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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 2 of 3

DEQ Supplement

BEFORE THE
STATE CORPORATION COMMISSION
OF VIRGINIA

APPLICATION OFVIRGINIA ELECTRIC AND POWER COMPANY
FOR APPROVAL AND CERTIFICATION
OF ELECTRIC FACILITIES

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Tysons Substation Rebuild
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Based on consultations with the Department of Environmental Quality ("DEQ"), Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") has developed this DEQ Supplement to facilitate review and analysis of the proposed Project by DEQ and other relevant agencies.

1. Project Description

In order to resolve a potential criteria violation of the mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards for the 230 kilovolt ("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 to the Company's existing Tysons Substations, 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").

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 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.

A complete description of the route evaluation and selection process is provided in the Environmental Routing Study. Figure 2.1-1 in Appendix B of the Environmental Routing Study provides an overview map of the project area, while Appendix C provides more a detailed aerial photo based route map set. The Environmental Routing Study also describes the evaluation criteria and rationale for identifying the Proposed Route and Underground Alternatives.

The underground Proposed Route and five Underground Alternatives are described as follows.

Proposed Route (Underground Alternative 05)

The Proposed Route is 4.3 miles long. Because it would be an underground route it would be an entirely new build line; however, a portion of it would follow Dominion Energy Virginia's existing overhead Lines #2035 and #202. The route would be constructed primarily within existing roadbeds and public rights-of-way.

The route would extend north from Idylwood Substation, through means of open trenching, for approximately 0.3 mile, crossing Shreve Road. The route would then turn west at the Washington & Old Dominion ("W&OD") Railroad Regional Park ("W&OD Park") and follow Line #202 along the park, crossing under I-66, the Washington Metro Area Transit Authority ("WMATA") Orange Line and I-495 until reaching Gallows Road through means of horizontal directional drilling ("HDD") (two parallel drill paths) for approximately 0.6 mile. 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.

Underground Alternative 06

Underground Alternative 06 is 4.7 miles long. Because it would be an underground route, it would be an entirely new build line; however, a portion of it would follow Dominion Energy Virginia's existing overhead Lines #2035 and #202. The route would be constructed primarily within existing roadbeds and public right-of-way.

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. 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. 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.

Underground Alternative 04

Underground Alternative 04 is 4.5 miles long. Because it would be an underground route it would be an entirely new build line; however, about 1.0 mile would follow Dominion Energy Virginia's existing overhead Lines #2035 and #202. The route would be constructed primarily within existing roadbeds and public rights-of-way.

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. 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. 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.

Underground Alternative 01

Underground Alternative 01 is 5.0 miles long. Because it would be an underground route it would be an entirely new build line; however, a portion of it would follow Dominion Energy Virginia's existing overhead Lines #2035 and #202. The route would be constructed primarily within the roadbed of existing roads and public right-of-way.

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. 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. At Gallows Road, the section westward along the W&OD Park trail would be installed through means of open trenching for approximately 1.1 mile. 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.

Underground Alternative 03

Underground Alternative 03 is 4.6 miles long. Because it would be an underground route, it would be an entirely new build line; however, about 0.2 mile of it would follow Dominion Energy Virginia's existing overhead Line #2035 out of the Idylwood Station. The route would be constructed primarily within the roadbed of existing roads.

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. 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. 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.

Underground Alternative 02

Underground Alternative 02 is 5.0 miles long. Because it would be an underground route, it would be an entirely new build line; however, about 0.2 mile of it would follow Dominion Energy Virginia's existing overhead Line #2035 out of the Idylwood Station. The route would be constructed primarily within the roadbed of existing roads.

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. 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. 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.

2. Environmental Analysis

A. Air Quality

Minimal tree clearing may be required as part of this Project. Tree clearing would be on existing, new and temporary right-of-way. Merchantable logs from those trees would be removed or stacked along the edge of the right-of-way and the remaining limbs and branches typically chipped and spread on the upland portions of the right-of-way. The Company does not expect to burn cleared material, but, if necessary, the Company will coordinate with the responsible locality to obtain these permits and will comply with any conditions set forth by the locality. Equipment and vehicles that are powered by gasoline or diesel motors will be used during the construction of the line so there will be exhaust from those motors. During construction, if the weather is dry for an extended period of time, there will be airborne particles from the use of vehicles and equipment within the right-of-way. However, minimal earth disturbance will take place and vehicle speed, which is often a factor in airborne particulate, will be kept to a minimum. Erosion and sedimentation control is addressed in Section 2.G of this Supplement.

B. Water Source

No water source is required for transmission lines so this discussion will focus on water bodies that will be crossed by the proposed transmission lines.

ERM identified and mapped waterbodies in the study area using publicly-available geographic information system ("GIS") databases, U.S. Geological Survey ("USGS") topographic maps (1:24,000), and recent digital aerial photography. The Underground Alternatives cross perennial and intermittent waterbodies (rivers, streams, tributaries); however, a majority of the waterbodies crossed by the Proposed Route and Underground Alternatives are channelized in culverts and/or avoided by HDD with minimal chance for environmental impact during construction. No navigable waterbodies would be crossed by the Proposed Route or any of the Underground Alternatives. Waterbodies in the Project area are shown on Figure 3.2.2-1 of Appendix B in the Environmental Routing Study.

The majority of the waterbodies crossed by the Proposed Route and Underground Alternatives are in culverts and would occur within exiting roadbeds. The Proposed Route and Underground Alternative would have minimal effects on surface waters along these routes due to the removal of forested riparian areas adjacent to streams given that the majority of each route would be constructed within existing roadbeds or avoided by HDD.

Short-term, minor water quality impacts could occur during the construction of this proposed option. Such impacts would be associated with the soils from disturbed areas being transported by stormwater into adjacent waters during rain events. Increased turbidity and localized sedimentation of the stream bottom may occur as a result of the runoff. However, these impacts would be significantly reduced by the implementation of Dominion Energy Virginia's erosion control measures, including the installation of erosion control structures and materials.

Waterways crossed by the Project would be maintained for proper drainage through the use of culverts or other crossing devices, according to Dominion Energy Virginia's standard policies. Where clearing of trees and/or woody shrubs is required, clearing within 100 feet of a stream would be conducted by hand. Vegetation would be at or slightly above ground level. Energy Virginia would use sediment barriers along waterways and steep slopes during construction to protect waterways from soil erosion and sedimentation. If a section of line cannot be accessed from existing roads, Dominion Energy Virginia may need to install a culvert, or temporary bridge to cross small streams. In such case, there may be some temporary fill material required that would be placed on erosion control fabric and removed when work is completed, returning the surface to original contours.

Proposed Route (Underground Alternative 05)

Based on USGS National Hydrography Dataset ("NHD") and Fairfax County data, the Proposed Route crosses three waterbodies having intermittent flow. The crossing of Holmes Run would take place in the HDD crossing of I-495 and no impacts on this waterbody are anticipated. Additionally, the crossing of two unnamed tributaries ("UNTs") of Holmes Run would take place in areas of conventional trenching and temporary impacts would occur along these waterbodies.

Underground Alternative 06

Based on NHD and Fairfax County data, Underground Alternative 06 crosses four waterbodies having intermittent flow. The crossing of Holmes Run would take place in the HDD crossing of I-495 and no impacts on this waterbody are anticipated. The second intermittent waterbody would be crossed near milepost ("MP") 4.2 and appears to be located in a culvert at the crossing location. No impacts to these waterbodies are anticipated. Additionally, the crossing of two UNTs of Holmes Run would take place in areas of conventional trenching and temporary impacts would occur along these waterbodies.

Underground Alternative 04

Based on NHD and Fairfax County data, Underground Alternative 04 crosses three waterbodies having intermittent flow. The crossing of Holmes Run would take place in the HDD crossing of I-495 and no impacts on this waterbody are anticipated. Additionally, the crossing of two UNTs of Holmes Run would take place in areas of conventional trenching and temporary impacts would occur along these waterbodies.

Underground Alternative 01

Based on NHD and Fairfax County data, Underground Alternative 01 crosses one waterbody with perennial flow and four with intermittent flow. The crossing of Holmes Run would take place in the HDD crossing of I-495. The second intermittent waterbody, Long Branch, would be crossed near MP 1.5 and appears to be located in a culvert at the crossing location. No impacts to these waterbodies are anticipated. The crossing of Wolftrap Creek and two UNTs of Holmes Run would take place in an area of conventional trenching and temporary impacts would occur along these waterbodies. Wolftrap Creek would be crossed using an open cut dam and pump crossing method.

Underground Alternative 03

Based on NHD and Fairfax County data, Underground Alternative 03 crosses three waterbodies having intermittent flow. The crossing of Holmes Run would take place in the HDD crossing of Electric Avenue at MP 1.2 and no impacts on this waterbody are anticipated. Additionally, the crossing of two UNTs of Holmes Run would take place in

areas of conventional trenching and temporary impacts would occur along these waterbodies.

Underground Alternative 02

Based on NHD and Fairfax County data, Underground Alternative 02 crosses one waterbody with perennial flow and three with intermittent flow. The crossing of Holmes Run would take place in the HDD crossing of Electric Avenue at MP 1.2. No impacts to this waterbody are anticipated. The crossing of Wolftrap Creek and two UNTs of Holmes Run would take place in an area of conventional trenching and temporary impacts would occur along these waterbodies. Wolftrap Creek would be crossed using an open cut dam and pump crossing method.

C. Discharge of Cooling Waters

No discharge of cooling waters is associated with the Project.

D. Tidal and Non-tidal Wetlands

ERM has identified wetlands within the Project area using remote sensing data sources to conduct an offsite desktop wetlands delineation. A copy of ERM's report is included in Appendix D of the Environmental Routing Study. These sources include the USGS 7.5 minute series topographic quadrangle maps, the National Wetland Inventory Online Maps from the U.S. Fish and Wildlife Service ("FWS"), soils data from the Natural Resources Conservation Service Web Soil Survey, Digital Orthophoto Quarter Quads dating from 1994, aerial photography dating from 1972 ,1980, 1990, 2015 and 2016, and National Agricultural Imagery Program ("NAIP") and Virginia Base Mapping Program ("VBMP") Digital Ortho-Rectified Infrared Images dating from 2016. ERM did not field delineate wetlands within the Project area.

All wetlands will require protective matting to be installed to support construction vehicles and equipment and materials during construction.

The trenching activities occurring within the right-of-way would not require additional tree clearing within wetlands. Herbaceous vegetation would not be removed but could be temporarily affected by construction and vehicular movement. After construction, vegetation within the right-of-way would be allowed to revert to preconstruction conditions. Disturbed areas resulting from the temporary right-of-way utilization would also be allowed to revert back to preconstruction vegetative conditions.

Tidally-influenced wetlands do not occur in the Project area. The nearest tidal wetlands are approximately 17.0 miles from the Project area.

Proposed Route (Underground Alternative 05)

Based on ERM's Desktop Wetland Analysis data, the centerline of the Proposed Route would cross about 308.6 feet of wetland habitat and will require the clearing and/or disturbance of up to approximately 0.2 acre of wetland area. Of the 0.2 acre of wetland habitat, 0.2 acre would be crossed along the Company's existing Line #2035 right-of-way and have been previously disturbed.

Underground Alternative 06

Based on ERM's Desktop Wetland Analysis data, the centerline of Underground Alternative 06 would cross about 308.6 feet of wetland habitat and will require the clearing and/or disturbance of up to approximately 0.2 acre of wetland area. Of the 0.2 acre of wetland habitat, 0.2 acre would be crossed along the Company's existing Line #2035 right-of-way and have been previously disturbed.

Underground Alternative 04

Based on ERM's Desktop Wetland Analysis data, the centerline of Underground Alternative 04 would cross about 308.6 feet of wetland habitat and will require the clearing and/or disturbance of up to approximately 0.2 acre of wetland area. Of the 0.2 acre of wetland habitat, 0.2 acre would be crossed along the Company's existing Line #2035 right-of-way and have been previously disturbed.

Underground Alternative 01

Based on ERM's Desktop Wetland Analysis data, the centerline of Underground Alternative 01 would cross about 308.6 feet of wetland habitat and will require the clearing and/or disturbance of up to approximately 0.2 acre of wetland area. Of the 0.2 acre of wetland habitat, 0.2 acre would be crossed along the Company's existing Line #2035 right-of-way and have been previously disturbed; however, in areas of greenfield right-of-way, new wetland impacts would occur affecting a total of less than 0.1 acre.

Underground Alternative 03

Based on ERM's Desktop Wetland Analysis data, the centerline of Underground Alternative 03 would cross about 308.6 feet of wetland habitat and will require the clearing and/or disturbance of up to approximately 0.2 acre of wetland area. Of the 0.2 acre of wetland habitat, 0.2 acre would be crossed along the Company's existing Line #2035 right-of-way and have been previously disturbed.

Underground Alternative 02

Based on ERM's Desktop Wetland Analysis data, the centerline of Underground Alternative 02 would cross about 308.6 feet of wetland habitat and will require the clearing and/or disturbance of up to approximately 0.2 acre of wetland area. Of the 0.2

acre of wetland habitat, 0.2 acre would be crossed along the Company's existing Line #2035 right-of-way and have been previously disturbed.

Correspondence from Dominion Energy Virginia to the U.S. Army Corps of Engineers is included as Attachment 2.D.1.

E. Solid and Hazardous Waste

Environmentally regulated sites in the study area have been identified using publicly-available GIS databases obtained from the U.S. Environmental Protection Agency ("EPA") and the DEQ. These databases provide "information about facilities, sites, or places subject to environmental regulation or of environmental interest." These include sites that use and/or store hazardous materials, waste producing facilities operating under permits from the EPA or other regulatory authorities, Superfund sites, the storage of petroleum, petroleum release sites, and solid waste sites. The identification of a site in the databases does not mean that the site necessarily has contaminated soil or groundwater.

A summary of the information from the EPA and DEQ databases within a 1.0 mile buffer of the centerlines of the Proposed Route and Underground Alternatives is provided in Table E-1 below and depicted in Attachment 2.E.1.

TABLE E-1
Idylwood to Tysons 230 kV Underground Transmission Line Project

Environmental Regulated Facilities and Hazardous Waste/Petroleum Release Sites within 1.0 Mile

Database	Proposed Route (Underground Alternative 05)	Underground Alternative 06	Underground Alternative 04	Underground Alternative 01	Underground Alternative 03	Underground Alternative 02
Waste	98	101	98	98	95	105
Toxics	1	1	1	0	1	0
Land	1	1	1	1	1	1
Air	59	65	61	64	61	63
Water	2	2	2	2	2	2
Solid Waste Facilities	0	0	0	0	0	0
Petroleum Facilities	133	138	134	137	130	134
Petroleum Releases	160	173	163	175	159	170
Total	**454**	**481**	**460**	**477**	**449**	**475**

Notes

Waste (Facilities that handle or generate hazardous wastes)
Toxics (Facilities that release toxic substances to the environment)
Land (Site cleanup under RCRA, DEQ VRP, Superfund or Brownfield programs)
Air (Facilities with a release of pollutants to the air)
Water (Facilities that discharge storm or process water to surface water)
Solid Waste Facilities (Former and existing landfills)
Petroleum Facilities (Regulated petroleum storage)
Petroleum Releases (Typically associated with storage tank releases)

No Brownfield or Superfund sites identified in the reviewed databases were located within 1.0 mile of the Proposed Route or the Underground Alternatives.

To evaluate the potential impact to the routes, ERM further assessed the sites within 1,000 feet of the route centerlines (Table E-2).

TABLE E-2
Idylwood to Tysons 230 kV Underground Transmission Line Project

Environmental Regulated Facilities and Hazardous Waste/Petroleum Release Sites within 1,000 Feet

Database	Proposed Route (Underground Alternative 05)	Underground Alternative 06	Underground Alternative 04	Underground Alternative 01	Underground Alternative 03	Underground Alternative 02
Waste	25	31	32	26	30	24
Toxics	0	0	0	0	0	0
Land	0	0	0	0	0	0
Air	15	20	24	14	21	11
Water	0	0	0	0	0	0
Solid Waste Facilities	0	0	0	0	0	0
Petroleum Facilities	38	40	36	25	35	24
Petroleum Releases	35	35	40	26	43	36
Total	**113**	**126**	**132**	**91**	**129**	**95**

Notes

Waste (Facilities that handle or generate hazardous wastes)
Toxics (Facilities that release toxic substances to the environment)
Land (Site cleanup under RCRA, DEQ VRP, Superfund or Brownfield programs)
Air (Facilities with a release of pollutants to the air)
Water (Facilities that discharge storm or process water to surface water)
Solid Waste Facilities (Former and existing landfills)
Petroleum Facilities (Regulated petroleum storage)
Petroleum Releases (Typically associated with storage tank releases)

Based on a review of sites listed in the EPA and DEQ databases within 1,000 feet of the various route centerlines and the estimated depth to groundwater and flow direction, ERM further evaluated three confirmed petroleum releases associated with gas stations that are located within 100 feet of the centerlines of the Proposed Route and Underground Alternatives. According to DEQ files, the petroleum release sites are listed as closed. The DEQ deems a petroleum release closed once no further risk to the general public has been identified, although petroleum residue might remain. The risk assessment does not always consider the risk to subsurface utility work nor address additional costs associated with managing contaminated soil or groundwater.

Proposed Route (Underground Route 05)

There are no confirmed petroleum release sites associated with gas stations located within 100 feet and up-gradient of the Proposed Route centerline.

Underground Alternative 06

One confirmed petroleum release is associated with a former Amoco gas station located on Chain Bridge Road east of International Drive and north of Tysons Corner Center, approximately 100 feet north of the Underground Alternative 06 centerline. Based on review of the most recent U.S.G.S. topographic map, the petroleum release is estimated to be hydraulically up-gradient of the centerline and groundwater is deeper than 30 feet below ground surface. The release case is listed as closed. Due to the groundwater depth, it is unlikely that the Project would encounter contaminated groundwater during the installation. As such, ERM does not recommend further evaluation of the site.

Care will be taken to operate and maintain construction equipment to prevent any fuel or oil spills. Any waste created by the construction crews will be disposed of in a proper manner and recycled where appropriate and will be further detailed in the Company's stormwater pollution prevention plan, a component of the Virginia Stormwater Management Program, which will be submitted to the Virginia Department of Conservation and Recreation ("VDCR").

Underground Alternatives 01–04

There are two confirmed petroleum releases associated with a Shell service center and gas station located approximately 80 feet west of the Underground Alternatives 01–04 centerlines, on the northwest corner of Chain Bridge Road and Old Courthouse Road. Based on review of the most recent U.S.G.S. topographic map, the petroleum releases are estimated to be hydraulically up-gradient of the centerlines and groundwater is deeper than 20 feet below ground surface. The petroleum release cases are listed as closed. Due to the groundwater depth, it is unlikely that the Project would encounter contaminated groundwater during the installation. As such, ERM does not recommend further evaluation of the sites.

F. Natural Heritage, Threatened and Endangered Species

In order to identify areas of ecological significance within the project area, ERM reviewed the VDCR's Natural Heritage Data Explorer ("NHDE"). The NDHE includes three components: Conservation Sites ("CS"), Stream Conservation Units ("SCU"), and General Location Areas for Natural Heritage Resources ("GLNHR"). ERM also obtained query results from the VDGIF Fish and Wildlife Information Service ("VaFWIS"), and the FWS Information for Planning and Consultation ("IPaC") System to identify federally-and state-listed species that may occur within the study area. Digital data were obtained from the VDCR NHDE to identify locations within the study area that potentially support protected species. Query results from FWS IPaC include species that may occur in Fairfax County. Query results from NHDE include species known to occur in the county and communities known to historically or currently contain protected species. Query results from VaFWIS include species known or likely to occur in the study area. To obtain the most current eagle nest data, ERM reviewed the Center for

Conservation Biology ("CCB") VA Eagle Nest Locator mapping portal, which provides information about the Virginia bald eagle population including the results of the CCB's annual eagle nest survey. If deemed necessary, surveys will be conducted at the appropriate time to determine if these species are present, and the Company will coordinate with VDGIF and VDCR as appropriate to minimize any impact on these resources. The agency/county lists of threatened and endangered species were reviewed and are described in Section 3.2.5 of the Environmental Routing Study.

The FWS county list identifies four federally-listed species protected under the ESA that potentially occur or have been documented within the proposed Project area. These species include: northern long-eared bat (*Myotis septentrionalis*), dwarf wedgemussel (*Alasmidonta heterodon*), yellow lance (*Elliptio lanceolata*), and small whorled pogonia (*Isotria medeoloides*). The VDGIF operates a *Northern Long-eared Bat Winter Habitat and Roost Trees* online mapping system, which shows general locations of known Northern Long-eared Bat hibernacula and roost trees. A review of this system did not show a hibernaculum or roost tree in Fairfax County. Dwarf wedgemussel and yellow lance have potential to occur in perennial waterbodies. Based on a review of the species' habitat requirements, none of the route alternatives appear to contain suitable habitat for small-whorled pogonia.

Based on VDCR and VDGIF queries, nine state-listed species potentially occur or have been documented within the proposed Project area. These species include: little brown bat (*Myotis lucifugus*), tri-colored bat (*Perimyotis subflavus*), brook floater (*Alasmidonta varicosa*), Appalachian springsnail (*Fontigens bottimeri*), Appalachian grizzled skipper (*Pyrgus centaureae Wyandot*), wood turtle (*Glyptemys insculpta*), Henslow's sparrow (*Ammodramus henslowii*), loggerhead shrike (*Lanius ludovicianus*), and peregrine falcon (*Falco peregrinus*). According to an official review conducted on October 6, 2017, the VDCR concluded that the Proposed Route and Underground Alternatives would not affect any documented state-listed plants or insects, and does not cross any State Natural Area Preserves under VDCR's jurisdiction.

Species-specific surveys may be recommended prior to construction to determine whether a listed species exists within the Project area. If identified, the Company will coordinate with the appropriate regulatory agencies to minimize any impacts on listed species and/or listed habitat(s).

The Proposed Route and Underground Alternatives do not intersect with any primary or secondary buffers of currently documented bald eagle nests as identified in The Bald Eagle Protection Guidelines for Virginia (2012). If an eagle nest is identified within 660 feet of the Project right-of-way prior to construction, the Company will work with the appropriate jurisdictional agencies to minimize impacts on this species.

Construction and maintenance of the new transmission line facilities could have some minor effects on wildlife; however, impacts on most species will be short-term in nature, and limited to the period of construction.

Correspondence from the VDCR dated October 6, 2017 is provided as Attachment 2.F.1. Additional correspondence to the VDCR from Dominion Energy Virginia is provided as Attachment 2.F.2.

Proposed Route (Underground Alternative 05)

Of the 13 species identified above, none have historically been documented by state agencies in areas crossed by the Proposed Route. Similar to the other routes, the Proposed Route provides suitable foraging habitat for the peregrine falcon and loggerhead shrike for approximately 1,500 feet at the southern end of the route where it occurs in an existing utility corridor. According to the CCB, this route does not cross a primary or secondary buffer zone of a documented bald eagle nest.

Underground Alternative 06

Of the 13 species identified above, none have historically been documented by state agencies in areas crossed by Underground Alternative 06. Similar to the other routes, Underground Alternative 06 provides suitable foraging habitat for the peregrine falcon and loggerhead shrike for approximately 1,500 feet at the southern end of the route where it occurs in an existing utility corridor. According to the CCB, this route does not cross a primary or secondary buffer zone of a documented bald eagle nest.

Underground Alternative 04

Of the 13 species identified above, none have historically been documented by state agencies in areas crossed by Underground Alternative 04. Similar to the other routes, Underground Alternative 04 provides suitable foraging habitat for the peregrine falcon and loggerhead shrike for approximately 1,500 feet at the southern end of the route where it occurs in an existing utility corridor. According to the CCB, this route does not cross a primary or secondary buffer zone of a documented bald eagle nest.

Underground Alternative 01

Of the 13 species identified above, none have historically been documented by state agencies in areas crossed by Underground Alternative 01. Similar to the other routes, Underground Alternative 01 provides suitable foraging habitat for the peregrine falcon and loggerhead shrike for approximately 1,500 feet at the southern end of the route where it occurs in an existing utility corridor. According to the CCB, this route does not cross a primary or secondary buffer zone of a documented bald eagle nest.

Underground Alternative 03

Of the 13 species identified above, none have historically been documented by state agencies in areas crossed by Underground Alternative 03. Similar to the other routes, Underground Alternative 03 provides suitable foraging habitat for the peregrine falcon and loggerhead shrike for approximately 1,500 feet at the southern end of the route where

it occurs in an existing utility corridor. According to the CCB, this route does not cross a primary or secondary buffer zone of a documented bald eagle nest.

Underground Alternative 02

Of the 13 species identified above, none have historically been documented by state agencies in areas crossed by Underground Alternative 02. Similar to the other routes, Underground Alternative 02 provides suitable foraging habitat for the peregrine falcon and loggerhead shrike for approximately 1,500 feet at the southern end of the route where it occurs in an existing utility corridor. According to the CCB, this route does not cross a primary or secondary buffer zone of a documented bald eagle nest.

G. Erosion and Sediment Control

Dominion Energy Virginia is required to submit annual erosion and sediment control specifications and an anticipated list of transmission line projects to DEQ for review and approval. Dominion Energy Virginia's annual submittal will follow DEQ guidelines, and the Project will be included in the submittal. These specifications are given to the Dominion Energy Virginia contractors and require erosion and sediment control measures to be in place before construction of the line begins and specify the requirements for rehabilitation of the right-of-way.

H. Archaeological, Historic, Scenic, Cultural or Architectural Resources

ERM conducted an analysis of potential cultural resource impacts for the alternatives under consideration in accordance with the Virginia Department of Historic Resources ("VDHR") 2008 Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia (2008) (Guidelines). For the pre-application analysis of cultural resources, ERM considered National Historic Landmark ("NHL") properties located within a 1.5-mile radius of the centerline; National Register of Historic Places ("NRHP")-listed properties, NHLs, battlefields, and historic landscapes within a 1.0-mile radius of the centerline; NRHP-eligible and -listed properties, NHLs, battlefields, and historic landscapes within a 0.5-mile radius of the centerline; and all of the above qualifying architectural resources as well as archaeological sites located within the right-of-way for each alternative. Information on the resources in each tier was collected from the Virginia Cultural Resource Information System. ERM also sought information on battlefields surveyed and assessed by the National Park Service's American Battlefield Protection Program ("ABPP"), however none are located in the vicinity of the proposed routes. Finally, information was sought on properties with VDHR easements, but none were identified in the vicinity of the proposed routes.

Along with the records review carried out for the four tiers defined by VDHR, ERM conducted field assessments of known NRHP-eligible or -listed architectural resources for each Project route alternative in accordance with the VDHR Guidelines. Digital

photographs of each architectural resource and views to the proposed transmission line were taken. Photo simulations were prepared to assess visual effects on NRHP-eligible or -listed architectural resources within the tiered study area. For previously recorded archaeological sites, aerial photographs were examined to assess the current status of sites to be traversed by a route alternative, and a windshield survey was conducted to document, where possible, current land use and site conditions.

A summary of the considered resources identified in the vicinity of the Proposed Route (Underground Alternative 05) and the Underground Alternatives and recommendations concerning Project effects is provided in the following discussion. The information presented here is derived from existing records and does not purport to encompass the entire suite of historic and archaeological resources that may ultimately be affected by the undertaking.

Proposed Route (Underground Alternative 05)

The resources that lie within the DHR tiers for the Proposed Route are presented in Table H-1. It is the W&OD Railroad Historic District (053-0276), currently maintained as W&OD Park. It is a linear resource determined eligible for the NRHP, which is intersected in some way by the Proposed Route and all of the Underground Alternatives. In the case of Underground Alternative 05, the Proposed Route would enter the park at Gallows Road/Route 650, and run through the park within existing overhead transmission line right-of-way for approximately 0.8 mile before exiting the park south of I-66 to access the Idylwood Substation to the south. Based on preliminary conceptual design, it is possible that a small area of trees and understory vegetation (less than 0.1 acre) would be removed within the boundary of the park where an HDD workspace will be sited immediately east of Gallows Road. The vegetation currently found within the park is not consistent with the historic landscape of the district, when the active rail corridor was maintained as a cleared right-of-way. Thus, the potential small change to the landscape in a single location along the 45-mile-long historic district would not degrade the historic setting of the resource. Where Underground Alternative 05 extends north and south of the district, there would be no tree cutting in adjacent areas that would create viewshed impacts from within the district. Therefore, the proposed route is considered to have only a minimal impact on historic resources. No resource within 1.5 miles of the Proposed Route has a DHR easement. In the case of Underground Alternative 05, beyond the one considered resource in the proposed right-of-way, there are two other historic resources within the right-of-way (029-0206 and 029-5470), both determined not eligible for the NRHP.

TABLE H-1 Idylwood to Tysons 230 kV Underground Transmission Line Project Historic Resources in VDHR Tiers for Proposed Route (Underground Alternative 05)			
Buffer (miles)	**Considered Resources**	**Resource Number**	**Description**
1.0 to 1.5	National Historic Landmarks	–	
0.5 to 1.0	National Register listed properties, NHLs, battlefields, historic landscapes	–	
0.0 to 0.5	National Register listed or eligible properties, NHLs, battlefields, historic landscapes	–	
0.0 (within right-of-way)	National Register – eligible	053-0276	Alexandria, Loudoun and Hampshire Railroad / Washington & Old Dominion Railroad Historic District, currently maintained as W&OD Park

The pre-application analysis also took into account the potential effects to archaeological resources. There are no recorded archaeological sites in the right-of-way of the Proposed Route.

Underground Alternative 06

The resources within the DHR tiers for Underground Alternative 06 are presented in Table H-2. One of the considered resources is the W&OD Railroad Historic District (053-0276), currently maintained as W&OD Park. It is a linear resource determined eligible for the NRHP, which is intersected in some way by the Proposed Route and all of the Underground Alternatives. In the case of Underground Alternative 06, the route would enter the park at Gallows Road/Route 650, and run through the park within existing overhead transmission line right-of-way for approximately 0.8 mile before exiting the park south of I-66 to access the Idylwood Substation to the south. Based on preliminary conceptual design, it is possible that a small area of trees and understory vegetation (less than 0.1 acre) would be removed within the boundary of the park where an HDD workspace will be sited immediately east of Gallows Road. The vegetation currently found within the park is not consistent with the historic landscape of the district, when the active rail corridor was maintained as a cleared right-of-way. Thus, the potential small change to the landscape in a single location along the 45-mile-long historic district would not degrade the historic setting of the resource. Where Underground Alternative 06 extends north and south of the district, there would be no tree cutting in adjacent areas that would create viewshed impacts from within the district. Therefore, the proposed route is considered to have only a minimal impact on historic resources. No resource within 1.5 miles of Underground Alternative 06 has a DHR

easement. Beyond the one considered resource in the right-of-way of Underground Alternative 06, there are only two other historic resources within the right-of-way (029-0206 and 029-5470), both determined not eligible for the NRHP.

TABLE H-2

Idylwood to Tysons 230 kV Underground Transmission Line Project
Historic Resources in VDHR Tiers for Underground Alternative 06

Buffer (miles)	Considered Resources	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	–	
0.5 to 1.0	National Register Properties (Listed)	029-0035	Spring Hill Farm
0.0 to 0.5	National Register listed or eligible properties, NHLs, battlefields, historic landscapes	–	
0.0 (within right-of-way)	National Register – eligible	053-0276	Alexandria, Loudoun and Hampshire Railroad / Washington & Old Dominion Railroad Historic District, currently maintained as W&OD Park

Underground Alternative 04

The resource within the DHR tiers for Underground Alternative 04 is presented in Table H-3. It is the W&OD Railroad Historic District (053-0276), currently maintained as W&OD Park. It is a linear resource determined eligible for the NRHP, which is intersected in some way by the Proposed Route and all of the Underground Alternatives. In the case of Underground Alternative 04, the route would enter the park at Gallows Road/Route 650, and run through the park within existing overhead transmission line right-of-way for approximately 0.8 mile before exiting the park south of I-66 to access the Idylwood Substation to the south. Based on preliminary conceptual design, it is possible that a small area of trees and understory vegetation (less than 0.1 acre) would be removed within the boundary of the park where an HDD workspace will be sited immediately east of Gallows Road. The vegetation currently found within the park is not consistent with the historic landscape of the district, when the active rail corridor was maintained as a cleared right-of-way. Thus, the potential small change to the landscape in a single location along the 45-mile-long historic district would not degrade the historic setting of the resource. Where Underground Alternative 04 extends north and south of the district, there would be no tree cutting in adjacent areas that would create viewshed impacts from within the district. Therefore, the proposed route is considered to have only a minimal impact on historic resources. No resource within 1.5 miles of Underground Alternative 04 has a DHR easement. Beyond the one considered resource in the right-of-way, there are two other historic resources within the right-of-way (029-0206 and 029-5470), both determined not eligible for the NRHP.

TABLE H-3 Idylwood to Tysons 230 kV Underground Transmission Line Project Historic Resources in VDHR Tiers for Underground Alternative 04			
Buffer (miles)	**Considered Resources**	**Resource Number**	**Description**
1.0 to 1.5	National Historic Landmarks	–	
0.5 to 1.0	National Register listed properties, NHLs, battlefields, historic landscapes	–	
0.0 to 0.5	National Register listed or eligible properties, NHLs, battlefields, historic landscapes	–	
0.0 (within right-of-way)	National Register – eligible	053-0276	Alexandria, Loudoun and Hampshire Railroad / Washington & Old Dominion Railroad Historic District, currently maintained as W&OD Park

The pre-application analysis also took into account the potential effects to archaeological resources. In the right-of-way of Underground Alternative 04, there is one recorded site, 44FX0043, reported in its right-of-way. It is the 18th-century Fairfax County Courthouse site, which also has multiple prehistoric components. It has not been evaluated as to NRHP eligibility. A modern office complex and parking garage have been built over the site.

The pre-application analysis also took into account the potential effects to archaeological resources. In the right-of-way of Underground Alternative 04, there is one recorded site, 44FX0540, which a prehistoric site that has not been evaluated as to NRHP eligibility. An office complex, sidewalk, and street have been constructed, apparently destroying the entirety of the site.

Underground Alternative 01

The resource within the DHR tiers for Underground Alternative 01 is presented in Table H-4. It is the W&OD Railroad Historic District (053-0276), currently maintained as W&OD Park. It is a linear resource determined eligible for the NRHP, which is intersected in some way by the Proposed Route and all of the Underground Alternatives. Underground Alternative 01 intersects the resource for the greatest distance among the alternatives, running through the park adjacent to the Company's existing overhead transmission line for approximately 1.9 miles before exiting the park south of I-66. Based on the preliminary conceptual design of the project, there might be some tree clearing within the open trench section of Underground Alternative 01 within the district between Gallows Road and the point where the transmission line would turn north and

leave the park. However, the precise amount of tree clearing cannot be quantified until the final alignment of this route is determined pending the completion of the underground utility survey. Tree clearing could be required along three segments of Underground Alternative 01 west of Gallows Road; these segments (from MP 1.06–1.57, 1.64–1.80, and 1.80–2.02) total approximately 0.89 miles, but vegetation may not need to be removed along that entire length. Construction along portions of the line within the district will involve HDD, and those segments will leave no visible evidence post-construction. However, it is possible that a small area of trees and understory vegetation (less than 0.1 acre) would be removed within the HDD temporary workspace located in the district immediately east of Gallows Road. In addition to the vegetation changes within the district itself, some trees would be removed adjacent to the park, creating visual effects where Underground Alternative 01 enters the park from the north. Some tree clearing would likely occur at the eastern edge of an office complex and to the west of a subdivision with houses along Malraux Drive, with possible tree clearing extending from 053-0276 north to Electric Avenue. The vegetation currently found within the park is not consistent with the historic landscape of the district, when the active rail corridor was maintained as a cleared right-of-way. Thus, the potential change to the landscape along less than a mile of the 45-mile-long historic district would not degrade the historic setting of the resource. Furthermore, the viewshed change to the adjacent area north of the district would be minor in the context of the overall length of the resource, which is lined by many more obtrusive modern landscape features and buildings; the current setting in that location is not significant to the historic character of the resource. Therefore, this route is considered to have only a minimal impact on historic resources. No resource within 1.5 miles of Underground Alternative 01 has a DHR easement. In the case of Underground Alternative 01, beyond the one considered resource in the right-of-way, there are three other historic resources within the right-of-way (029-0206, 029-5470, and 153-5014), and all have been determined not eligible for the NRHP.

TABLE H-4 Idylwood to Tysons 230 kV Underground Transmission Line Project Historic Resources in VDHR Tiers for Underground Alternative 01			
Buffer (miles)	**Considered Resources**	**Resource Number**	**Description**
1.0 to 1.5	National Historic Landmarks	–	
0.5 to 1.0	National Register listed properties, NHLs, battlefields, historic landscapes	–	
0.0 to 0.5	National Register listed or eligible properties, NHLs, battlefields, historic landscapes	–	
0.0 (within right-of-way)	National Register – eligible	053-0276	Alexandria, Loudoun and Hampshire Railroad / Washington & Old Dominion Railroad Historic District, currently maintained as W&OD Park

The pre-application analysis also took into account the potential effects to archaeological resources. There is one site in the right-of-way of Underground Alternative 01, 44FX0043, the 18th-century Fairfax County Courthouse site, which also has multiple prehistoric components. It has not been evaluated for NRHP eligibility. A modern office complex and parking garage have been built over site.

Underground Alternative 03

The resource within the DHR tiers for Underground Alternative 03 is presented in Table H-5. It is the W&OD Railroad Historic District (053-0276), currently maintained as W&OD Park. It is a linear resource determined eligible for the NRHP, which is intersected by the Proposed Route and all of the Underground Alternatives. Underground Alternative 03 would cross the resource perpendicularly south of I-66, and proceed south to the Idylwood Substation. Underground Alternative 03 would proceed north of I-66 using an HDD, whose entry point and associated temporary workspace is proposed within the W&OD Railroad Historic District. No trees would be removed within the district, either from the HDD workspace usage, or from the open-trench installation of the buried line to the south. Likewise, no trees would be removed outside the district boundary within view of the resource. The nearest area where trees would be removed along Underground Alternative 03 would be on the north side of Idylwood Park, north of I-66 and well outside the viewshed of the resource. The direct construction impacts to the W&OD Railroad Historic District (053-0276) would leave no visible evidence post-construction. Therefore, this alternative is considered to have only a minimal impact on historic resources. No resource within 1.5 miles of Underground Alternative 03 has a DHR easement. Beyond the one considered resource in the right-of-way, there are also

three other historic resources within the right-of-way (029-5470, 029-5470-0002, and 029-5861), and all have been determined not eligible for the NRHP.

TABLE H-5

Idylwood to Tysons 230 kV Underground Transmission Line Project
Historic Resources in VDHR Tiers for Underground Alternative 03

Buffer (miles)	Considered Resources	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	–	
0.5 to 1.0	National Register listed properties, NHLs, battlefields, historic landscapes	–	
0.0 to 0.5	National Register listed or eligible properties, NHLs, battlefields, historic landscapes	–	
0.0 (within right-of-way)	National Register – eligible	053-0276	Alexandria, Loudoun and Hampshire Railroad / Washington & Old Dominion Railroad Historic District, currently maintained as W&OD Park

The pre-application analysis also took into account the potential effects to archaeological resources. In the right-of-way of Underground Alternative 03, there are three sites: 44FX0043, 44FX0045, and 44FX2364. Site 44FX0043 is the 18th-century Fairfax County Courthouse site, which also has multiple prehistoric components; 44FX0045 is a site with historic-period components dating to the 18th through 20th centuries; and 44FX2364 is the remains of an early 20th century streetcar line. None have been evaluated as to NRHP eligibility. A modern office complex and parking garage have been built over 44FX0043. In the case of 44FX0045, Custis Memorial Parkway was built over part of the site, while the northern and eastern portion may be intact within Idylwood Park. In the case of 44FX2364, the streetcar line has been paved over with asphalt for a pedestrian trail, but it may be sealed intact below fill.

Underground Alternative 02

The resource within the DHR tiers for Underground Alternative 02 is presented in Table H-6. It is the W&OD Railroad Historic District (053-0276), currently maintained as W&OD Park. It is a linear resource determined eligible for the NRHP, which is intersected by the Proposed Route and all of the Underground Alternatives. Underground Alternative 02 would cross the resource perpendicularly south of I-66, and proceed south to the Idylwood Substation. Underground Alternative 02 would proceed north of I-66 using an HDD, whose entry point and associated temporary workspace is proposed within the W&OD Railroad Historic District. No trees would be removed within the

district, either from the HDD workspace usage, or from the open-trench installation of the buried line to the south. Likewise, no trees would be removed outside the district boundary within view of the resource. The nearest area where trees would be removed along Underground Alternative 02 would be on the north side of Idylwood Park, north of I-66 and well outside the viewshed of the resource. The direct construction impacts to the W&OD Railroad Historic District (053-0276) would leave no visible evidence post-construction. Therefore, this alternative is considered to have only a minimal impact on historic resources. No resource within 1.5 miles of Underground Alternative 02 has a DHR easement. Beyond the one considered resource in the right-of-way, there are also three other historic resources within the right-of-way (029-5470, 029-5470-0002, and 029-5861), and all have been determined not eligible for the NRHP.

TABLE H-6

Idylwood to Tysons 230 kV Underground Transmission Line Project
Historic Resources in VDHR Tiers for Underground Alternative 02

Buffer (miles)	Considered Resources	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	–	
0.5 to 1.0	National Register listed properties, NHLs, battlefields, historic landscapes	–	
0.0 to 0.5	National Register listed or eligible properties, NHLs, battlefields, historic landscapes	–	
0.0 (within right-of-way)	National Register – eligible	053-0276	Alexandria, Loudoun and Hampshire Railroad / Washington & Old Dominion Railroad Historic District, currently maintained as W&OD Park

The pre-application analysis also took into account the potential effects to archaeological resources. In the right-of-way of Underground Alternative 02, there are two sites: 44FX0043 and 44FX0045. Site 44FX0043 is the 18th-century Fairfax County Courthouse site, which also has multiple prehistoric components; and 44FX0045 is a site with historic-period components dating to the 18th through 20th centuries. Neither has been evaluated as to NRHP eligibility. A modern office complex and parking garage have been built over 44FX0043. In the case of 44FX0045, Custis Memorial Parkway was built over part of the site, while the northern and eastern portion may be intact within Idylwood Park.

Correspondence from Dominion Energy Virginia to the VDHR is included as Attachment 2.H.1.

I. Chesapeake Bay Preservation Areas

Construction, installation, operation and maintenance of electric transmission lines are conditionally exempt from the Chesapeake Bay Act as stated in the exemption for public utilities, railroads, public roads and facilities in 9 VAC 25-830-150. The Company will meet those conditions.

J. Wildlife Resources

As noted in Section 2.F, the FWS, VDCR and VDGIF databases were searched in order to assess the potential presence of federal- or state-listed threatened or endangered species in the vicinity of the Project. The search determined there is the potential presence of four federal-listed and nine state-listed endangered and threatened species within the Project area. In addition to the 13 listed species, three federal Species of Concern were noted as potentially being present in the Project area: Holsinger's groundwater planarian (*Sphalloplana holsingeri*), Bigger's groundwater planarian (*Sphalloplana subtilis*), and Torrey's mountain-mint (*Pycnanthemum torreyi*). In general, the Project area is highly developed for residential and commercial use, and therefore does not contain large amounts of wildlife habitat.

Proposed Route (Underground Alternative 05)

The Proposed Route crosses highly developed areas, and minimal impacts on wildlife resources would be expected.

Underground Alternative 06

Underground Alternative 06 crosses highly developed areas, and minimal impacts on wildlife resources would be expected.

Underground Alternative 04

Underground Alternative 04 crosses highly developed areas, and minimal impacts on wildlife resources would be expected.

Underground Alternative 01

According to the VDCR official project review, the Long Branch SCU is located downstream of Underground Alternative 01, and is known as an aquatic natural community of moderate significance. The VDCR recommended that the Company implement and adhere to applicable state and local erosion and sediment control and stormwater management laws and regulation to avoid and minimize impacts on this resource. Overall, Underground Alternative 01 crosses highly developed areas, and minimal impacts on wildlife resources would be expected.

Underground Alternative 03

Underground Alternative 03 crosses highly developed areas, and minimal impacts on wildlife resources would be expected.

Underground Alternative 02

According to the VDCR official project review, the Long Branch SCU is located downstream of Underground Alternative 01, and is known as an aquatic natural community of moderate significance. The VDCR recommended that the Company implement and adhere to applicable state and local erosion and sediment control and stormwater management laws and regulation to avoid and minimize impacts on this resource. Underground Alternative 02 crosses highly developed areas, and minimal impacts on wildlife resources would be expected.

Correspondence from Dominion Energy Virginia with the FWS and Virginia Department of Games and Inland Fisheries is included as Attachment 2.J.1.

K. Recreation, Agricultural, and Forest Resources

Proposed Route (Underground Alternative 05)

The Proposed Route would use existing right-of-way for the entire 4.3 miles. Approximately 3.3 miles would be collocated with road rights-of-way and 1.0 mile would be collocated with existing electric line easements. Land use crossed by the Proposed Route is predominantly developed land (3.5 miles or 81%). Other land crossed by the Proposed Route includes forested land (0.3 mile or 7%) and open land (0.5 mile or 12%). The Proposed Route would impact 0.7 acre of forested land along the existing right-of-way with no additional impacts from expanded right-of-way or HDD additional temporary workspaces ("ATWS"). The use of the existing rights-of-way along the Proposed Route is expected to have minimal impacts on recreational, agricultural, and forest resources because its existing condition will not be permanently altered.

The Proposed Route crosses 0.1 mile of a designated Resource Protection Area ("RPA") with no additional impacts from expanded right-of-way or HDD ATWS. No designated Agricultural and Forestal Districts ("AFDs") are crossed by the Proposed Route nor does the route run parallel or cross any Virginia Byways or Scenic Rivers. The Proposed Route crosses a section of the Great Falls Loop Virginia Birding and Wildlife Trail, which follows I-495 through the Project area. The route follows the W&OD Park, which is owned and maintained by NOVA. Impacts to the W&OD Park trail include 2.8 acres along the existing right-of-way and 0.7 acre associated with the HDD ATWS.

Underground Alternative 06

Underground Alternative 06 would use existing right-of-way for the entire 4.7 miles. Approximately 3.7 miles would be collocated with road rights-of-way and 1.0 mile would

be collocated with existing electric line easements. Land use crossed by Underground Alternative 06 is predominantly developed land (3.8 miles or 81%). Other land crossed by Underground Alternative 06 includes forested land (0.3 mile or 6%) and open land (0.6 mile or 13%). Underground Alternative 06 would impact 0.7 acre of forested land along the existing right-of-way with no additional impacts from expanded right-of-way. The use of the existing rights-of-way along the Underground Alternative 06 is expected to have minimal impacts on recreational, agricultural, and forest resources because its existing condition will not be permanently altered.

Underground Alternative 06 crosses 0.1 mile of a designated RPA with no additional impacts from the expanded right-of-way and HDD ATWS. No designated AFDs are crossed by the Underground Alternative 06 nor does the route run parallel or cross any Virginia Byways or Scenic Rivers. Underground Alternative 06 crosses a section of the Great Falls Loop Virginia Birding and Wildlife Trail, which follows I-495 through the Project area. The route follows the W&OD Park with impacts including 2.8 acres along the existing right-of-way less and 0.7 acre associated with the HDD ATWS.

Underground Alternative 04

Underground Alternative 04 would use existing right-of-way for the entire 4.5 miles. Approximately 3.5 miles would be collocated with road rights-of-way and 1.0 mile would be collocated with existing electric line easements. Land use crossed by Underground Alternative 04 is predominantly developed land (3.7 miles or 82%). Other land crossed by Underground Alternative 04 includes forested land (0.3 mile or 7%) and open land (0.5 mile or 11%). Underground Alternative 04 would impact 0.7 acre of forested land along the existing right-of-way with less than 0.1 acre of additional impacts from expanded right-of-way. The use of the existing rights-of-way along the Underground Alternative 04 is expected to have minimal impacts on recreational, agricultural, and forest resources because its existing condition will not be permanently altered.

Underground Alternative 04 crosses 0.1 mile of a designated RPA with no additional impacts from the expanded right-of-way and HDD ATWS. No designated AFDs are crossed by the Underground Alternative 04 nor does the route run parallel or cross any Virginia Byways or Scenic Rivers. Underground Alternative 04 crosses a section of the Great Falls Loop Virginia Birding and Wildlife Trail, which follows I-495 through the Project area. The route follows the W&OD Park with impacts including 2.8 acres along the existing right-of-way less and 0.7 acre associated with the HDD ATWS.

Underground Alternative 01

Underground Alternative 01 would use existing right-of-way for 4.8 miles or 96% of the route. Approximately 2.8 miles would be collocated with road rights-of-way and 2.0 miles would be collocated with existing electric line easements. Land use crossed by Underground Alternative 01 is predominantly developed land (3.0 miles or 60%). Other land crossed by Underground Alternative 01 includes forested land (1.2 miles or 24%)

and open land (0.8 mile or 16%). Underground Alternative 01 would impact 1.8 acres of forested land along the existing right-of-way and require 1.0 acre of additional impacts to forested land from expanded right-of-way. The use of the existing rights-of-way along the Underground Alternative 01 is expected to have minimal impacts on recreational, agricultural, and forest resources because its existing condition will not be permanently altered.

Underground Alternative 01 crosses 0.2 mile of a designated RPA with 0.4 acre of additional impacts from the expanded right-of-way. No designated AFDs are crossed by the Underground Alternative 01 nor does the route run parallel or cross any Virginia Byways or Scenic Rivers. Underground Alternative 01 crosses a section of the Great Falls Loop Virginia Birding and Wildlife Trail, which follows I-495 through the Project area. The route follows the W&OD Park with impacts including 6.6 acres along the existing right-of-way and 0.7 acre associated with the HDD ATWS.

Underground Alternative 03

Underground Alternative 03 would use existing right-of-way for 4.1 miles or 89% of the route. Approximately 4.0 miles would be collocated with road rights-of-way and 0.2 mile would be collocated with existing electric line easements. Land use crossed by Underground Alternative 03 is predominantly developed land (3.4 miles or 74%). Other land crossed by the Underground Alternative 03 includes forested land (0.3 mile or 7%) and open land (1.0 mile or 20%). Underground Alternative 03 would impact 0.8 acre of forested land along the expanded right-of-way and require 0.2 acre of additional impacts to forested land from the HDD ATWS. The use of the existing rights-of-way along the Underground Alternative 03 is expected to have minimal impacts on recreational, agricultural, and forest resources because its existing condition will not be permanently altered.

Underground Alternative 03 crosses 0.1 mile of a designated RPA with 0.3 acre of additional impacts from the expanded right-of-way and less than 0.1 acre from the HDD ATWS. No designated AFDs are crossed by the Underground Alternative 03 nor does the route run parallel or cross any Virginia Byways or Scenic Rivers. Underground Alternative 03 crosses a section of the Great Falls Loop Virginia Birding and Wildlife Trail, which follows I-495 through the Project area. The route crosses the W&OD Park with impacts including 0.1 acre along the existing right-of-way, less than 0.1 acre associated with the expanded right-of-way, and 0.4 acre associated with the HDD ATWS. Underground Alternative 03 would impact a total of 0.6 acre of Fairfax County park land, including 0.4 acre of expanded right-of-way and 0.2 acre for the HDD ATWS.

Underground Alternative 02

Underground Alternative 02 would use existing right-of-way for 4.6 miles or 92% of the route. Approximately 4.4 miles would be collocated with road rights-of-way and 0.2 mile would be collocated with existing electric line easements. Land use crossed by

Underground Alternative 02 is predominantly developed land (3.5 miles or 70%). Other land crossed by the Underground Alternative 02 includes forested land (0.2 mile or 4%) and open land (1.3 miles or 26%). Underground Alternative 02 would impact 1.3 acres of forested land along the expanded right-of-way and require 0.2 acre of additional impacts to forested land from the HDD ATWS. The use of the existing rights-of-way along Underground Alternative 02 is expected to have minimal impacts on recreational, agricultural, and forest resources because its existing condition will not be permanently altered.

Underground Alternative 02 crosses 0.2 mile of a designated RPA with 0.6 acre of additional impacts from the expanded right-of-way and less than 0.1 acre from the HDD ATWS. No designated AFDs are crossed by the Underground Alternative 02 nor does the route run parallel or cross any Virginia Byways or Scenic Rivers. Underground Alternative 02 crosses a section of the Great Falls Loop Virginia Birding and Wildlife Trail, which follows I-495 through the Project area. The route crosses the W&OD Park with impacts including 0.1 acre along the existing right-of-way, less than 0.1 acre associated with the expanded right-of-way, and 0.4 acre associated with the HDD ATWS. Underground Alternative 02 would impact a total of 0.6 acre of Fairfax County park land, including 0.4 acre of expanded right-of-way and 0.2 acre for the HDD ATWS.

L. Use of Pesticides and Herbicides

Dominion Energy Virginia typically maintains transmission right-of-way by means of selective, low volume applications of EPA-approved, non-restricted use herbicides. The goal of this method is to exclude tall growing brush species from right-of-way by establishing early successional plant communities of native grasses, forbs, and low growing woody vegetation. "Selective" application means the Company sprays only the undesirable plant species (as opposed to broadcast applications). "Low volume" application means the Company uses only the volume of herbicide necessary to remove the selected plant species. These herbicides are routinely applied by hand. DEQ has made previous requests that only herbicides approved for aquatic use by the EPA or the FWS be used in or around any surface water; Dominion Energy Virginia intends to comply with this request.

M. Geology and Mineral Resources

The Proposed Route and Underground Alternatives all fall within the Piedmont geologic province. This province is characterized by its gently rolling topography, deeply weathered bedrock, and a relative scarcity of solid outcrops. The Piedmont Lowlands sub-province, has an elevation range of 60 to 700 feet. The sub-section's physiography is classified by broad moderately dissected valleys separated by broad low hills. The Piedmont Uplands sub-province has an elevation range of 100 to 1,220 feet. The sub-sections physiography is classified by broad gently rolling hills and valleys.

Mineral resource areas were identified through review of publicly-available datasets, USGS topographic quadrangles, and recent (2011) digital aerial photographs. There are

no mines or rock quarries located within 0.5 mile of the Proposed Route or any of the Underground Alternatives.

N. Transportation Infrastructure

Temporary closures of roads and or traffic lanes would be required during construction of the Proposed Route or any of the Underground Alternatives. No long-term impacts to roads are anticipated. The Company will comply with VDOT requirements for access to the rights-of-way from public roads as well as the underground crossings of the roads. At the appropriate time, the Company will obtain the necessary VDOT permits as required and comply with permit conditions.

Correspondence with VDOT is provided as Attachment 2.N.1. Correspondence with MWAA is provided as Attachment 2.N.2.

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.

Correspondence with the Commonwealth of Virginia Department of Aviation is provided as Attachment 2.N.3.

Proposed Route (Underground Alternative 05)

Thirty-five road crossings were identified along Proposed Route, of which 20 crossings are of county or local roads and 15 are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), I-66 East, I-66 West, I-66 West Exit 64 off ramp, I-495 North, I-495 South, I-495 South Exit 49 Off-Ramp, Nottingham Drive, Sandburg Street, Gallows Road (SR 650) (within road), Idylwood Road (SR 695), Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive, Science Applications Court, Gallows Branch Road, Aline Avenue, Boone Boulevard, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, International Drive (SR 6034) (within road), Fletcher Street, Tysons Corner Center, Chain Bridge Road (VA 123), Galleria Drive, Greensboro Drive, Westpark Drive, Lincoln Circle, Lincoln Lane, Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

Underground Alternative 06

Thirty-nine road crossings were identified along Underground Alternative 06, of which 23 crossings are of county or local roads, 15 are of state routes/highways or U.S. highways including on and off ramps, and one private road. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), I-66 East, I-66

West, I-66 West Exit 64 off ramp, I-495 North, I-495 South, I-495 South Exit 49 Off-Ramp, Nottingham Drive, Sandburg Street, Gallows Road (SR 650), Idylwood Road (SR 695), Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive, Science Applications Court, Gallows Branch Road, Aline Avenue, Boone Boulevard, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, International Drive (SR 6034) (within road), Fletcher Street, Tysons Corner Court (within road), Chain Bridge Road (VA 123), Tysons Boulevard (within road), Galleria Drive, Westbranch Drive, Park Run Drive (within road), Westpark Drive, Crestwood Heights Drive, Jones Branch Drive (within road), Lincoln Way, Lincoln Center Court, International Drive (SR 6034), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

Underground Alternative 04

Thirty-six road crossings were identified along Underground Alternative 04, of which 20 crossings are of county or local roads and 16 are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), I-66 East, I-66 West, I-66 West Exit 64 off ramp, I-495 North, I-495 South, I-495 South Exit 49 Off-Ramp, Nottingham Drive, Sandburg Street, Gallows Road (SR 650) (within road), Idylwood Road (SR 695), Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive, Science Applications Court, Gallows Branch Road, Old Courthouse Road (SR 677) (within road), Lord Fairfax Road, Byrd Road, Hull Road, Woodford Road, Chain Bridge Road (VA 123), Gosnell Road (SR 939) (within road), Wall Street, Raglan Road, Tyspring Street, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, Westpark Drive (within road), Greensboro Drive (within road), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

Underground Alternative 01

Thirty-seven road crossings were identified along Underground Alternative 01, of which 21 crossings are of county or local roads and 16 are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), I-66 East, I-66 West, I-66 West Exit 64 off ramp, I-495 North, I-495 South, I-495 South Exit 49 Off-Ramp, Nottingham Drive, Sandburg Street, Gallows Road (SR 650), Cedar Lane (SR 698), Electric Avenue (within road), Chestertown Drive, Woodford Road (within road), Connierae Lane, Falcone Pointe Way, Wolftrap Creek, Tysons Court, Bethany Court, Quaint Lane, Wolftrap Road, Woodford Court, Rainbow Road, Black Stallion Place, Old Courthouse Road (SR 677) (within road), Howard Road, Chain Bridge Road (VA 123), Gosnell Road (SR 939) (within road), Wall Street, Raglan Road, Tyspring Street, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, Westpark Drive (within road), Greensboro Drive (within road), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

Underground Alternative 03

Forty-three road crossings were identified along Underground Alternative 03, of which 30 crossings are of county or local roads and 13 are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), unnamed road, I-66 East, I-66 West, Virginia Lane, Hurst Street (within road), Idylwood Road (SR 695) (within road), Senseney Lane, Helena Drive (within road), Providence Street, I-495 North, I-495 South, Railroad Street (within road), Coal Train Drive, Morgan Lane, Railroad Street (within road), 4th Place, Arden Street, Journet Drive, Gallows Road (SR 650) (within road), Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tysons Oaks Drive, Science Applications Court, Gallows Branch Road, Old Courthouse Road (SR 677) (within road), Lord Fairfax Road, Byrd Road, Hull Road, Woodford Road, Chain Bridge Road (VA 123), Gosnell Road (SR 939) (within road), Wall Street, Raglan Road, Tyspring Street, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, Westpark Drive (within road), Greensboro Drive (within road), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

Underground Alternative 02

Fifty-two road crossings along Underground Alternative 02, of which 38 crossings are of county or local roads and are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), unnamed road, I-66 East, I-66 West, Virginia Lane, Hurst Street (within road), Idylwood Road (SR 695) (within road), Senseney Lane, Helena Drive (within road), Providence Street, I-495 North, I-495 South, Railroad Street (within road), Coal Train Drive, Morgan Lane, Railroad Street (within road), 4th Place, Arden Street, Journet Drive, Gallows Road (SR 650), Electric Avenue (within road), McGregor Court, Wheystone Court, Cedar Lane, Central Avenue, Williams Avenue, Frank Street, Woodford Road (within road), Connierae Lane, Falcone Pointe Way, Wolftrap Creek, Tysons Court, Bethany Court, Quaint Lane, Wolftrap Road, Wolftrap Road Southeast, Woodford Court, Rainbow Road, Black Stallion Place, Old Courthouse Road (SR 677) (within road), Howard Avenue, Chain Bridge Road (VA 123), Gosnell Road (SR 939) (within road), Wall Street, Raglan Road, Tyspring Street, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, Westpark Drive (within road), Greensboro Drive (within road), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

ATTACHMENTS

Attachment 2.D.1

October 17, 2017 Correspondence from Dominion Energy Virginia to the U.S. Army Corps of Engineers

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.

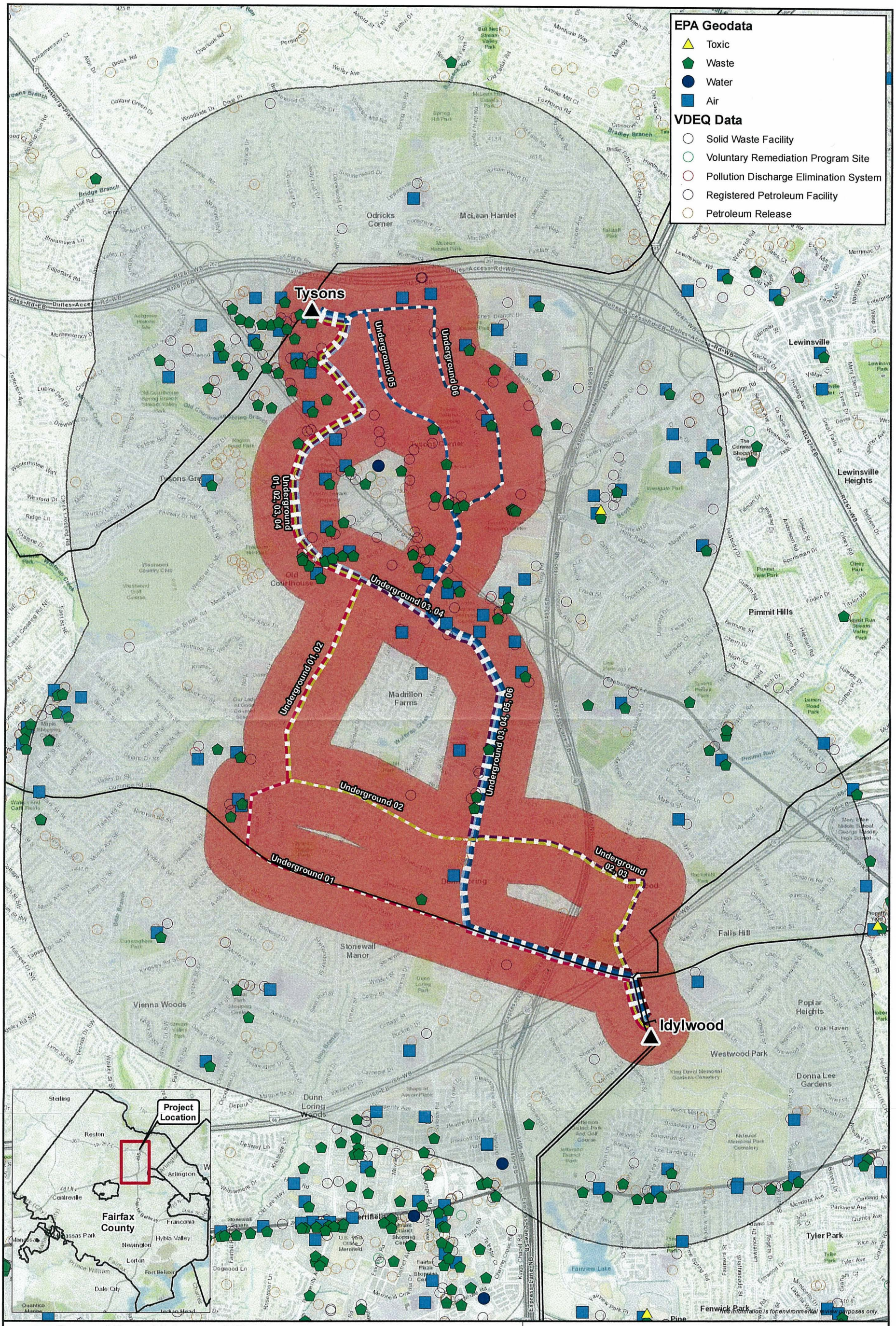
Sincerely,

Amanda Mayhew
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Attachment 2.E.1

Contaminated Sites Map Idylwood to Tysons Project



Attachment 2.E.1
Contaminated Sites Map
Idylwood to Tysons Project
Fairfax County, Virginia

ERM

Dominion Energy

FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\DEQ_Supp_DOM_IDYL_Contaminated_Sites.mxd | REVISED: 10/18/2017 | SCALE: 1:25,000 when printed at 11x17 | DRAWN BY: 0239

Attachment 2.F.1

Department of Conservation and Recreation Division of Natural Heritage Response

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

David C. Dowling
Deputy Director of Soil and Water Conservation and Dam Safety

Thomas L. Smith
Deputy Director of Operations

October 6, 2017

Karen Beatty
Environmental Resourses Management, Inc.
121 W. Trade St., Suite 2320
Charlotte, NC 28202

Re: Dominion – Idylwood Tyson's Project

Dear Ms. Beatty:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Lines: Overhead 03, and Underground 03, 04, 05, 06, 07

According to information currently in our files, the Rusty patched bumble bee (*Bombus affinis*, G1/S1/LE/NL) has been historically documented within two miles of the project area. The Rusty patched bumble bee is listed as endangered under the Endangered Species Act by U.S. Fish and Wildlife Service (USFWS) effective March 21, 2017. Since the late 1990s, the Rusty patched bumble bee has declined throughout its historical range including Virginia and is anticipated to be extinct in all ecoregions by 2030. Threats to the Rusty patched bumble bee include disease, pesticides, climate change, habitat loss and small population dynamics.

Lines: Underground 01 and 02:

According to information currently in our files, the Rusty patched bumble bee has been historically documented within two miles of the project area.

In addition, the Long Branch Stream Conservation Unit (SCU) is located downstream from the project site. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Long Branch SCU has been given a biodiversity ranking of B4, which represents a site of moderate significance. The natural heritage resource associated with this site is:

Aquatic Natural Community (NP-Middle Potomac – Anacostia – Occoquan First Order Stream)	G3G4/S3S4/NL/NL

The documented Aquatic Natural Community is based on Virginia Commonwealth University's **INSTAR** (*Interactive Stream Assessment Resource*) database which includes over 2,000 aquatic (stream and river)

collections statewide for fish and macroinvertebrate. These data represent fish and macroinvertebrate assemblages, instream habitat, and stream health assessments. The associated Aquatic Natural Community is significant on multiple levels. First, this stream is a grade B, per the VCU-Center for Environmental Sciences (CES), indicating its relative regional significance, considering its aquatic community composition and the present-day conditions of other streams in the region. This stream reach also holds a "Healthy" stream designation per the INSTAR Virtual Stream Assessment (VSS) score. This score assesses the similarity of this stream to ideal stream conditions of biology and habitat for this region. Lastly, this stream contributes to high Biological Integrity at the watershed level (6th order) based on number of native/non-native, pollution-tolerant/intolerant and rare, threatened or endangered fish and macroinvertebrate species present.

Threats to the significant Aquatic Natural Community and the surrounding watershed include water quality degradation related to point and non-point pollution, water withdrawal and introduction of non-native species.

DCR recommends the implementation of the following USFWS voluntary measures for the conservation of the Rusty patched bumble bee: avoid pesticide use, avoid herbicide use, and plant native flowers that bloom throughout the spring and summer to support pollinator habitat. To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR also recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations, establishment/enhancement of riparian buffers with native plant species and maintaining natural stream flow.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please re-submit a completed order form and project map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

A fee of $595.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, **DCR - Division of Natural Heritage, 600 East Main Street, 24th Floor, Richmond, VA 23219.** Payment is due within thirty days of the invoice date. Please note the change of address for remittance of payment as of July 1, 2013. Late payment may result in the suspension of project review service for future projects.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov. According to the information currently in our files, Pimmit Run, which has been designated by the Virginia Department of Game and Inland Fisheries (VDGIF) as a "Threatened and Endangered Species Water" for the Wood turtle is within 2 miles of the project area. Therefore, DCR recommends coordination with Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at (804) 692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Cc: Amy Ewing, VDGIF

COMMONWEALTH OF VIRGINIA
Department of Conservation and Recreation

DCR – Natural Heritage
600 East Main Street, 24th Floor
Richmond, VA 23219

Make checks payable to: ***TREASURER OF VIRGINIA***
Send payment to the address at the left
Payment is due 30 days after receipt of invoice

Fed I.D. # 54-6004497
DUNS # 8097 44444

Accounts Payable

Karen Beatty Environmental Resourses Management, Inc. 121 W. Trade St., Suite 2320 Charlotte, NC 28202	Invoice Number: **H- 12686** Invoice Date: October 6, 2017

TAXPAYER ID:	62-1130061
CONTACT	Liz Dean, Business Manager, Division of Natural Heritage
CONTACT Number	(804) 371-2671
FAX Number	(804) 371-2674

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
Impact Review	1	AT	90.00	90.00
Element Occurrences	1-5	AT	35.00	35.00
Site Reference				
Dominion – Idylwood Tyson's Project				
Priority Service	1	AT	500.00	500.00
NHDE Discount	1	AT	-30.00	-30.00
			Amount Due:	595.00

BUSINESS UNIT	COST CENTER	ACCOUNT	FUND	PROGRAM	DEPT	AMOUNT	PROJECT	AGENCY USE 1	FY
19900	304	4002199	02199	503017	19900	$595.00	0000109675	732320000	18

AGENCY REFERENCE	DESCRIPTION

Attachment 2.F.2

October 20, 2017 Correspondence from Dominion Energy Virginia to the VDCR

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.

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

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.

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Sincerely,

Amanda Mayhew
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Attachment 2.H.1

October 17, 2017 Correspondence from Dominion Energy Virginia to the VDHR

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.

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

Attachment 2.J.1

October 17, 2017 Correspondence from Dominion Energy Virginia to the U.S. Fish and Wildlife Services and Virginia Department of Game and Inland Fisheries

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.

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

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.

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

Attachment 2.N.1

July 5, 2017 Correspondence from Dominion Energy Virginia to VDOT-NOVA District and Attachments

Dominion Energy®

July 5, 2017

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

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

Dear Mr. Lerner,

This letter is to follow up with our discussions and to thank you for your time on our June 22, 2017 meeting held at your office regarding Dominion Energy's proposed Idylwood to Tysons 230 kV 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 and its consultant ERM have been researching overhead and underground route alternatives to connect the two substations. Currently, there are three overhead routes and seven underground routes under consideration. The attached tables identify the routes under review and how each route affects Virginia Department of Transportation (VDOT)-owned assets. Maps showing each of the routes are also attached.

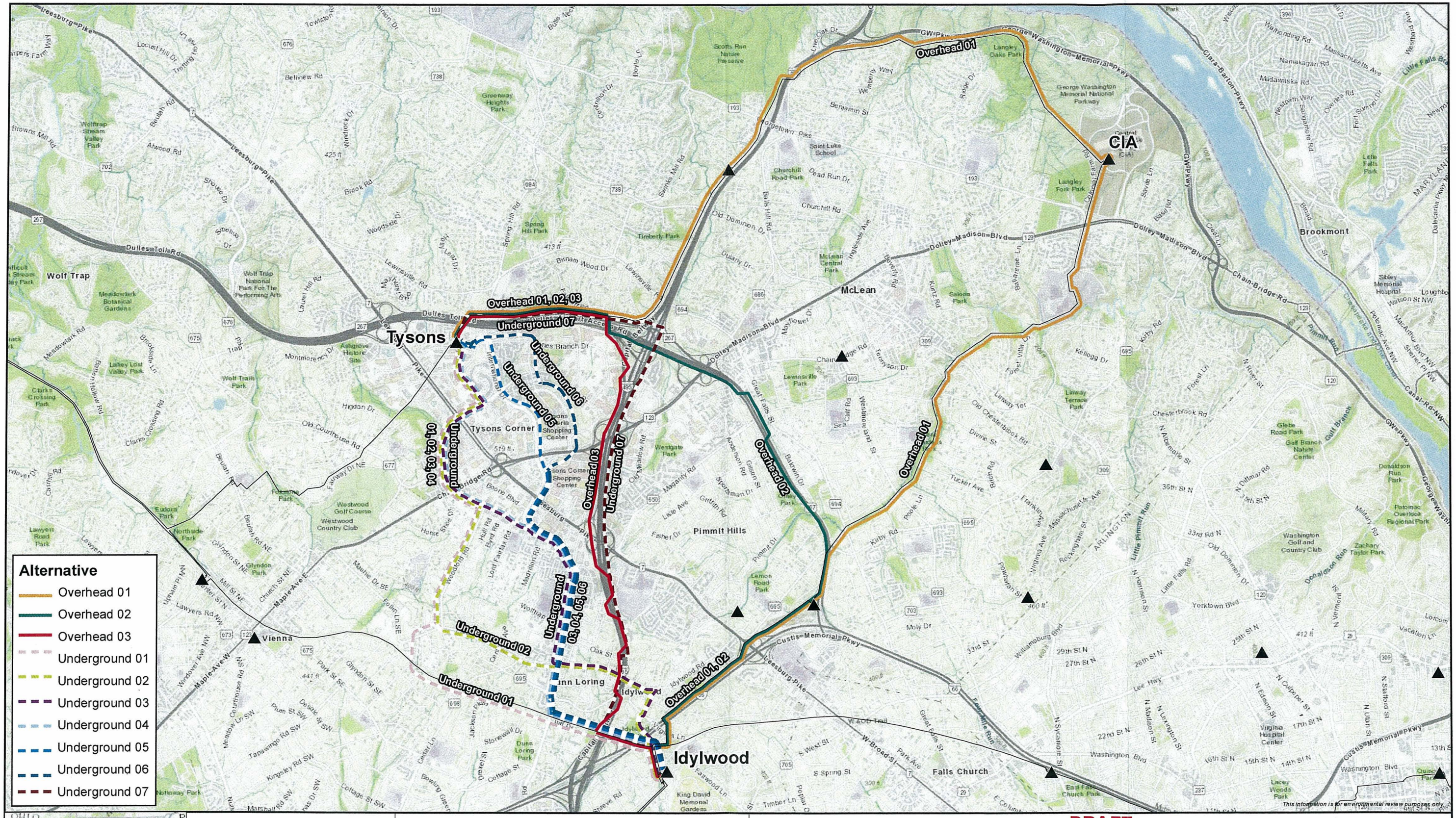
Dominion requests that VDOT reviews each route and provide comments as to under what circumstances VDOT would allow an overhead or underground transmission line on or adjacent to VDOT easements or property. Dominion will use this information in determining the routes that will be presented to the State Corporation Commission in an application to be filed in the fall of this year. The next step in the Company's routing process is to present the overhead and underground routes at focus group meetings that will begin at the end of July. Dominion understands that VDOT review can take up to 30 days and would appreciate any expediting that VDOT can allow.

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

Sincerely,

Amanda Mayhew

Enclosures



DRAFT

Overview Map
Idylwood to Tysons Project
Maps for VDOT and Fairfax DOT
Fairfax County, Virginia

ERM

Dominion Energy

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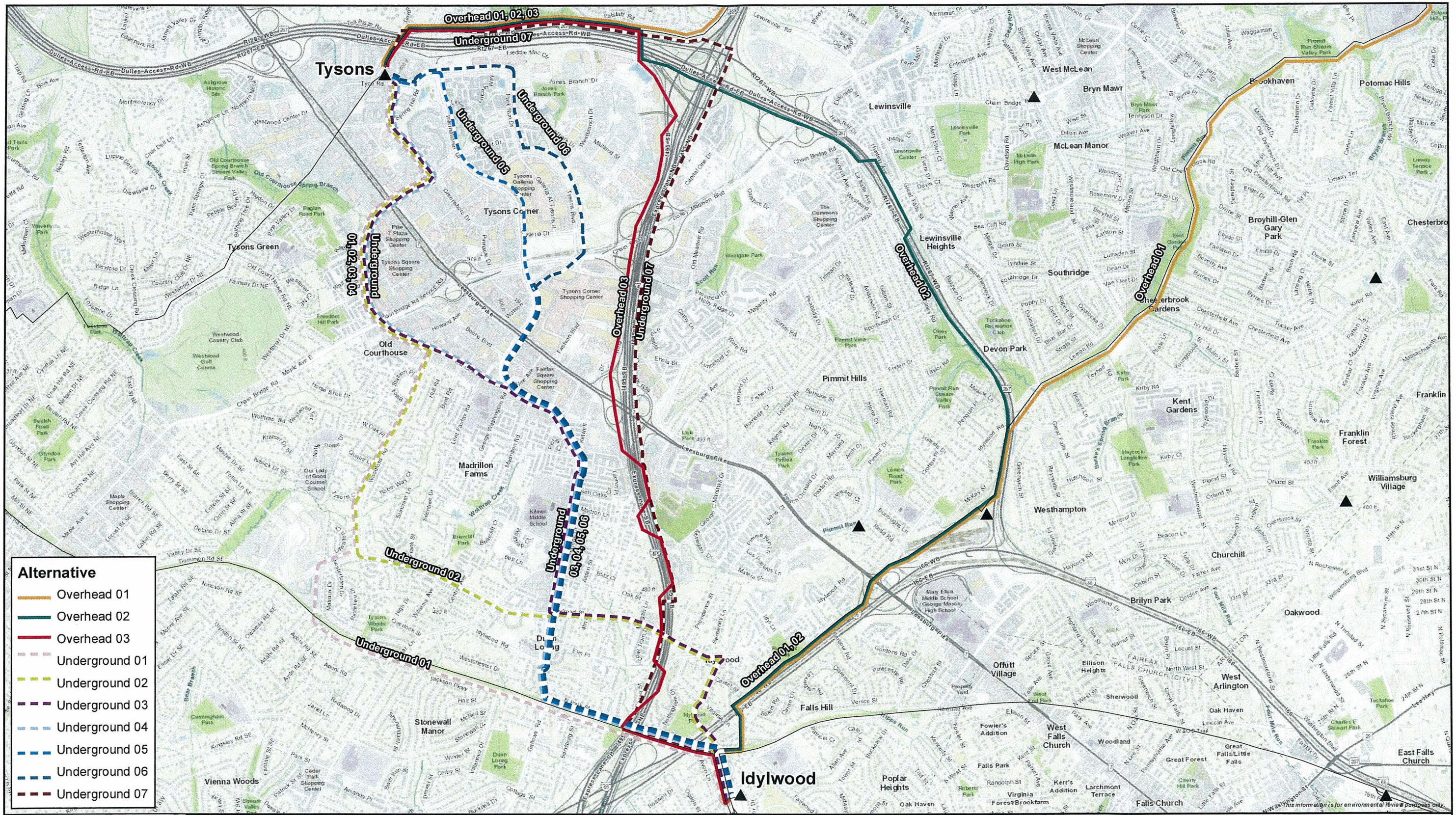

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COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
4975 Alliance Drive
Fairfax, VA 22030

CHARLES A. KILPATRICK, P.E.
COMMISSIONER

August 11, 2017

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

Re: Dominion Energy Idylwood to Tysons Substation 230 kV Electric Transmission Line

Dear Ms. Mayhew:

This letter is in response to your letter requesting VDOT's review of the different alternatives for the Idylwood to Tysons Substation 230 kV Electric Transmission Line. We understand that the proposed transmission line is being built to address reliability issues and to support the load growth in the Tysons area.

The Virginia Department of Transportation (VDOT) Northern Virginia District Office has reviewed the proposed alternatives. Our comments are noted below.

General

- Since the maps provided to us depicting the alternatives show conceptual designs, not detailed engineering design, VDOT's review comments are preliminary.
- Dominion Energy is responsible for compliance with applicable federal and state environmental laws and regulations, and requirements for any access within the existing state right-of-way. Any land disturbance activities resulting from the proposed transmission line within the state right-of-way would require a VDOT Erosion and Sediment Control Contractor Certification (ESCCC).
- Temporary closures or impacts to existing roadways must be coordinated with VDOT prior to finalization of the construction plans.
- For work to be performed within the VDOT right-of-way, a land use permit will be required from the VDOT Fairfax Permits section.
- The proposed transmission line should be coordinated with Fairfax County, the Metropolitan Washington Airports Authority (MWAA) and VDOT so as not to preclude future planned improvements.

- New lines within the VDOT right-of-way should be installed under land use permit (not easement).
- VDOT will not allow attaching the new line or infrastructure associated with the new line to VDOT structures.
- Parallel installations within interstates are not allowed except as outlined in the land use regulation 24VAC30-151-310 below.

24VAC30-151-310. Utility Installations within Limited Access Highways.

Utility installations on all limited access highways shall comply with the following provisions:

1. Requests for all utility installations within limited access right-of-way shall be reviewed and, if appropriate, be approved by the Commissioner of Highways prior to permit issuance.
2. New utilities will not be permitted to be installed parallel to the roadway longitudinally within the controlled or limited access right-of-way lines of any highway, except that in special cases or under resource sharing agreements such installations may be permitted under strictly controlled conditions and then only with approval from the Commissioner of Highways. However, in each such case the utility owner must show the following:

   a. That the installation will not adversely affect the safety, design, construction, operation, maintenance or stability of the highway.

   b. That the accommodation will not interfere with or impair the present use or future expansion of the highway.

   c. That any alternative location would be contrary to the public interest. This determination would include an evaluation of the direct and indirect environmental and economic effects that would result from the disapproval of the use of such right-of-way for the accommodation of such utility.

   d. In no case will parallel installations within limited access right-of-way be permitted that involve tree removal or severe tree trimming.
3. Overhead and underground utilities may be installed within limited access right-of-way by a utility company under an agreement that provides for a shared resource arrangement subject to VDOT's need for the shared resource.
4. All authorized longitudinal utility installations within limited access right-of-way, excluding communication tower facilities, shall be located in a utility area established along the outer edge of the right-of-way. Special exceptions must be approved by the Commissioner of Highways.
5. Authorized overhead utility installations within limited access right-of-way shall maintain a minimum of 21 feet of vertical clearance.

6. Authorized underground utility installations within limited access right-of-way shall have a minimum of 36 inches of cover.
7. Service connections to adjacent properties shall not be permitted from authorized utility installations within limited access right-of-way.
8. Overhead crossings shall be located on a line that is perpendicular to the highway alignment.
9. A utility access control line will be established between the proposed utility installation, the through lanes, and ramps.

Overhead 01 (Tysons Loop)

- Total Length within the VDOT ROW is minimal and will be on an existing running line.
- A few side streets to contend with and a few crossings of limited access highways (existing).
- No new overhead crossings of limited access highways.
- I-66 and I-495 would require Central Office approval.
- Toll Road section would require additional approval by MWAA.
- GW Parkway right of way may come into play requiring Park Authority approval.
- This route will have limited disruption to traffic as compared to the other routes.
- Tree removal not permitted in limited access right of way.
- Significant impacts to parks and schools.
- Alternative 1 has the least new overhead crossings of exit/entrance ramps, structures on VDOT right-of-way and structures within soundwall.
- Alternative 1 is the overhead alternative with the least impacts to VDOT roadways.

Overhead 02 (267/I-66)

- A good portion of this run is on the Dulles Toll Road (Route 267) which would require MWAA approval.
- New construction at Route 123 and I-495 with new crossings.
- May affect future road expansion for the Dulles Toll Road (Route 267)
- Major traffic impacts during construction.
- There are some side streets to contend with.
- I-66 and I 495 would require Central Office approval.
- Tree removal not permitted in limited access right of way.

Overhead 03 (I-495)

- Majority of the route is within I-495 with multiple new crossing of I-495, Route 7 and Route 123.

- Many of the crossings of I-495 are not perpendicular to the highway alignment. Overhead crossings shall be located on a line that is perpendicular to the highway alignment.
- Significant traffic impacts during construction.
- Future maintenance of the line is a critical issue. Maintenance operations may require closing of I-495 lanes. Traffic volumes on I-495 are high and closing of lanes on this roadway can affect regional traffic operations.
- I-66 and I 495 would require Central Office approval. Dulles Toll Road section would require additional approval by MWAA.
- May affect future road expansion of I-495.
- Tree removal not permitted in limited access right of way.
- From the VDOT perspective, Overhead 03 is the least favored overhead option.

Underground 01 (Western Underground WOD Route)

- I-66 and I-495 crossings would require Central Office Approval.
- Only two limited access requests to process.
- A good portion is on the WOD right of way which would require approval from NOVA Parks.
- Crossing under WMATA tracks would require their approval.
- Several traffic signals to work around.
- There may be possible neighborhood opposition due to impacts to residential areas.
- Major traffic impacts on primary and secondary streets.
- Repairs and maintenance of underground lines more difficult than the maintenance and repairs for overhead lines.
- Installation under sidewalks should be explored as opposed to under pavement.
- Duct bank likely will not be impacted by future roadway widening projects.
- The routing is shorter than the routing for all of the overhead routes under consideration.

Underground 02 (Western Underground Non-WOD Route)

- I-66 and I-495 crossings would require Central Office Approval.
- Only two limited access requests to process.
- Crossing under WMATA tracks would require their approval.
- Several traffic signals to work around.
- There may be possible neighborhood opposition due to impacts to residential areas.
- Major traffic impacts on primary and secondary streets.
- Repairs and maintenance of underground lines more difficult than the maintenance and repairs for overhead lines.
- Installation under sidewalks should be explored as opposed to under pavement.
- Duct bank likely will not be impacted by future roadway widening projects.
- The routing is shorter than the routing for all of the overhead routes under consideration.

Underground 03 (Gallows Road Non-WOD Route)

- I-66 and I-495 crossings would require Central Office Approval.
- Only two limited access requests to process.
- Crossing under WMATA tracks would require their approval.
- Several traffic signals to work around.
- There may be possible neighborhood opposition due to impacts to residential areas.
- Major traffic impacts on primary and secondary streets.
- Repairs and maintenance of underground lines more difficult than the maintenance and repairs for overhead lines.
- Installation under sidewalks should be explored as opposed to under pavement.
- Duct bank likely will not be impacted by future roadway widening projects.
- The routing is shorter than the routing for all of the overhead routes under consideration.

Underground 04 (WOD Gallows Road)

- I-66 and I-495 crossings would require Central Office Approval.
- Only two limited access requests to process.
- A portion is on the WOD right of way which would require approval from NOVA Parks.
- Crossing under WMATA tracks would require their approval.
- Several traffic signals to work around.
- There may be possible neighborhood opposition due to impacts to residential areas.
- Major traffic impacts on primary and secondary streets.
- Repairs and maintenance of underground lines more difficult than the maintenance and repairs for overhead lines.
- Installation under sidewalks should be explored as opposed to under pavement.
- Duct bank likely will not be impacted by future roadway widening projects.
- The routing is shorter than the routing for all of the overhead routes under consideration.

Underground 05 (WOD Gallows Road W of Mall)

- I-66 and I-495 crossings would require Central Office Approval.
- Only two limited access requests to process.
- A portion is on the WOD right of way which would require approval from NOVA Parks.
- Crossing under WMATA tracks would require their approval.
- Several traffic signals to work around.
- There may be possible neighborhood opposition due to impacts to residential areas.
- Major traffic impacts on primary and secondary streets.
- Construction adjacent to two major regional shopping centers will affect operations for these retail establishments.
- There are multiple other utilities under the road/sidewalk along the proposed routing. Portions of the alignment are full of fiber optics and other buried facilities.

- Repairs and maintenance of underground lines more difficult than the maintenance and repairs for overhead lines.
- Installation under sidewalks should be explored as opposed to under pavement.

Underground 06 (WOD Gallows Road E of Mall)

- I-66 and I-495 crossings would require Central Office Approval.
- Only two limited access requests to process.
- A portion is on the WOD right of way which would require approval from NOVA Parks.
- Crossing under WMATA tracks would require their approval.
- Several traffic signals to work around.
- There may be possible neighborhood opposition due to impacts to residential areas.
- Major traffic impacts on primary and secondary streets.
- Construction adjacent to two major regional shopping centers will affect operations for these retail establishments.
- There are multiple other utilities under the road/sidewalk along the proposed routing. Portions of the alignment are full of fiber optics and other buried facilities.
- Repairs and maintenance of underground lines more difficult than the maintenance and repairs for overhead lines.
- Installation under sidewalks should be explored as opposed to under pavement.

Underground 07 (495 Underground)

- I-66 and I-495 crossings would require Central Office Approval.
- Crossing under WMATA tracks would require their approval.
- Dulles Toll Road section will require MWAA approval.
- Repairs and maintenance of underground lines more difficult than the maintenance and repairs for overhead lines.
- Impacts to I-495 traffic operations during construction will be substantial.
- The routing is shorter than the routing for all of the overhead routes under consideration.

Please call me if you have any questions with respect to the VDOT comments on the proposed 230 kV line alternatives.

Sincerely,

Abraham Lerner

Abraham Lerner
Associate Manager of Special Project Development

cc: Helen Cuervo, VDOT
Renee Hamilton, VDOT
Mark Comer, VDOT
Imad Salous, VDOT
Michael Kroskie, VDOT
Abdul Hammadi, VDOT
Gang Zhang, VDOT
Norman Whitaker, VDOT
Terry Yates, VDOT
Allison Richter, VDOT
Rahul Trivedi, VDOT

Dominion Energy®

August 31, 2017

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

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

Dear Mr. Lerner,

Thank you for your letters dated August 11, 2017, regarding Dominion Energy's proposed Idylwood to Tysons Substation 230 kV Electric Transmission Line. The comments that you compiled from various groups within the agency will help us determine viable, constructible routes to meet the need. To that end, we have a few additional questions that we would like to pose. For your reference, a copy of your August 11, 2017 letters are attached.

- Dominion understands that Overhead 3 is VDOT's least favored overhead option. To the extent possible, please identify those items under VDOT's Overhead 3 comments that VDOT is unlikely to approve or permit, if an application were to be submitted by Dominion.
- As noted in your letter, land use regulation 24 VAC 30-151-310(2)(d) states: "In no case will parallel installations within limited access right-of-way be permitted that involve tree removal or severe tree trimming." Is there any instance where tree removal can be permitted? For example, based on Dominion's route descriptions, could Overhead 2 be permitted with the amount of clearing described? What about Overhead 3, or the electrical solution VDOT reviewed from Reston to Tysons that followed the Dulles Toll Road (Rt. 267)?
- The letter notes that the overhead routes being evaluated along I-66 and I-495 would require approval from the Central Office. Is the same true for the electrical solution from Reston to Tysons along the Dulles Toll Road (Rt. 267)? Is there a contact at the Central Office with whom we could discuss issues related to the approval process?
- In addition to reviewing Overhead 3, VDOT also reviewed an electrical solution from Reston to Tysons Corner that followed the Dulles Toll Road (Rt. 267). As noted above, VDOT initially found Overhead 3 to be VDOT's least favorable route. Based on VDOT's review of the electrical solution from Reston to Tysons along the Dulles Toll Road (Rt. 267), which has more tree removal than Overhead 3, would VDOT find that route be less favorable as Overhead 3, also considering the other issues VDOT identified regarding Overhead 3 and the alternative electrical solution? To the extent possible, please identify those items under VDOT's Overhead 6 (Reston to Tysons Corner) comments that VDOT is unlikely to approve or permit, if an application were to be submitted by Dominion.

- The attached map shows the location of a possible re-route identified by the Focus Group held on August 24, which helps avoid the Washington and Old Dominion Trail. Please confirm whether the re-route section along I-66 has been scheduled for expansion and any other concerns VDOT may have with the re-route.

Thank you for your time and attention to this matter. Please contact me with any questions at 804.771.6145 or at Amanda.m.mayhew@dominionenergy.com.

Sincerely,

Amanda Mayhew

Enclosures

From: Lerner, Abraham (VDOT) <Abraham.Lerner@vdot.virginia.gov>
Sent: Wednesday, September 06, 2017 1:04 PM
To: Amanda M Mayhew
Cc: Wes Keck; Richter, Allison C., PMP (VDOT); Salous, Imad A., P.E. (VDOT); Bates, Stephen L., P.E. (VDOT); Caparas, Robert F. (VDOT); Sheth, Umesh J. (VDOT); Kroskie, Michael (VDOT); Zhang, Gang (VDOT); Trivedi, Rahul, P.E. (VDOT); Yates, Terry (VDOT); Hammadi, Abdul PE (VDOT); Alkhadra, Mutaz Y. (VDOT)
Subject: [External] RE: Follow up Letter- Idylwood to Tysons Project

Importance: High

Amanda,

Below please find responses to the questions included in your August 31 letter.

- Dominion understands that Overhead 3 is VDOT's least favored overhead option. To the extent possible, please identify those items under VDOT's Overhead 3 comments that VDOT is unlikely to approve or permit, if an application were to be submitted by Dominion.

  The main issues are the fact that trees are removed within the limited access right-of-way and there are crossings that are not perpendicular to the highway alignment.

- As noted in your letter, land use regulation 24 VAC 30-151-310(2)(d) states: "In no case will parallel installations within limited access right-of-way be permitted that involve tree removal or severe tree trimming." Is there any instance where tree removal can be permitted? For example, based on Dominion's route descriptions, could Overhead 2 be permitted with the amount of clearing described? What about Overhead 3, or the electrical solution VDOT reviewed from Reston to Tysons that followed the Dulles Toll Road (Rt. 267)?

  It is very unlikely that utilities parallel to the roadways within the limited access lines will be approved if they involve tree removal or severe tree trimming. However, the limited access requirements are not applicable to the Dulles Toll Road option (Overhead 6), as this facility, from the Dulles Airport to I-495, is not within the VDOT right-of-way and is operated and maintained by MWAA. Dominion will need to obtain the permits to construct the overhead power line within the Dulles Toll Road right-of-way from MWAA not from VDOT.

- The letter notes that the overhead routes being evaluated along I-66 and I-495 would require approval from the Central Office. Is the same true for the electrical solution from Reston to Tysons along the Dulles Toll Road (Rt. 267)? Is there a contact at the Central Office with whom we could discuss issues related to the approval process?

  No, the Reston to Tysons option does not require approval from Central Office. The Dulles Toll Road (from the Dulles Airport to I-495) is operated and maintained by the Metropolitan Washington Airports Authority (MWAA). Therefore, Dominion will need to obtain the permits to construct the overhead power line within the Dulles Toll Road right-of-way from MWAA not from VDOT. The point of contact in Central Office is: Mr. Mutaz Alkhadra (Tel: 804-786-0622 – E-Mail: Mutaz.Alkhadra@VDOT.Virginia.gov). You may contact Mutaz. However, please note that the standard procedure is for the District (Northern Virginia District in this case) to review the proposed utility concepts and to send to Central Office the ones that require review and approval from Central Office.

- In addition to reviewing Overhead 3, VDOT also reviewed an electrical solution from Reston to Tysons Corner that followed the Dulles Toll Road (Rt. 267). As noted above, VDOT initially found Overhead 3 to be VDOT's least favorable route. Based on VDOT's review of the electrical solution from Reston to Tysons along the Dulles Toll Road (Rt. 267), which has more tree removal than Overhead 3, would VDOT find that route be less favorable as Overhead 3, also considering the other issues VDOT identified regarding Overhead 3 and the alternative electrical solution? To the extent possible, please identify those items under VDOT's Overhead 6 (Reston to Tysons Corner) comments that VDOT is unlikely to approve or permit, if an application were to be submitted by Dominion.

  From the perspective of tree removal, Overhead 6 is less desirable than Overhead 3. However, as noted above, the limited access requirements are not applicable to the Dulles Toll Road as this facility, from the Dulles Airport to I-495, is not within the VDOT right-of-way and is operated and maintained by MWAA. Dominion will need to obtain the permits to construct the overhead power line within the Dulles Toll Road right-of-way from MWAA not from VDOT.

- The attached map shows the location of a possible re-route identified by the Focus Group held on August 24, which helps avoid the Washington and Old Dominion Trail. Please confirm whether the re-route section along I-66 has been scheduled for expansion and any other concerns VDOT may have with the re-route.

  There are portions of the rerouted sections along I-66 that are going to be modified in conjunction with the I-66 Outside the Beltway widening project. If any of these underground line routes are selected, Dominion will need to work with the I-66 Design-Build Team to figure out ways to accommodate these lines.

Please call me or e-mail me if you have any questions with respect to our responses.

Abi Lerner, P.E.
Associate Manager of Special Project Development
VDOT-NOVA District
4975 Alliance Drive, Fairfax, VA 22030
Office Phone: 703-259-3345
Mobile: 703-414-9299
abraham.lerner@vdot.virginia.gov

From: Amanda M Mayhew [mailto:Amanda.M.Mayhew@dominionenergy.com]
Sent: Thursday, August 31, 2017 11:27 AM
To: Lerner, Abraham (VDOT)
Cc: Wes Keck
Subject: Follow up Letter- Idylwood to Tysons Project

Good morning Abi,

Attached is a follow up letter with questions pertaining the letters you provided to us earlier this month. Please call me with any clarification you need on the letter. We will be holding open houses for the project the week of September 25th and hope to have a response by then, if possible.

Thank you again for the time you and your organization's have spent reviewing this project.

Amanda Mayhew
Senior Siting and Permitting Specialist
Electric Transmission

Dominion Energy Services, Inc
701 East Cary Street, Richmond, VA 23219
O: 804.771.6145 C: 804.297.8685

Attachment 2.N.2

September 26, 2017 Correspondence from Dominion Energy Virginia to Metropolitan Washington Airports Authority

Dominion Energy®

September 26, 2017

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

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

Dear Mr. Rabindranath,

This letter is to follow up on our discussions during our September 19, 2017, meeting with your colleagues regarding Dominion Energy's proposed Idylwood to Tysons 230 kV Electric Transmission Line located in Fairfax County. As we discussed, the project will connect the Company's Idylwood Substation, located off Shreve Road, and Tysons Substation, located 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. Additionally there is an electrical alternative that would connect the Reston Substation to Tysons Substation (referred to as Overhead 6). The overhead options all have some impact to the Metropolitan Washington Airports Authority (MWAA) maintained Dulles Toll Road. One underground option could impact the Dulles Toll Road. Attached with this letter are maps showing all the routes, including a separate map showing Overheads 2 and 6 in greater detail.

Dominion Energy requests that MWAA review each route, particularly Overhead 2 and Overhead 6, and provide comments as to under what circumstances MWAA would allow an overhead or underground transmission line on or adjacent to MWAA property or leased lands. 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 later this year. Dominion Energy would like to include the MWAA response letter in the SCC filing and would appreciate a response by October 16, 2017, if possible.

Below are few questions that Dominion Energy considers important to MWAA's review:

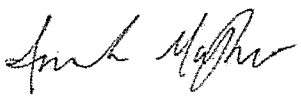
- Overhead 2 and Overhead 6 would require significant tree clearing along the Dulles Toll Road. Dominion's understanding is that MWAA follows Virginia Department of Transportation's requirements related to tree clearing along limited access highways. Can you confirm this?
- Overhead 2 and Overhead 6 would require several non-perpendicular crossings of wires across the Dulles Toll Road. Dominion Energy's understanding is that MWAA follows Virginia

Department of Transportation's requirements related to line crossings along limited access highways. Can you confirm this?

- Would the location of transmission lines along the Dulles Toll Road impact potential future or planned expansions of that road? If so, what impact would that have on the location of a line along that road (we see this as a particularly important issue for Overheads 2 and 6).
- What type and level impacts to traffic would the initial construction and long-term operation and maintenance of the routes have?
- What is the permitting process through MWAA for any route (underground or overhead) that would impact the Dulles Toll Road, and what is the typical time frame to receive approval?

Thank you for your time and attention to this matter. Please contact me with any questions at 804.771.6145 or at Amanda.m.mayhew@dominionenergy.com.

Sincerely,



Amanda Mayhew

Enclosures

Dominion Energy®

Overview Map
Idylwood to Tysons Project
Fairfax County, Virginia

- Existing Substation
- Existing Dominion Transmission Line
- Overhead 02
- Overhead 06

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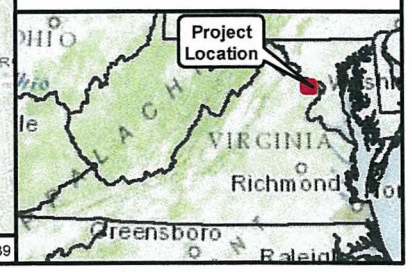

This information is for environmental review purposes only.

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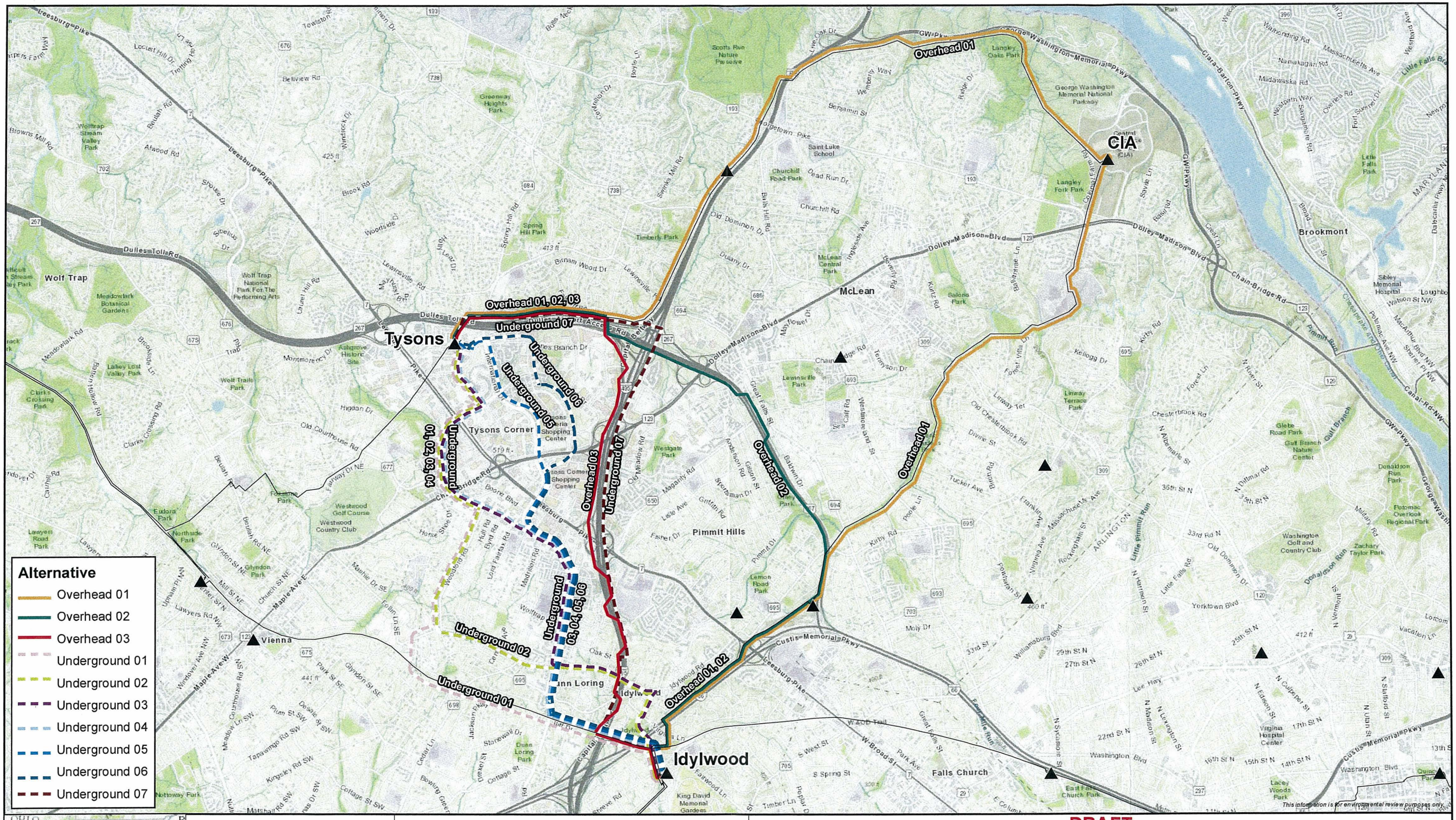

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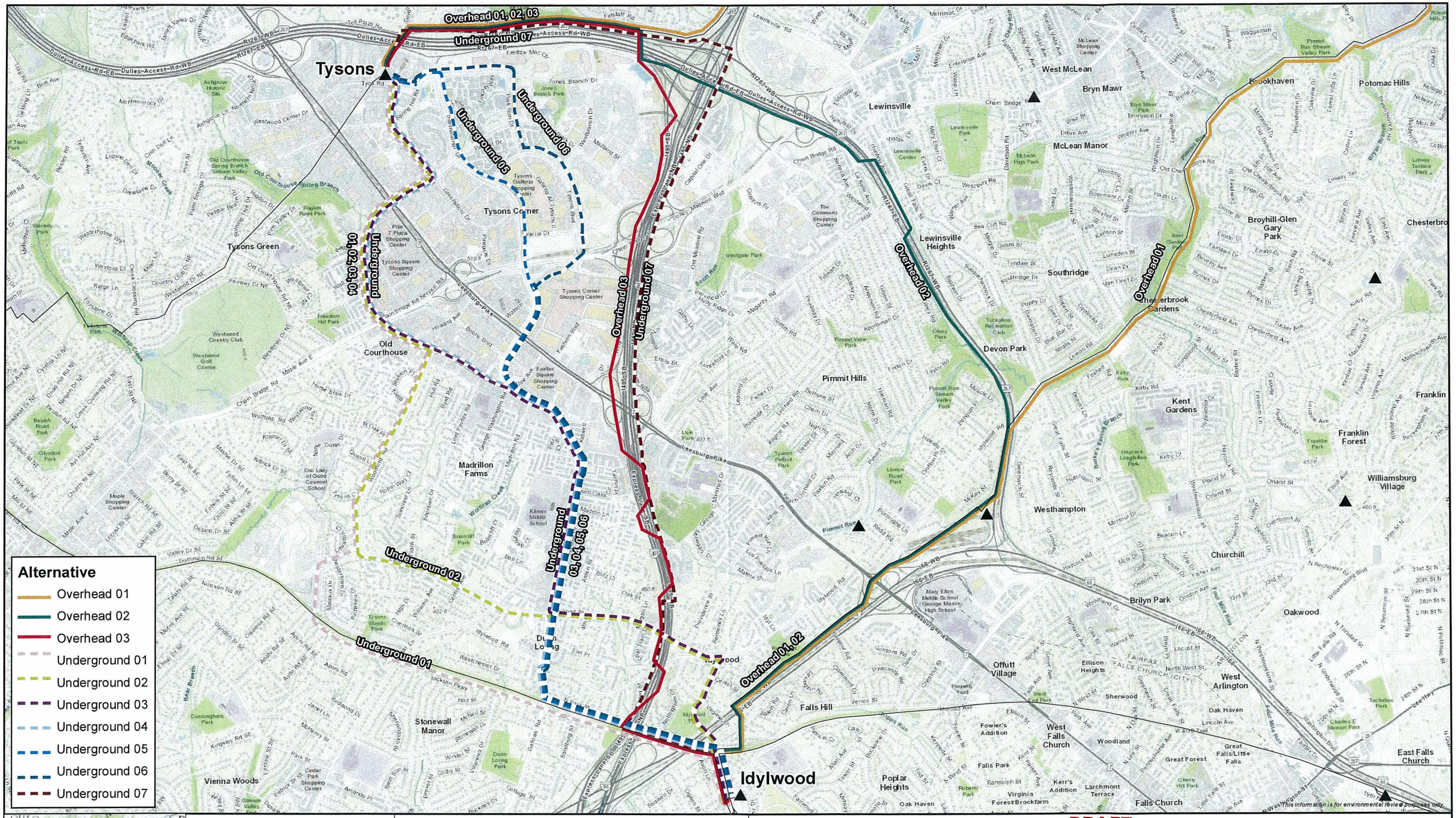

DRAFT

Overview Map
Idylwood to Tysons Project
Maps for VDOT and Fairfax DOT
Fairfax County, Virginia

ERM

Dominion Energy®

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Attachment 2.N.3

October 24, 2017 Correspondence from Commonwealth of Virginia Department of Aviation to Dominion Energy Virginia

COMMONWEALTH of VIRGINIA

Randall P. Burdette
Executive Director

Department of Aviation
5702 Gulfstream Road
Richmond, Virginia 23250-2422

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ISO 9001:2008 Certified
IS-BAO Registered

October 24, 2017

Ms. Amanda Mayhew
Dominion Energy Virginia
701 East Cary Street
Richmond, Virginia 23219

RE: Dominion Energy Proposed Idylwood to Tysons 230 kV Transmission Line

Dear Ms. Mayhew:

Thank you for providing the information package on the proposed Idylwood to Tysons 230 kV Transmission Line. Following our review, staff finds the proposed lines to be located more than 20,000 linear feet from any public use airport in the Commonwealth. However, the heights of the proposed towers for the above ground option were not identified. If the finished elevation of any of the structures reaches 200' above ground level or higher, a 7460 form must be submitted to the FAA to determine if the structures would constitute a hazard to air navigation.

The outcome of any air space evaluation as a result of the submission of the 7460 may result in additional comments by the Department. However, provided any towers involved in the construction of this project are less than 200' above ground level, the Department has no objection to either the underground or above ground alternatives as they are presented in your October 17, 2017 review package.

Please let me know if you have any questions regarding this matter.

Sincerely,

S. Scott Denny
Senior Aviation Planner
Virginia Department of Aviation

100 DOAVAS 20101024 Dominion Courtesy Review Idylwood to Tysons

Environmental Routing Study

DOMINION ENERGY VIRGINIA

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

Environmental Routing Study

FINAL REPORT

Prepared by

ERM

November 2017

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

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LIST OF TABLES

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

ABPP	NPS's American Battlefield Protection Program
ATWS	additional temporary workspace
CBPA	Chesapeake Bay Preservation Act
CCB	Center for Conservation Biology
Company	Virginia Electric and Power Company
CS	Conservation Site
CTB	Commonwealth Transportation Board
Dominion Energy Virginia	Virginia Electric and Power Company
ERM	Environmental Resources Management
ESA	Endangered Species Act in 1973
FWS	U.S. Fish and Wildlife Service
GIS	geographic information system
GLNHR	General Location Areas for Natural Heritage Resources
Guidelines	VDHR 2008 Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia
HDD	horizontal directional drill
I-495	Interstate 495
I-66	Interstate 66
KOP	key observation points
kV	kilovolt
MP	milepost
MWAA	Metropolitan Washington Airports Authority
NERC	North American Electric Reliability Corporation
NHDE	VDCR's Natural Heritage Data Explorer
NHL	National Historic Landmark
NHP	Natural Heritage Program
NLEB	Northern Long-eared Bat
NOVA	Northern Virginia Regional Park Authority
NRHP	National Register of Historic Places
NVCT	Northern Virginia Conservation Trust
Project Team	Dominion Energy Virginia and ERM
Project	Idylwood-Tysons 230 kV Underground Transmission Line Project
PVC	polyvinyl chloride
RPA	Resource Protection Area
SCC	Virginia State Corporation Commission
SCU	Stream Conservation Units
USGS	U.S. Geological Survey
Va. Code	Code of Virginia
VAC	Virginia Administrative Code
VaFWIS	VDGIF Fish and Wildlife Information Service
V-CRIS	Virginia Cultural Resource Information System
VDCR	Virginia Department of Conservation and Recreation
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VOF	Virginia Outdoors Foundation
W&OD	Washington and Old Dominion
W&OD Park	Washington and Old Dominion Railroad Regional Park
WMATA	Washington Metro Area Transit Authority

1.0 INTRODUCTION AND BACKGROUND

This report presents the results of environmental constraint identification and routing study prepared by Environmental Resources Management (ERM) on behalf of Virginia Electric and Power Company (Dominion Energy Virginia or the Company) for the proposed Idylwood-Tysons 230 kilovolt (kV) Transmission Line Project (Project).

For this Project, Dominion Energy Virginia reviewed overhead and underground new build routes, wreck and rebuild routes, and combination wreck and rebuild and overhead and underground new build routes that could potentially address reliability and accommodate increased future demand in the Tysons area of Fairfax County, Virginia. The Company considered the facilities required to construct and operate the electric transmission line; the length of new rights-of-way that would be required; the amount of existing development in each area; the potential for impacts on the environment and on the communities; issues and concerns associated with each route; and the relative cost of each option.

After identifying the potential options, the Company decided to more intensively review four overhead routes and six underground routes, each of which involves the construction and operation of a new 230 kV electric transmission line between its existing Idylwood Substation and its Tysons Substation, both located in Fairfax County, Virginia.

The purpose of the Project is 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.

ERM's scope of work for this study consisted of:

1. defining and describing a study area for the project based on Dominion Energy Virginia's electric transmission and service needs;

2. participating in the public outreach efforts (e.g., focus groups and public open houses) to gather information from stakeholders regarding constraints to be considered as part of the routing process;

3. identifying and mapping routing constraints and opportunities within the study area;

4. identifying buildable alternative routes, each of which meets the objective of the Project as well as siting criteria identified in the Code of Virginia (or Va. Code) and included in the Virginia State Corporation Commission's (SCC) minimum filing guidelines for transmission projects;

5. comparing the alternative routes based on an analysis of impacts on environmental constraints and utilization of routing opportunities; and

6. recommending a proposed and alternative route(s).

Once the study area was defined, ERM identified and mapped existing land use, environmental, visual, and cultural features within the Project area. Sensitive environmental, political, or constructability-related features were defined as routing constraints. ERM also identified

existing electric transmission and distribution lines, pipelines, railroad, and other existing rights-of-way within the study area. These features were defined as routing opportunities. ERM then layered the routing opportunities over the constraints in a geographic information system (GIS) to identify preliminary routes based on the Project description provided above. Subsequently, a more sophisticated route selection process was completed. ERM refined the preliminary routes, taking into account potential impacts on environmental constraints and utilization of routing opportunities. To the extent practicable, ERM identified routes that both avoid constraints and utilize routing opportunities where appropriate.

After the potential routes were identified, ERM conducted an analysis using GIS to quantify potential impacts associated with constraints and the use of opportunities for each route. Crossings of sensitive features were measured and tabulated to facilitate route comparisons. Other factors such as visual and construction-related impacts were assessed based on ERM's experience in electric transmission route selection. After collecting, mapping, and evaluating constraint information within the study area, Dominion Energy Virginia and ERM (Project Team) identified four overhead routes and six underground routes. The Project Team evaluated and compared the routes that were considered. Constraints in this study area included large numbers of houses and residential subdivisions, conservation easements, and public lands, including schools among others.

Following a preliminary quantitative assessment of routes, Dominion Energy Virginia engaged the public, including elected officials, in discussions to gather feedback on the various routes. Some of this feedback resulted in adjustments being made to optimize the potential routes, and in certain cases helped to inform the Project Team's decision to reject a particular route. A proposed underground route and alternative routes were then identified based on a comparison of advantages and disadvantages of each route. The process considered both the sensitivity and extent of the constraints affected relative to each route.

In addition, as a part of the route identification process, the Company and ERM identified and analyzed four potential overhead routes - two primarily following existing transmission line rights-of-way and two following a combination of existing transmission line rights-of-way and limited access roadways managed by the Virginia Department of Transportation (VDOT) and Metropolitan Washington Airports Authority (MWAA). As these routes were optimized and studied for potential environmental impacts, it became clear that each of these routes was inferior to any of the underground routes. Because the environmental impacts of the overhead routes were determined to be significantly greater than the underground routes, they were more costly and posed constructability challenges, these routes were rejected from further consideration. An analysis of the environmental impacts associated with these four overhead routes is included in Appendix A.

2.0 PROJECT DESCRIPTION

As a first step in identifying potential transmission line routes, ERM (as directed by Dominion Energy Virginia) defined a geographic study area for the Project based on Dominion Energy Virginia's electric transmission and service needs as described above. Generally, the study area was defined to encompass the fixed beginning and ending points for the proposed facilities (i.e., the existing substations) as well as an area broad enough to allow for the identification of reasonable alternatives meeting the objective of the Project. Additionally, and to the extent practicable, the limits of the study area were defined by reference to easily distinguished features, such as roads or other linear features.

After developing the study area, ERM identified multiple preliminary route alternatives that could meet the Project objectives. Given the amount of residential and commercial development in the general area, ERM focused on developing routes that would follow existing roadways and transportation corridors within the study area. Subsequent to identification of those preliminary routes, ERM conducted several site visits and began evaluating the routes. The Company also began stakeholder outreach during this time to assist with route evaluation. As part of this outreach, the Company hosted two public open houses and launched a three-part Energy Infrastructure Focus Group ("Focus Group") series. The open houses were held at Shrevewood Elementary School in Falls Church on September 26, 2017 and Kilmer Middle School in Vienna on September 28, 2017. The Focus Group meetings were held on July 27, 2017, August 24, 2017, and October 5, 2017 in Fairfax.

In addition, Company representatives met with staff from VDOT, Fairfax County Parks Authority, Fairfax County Planning Department, Northern Virginia Regional Park Authority (NOVA) Parks, MWAA, and Washington Metropolitan Area Transit Authority (WMATA). Additional information regarding the Company's outreach efforts is included in Appendix Section III.B of the Company's SCC Application.

Six underground route alternatives were identified that had the potential to meet the Project objectives. These six routes, described below and depicted in Figure 2.1-1 in Appendix B and in the aerial photo based route map set in Appendix C, required more detailed evaluation to determine to what degree each of the routes could impact various sensitive resources and other constraints within the study area. Section 3 below describes the various resources found along each of the alternatives and Section 4 discusses how the alternatives could impact those resources. Finally, Section 5 presents the conclusions and recommendations.

2.1 ALTERNATIVES CONSIDERED

Each alternative involves construction of a new underground 230 kV electric transmission line between the existing Idylwood and Tysons Substations. The Project Team performed reconnaissance in the areas where transition stations would be required for a potential hybrid solution (i.e., part overhead, part underground) and was unable to identify parcel/parcels of adequate size; therefore, no further development of a potential hybrid solution was conducted.

Each alternative under consideration would require that the Tysons Substation be rebuilt to accommodate the new 230 kV transmission line along with terminals for the existing transmission lines (Reston-Tysons Line #2010 and Tysons-Swinks Mill Line #2108), as well as other changes necessary to bring it into compliance consistent with the Company's NERC-compliant Facility Interconnection Requirements document. The Tysons Substation will be rebuilt using Gas Insulated Substation equipment to accommodate a six-breaker 230 kV ring bus. All changes would occur within the existing property boundary, however the western fence line would be expanded. At the Idylwood Substation, new 230 kV Gas Insulated Line terminal equipment will be installed within the existing facility for the new Line #2175 installation. Finally, minor relay work will be required at the existing Idylwood Substation and Reston Substation.

Due to rounding to a tenth MP, the sum of the mileages broken out for each alternative described below may not equal the total route length.

2.1.1 Underground Alternative 01

Underground Alternative 01 is 5.0 miles long. Because it would be an underground route it would be an entirely new build line; however, a portion of it would follow Dominion Energy Virginia's existing overhead Lines #2035 and #202. The route would be constructed primarily within the roadbed of existing roads and within the Company's existing right-of-way along the Washington and Old Dominion Regional Park (W&OD Park).

The route would follow Dominion Energy Virginia's existing Line #2035 for about 0.2 mile out of the Idylwood Substation, through means of open trenching, heading north across Shreve Road. At the W&OD Park, the route turns west to follow Line# 202 parallel with the park for 0.1 mile before crossing under Interstate 66 (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. Along this portion of the route, a horizontal directional drill (HDD) (two parallel drill paths) would be used for approximately 0.6 mile, following the W&OD Park trail and crossing under I-66 (and the WMATA Orange Line), and I-495, with temporary workspace located near approximate mileposts (MP) 0.2 and 0.9. About 0.4 mile west of the Cedar Lane crossing, the route heads north behind residences on the west side of Malraux Road for 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 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. The route then turns west to follow Tyco Road for about 0.1 mile before entering the Tysons Substation.

2.1.2 Underground Alternative 02

Underground Alternative 02 is 5.0 miles long. Because it would be an underground route, it would be an entirely new build line; however, about 0.2 mile of it would follow Dominion Energy Virginia's existing overhead Line #2035 out of the Idylwood Station. 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 through means of open trenching, heading north across Shreve Road. The route would diverge from Line 2035 and cross under the W&OD Park before crossing under I-66 (and the WMATA Orange Line), and entering Idylwood Park. The I-66 crossing requires a HDD (two parallel drill paths) crossing about 0.1 mile in length with temporary workspace located in in Idylwood Park to the north and within the W&OD Park to the south. The route turns northeast for about 0.1 mile before leaving the park and crossing Virginia Lane. After crossing Virginia Lane the route follows Hurst Street for about 0.3 mile before turning west on Idylwood Road and crossing under Senseney Lane. The route veers northwest onto Helena Drive for about 0.2 mile, crossing Providence Street. The route crosses I-495 via a liner plate tunnel installation about 0.1 mile in length extending onto Railroad Street crossing Coal Train Drive and Morgan Lane while turning west. Another HDD, about 0.3 mile long would be used to

construct the route as it continues west along an unpaved Fairfax County right-of-way before rejoining Railroad Street where the construction method returns to conventional trenching approximately 0.2 mile, crossing 4th Place, Arden Street, Journey Drive, and Gallows Road. 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 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. The route then turns west to follow Tyco Road for about 0.1 mile before entering the Tysons Substation.

2.1.3 Underground Alternative 03

Underground Alternative 03 is 4.6 miles long. Because it would be an underground route, it would be an entirely new build line; however, about 0.2 mile of it would follow Dominion Energy Virginia's existing overhead Line #2035 out of the Idylwood Station. 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 through means of open trenching, heading north across Shreve Road. The route would diverge from Line #2035 and cross the W&OD Park before crossing under I-66 (and the WMATA Orange Line), and entering Idylwood Park. The I-66 crossing requires a HDD (two parallel drill paths) crossing about 0.1 mile in length with temporary workspaces located in in Idylwood Park to the north and within the W&OD Park to the south. The route turns northeast for about 0.1 mile before leaving the park and crossing Virginia Lane. After crossing Virginia Lane the route follows 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 under I-495 via a liner plate tunnel installation about 0.1 mile in length extending onto Railroad Street, crossing Coal Train Drive and Morgan Lane while turning west. Another HDD, about 0.3 mile long would be used to construct the route as it continues west along an unpaved Fairfax County right-of-way before rejoining Railroad Street where the construction method returns to conventional trenching for approximately 0.2 mile crossing 4th Place, Arden Street, and Journey Drive. 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 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. The route then turns west to follow Tyco Road for about 0.1 mile before entering the Tysons Substation.

2.1.4 Underground Alternative 04

Underground Alternative 04 is 4.5 miles long. Because it would be an underground route it would be an entirely new build line; however, about 1.0 mile would follow Dominion Energy Virginia's existing overhead Lines #2035 and #202. The route would be constructed primarily within existing roadbeds.

The route would follow Dominion Energy Virginia's existing Line #2035 for about 0.2 mile out of the Idylwood Substation, through means of open trenching 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 along the W&OD Park trail through means of a HDD (two parallel drill paths) for about 0.6 mile, crossing under I-495, Nottingham Drive, and Sandburg Street, with additional temporary workspaces (ATWS) located near about MP 0.2 and 0.9. The route continues for about 1.6 miles, turning north, 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, 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 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. The route then turns west to follow Tyco Road for about 0.1 mile before entering the Tysons Substation.

2.1.5 Underground Alternative 05

Underground Alternative 05 is 4.3 miles long. Because it would be an underground route it would be an entirely new build line; however, a portion of it would follow Dominion Energy Virginia's existing overhead Lines #2035 and #202. The route would be constructed primarily within existing roadbeds.

The route would follow Dominion Energy Virginia's existing Line #2035 out of the Idylwood Substation for about 0.2 mile through means of open trenching, 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 through means of an HDD (two parallel drill paths) for about 0.6 mile, crossing I-495, Nottingham Drive, and Sandburg Street with ATWSs located near about MP 0.2 and 0.9. The route continues for about 1.9 miles, turning north 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.

2.1.6 Underground Alternative 06

Underground Alternative 06 is 4.7 miles long. Because it would be an underground route, it would be an entirely new build line; however, a portion of it would follow Dominion Energy Virginia's existing overhead Lines #2035 and #202. The route would be constructed primarily within existing roadbeds.

The route would follow Dominion Energy Virginia's existing Line #2035 out of the Idylwood Substation for about 0.2 mile through means of open trenching, 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 through means of an HDD (two parallel drill paths) for about 0.6 mile, crossing I-495, Nottingham Drive, and Sandburg Street with ATWS located near about MP 0.2 and 0.9. The route continues for 1.9 miles, turning north 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 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.

2.1.7 Variations to Underground Alternatives

As discussed above, the Company hosted three Focus Group meetings with representatives from the local communities. One of the items of concern identified at the Focus Group meetings was the potential impact on users of the W&OD Park trail. The trail is heavily used by bicyclists (both for recreation and commuting) and pedestrians. Construction of several of the underground routes would require trail closures and reroutes, disrupting use of the trail. During one of the Focus Group meetings, the participants identified potential variations to Underground Alternatives 01, 04, 05, and 06 that would avoid or reduce construction impacts along the W&OD Park trail by diverting the routes off of the trail. Four potential variations were identified (Variations A, B, C, and D) (see Figure 2.1.7-1 in Appendix B).

Variation A is 1.6 miles long and begins at the point where Underground Alternatives 01, 04, 05, and 06 reach I-66 after leaving the Idylwood Substation. At I-66, Variation A turns southwest, parallel to the southeast side of I-66, crossing the I-66/I-495 interchange until reaching Gallows Road. At Gallows Road, the route would turn north, crossing I-66 (and the WMATA Orange Line), and continue within the Gallows Road right-of-way. After crossing the W&OD Park, Variation A would rejoin Underground Alternative 01, which would continue west along the trail, and 04, 05, and 06, which would continue north on Gallows Road.

Variation B is 1.3 miles long and initially follows a similar route as Variation A. Variation B would deviate from Variation A where the routes cross the I-66/I-495 interchange. Instead of continuing south, Variation B would head west across I-66 and continue along an undeveloped Fairfax County easement that connects to Cottage Road. Variation B would continue west

within the Cottage Road right-of-way until reaching Gallows Road, where the route would veer north within the Gallows Road right-of-way until crossing the W&OD Park trail and rejoining Underground Alternatives 01, 04, 05, and 06.

Variation C is about 0.6 mile long, beginning at a point immediately after Underground Alternatives 01, 04, 05, and 06 cross under I-66 (and the WMATA Orange Line). At this point, Variation C would head south across a NOVA Parks property and two commercial properties along the west side of I-66 until turning west along an undeveloped Fairfax County easement that connects to Cedar Street. Variation C would continue west within the Cedar Street right-of-way until reaching Gallows Road, where the route would veer north within the Gallows Road right-of-way until crossing the W&OD Park trail and rejoining Underground Alternatives 01, 04, 05, and 06.

Variation D is about 0.4 mile long and, similar to Variation C, would begin at a point immediately after Underground Alternatives 01, 04, 05, and 06 cross under I-66 (and the WMATA Orange Line). At this point, Variation D would veer southwest through a NOVA Parks property until turning west and following an undeveloped Fairfax County easement that connects to Iliff Drive. Variation D would continue west within the Iliff Drive right-of-way until reaching Gallows Road, where the route would veer north within the Gallows Road right-of-way until crossing the W&OD Park trail and rejoining Underground Alternatives 01, 04, 05, and 06.

If implemented, these variations would reduce the length of underground construction along the W&OD Park trail from between 0.3 to 0.6 mile, avoiding the need to shut down this portion of the trail to users during construction. Although the variations reduce the length of the alternative routes along the W&OD Park trail, they result in routes that are longer than Underground Alternatives 01, 04, 05, and 06.

In addition, these variations would result in other impacts that would not occur along the corresponding section of the Underground Alternatives. The variations would require new right-of-way versus the corresponding sections of Underground Alternatives 01, 04, 05, and 06, which would be located within the Company's existing right-of-way within the W&OD Park. In addition, while the variations primarily are located within existing road and VDOT limited access rights-of-way, they would be in close proximity to homes versus the corresponding section of the Alternative routes, which would result in temporary disruption to residents during construction. Variations A and B would require clearing trees along the east side of I-66 in the VDOT limited access right-of-way, between the freeway and residences, which is restricted by VDOT regulations. Variations C and D would require tree clearing in a NOVA Parks owned parcel and along two undeveloped Fairfax County designated road rights-of-way. In addition, Variations A, B, and C would conflict with VDOT's Transform 66 Outside the Beltway plan, which would add lanes along I-66 from the I-495 interchange south to Gainesville and include extensive changes to the I-66/I-495 interchange (VDOT, 2017).

In an effort to avoid the impacts associated with the variations and reduce impacts on the W&OD Park trail, the Company's engineers investigated a variety of underground construction methods/techniques. The Company's engineers determined that the HDD crossing of I-66 and I-495 that would be required for Underground Alternatives 01, 04, 05, and 06 could be extended along the trail to avoid open trenching between I-66 and Gallows Road. The HDD construction method would result in the transmission line being drilled under the trail, thereby reducing the need to close this segment of the trail for any significant duration. Given their more significant environmental impacts and the use of HDD construction to avoid trenching along the W&OD

Park trail, there is no obvious advantage to these variations; therefore, the Company rejected them from further consideration.

2.2 RIGHT-OF-WAY WIDTHS

2.2.1 Right-of-Way Widths

Dominion Energy Virginia will utilize a maximum 30-foot-wide right-of-way for all of the Underground Alternatives.

2.3 CONSTRUCTION, OPERATION, AND MAINTENANCE PROCESS

Construction of new underground transmission lines may involve some or all of the steps listed below:

- detailed survey of the route alignment;
- right-of-way acquisition and clearing;
- construction of access roads, where necessary; and
- final clean-up and land restoration.

2.3.1 Underground Construction

A 4.5-foot-wide by 2.5-foot-deep concrete-encased duct bank would be constructed. To construct this duct bank, a 4.5-foot-wide trench would be excavated through means of an excavator and supported with trench box shoring. Excavated spoils would be hauled off to an appropriate disposal location. Eight 8-inch polyvinyl chloride (PVC) conduits (plus four 2-inch PVC conduits installed for sheath bonding cables and protective relaying) would be placed within the trench bottom, segments ends joined together, and placed in spacers for maintained separation. Ready-mix concrete would be poured into the trench encasing the cables and creating the duct bank. This duct bank would be located 3.5 feet below final grade, covered by approved fluidized thermal backfill and of native backfill (soil). Final asphalt, sidewalk, and/or greenspace restorations take place once backfilling operations have been completed.

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. A bundle of four 10-inch high-density polyethylene 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 high-density polyethylene conduits. The depth of the conduits would range from 5 to 50 feet below the surface, determined based on design requirements of the drill path.

Certain features (e.g., limited access highways, high traffic roads, certain buried utilities or environmental resources) could require the use of the HDD construction method. To begin each crossing, a drill rig would be placed on the entry side of the HDD and an approximately 8-inch pilot hole would be drilled along a predetermined path beneath the feature. The pilot hole would be progressively enlarged through a process called reaming. A reaming tool would be installed at the end of the drill string on the exit side of the pilot hole, and then drawn back to the drill rig to enlarge the hole. Several passes with progressively larger reaming tools could be needed to enlarge the hole to a sufficient diameter to accommodate the conduit. During this process, drilling fluid, or mud, consisting of bentonite clay and water would be circulated through the hole to remove drill cuttings and maintain the integrity of the hole. Once the reaming

process is complete, a prefabricated segment of pipe conduit would be attached to the drill string on the exit side of the crossing, and pulled back through the hole toward the drill rig. This process would be repeated for each individual conduit installed at the crossing. The Company has preliminarily designed three HDDs along common segments of Underground Alternatives 02 and 03 and one HDD along common segments of Underground Alternatives 01, 04, 05, and 06. The approximate locations of these HDD's, subject to final engineering, are noted in the route descriptions below.

Certain locations (e.g., limited access roadways) may require crossing using the liner plate installation method. A 2 to 3-foot tunnel is first excavated and then a 2-foot section of steel plate is installed. This process is repeated with each new section of liner plate bolted onto the previously installed section until the crossing is completed creating a solid tunnel lining. All excavated materials will be disposed of at an approved disposal facility.

2.3.2 Maintenance

Maintaining the right-of-way for a transmission line is essential for the reliable operation of the line, as well as public safety. Operation and maintenance of the line would consist of periodic inspections of the line and the right-of-way. Maintenance of underground transmission lines is required by the Company every five years per its routine maintenance program. Access to manholes located along the route within roadways and shoulder lanes require obtaining Maintenance of Traffic Plans and approved street permitting, prior to any inspection work. The Company is required by VDOT Operations Center to be notified daily during routine maintenance work for a particular inspection period. In locations next to manholes where parking meters are present, the Company is required to make payment for the duration of the time routing manhole inspections are scheduled to take place. The appropriate entities (e.g., private land owners, schools, traffic engineering) would be notified in advance of any inspections. A 20-foot-wide area centered on duct bank would remain cleared of large trees and shrubs in non- paved areas.

3.0 INVENTORY OF EXISTING CONDITIONS

Once ERM defined the study area, a list of routing criteria to help guide the routing process and provide a basis for comparing potential routes was developed (see Table 3-1). The routing criteria include routing constraints (e.g., sensitive environmental resources) and routing opportunities (e.g., existing corridors) as described in more detail in Section 4. ERM inventoried existing conditions, routing constraints, and routing opportunities using information obtained from publicly-available GIS databases, agency websites and databases, published documents such as county or municipal land use plans, and communication with agency and county staff, stakeholders, and elected officials. In those cases where GIS data were not available for a particular environmental resource or other feature, ERM obtained the best available hard-copy or online map and hand digitized the information needed to complete the study.

The existing conditions along each route alternative that were identified are discussed below. Table 3-1 identifies the categories of environmental features considered in the study. Descriptive information regarding these features is provided in subsequent sections.

3.1 LAND USE CONSTRAINTS

3.1.1 Land Ownership

ERM quantified information on land ownership in the Project area using publicly-available GIS databases and digital tract data obtained from the Fairfax County GIS & Mapping Department. These data indicate that the majority of the lands crossed by the route alternatives are privately owned or existing road rights-of-way with smaller portions of federal, state, county, and municipal land, and land for which ownership is not listed. Figure 3.1.1-1 in Appendix B depicts land ownership along each route alternative.

TABLE 3-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Routing Constraints and Opportunities Considered in the Study Area

Constraint Type	Description
Land Use Constraints	
Land Ownership	• Federal, state, and local government lands • Private Lands
Recreational Areas	• National, state, county, or municipal parks in the project vicinity • Federal, state, county, or municipal managed recreation areas crossed • Golf courses • Recreation trails (biking, hiking, birding, wildlife)
Existing Land Use and Land Cover	• Existing subdivisions • Land cover types (e.g., forest, agricultural, developed) • Residences, churches, schools, cemeteries
Land Use Planning and Zoning	• Zoning Districts
Planned Developments	• Planned or Proposed Residential, Commercial, or Industrial Developments
Conservation Lands	• Virginia Outdoors Foundation and Virginia Department of Conservation and Recreation conservation land and easements • Fairfax County protected open space • Other conservation lands
Transportation	• Road and railroad crossings, crossings of limited access highways
Environmental Constraints	
Surface Waters	• Wetlands • Waterbodies
Land Cover	• Forested Lands
Protected or Managed Areas	• Resource Protection Areas
Protected Species	• Stream Conservation Units • Natural Heritage Resources • Threatened and Endangered Species • Bald Eagles
Vegetation	• Vegetation Characteristics • Virginia Department of Forestry medium and high priority forests
Visual Constraints	
Visually Sensitive Areas	• Viewsheds to and from Visually Sensitive Areas
Cultural Resources Constraints	
Historic Properties	• Sites Listed in or Eligible for Listing in the National Register of Historic Places
Other Cultural Resource Sites	• Archaeological Sites • Historical or Architectural Sites • Prehistoric and Historic Sensitivity Areas • Battlefields • Virginia Department of Historic Resources Protect Easements
Geological Constraints	
Mineral Resources	• Mines or Mining Areas
Engineering Constraints	
Length	• Length of Routes
Existing Electric Facilities	• Transmission or Distribution Lines
Greenfield Construction	• New Corridor (i.e., not adjacent to existing corridor)
HDD Construction	• Number of HDD crossings required for Underground Alternatives
Routing Opportunities	
Land Use Planning	• Designated Utility Corridors
Existing Electric Facilities	• Transmission or Distribution Lines
Other Utilities	• Pipelines
Transportation Infrastructure	• Roads or Railroads

Underground Alternative 01 crosses one parcel owned by the Town of Vienna. This parcel is associated with the crossing of Electric Avenue near MP 2.3 and appears to be a road right-of-way. Underground Alternative 01 crosses and parallels the NOVA Parks-owned W&OD Park. Additionally, Underground Alternative 01 crosses multiple roads owned by VDOT.

Underground Alternatives 02 and 03 both cross one Fairfax County Park Authority-owned parcel and one Board of Supervisors-owned parcel for a total of about 0.2 mile. The Park Authority parcel is associated with Idylwood Park. These routes also both cross the NOVA Parks-owned W&OD Park in one location. Additionally, Underground Alternatives 02 and 03 cross multiple roads owned by VDOT.

Underground Alternatives 04, 05, and 06 all follow and cross the NOVA Parks-owned W&OD Park, while the remaining parcels are all privately owned or road rights-of-way. Additionally, these routes all cross multiple roads owned by VDOT.

3.1.2 Recreation Areas

ERM identified recreation areas through review of digital data sets and maps, U.S. Geological Survey (USGS) topographic quadrangles, recent digital aerial photography, and the Fairfax County website. This review identified a variety of recreation areas either crossed or located within 0.25 mile of route alternatives. These are described below (ordered alphabetically) and shown on Figure 3.1.2-1 in Appendix B. In addition to the recreation areas discussed below, Fairfax County has a database of swimming pools located within the County. The majority of these pools are private pools associated with apartment complexes and hotels. Table 3.1.2-1 lists the swimming pools, excluding those associated with hotels, located within 0.25 mile of the route alternatives. None of the swimming pools are directly crossed by any of the route alternatives.

TABLE 3.1.2-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County Swimming Pools Located within 0.25 mile of Underground Alternatives

Pool Name	Route Alternatives within 0.25 mile
Archstone Tysons Corner Swimming Pool	Underground Alternatives 01, 02, 03 and 04
Avalon Crescent Swimming Pool	Underground Alternatives 05 and 06
Equinox Fitness Club Swimming Pool	Underground Alternatives 03, 04, 05, and 06
Fountains of McLean Swimming Pool	Underground Alternatives 05 and 06
Kilmer Center Swimming Pool	Underground Alternatives 03, 04, 05, and 06
Lillian Court Swimming Pool	Underground Alternatives 01, 02, 03, 04, 05, and 06
Lofts at Park Crest Swimming Pool	Underground Alternatives 05 and 06
One Park Crest Swimming Pool	Underground Alternatives 05 and 06
Park Crest Building 2	Underground Alternatives 05 and 06
Reserve at Tysons Corner 1 Swimming Pool	Underground Alternatives 03, 04, 05, and 06
Reserve at Tysons Corner 2 Swimming Pool	Underground Alternatives 03, 04, 05, and 06
Rotonda Swimming Pool	Underground Alternatives 01, 02, 03, 04, 05, and 06
Tysons Manor Swimming Pool	Underground Alternatives 02, 03, 04, 05, and 06
Tysons Sport and Health Swimming Pool	Underground Alternatives 01, 02, 03, 04, and 05
Tysons Westpark Swimming Pool	Underground Alternatives 01, 02, 03, and 04
Wein Private Day School Swimming Pool	Underground Alternative 01
YMCA National Capital Swimming Pool	Underground Alternatives 03, 04, 05, and 06

Arbor Row Stream Valley Park

Arbor Row Stream Valley Park is located off of Westpark Drive. The park was recently developed with sports fields, as well as a walking path and pedestrian bridge. The sports fields opened for use in May 2015. The two fields cover about 8.0 acres of land and are multi-sport fields. One of the fields is a permanent field, while the other sits on the site of a future elementary school. The stream channel along the park was regraded and had extensive restoration work done. Additionally, an asphalt trail, pedestrian bridge, and new landscaping were added to the space (Fairfax County, 2015a). Arbor Row Stream Valley Park is located within 0.25 mile of Underground Alternative 06.

Briarcliff Park

Briarcliff Park is located at the end of Silentree Drive, near Kilmer Middle School and the Peace Baptist Church. It is densely covered in tree canopy. It is about 5.5 acres in size and is classified as a local park, meaning it is designed for the surrounding neighborhoods to use (Fairfax County, 2011). Briarcliff Park is located within 0.25 mile of Underground Alternative 02.

Dunn Loring Park

Dunn Loring Park is a Fairfax County park located off of Gallows Road near the intersection of Revatom Court (Fairfax, 2015a). There is a playground with multiple swing sets and a play structure, as well as basketball courts and tennis courts. The entire park is surrounded by walking paths. Additionally, there is a covered picnic area with four tables and two grills. Dunn Loring Park is located within 0.25 mile of Underground Alternatives 01, 04, 05, and 06.

Freedom Hill Elementary School

Freedom Hill Elementary School is located off of Lord Fairfax Road, near the intersection of Brandywine Drive. The Freedom Hill Elementary playground has sports fields and play structures available for the public. Freedom Hill Elementary is located within 0.25 mile of Underground Alternatives 02, 03, 04, 05, and 06.

Freedom Hill Park

Freedom Hill Park is a Fairfax County park located off of Old Courthouse Road, just past the intersection with Battery Park Street. The park has swings, a play structure with slides, and a grassy area. There are also picnic tables and benches available. Freedom Hill Park is located within 0.25 mile of Underground Alternatives 01, 02, 03, and 04.

Garden Apartments Recreation Area

Garden Apartments Recreation Area is located off of International Drive, near the intersection of Lincoln Circle. This is an outdoor recreation area with multiple sports courts, including four tennis courts and a basketball court. Garden Apartments Recreation Area is located within 0.25 mile of Underground Alternatives 01, 02, 03, 04, 05, and 06.

Great Falls Loop – Virginia Birding and Wildlife Trail

The Virginia Birding and Wildlife Trail network consists of over 600 viewing sites for bird and wildlife viewing in the Commonwealth. The Great Falls Loop of the Virginia Birding and Wildlife

Trail begins west Washington D.C, following the Potomac River, continuing northwest along the George Washington Memorial Parkway through the Project study area. The trail follows the Potomac River upstream through the Great Falls National Park, to the northernmost site at Riverbend Park. Following I-495, the loop travels through several habitats, ranging from extensive forests to narrow riparian corridors. The Great Falls Loop Trail generally follows major roadways leading to viewing sites however there are no viewing sites in the study area. All of the underground alternatives cross the Great Falls Loop upon crossing I-495 in the vicinity of Idylwood and Dunn Loring.

Idylwood Park

Idylwood Park is a Fairfax County park located off of I-66, near the intersection of Virginia Lane. Idylwood Park has a softball field, a baseball field, two tennis courts, a soccer field, walking trail, as well as a playground with a swing set. Idylwood Park is crossed by Underground Alternatives 02 and 03, and is located within 0.25 mile of Underground Alternatives 01, 04, 05, and 06.

Jones Branch Park

Jones Branch Park is a Fairfax County park that consists of two turf athletic fields and is located off of Westpark Drive. Jones Branch Park was one of the first new parks to open in Tysons as part of the Tysons Park System Concept Plan. The conceptual plan was intended to stimulate public involvement and help bring about future park development. Aside from the athletic fields, the park features a restored stream valley. Jones Branch Park is located within 0.25 mile of Underground Alternative 06.

Kilmer Middle School

Kilmer Middle School is a Fairfax County public school located off of Gallows Road near the intersection of Wolftrap Road. Kilmer Middle School has two athletic fields and four tennis courts located on the campus. One of the athletic fields has a running track around the grass area. Kilmer Middle School is located within 0.25 mile of Underground Alternatives 03, 04, 05, and 06.

McLean Hamlet Park

McLean Hamlet Park is a Fairfax County park located behind the McLean Hamlet community off of Dunsinane Court. The park is wooded with some paths available for walking. The park is located behind the Hamlet Swim and Tennis Club. McLean Hamlet Park is located within 0.25 mile of Underground Alternative 06.

Old Courthouse Spring Branch Stream Valley Park

Old Courthouse Spring Branch Stream Valley Park is a Fairfax County park located off of Palm Springs Drive, near the intersection of Doral Court. The park is about 33 acres and is an ecologically-sensitive area. The park is located within 0.25 mile of Underground Alternatives 01, 02, 03, and 04.

Our Lady of Good Counsel School

Our Lady of Good Counsel School is located at the intersection of Niblick Drive Southeast and Notre Dame Drive on property owned by the Catholic Church. The recreation area associated with the school has an outdoor playground and playing fields. Our Lady of Good Counsel is located within 0.25 mile of Underground Alternatives 01 and 02.

Park at Tysons II

The Park at Tysons II is an approximately 2-acre Fairfax County park located off of Tysons Boulevard near the intersection of Westbranch Drive. This park is designed to be a plaza area with seating, as well as a lawn area with perennial plantings (Fairfax County, 2015a). Park at Tysons II is located within 0.25 mile of Underground Alternatives 05 and 06.

Raglan Road Park

Raglan Road Park is located off of Raglan Road. This Fairfax County park is densely forested, but has a small grassy field for playing. Raglan Road Park is located within 0.25 mile of Underground Alternatives 01, 02, 03, and 04.

Rotonda Condominiums

The Rotonda Condominiums, located off of International Drive, include a private recreational area for use by residents of the condominiums. There is an outdoor pool and spa and indoor pool and sauna available for use. Additionally, there are outdoor basketball courts, tennis courts, and soccer fields available for use by the residents, as well as a sand volleyball court and a putting green. There is a fitness trail on the property for residents, as well as outdoor exercise equipment available for use. An off-leash dog park is also located on site. Rotonda Condominiums is located within 0.25 mile of all of the Underground Alternatives.

Ruckstuhl Park

Ruckstuhl Park is an approximately 7-acre Fairfax County park located off of Idylwood Road near the intersection of Dunford Drive. The master plan for this park, which was approved in October of 2015, is to have a walking trail around the entire park, a picnic area, a nature playground and education area, an open play area, and a cultural interpretation spot, as well as parking (Fairfax County, 2015a). Ruckstuhl Park is located within 0.25 mile of Underground Alternatives 02 and 03.

South Railroad Street Park

South Railroad Street Park is located off of Railroad Street, near the intersection of 4th Place. A large play structure with multiple slides, monkey bars and a climbing wall are available on site. There are also picnic tables and a walking path for visitors of the park to enjoy. South Railroad Street Park is located adjacent to an ATWS associated with Underground Alternatives 02 and 03 and is located within 0.25 mile of Underground Alternatives 04 through 06.

Tysons Woods Park

Tysons Woods Park is a Fairfax County park located off of Malraux Drive, near the intersection of Richelieu Drive. The park has two play structures and a swing set on site. The park also has

a shaded walking path for visitors to enjoy. Tysons Woods Park is located within 0.25 mile of Underground Alternatives 01 and 02.

Washington and Old Dominion Railroad Regional Park

W&OD Park is located along the former roadbed of the Washington & Old Dominion Railroad. The park runs approximately 45 miles from Shirlington to Purcellville, and includes a paved trail designed for walking, hiking, and biking, that 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 (NOVA Parks, 2017). All of the Underground Alternatives would either cross or extend along the W&OD Park for varying distances. The Company has an existing easement along the park.

3.1.3 Existing Land Cover

Existing land cover within the Project area was identified using the National Land Cover Database data layer. Existing land cover for each route alternative is depicted on Figure 3.1.3-1 in Appendix B and quantified in Table 4-1.

ERM identified buildings (including dwellings) within 500 feet of each route through review of various digital data sets and maps, USGS topographic quadrangles, and current aerial photography. Features found within 500 feet of Project route alternatives include churches, cemeteries, and schools, as well as other public, residential, commercial, and industrial buildings.

Residences were identified within 500, 200, and 100 feet of the route centerlines as well as residences within 60 feet of the edge of new right-of-way and dwellings located within the right-of-way. The development of new right-of-way within 60 feet of a residence would invoke the provisions of Va. Code § 56-49. The number of residences and their proximity to each route alternative are provided in Table 4-1 and are categorized by whether the residences are within proximity of the existing right-of-way or the new/expanded permanent right-of-way. Table 4-1 also quantifies the number of outbuildings, industrial/commercial buildings, and multi-family residential buildings located in the existing right-of-way and expanded/new right-of-way.

Underground Alternative 01

There are two churches and one school located within 500 feet of Underground Alternative 01. At MP 1.0, the route passes 250 feet north of the Vietnamese Alliance Church and 370 feet north of Dunn Loring Community Church, both located along Gallows Road and Bright Meadows Lane. At MP 4.7, Underground Alternative 01 passes 150 feet east of Bright Horizons Early Education Center located on Greensboro Drive in Tysons.

Underground Alternative 01 crosses primarily developed land and developed open space. 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 route heads north through residential areas of south of Tysons before crossing into commercial mixed-use development south of the Dulles Toll Road.

Underground Alternative 02

There is one school located within 500 feet of Underground Alternative 02. At MP 4.6, the route passes 150 feet east of Bright Horizons Early Education Center located on Greensboro Drive in Tysons.

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.

Underground Alternative 03

There are three schools and one church located within 500 feet of Underground Alternative 03. At MP 1.9, Underground Alternative 03 passes Kilmer Middle School, located 480 feet west of the route on Wolftrap Road. Also within 480 feet is the Chinese Bible Church of Fairfax, which uses space at Kilmer Middle School. Near MP 2.7 the route passes within 500 feet of the Freedom Hill Elementary School located on Lord Fairfax Road. At MP 4.3, the route passes 150 feet east of Bright Horizons Early Education Center located on Greensboro Drive in Tysons.

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.

Underground Alternative 04

There are three churches and three schools located within 500 feet of Underground Alternative 04. At MP 1.0, the route passes 250 feet north of the Vietnamese Alliance Church and 370 feet north of Dunn Loring Community Church, both located along Gallows Road and Bright Meadows Lane. At MP 1.7, Underground Alternative 04 passes Kilmer Middle School, located 480 feet west of the route on Wolftrap Road. Also within 480 feet is the Chinese Bible Church of Fairfax, which uses space at Kilmer Middle School. Near MP 2.6 the route passes within 500 feet of the Freedom Hill Elementary School located on Lord Fairfax Road. At MP 4.2, the route passes 150 feet east of Bright Horizons Early Education Center located on Greensboro Drive in Tysons.

Underground Alternative 04 crosses primarily developed land. 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 of south of Tysons before crossing into commercial mixed-use development near the route terminus south of the Dulles Toll Road.

Underground Alternative 05

There are three churches and two schools located within 500 feet of Underground Alternative 05. At MP 1.0, the route passes 250 feet north of the Vietnamese Alliance Church and 370 feet north of Dunn Loring Community Church, both located along Gallows Road and Bright Meadows Lane. At MP 1.7, the route passes Kilmer Middle School, located 480 feet west of the route on Wolftrap Road. Also within 480 feet is the Chinese Bible Church of Fairfax, which uses space at Kilmer Middle School. Near MP 2.6, the route passes within 500 feet of the Freedom Hill Elementary School located on Lord Fairfax Road.

Underground Alternative 05 crosses primarily developed land. 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 4.3, Underground Alternative 05 heads north through residential areas of south of Tysons before crossing into commercial mixed-use development near the route terminus south of the Dulles Toll Road.

Underground Alternative 06

There are three churches and two schools located within 500 feet of Underground Alternative 06. At MP 1.0, the route passes 250 feet north of the Vietnamese Alliance Church and 370 feet north of Dunn Loring Community Church, both located along Gallows Road and Bright Meadows Lane. At MP 1.7, the route passes Kilmer Middle School, located 480 feet west of the route on Wolftrap Road. Also within 480 feet is the Chinese Bible Church of Fairfax, which uses space at Kilmer Middle School. Near MP 2.6 the route passes within 500 feet of the Freedom Hill Elementary School located on Lord Fairfax Road.

Underground Alternative 06 crosses primarily developed land. 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 of south of Tysons before crossing into commercial mixed-use development near the route terminus south of the Dulles Toll Road.

3.1.4 Planned Developments

ERM obtained information on planned future developments through publicly-available data on county websites, and consultations with county and city planning officials and other stakeholders. Planned developments located within 0.25 mile of an alternative are described below, listed in alphabetical order. Unless otherwise noted, information on these planned developments was found in the Tysons 2016-2017 Progress Report on the Implementation of the Comprehensive Plan (Fairfax County Virginia, 2017a). These planned developments are also depicted on Figure 3.1.4-1 of Appendix B.

1690 Old Meadow Road

The 1690 Old Meadow Road development is a mixed-use development currently under review located between Dolley Madison Boulevard and Old Meadow Road. The development site currently has a two-story office building located on it, which would be demolished and replaced with a new single office tower with first floor retail. The development is estimated to add over 800 employees to the building. This development is located within 0.25 mile of Underground Alternative 06.

Arbor Row

The Arbor Row Planned Development is an approved development located along Westpark Drive and Tysons Boulevard. The site area is 19.4 acres and is divided into six sections to incorporate office, hotel, residential, and retail space. Aside from adding these buildings, the development of this project will improve Westpark Drive and Westbranch Drive by adding bike lanes and street parking. Building E, a residential building, has been developed and is leasing space. The development is located within 0.25 mile of Underground Alternative 06.

Boone Boulevard

The Boone Boulevard development is an approved 8.9-acre mixed-use development located between Boone Boulevard and Old Courthouse Road south of Howard Ave. The site is currently developed with two office buildings and a parking. The approved modification to the original development will include the construction of a hotel within the current parking lot. The development is located within 0.25 mile of Underground Alternatives 01, 02, 03, 04, 05, and 06.

The Boro

The Boro is a multi-phase mixed-use development located between Leesburg Pike, Greensboro Drive and Westpark Drive. Construction of this development is currently underway, with a planned completion in 2019. In total, the development will add 14 new, primarily high-rise buildings to Tysons. These include: five apartment buildings with up to 2,010 units, three office towers with up to 1.9 million square feet, 430,000 square feet of retail space, a hotel, seven parks totaling 4.2 acres and a 19,000 square-foot public library. A luxury theater is planned to be built as part of a later development phase with 15 screens and a restaurant. Additionally, this development includes the creation of new streets, including Park Avenue, which will run parallel to Leesburg Pike and Greensboro Drive (Fairfax County, 2016). Underground Alternatives 01, 02, 03, and 04 all run down West Park Drive adjacent to this development.

Dominion Square

Dominion Square has two locations currently under review for development, totaling 19.6 acres in site size. One location is off of Leesburg Pike, near the intersection of Spring Hill Road. The other is also located off of Leesburg Pike, just past the intersection of Spring Hill Road. The proposed development for these sites involves rezoning 12 structures to allow a mix of office buildings, residential, and hotel uses. These sites are currently developed with car dealerships. Additionally, there are transportation improvements proposed, including the extension of Boone Boulevard. Both sites are located within 0.25 mile of Underground Alternative 03.

The Evolution

The Evolution planned development would be located along Leesburg Pike between Spring Hill Road and Westpark Drive and is currently under review. The site currently contains a seven-story commercial building which would be demolished to make way for 1,400 Workforce Dwelling Units. Current plans include parks and greenspaces as well as the creation of a new road (State Street), as well as the extension of an existing road (Broad Street). The development is located within 0.25 mile of Underground Alternatives 01, 02, 03, and 04.

Greensboro Park Place

Greensboro Park Place is an approved development located between International Drive and Greensboro Drive. This site is about 7 acres and is currently developed with office buildings. The approved redevelopment plan will add residential space and ground floor retail units, while maintaining the existing office buildings. Underground Alternative 05 follows International Drive, adjacent to the property.

International Place at Tysons

International Place at Tysons is a planned 5.4-acre mixed-use development located between Leesburg Pike, Gallows Road, and Boone Boulevard. This development was recently approved and comprises a mixed-use building with ground level retail and dining and residential living spaces above. Discussions about public facilities, recreation areas, building standards, and stormwater management goals are still ongoing for this development. The plans identify the building as housing about 674 residents. The development is located within 0.25 mile of Underground Alternatives 01, 02, 03, 04, 05, and 06.

The Mile

The Mile is a 38.8-acre mixed-use development located between Westpark Drive and Jones Branch Road. This development is currently under review and comprises 13 mixed-use buildings slated for office, retail, residential, hotel, and storage uses. Discussions about public facilities, recreation areas, building standards, and stormwater management goals are still ongoing for this development. The plans identify the proposed development as accommodating over 5,000 new residents. The development is located within 0.25 mile of Underground Alternative 06.

Park Crest

The Park Crest development is an approximately 13.6-acre mixed-use development that has been ongoing since 2002. The development is located north of Westpark Drive just east of International Drive in Tysons. Current approved plans depict five residential buildings with ground floor retail including a grocery store. There are multiple parks and greenspaces integrated within the development. Plans estimate the developments increasing employee and residents to 172 employees and 2,370 residents. To date, four of the buildings have been completed. This development is located within 0.25 mile of Underground Alternatives 01, 02, 03, 04, 05, and 06.

Spring Hill Station

Spring Hill Station is made up of four different project locations, totaling about 24 acres, all of which are approved for development in the Tysons Comprehensive Plan. Two of the sites are located along Tyco Road, just off of Leesburg Pike. The other two are located off of Spring Hill Road, at the intersection with Leesburg Pike. Seventeen buildings are proposed, including uses for office, residential, hotel, neighborhood serving retail, and a new fire station. All four of the sites are located within 0.25 mile of all of the Underground Alternatives.

Towers Crescent

Towers Crescent is an approved development located off of Towers Crescent Drive. The project site is about 18 acres and will add residential space to the area. The development aims to add three residential towers, which may include ground floor retail. It is located within 0.25 mile of Underground Alternatives 05 and 06.

Tysons II

Tysons II is an approved development located along International Drive, near the intersection with Galleria Drive. This site is approximately 107 acres, and is currently developed with the

Tysons Galleria Mall. The planned development includes adding eight office, hotel, and residential buildings to the site. Building H, an 18-story office building, has already been built. The site is located within 0.25 mile of Underground Alternatives 01 through 05, and is crossed by Underground Alternative 06.

Tysons Central

Tysons Central is an approved development located off of Leesburg Pike, near the Greensboro Metro Station. The site is about 6 acres and is currently developed with retail and commercial space. The proposal includes six new buildings to hold office, hotel, residential, and retail spaces. There are two approved layouts for the site, one that maximizes residential space and one that maximizes office space. There is one pending application for this space, and it proposes modifications to one of the buildings to increase office space. Underground Alternatives 01, 02, 03, and 04 all run down West Park Drive adjacent to this development.

Tysons Corner Center

Tysons Corner Center is an approved development located along International Drive near the intersection with Tysons Corner Court. The site is about 79 acres in size and will update the area surrounding the mall by adding office, residential, and hotel use to the area. Phase 1 construction, including the Tysons Tower office building, a 28-story residential building, a Hyatt Regency hotel, and existing retail sites, has been completed. It is crossed by Underground Alternative 06 and within 0.25 mile of Underground Alternative 05.

Tysons Technology Center

The Tysons Technology Center is an approved development located east of Kidwell Drive and north of Sciences Applications Court. The site is already developed with two office buildings and the approved plan will include the construction of a full-size athletic field. The field will measure 180-feet-wide by 360-feet-deep. Other onsite facilities will include two bleachers, bicycle racks, LED lighting, and a 789-space parking garage to be shared with the existing neighboring office buildings. The field is planned to be open between 8 a.m. and 11 p.m. Tysons land use plan recommends one full-size athletic field for every 4.5 million square feet of new development. The field will meet the athletic needs created by The Boro and Westpark Plaza. Construction and an opening date will depend on construction progress of these two other developments. Underground Alternatives 02, 03, 04, 05, and 06 are all located within 0.25 mile of the development.

The View

The View is mixed-use development currently under review located at the corner of Leesburg Pike and Spring Hill Road. The development site currently is occupied by a low-rise office building and car dealerships with service areas. The planned development proposes five buildings, including a 615-foot tall tower, which will have a hotel, retail, and condos. The remaining buildings will house a performing arts center, residential, retail, office space, and a civic plaza. The development is located within 0.25 mile of all of the Underground Alternatives.

Westpark Plaza

Westpark Plaza is an approved mixed-use development to be located at the corner of Leesburg Pike and Westpark Drive, adjacent to The Boro described above. The land was previously

home to the Westpark Hotel. Westpark Plaza plans for two residential buildings totaling up to 1,300 units, a 150- to 300-room hotel, and a retail building/parking garage. These four buildings would be surrounding a large neighborhood park. Two smaller public parks are also planned as part of the development, and one private park is planned to be constructed on top of the parking garage structure (Hemphill, 2016 and Neibauer, 2014). Underground Alternatives 01, 02, 03, and 04 all follow West Park Drive adjacent to this development.

3.1.5 Land Use Planning and Zoning

The Code of Virginia requires every governing body within the state to adopt a plan, called a Comprehensive Plan, to provide guidance for land planning decisions within the territory of its jurisdiction. The Comprehensive Plan identifies and describes the location, character, and extent of existing, proposed, or anticipated land uses, and identifies facilities (e.g., roads, housing, utilities, an libraries) needed to serve current and future residents. Zoning, which is a power granted to governing bodies to regulate land uses, is a tool used by land managers to implement the objectives of the Comprehensive Plan by defining standards for development and permissible uses within different land use categories. Comprehensive Plans are updated every five years to make adjustments for actual or projected changes in land use conditions or needs. Zoning ordinances may be modified by land managers or governing bodies or through requests from residents or businesses to change zoning designations or approve new uses.

Fairfax County has adopted a Comprehensive Plan, Policy Plan, and Zoning Ordinance which guides land use planning and development in the County. ERM obtained GIS data sets for zoning districts from Fairfax County. The Comprehensive Plan is required by state law to be used as a guide in decision-making about the built and natural environment by Fairfax County's Board of Supervisors and other agencies, such as the Planning Commission. The Plan consists of several components. The Policy Plan outlines the objectives, policies, and guidelines to guide planning and development review considerations toward implementing Fairfax County goals. The goals address the future development pattern of Fairfax County, and protection of natural and cultural resources for present and future generations. The four Area Plans (Area I, Area II, Area III, and Area IV) identify key elements for implementing the Policy Plan's goals and objectives at the more detailed Planning District and Community Planning Sector levels.

Because Fairfax County encompasses over 400 square miles with over one million residents living in several densely population urban centers and suburban communities, the Comprehensive Plan and Policy Plan are structured to provide policy direction both broadly and discretely using subcomponent Area Plans, Planning Districts, Community Planning Sectors and Special Planning Areas. Area Plans contain detailed recommendations for land use, transportation, housing, the environment, heritage resources, public facilities and parks and recreation. These recommendations refine the guidance provided in the Policy Plan and were developed within the framework of the County's Concept for Future Development. Each Area Plan is subdivided into Planning Districts, which, in turn, are subdivided into Community Planning Sectors, the smallest geographical components of the Plan.

The Zoning Ordinance of Fairfax County, Virginia, regulates zoning in Fairfax County. It is intended to promote the health, safety and general welfare of the public and to implement the adopted Comprehensive Plan for the orderly and controlled development of the County. It is administered by the Fairfax County Department of Planning & Zoning. The Zoning Ordinance establishes zoning districts separating residential, commercial, and industrial land uses. Each of these broad land use designations contain specific zoning districts that reflect the existing or desired intensity of use or residential density for a given district. The Residential District

regulations, for example, encompass a wide variety of residential districts that span low-density rural agricultural districts to residential districts containing 30 dwelling units per acre. Similarly, the Commercial District regulations differentiate commercial development intensity from low-rise offices to large-scale regional retail centers. To simplify the descriptions of zoning districts crossed by the route alternatives, the broadest zoning district groups described in the Zoning Ordinance are used: Residential, Commercial, Planned Units, and Industrial. Figure 3.1.5-1 in Appendix B depicts the zoning categories crossed by the Underground Alternatives.

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 of 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.

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 the 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.

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 the 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.

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 0.7 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. 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.

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.

ERM reviewed Fairfax County zoning ordinances and Comprehensive Plans for Fairfax County to identify potential conflicts with zoning and the proposed Project. As indicated below, Fairfax County requires a special exception for certain utilities, but exempts transmission lines approved by the SCC pursuant to Va. Code § 56-46.1 F.

Select land use classifications and zoning districts nonetheless were considered routing constraints in this study due to the potential for a transmission line to conflict with existing or planned land uses. These include areas zoned or planned for residential developments or areas designated for preservation as parkland or open space.

3.1.6 Conservation Easements

The Virginia Open-Space Land Act provides for the creation of open-space easements by public bodies as a means of preserving open space or significant natural, cultural, and recreational resources on public or private lands. Most easements created under the Act are held by the Virginia Outdoors Foundation (VOF), but any state agency is authorized to create and hold an open-space easement. The Virginia Conservation Easement Act similarly provides for the creation of conservation easements on public or private lands but under the auspices of charitable organizations (such as conservation trusts) rather than public agencies. In both cases, easements are designed to preserve and protect open space or other resources in perpetuity. Easements negotiated with private landowners allow the lands to remain in private ownership but with protections imposed to limit or restrict land uses on the property.

Virginia Outdoors Foundation

The VOF is Virginia's leader in land conservation, protecting over 675,000 acres across the state. The VOF was created under the Virginia Open-Space Land Act, which provides for the creation of open-space easements by public bodies as a means of preserving open space or significant natural, cultural, and recreational resources on public or private lands. Most easements created under the Act are held by the VOF, but any state agency is authorized to create and hold an open-space easement (VOF, 2015). There are currently no VOF easements that would be crossed by any of the Underground Alternatives. The closest VOF easement is located about 5.0 miles northeast of Underground Alternative 06.

Northern Virginia Conservation Trust

The Northern Virginia Conservation Trust (NVCT) is a nonprofit organization that helps permanently conserve land by working with landowners who voluntarily agree to legal restrictions to conserve their lands. The NVCT follows the national standards and practices of the Land Trust Alliance and is accredited by the Land Trust Accreditation Commission. The NVCT was founded in 1994 and has preserved almost 600 acres in Northern Virginia through easements and land acquisition. There are no NVCT easements that would be crossed by any of the Underground Alternatives.

Agricultural and Forestal Districts

The Virginia Agricultural and Forestal Districts Act provides for the creation of conservation districts (Commonwealth of Virginia, 1997). 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. A district must contain at least 200 acres. Fairfax County has developed Agricultural and Forestal Districts (Fairfax County, 2015b); however, none would be crossed by any of the Underground Alternatives.

Fairfax County Easements

ERM obtained publicly-available information from Fairfax County on various easement types located within the Project area. The Fairfax County Open Space/Historic Preservation Easement Program allows property owners to protect open space, historic resources, scenic

vistas, and sensitive natural areas on their property, allowing these resources to stay in private ownership. Fairfax County has entered into a public-private partnership with the Northern Virginia Conservation Trust, a private non-profit land trust also eligible for holding easements. This partnership does not prevent property owners from putting easements on their properties from other qualified easement holding entities such as county or regional authorities and agencies, as well as local, state, or national non-profit land trusts. Fairfax County conservation easements are depicted on Figure 3.1.6-1 in Appendix B.

The Fairfax County easement data included a variety of easement types that were not specific to standard conservation easements. Fairfax County Planning Department indicated that it would be necessary to review the individual deeds associated with the easements to determine what restrictions may apply. Dominion Energy Virginia is in the process of reviewing the deeds for all parcels crossed that have Fairfax County easements on them to determine whether any restrictions exist on that parcel. In addition to conservation easements, the following easement types have been identified:

- Stormwater conservation;
- Floodplain and Storm Drainage;
- Detention Pond Access;
- Floodplain;
- Building Restriction;
- Storm Drainage;
- Storm Sewer;
- Natural Drainage Easement;
- Pedestrian Bridge;
- Sight Distance;
- Signal Equipment;
- Restrictive Planting; and
- Stormwater Management Access.

Dominion Energy Virginia will continue to work with the Fairfax County to determine what, if any, restrictions apply to these various types of easements.

3.1.7 Other Conservation Lands

ERM obtained information on other conservation lands through review of a digital dataset obtained from the Virginia Department of Conservation and Recreation (VDCR). The dataset identifies "lands of conservation and recreational interest" in Virginia, including federal, state, local, and privately-owned lands. The majority of the VDCR conservation areas that are located in the Project area are associated with Fairfax County parks, which are discussed in more detail in Section 3.1.2. Table 3.1.7-1 lists these areas and which Underground Alternatives cross any of the lands and Figure 3.1.7-1 in Appendix B depicts these conservation lands within the Project area.

TABLE 3.1.7-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Other Conservation Lands Crossed by the Underground Alternatives

Conservation Area	Route Alternatives Crossed
W&OD Park trail	All Underground Alternatives
Idylwood Park	Underground Alternative 02 and 03

3.1.8 Traffic and Transportation

3.1.8.1 Virginia Department of Transportation Regulations

All routing alternatives presented in this report require crossings of rights-of-way under VDOT jurisdiction. The VDOT rights-of-way crossed are limited access highways, which VDOT defines as: a highway especially designed for through traffic over which abutters have no easement or right of light, air, or access by reason of the fact that their property abuts upon such limited access highway. Typically, limited access highways are separated from abutting property by sound barriers and/or treed buffers, and are accessed through ramps to accommodate high volume through traffic. Limited access highways are regulated under the General Rules and Regulations of the Commonwealth Transportation Board (24 VAC 30-151-760).

The Rules and Regulations provide that no work shall be performed on real property under the ownership, control, or jurisdiction of VDOT until written permission has been obtained from VDOT. Real property includes, but is not limited to, the right-of-way of any highway in the state highways system. Written permission is granted either by permit or a state-authorized contract let by VDOT.

Utility construction is regulated specifically in Rules and Regulations in *24 VAC 30-151-310 - Utility installations within limited access highways.* The provisions of this section are provided below and have been used to develop routing options for the Project.

24 VAC 30-151-310. Utility installations within limited access highways.

Utility installations on all limited access highways shall comply with the following provisions:

1. Requests for all utility installations within limited access right-of-way shall be reviewed and, if appropriate, be approved by the Commonwealth Transportation Commissioner prior to permit issuance. *(Authority delegated by the Commissioner to the Chief Engineer)*

2. New utilities will not be permitted to be installed parallel to the roadway longitudinally within the controlled or limited access right-of-way lines of any highway, except that in special cases or under resource sharing agreements such installations may be permitted under strictly controlled conditions and then only with approval from the Commonwealth Transportation Commissioner. *(Authority delegated by the Commissioner to the Chief Engineer)* However, in each such case the utility owner must show the following:

    a. That the installation will not adversely affect the safety, design, construction, operation, maintenance or stability of the highway.

    b. That the accommodation will not interfere with or impair the present use or future expansion of the highway.

    c. That any alternative location would be contrary to the public interest. This determination would include an evaluation of the direct and indirect environmental and economic effects that would result from the

disapproval of the use of such right-of-way for the accommodation of such utility.

d. In no case will parallel installations within limited access right-of-way be permitted that involve tree removal or severe tree trimming.

3. Overhead and underground utilities may be installed within limited access right-of-way by a utility company under an agreement that provides for a shared resource arrangement subject to VDOT's need for the shared resource.

4. All authorized longitudinal utility installations within limited access right-of-way, excluding communication tower facilities, shall be located in a utility area established along the outer edge of the right-of-way. Special exceptions must be approved by the Commonwealth Transportation Commissioner. *(Authority delegated by the Commissioner to the Chief Engineer)*

5. Authorized overhead utility installations within limited access right-of-way shall maintain a minimum of 21 feet of vertical clearance.

6. Authorized underground utility installations within limited access right-of-way shall have a minimum of 36 inches of cover.

7. Service connections to adjacent properties shall not be permitted from authorized utility installations within limited access right-of-way.

8. Overhead crossings shall be located on a line that is perpendicular to the highway alignment.

9. A utility access control line will be established between the proposed utility installation, the through lanes, and ramps.

The Commonwealth Transportation Board (CTB) regulates and funds transportation projects in Virginia. The CTB is a 17-member board appointed by the governor that oversees all VDOT projects. CTB has authority over routing transportation infrastructure, making traffic regulations, and administering funds in the Transportation Trust Fund. The Transform I-66 Outside the Beltway project is an example of a major CTB project that is underway within the study area. A discussion of planned transportation projects is provided in Section 3.1.8.3.

3.1.8.2 Metropolitan Washington Airports Authority

The Dulles Toll Road is operated by MWAA, a public body created with the consent of Congress by the District of Columbia Regional Airports Authority Act of 1985, as amended, and Va. Code §§ 5.1-152 to 5.1-178, as amended. The purpose of this entity is to plan, provide, and actively manage access to the aviation system serving the region. MWAA is governed by a 17-member Board of Directors. The Board establishes policy and provides direction for management. Members of the Board are appointed by the Governors of Virginia and Maryland, the Mayor of Washington, D.C., and the President of the United States.

The Dulles Toll Road is an eight-lane, 14-mile highway in Northern Virginia. The eastern end of the Dulles Toll Road directly connects to the Capital Beltway (I-495) and connects to I-66 via the Dulles Connector Road (east of the Capital Beltway). The Toll Road is located in the Dulles

Corridor, which also carries the Dulles Airport Access Highway and is the location of the Dulles Corridor Metrorail Project.

MWAA has adopted VDOTs regulations specific to limited access highways. Utility construction is thereby regulated by the provisions of *24 VAC 30-151-310 - Utility installations within limited access highways,* as referenced above. None of the Underground Alternatives cross the Dulles Toll Road, therefore these restrictions would not apply to the Project.

3.1.8.3 Planned Transportation Projects

ERM reviewed the Tysons 2016-2017 Progress Report on the Implementation of the Comprehensive Plan as well as Fairfax County Department of Transportation Capital Projects data to determine if there were any planned transportation projects within the study area. A description of each of the projects identified is provided in Table 3.1.8.3-1.

TABLE 3.1.8.3-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Transportation Projects within 0.25 mile of Underground Alternatives

Project Name	Scope	Status	Nearby Route(s)
Electric Avenue and Cedar Lane NB Left Turn Lane	Add 250 linear feet of left turn lane on northbound Cedar Lane at Electric Avenue, including drainage improvements, signal improvements, and a 5-foot concrete sidewalk	Design	Near Underground Alternatives 02, 03, 04, 05, 06
I-495 Express Lanes Ped/Bike at Chain Bridge Road	Both sides from Old Meadow Road to Tysons Boulevard	Design	Near Underground Alternative 06
I-495 Express Lanes Ped/Bike at Idylwood Road (North)	North side from I-495 to Shreve Hill Road	On Hold	Near Underground Alternatives 01, 04, 05
I-495 Express Lanes Ped/Bike at Idylwood Road (South)	South side from I-495 to Whitestone Hill Court	On Hold	Near Underground Alternatives 02, 03, 06
I-66 Inside the Beltway Tolling from I-495 (Capital Beltway) to U.S. Route in Rosslyn	Convert I-66 inside the Beltway into a managed express lane facility in peak directions	Construction	Crossed by all Underground Alternatives
Idylwood Road Trail (TMSAMS)	Construct shared use path from Helena Drive to Idyl Lane on the south side of Idylwood Road	Project Initiation	Crossed by Underground Alternatives 02, 03,
Pavement Marking Plans (TMSAMS)	Install bike lanes on Margarity Road, Westmoreland Street, Madrillon Road through repavement projects	Design	Crossed by Underground Alternatives 03, 04,05, and 06
Route 7 Widening from Route 123 to I-495 (Study Only)	Conceptual Design and traffic operations study to determine future cross section	Study	Crossed by Underground Alternatives 05, 06

3.1.8.4 WMATA Silver Line and Orange Line

The Silver Line, under construction by WMATA, is a 23-mile Metrorail extension connecting the Tysons, Reston, Herndon, and Dulles Airport areas of Fairfax County to the regional Metrorail system. There are four new Silver Line stations located in the Project area: Spring Hill, Greensboro, Tysons, and McLean. The Silver Line is a multi-phased project that incorporates a number of transportation improvements and station-area planning, including pedestrian bridges and paths, bus drop-off/pickup, parking, and bicycle facilities. Within the Project area, the Silver Line follows VA 267 and Leesburg Pike with portions of the line located below ground. All of the Underground Alternatives cross the Silver Line at various locations.

The portion of the Orange Line, an overhead Metrorail line, in the Project area is located in the center of I-66. The Orange Line is crossed by all Underground Alternatives.

3.1.8.5 Road Crossings

ERM identified 37 road crossings along Underground Alternative 01, of which 21 crossings are of county or local roads and 16 are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), I-66 East, I-66 West, I-66 West Exit 64 off ramp, I-495 North, I-495 South, I-495 South Exit 49 Off-Ramp, Nottingham Drive, Sandburg Street, Gallows Road (SR 650), Cedar Lane (SR 698), Electric Avenue (within road), Chestertown Drive, Woodford Road (within road), Connierae Lane, Falcone Pointe Way, Wolftrap Creek, Tysons Court, Bethany Court, Quaint Lane, Wolftrap Road, Woodford Court, Rainbow Road, Black Stallion

Place, Old Courthouse Road (SR 677) (within road), Howard Road, Chain Bridge Road (VA 123), Gosnell Road (SR 939) (within road), Wall Street, Raglan Road, Tyspring Street, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, Westpark Drive (within road), Greensboro Drive (within road), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

ERM identified 52 road crossings along Underground Alternative 02, of which 38 crossings are of county or local roads and are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), unnamed road, I-66 East, I-66 West, Virginia Lane, Hurst Street (within road), Idylwood Road (SR 695) (within road), Senseney Lane, Helena Drive (within road), Providence Street, I-495 North, I-495 South, Railroad Street (within road), Coal Train Drive, Morgan Lane, Railroad Street (within road), 4th Place, Arden Street, Journet Drive, Gallows Road (SR 650), Electric Avenue (within road), McGregor Court, Wheystone Court, Cedar Lane, Central Avenue, Williams Avenue, Frank Street, Woodford Road (within road), Connierae Lane, Falcone Pointe Way, Wolftrap Creek, Tysons Court, Bethany Court, Quaint Lane, Wolftrap Road, Wolftrap Road Southeast, Woodford Court, Rainbow Road, Black Stallion Place, Old Courthouse Road (SR 677) (within road), Howard Avenue, Chain Bridge Road (VA 123), Gosnell Road (SR 939) (within road), Wall Street, Raglan Road, Tyspring Street, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, Westpark Drive (within road), Greensboro Drive (within road), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

ERM identified 43 road crossings along Underground Alternative 03, of which 30 crossings are of county or local roads and 13 are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), unnamed road, I-66 East, I-66 West, Virginia Lane, Hurst Street (within road), Idylwood Road (SR 695) (within road), Senseney Lane, Helena Drive (within road), Providence Street, I-495 North, I-495 South, Railroad Street (within road), Coal Train Drive, Morgan Lane, Railroad Street (within road), 4th Place, Arden Street, Journet Drive, Gallows Road (SR 650) (within road), Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tysons Oaks Drive, Science Applications Court, Gallows Branch Road, Old Courthouse Road (SR 677) (within road), Lord Fairfax Road, Byrd Road, Hull Road, Woodford Road, Chain Bridge Road (VA 123), Gosnell Road (SR 939) (within road), Wall Street, Raglan Road, Tyspring Street, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, Westpark Drive (within road), Greensboro Drive (within road), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

ERM identified 36 road crossings along Underground Alternative 04, of which 20 crossings are of county or local roads and 16 are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), I-66 East, I-66 West, I-66 West Exit 64 off ramp, I-495 North, I-495 South, I-495 South Exit 49 Off-Ramp, Nottingham Drive, Sandburg Street, Gallows Road (SR 650) (within road), Idylwood Road (SR 695), Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive, Science Applications Court, Gallows Branch Road, Old Courthouse Road (SR 677) (within road), Lord Fairfax Road, Byrd Road, Hull Road, Woodford Road, Chain Bridge Road (VA 123), Gosnell Road (SR 939) (within road), Wall Street, Raglan Road, Tyspring Street, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, Westpark Drive (within road), Greensboro Drive (within road), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

ERM identified 35 road crossings along Underground Alternative 05, of which 20 crossings are of county or local roads and 15 are of state routes/highways or U.S. highways, including on and off ramps. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), I-66 East, I-66 West, I-66 West Exit 64 off ramp, I-495 North, I-495 South, I-495 South Exit 49 Off-Ramp, Nottingham Drive, Sandburg Street, Gallows Road (SR 650) (within road), Idylwood Road (SR 695), Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive, Science Applications Court, Gallows Branch Road, Aline Avenue, Boone Boulevard, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, International Drive (SR 6034) (within road), Fletcher Street, Tysons Corner Center, Chain Bridge Road (VA 123), Galleria Drive, Greensboro Drive, Westpark Drive, Lincoln Circle, Lincoln Lane, Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

ERM identified 39 road crossings along Underground Alternative 06, of which 23 crossings are of county or local roads, 15 are of state routes/highways or U.S. highways, including on and off ramps, and one private road. From Idylwood Substation to the Tysons Substation, these road crossings are: Shreve Road (SR 703), I-66 East, I-66 West, I-66 West Exit 64 off ramp, I-495 North, I-495 South, I-495 South Exit 49 Off-Ramp, Nottingham Drive, Sandburg Street, Gallows Road (SR 650), Idylwood Road (SR 695), Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive, Science Applications Court, Gallows Branch Road, Aline Avenue, Boone Boulevard, Leesburg Pike (VA 7) South, Leesburg Pike (VA 7) North, International Drive (SR 6034) (within road), Fletcher Street, Tysons Corner Court (within road), Chain Bridge Road (VA 123), Tysons Boulevard (within road), Galleria Drive, Westbranch Drive, Park Run Drive (within road), Westpark Drive, Crestwood Heights Drive, Jones Branch Drive (within road), Lincoln Way, Lincoln Center Court, International Drive (SR 6034), Spring Hill Road (SR 684) (within road), and Tyco Road (SR 3880) (within road).

3.2 ENVIRONMENTAL CONSTRAINTS

ERM utilized several desktop data sources to map wetlands and waterbodies within the Underground Alternatives right-of-way corridors. These sources included USGS 7.5 minute series topographic quadrangle maps, National Wetlands Inventory maps obtained from the U.S. Fish and Wildlife Service (FWS), soils data from the Natural Resources Conservation Service Web Soil Survey, recent aerial photography, and National Hydrography Dataset and Fairfax County stream layers. ERM did not conduct an onsite wetland delineation of wetlands or waterbodies within the study area.

3.2.1 Wetlands

A quantification of the various wetlands types crossed by each of the routes is provided in the Environmental Features Comparison Table included as Table 4-1. As discussed in Appendix D (Wetland Desktop Study), while no National Wetlands Inventory wetlands were identified as being crossed by any of the Underground Alternatives, two wetlands were identified through ERM's review. These wetlands are depicted in Attachment 2 of Appendix D.

One Palustrine Emergent wetland associated with an unnamed tributary of Holmes Run was identified, which is crossed by all of the Underground Alternatives at MP 0.1 north of the Idylwood Substation and Shreve Road. The 0.2 acre Palustrine Emergent wetland crossed at MP 0.1 is approximately 308.6-foot in length. A less than 0.1 acre Palustrine Emergent wetland associated with an unnamed tributary of Bear Branch was identified along Underground Alternative 01 at MP 2.1. The wetland is not crossed by the centerline of the alternative; however, it is crossed by a small portion of the right-of-way. The Underground Alternatives are

primarily located within existing roads or alongside existing roads and/or trail corridors within urban areas where previous disturbance has inhibited wetland formation. These wetlands are located adjacent to, or contiguous with, tributaries that would be considered relatively permanent waters; therefore, a significant nexus to navigable waters is assumed. As such, they would be regulated by the U.S. Army Corps of Engineers and Virginia Department of Environmental Quality under Sections 404 and 401 of the Clean Water Act, respectively.

3.2.2 Waterbodies

ERM identified and mapped waterbodies in the study area using publicly-available GIS databases, USGS topographic maps (1:24,000), and recent digital aerial photography. The Underground Alternatives cross perennial and intermittent waterbodies (rivers, streams, tributaries); however, a majority of the waterbodies crossed by the Underground Alternatives are channelized in culverts or avoided by HDD with minimal chance for environmental impact during construction. No navigable waterbodies would be crossed by any of the Underground Alternatives.

A general location map that illustrates waterbodies that are crossed by the various route alternatives is included as Figure 3.2.2-1 in Appendix B. Although these streams would not require a Rivers and Harbors Act Section 10 authorization, activities within and over subaqueous lands of Virginia require a permit from the Virginia Marine Resources Commission pursuant to Va. Code § 28.2-1205.

Underground Alternatives 01 and 02 both cross one perennial waterbody, Wolftrap Creek, for a crossing width of approximately 30 feet. Underground Alternative 01 also crosses four intermittent waterbodies while Underground Alternative 02 crosses three intermittent waterbodies. Both alternatives cross Holmes Run within an existing roadway at MP 0.6 and MP 1.2, respectively. Additionally, Underground Alternative 01 and 02 cross two unnamed tributaries (UNTs) of Holmes Run at MP 0.0 and 0.1. Underground Alternative 01 crosses Long Branch within an existing culvert at MP 1.5.

Underground Alternatives 03, 04, 05, and 06 do not cross any perennial waterbodies. These routes all cross Holmes Run (an intermittent waterbody) at MP 0.6 or 1.2. For all routes, the crossing would be located within an existing roadway and/or avoided by HDD and no impacts are anticipated. Additionally, all routes cross two UNTs of Holmes Run at MP 0.0 and 0.1. Underground Alternative 06 crosses an intermittent waterbody within an existing roadway near MP 4.1.

3.2.3 Resource Protection Areas

The Chesapeake Bay Preservation Act (CBPA) (Va. Code § 62.1-44.15:67, *et seq.*) establishes a program to protect and improve the quality of water of the Chesapeake Bay (Va. Code § 62.1-44.15:72 and 9 VAC 25-830-10, *et seq.*). The focus of the CBPA is to protect sensitive land areas that are adjacent to tributaries of the bay and its tributaries. Areas protected under the CBPA and designated as Resource Protection Areas (RPA) by localities are sensitive lands at or near the shoreline that have an intrinsic water quality value due to the ecological and biological processes they perform (see Va. Code §§ 62.1-44.15:68 and 62.1-195.1). RPA components include tidal wetlands, tidal shores, non-tidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary streams, waterbodies with perennial flow, and a minimum 100-foot buffer landward of the other RPA components.

Fairfax County Board of Supervisors enacted a Chesapeake Bay Preservation Ordinance (Fairfax County Virginia, 1993), which regulates the kind of development that is allowed to occur in certain areas. In Fairfax County, Resource Management Areas are all areas in the County that are not classified as RPAs. Collectively, RPAs and Resource Management Areas are Chesapeake Bay Preservation Areas and development must follow certain restrictions. Activities or facilities prohibited in RPAs include but are not limited to new developments, parking lots, filing and grading, and clearing trees. Activities or facilities permitted in RPAs (with county approval) include but are not limited to water dependent facilities (e.g., docks), replacement of existing structures to the original footprint, water wells, boardwalks or trails, public utility structures, railroads, transmission lines, flood control, stormwater management control, roads, and driveways that meet certain conditions.

ERM obtained information on RPAs in the study area from the Fairfax County Department of Information Technology (Fairfax County Virginia, 2017b). The RPAs identified in the Project area are located along Holmes Run, Pimmit Run, Wolftrap Creek, and Scott's Run (Figure 3.2.3-1 in Appendix B).

Electric transmission lines that are constructed, installed, and operated in accordance with the Erosion and Sediment Control Law and Stormwater Management Act (Va. Code § 62.1-44.15:51 *et seq.* and § 62.1-44.15:24 *et seq.*), and Chapters 104 and 124 of the County Code, or an erosion and sediment control plan and stormwater management plan approved by the Office of Stormwater Management, are exempt from the provisions of the Chesapeake Bay Preservation Ordinance. Nonetheless, RPAs were identified as constraints in this study given the potential for new facilities to impact these areas (e.g., as a result of tree clearing or filling to support tower structures in wetlands).

3.2.4 Areas of Ecological Significance

ERM reviewed the VDCR's Natural Heritage Data Explorer (NHDE) to identify areas of ecological significance within the Project area (VDCR, 2017a). As described below, the NDHE includes three components: Conservation Sites (CSs), Stream Conservation Units (SCUs), and General Location Areas for Natural Heritage Resources (GLNHRs).

1. CSs identify a planning boundary delineating the Natural Heritage Program's (NHP) best determination of the land and water area occupied by one or more natural heritage resources (exemplary natural communities and rare species) and are necessary to maintain ecological processes that will facilitate their long-term survival. The size and dimensions of a CS are based on the habitat requirements of the natural heritage resources present and the physical features of the surrounding landscape. Features taken into consideration include hydrology, slope, aspect, vegetation structure, current land uses, and potential threats from invasive species. CSs do not necessarily preclude human activities, but a site's viability may be greatly influenced by human activities. CSs may require ecological management, such as invasive species control or water management, in order to maintain or enhance their viability. Each CS is given a biodiversity significance ranking based on rarity, quality, and number of natural heritage resources it contains.

2. SCUs identify stream reaches that contain aquatic natural heritage resources, including upstream and downstream buffers and tributaries associated with the reach. SCUs are given a biodiversity significance ranking based on the rarity,

quality, and number of natural heritage resources they contain. SCUs can be used to identify land management needs and protection priorities.

3. GLNHRs represent the approximate locations of documented natural heritage resource occurrences that were not incorporated into CSs, either because they are poor quality, their location was not precisely identified, or they have not been verified in over 20 years. These approximate locations, marked with a one-mile-diameter circle, are included in the initial review because they indicate areas with relatively high potential for natural heritage resource occurrences to be documented. Depending on the apparent suitability of local habitat, VDCR may recommend biological surveys when reviewing projects that intersect these locations.

The VDCR NDHE identified one CS (Potomac Gorge), one SCU (Potomac River-Yellow Falls), and six unnamed GLNHRs in the Project study area. The Potomac Gorge CS is ranked B1, indicating outstanding significance, and the Potomac River-Yellow Falls SCU is ranked B3, indicating high significance. The GLNHRs are not given a biodiversity rank. The CS, SCU, and four GLNHRs are found within the Project study area, but are not crossed by the Underground Alternative routes.

The Potomac Gorge CS is located in Fairfax County along the Potomac River. It is an entrenched, fall-line river valley, hardwood-dominated forest. The Potomac Gorge CS supports several globally-rare communities, two of which are endemic, two globally rare amphipods, and several globally-and state-rare plants and community elements. There is one state-listed species known from this CS. The VDCR NHP ranks this area as a B1 Outstanding Significance CS. The site is not crossed by any of the route alternatives.

The Potomac River-Yellow Falls SCU is the stretch of Bullneck Run between Old Dominion Drive and the Potomac River. The Potomac River-Yellow Falls SCU contains riparian habitat that supports a rare aquatic plant, animal, or community. The VDCR NHP ranks this area as a B3 High Significance stream. The site is not crossed by any of the route alternatives.

One GLNHR is located within and around Scott's Run Nature Preserve and is adjacent to the Potomac River. It is known to contain a rare but not state-or federally-listed invertebrate animal. This GLNHR is not crossed by any of the route alternatives.

A second GLNHR is bounded by I-495 and Route 686 to the west and east, and Lewinsville Road and Old Dominion Drive to the south and north. It is the known to contain a rare but not state-or federally-listed invertebrate animal. This GLNHR is not crossed by any of the route alternatives.

A third GLNHR follows the corridor of Scott's Run from Lewinsville Road north to the Potomac River. It is known to contain a rare but not state-or federally-listed invertebrate animal. This GLNHR is not crossed by any of the route alternatives.

A fourth GLNHR follows the corridor of Bullneck Run from Spring Hill Park north to the Potomac River. It contains habitat that supports a rare but not state- or federally-listed invertebrate animal. This GLNHR is not crossed by any of the Underground Alternatives.

A fifth GLNHR is bounded by I-66 to the south and east, Leesburg Pike (Rt. 7) to the northeast, Dulles Airport Access Road to the north, and Hunter Mill Road to the west. It is known to contain a rare but not state-or federally-listed invertebrate animal. This GLNHR is crossed by Underground Alternative 01 for approximately 3.6 miles, Underground Alternative 02 for approximately 3.1 miles, Underground Alternative 03 for approximately 2.8 miles, Underground Alternative 04 for approximately 3.1 miles, Underground Alternative 05 for approximately 2.2 miles, and Underground Alternative 06 for approximately 2.2 miles.

A sixth GLNHR is centered just north of the I-66 and I-495 interchange and encompasses an approximately 0.78 square mile area, including the northern half of the Idylwood Substation. It is known to contain a rare but not state-or federally-listed vascular plant. This GLNHR is crossed by Underground Alternative 01 for approximately 1.4 miles, Underground Alternative 02 for approximately 1.7 miles, Underground Alternative 03 for approximately 1.6 miles, Underground Alternative 04 for approximately 1.5 miles, Underground Alternative 05 for approximately 1.5 miles, and Underground Alternative 06 for approximately 1.5 miles.

3.2.5 Protected Species

To protect and recover imperiled species and the ecosystems they depend on, Congress passed the Endangered Species Act in 1973 (ESA), which states that threatened and endangered plant and animal species are of aesthetic, ecological, educational, historic, and scientific value to the United States, and protection of these species and their habitats is required. The ESA is administered by both the National Oceanic and Atmospheric Administration and the FWS. It protects fish, wildlife, plants, and invertebrates that are federally listed as endangered or threatened by prohibiting the "take" of these species and the interstate or international trade, including their parts and products, unless federally permitted.

Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." A federally-endangered species is any species that is in danger of extinction throughout all or a significant portion of its range, with exceptions for certain insect pests. A federally-threatened species is any species that is likely to become endangered in the near future throughout all or a significant portion of its range.

Virginia has adopted separate acts for protecting animals and plants in the state. The Virginia Endangered Species Act (Va. Code §§ 29.1-563 - 29.1-570) designates the Virginia Department of Game and Inland Fisheries (VDGIF) as the state agency with jurisdiction over state-listed endangered or threatened fish and wildlife. The act authorizes the Board of the VDGIF to adopt the federal list of endangered and threatened species and to identify and protect state-listed wildlife. This act prohibits by regulation the taking, transportation, processing, sale, or offer for sale of those species.

Under the Endangered Plant and Insect Species Act (2 VAC 5-320-10), the taking or possession of endangered or threatened plant and insect species is prohibited. The VDCR represents the Virginia Department of Agriculture and Consumer Services, which is responsible for state-listed plants and insects, in providing comments regarding potential effects on state-listed plant and insect species.

ERM obtained query results from the VDCR's NHDE, VDGIF Fish and Wildlife Information Service (VaFWIS), and the FWS Information for Planning and Consultation System to identify federally-and state-listed species that may occur within the study area. Digital data were obtained from the VDCR NHDE to identify locations within the study area that potentially

support protected species. Query results from FWS Information for Planning and Consultation System includes species that may occur in Fairfax County (FWS, 2017). Query results from NHDE include species known to occur in the County and communities known to historically or currently contain protected species (VDCR, 2017b; VDCR, 2017a). Query results from VaFWIS include species known or likely to occur in the study area (VDGIF, 2017).

3.2.5.1 Federally- and State-Listed Endangered and Threatened Species

Because the various queries that indicate potential or actual occurrences of protected species in the vicinity of the Project do not specify exact occurrence locations, a summary of the federally- and state-listed species documented in the vicinity of the Project, either within Fairfax County or the study area, is presented in Table 3.2.5.1-1. Federal Species of Concern are summarized in Section 3.2.5.3.

The database queries identified four federally listed species: northern long-eared bat (*Myotis septentrionalis*), dwarf wedgemussel (*Alasmidonta heterodon*), yellow lance (*Elliptio lanceolata*), and small-whorled pogonia (*Isotria medeoloides*). According to the review each of these species has potential to occur in Fairfax County. The VDGIF operates a *Northern Long-eared Bat (NLEB) Winter Habitat and Roost Trees* online mapping system, which shows general locations of known NLEB hibernacula and roost trees. A review of this system did not show a hibernaculum or roost tree in Fairfax County. Yellow lance and NLEB are not legally protected by the Commonwealth of Virginia, but dwarf wedgemussel and small whorled pogonia are listed as endangered by the state.

The database queries identified nine state-listed species that may occur or are known to occur in Fairfax County or study area. The VDGIF operates a *Little Brown Bat and Tri-colored Bat Winter Habitat and Roosts Application* online mapping system, which shows general locations of known little brown bat and tri-colored bat hibernacula and roost trees. A review of this system did not show a hibernaculum or roost tree in Fairfax County. The VaFWIS search results indicated that wood turtle is known to occur or predicted to occur in waterbodies that are not crossed by the Underground Alternative routes.

The query of the VaFWIS listed six stream systems in Fairfax County that are known to contain state-listed species. Of these six stream systems, none are crossed by the Underground Alternative routes.

TABLE 3.2.5.1-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Federal- and State-Listed Species Occurrence in the Project Area

Common Name	Scientific Name	Federal Status	State Status	Global Rank	Habitat	Source
FEDERALLY-LISTED SPECIES						
Mammals						
Northern long-eared bat	*Myotis septentrionalis*	LT	None	G4	Generally associated with old-growth or late successional interior forests. Partially dead or decaying trees are used for breeding, summer day roosting, and foraging. Hibernation occurs primarily in caves, mines, and tunnels.	IPaC VaFWIS
Invertebrates						
Dwarf wedgemussel	*Alasmidonta heterodon*	LE	LE	G1G2	Deep quick running water on cobble, fine gravel, or on firm silt or sandy bottoms.	IPaC
Yellow lance	*Elliptio lanceolata*	PT	None	G2G3	Main channels of drainages and streams as small as one meter across with clean, coarse; medium-sized sand or gravel substrate.	IPaC
Plants						
Small whorled pogonia	*Isotria medeoloides*	LT	LE	G2	Older hardwood stands with an open understory, sometimes in stands of softwoods. Prefers acidic soils with thick layer of dead leaves, often on slopes near small streams.	IPaC NHDE
STATE-LISTED SPECIES						
Mammals						
Little brown bat	*Myotis lucifugus*	None	LE	G3	Roosts in caves, buildings, rocks, trees, under bridges, and in mines and tunnels. Found in all forested regions of the state.	VaFWIS
Tri-colored bat	*Perimyotis subflavus*	None	LE	G3	Typically roost in trees near forest edges during summer. Hibernate deep in caves or mines in areas with warm, stable temperatures during winter.	VaFWIS
Invertebrates						
Brook floater	*Alasmidonta varicosa*	None	LE	G3	Creeks and small rivers, found among rocks in gravel substrates and in sandy shoals, flowing-water habitats only.	NHDE VaFWIS
Appalachian springsnail	*Fontigens bottimeri*	SOC	LE	G2G3	Small freshwater springs and streams.	NHDE
Appalachian grizzled skipper	*Pyrgus centaureae Wyandot*	None	LT	G5	Semi-open slopes with sparse herbaceous vegetation and exposed rock or soil.	VaFWIS
Birds						
Peregrine falcon	*Falco peregrinus*	None	LT	G4	Tall structures, such as powerline poles, buildings, and rock ledges, in generally open landscapes.	VaFWIS
Loggerhead shrike	*Lanius ludovicianus*	None	LT	G4	Open country with scattered shrubs and trees or other tall structures for perching.	VaFWIS
Henslow's sparrow	*Ammodramus henslowii*	None	LT	G4	Open grasslands with few or no woody plants and tall dense grasses and litter layer.	VaFWIS
Reptiles						
Wood turtle	*Glyptemys insculpta*	None	LT	G3	Forested floodplains, fields, wet meadows, and farmland with a perennial stream nearby.	NHDE VaFWIS

TABLE 3.2.5.1-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Federal- and State-Listed Species Occurrence in the Project Area

Common Name	Scientific Name	Federal Status	State Status	Global Rank	Habitat	Source

Federal/State Status:

LE	Listed as endangered.
LT	Listed as threatened.
PT	Proposed as threatened.
SOC	Species of Concern.

Global Rank:

G1	Critically Imperiled: At very high risk of extinction due to extreme rarity (often five or fewer populations), very steep declines, or other factors.
G2	Imperiled: At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3	Vulnerable: At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4	Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5	Secure: Common; widespread, and abundant.

Source:

IPaC	U.S. Fish and Wildlife Service Information for Planning and Consultation
NHDE	Virginia Department of Conservation and Recreation Natural Heritage Data Explorer
VaFWIS	Virginia Department of Game and Inland Fisheries Virginia Fish and Wildlife Information System

3.2.5.2 Bald Eagle Management

The bald eagle is no longer federally listed under the ESA, but it is a state-listed threatened species in Virginia under the Virginia ESA and is protected under Va. Code § 29.1-521 and VDGIF regulations (4 VAC 15-30-10). The bald eagle is also protected under the federal Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The "Management of Bald Eagle Nests, Concentration Areas, and Communal Roosts in Virginia: A Guide for Landowners," issued by the VDGIF provides management practices for avoiding take of bald eagles and outlines restrictions on construction activities within defined management zones. Proposed activities that have the potential to affect bald eagles are evaluated by the VDGIF on a case-by-case basis (VDGIF, 2012).

To obtain the most current eagle nest data, ERM reviewed the Center for Conservation Biology (CCB) website (Watts and Byrd, 2013), which provides information about the Virginia bald eagle population, including the results of the CCB's annual eagle nest survey. According to the CCB database, the only known bald eagle nests within the study area are located approximately 5.0 miles from Underground Alternative 06 along the Potomac River on the opposite side of the George Washington Memorial Parkway. Nest FF0503 was last occupied in 2016, and nest FF0903 was last occupied in 2009 and is now considered inactive. None of the Underground Alternative routes are located within the 330- or 660-foot management buffers of either nest.

3.2.5.3 Species of Concern and Other Documented Occurrences

A summary of the federally-listed Species of Concern occurring in Fairfax County is included in Table 3.2.5.3-1. Species of Concern typically are not afforded the same level of protection as federally- and state-listed endangered and threatened species. NatureServe, an international network of Natural Heritage Programs, assigns a Global Rank based on rarity and conservation status. Species ranked "G1" (global rank 1/critically imperiled) or "G2" (global rank 2/imperiled)

are most at risk. According to NatureServe, Holsinger's groundwater planarian and Bigger's groundwater planarian are considered extirpated or possibly extirpated in Virginia.

The VDCR conducted an official review of the Project on October 6, 2017. As part of this review, the VDCR concluded that the Project as proposed would not affect any documented state-listed plants or insects, and does not cross any State Natural Area Preserves under VDCR's jurisdiction. The VDCR noted that, as described above, Pimmit Run is located in the Project study area and is known to contain the state-listed wood turtle. The VDCR observed that the Long Branch SCU is located downstream of Underground Alternative 01 and Underground Alternative 02, and is known as an aquatic natural community of moderate significance.

TABLE 3.2.5.3-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Species of Concern and Rare Species in the Project Area

Common Name	Scientific Name	Federal Status	State Status	Global Rank	Habitat	Source
Invertebrates						
Appalachian springsnail	*Fontigens bottimeri*	SOC	LE	G2G3	Small freshwater springs and streams.	NHDE
Holsinger's groundwater planarian	*Sphalloplana holsingeri*	SOC	None	G1G2	Subterranean, subaquatic environments.	NHDE
Bigger's groundwater planarian	*Sphalloplana subtilis*	SOC	None	G1G2	Subterranean, subaquatic environments.	NHDE
Plants						
Torrey's mountain-mint	*Pycnanthemum torreyi*	SOC	None	G2	Dry, open habitats or upland edges, including rights-of-way and roadsides.	NHDE

Federal/State Status:
LE Listed as endangered.
LT Listed as threatened.
PT Proposed as threatened.
SOC Species of Concern.
Global Rank:
G1 Critically Imperiled: At very high risk of extinction due to extreme rarity (often five or fewer populations), very steep declines, or other factors.
G2 Imperiled: At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3 Vulnerable: At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5 Secure: Common; widespread, and abundant.
Source:
IPaC U.S. Fish and Wildlife Service Information for Planning and Consultation
NHDE Virginia Department of Conservation and Recreation Natural Heritage Data Explorer
VaFWIS Virginia Department of Game and Inland Fisheries Virginia Fish and Wildlife Information System

3.2.6 Vegetation

The vegetation of the Northern Piedmont ecoregion has been severely altered by clearing as part of ongoing agricultural and silvicultural practices occurring since European settlement. Prior to the effects of European settlement, the vegetation was influenced by the practices of Native Americans. Writings from early explorers indicate that parts of the Piedmont were once

open, savanna-like woodlands and grasslands. Native Americans' practices included burning the forests to drive game and keep the understory of forests clear for hunting. More recently, forests in this area have undergone a cycle of clearing, farming, and regenerating. The fallow farmlands, if left unattended, undergo a successional regeneration process that generally results in a prevalence of early successional trees such as Virginia pine (*Pinus virginiana*) and tulip-poplar (*Liriodendron tulipifera*), which ultimately matures into oak-hickory forest (Flemming, 2004). The effect of man's influence on the landscape for centuries has resulted in a patchwork of secondary forests, pastures, and agricultural fields. The vegetation of the remaining forests occurring throughout the project area is likely now a predominant mix of pine (*Pinus* sp.) and hardwoods, including hickories (*Carya* sp.) and oaks (*Quercus* sp.).

ERM reviewed the route alternatives using Environmental Systems Research Institute aerial imagery from July, 2016, to assess vegetative cover in the study area. Descriptions of the vegetation communities crossed by the route alternatives are provided below.

Underground Alternative 01

Underground Alternative 01 crosses a mixture of commercial and residential land. Moving from Idylwood Substation to Tysons Substation, Underground Alternative 01 parallels an existing utility corridor maintained in an herbaceous or shrub-scrub state for approximately 1,700 feet. For the remainder of the route, it follows existing roadways bordered by mature ornamental trees that serve as a buffer between residences and roadways. Because Underground Alternative 01 parallels existing roadways in developed areas, there is minimal vegetative cover along this route.

Underground Alternatives 02 and 03

Underground Alternatives 02 and 03 both cross a mixture of commercial and residential land. Moving from Idylwood Substation to Tysons Substation, the alternatives parallel an existing utility corridor maintained in an herbaceous or shrub-scrub state for approximately 1,700 feet, then meander through a residential area containing ornamental trees and approximately 1,200 feet of a woodlot. The remainder of the routes follows existing tree-lined roadways, most of which are main thoroughfares. Because the routes primarily parallels existing roadways in developed areas, there is minimal vegetative cover along this route.

Underground Alternatives 04, 05, and 06

Underground Alternatives 04, 05, and 06 cross commercial land and roadways. Moving from Idylwood Substation to Tysons Substation, the routes parallel an existing utility corridor maintained in an herbaceous or shrub-scrub state for approximately 1,700 feet. For the remainder of the routes, they follow existing tree-lined roadways, most of which are main thoroughfares. Because the alternatives parallel existing roadways in developed areas, there is minimal vegetative cover along this route.

3.3 VISUAL CONDITIONS

ERM identified visually sensitive-areas through review of recent digital aerial photography. These were defined as areas where an electric transmission line or tree-cleared right-of-way for the Underground Alternatives would be out of character with the surrounding visual characteristics of the landscape or individual sites possessing unique scenic qualities or viewsheds. Examples of visually sensitive-areas include residential or recreational areas;

historic landscapes or districts; open space; natural features; and individual sites, such as historic sites or buildings.

Underground Alternative 01

Underground Alternative 01 crosses primarily developed open space, residential land, commercial land, and existing road rights-of-way. The route may require removal of trees along W&OD Park between MP 1.0 and 2.0 and residential areas between MP 2.0 and 2.3. These areas represent areas with potentially visually-sensitive features due to the removal of the treed buffers.

Underground Alternatives 02 and 03

Underground Alternatives 02 and 03 cross primarily developed residential and commercial land and existing road rights-of-way. The routes require removal of trees along residential areas and park land between MPs 0.4 and 1.3.

Underground Alternatives 04, 05, and 06

Underground Alternatives 04, 05, and 06 cross primarily developed open space, residential land, commercial land, and existing road rights-of-way. These routes may require minimal removal of trees along W&OD Park, which could impact visually-sensitive features due to the removal of the treed buffers.

3.4 CULTURAL RESOURCES CONSTRAINTS

ERM conducted an analysis of potential cultural resource impacts for the alternatives under consideration in accordance with the Virginia Department of Historic Resources (VDHR) 2008 Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia (2008) (Guidelines). For the pre-application analysis of cultural resources, ERM considered National Historic Landmark (NHL) properties located within a 1.5-mile radius of the centerline; National Register of Historic Places (NRHP)-listed properties, NHLs, battlefields, and historic landscapes within a 1.0-mile radius of the centerline; NRHP-eligible and -listed properties, NHLs, battlefields, and historic landscapes within a 0.5-mile radius of the centerline; and all of the above qualifying architectural resources as well as archaeological sites located within the right-of-way for each alternative route. Information on the resources in each tier was collected from the Virginia Cultural Resource Information System (V-CRIS). ERM also collected information on battlefields surveyed and assessed by the National Park Service's American Battlefield Protection Program (ABPP). In their focus on nationally significant Civil War battlefields, the ABPP identifies the historic extent of the battle (study area), the areas of fighting on the battlefield (core area located within the study area), and potential National Register boundaries. Mapping of those ABPP boundaries in the form of ArcGIS shape files was reviewed as part of the analysis of potential cultural resource impacts. In addition to those resources, Dominion Energy Virginia is considering potential effects to VDHR easements.

Many cultural resources in the vicinity of the Project have not been assessed for NRHP eligibility, and therefore are not included in the pre-application analysis, per VDHR Guidelines. Until they have been assessed and a determination made by VDHR, they should be considered potentially eligible for listing in the NRHP. Likewise, there may be as-yet unreported historic and archaeological resources that may ultimately be affected by the Project. Any such

resources will be addressed during the full cultural resource survey to be conducted following SCC approval of the Project.

Along with the records review carried out for the four tiers defined by VDHR, ERM conducted field assessments of known NRHP-eligible or -listed architectural resources for each Project alternative in accordance with the VDHR Guidelines. Digital photographs of each architectural resource and views to the transmission line were taken. Photo simulations were prepared to assess visual effects on NRHP-eligible or -listed architectural resources within the tiered study area. For previously recorded archaeological sites under consideration, aerial photographs were examined to assess the current land condition and the spatial relationship between the sites and any existing or planned transmission line structures. Because of the sensitive nature of archaeological site locations, those resources are not included in Figure 3.4-1 in Appendix B of this publicly available document.

3.4.1 Archaeological Sites

Crossings of archaeological sites were considered a constraint in this study due to the potential for an electric transmission line to impact archaeological deposits in these areas (for example, due to transmission structure placement, tree clearing or heavy equipment usage within a site). The known archaeological sites in the right-of-way for each Project alternative are summarized in Table 3.4.1-1. None have been evaluated as to NRHP eligibility. Based on a review of contemporary aerial photographs, some of these sites, or portions of them, have been disturbed or destroyed by modern development. However, a confident and complete assessment of the integrity of each site would require archaeological field investigations.

TABLE 3.4.1-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Archaeological Resources in Right-of-Way of Underground Alternatives

Route Alternative	Site Number	Description	NRHP Status
Underground Alternative 01	44FX0043	Fairfax County Courthouse (18th century)/ multicomponent prehistoric camp (Late Archaic, Early Woodland)	Not evaluated
Underground Alternative 02	44FX0043	Fairfax County Courthouse (18th century)/ multicomponent prehistoric camp (Late Archaic, Early Woodland)	Not evaluated
	44FX0045	Historic domestic site (late 18th century, 20th century)	Not evaluated
Underground Alternative 03	44FX0043	Fairfax County Courthouse (18th century)/ multicomponent prehistoric camp (Late Archaic, Early Woodland)	Not evaluated
	44FX0045	historic domestic site (late 18th century, 20th century)	Not evaluated
	44FX2364	early 20th century streetcar line	Not evaluated
Underground Alternative 04	44FX0043	Fairfax County Courthouse (18th century)/ multicomponent prehistoric camp (Late Archaic, Early Woodland)	Not evaluated
Underground Alternative 05	–		
Underground Alternative 06	44FX0540	prehistoric lithic workshop	Not evaluated

3.4.2 Historic and Architectural Sites

Each alternative reviewed has the potential to affect a number of historic and architectural resources. This section presents information on known resources in the vicinity of each Project alternative according to VDHR's tiered study area model. The locations of the resources relevant to each alternative are depicted in Figure 3.4-1. Many of the same resources are relevant from one alternative to the next, since segments of alternative routes are shared among different alternatives. Tables 3.4.2-1–3.4.2-2 list the considered resources pertinent to each route alternative; in some cases, multiple routes have the same considered resources, and

are combined in a single table. Resources that extend from one tier into the next are only presented once in the tier nearest the alternative. Note that no ABPP study area, core area, or potential NRHP boundaries for battlefields are within the relevant tiers for the various options.

The one considered resource that lies within the DHR tiers for Underground Alternatives 01–05 is presented in Table 3.4.2-1. This resource was subjected to field reconnaissance and a preliminary assessment of effects involving photo simulations. The results of that assessment are summarized in Section 4.1.4.

None of the resources within 1.5 miles of Underground Alternatives 01–05 contain a DHR easement. In the case of Underground Alternative 01, beyond the one considered resource in the right-of-way, there are only three other historic resources within the right-of-way (029-0206, 029-5470, and 153-5014), and all have been determined not eligible for the NRHP. In the case of Underground Alternatives 02 and 03, beyond the one considered resource in the right-of-way, there are also three other historic resources within the right-of-way (029-5470, 029-5470-0002, and 029-5861), and all have been determined not eligible for the NRHP. In the case of Underground Alternatives 04 and 05, beyond the one considered resource in the right-of-way, there are only two other historic resources within the right-of-way (029-0206 and 029-5470), both determined not eligible for the NRHP.

TABLE 3.4.2-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Historic Resources in VDHR Tiers for Underground Alternatives 01–05

Buffer (miles)	Considered Resources	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	–	
0.5 to 1.0	National Register listed properties, NHLs, battlefields, historic landscapes	–	
0.0 to 0.5	National Register listed or eligible properties, NHLs, battlefields, historic landscapes	–	
0.0 (within right-of-way)	National Register – eligible	053-0276	Alexandria, Loudoun and Hampshire Railroad / Washington & Old Dominion Railroad Historic District, currently maintained as Washington & Old Dominion Railroad Regional Park

The two considered resources that lie within the DHR tiers for Underground Alternative 06 are presented in Table 3.4.2-2. These resources were subjected to field reconnaissance and a preliminary assessment of effects involving photo simulations. The results of that assessment are summarized in Section 4.1.4.

None of the resources within 1.5 miles of Underground Alternative 06 contain a DHR easement. In the case of Underground Alternative 06, beyond the one considered resource in the right-of-way, there are only two other historic resources within the right-of-way (029-0206 and 029-5470), both determined not eligible for the NRHP.

TABLE 3.4.2-2

Idylwood-Tysons 230 kV Underground Transmission Line Project
Historic Resources in VDHR Tiers for Underground Alternative 06

Buffer (miles)	Considered Resources	Resource Number	Description
1.0 to 1.5	National Historic Landmarks	–	
0.5 to 1.0	National Register Properties (Listed)	029-0035	Spring Hill Farm
0.0 to 0.5	National Register listed or eligible properties, NHLs, battlefields, historic landscapes	–	
0.0 (within right-of-way)	National Register – eligible	053-0276	Alexandria, Loudoun and Hampshire Railroad / Washington & Old Dominion Railroad Historic District, currently maintained as Washington & Old Dominion Railroad Regional Park

3.4.3 Summary of Existing Survey Data Performed Under Section 106 or Section 110 of the National Historic Preservation Act

Some portions of the proposed Project alternatives have been subject to previous cultural resource survey coverage. Because many segments of Underground Alternatives are concurrent with others, many previous surveys have covered portions of multiple routes. The previous surveys relevant to the Underground Alternatives are indicated in Table 3.4.3-1. The majority of the surveys were for highway projects, but investigations of individual sites and one survey for construction sites at the Central Intelligence Agency facility in Langley are also included.

TABLE 3.4.3-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Cultural Resources Surveys Covering Portions of the Underground Alternatives

Route Alternative						Survey	
UG 01	UG 02	UG 03	UG 04	UG 05	UG 06	Citation	DHR Report Number
X	X	X	X	X	X	Barber et al. 2001	FX-358
						Browning 1980	FX-124
				X	X	Chatelain n.d.	FX-111
						Chatelain and Johnson n.d.	FX-113
						Gardner 1978	FX-008
						Johnson 1980a	FX-026
						Johnson 1980b	FX-132
X	X					Jolley 1987	FX-106
						Parsons Engineering Science 1989	LD-053
						Rickard 1986	FX-101
						Wamsley 1984	FX-146
						Williams 1977	FX-010

3.5 GEOLOGICAL CONSTRAINTS

ERM identified mineral resource areas through review of publicly-available Virginia Department of Mines, Minerals, and Energy (2017) datasets, USGS topographic quadrangles, and recent digital aerial photographs. There are no active mineral resources identified within 0.25 mile of any of the route alternatives.

3.6 ENGINEERING CONSTRAINTS

For underground routes, the crossings of existing and buried utilities (i.e., electric gas, and water lines, phone, cable, and fiber optic lines, effluent and storm sewers, and culverted streams or drainages) were identified as engineering constraints due to increased difficulty in identifying and locating existing buried conflicts and/or the need to route around (or above and below) existing conflicts.

3.7 EXISTING CORRIDORS WITHIN THE PROJECT AREA

ERM identified existing corridors within the Project area through review of recent digital aerial photography, the Fairfax County Comprehensive Plan, and various publicly-available data layers. Existing corridors within the study area that were identified consist of existing electric transmission and pipeline facilities, railroad corridors, and major road corridors. These existing corridors are described below. The existing corridors were identified for the purpose of assessing their potential use as routing or collocation opportunities in the portions of the Project area where new or different rights-of-way would be required. These existing corridors are described below.

3.7.1 Electric Facilities

Existing electrical transmission or distribution facilities are found throughout the Project area. Dominion Energy Virginia has an existing 230 kV transmission line which originates at the Idylwood Substation and runs north crossing Curtis Memorial Parkway (I-66), Dulles Access Road, Westmoreland Street (SR 693), Old Dominion Drive, Evermay Drive, Long Meadow Road, Stoneham Lane, Dolley Madison Boulevard (SR 123), Dead Run Road. The corridor then heads south, crossing the Capital Beltway (I-495), Georgetown Pike (SR 193), Old Dominion Drive (SR 738), Lewinsville Road (SR 694), Spring Hill Road (SR 684), and Dulles Toll Road, and ending at the Tysons Substation. Dominion Energy Virginia has a second existing 230 kV transmission line that runs along the southern part of the study area, parallel to Underground Alternative 01. This corridor originates at the Idylwood Substation and runs east crossing the Curtis Memorial Parkway (I-66), Capital Beltway (I-495), Gallows Road (SR 650), Cedar Lane (SR 698), and pulls away from Underground Alternative 01 near Adahi Road Southeast.

Additionally, there are seven existing Dominion Energy Virginia substations located within the Project area. The Idylwood Substation is located on Shreve Road, and is the starting location for all routes. The Tysons Substation is located off of Tyco Road, and is the ending location for all of the routes. There are five more substations in the area that are not part of the Project: the Reddfield Substation located off of Idylwood Road, the Pimmit Substation located off of Reed Road, the McLean Substation located off of Chain Bridge Road, the Central Intelligence Agency Substation located off of Georgetown Pike, and the Swinks Mill Substation located off of Spencer Road.

3.7.2 Railroad Corridors

WMATA was created in 1967 by an interstate compact to plan, develop, build, finance, and operate a regional transportation system in the national capital area. It began building its heavy rail system in 1969. It serves 91 stations and has 117 miles of track (WMATA 2017). The Greensboro Metro Station is located within the study area. Greensboro Metro Station is located off of Greensboro Station Place, near the intersection with Leesburg Pike. The Spring Hill Metro Station is located at the intersection of Spring Hill Road and Leesburg Pike. Within the study

area, the Silver Line runs from the intersection of Dulles Toll Road and Wiehle Avenue and parallel to VA 276, until the intersection with Leesburg Pike. The rail then travels along Leesburg Pike, until the intersection with Chain Bridge Road, which it follows until it intersects with Dulles Toll Road, which it continues to follow. The route then heads south and follows along Curtis Memorial Parkway, through the remainder of the study area. The Silver Line is crossed by all of the Underground Alternatives. Within the study area the Orange Line follows I-66 and would be crossed by all of the Underground Alternatives.

3.7.3 Pipeline Corridors

The Washington Gas Light Company Natural Gas Transmission line is located within the Project area. This pipeline runs east to west, and begins just north of the Project starting location and follows Leesburg Pike (VA 7). The pipeline route would be crossed by Underground Alternatives 03, 04, 05, and 06.

3.7.4 Major Road Corridors

Major road corridors in the Project area include Curtis Memorial Parkway (I-66), Capital Beltway (I-495), Leesburg Pike (VA-7), Idylwood Road (SR 695), Dulles Toll Road, Great Falls Street (SR 694), Chain Bridge road (VA 123), and George Washington Memorial Parkway. There are many more roads located within the Study area. Road rights-of-way were considered potential routing opportunities, although constructing and operating a transmission line within road rights-of-way, especially those that are considered 'limited access' such as portions of the I-66 right-of-way, can require certain limitations on those activities.

4.0 RESOURCES AFFECTED

Environmental conditions along each of the alternative routes were identified, mapped, and reviewed as discussed in Section 3.0. Refer to Table 3-1 for a list of environmental features considered during the evaluation process. To further evaluate and consider the environmental advantages and disadvantages of each alternative route, the environmental features potentially affected by these alternatives were quantified for comparison purposes. A quantified environmental features comparison table for the six Underground Alternatives considered is presented in Table 4-1. The locations of all alternative routes are described in Section 2.1. A discussion and comparison of each route's environmental advantages and disadvantages is presented below.

4.1 UNDERGROUND ALTERNATIVES

Environmental conditions along each of the underground alternative routes were identified, mapped, and reviewed as discussed in Section 3.0. To further evaluate and consider the environmental advantages and disadvantages of each alternative route, the environmental features potentially affected by these alternatives were quantified for comparison purposes. A quantified environmental features comparison table for the six alternative routes considered is presented in Table 4-1. The locations of all alternative routes are described in Section 2.1. A discussion and comparison of each route's environmental advantages and disadvantages is presented below.

TABLE 4-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Environmental Features Comparison Table – Underground Alternatives [a]

Environmental Features	Unit	UG 01	UG 02	UG 03	UG 04	UG 05	UG 06
Route							
Route Length Total	miles	5.0	5.0	4.6	4.5	4.3	4.7
Existing ROW	miles	2.0	0.2	0.2	1.0	1.0	1.0
New ROW	miles	3.0	4.8	4.4	3.5	3.3	3.7
Route Acres Total	acres	20.5	20.2	19.0	18.6	17.7	19.3
Existing ROW	acres	8.1	1.2	1.2	4.3	4.3	4.3
New ROW	acres	11.4	18.0	16.7	13.3	12.4	13.9
HDD ATWS	acres	1.1	1.1	1.1	1.1	1.1	1.1
Land Use Features / Constraints							
State Owned Lands	miles	0.0	0.0	0.0	0.0	0.0	0.0
Local Government Lands	miles	<0.1	0.1	0.1	0.0	0.0	0.0
Private Lands Crossed (total)	miles	0.4	0.3	0.4	0.2	0.2	0.4
Northern Virginia Regional Park Authority	miles	1.8	<0.1	<0.1	0.8	0.8	0.8
Virginia DOT Crossings (roads)	miles	2.8	4.5	4.1	3.5	3.3	3.5
MWAA Crossings (roads)	miles	0.0	0.0	0.0	0.0	0.0	0.0
Parcels crossed by ROW (total)	number	25	22	23	10	9	11
Existing ROW	number	10	5	5	7	7	7
New ROW	number	14	13	14	2	1	3
HDD ATWS	number	1	4	4	1	1	1
Existing Land Use (VDOF)							
Open Land	miles	0.8	1.3	1.0	0.5	0.5	0.6
Developed	miles	3.0	3.5	3.4	3.7	3.5	3.8
Forested	miles	1.2	0.2	0.2	0.3	0.3	0.3
Zoning							
Commercial	miles	0.2	0.2	0.2	0.2	0.2	0.2
Industrial	miles	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Planned Units	miles	0.0	0.0	0.0	0.0	0.0	0.9
Residential	miles	2.8	2.0	1.4	1.1	1.4	1.1
Uncategorized/ROW	miles	1.8	2.8	3.0	3.2	2.7	2.5
Planned Developments Crossed by Centerline and Right-of-Way	miles	0.0	0.0	0.0	0.0	0.0	0.8
	(number)	0	0	0	0	0	2
	acres	0.0	0.0	0.0	0.0	0.0	2.8
Proposed Commuter Rail stations Crossed	number	0	0	0	0	0	0
Recreational Areas Crossed							
City Parks	number	0	0	0	0	0	0
County Parks							
Existing ROW	number	0	0	0	0	0	0
	acres	0.0	0.0	0.0	0.0	0.0	0.0
New ROW	number	0	1	1	0	0	0
	acres	0.0	0.4	0.4	0.0	0.0	0.0
HDD ATWS [b]	number	0	1	1	0	0	0
	acres	0.0	0.2	0.2	0.0	0.0	0.0
NOVA Parks							
Existing ROW	number	1	1	1	1	1	1
	acres	6.6	0.1	0.1	2.8	2.8	2.8
New ROW [c]	number	0	1	1	0	0	0
	acres	0.0	<0.1	<0.1	0.0	0.0	0.0

TABLE 4-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Environmental Features Comparison Table – Underground Alternatives [a]

Environmental Features	Unit	UG 01	UG 02	UG 03	UG 04	UG 05	UG 06
HDD ATWS [b]	number	1	1	1	1	1	1
	acres	0.7	0.4	0.4	0.7	0.7	0.7
Virginia Birding and Wildlife Trails Crossed	number	1	1	1	1	1	1
Other Land Use Constraints							
Single-family residences within 500 feet	number	786	831	483	414	361	360
Single-family residences within 200 feet	number	253	302	161	116	107	107
Single-family residences within 100 feet	number	124	167	75	41	38	38
Multi-family buildings within 500 feet	number	12	12	13	13	26	35
Multi-family buildings within 200 feet	number	9	9	9	9	12	14
Multi-family buildings within 100 feet	number	3	3	3	3	7	11
Single-family residences in New ROW	number	0	0	0	0	0	0
Multi-family buildings in New ROW	number	0	0	0	0	0	0
Single-family residences within 60 feet of new ROW [d]	number	0	1	1	0	0	0
Multi-family buildings within 60 feet of new ROW [d]	Number	0	0	0	0	0	0
Buildings within Existing Right-of-Way (total)	number	0	0	0	0	0	0
Buildings within New Right-of-Way (total)	number	0	1	1	0	0	1
Single-family Residences	number	0	0	0	0	0	0
Multi-family Buildings	number	0	0	0	0	0	0
Industrial/Commercial	number	0	0	0	0	0	1
Outbuildings	number	0	1	1	0	0	0
Cemeteries within 500 feet	number	0	0	0	0	0	0
Churches within 500 feet	number	2	0	1	3	3	3
Schools within 500 feet	number	1	1	3	3	2	2
Environmental Constraints							
Emergent Wetlands Crossed by Right-of-Way (total)	acres	0.2	0.2	0.2	0.2	0.2	0.2
	number	2	1	1	1	1	1
Waterbody Crossings (total)	number	5	4	3	3	3	4
Perennial	number	1	1	0	0	0	0
Intermittent	number	4	3	3	3	3	4
Forested Lands Crossed (total)	acres	2.1	1.5	1	<0.1	0	0
Existing ROW [e]	acres	1.1	0.0	0.0	0.0	0.0	0.0
New ROW	acres	1.0	1.3	0.8	<0.1	0.0	0.0
HDD ATWS [b]	acres	<0.1	0.2	0.2	<0.1	<0.1	<0.1
Resource Protection Areas Crossed							
Centerline Crossing	miles	0.2	0.2	0.1	0.1	0.1	0.1
Existing ROW	acres	0.4	0.0	0.0	0.3	0.3	0.3
New ROW	acres	0.4	0.6	0.3	0.0	0.0	0.0
HDD ATWS [b]	acres	0.0	<0.1	<0.1	0.0	0.0	0.0
Conservation Easements Crossed							
Fairfax County Conservation Easements	number	0	0	0	0	0	0
VDCR Conservation Lands	number	0	0	0	0	0	0
Cultural Resources Constraints							
Archaeology (VDHR)							
Archaeological Sites Within Right-of-Way	number	1	2	3	1	0	1
Architectural Resources (VDHR)							
Architectural Resources Within Right-of-Way (Battlefields listed below)	number	1	1	1	1	1	1

TABLE 4-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Environmental Features Comparison Table – Underground Alternatives [a]

Environmental Features	Unit	UG 01	UG 02	UG 03	UG 04	UG 05	UG 06
National Register-Eligible and -Listed Properties, Battlefields, Historic Landscapes, and National Historic Landmarks within 0.5 mile	number	0	0	0	0	0	0
National Register-Listed Properties, Battlefields, Historic Landscapes, and National Historic Landmarks between 0.5 and 1.0 mile	number	0	0	0	0	0	1
National Historic Landmarks between 1.0 and 1.5 miles	number	0	0	0	0	0	0
Historic Districts (VDHR) Crossed	miles	1.9	0.1	0.1	0.8	0.8	0.8
	(number)	1	1	1	1	1	1
NRHP-Listed Battlefield (VDHR) Crossed	number	0	0	0	0	0	0
NRHP-Eligible Battlefield (VDHR) Crossed	number	0	0	0	0	0	0
Easements (VDHR) Crossed	number	0	0	0	0	0	0
Historic High Sensitivity Areas (PWC only)	number	0	0	0	0	0	0
Prehistoric Sensitivity Areas (PWC only)	number	0	0	0	0	0	0
Battlefields (NPS ABPP)	number	0	0	0	0	0	0
Geological or Physical Constraints							
Mines or Mining Areas Crossed	miles	0.0	0.0	0.0	0.0	0.0	0.0
Visual Features/Constraints							
Length Parallel to Scenic Byway/Road	miles	0.0	0.0	0.0	0.0	0.0	0.0
Engineering Constraints							
Total Length	miles	5.0	5.0	4.6	4.5	4.3	4.7
Open Trench Construction	miles	4.4	4.5	4.1	3.9	3.7	4.1
HDD Construction [f]	miles	0.6	0.4	0.4	0.6	0.6	0.6
Liner plate tunnel installation [f]	miles	0.0	0.1	0.1	0.0	0.0	0.0
Roads Crossings (total)	number	37	52	43	36	35	39
U.S. or State Highways (including on/off ramps)	number	16	14	13	16	15	15
County or Local Roads	number	21	38	30	20	20	23
Private Roads	number	0	0	0	0	0	1
Existing Electric Facilities Crossed	number	N/A	N/A	N/A	N/A	N/A	N/A
VDOT Impacts							
Length of Route Within VDOT Rights-of-Way	miles	2.5	4.2	3.9	3.3	3.3	3.5
Crossings of Limited Access Freeways	number	2	2	2	2	2	2
Routing Opportunities							
Collocation Opportunities (total)	miles	4.8	4.6	4.2	4.5	4.3	4.7
	(percent)	96	92	91	100	100	100
Road	miles	2.8	4.4	4.0	3.5	3.3	3.7
Electric Line	miles	2.0	0.2	0.2	1.0	1.0	1.0
Electric Line and Road	miles	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 4-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Environmental Features Comparison Table – Underground Alternatives [a]

Environmental Features	Unit	UG 01	UG 02	UG 03	UG 04	UG 05	UG 06

[a] For the majority of all of the underground alternative routes, the Company would obtain new rights-of-way within public road rights-of-way and, in limited cases, on private and public land. In addition, Underground Alternatives 01, 04, 05, and 06 follow NOVA Parks W&OD Park for various distances. Dominion currently has an existing right-of-way along the park. Since no new easement would be required within the park, these locations are quantified as existing right-of-way.

[b] The ATWS design for the Project are preliminary and subject to change pending final engineering design of the Project.

[c] Represents expanded right-of-way along an existing park crossing.

[d] The development of new right-of-way within 60 feet of a residence would invoke the provisions of Va. Code § 56-49.

[e] Based on the preliminary conceptual design of the project there might be some tree clearing within the open trench section of Underground Alternative 01, along the W&OD Park between Gallows Road and the point where the transmission line would turn north and leave the park. However, the precise amount of tree clearing cannot be quantified until the final alignment of this route is determined pending the completion of the underground utility survey.

[f] The HDD and linear plate tunnel designs for the Project are preliminary, therefore these lengths may change pending final engineering design of the Project.

4.1.1 Land Use

4.1.1.1 Land Ownership

While the majority (56 percent) of lands crossed by Underground Alternative 01 is VDOT right-of-way, about 1.8 miles (36 percent) is NOVA owned land, 0.4 mile (8 percent) is private land and less than 0.1 mile (less than 1 percent) is local government lands. The right-of-way along Underground Alternative 01 is primarily developed land (3.0 miles or 60 percent). Other land uses that would be crossed by Underground Alternative 01 consist of about 1.2 miles (24 percent) of forested land and 0.8 mile (16 percent) of open land. Development of this route would require the clearing of about 2.8 acres of trees. Of these 2.8 acres, 0.5 acre are within the VDOT right-of-way.

While the majority (90 percent) of lands crossed by Underground Alternative 02 is VDOT right-of-way, about 0.3 mile (7 percent) is private lands, about 0.1 mile (3 percent) is local government lands and less than 0.1 mile (less than 1 percent) of NOVA owned lands. The right-of-way along Underground Alternative 02 is primarily developed land (3.5 miles or 70 percent). Other land uses that would be crossed by Underground Alternative 02 consist of about 1.3 miles (26 percent) of open land and 0.2 mile (4 percent) of forested land. Development of this route would require the clearing of about 1.5 acres of trees. Of the total acreage, 1.3 acres are within the VDOT right-of-way.

While the majority (89 percent) of lands crossed by Underground Alternative 03 is VDOT right-of-way, about 0.4 mile (9 percent) is private lands, 0.1 mile (2 percent) consists of local government land, and less than 0.1 mile (less than 1 percent) of NOVA owned lands. The right-of-way along Underground Alternative 03 is primarily developed land (3.4 miles or 73 percent). Other land uses that would be crossed by Underground Alternative 03 consist of about 1.0 mile (22 percent) of open land and 0.2 mile (5 percent) of forested land. Development of this route would require the clearing of about 1.0 acre of trees. Of this acre, 0.8 acre are within the VDOT right-of-way.

While the majority (78 percent) of lands crossed by Underground Alternative 04 is VDOT right-of-way, about 0.8 mile (18 percent) consists of NOVA owned lands, and 0.2 mile (4 percent) is private land. The right-of-way along Underground Alternative 04 is primarily developed land

(3.7 miles or 82 percent). Other land uses that would be crossed by Underground Alternative 04 consist of about 0.5 mile (11 percent) of open land and 0.3 mile (7 percent) of forested land. Development of this route would require the clearing of about 0.8 acre of trees. Of this 0.8 acre, less than 0.1 acre are within the VDOT right-of-way.

While the majority (77 percent) of lands crossed by Underground Alternative 05 is VDOT right-of-way, about 0.8 mile (18 percent) is NOVA land, and 0.2 mile (5 percent) is privately owned land. The right-of-way along Underground Alternative 05 is primarily developed land (3.5 miles or 81 percent). Other land uses that would be crossed by Underground Alternative 05 consist of about 0.5 mile (12 percent) of open land and 0.3 mile (7 percent) of forested land. Development of this 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.

While the majority (74 percent) of lands crossed by Underground Alternative 06 is VDOT right-of-way, about 0.8 mile (17 percent) is NOVA owned land, and 0.4 mile (9 percent) is privately owned land. The right-of-way along Underground Alternative 06 is primarily developed land (3.8 miles or 81 percent). Other land uses that would be crossed by Underground Alternative 06 consist of about 0.6 mile (13 percent) of open land and 0.3 mile (6 percent) of forested land. Development of this 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.

4.1.1.2 Recreation Areas

All of the Underground Alternatives follow the W&OD Park trail for varying distances. Development of the right-of-way may require tree clearing, which may cause permanent visual impacts. During construction of the Underground Alternatives there would be temporary impacts that may restrict access to the portions of the park crossed by each alternative. For Underground Alternatives 01, 04, 05, and 06 which are all located within the W&OD Park trail, at least a portion of the crossing would be constructed using the HDD method to minimize impacts on the trail. Two ATWS would be required for the HDD crossing; one located near MP 0.3 and another near MPS 1.0. This HDD encompasses the entire crossing of the W&OD Park trail for Underground Alternatives 04, 05, and 06. Impacts for these routes would be limited to noise, dust, and temporary disturbances associated with the HDD construction method.

Underground Alternative 01 continues along the trail for approximately an additional 1.1 mile which would be constructed using a traditional trenching method. It is anticipated that this stretch of the trail would need to be temporarily closed and re-routed during construction. Underground Alternatives 02 and 03 both cross the W&OD Park but do not run parallel to the trail portion of the park. Temporary impacts including dust and noise may occur during construction, however given that this portion of the park is not a developed part of the trail, impacts are expected to be minor. No permanent impacts to the park are anticipated from any of the Underground Alternatives.

All of the Underground Alternatives cross a section of the Great Falls Loop Virginia Birding and Wildlife Trail. Given the developed nature of the trail that follows major roadways through the Project area and the fact that all the alternatives would be underground, no impacts to the trail are expected.

Underground Alternatives 02 and 03 both cross Idylwood Park along the eastern portion of the park within the soccer field. The majority of the Idylwood Park crossing would be completed using the HDD crossing construction method. 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 the one of the ATWS required for the HDD crossing of Railroad Street for Underground Alternatives 02 and 03. It is anticipated that temporary closures or access issues 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.

4.1.1.3 Residential, Existing and Planned Developments

Underground Alternative 01

Underground Alternative 01 crosses 2.8 miles of land zoned as residential. There are 786 single-family residences and 12 multi-family residential buildings within 500 feet of the Underground Alternative 01 centerline. There are 253 single-family residences and nine multi-family buildings within 200 feet of the centerline and 124 single-family residences and three multi-family buildings within 100 feet of the centerline. No single-family residences or multi-family buildings are located within 60 feet of the new Underground Alternative 01 right-of-way.

There are no single-family residences, multi-family residences, industrial/commercial buildings, or outbuildings located within the right-of-way of Underground Alternative 01. No planned developments would be crossed by Underground Alternative 01.

Underground Alternative 02

Underground Alternative 02 crosses 2.0 miles of land zoned as residential. There are 831 single-family residences and 12 multi-family residential buildings within 500 feet of the Underground Alternative 02 centerline. There are 302 single-family residences and nine multi-family buildings within 200 feet of the centerline and 167 single-family residences and three multi-family buildings within 100 feet of the centerline. One single-family residence and no multi-family buildings are located within 60 feet of the new Underground Alternative 02 right-of-way.

There are no single-family residences, multi-family residences, or industrial/commercial buildings, located within the right-of-way of Underground Alternative 02. There is one outbuilding located within the right-of-way. No planned developments would be crossed by Underground Alternative 02.

Underground Alternative 03

Underground Alternative 03 crosses 1.4 miles of land zoned as residential. There are 483 single-family residences and 13 multi-family residential buildings within 500 feet of the Underground Alternative 03 centerline. There are 161 single-family residences and nine multi-family buildings within 200 feet of the centerline and 75 single-family residences and three multi-family buildings within 100 feet of the centerline. One single-family residence and no multi-family buildings are located within 60 feet of the new Underground Alternative 03 right-of-way.

There are no single-family residences, multi-family residences, or industrial/commercial buildings, located within the right-of-way of Underground Alternative 03. There is one outbuilding located within the right-of-way. No planned developments would be crossed by Underground Alternative 03.

Underground Alternative 04

Underground Alternative 04 crosses 1.1 miles of land zoned as residential. There are 414 single-family residences and 13 multi-family residential buildings within 500 feet of the Underground Alternative 04 centerline. There are 116 single-family residences and nine multi-family buildings within 200 feet of the centerline and 41 single-family residences and three multi-family buildings within 100 feet of the centerline. No single-family residences or multi-family buildings are located within 60 feet of the new Underground Alternative 04 right-of-way.

There are no single-family residences, multi-family residences, industrial/commercial buildings, or outbuildings located within the right-of-way of Underground Alternative 04. No planned developments would be crossed by Underground Alternative 04.

Underground Alternative 05

Underground Alternative 05 crosses 1.4 miles of land zoned as residential. There are 361 single-family residences and 26 multi-family residential buildings within 500 feet of the Underground Alternative 05 centerline. There are 107 single-family residences and 12 multi-family buildings within 200 feet of the centerline and 38 single-family residences and seven multi-family buildings within 100 feet of the centerline. No single-family residences or multi-family buildings are located within 60 feet of the new Underground Alternative 05 right-of-way.

There are no single-family residences, multi-family residences, industrial/commercial buildings, or outbuildings located within the right-of-way of Underground Alternative 05. Underground Alternative 05 runs adjacent to the Tysons Corner Center planned development for about 0.2 mile between MPs 2.9 and 3.1 but does not cross the development.

Underground Alternative 06

Underground Alternative 06 crosses 1.1 miles of land zoned as residential. There are 360 single-family residences and 35 multi-family residential buildings within 500 feet of the Underground Alternative 06 centerline. There are 107 single-family residences and 14 multi-family buildings within 200 feet of the centerline and 38 single-family residences and 11 multi-family buildings within 100 feet of the centerline. No single-family residences or multi-family buildings are located within 60 feet of the new Underground Alternative 06 right-of-way.

There are no single-family residences, multi-family residences, or outbuildings located within the right-of-way of Underground Alternative 06. There is one industrial/commercial building located within the right-of-way. Underground Alternative 06 crosses two planned developments for a total of about 2.8 acres of right-of-way crossing impacts. Underground Alternative 06 crosses Tysons Corner Center for about 0.2 mile between MPs 3.0 and 3.2, which is along a portion of the development where construction is planned and could create a challenge to the development of this section of the route. The route crosses Tysons II for about 0.6 mile between MPs 3.3 and 3.9. The route would cross Tysons II along the western edge of the development that includes road improvements. Impacts along International Drive, including Tysons II, would occur if Underground Alternative 06 was constructed.

4.1.1.4 Zoning

Underground Alternative 01 would cross the following zoning districts: Residential (2.8 miles or 56 percent), 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 02 would cross the following zoning districts: Uncategorized/ Right-of-way (2.8 miles or 55 percent), Residential (2.0 miles or 40 percent), Commercial (0.2 mile or 4 percent), and Industrial (less than 0.1 mile or 1 percent).

Underground Alternative 03 would cross the following zoning districts: Uncategorized/ Right-of-way (3.0 miles or 65 percent), 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 04 would cross the following zoning districts: Uncategorized/ Right-of-way (3.2 miles or 71 percent), 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 05 would cross the following zoning districts: Uncategorized/ Right-of-way (2.7 miles or 62 percent), Residential (1.4 miles or 33 percent), Commercial (0.2 mile or 4 percent), and Industrial (less than 0.1 mile or 1 percent).

Underground Alternative 06 would cross the following zoning districts: Uncategorized/ Right-of-way (2.5 miles or 53 percent), 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).

4.1.1.5 Conservation Lands

None of the Underground Alternatives cross any Fairfax County conservation easements.

Dominion Energy Virginia understands that properties are placed under easement throughout the year and additional easements may be identified as the project moves forward. Dominion Energy Virginia will continue to consult with the various land managing entities regarding potential new easements in the Project area.

4.1.1.6 Traffic and Transportation

Impacts on Traffic Operations

Once installed under public roads, private roads, trails, and other rights-of-way, the Underground Alternatives would have minimal impacts on traffic operations or other surface activity. See Section 2.3.2 for a discussion of maintenance activities and potential traffic impacts. The Company commissioned Dewberry to review the construction impacts of underground alternatives on traffic flow. This review, currently in progress, will be used to assess potential traffic impacts from construction within roadbeds and develop mitigation measures such as alternative construction measures, scheduling, and potentially minor reroutes. The Company expects this Traffic Review to be completed during the course of this proceeding and made available for review.

Transportation Projects Affected

The Underground Alternatives cross several transportation projects as identified in Table 4.2.1.6-1. The Idylwood Road Trail Project proposes the construction of a shared use path from Helena Drive to Idyl Lane on the south side of Idylwood Road. As of summer 2017, the path alignment is still being evaluated and no construction schedule is proposed. The project would be crossed by Underground Alternatives 02 and 03 at MP 0.7.

TABLE 4.2.1.6-1

Idylwood-Tysons 230 kV Underground Transmission Line Project
Transportation Projects within 0.25 mile of Underground Alternatives

Project Name	Scope	Status	Nearby Route(s) and MP Crossings
I-66 Inside the Beltway Tolling from I-495 (Capital Beltway) to U.S. Route in Rosslyn	Convert I-66 inside the Beltway into a managed express lane facility in peak directions	Construction	All Underground Routes (MP 0.3)
Idylwood Road Trail (TMSAMS)	Construct shared use path from Helena Drive to Idyl Lane on the south side of Idylwood Road	Project Initiation	Underground 02 and 03 (MP 0.7)
Route 7 Widening from Route 123 to I-495 (Study Only)	Conceptual Design and traffic operations study to determine future cross section	Study	Underground 05 and 06 (MP 2.8)

The VDOT Northern Virginia District Office reviewed the Underground Alternatives and provided comments in a letter dated August 11, 2017 (VDOT, 2017). The VDOT comments include general comments and recite the applicable regulations found in 24 VAC 30-151-310 - *Utility installations within limited access highways.* General comments on the Underground Alternatives include the need for Central Office Approval for crossings of I-66 and I-495, WMATA approval of track crossings, the difficultly of maintenance and repairs of underground lines, and that Installation under sidewalks should be explored as opposed to under road pavement. Specific comments on the alternatives are summarized in Table 4.2.1.6-2 and provide preliminary feedback from VDOT on the Underground Alternatives.

TABLE 4.2.1.6-2

Idylwood-Tysons 230 kV Underground Transmission Line Project
Specific VDOT Comments on Underground Alternatives

Underground Alternative	VDOT Comments
01	• Only two limited access requests to process. • Would require approval from NOVA Parks. • Several traffic signals to work around. • Possible neighborhood opposition due to impacts to residential areas. • Major traffic impacts on primary and secondary streets. • Duct bank likely will not be impacted by future roadway widening projects. • The routing is shorter than the routing for all of the overhead routes under consideration.
02	• Only two limited access requests to process. • Several traffic signals to work around. • Possible neighborhood opposition due to impacts to residential areas. • Major traffic impacts on primary and secondary streets. • Duct bank likely will not be impacted by future roadway widening projects. • The routing is shorter than the routing for all of the overhead routes under consideration.

TABLE 4.2.1.6-2

Idylwood-Tysons 230 kV Underground Transmission Line Project
Specific VDOT Comments on Underground Alternatives

Underground Alternative	VDOT Comments
03	• Only two limited access requests to process. • Several traffic signals to work around. • Possible neighborhood opposition due to impacts to residential areas. • Major traffic impacts on primary and secondary streets. • Duct bank likely will not be impacted by future roadway widening projects. • The routing is shorter than the routing for all of the overhead routes under consideration.
04	• Only two limited access requests to process. • Would require approval from NOVA Parks. • Several traffic signals to work around. • Possible neighborhood opposition due to impacts to residential areas. • Major traffic impacts on primary and secondary streets. • Duct bank likely will not be impacted by future roadway widening projects. • The routing is shorter than the routing for all of the overhead routes under consideration.
05	• Only two limited access requests to process. • Would require approval from NOVA Parks. • Several traffic signals to work around. • Possible neighborhood opposition due to impacts to residential areas. • Major traffic impacts on primary and secondary streets. • Construction adjacent to two major regional shopping centers will affect operations for retail establishments. • There are multiple other utilities under the road/sidewalk along the proposed routing. Portions of the alignment are full of fiber optics and other buried facilities.
06	• Only two limited access requests to process. • Would require approval from NOVA Parks. • Several traffic signals to work around. • Possible neighborhood opposition due to impacts to residential areas. • Major traffic impacts on primary and secondary streets. • Construction adjacent to two major regional shopping centers will affect operations for retail establishments. • There are multiple other utilities under the road/sidewalk along the proposed routing. Portions of the alignment are full of fiber optics and other buried facilities.

The company also corresponded with MWAA and requested their review the Underground Alternatives (see Attachment 2.N.2 to the DEQ Supplement).

4.1.2 Environmental Constraints

4.1.2.1 Wetlands

Based on ERM's desktop wetland analysis, the underground alternative routes would have the following impacts on wetlands:

- Underground Alternative 01 crosses two PEM wetlands with a total centerline crossing distance of 308.6 feet. One of the wetlands occurs within the existing Dominion Energy Virginia's Line #2035 right-of-way north of Shreve Road at MP 0.1. The second wetland occurs where the route heads north behind residences on the west side of Malraux Road at MP 2.1 and is not crossed by the centerline.

- Underground Alternatives 02, 03, 04, 05, and 06 cross one PEM wetland with a total centerline crossing distance of 308.6 feet. The wetland occurs within the existing Dominion Energy Virginia's Line #2035 right-of-way north of Shreve Road at MP 0.1.

4.1.2.2 Waterbodies

Based on ERM's desktop waterbody analysis, the underground alternative routes would have the following waterbody impacts:

- Underground Alternative 01 crosses five waterbodies, including four intermittent streams and one perennial stream. The crossing of Holmes Run would take place in the HDD crossing of I-495. No impacts to this waterbody are anticipated. The crossing of the perennial Wolftrap Creek and two UNTs of Holmes Run would take place in areas of conventional trenching and temporary impacts would occur along these waterbodies. Wolftrap Creek would be crossed using an open cut dam and pump crossing method. Long Branch appears to exist in a culvert at the MP 1.5 crossing. No impacts are anticipated.

- Underground Alternative 02 crosses four waterbodies, including one perennial stream, Wolftrap Creek. The crossing of Holmes Run would take place in the HDD crossing of Electric Avenue at MP 1.2. No impacts to this waterbody are anticipated. The crossing of Wolftrap Creek and two UNTs of Holmes Run would take place in areas of conventional trenching and temporary impacts would occur along these waterbodies. Wolftrap Creek would be crossed using an open cut dam and pump crossing method.

- Underground Alternative 03 crosses three intermittent waterbodies. None of these stream crossings are greater than 100-feet-wide. The crossing of Holmes Run would take place in the HDD crossing of Electric Avenue at MP 1.2. No impacts to this waterbody are anticipated. The crossing of two UNTs of Holmes Run would take place in areas of conventional trenching and temporary impacts would occur along these waterbodies.

- Underground Alternative 04 crosses three intermittent waterbodies. None of these stream crossings are greater than 100-feet-wide. The crossing of Holmes Run would take place in the HDD crossing of I-495 at MP 0.6. No impacts to this waterbody are anticipated. The crossing of two UNTs of Holmes Run would take place in areas of conventional trenching and temporary impacts would occur along these waterbodies.

- Underground Alternative 05 crosses three intermittent waterbodies. None of these stream crossings are greater than 100-feet-wide. The crossing of Holmes Run would take place in the HDD crossing of I-495 at MP 0.6. No impacts to this waterbody are anticipated. The crossing of two UNTs of Holmes Run would take place in areas of conventional trenching and temporary impacts would occur along these waterbodies.

- Underground Alternative 06 crosses four intermittent waterbodies. None of these stream crossings are greater than 100-feet-wide. The crossing of Holmes Run would take place in the HDD crossing of I-495. The second intermittent

waterbody would be crossed near MP 4.1 and appears to be located in a culvert at the crossing location. No impacts to these waterbodies are anticipated. The crossing of two UNTs of Holmes Run would take place in areas of conventional trenching and temporary impacts would occur along these waterbodies.

4.1.2.3 Resource Protection Areas and Areas of Ecological Significance

When assessing the number of RPA crossings, the Underground Alternatives cross no more than three RPAs each. Underground Alternatives 04, 05, and 06 cross only one RPA for 0.1 mile. Underground Alternatives 01, 02, and 03 cross two RPAs for 0.2, 0.2 and 0.1 mile, respectively. Of the Underground Alternatives, Underground Alternatives 04, 05, and 06 would impact the least amount of RPAs, and Underground Alternatives 01 and 02 would impact the most amount of RPAs.

When assessing VDCR natural heritage area crossings, each of the Underground Alternative routes cross the same two GLNHRs, and none of the Underground Alternatives cross an SCU or CS. However, during an official review, the VDCR noted that Underground Alternative 01 and Underground Alternative 02 occur upstream of the Long Branch SCU, and recommended that Dominion implement and adhere to applicable state and local erosion and sediment control and stormwater management laws and regulation to avoid and minimize impacts on this resource.

4.1.2.4 Protected Species

None of the Underground Alternatives would impact protected bat species outside of the construction period. While each of the alternative routes has the potential to affect protected bat species during construction, Underground Alternative 04, Underground Alternative 05, and Underground Alternative 06 parallel existing roadways to such a great extent that they are highly unlikely to impact protected bats. Underground Alternative 02 and Underground Alternative 03 will require clearing 1,200 feet of trees in a woodlot, which is more likely to impact protected bats than the other Underground Alternatives.

Based on a review of the species' habitat requirements, none of the route alternatives appear to contain suitable habitat for small-whorled pogonia.

When considering potential impacts on freshwater mussels and other stream-dependent species such as Appalachian springsnail, each Underground Alternative crosses at least one perennial stream, most of which have the potential to contain protected freshwater mussels. Underground Alternative 01 crosses 1 perennial waterbody, Underground Alternative 02 crosses 1 perennial waterbody, Underground Alternatives 03, 04, 05 and 06 do not cross any perennial waterbodies. It is worth noting that depending on the methods used to cross each waterbody, the number of possible impacts resulting from each alternative route are variable, and impacts, if any, would only occur during the construction period.

When considering possible impacts to peregrine falcon and loggerhead shrike, route alternatives that utilize edge habitats and existing utility corridors have the greatest relative potential to impact these species. This type of habitat is not found along any of the underground alternative routes. Additionally, none of the Underground Alternative routes cross the open grassland habitat suitable for Henslow's sparrow, so there is a very low potential for any Underground Alternative to impact these species. When accounting for the number of bald

eagle nest management buffers crossed, no Underground Alternative crosses a known bald eagle nest 330-foot or 660-foot management buffer.

4.1.2.5 Vegetation

When accounting for vegetation impacts by each alternative route, the routes can be generally divided into two categories: routes that entirely follow an existing roadway and routes that partially require clearing a new corridor. Underground Alternative 01, Underground Alternative 04, Underground Alternative 05, and Underground Alternative 06 parallel roadways and are thus minimally impactful to vegetation. Underground Alternative 02 and Underground Alternative 03 require clearing a 1,200-foot-long path through a woodlot in addition to following existing roadways.

4.1.3 Visual Conditions

Overview

The Underground Alternatives would be installed almost entirely directly beneath or adjacent to existing roads, and covered with pavement or roadside landscaping (i.e., lawn). These future visual conditions would be essentially identical to current visual conditions; therefore, visual simulations were not prepared for the Underground Alternatives, with one exception, described below.

Underground Alternative 01

Underground Alternative 01 would be constructed almost entirely within existing rights-of-way, including the Company's existing Line #202 (MP 0.0 to 2.0) and public roads (MP 2.3 to 4.9). The route would cross through a tree line that separates a residential neighborhood from office buildings.

Pavement in affected roads and segments of the W&OD Park trail (MP 0.2 to 2.0) would be replaced. Following construction, the only visual evidence of the route would be the removal of trees over the underground right-of-way between MPs 2.0 and 2.3. This change would be directly visible to approximately 14 houses Malraux Drive, but would otherwise not be noticeable. The wooded buffer between these houses and the office buildings would be thinned, but not entirely removed. In addition, based on the preliminary conceptual design of the project, there might be some tree clearing within the open trench section of Underground Alternative 01 along the W&OD Park between Gallows Road and the point where the transmission line would turn north and leave the park (between MPs 1.0 and 2.0). The Company will make every effort to minimize any tree clearing within the park. As a result, visual impacts of Underground Alternative 01 would be minor and limited in geographic scope.

Underground Alternatives 02 and 03

Underground Alternatives 02 and 03 would be constructed almost entirely within existing rights-of-way, including the Company's existing Line #202 (MP 0.0 to 0.3) and public roads (MP 0.5 to the Tysons Substation). These routes route would both cross through Idylwood Park between MP 0.3 and 0.5.

Pavement in affected roads would be replaced, as would turf grass in Idylwood Park. Following construction, the only visual evidence of the route would be where the transmission line right-of-

way crosses an existing tree line at the north end of Idylwood Park. A 30-foot-wide corridor over the transmission line would remain vegetated, but permanently cleared of trees. As a result, visual impacts of Underground Alternative 02 or 03 would be minor and limited in geographic scope.

Underground Alternatives 04, 05, and 06

Underground Alternatives 04, 05, and 06 would be constructed entirely within existing rights-of-way, including the Company's existing Line #202 (MP 0.0 to 1.0) and public roads (MP 1.0 to the Tysons Substation). Underground Alternative 06 would also be located with Tysons Corner Court, a private road owned and maintained by Tyson Corner Center, for about 0.2 mile.

Pavement in affected roads and segments of the W&OD Park trail (MP 0.2 to 1.0) would be replaced. Since the Company intends to install the transmission line between I-66 and Gallows Road via HDD, there would be no direct impacts to the trail in this area. Following construction, there would be no visual evidence of the route. There would be limited removal of trees within the temporary extra workspace for the HDD adjacent to Gallows Road. Therefore, construction of one of these alternatives would have no visual impacts.

4.1.4 Cultural Resources

Effects for the considered resources relevant to each Underground Alternative are discussed below. A complete discussion of the impacts of the Project on cultural resources can be found in Appendix E.

4.1.4.1 Archaeology Findings

Underground Alternative 05 has no archaeological sites mapped within the proposed right-of-way. Between one and three sites each have been recorded in the proposed right-of-way of the other alternatives—three sites in Underground Alternative 03 (44FX0043, 44FX0045, and 44FX2364), two sites in Underground Alternative 02 (44FX0043 and 44FX0045), and one site each in Underground Alternatives 01 (44FX0043), 04 (44FX0043), and 06 (44FX0540). Some of the same sites occur in the right-of-way of different alternatives because of the concurrent segments currently under consideration. None of the known archaeological sites located in the right-of-way of the proposed transmission line alternatives have been evaluated for NRHP eligibility. Based on a review of contemporary aerial photographs and ground-level photography conducted during field investigations, some of these sites, or portions of them, have been disturbed or destroyed by modern development. In the case of 44FX0043, a modern office complex and parking garage have been built over site. In the case of 44FX0045, Custis Memorial Parkway was built over part of the site, while the northern and eastern portion may be intact within Idylwood Park. In the case of 44FX0540, an office complex, sidewalk, and street have been constructed, destroying the entirety of the site. In the case of 44FX2364, the streetcar line has been paved over with asphalt for a pedestrian trail, but it may be sealed intact below fill. A confident and complete assessment of the integrity of each site would require archaeological field investigations. Until archaeological field investigations are conducted to determine the status of recorded archaeological sites, a definitive comparison of potential impacts to archaeological sites for each alternative would be speculative.

4.1.4.2 Above-ground Historic Properties

Only one considered resource defined in accordance with VDHR Guidelines that is extant is associated with all of the alternatives. It is the W&OD Railroad Historic District (053-0276), currently maintained as W&OD Park. It is a linear resource determined eligible for the National Register of Historic Places, which is intersected by all of the alternatives. Underground Alternative 01 intersects the resource for the greatest distance among the alternatives, running through the park for approximately 1.9 miles; Underground Alternatives 04, 05, and 06 enter the park further east from Underground Alternative 01 (at Gallows Road/Route 650), and run through the park for approximately 0.8 mile. Each of these alternatives exit the park south of I-66 to access the Idylwood Substation. Underground Alternatives 01, 04, 05, and 06 would all involve placement of the buried line within existing overhead transmission line right-of-way using a combination of open-trench and HDD construction. Underground Alternatives 02 and 03 cross the resource perpendicularly south of I-66, and follow the same route from that point to the Idylwood Substation as Underground Alternatives 01, 04, 05, and 06. Underground Alternatives 02 and 03 would proceed north of Interstate 66 using an HDD, whose entry point and associated temporary workspace is proposed within the W&OD Railroad Historic District.

No trees would be removed within the boundary of the district itself in the case of Underground Alternatives 02 and 03; these two alternatives would directly affect the resource by the siting of a temporary HDD workspace within the district boundary, but no visual impacts would result post-construction. Whereas Underground Alternatives 02 and 03 would have the least impact on the W&OD Railroad Historic District, Underground Alternative 01 would have the greatest impact. Underground Alternative 01 intersects the resource for the greatest distance among the alternatives, extending through the park adjacent to the Company's existing overhead transmission line for approximately 1.86 miles before exiting the park south of I-66. Based on the preliminary conceptual design of the project, there might be some tree clearing within the open trench section of Underground Alternative 01 within the district between Gallows Road and the point where the transmission line would turn north and leave the park. However, the precise amount of tree clearing cannot be quantified until the final alignment of this route is determined pending the completion of the underground utility survey. Tree clearing could be required along three segments of Underground Alternative 01 west of Gallows Road; these segments (from MP 1.06–1.57, 1.64–1.80, and 1.80–2.02) total approximately 0.89 miles, but vegetation may not need to be removed along that entire length. Construction along portions of the transmission line within the district will involve HDD, and those segments will leave no visible evidence post-construction. However, it is possible that a small area of trees and understory vegetation (less than 0.1 acre) would be removed within the temporary HDD workspace that would be located in the district immediately east of Gallows Road. In addition to the vegetation changes within the district itself, there is one location where trees would be removed adjacent to the park, affecting the resource's viewshed. Where Underground Alternative 01 proceeds north from the park, some tree clearing would occur at the eastern edge of an office complex and to the west of a subdivision with houses along Malraux Drive, with possible tree clearing extending from 053-0276 north to Electric Avenue. In the case of Underground Alternatives 04, 05, and 06, the routes would enter the park at Gallows Road/Route 650, and run through the park adjacent to the Company's existing overhead transmission line for approximately 0.83 mile using open-trench and HDD construction before exiting the park south of Interstate 66 to access the Idylwood Substation to the south. For Underground Alternatives 04, 05, and 06, it is possible that a small area of trees and understory vegetation (less than 0.1 acre) would be removed within the boundary of the park where a temporary HDD workspace would be sited immediately east of Gallows Road. Where Underground Alternatives 04, 05, and 06 extend north and south

of the district, there would be no tree cutting in adjacent areas that would create viewshed impacts from within the district.

The vegetation currently found within the park is not consistent with the historic landscape of the district, when the active rail corridor was maintained as a cleared right-of-way. Thus, the potential change to the landscape of the historic district under the construction scenarios proposed for Underground Alternatives 01, 04, 05, and 06 would not degrade the historic setting of the resource. Underground Alternative 01, which would have the greatest impact, would involve potential vegetation changes along less than a mile of the 45-mile-long resource. Furthermore, the viewshed change to the adjacent area north of the district in the case of Underground Alternative 01 would be minor in the context of the overall length of the resource, which is lined by many more obtrusive modern landscape features and buildings. The current setting in that location is not significant to the historic character of the resource. The changes to the setting of 053-0276 under the construction scenarios proposed for Underground Alternatives 04, 05, and 06 are even less, consisting of vegetation removal in a single location within the park. The visual impacts are considered to be minimal and would not impair the historic character of the resource. There would be no visual impacts from tree cutting in the case of Underground Alternatives 02 and 03. Potential impacts from each alternative are considered to be minimal.

In the case Underground Alternative 06, in addition to 053-0276, a second considered resource is located within one mile of the route: Spring Hill Farm (029-0035) a National Register listed property that is also on the Virginia Landmarks Register. The field investigations for this study confirmed that Spring Hill Farm is no longer extant, and thus would not be affected by construction of Underground Alternative 06.

4.1.5 Geological Constraints

No impacts on geological constraints will occur from construction of any of the Underground Alternatives.

4.1.6 Engineering Constraints

All of the Underground Alternatives require numerous road crossings. Underground Alternative 05 requires 35 road crossings, which is the least of all the routes. Underground Alternatives 04, 01, and 06 require slightly more road crossings (36, 37, and 39, respectively). Underground Alternative 03 requires somewhat more road crossings (43) while Underground Alternative 02 requires the most with 52 road crossings. As discussed in section 3.1.6, for underground routes in urban areas the crossing of buried utilities is a significant engineering constraint. The Company is in the process of completing a buried infrastructure survey. The results of the survey are expected to be completed during the course of this proceeding and will be provided for review.

In addition, HDDs would be required at three locations for the construction of Underground Alternatives 02 and 03: the crossing of I-66 between MPs 0.2 and 0.4; the crossing of I-495 between MPs 0.9 and 1.0; and along Railroad Street between MPS 1.0 and 1.3. The temporary extra workspace required for the HDD at the crossing of I-495 on the west side of the highway would need to be placed on the front yards of two homes along Helena Drive (see Appendix C, page 1) and trees would need to be cleared in the area of the workspaces.

4.1.7 Routing Opportunities

Each of the Underground Alternatives take advantage of existing routing opportunities ranging from 91 to 100 percent collocated. Underground Alternatives 03 and 02 both require 0.4 mile of new right-of-way, and Underground Alternative 01 requires 0.2 mile of right-of-way not collocated with existing rights-of-way. In contrast, Underground Alternatives 04, 05, and 06 are 100 percent collocated with existing rights-of-way.

4.1.8 Underground Alternative Considerations and Conclusions

Considerations relevant to selecting a proposed underground alternative are different than those for an overhead route. The majority of the Underground Alternatives are located within existing roadbeds or developed rights-of-way resulting in limited environmental impacts; therefore, while the discussion below ranks the alternatives based primarily on environmental impacts, each of these alternatives would result in minor environmental impacts when compared to routes located in less urbanized environments. Considerations associated with the six Underground Alternatives are discussed below. The specific resources associated with some or all of the alternatives which have a noteworthy variance include the following:

Length of Route – Of the six Underground Alternatives considered, Underground Alternatives 01 and 02 represent the longest routes at 5.0 miles each. This is 0.3 mile longer than the next longest route, Underground Alternative 06, which is 4.7 miles long. The next longest route is Underground Alternative 03 at 4.6 miles long, while Underground Alternative 04 is 4.5 miles long. Underground Alternative 05 is the shortest at 4.3 miles long.

Forested Lands Affected – Of the six Underground Alternatives considered, the new right-of-way required for Underground Alternative 02 would affect the most forested land, resulting in the permanent loss of 1.3 acres of tree cover. Underground Alternatives 01 and 03 would affect 1.0 and 0.8 acre, respectively. The new right-of-way required for Underground Alternative 04 would affect less than 0.1 acre and Underground Alternatives 05 and 06 would require no clearing of forested land. Finally, based on the preliminary conceptual design of the project, there might be up to 1.1 acres of tree clearing within the open trench section of Underground Alternative 01 within the Company's existing right-of-way along the W&OD Park trail. However, the precise amount of this tree clearing cannot be quantified until the final alignment of this route is determined pending the completion of the underground utility survey.

Resource Protection Areas Crossed – Three of the six Underground Alternatives considered would require new right-of-way within RPAs. Underground Alternative 02 would affect 0.6 acre of RPAs and Underground Alternatives 01 and 03 would affect 0.4 and 0.3 acre, respectively. Underground Alternatives 04, 05, and 06 would not require new right-of-way within RPAs.

Waterbody Crossings – Underground Alternative 01 would require five waterbody crossings (one perennial and four intermittent). Four waterbodies would be crossed by Underground Alternative 02 (one perennial and three intermittent) and four intermittent waterbodies would be crossed by Underground Alternative 06. Underground Alternatives 03, 04, and 05 each cross three intermittent waterbodies.

Planned Developments – Underground Alternative 06 is the only alternative route that would cross planned developments; it would affect 2.8 acres across two planned developments.

Crossings of Fairfax County Parks – Both Underground Alternatives 02 and 03 would cross a single county park, Idylwood Park, and would each impact 0.4 acre of the park. Of this 0.4 acre, tree clearing would be required on approximately 0.2 acre within the park. The Company would have to acquire permission from the Fairfax County Park Authority to obtain a right-of-way across the park.

In a letter dated November 2, 2017 Fairfax County Park Authority responded to the Company's consultation letter regarding the Project (See Attachment II.A.7.a in the Appendix to this Application for correspondence with the Fairfax County Park Authority. The Park Authority noted that Idylwood Park has an Invasive Management Area and conservation and Northern Virginia Conservation Trust Easements, respectively that would require additional review in consultation with the Natural Resources Branch, including the Invasive Management Area program coordinator and volunteers and the Northern Virginia Conservation Trust. Due to their natural resources impacts on Idylwood Park, the Fairfax County Park Authority concluded that Underground Alternatives 2 and 3 are the least preferable of the underground alternatives and are not recommended.

Proximity to Residences – In the case of this Project, proximity to residences along underground transmission lines is not considered a significant routing constraint, since the alternatives primarily would be installed within existing roadbeds and public rights-of-way. In addition, the impacts on nearby residences would be limited to the duration of Project construction. Most alternatives have no houses within 60 feet of the right-of-way; however, the rights-of-way for both Underground Alternatives 02 and 03 would be located within 60 feet of one residence.

5.0 CONCLUSIONS AND RECOMMENDATION

Because these routes are all substantially located within existing roadbeds or along the Company's existing right-of-way along the W&OD Park, their environmental impacts are limited. However, as described in Section 4.1.8 above, there are some factors that differentiate the routes. The Underground Alternatives are listed below in order of ranking primarily based on the assessment of environmental impacts discussed in Section 4.0 of this report.

Underground Alternative 05 is the shortest route and the least expensive alternative. Along with Underground Alternative 04, this route would cross the least amount of private land (0.2 mile). The right-of-way for this route would not be within 60 feet of any residential homes. In addition, this alternative would not require the clearing of any forest lands outside of the existing right-of-way and would not require new right-of-way through any RPAs. Moreover, the construction of this route would have no direct impacts on the W&OD Park trail, since the portion of the transmission line that would be located along the trail would be installed by HDD under the trail. While this route would cross three intermittent waterbodies and would impact about 0.2 acre of wetlands, Underground Alternatives 03 and 04 would have the same impact on these resources. For these reasons, Underground Alternative 05 is the Company's preferred alternative.

Underground Alternative 06 is the second highest cost option due to the extended length of the route through the Tysons Corner Center and Tysons Galleria areas and the crossing of a private road. On November 1, 2017 the Company was informed that a planned development along this private road could create a challenge to the development of this section of the route. However, this route would require minimal tree clearing outside of the existing right-of-way or new right-of-way through any RPAs, and the right-of-way for the route would not be within 60 feet of any

residences. Additionally, at 4.7 miles this route is only 0.4 mile longer than Underground Alternative 05 and 0.2 mile longer than Underground Alternative 04. Moreover, the construction of this route would have no direct impacts on the W&OD Park trail, since the portion of the transmission line that would be located along the trail would be installed by HDD under the trail. Finally, it would cross through fewer residential areas than Underground Alternative 04 and would largely be located on public roads via permit as is the Proposed Route. Therefore, the Company proposes Underground Alternative 06 for notice and consideration by the Commission.

At 4.5 miles long, Underground Alternative 04 is the next shortest alternative route after Underground Alternative 05. There are no homes within 60 feet of the right-of-way of this route. While there would be some minor tree clearing required to construct the route, it would be less than 0.1 acre in areas of new right-of-way. Similar to Underground Alternative 05, this alternative would not require new right-of-way through RPAs, would require three intermittent waterbody crossings, and would impact about 0.2 acre of wetland. The construction of this route would have no direct impacts on the W&OD Park trail, since the portion of the transmission line that would be located along the trail would be installed by HDD under the trail.

Underground Alternative 01 is tied with Underground Alternative 02 as the longest routes at 5.0 miles long. Underground Alternative 01 would affect the most waterbodies (one perennial stream and four intermittent streams). Underground Alternative 01 would also impact 0.2 acre of wetlands, and this is the only route that crosses two wetlands rather than just one. Approximately 1.0 acre of tree clearing and 0.4 acre of RPAs would be permanently affected along areas of new right-of-way along this route. Finally, Underground Alternative 01 would have the most significant impact to the W&OD Park trail. An approximately 1.1-mile long portion of the route west of Gallows Road located along the trail would be installed by the open trenching method. This would result in the temporary closure of segments of the trail along this area during construction and may require some clearing of trees along the trail.

The main advantage of Underground Alternative 03 is that it would avoid any potential disturbance to the W&OD Park trail; however, it requires crossing through Idylwood Park. While a portion of the route would be drilled under the park, the remainder of the park crossing would be open trenched and would require the clearing of 0.2 acre of trees across park property. The Company would have to acquire permission from the Fairfax County Park Authority to obtain a right-of-way across the park. As a result of the impacts on Idylwood Park, the Fairfax County Park Authority has stated that Underground Alternatives 02 and 03 are the least preferable of the underground alternatives and are not recommended. In addition, at 4.6 miles long, this route would be longer than Underground Alternatives 04 and 05, but shorter than Underground Alternative 06. This route would require a total of about 0.8 acre of tree clearing and affects about 0.3 acre of RPAs along areas of new right-of-way. Similar to Underground Alternatives 05 and 04, this route would cross three intermittent streams and impact 0.2 acre of wetlands. In addition, one residence would be within 60 feet of the right-of-way of this route. Finally, the HDD of I-495 that would be required to construct this route would require the temporary extra workspace be established during construction on the west side of the highway on the front yards of two homes along Helena Drive.

As noted above, Underground Alternative 02 is 5.0 miles long and would be one of the two longest routes considered (along with Underground Alternative 01). Similar to Underground Alternative 03, this route would avoid potential disturbance to the W&OD Park trail, but would also cross through Idylwood Park. While a portion of the route would be drilled under the park, the remainder of the park crossing would be open trenched and would require the clearing of

0.2 acres of trees across park property. The Company would have to acquire permission from the Fairfax County Park Authority to obtain a right-of-way across the park. As a result of the impacts on Idylwood Park, the Fairfax County Park Authority has stated that Underground Alternatives 02 and 03 are the least preferable of the underground alternatives and are not recommended. In addition, the right of-way for Underground Alternative 02 would be within 60 feet of 1 residence. This route would cross one perennial and three intermittent streams and impact 0.2 acre of wetlands. The route would result in impacts on a total of 1.3 acres of trees and 0.6 acre of RPAs along new right-of-way, the most of any routes. Finally, the HDD of I-495 that would be needed to construct this route would require temporary extra workspace be established during construction on the west side of the highway on the front yards of two homes along Helena Drive.

Based on the discussion above, ERM recommends Underground Alternative 05 as the proposed route based on environmental impacts, the Company's ability to construct these routes, and cost. The remaining alternative routes in order of preference based on environmental impacts are:

1. Underground Alternative 06
2. Underground Alternative 04
3. Underground Alternative 01
4. Underground Alternative 03
5. Underground Alternative 02

While these routes are ranked in order of preference based on environmental impact, the Company's ability to construct and cost, the environmental analysis does not identify significant differences in environmental impacts between the routes with the exceptions of Underground Alternatives 02 and 03. Both of these routes would involve crossing a Fairfax County Park, Idylwood Park, and could only be constructed with the permission of the Fairfax County Park Authority. However, Fairfax County Park Authority has stated that Underground Alternatives 02 and 03 are the least preferable of the underground alternatives due to their impacts on Idylwood Park and are not recommended.

Due to the urban nature of the area in which this line is to be installed, numerous existing utilities would be crossed by the Underground Alternatives including water, gas, sewer, communication 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 Study to determine if any variation to the Proposed Route (Underground Alternative 05) or other Underground Alternatives is needed due to utility conflicts.

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