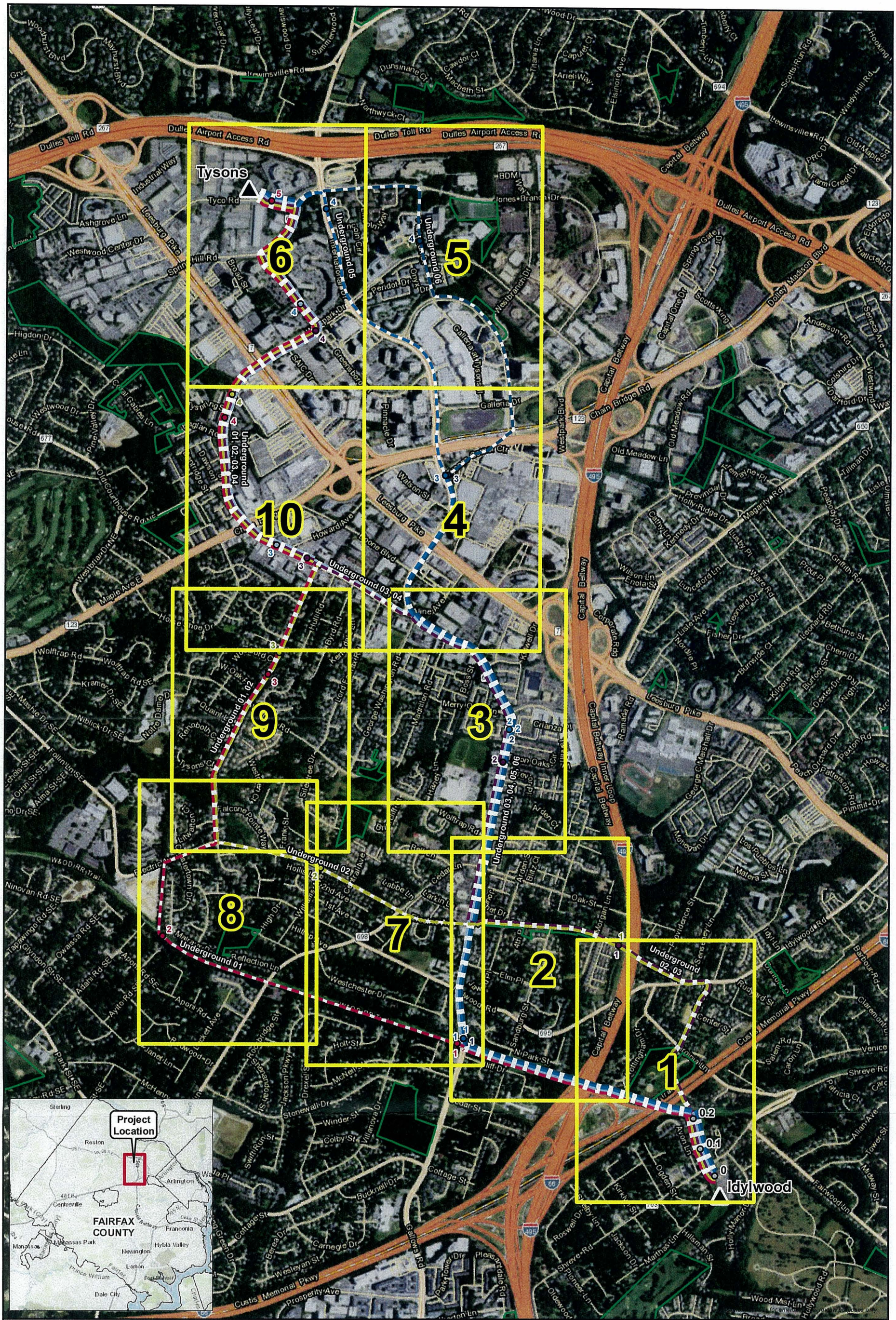
Appendix C

DOMINION ENERGY VIRGINIA

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

Environmental Routing Study

Appendix C
Aerial Photo Based Route Map Set

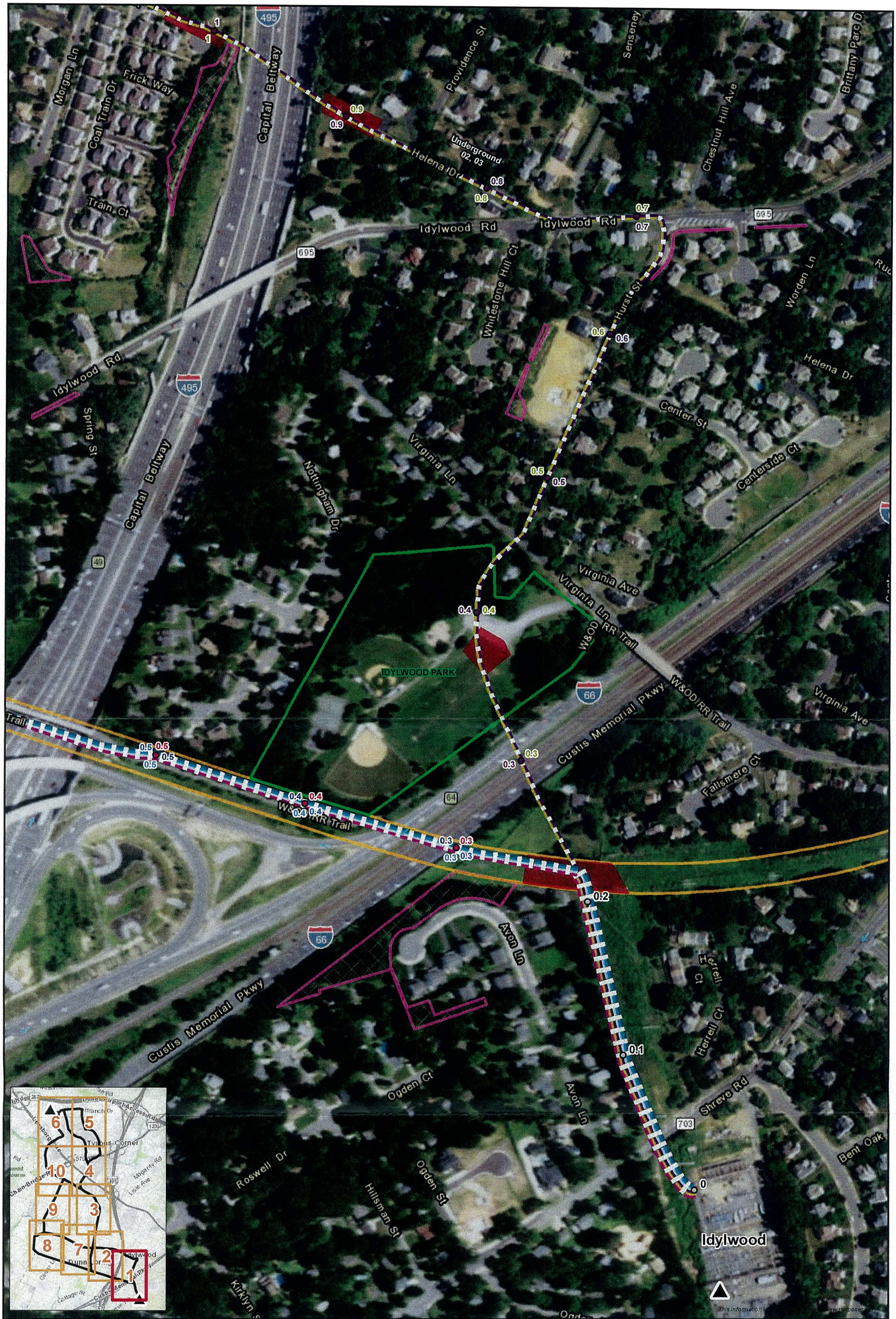


Appendix C
Aerial Photo-Based Route Index Map
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\Routing_Study_DOM_IDYL_AppdxC_Aerial_Index.mxd | REVISED: 10/19/2017 | SCALE: 1:18,000 when printed at 11x17 | DRAWN BY: 0239



Underground Alternative 01
Underground Alternative 02
Underground Alternative 03
Underground Alternative 04
Underground Alternative 05
Underground Alternative 06

Existing Substation
Milepost
Fairfax County Park
Recreation Area
Fairfax County Conservation Easement

Additional Temporary Workspace
(Preliminary - Subject to Final Engineering)

1:3,600
0 150 300 Feet

Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

- Underground Alternative 01
- Underground Alternative 02
- Underground Alternative 03
- Underground Alternative 04
- Underground Alternative 05
- Underground Alternative 06
- Existing Substation
- Milepost
- Fairfax County Park
- Recreation Area
- Fairfax County Conservation Easement
- Additional Temporary Workspace (Preliminary - Subject to Final Engineering)

1:3,600

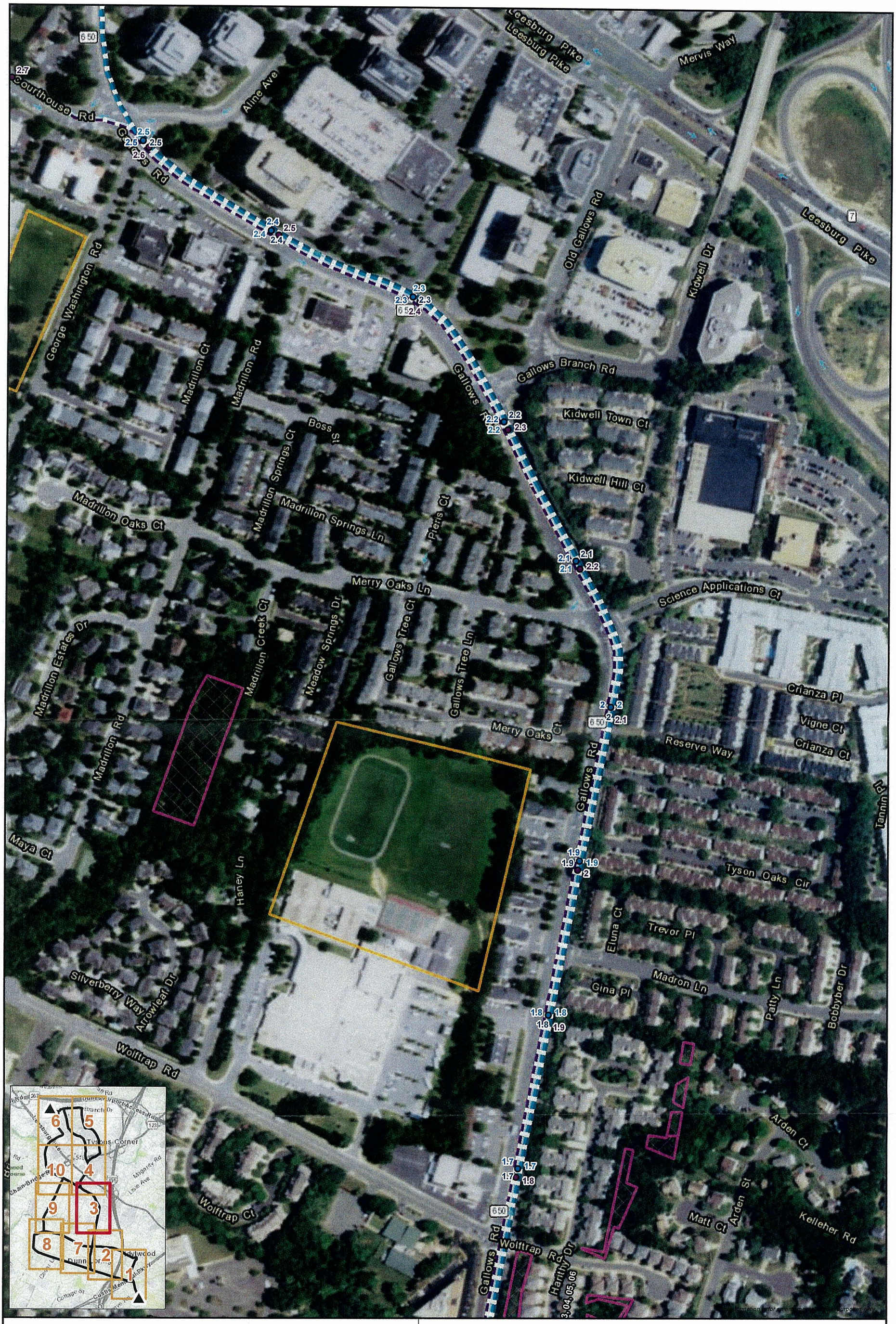
0 150 300 Feet

Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\Routing_Study_DOM_IDYL_AppdxC_Aerial_Map_Set.mxd | REVISED: 10/25/2017 | SCALE: 1:3,600 when printed at 11x17 DRAWN BY: 0239



- Underground Alternative 01
- Underground Alternative 02
- Underground Alternative 03
- Underground Alternative 04
- Underground Alternative 05
- Underground Alternative 06
- Existing Substation
- Milepost
- Recreation Area
- Fairfax County Conservation Easement

1:3,600

0 150 300 Feet

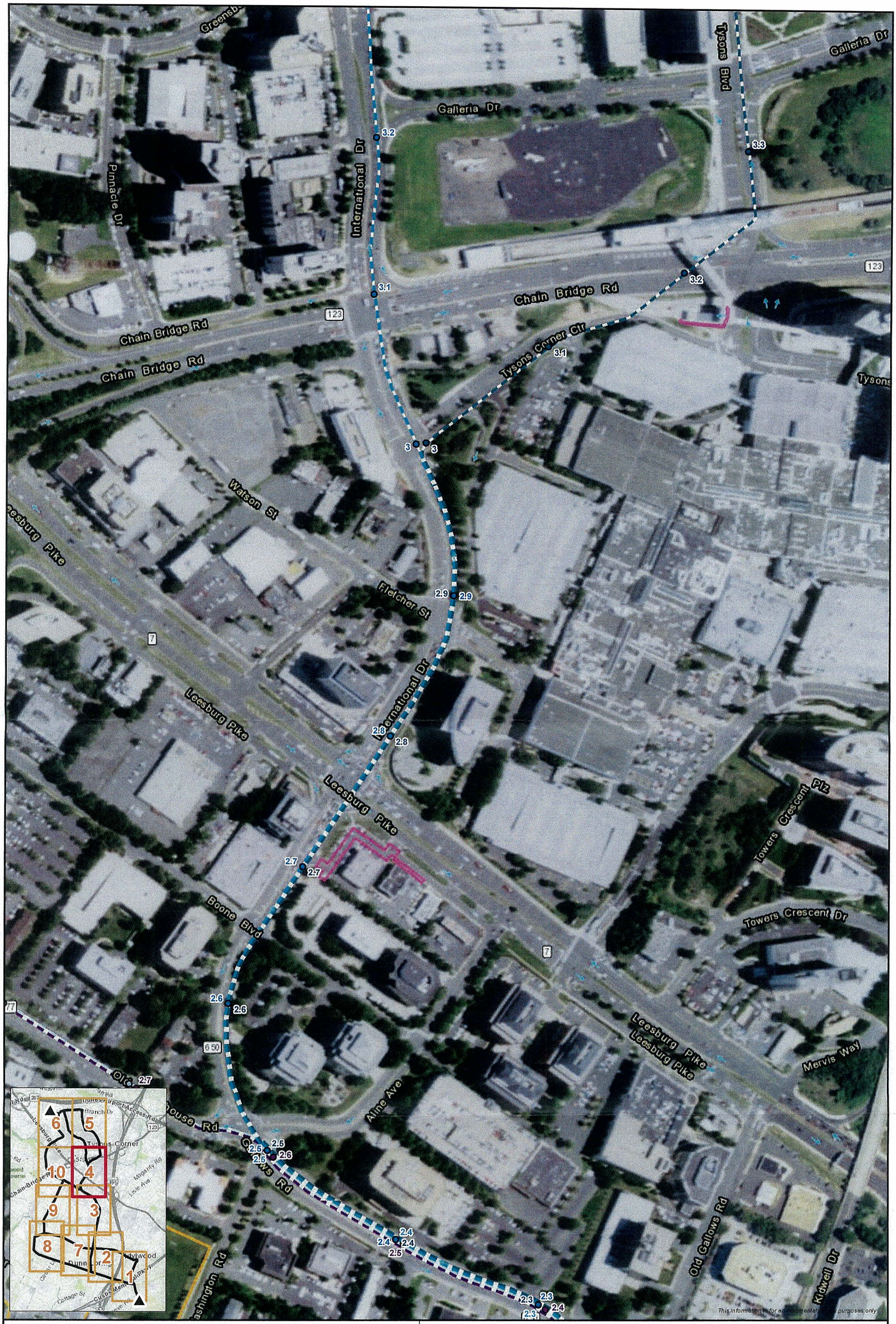
N

Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\Routing_Study_DOM_IDYL_AppdxC_Aerial_Map_Set.mxd | REVISED: 10/25/2017 | SCALE: 1:3,600 when printed at 11x17 DRAWN BY: 0239

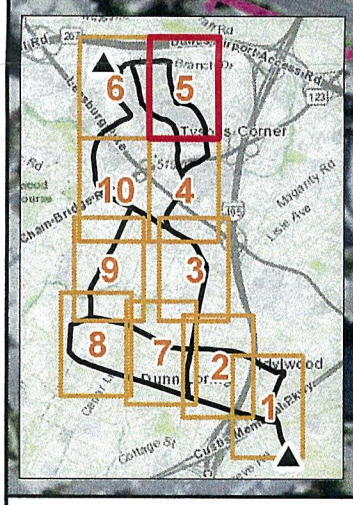


Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

Dulles Toll Rd
17
Dulles Toll Rd
Dulles Airport Access Rd
ulles Airport Access Rd
267
18
18A
267
BDM Way
4.3
4.2
Jones Branch Dr
4.1
JONES BRANCH PARK
ARBORROW STREAM VALLEY PARK
Underground 06
Park Run Dr
4
Westpark Dr
Amethyst Dr
Westpark Dr
3.9
Sunstone Dr
Agate Ct
Westbranch Dr
Peridot Dr
Onyx Dr
3.8
Tysons Blvd
3.7
PARK AT TYSONS II
Westpark Dr
Tysons Blvd
Galleria at Tysons II
3.6
3.6
3.5
International Dr
3.4
3.5
Galleria at Tysons II
3.3
3.4
This information is for environmental review purposes only.



- Underground Alternative 01
- Underground Alternative 02
- Underground Alternative 03
- Underground Alternative 04
- Underground Alternative 05
- Underground Alternative 06
- Existing Substation
- Milepost
- Fairfax County Park
- Fairfax County Conservation Easement

1:3,600

0 150 300 Feet

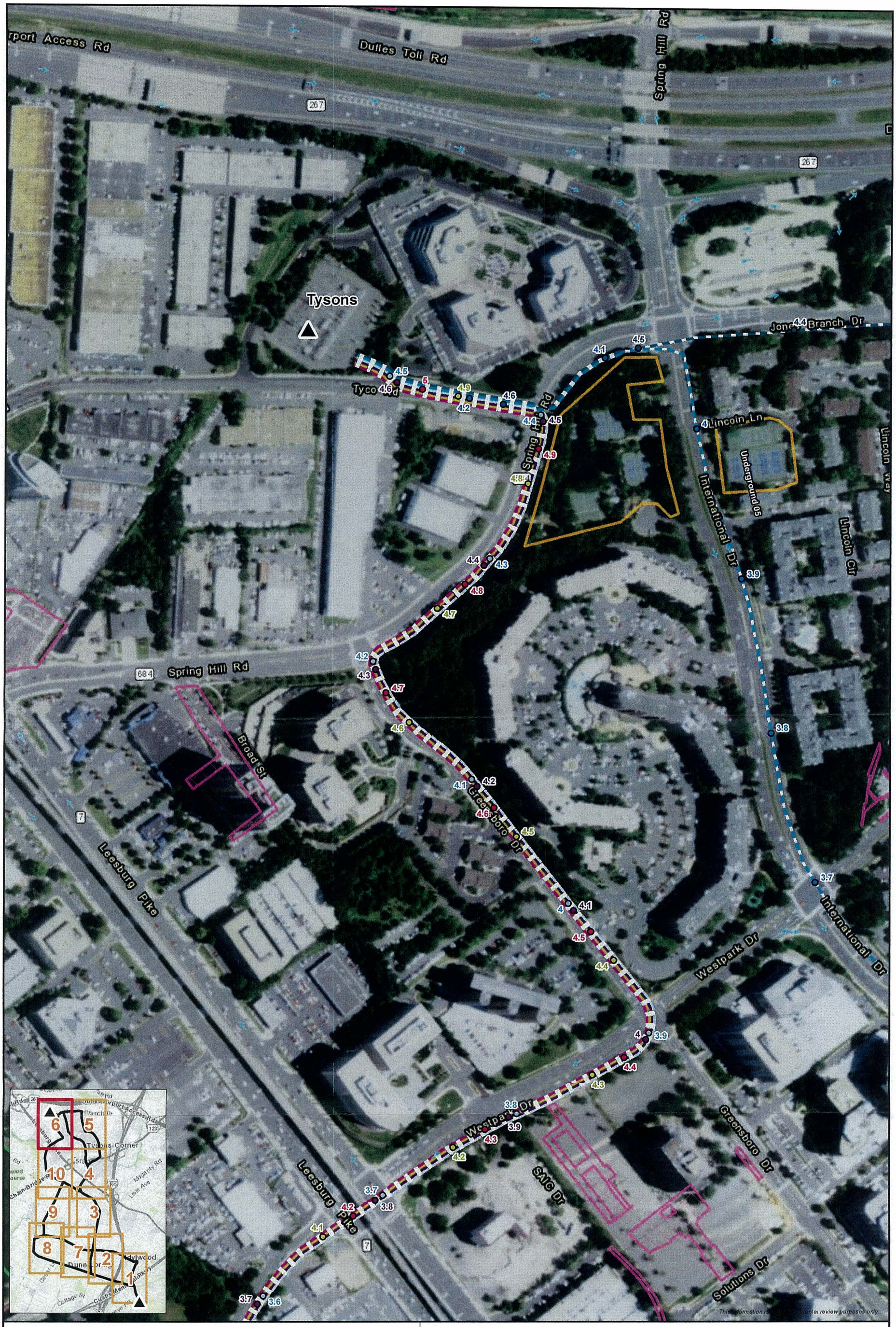
N

Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\Routing_Study_DOM_IDYL_AppdxC_Aerial_Map_Set.mxd | REVISED: 10/25/2017 | SCALE: 1:3,600 when printed at 11x17 DRAWN BY: 0239

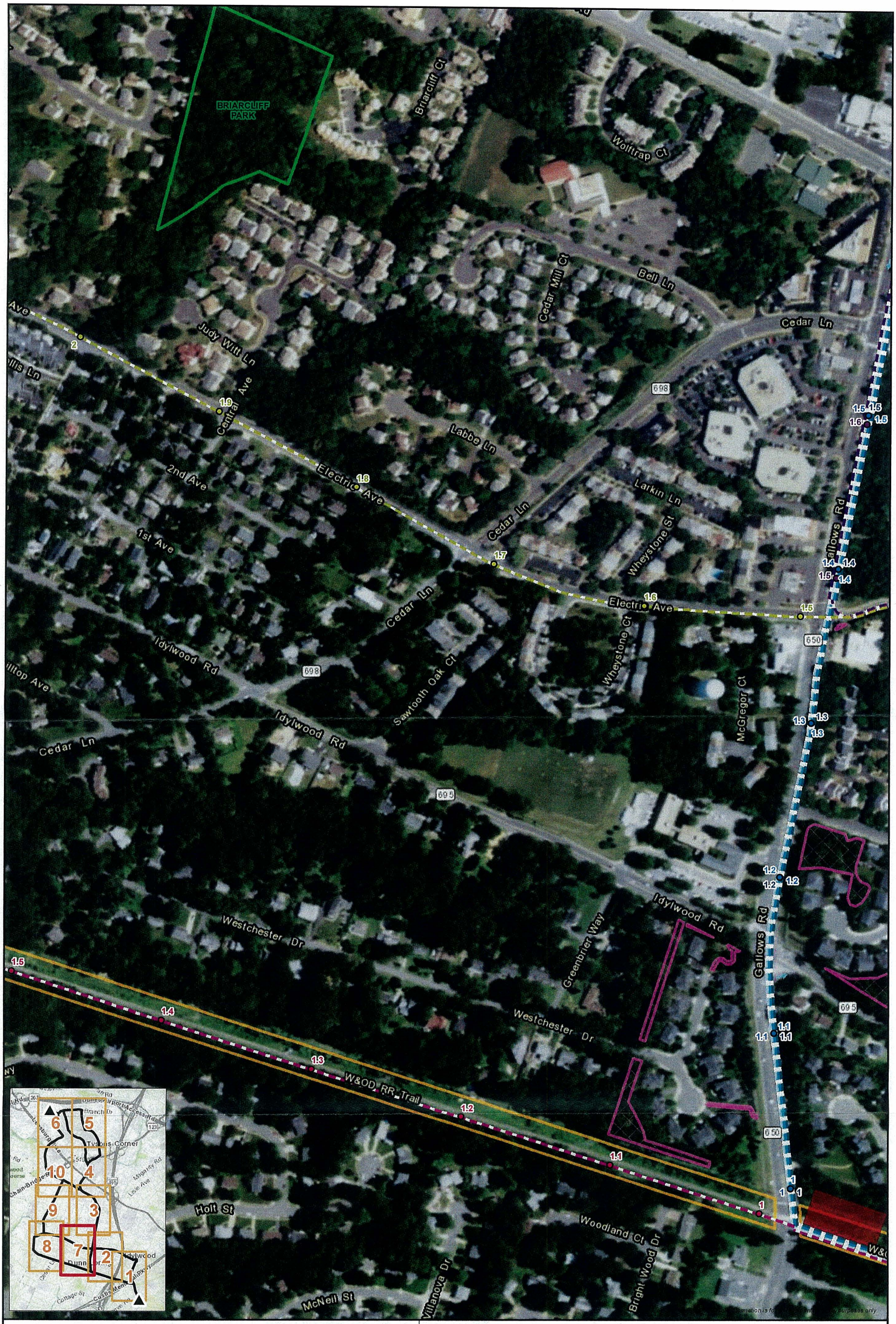


Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\Routing_Study_DOM_IDYL_AppdxC_Aerial_Map_Set.mxd | REVISED: 10/25/2017 | SCALE: 1:3,600 when printed at 11x17 DRAWN BY: 0239



Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\Routing_Study_DOM_IDYL_AppdxC_Aerial_Map_Set.mxd | REVISED: 10/25/2017 | SCALE: 1:3,600 when printed at 11x17 DRAWN BY: 0239

- Underground Alternative 01
- Underground Alternative 02
- Underground Alternative 03
- Underground Alternative 04
- Underground Alternative 05
- Underground Alternative 06
- Existing Substation
- Milepost
- Fairfax County Park
- Recreation Area
- Fairfax County Conservation Easement

1:3,600

0 150 300 Feet

Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\Routing_Study_DOM_IDYL_AppdxC_Aerial_Map_Set.mxd | REVISED: 10/25/2017 | SCALE: 1:3,600 when printed at 11x17 DRAWN BY: 0239

- Underground Alternative 01
- Underground Alternative 02
- Underground Alternative 03
- Underground Alternative 04
- Underground Alternative 05
- Underground Alternative 06
- Existing Substation
- Milepost
- Fairfax County Park
- Recreation Area
- Fairfax County Conservation Easement

1:3,600

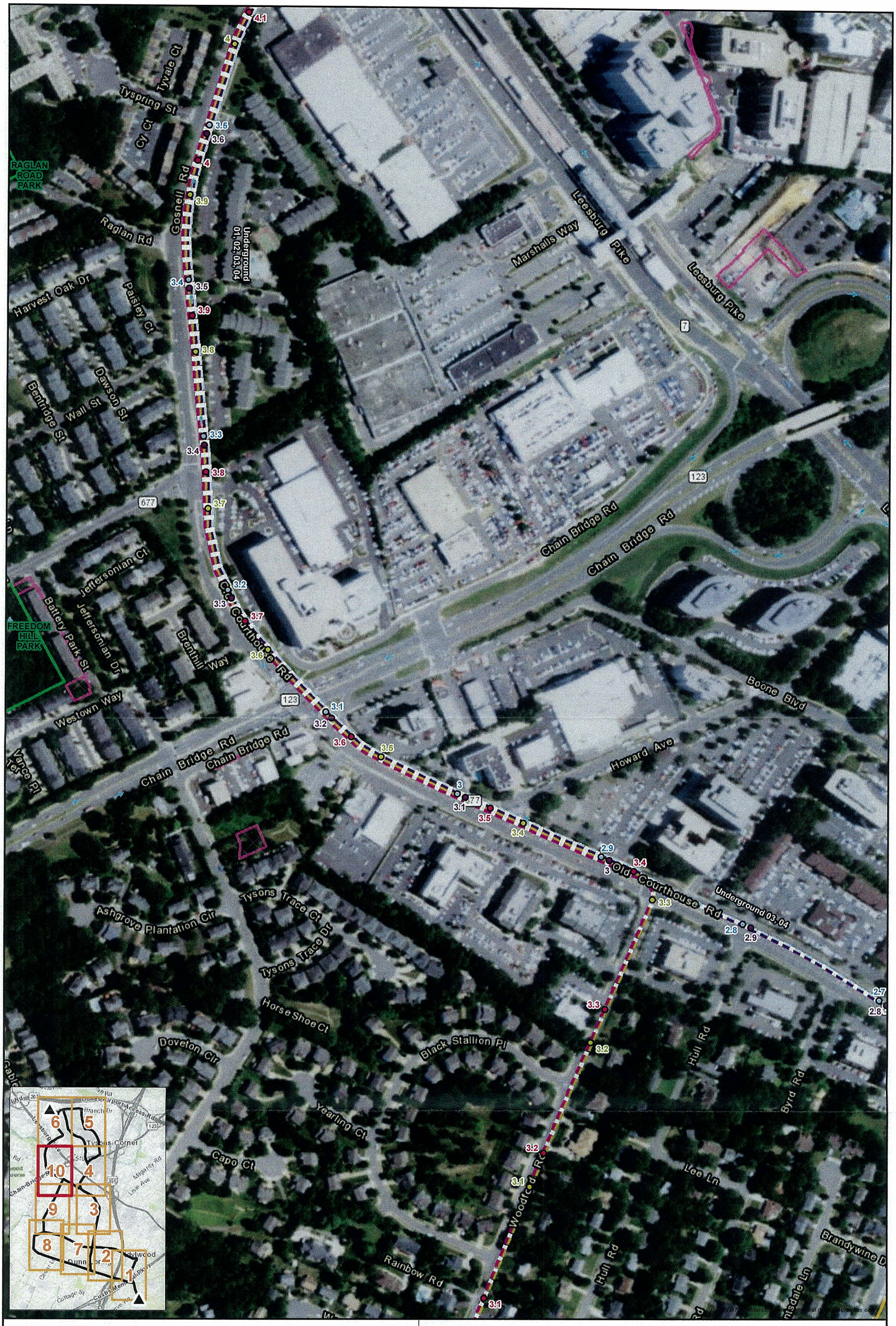
0 150 300 Feet

N

Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy



Appendix C
Aerial Photo-Based Route Map Set
Idylwood-Tysons 230 kV Underground Transmission Line Project
Fairfax County, Virginia

ERM

Dominion Energy

FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\Routing_Study_DOM_IDYL_AppdxC_Aerial_Map_Set.mxd | REVISED: 10/25/2017 | SCALE: 1:3,600 when printed at 11x17 DRAWN BY: 0239

Appendix D

DOMINION ENERGY VIRGINIA

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

Environmental Routing Study

Appendix D
Wetland Study

Suite 2350
121 West Trade Street
Charlotte, NC 28202

ERM

telephone (980) 297-7270
facsimile (980) 297-7272
www.ERM.com

October 31, 2017

Ms. Bettina Sullivan, Manager
Virginia Department of Environmental Quality
Office of Environmental Impact Review
P.O. Box 1105
Richmond, Virginia 23218

RE: Wetland and Waterbody Summary
Idylwood-Tysons 230 kV Single Circuit Underground Transmission Line, Tysons Substation Rebuild and Related Transmission Facilities
New SCC Filing

Dear Ms. Sullivan:

Environmental Resources Management (ERM), on behalf of Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), conducted a desktop wetland and waterbody review of publically-available information for the proposed Idylwood-Tysons 230 kV Single Circuit Underground Transmission Line, Tysons Substation Rebuild and Related Transmission Facilities located in Fairfax County, Virginia. Attachment 1 depicts the general location of the proposed project. Attachment 2 illustrates the wetland boundaries that were identified as part of the desktop review.

Dominion Energy Virginia is filing an application with the State Corporation Commission (SCC) for the following:

In order to maintain the structural integrity and reliability of its transmission system and to comply with mandatory North American Electric Reliability Corporation (NERC) Reliability Standards by resolving a projected criteria violation of the NERC Reliability Standards for the 230 kilovolt (kV) lines feeding the substations serving the Tysons and McLean areas of Fairfax County and to maintain reliable service to the overall growth in the area. Dominion Energy Virginia proposes to (i) install, approximately 4.3 miles of new underground 230 kV transmission line in Fairfax County between its existing Idylwood and Tysons Substations,(ii) rebuild the Tysons Substation using Gas Insulated Substation equipment to accommodate a six-breaker 230 kV ring bus within the existing property boundaries; (iii) install a new terminal point at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the Project).

The purpose of this desktop analysis was to identify and evaluate potential impacts of the project on wetlands and streams. In accordance with Virginia Department of Environmental Quality (DEQ) and the SCC's Memorandum of Agreement, the evaluation was conducted using various data sets that may indicate wetland location and type. The information summarized in this report will be submitted to the DEQ as part of the DEQ Wetland Impacts Consultation.

This assessment did not include the field investigations required for wetland delineations in accordance with the U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987) and the Eastern Mountains and Piedmont Regional Supplement (Environmental Laboratory, 2010).

Project Study Area and Potential Routes

For this project, Dominion Energy Virginia reviewed new build routes, wreck and rebuild routes, and combination wreck and rebuild and 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.

Six underground route alternatives were identified that had the potential to meet the Project objectives. These six routes are described below and depicted in Attachments 1 and 2. The Company is including Underground Alternative 05 as its preferred alternative and is recommending Underground Alternatives 01-04 and 06 as acceptable alternatives for Commission consideration. Descriptions of the Underground Alternatives 01-06 routes are presented below.

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 Interstate 66 (I-66) and the Washington Metro Area Transit Authority (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, 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.

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 Idlywood 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.

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.

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 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 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 and following Gallows Road crossing Idylwood Road, Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive (2 crossings), Science Applications Court, 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.

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 and following Gallows Road, crossing Idylwood Road, Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive (2 crossings), Science Applications Court, Gallows Branch Road Road/Aline, and Boone Boulevard. The route crosses Leesburg Pike and continues in a northeast direction along International Drive for about 1.3 miles, crossing Fletcher Street, Tysons Corner Center, Chainbridge Road, the WMATA Silver Line, Galleria Drive, Greensboro Drive, Tysons Boulevard, Westpark Drive, Lincoln Circle (2 crossings), and Lincoln Lane. Just prior to reaching Jones Branch Drive, the route turns west and southwest following Spring Hill Road for 0.1 mile. The route then turns west to follow Tyco Road for about 0.1 mile before entering the Tysons Substation.

Underground Alternative 06:

Underground Alternative 06 is 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 and following Gallows Road crossing Idylwood Road, Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive (2 crossings), Science Applications Court, Gallows Branch Road Road/Aline 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.

Desktop Evaluation Methodology

The area of effect considered for this study consists of the proposed rights-of-way identified above within which the electric transmission lines would be constructed and operated. Data sources used for this review include the following, each of which is described briefly below:

- National Agricultural Imagery Program (NAIP) Digital Ortho-Rectified Natural Color Images, Virginia, 1-meter pixel resolution, photo date 2016;
- NAIP Digital Ortho-Rectified Infrared Images, Virginia, 1-meter pixel resolution, photo date 2016;
- Virginia Base Mapping Program (VBMP) Digital Ortho-Rectified Infrared Images, East Zone of Virginia, 1-foot ground sample distance resolution, photo date 2013;
- Fairfax County Aerial Photography, photo date 1972, 1980, and 1990;
- U.S. Geological Survey (USGS) 7.5-minute current (2016) and historic (1950) topographic mapping;
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping;
- U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) Soil Survey Geographic (SSURGO) database for Fairfax County, Virginia;
- Fairfax County Perennial Streams, Water Features – Lines, and Water Features - Polys Datasets (Fairfax County Waterbody); and
- USGS National Hydrography Dataset (NHD).

Natural Color and Infrared Aerial Photography
Recent (2016) natural color aerial photography was used to provide a visual overview of the project area and to assist in evaluating current conditions. Recent (2016) infrared aerial photography was used to identify the potential presence of wetlands based on signatures associated with the levels of reflectance. For example, areas that are inundated with water appear very dark (almost black) due to the low level of reflectance in the infrared spectrum. The presence of these dark colors can be used as a potential indicator of hydric or inundated soils that are likely associated with wetlands.

USGS Topographic Maps
The USGS topographic maps show the topography of the area. The USGS topographic maps also depict other important landscape features such as forest cover, development, buildings, mining areas, streams, lakes, and wetlands. Historic topographic mapping (1950) was used to identify potential changes in topography due to the high level of urban disturbance in the study area.

NWI Maps

The NWI maps provide the boundaries and classifications of potential wetland areas as mapped by the USFWS. However, NWI data are based primarily on aerial photo interpretations with limited ground-truthing and may represent incorrect boundaries or wetland cover types. NWI data can be unreliable in some areas, especially in forested landscapes, when aerial photography is used as the major data source. No NWI polygons were identified in the study area therefore no adjustment or interpretation of the data was required.

USDA-NRCS Soils Data

The soils in the study area were identified and assessed using the SSURGO database, which is a digital version of the original county soil surveys. The attribute data within the SSURGO database provides the proportionate extent of the component soils and their properties (e.g., hydric rating) for each soil map unit. The soils in the study area were grouped into two categories based on the hydric rating of the component soils within each map unit: partially hydric and non-hydric. No hydric soils were identified in the study area. Hydric soils defined as those where the major component soils, and minor components in some cases, are designated as hydric. Partially hydric soils include map units that only contain minor component soils that are designated as hydric. The partially hydric map units in the project area contain 10 percent or less hydric soils. The remaining map units do not contain any component soils that are designated as hydric. Areas mapped as partially hydric have a higher probability of containing wetlands than areas with no hydric soils.

USGS Hydrography and Fairfax County Waterbody Datasets

The NHD and Fairfax County Waterbody datasets contain features such as lakes, ponds, streams, rivers, canals, dams and stream gages. The waterbodies mapped by the NHD appeared consistent with those visible on the USGS maps and aerial photography. The Fairfax County Waterbody datasets were used in coordination with the USGS Hydrography dataset for additional refinement.

ERM used a stepwise process to identify probable wetland areas along the transmission line routes, as follows:

1. Infrared aerial photography was used in conjunction with USGS topographic maps and soils maps to identify potential wetland areas. Boundaries were assigned to the areas that appeared to exhibit wetland signatures based on this review and a cover type was determined based on aerial photo interpretation. For the purpose of the study, these areas are referred to as Interpreted Wetlands.

2. To further determine the probability of a wetland occurring within a given location, the Interpreted Wetland polygon shape files were digitally layered with the NWI mapping and soils information from the SSURGO database.

3. The probability of a wetland occurring was assigned based on the number of overlapping data layers (i.e., indicators of potential wetland presence) that occurred in a particular area.

The criteria assigned to each probability class are outlined in Table 1 below.

Table 1 **Idylwood-Tysons 230 kV Transmission Line Project** **Criteria Used to Rank the Probability of Wetland Occurrence**	
Probability	**Criteria**
High	Areas where layers of hydric soils, Interpreted Wetlands, and NWI data overlap
Medium/High	NWI data overlaps hydric soils; or NWI data overlaps Interpreted Wetlands with or without partially hydric soils; or Hydric soils overlap Interpreted Wetlands
Medium	Interpreted Wetlands with or without overlap by partially hydric soils
Medium/Low	Hydric soils only; or NWI data with or without overlap by partially hydric soils
Low	Partially hydric soils only
Very Low	None of the layers present

Results

Wetland Crossings

A range of wetland occurrence probabilities are reported by this study from very low to medium. The probability of wetland occurrence increases as multiple indicators begin to overlap towards the "high" end of the spectrum. The medium-high and high probability category are the most reliable representation of in-situ conditions and these categories are typically reported in the summary below as a percentage of the total acreage of each route. There are no medium-high or high probability wetland occurrences in the study area. For purposes of this study, the medium probability category is reported in Table 2 and summarized below as a percentage of the total acreage of each route. Attachment 2 depicts the interpreted wetlands displayed on color infrared base map images.

TABLE 2

Idylwood-Tysons 230 kV Transmission Line Project
Summary of the Probabilities of Wetland Occurrence by Type along Each Route

Probability	Total Acres	Wetland Type (acres)		
		Forested	Scrub/Shrub	Emergent
Underground Alternative 01				
High	0.0	0.0	0.0	0.0
Medium/High	0.0	0.0	0.0	0.0
Medium	0.2	0.0	0.0	0.2
Medium/Low	0.0	0.0	0.0	0.0
Low	1.7	N/A	N/A	N/A
Very Low	17.5	N/A	N/A	N/A
Underground Alternative 02				
High	0.0	0.0	0.0	0.0
Medium/High	0.0	0.0	0.0	0.0
Medium	0.2	0.0	0.0	0.2
Medium/Low	0.0	0.0	0.0	0.0

TABLE 2

Idylwood-Tysons 230 kV Transmission Line Project
Summary of the Probabilities of Wetland Occurrence by Type along Each Route

Probability	Total Acres	Wetland Type (acres)		
		Forested	Scrub/Shrub	Emergent
Low	2.3	N/A	N/A	N/A
Very Low	16.6	N/A	N/A	N/A
Underground Alternative 03				
High	0.0	0.0	0.0	0.0
Medium/High	0.0	0.0	0.0	0.0
Medium	0.2	0.0	0.0	0.2
Medium/Low	0.0	0.0	0.0	0.0
Low	1.3	N/A	N/A	N/A
Very Low	16.4	N/A	N/A	N/A
Underground Alternative 04				
High	0.0	0.0	0.0	0.0
Medium/High	0.0	0.0	0.0	0.0
Medium	0.2	0.0	0.0	0.2
Medium/Low	0.0	0.0	0.0	0.0
Low	0.8	N/A	N/A	N/A
Very Low	16.6	N/A	N/A	N/A
Underground Alternative 05				
High	0.0	0.0	0.0	0.0
Medium/High	0.0	0.0	0.0	0.0
Medium	0.2	0.0	0.0	0.2
Medium/Low	0.0	0.0	0.0	0.0
Low	0.7	N/A	N/A	N/A
Very Low	15.7	N/A	N/A	N/A
Underground Alternative 06				
High	0.0	0.0	0.0	0.0
Medium/High	0.0	0.0	0.0	0.0
Medium	0.2	0.0	0.0	0.2
Medium/Low	0.0	0.0	0.0	0.0
Low	0.9	N/A	N/A	N/A
Very Low	17.1	N/A	N/A	N/A

N/A = Not applicable because areas assigned a probability based on the presence of hydric soils alone do not have an assigned cover type.

Underground Alternative 01

Underground Alternative 01 is approximately 5.0 miles long; the 30-foot-wide right-of-way along this route encompasses a total of approximately 19.4 acres. Based on the methodology discussed above, the right-of-way will encompass approximately 1.3 percent (0.2 acre) of land with a medium probability of containing wetlands. Of these wetlands, 0.2 acre occur within the existing right-of-way.

Underground Alternative 02

Underground Alternative 02 is approximately 5.0 miles long; the 30-foot-wide right-of-way along this route encompasses a total of approximately 19.2 acres. Based on the methodology discussed above, the right-of-way will encompass approximately 1.1 percent (0.2 acre) of land with a medium probability of containing wetlands. Of these wetlands, 0.2 acre occur within the existing right-of-way.

Underground Alternative 03

Underground Alternative 03 is approximately 4.6 miles long; the 30-foot-wide right-of-way along this route encompasses a total of approximately 17.9 acres. Based on the methodology discussed above, the right-of-way will encompass approximately 1.0 percent (0.2 acre) of land with a medium probability of containing wetlands. Of these wetlands, 0.2 acre occur within the existing right-of-way.

Underground Alternative 04

Underground Alternative 04 is approximately 4.5 miles long; the 30-foot-wide right-of-way along this route encompasses a total of approximately 17.5 acres. Based on the methodology discussed above, the right-of-way will encompass approximately 1.0 percent (0.2 acre) of land with a medium probability of containing wetlands. Of these wetlands, 0.2 acre occur within the existing right-of-way.

Underground Alternative 05

Underground Alternative 05 is approximately 4.3 miles long; the 30-foot-wide right-of-way along this route encompasses a total of approximately 16.6 acres. Based on the methodology discussed above, the right-of-way will encompass approximately 1.1 percent (0.2 acre) of land with a medium probability of containing wetlands. Of these wetlands, 0.2 acre occur within the existing right-of-way.

Underground Alternative 06

Underground Alternative 06 is approximately 4.7 miles long; the 30-foot-wide right-of-way along this route encompasses a total of approximately 18.2 acres. Based on the methodology discussed above, the right-of-way will encompass approximately 1.1 percent (0.2 acre) of land with a medium probability of containing wetlands. Of these wetlands, 0.2 acre occur within the existing right-of-way.

Waterbody Crossings

Underground Alternative 01

- Based on NHD and Fairfax County Waterbody Datasets, Underground Alternative 01 crosses one perennial and four intermittent streams. No open water features are crossed by this route. Two intermittent streams cross existing right-of-way, one intermittent stream crosses within an existing culvert, and one intermittent stream crosses an existing roadway and will be avoided by HDD.

Underground Alternative 02

- Based on NHD and Fairfax County Waterbody Datasets, Underground Alternative 02 crosses one perennial and three intermittent streams. No open water features are crossed by this route. Two intermittent streams cross existing right-of-way and one intermittent stream crosses an existing roadway and will be avoided by HDD.

Underground Alternative 03

- Based on NHD and Fairfax County Waterbody Datasets, Underground Alternative 03 crosses three intermittent streams. No perennial streams or open water features are crossed by this route. Two intermittent streams cross existing right-of-way and one intermittent stream crosses an existing roadway and will be avoided by HDD.

Underground Alternative 04

- Based on NHD and Fairfax County Waterbody Datasets, Underground Alternative 04 crosses three intermittent streams. No perennial streams or open water features are crossed by this route. Two intermittent streams cross existing right-of-way and one intermittent stream crosses an existing roadway and will be avoided by HDD.

Underground Alternative 05

- Based on NHD and Fairfax County Waterbody Datasets, Underground Alternative 05 crosses three intermittent streams. No perennial stream or open water features are crossed by this route. Two intermittent streams cross existing right-of-way and one intermittent stream crosses an existing roadway and will be avoided by HDD.

Underground Alternative 06

- Based on NHD and Fairfax County Waterbody Datasets, Underground Alternative 06 crosses four intermittent streams. No perennial streams or open water features are crossed by this route. Two intermittent streams cross existing right-of-way, one intermittent stream crosses within an existing roadway, and one intermittent stream crosses an existing roadway and will be avoided by HDD.

Project Impacts

Avoiding or minimizing impacts on wetlands and streams was among the criteria Dominion Virginia Power used in developing potential routes for the project and in selecting the proposed and other buildable alternatives. While crossings of wetlands and streams could not be entirely avoided in siting this linear facility, Dominion Virginia Power has minimized crossings of these features to the extent practicable.

To minimize impacts on wetland areas, the underground transmission line would be designed to avoid wetlands where possible. Where the removal of shrubby vegetation occurs within wetlands, Dominion Virginia Power would use the least intrusive method reasonably possible to clear the corridor. Hand-cutting of vegetation would be conducted, where needed, to avoid and minimize impacts on streams and/or wetlands. There would be no change in contours or redirection of the flow of water, and the amount of spoil from trenching would be minimal. Excess soil in wetlands generated during construction would be removed from the wetland.

Mats would be used for construction equipment to travel over wetlands, as appropriate. Grading in wetlands will consist of the minimum necessary for safe and efficient equipment operation. Potential direct impacts on wetlands would be temporary in nature, but a reduction in wetland functions and values would occur where tree clearing within wetlands is necessary.

Conclusions

Based on ERM's desktop analysis, the following is a summary of the aquatic features crossed by each project option.

Underground Alternative 01

Approximately 1.3 percent (0.2 acre) of the 30-foot-wide right-of-way along this route consists of areas with a medium probability of containing wetlands. Approximately 1.3 percent (0.2 acre) of the medium probability areas are within existing right-of-way.

- This route also crosses one perennial stream, four intermittent streams, and no open water features all along existing right-of-way.

Underground Alternative 02

Approximately 1.1 percent (0.2 acre) of the 30-foot-wide right-of-way along this route consists of areas with a medium/high or higher probability of containing wetlands. Approximately 1.1 percent (0.2 acre) of the medium/high or higher probability areas are within existing right-of-way.

- This route also crosses one perennial stream, three intermittent streams, and no open water features all along existing right-of-way.

Underground Alternative 03

Approximately 1.0 percent (0.2 acre) of the 30-foot-wide right-of-way along this route consists of areas with a medium/high or higher probability of containing wetlands. Approximately 1.0 percent (0.2 acre) of the medium/high or higher probability areas are within existing right-of-way.

- This route also crosses three intermittent streams, and no perennial streams or open water features all along existing right-of-way.

Underground Alternative 04

Approximately 1.0 percent (0.2 acre) of the 30-foot-wide right-of-way along this route consists of areas with a medium/high or higher probability of containing wetlands. Approximately 1.0 percent (0.2 acre) of the medium/high or higher probability areas are within existing right-of-way.

- This route also crosses three intermittent streams, and no perennial streams or open water features all along existing right-of-way.

Underground Alternative 05

Approximately 1.1 percent (0.2 acre) of the 30-foot-wide right-of-way along this route consists of areas with a medium/high or higher probability of containing wetlands. Approximately 1.1 percent (0.2 acre) of the medium/high or higher probability areas are within existing right-of-way.

- This route also crosses three intermittent streams, and no perennial streams or open water features all along existing right-of-way.

Underground Alternative 06

Approximately 1.1 percent (0.2 acre) of the 30-foot-wide right-of-way along this route consists of areas with a medium/high or higher probability of containing wetlands. Approximately 1.1 percent (0.2 acre) of the medium/high or higher probability areas are within existing right-of-way.

- This route also crosses four intermittent streams, and no perennial streams or open water features all along existing right-of-way.

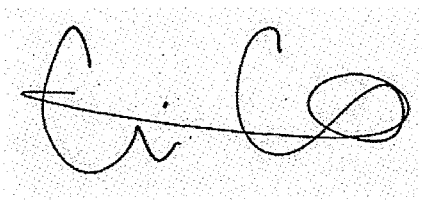
Closing

This Wetland and Waterbody Summary report was prepared in accordance with the Memorandum of Agreement between the Department of Environmental Quality and the State Corporation Commission for purposes of initiating a Wetlands Impact Consultation. Please note: a formal onsite wetland delineation was not conducted as part of this review.

In addition, we have a project website where the SCC application will be available after filing, as well as maps and discussions about the project. It can be accessed by going to dom.com and inserting the keyword "Idylwood". If you have any questions regarding this wetland assessment please contact me at 980-297-7283 or by email at christopher.clary@erm.com.

Sincerely,

Environmental Resources Management



Christopher Clary

cc: Amanda Mayhew, Virginia Electric and Power Company

Enclosures: Attachments 1 and 2

References

Environmental Laboratory. 1987. Technical Report Y-87-1: Corps of Engineers Wetlands Delineation Manual US Army Corps of Engineers, Waterways Experiment Station. January 1987

Environmental Laboratory. 2012. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region. Prepared for U.S. Army Corps of Engineers Wetlands Regulatory Assistance Program. ERDC/EL TR-12-9. July 2012.

National Agricultural Imagery Program (NAIP). 2016. Digital Ortho-Rectified Natural Color Images and NAIP Digital Ortho-Rectified Infrared Images. Available online at http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai. Accessed October 2017.

Natural Resource Conservation Service (NRCS). 2017. Soil Survey Geographic Data (SSURGO). Available online at http://soils.usda.gov/survey/geography/ssurgo/. Accessed October 2017.

U.S. Fish and Wildlife (USFWS). 2017. National Wetlands Inventory. Available online at http://www.fws.gov/wetlands/. Accessed October 2017.

U.S. Geological Survey (USGS). 2017. U.S. Geological Survey. The National Hydrography Dataset. Available online at http://nhd.usgs.gov/. Accessed October 2017.

Virginia Geographic Information Network (VGIN). 2013. Virginia Base Mapping Program (VBMP) 1 Foot Countywide Color Spring 2013 Ortho-Rectified Infrared Images. Available online at http://www.vita.virginia.gov/isp/default.aspx?id=12118. Accessed October 2017.