APPALACHIAN POWER COMPANY
BEFORE THE
VIRGINIA STATE CORPORATION COMMISSION
CASE NO. PUR-2024-00169

APPLICATION FOR APPROVAL AND CERTIFICATION OF ELECTRICAL TRANSMISSION LINE

Abingdon 138-kV Substation Transmission Project

VOLUME 1 OF 2

Application, Testimony, Response to Guidelines, Exhibits, and VDEQ Supplement

October 2024

VOLUME 1 OF 2 CONTENTS

APPLICATION, TESTIMONY, RESPONSE TO GUIDELINES, EXHIBITS AND VDEQ SUPPLEMENT

GLOSSARY OF TERMS AND ABBREVIATIONS

ACSR	Aluminum Conductor Steel Reinforced
AEP	American Electric Power Company, Inc. (parent company of Appalachian)
AEPSC	American Electric Power Service Corporation
Alternative Routes	Assemblage of Study Segments that form routes for analysis and comparison.
APCo	Appalachian Power Company (a unit of AEP)
Appalachian	Appalachian Power Company (a unit of AEP)
Application	Collectively refers to the application requesting Commission approval for the proposed Project, together with all of the supporting testimony, Response to Guidelines, VDEQ Supplement, tables, exhibits, attachments, figures and maps, etc.
cmil	circular mils
Code	Code of Virginia
Company	Appalachian Power Company (a unit of AEP)
Commission	Commonwealth of Virginia State Corporation Commission
Conductor sway	The distance from the overhead conductor at rest to the physical location of the conductor when displaced by wind.
Constraints	Specific areas that should be avoided to the extent reasonably practical during the route development and site selection process.
ELF	Extremely low frequency
EMF	Electric and Magnetic Fields or Electromagnetic Fields
EMF RAPID	Electric and Magnetic Fields Research and Public Information Dissemination
Encroachment	Any structure or activity within an existing right-of-way that could interfere with the safe, reliable operation of transmission facilities is called an encroachment and is prohibited under the terms of a right-of-way.
Endpoints	The project starting and ending point(s) ("Project Endpoints"), which may include substations, switch stations, tap points, or other locations defined by the Company's planners and engineers.
Environmental Justice ("EJ")	The fair treatment and meaningful involvement of every person, regardless of race, color, national origin, income, faith, or disability, regarding the development, implementation, or enforcement of any environmental law, regulation, or policy (VA Code § 2.2-234).
EPRI	Electric Power Research Institute
FERC	Federal Energy Regulatory Commission
GIS	Geographic Information System
Guidelines	VDHR Guidelines for Assessing Impacts of Proposed Electric Facilities on Historic Resources in the Commonwealth of Virginia (2008)
Hz	hertz
IARC	International Agency for Research on Cancer
IEEE	Institute of Electrical and Electronics Engineers
IPaC	Information for Planning and Consultation
Incompatible Use	Any structure or activity in close proximity to a transmission line that could interfere with the safe, reliable operation of transmission facilities.
kHz	kilohertz
kV	kilovolt (1,000 volts)
kV/m	kilovolt/meter (a unit of measurement for electric fields)

Land Use	Describes the human use of the land and activities at a given location such as agricultural, residential, industrial, mining, commercial, and recreational uses. It differs from land cover which only describes the physical characteristics (summarized from EPA.gov).
LiDAR	Light Detection and Ranging imagery
mG	milligauss (a unit of measurement for magnetic fields)
MVA	megavolt ampere
NESC	National Electrical Safety Code
NIEHS	National Institute of Environmental Health Services
NLCD	National Land Cover Database
NRHP	National Register of Historic Places
NUG	Non-Utility Generator
OPGW	Optical Ground Wire
Opportunity Feature(s)	Areas or existing linear features along which the transmission line may have less disruption to area land uses and the natural and cultural environment.
PJM	PJM Interconnection, L.L.C. - the RTO that coordinates the movement of wholesale electricity in parts of the Northeast, Mid-Atlantic and Midwest
POWER	POWER Engineers, Inc.
Project	Abingdon 138-kV Substation Transmission Project
Project Alternative	An alternative solution the Company's planners reviewed to address the Project needs but dismissed early at the conceptual stage (see Section I.E of the Response to Guidelines).
Proposed Route	The alignment on which the applicant/Siting Team proposes to construct a transmission line. The Proposed Route (1) reasonably minimizes adverse impacts on area land uses and the natural and cultural environment; (2) minimizes special design requirements and unreasonable costs; and (3) can be constructed and operated in a safe, timely, and reliable manner.
QF	Qualifying Facilities
Response to Guidelines	Response to "Guidelines of Minimum Requirements for Transmission Line Applications Filed under Title 56 of the Code of Virginia"
ROW(s)	Right(s)-of-Way
RTEP	Regional Transmission Expansion Plan
RTO	Regional Transmission Organization
SCC	Virginia State Corporation Commission
SCENIHR	Scientific Committee on Emerging and Newly Identified Health Risks
SE	Summer Emergency
Siting Team	A multidisciplinary team of experts in transmission line routing, impact assessment for a wide variety of natural resources and the human environment, impact mitigation, engineering, and construction management.
SN	Summer Normal
Substation or Station	Substations or stations are facilities that transform bulk electric voltage down to distribution levels and/or provide protection and controls for the transmission electric grid. Typical equipment includes switches, circuit breakers, buses, and transformers.
Tap Point	The location where power is tapped from an existing transmission line to source a substation or customer.
Transmission Line	An electric line that operates at 69 kilovolts and/or above and has the purpose of moving power from a generation facility to a substation or between substations.
Transmission Line Extension	An electric transmission line from a tap point on an existing transmission line to a substation or customer.

U.S.	United States
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDEQ Supplement	The analysis included in this Application, which addresses the environmental and historic features associated with the Project
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VOF	Virginia Outdoors Foundation
WE	Winter Emergency
WN	Winter Normal
WHO	World Health Organization

EXECUTIVE SUMMARY

Appalachian Power Company ("Appalachian" or "Company"), a unit of American Electric Power Company, Inc. ("AEP"), is seeking permission for the Abingdon 138-kV Substation Transmission Project (the "Project"). The Project proposes to upgrade the Abingdon Substation in Washington County, Virginia, near the Town of Abingdon, and to partially rebuild an existing 138-kV transmission line to increase the electric reliability for customers in and around Washington County.

The Project generally consists of the termination of the existing Broadford – Wolf Hills 138-kV Circuit into the Abingdon Substation, resulting in two new circuits and sources for the Abingdon Substation. The existing circuit currently bypasses the Abingdon Substation. The Project also involves improvements to the Abingdon Substation—including four new 138-kV circuit breakers, new bays, disconnect switches, and bus work—to bifurcate and provide additional protection and controls. The Project further includes the rebuild of approximately one mile of the Saltville – Kingsport 138-kV Transmission Line and reconnection of two transmission lines that tap off the Saltville – Kingsport 138-kV Transmission Line to maintain service to the Clinch River, Hansonville, and South Abingdon Substations. And lastly, the Project involves the relocation of the existing Abingdon 34.5-kV/138-kV Bus Tie #3 138-kV Transmission Line to make space for the new bays at the Abingdon Substation.

The Project will address thermal and voltage violations of AEP's transmission reliability criteria identified on several 69-kV sub-transmission facilities under certain N-1-1 contingencies using the 2027 summer and winter cases developed by PJM Interconnection L.L.C. in the 2022 Regional Transmission Expansion Plan. The transmission line rebuild component of the Project will require new or partially overlapping 100-foot-wide, right-of-way ("ROW") easements for approximately 0.7 miles of the one mile rebuild. The remaining 0.3 miles will be constructed within existing transmission line ROW easements. Based on preliminary engineering, Appalachian anticipates primarily using double-circuit lattice steel towers and steel monopole structures for the rebuild. There is on average a five-foot increase in height between the existing and proposed structures with the lattice steel towers increasing from 105 feet to 110 feet. The monopole structures will average 95 feet in height. The change in height between the existing and proposed structures is necessary to accommodate changes in industry codes since the existing transmission line was built as well as a heavier conductor. The other components of the Project will be constructed on Company-owned property or within existing ROW easements.

Appalachian hired POWER Engineers, Inc. ("POWER") to evaluate the routing and environmental issues related to the rebuild. POWER used a traditional siting methodology. The Company supports POWER's selection of the proposed route because it maximizes the use of existing ROW easements. Moreover, it is not anticipated that the proposed route will result in adverse impacts to cultural or recreational resources or have a disproportionately high or adverse impact on environmental justice or fenceline communities.

In addition to engaging POWER to develop the proposed route, the Company considered feedback from federal, state, and local agencies, or officials, and undertook public outreach efforts to

promote meaningful engagement from each community affected by the Project. Appalachian is currently unaware of any opposition to the Project, and it has already obtained permission to survey from each landowner crossed by the proposed route. The Company will continue to work with all affected landowners as the design is completed.

The estimated functional cost of the Project is approximately $20.1 million, which includes approximately $6.6 million for substation-related work and $13.5 million for transmission-related work. Upon approval of the Project, the Company estimates that it will need approximately two years for engineering, design, ROW acquisition, permitting, material procurement, and construction to place the Project in service. Because of the limited scope of this Project and the small number of landowners directly affected by the Project, Appalachian respectfully requests that the Commission, in the interest of judicial economy, issue an Order for Notice and Comment establishing a procedural schedule without an evidentiary hearing, but allowing Commission Staff and any interested persons to request an evidentiary hearing if the issues raised cannot be adequately addressed without one.

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF

APPALACHIAN POWER COMPANY **CASE NO. PUR-2024-00169**

for Approval and Certification of the Abingdon 138-kV Substation Transmission Project under Title 56 of the Code of Virginia

APPALACHIAN POWER COMPANY ("Appalachian" or "Company"), a corporation duly organized and existing under the laws of the Commonwealth of Virginia, represents as follows:

1. Appalachian is a Virginia public service corporation providing electric service in Virginia and other states with a mailing address of P.O. Box 2021, Roanoke, Virginia 24022.

2. Appalachian proposes to construct, own, operate, and maintain the Abingdon 138-kV Substation Transmission Project (the "Project"), which generally consists of improvements and additions to the Company's Abingdon Substation in Washington County near the Town of Abingdon, Virginia, and a partial rebuild of approximately one mile of an existing 138-kV transmission line that currently passes over the Abingdon Substation property, and termination (connection) of the rebuilt line into the Abingdon Substation. The Project serves customers in and around the Town of Abingdon and supports additional loads served from other substations in Washington County, Virginia (the "Project area"). (All the various improvements and additions comprising the Project are listed and more fully described in Section I of the Company's Response to Guidelines filed with this Application.) The Project is needed to address reliability criteria violations on the existing transmission system serving the Project area and will result in

the creation of two new 138-kV circuits and sources for the Abingdon Substation. These new circuits and sources, along with their accompanying improvements, will create a more robust 69-kV and 138-kV transmission system to continue providing reliable service to the Company's customers in the Project area.

3. The Project includes the following PJM baseline work: (a) termination of the existing Broadford – Wolf Hills 138-kV Circuit into the existing Abingdon Substation, resulting in the creation of two new circuits and sources for the Abingdon Substation (the existing circuit currently bypasses the Abingdon Substation); (b) improvements to the existing Abingdon Substation, including the installation of four new 138-kV circuit breakers, bays, disconnect switches, and bus work; (c) transmission line work on the Saltville – Kingsport 138-kV Transmission Line between existing structure 62-83 and existing structure 62-90, consisting of the rebuild of approximately one mile from existing structure 62-84 to existing structure 62-89 to connect the line into the Abingdon Substation, and reconnection of the spans from those previously mentioned endpoints to the rebuilt structures; (d) reconnection of two transmission lines that tap off the Saltville – Kingsport 138-kV Transmission Line; and (e) relocation of the Abingdon 34.5-kV/138-kV Bus Tie No. 3 138-kV Transmission Line at the Abingdon Substation to make room for the new substation bays and to attach to proposed structure 62-86A.

4. The Project will ensure adequate and reliable electric service and accommodate future growth in and around the Town of Abingdon and in Smyth and Washington Counties by eliminating the reliability criteria violations for the impacted facilities.

5. The Project will require new right-of-way ("ROW") easements for just a limited portion of the rebuild of the Saltville – Kingsport 138-kV Transmission Line between existing structure 62-84 and existing structure 62-89. Part of the proposed route (0.3 miles) will be

constructed on Appalachian's property or within its existing transmission line ROW, but approximately 0.7 miles will be rebuilt within new, parallel, or partially overlapping ROW to accommodate the improvements at the Abingdon Substation and to avoid a commercial building that is within the existing ROW at the United States ("U.S.") Route 58 Alternate/U.S. Route 19 (Porterfield Highway) crossing. The other components of the Project will not require new ROW.

6. In support of this Application, Appalachian is filing the direct testimony of the following witnesses:

(a) Jasmine L. Moore, P.E., with regard to the need for the Project;

(b) Jeffrey Scott Woody, P.E., with regard to the transmission line engineering components of the Project;

(c) Charles R. Parmain, P.E., with regard to the substation engineering components of the Project;

(d) Mary Berkley, P.E., with regard to electric and magnetic field levels associated with the Project; and

(e) Daniel Fraser, P.E., with regard to the route development and environmental analysis aspects of the Project.

7. The Company is also filing: (a) Response to Guidelines, responding to the "Guidelines of Minimum Requirements for Transmission Line Applications Filed Under Title 56 of the Code of Virginia" issued by the Commission's Division of Public Utility Regulation on August 10, 2017; (b) a Virginia Department of Environmental Quality Supplement prepared by the Company's siting and environmental consultant, POWER Engineers, Inc.; and (c) related tables, exhibits, attachments, and maps (including a digital geographic information system

("GIS") constraints map and GIS shapefiles of the Project and the Virginia Department of Transportation's General Highway Map via electronic filing).

8. Appalachian's direct testimony, Response to Guidelines, and related tables, exhibits, attachments, and maps filed with this Application establish the following:

(a) The Project is needed and the public convenience and necessity require the construction of the Project by the Company;

(b) The proposed route for the transmission line rebuild included in the Project reasonably minimizes adverse impacts on the scenic assets, historic districts, and environment of the area in which the Project will be located;

(c) The Project is essential to ensure continued reliable electric service in the Town of Abingdon and Smyth and Washington County areas; and

(d) The Project will support and facilitate economic development within the Town of Abingdon and Smyth and Washington Counties.

9. The proposed in-service date for the Project is June 1, 2027. If the Commission approves the Project, Appalachian estimates that it will need approximately two years after entry of the Commission's final approving order for engineering, design, ROW acquisition, permitting, material procurement, and construction to place the Project in service.

10. Because this Application seeks approval for improvements and expansion of a substation on Company-owned property and for a related transmission line rebuild of limited scope involving few landowners who to date have been receptive to the Project by granting the Company permission to survey, Appalachian respectfully requests that the Commission, in the interest of judicial economy, issue an Order for Notice and Comment establishing a procedural schedule without an evidentiary hearing, but allowing Commission Staff and any interested

persons to request an evidentiary hearing if the issues raised cannot be adequately addressed without one. Such an Order will still permit Appalachian, Commission Staff, and any interested persons that join this proceeding to develop a complete record without prejudice, since Commission Staff and any interested persons may request an evidentiary hearing.

Accordingly, Appalachian hereby requests the following relief:

(a) That this Application be filed and docketed;

(b) That the Commission cause notice of this Application to be given as required by Virginia Code § 56-46.1 and the Utility Facilities Act, Virginia Code § 56-265.1 *et seq.*;

(c) That the Commission issue an Order for Notice and Comment establishing a procedural schedule without an evidentiary hearing;

(d) That Commission Staff undertake an investigation of this Application and report its findings to the Commission;

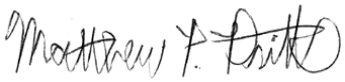
(e) That the Commission determine, as required by Virginia Code §§ 56-46.1 and 265.2, that (1) the Project is needed and that the public convenience and necessity require the construction of the Project by the Company; and (2) the proposed route for the transmission line rebuild included in the Project reasonably minimizes adverse impacts on the scenic assets, historic districts, and environment of the area concerned;

(f) That the Commission approve the construction of the Project pursuant to Virginia Code § 56-46.1 and any other applicable law; and

(g) That the Commission grant the Company a certificate of public convenience and necessity under the Utility Facilities Act and grant such other relief as may be necessary for the construction and operation of the Project.

Respectfully submitted,

APPALACHIAN POWER COMPANY



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Counsel for Appalachian Power Company

APCo Exhibit No. ___
Witness: JLM

DIRECT TESTIMONY OF
JASMINE L. MOORE, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

APCo Exhibit No. ___
Witness: JLM

SUMMARY OF DIRECT TESTIMONY OF JASMINE L. MOORE

My direct testimony supports Appalachian Power Company's ("APCo," "Appalachian," or "Company") Application and Response to Guidelines in connection with the Abingdon 138-kV Substation Transmission Project ("Project"). I am sponsoring Section I of the Response to Guidelines (Necessity for the Project), including the associated figures, confidential figures, and tables.

American Electric Power ("AEP") Transmission determined that Appalachian should terminate (connect) the existing Broadford – Wolf Hills 138-kV Circuit into the existing Abingdon Substation, resulting in two new circuits and sources for the Abingdon Substation, and make improvements at the existing Abingdon Substation in order to accommodate the two new circuits at the substation. The improvements require a small expansion of the station fence area within APCo property. The proposed Project is in Washington County, Virginia ("Project Area"), which is in the southwestern part of Appalachian's Virginia service territory. The Project Area encompasses industrial, commercial, and residential loads.

Using the 2027 summer and winter cases developed by PJM in the 2022 Regional Transmission Expansion Plan ("RTEP") cycle, AEP's assessment identified thermal and voltage violations of the AEP Criteria on several 69-kV sub-transmission facilities under certain N-1-1 contingencies in the Abingdon area. The violations occur on facilities serving the Appalachian's customers in the Abingdon Load Area (~140 megavolt amperes ["MVA"] summer and ~240 MVA winter) in Washington County as well as Smyth County and the Town of Abingdon, Virginia.

The desired in-service date for the Project is June 1, 2027. The total estimated cost of the Project is approximately $20.1 million.

DIRECT TESTIMONY OF
JASMINE L. MOORE, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

Q: PLEASE STATE YOUR NAME, ADDRESS AND PRESENT POSITION.

A: My name is Jasmine L. Moore. My position is Manager, Transmission Planning for American Electric Power Service Corporation ("AEPSC"). AEPSC supplies engineering, financing, accounting, planning, advisory, and other services to the subsidiaries of the AEP system, one of which is APCo. My business address is 1 Riverside Plaza, Columbus, Ohio 43215.

Q: PLEASE REVIEW YOUR EDUCATIONAL BACKGROUND AND YOUR WORK EXPERIENCE.

A: I received a Bachelor of Science Electrical Engineering degree from Ohio Northern University in Ada, Ohio. In 2002, I joined AEPSC as a Protection and Controls Engineer in the Station Projects Engineering Group. I received my Professional Engineering license in the state of Ohio in 2006 (license number 71494). In 2007, I transitioned to the Planning Group where I was initially a Planning Engineer; then in 2016, I became the Planning Customer Connections Supervisor. In 2017, I became the Transmission Planning Manager for the Ohio Region and then transitioned to my current position in 2018.

Q: WHAT ARE YOUR RESPONSIBILITIES AS MANAGER, TRANSMISSION PLANNING?

A: My responsibilities include organizing and managing all activities related to assessing the adequacy of the AEP transmission network in the APCo region to meet the needs of its

customers in a reliable, cost effective, and environmentally compliant manner. My primary focus is overseeing the planning for transmission projects in Kentucky, Tennessee, Virginia, and West Virginia. This includes coordinating with PJM and other AEP organizations that support the transmission planning, budgeting, and construction of projects for the PJM transmission system.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to support certain aspects of Appalachian's Application to this Commission for approval and certification of the Project. Specifically, the Company proposes to undertake the following work:

- Terminate (connect) the existing Broadford – Wolf Hills 138-kV Circuit (located on the existing Saltville – Kingsport 138kV Transmission Line) into the existing Abingdon Substation, resulting in two new circuits (Broadford – Abingdon and Abingdon – Wolf Hills 138-kV Circuits) and two additional sources for the Abingdon Substation. The circuit currently spans over and bypasses the Abingdon Substation.
- Improvements at the existing Abingdon Substation—including four new 138-kV circuit breakers; new bays; associated disconnect switches; and new bus work—to bifurcate the existing circuit and provide additional protection and controls. The improvements require a small expansion of the substation's fence area within APCo property.
- Transmission line work will take place for approximately one mile of the Saltville – Kingsport 138-kV Transmission Line between existing structure 62-83 and existing structure 62-90 to connect the existing line into the Abingdon Substation.

- Connect the existing Clinch River – Abingdon 138-kV Transmission Line to the slightly relocated Saltville – Kingsport 138-kV Transmission Line from existing structure 71-84/71 to proposed structure 62-85A, and connect the South Abingdon 138-kV Extension Transmission Line to proposed structures 62-87A and 62-87B.
- Relocate the existing Abingdon 34.5kV/138-kV Bus Tie #3 138-kV Transmission Line to make space for the new substation bays. The existing single span bus tie will be attached to proposed structure 62-86A to connect the 34.5-kV and 138-kV substation yards.

Q: WHICH OF THE SPECIFIC MATERIALS INCLUDED IN THE RESPONSE TO GUIDELINES ARE YOU SPONSORING?

A: I am responsible for Section I, Necessity for the proposed Project, and Confidential Figures I-3-C, I-6-C, and I-7-C in Volume 2: Confidential Appendix.

Q: WERE THE PORTIONS OF APPALACHIAN'S FILING WHICH YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: PLEASE SUMMARIZE THE NEED FOR THE PROJECT.

A: The Project is required to address reliability criteria violations. Reliability criteria violations are identified through the PJM RTEP process, which is governed by PJM Manual 14b and AEP's transmission planning requirements as defined in AEP's FERC Form 715 Part 4. The PJM manual describes the base case building procedure used to develop load flow models where the reliability criteria violations were identified. Using the 2027 summer and winter cases developed by PJM in the 2022 RTEP, AEP's

assessment identified thermal and voltage violations of the AEP Criteria on several 69-kV sub-transmission facilities serving Appalachian's customers located in the Abingdon area. Two critical N-1-1 contingency scenarios cause voltage deviation violations (voltage deviations of 8% or more), low voltage magnitude violations (substation voltages lower than 0.92 per unit), and thermal loading violations (loading exceeds the facility's emergency thermal rating) in the Abingdon area. The N-1-1 contingency scenario in the 2027 summer RTEP case involving the loss of the North Bristol – Wolf Hills 138-kV Circuit and the Abingdon – South Abingdon 138-kV Circuit resulted in a thermal violation on the Arrowhead – Hillman Highway 69-kV circuit section. The N-1-1 contingency scenario in the 2027 winter RTEP case involving the loss of the Abingdon – Clinch River 138-kV Circuit and the South Abingdon – Wolf Hills 138-kV Circuit resulted in a thermal violation on the Arrowhead – Hillman Highway 69-kV circuit section and voltage violations at the following buses: Arrowhead, Damascus, Hillman Highway, and South Abingdon.

Q. ACCORDING TO COMPANY TESTIMONY OF COMPANY WITNESSES PARMAIN AND WOODY, THE ABINGDON – HILLMAN HIGHWAY 69-kV TRANSMISSION LINE AND CIRCUIT WILL BE RETIRED AS A RESULT OF ANOTHER INDEPENDENT PROJECT; DOES THIS AFFECT THE PROJECT'S NEED?

A: It does not. The Abingdon – Hillman Highway 69-kV Transmission Line retirement is unrelated to this Project's need and is planned to be completed Summer 2025. Once the Arrowhead – South Abingdon 69-kV Transmission Line is completed, the 69-kV network will be served from the South Abingdon Substation rather than the Abingdon Substation

and the Abingdon – Hillman Highway 69-kV Transmission Line will be retired. Even with these changes, the reliability violations still exist on the 69-kV network and the Project is needed to address those violations.

Q. WHAT ARE THE REASONS FOR THE SUBSTATION WORK?

A: Currently, the existing Broadford – Wolf Hills 138-kV Circuit spans over and bypasses the existing Abingdon Substation. To address the criteria violations described above, the proposed Project requires work within the existing Abingdon Substation to terminate (connect) the existing Broadford – Wolf Hills 138-kV Circuit into the Abingdon Substation. This work includes installing four new 138-kV circuit breakers, new bays, associated disconnect switches, and new bus work to bifurcate the existing circuit and provide additional protection and controls. By terminating the Broadford – Wolf Hills 138-kV Circuit in the Abingdon Substation, this provides the Abingdon area two additional 138-kV sources, which will address the violations described above as well as provide greater operational flexibility on the surrounding transmission network. To minimize the duration of the outages to expand the substation, and to accommodate the termination of the circuit, AEP will also need to replace, and relocate the bus tie circuit breaker.

Q: WHAT ARE THE REASONS FOR THE ASSOCIATED TRANSMISSION LINE WORK?

A: The rebuild of approximately one mile of the Saltville – Kingsport 138-kV Transmission Line between existing structure 62-84 and existing structure 62-89 is required to connect the Broadford – Wolf Hills 138-kV Circuit into the Abingdon Substation. As mentioned above, the Broadford – Wolf Hills 138-kV Circuit currently bypasses the existing

Abingdon Substation. The existing line location needs to be slightly adjusted to avoid several encroachments and to enter the substation at the proposed location as shown on Exhibit 3. Additionally, this deteriorating asset needs to be rebuilt. A future project is planned to rebuild the remainder of the Saltville – Kingsport 138-kV Transmission Line. See Company witness Woody's direct testimony for more details.

Q: WHAT BENEFITS DOES THE PROJECT PROVIDE?

A: The Project addresses the identified baseline needs by: (1) establishing the Abingdon – Broadford 138- kV Circuit and Wolf Hills – Abingdon 138-kV Circuit, which creates two new 138-kV sources to the Abingdon area and the 69-kV network downstream; (2) providing redundancy to the transmission network at the Abingdon Substation to withstand the various N-1-1 contingencies described above; and (3) improving operational flexibility for scheduling maintenance outages on the area transmission network by installing appropriate sectionalizing to better withstand planned and unplanned system outages.

Q: DOES THE PROPOSED PROJECT IMPACT FUTURE PROJECTS IN THE AREA?

A: The Company plans to file a separate application in 2025 for approval to rebuild the remaining approximately 25 miles of the Saltville – Kingsport 138-kV Transmission Line due to independent asset renewal needs. The proposed Project is designed to connect to this future rebuild to avoid any wasteful duplication.

Q: WHAT IS THE REQUIRED IN-SERVICE DATE FOR THE PROJECT?

A: The required in-service date for the Project is June 1, 2027. This in-service date is required by PJM because the Project is a PJM Baseline Project (PJM ID: B3735).

Q: WHAT IS THE TOTAL ESTIMATED COST OF THE PROJECT?

A: The total estimated cost of the Project is approximately $20.1 million. Out of the total estimated cost, the estimated substation-related cost is approximately $6.6 million, and the estimated transmission line-related cost is approximately $13.5 million.

Q: DOES THIS CONCLUDE YOUR TESTIMONY?

A: Yes.

APCo Exhibit No. ____
Witness: JSW

DIRECT TESTIMONY OF
JEFFREY SCOTT WOODY, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

APCo Exhibit No. ____
Witness: JSW

SUMMARY OF DIRECT TESTIMONY OF JEFFREY SCOTT WOODY, P.E.

My direct testimony supports the transmission line engineering aspects of Appalachian Power Company's ("Appalachian" or "the Company") Application and Response to Guidelines in connection with the Abingdon 138-kV Substation Transmission Project ("Project"). Specifically, I sponsor: (i) the description of the transmission lines and other engineering components of the Project in Section II (but not Sections II.A.1, 2, 3, and 9 and Section II.C) of the Response to Guidelines; (ii) Exhibits 4 through 8; (iii) Confidential Exhibits 2-C, 9-C and 10-C; and (iv) geographic information system shapefiles of the Project to be submitted electronically to the Commission with the Application. My testimony describes the transmission line components of the Project, which generally consist of transmission line work between existing structures 62-83 and 62-90, reconnection of the two existing lines that tap off of the Saltville – Kingsport 138-kV Transmission Line, and re-routing and termination of the Abingdon 34.5-kV/138-kV Bus Tie #3 138-kV Line into a new 138-kV station bay.

My testimony also describes the existing and proposed transmission lines and circuits in the Project area. It also explains why approximately one mile of transmission line rebuild work is required for this Project. My testimony further summarizes the quantities, types, and height ranges of the transmission structures that will be used for the Project. Approximately 0.3 miles of the Project's 1.0-mile double-circuit transmission line will be rebuilt within existing rights-of-way ("ROWs") in select areas to minimize impacts to developments. The remaining approximately 0.7 miles will be constructed in new ROW that is located parallel to or partially overlapping the existing transmission line to minimize the duration of circuit outages and avoid encroachments in the existing ROW.

The Company estimates that it will need approximately two years from this Commission's approval of the Project for engineering, design, ROW acquisition, permitting, material procurement, outage coordination and constraints, and construction sequencing to place the entire Project in service.

DIRECT TESTIMONY OF
JEFFREY SCOTT WOODY, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

Q: PLEASE STATE YOUR NAME, PRESENT POSITION, AND BUSINESS ADDRESS.

A: My name is Jeffrey Scott Woody. I am a Supervisor for Transmission Line Engineering for American Electric Power Service Corporation ("AEPSC"). AEPSC is a subsidiary of American Electric Power Company, Inc. ("AEP") that provides corporate support services to the operating subsidiaries of AEP, including Appalachian. My business address is 40 Franklin Road Southwest, Roanoke, Virginia 24011.

Q: PLEASE REVIEW YOUR EDUCATIONAL BACKGROUND AND YOUR WORK EXPERIENCE.

A: I graduated from Virginia Tech with a Bachelor of Science in Civil and Environmental Engineering in 2012. I am a licensed Professional Engineer in the Commonwealth of Virginia. I worked for two years in a civil site development firm, and then was hired by AEP in 2014 in the Transmission Line Engineering group in Roanoke. I was promoted to my current position of supervisor within the Transmission Engineering group in 2023.

I am responsible for overseeing and directing the engineering for the AEP transmission line system (including transmission lines operating at voltages from 34.5-kV through 765-kV) in Virginia, West Virginia, Tennessee, and Kentucky.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to support the transmission line components of Appalachian's Application to this Commission for approval and certification of the Abingdon 138-kV Substation Transmission Project ("Project"). The Project proposes to connect the existing Broadford – Wolf Hills 138-kV Circuit located on the Saltville – Kingsport 138-kV Transmission Line, which currently spans over the existing Abingdon Substation, into the substation thereby creating two new sources for the Abingdon Substation (see Company witness Moore's Direct Testimony concerning the necessity of the Project for additional details).

I am also sponsoring various sections of the Response to Guidelines filed by the Company together with the Application in response to the Commission Staff's *Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia.*

Q: WHAT ARE YOUR RESPONSIBILITIES AS RELATED TO THE PROJECT?

A: As a Supervisor of Transmission Line Engineering at AEP, my primary duties involve oversight of the engineering, design, material procurement, and other technical requirements associated with the construction of transmission lines related to the Project.

Q: WHICH SPECIFIC MATERIALS INCLUDED IN THE RESPONSE TO GUIDELINES ARE YOU SPONSORING?

A: I am sponsoring: (1) the information describing the transmission line and other engineering components of the Project set forth in Sections II (excluding Section II.A.1, 2, 3, and 9 and Section II.C); (2) Exhibits 4 through 8, which include the transmission line structure exhibits; (3) Confidential Exhibit 2-C, the existing and proposed circuit configurations; (4) Confidential Exhibit 9-C, the construction and outage sequence

drawing; (5) Confidential Exhibit 10-C, a digital copy of the Virginia Department of Transportation General Highway Maps for Washington County showing the Project, which will be submitted electronically to the Commission with the Application in lieu of providing three hard copies; and (6) geographic information system ("GIS") shapefiles of the Project, which will be submitted electronically to the Commission with the Application.

Q: WERE THE PORTIONS OF APPALACHIAN'S FILING THAT YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: PLEASE DESCRIBE THE PROJECT AREA'S EXISTING TRANSMISSION LINES AND CIRCUITS.

A: Traversing northeast to southwest, the existing Saltville – Kingsport 138-kV Transmission Line is a double-circuit line that connects the Saltville Substation in Saltville, Virginia, to the Holston (KGP) Substation in Kingsport, Tennessee.

At the Abingdon Substation, two existing 138-kV circuits and one 69-kV circuit (which will be retired in the near future) connect to the substation. The Abingdon – Clinch River 138-kV Circuit enters the Abingdon Substation from the east and exits to the west as the Abingdon – South Abingdon 138-kV Circuit, which connects the Abingdon and South Abingdon Substations. The Broadford – Wolf Hills 138-kV Circuit currently bypasses the Abingdon Substation and connects the Saltville Substation to the Wolf Hills Substation. The existing Abingdon – Hillman Highway 69-kV Circuit generally traverses to the east out of the Abingdon Substation and will be retired in the

near future as a result of another, independent project. (See Company witness Moore's Direct Testimony for more details concerning retirement of the 69-kV Transmission Line.)

There are two lines in the area that tap off of the Saltville – Kingsport 138-kV Transmission Line. To the east of the Abingdon Substation, the Clinch River – Abingdon 138-kV Transmission Line taps off the Saltville – Kingsport 138kV Transmission Line and goes north to the Hansonville and Clinch River Substations. To the west of the Abingdon Substation, the South Abingdon 138-kV Extension Transmission Line taps off the Saltville – Kingsport 138-kV Transmission Line and goes south to the South Abingdon Substation.

The existing Abingdon 34.5-kV/138-kV Bus Tie #3 138-kV Transmission Line currently connects an existing 34.5-kV substation bay on the northwestern side of the Abingdon Substation to a 138-kV substation bay on the southeastern side of the Abingdon Substation.

Please reference Confidential Exhibit 2-C (Sheet 1) and Section I.A, Figure I-2 for the existing transmission line circuit layout.

Q: PLEASE DESCRIBE THE PROPOSED TRANSMISSION LINES AND CIRCUITS ONCE THE PROJECT IS COMPLETED.

A: Once the Project is completed, the Broadford – Wolf Hills 138-kV Circuit, which currently spans over the Abingdon Substation, will terminate into the substation providing two new sources (the Abingdon – Broadford 138-kV Circuit and the Abingdon – Wolf Hills 138-kV Circuit) resulting in four total 138-kV sources for the substation. Reference the Project GIS Constraint Map, Exhibit 3, for the proposed transmission lines

layout and Confidential Exhibit 2-C (Sheet 2) and Section I.A, Figure I-2 for the proposed transmission line circuit layout.

Q: MR. WOODY, PLEASE SUMMARIZE THE PROPOSED PROJECT TRANSMISSION LINE AND CIRCUIT WORK.

A: The Company proposes the following transmission line and circuit work (see Exhibit 2-C and Section I.A, Figure I-2):

- Transmission line work between existing structure 62-83 and 62-90 on the Saltville – Kingsport 138-kV Transmission Line. This includes a rebuild of approximately one mile of the existing double-circuit transmission line asset between existing structure 62-84, east of the Abingdon Substation, and existing structure 62-89, west of the Abingdon Substation. The spans of existing conductor from structures 62-83 and 62-90 will be reconnected to proposed structures 62-84A and 62-89A, respectively. The proposed rebuild is within, parallel to, or near the existing right-of-way ("ROW").
- Terminate the new section of the Clinch River – Abingdon 138-kV Circuit into a new 138-kV substation bay on the southeast side of the Abingdon Substation. The existing Broadford – Wolf Hills 138-kV Circuit will now terminate on a new 138-kV substation bay on the southeastern side of the Abingdon Substation and exit the substation to the north. Two new circuits will be created from the Broadford – Wolf Hills 138-kV Circuit. The Abingdon – Broadford 138-kV Circuit will connect the Saltville Substation to the Abingdon Substation and the Abingdon – Wolf Hills 138-kV Circuit will connect the Abingdon Substation to the Wolf Hills Substation. Re-connect the Clinch River – Abingdon 138-kV Line

to proposed structure 62-85A utilizing the existing conductor.

- Re-connect the South Abingdon 138-kV Extension Transmission Line to proposed structures 62-87A and 62-87B utilizing new conductor.
- Reroute the Abingdon 34.5-kV/138-kV Bus Tie #3 138-kV Transmission Line. The line will be placed on proposed structure 62-86A and terminate into a new 138-kV substation bay inside the Abingdon Substation.
- Expansion of and improvements to the existing Abingdon Substation to connect the transmission line. Refer to Company witness Parmain's Direct Testimony concerning the Abingdon Substation proposed upgrades.

Q: WHY CAN'T THE EXISTING BROADFORD – WOLF HILLS 138-KV CIRCUIT, WHICH SPANS OVER THE ABINGDON SUBSTATION, SIMPLY SPAN DOWN INTO THE SUBSTATION RATHER THAN REBUILDING APPROXIMATELY ONE-MILE OF TRANSMISSION LINE?

A: The existing transmission line and the Abingdon Substation configurations make it impractical to simply splice and connect the Broadford – Wolf Hills 138-kV Circuit into the existing Abingdon Substation. The surrounding area for the Abingdon Substation is space constrained and cannot receive the new circuits without expanding the substation, moving/adding substation equipment, and relocating existing transmission lines to meet today's standards and clearance requirements necessary for safe operation and maintenance.

Additionally, once the engineering team began relocating structures to enter the substation's new bay locations, downstream and upstream constraints (i.e., existing substation equipment, existing transmission lines, and adjacent and encroaching building

structures, see Exhibit 3) resulted in the need for additional line work. Furthermore, the one mile of line work is good engineering practice to (i) avoid or minimize outages; (ii) facilitate reconnection of the existing tap lines into the Saltville – Kingsport 138-kV Transmission Line; and (iii) prepare for the near future 25-mile Saltville – Kingsport 138-kV Transmission Line Rebuild (estimated to be filed with the SCC in 2025). The entire line must be rebuilt due to its deteriorating condition and age. Therefore, the Project's one-mile portion would need to be rebuilt either now or later.

Q: PLEASE DESCRIBE HOW THE PROPOSED REBUILD ROUTE WAS DEVELOPED.

A: Transmission line engineers conducted desktop and field reviews of the proposed route to validate feasibility of rebuilding the transmission line primarily within or parallel to the existing transmission line ROW from an engineering and constructability standpoint. It was determined that due to (i) the location of a veterinary practice building and the location of the Company's Abingdon transmission service building encroaching on the existing ROW and (ii) the need to minimize outages, approximately 0.7 miles of the Saltville – Kingsport 138-kV Transmission Line would be rebuilt parallel to or partially overlapping the existing ROW while the remaining 0.3 miles would be rebuilt within existing ROW.

The bookend structures of the Project, proposed structure 62-84A and 62-89A, were placed strategically to allow for completion of the Project independent of the future planned 25-mile Saltville – Kingsport 138-kV Transmission Line Rebuild. The proposed baseline Project has a much sooner in-service date requirement than the future 25-mile Rebuild (see Moore Direct Testimony for more detail). Additionally, by extending the

Project to proposed structures 62-84A and 62-89A, the Clinch River – Abingdon 138-kV Transmission Line and South Abingdon 138-kV Extension Transmission Line will be able to be reconnected to prevent additional outages to customers.

For more information on the route review process, please see Company witness Fraser's Direct Testimony. The proposed route for the transmission line is shown in Exhibit 1 (Project Area Map) and Exhibit 3 (GIS Constraints Map).

Q: WHAT STRUCTURE TYPES AND HOW MANY STRUCTURES WILL BE USED FOR THE PROJECT?

A: The Project typically requires two types of transmission structures for the double-circuit transmission line, as described in detail in Section II.B.3 of the Response to Guidelines. The structure types included in this Application are preliminary and final structure types will be determined during final engineering, which includes ground surveys and geotechnical studies. Nevertheless, based on preliminary engineering, the Company anticipates primarily using double-circuit lattice steel towers and steel monopole structures for the 138-kV transmission line rebuild. The proposed structure types are described in detail in Exhibits 6 through 8.

Specifically, the Company plans to remove seven lattice steel towers (see Exhibits 4 and 5) and replace them with the following eleven structures: two double-circuit lattice tower structures, which will more closely resemble the existing structures on the line creating less impact on the aesthetics of the area (see Exhibit 8); seven double-circuit davit arm monopole structures, which are best suited for medium-to-long spans in areas that require a more compact structural footprint in constrained areas (see Exhibit 7); one double-circuit monopole dead-end structure, and one single-circuit monopole dead-end

structure, which are best suited for taps into substations, heavy line angle locations, and breaking wire tension (see Exhibit 6). The four additional proposed structures are necessary to bypass encroachments in the existing ROW and support sequencing of construction to minimize outage durations at the Clinch River – Abingdon 138-kV Transmission Line and the South Abingdon 138-kV Extension Transmission Line.

Q: HOW DO THE HEIGHTS OF THE EXISTING AND PROPOSED STRUCTURES COMPARE TO EACH OTHER?

A: The details of the heights of the existing and proposed structures are described in Section II.B.3 and shown on Exhibit 3. There is on average an approximate five-foot increase in height between the existing structures and the proposed structures. The small increase in height between the existing and proposed structures is necessary to accommodate: (1) changes in industry code standards since the original construction; and (2) a heavier conductor, which results in a greater amount of conductor sag between the structures.

Q: WILL THE COMPANY EMPLOY LOW-COST AND EFFECTIVE MEANS TO IMPROVE THE AESTHETICS OF THE PROPOSED TRANSMISSION LINE?

A: The proposed structures are to be located in or near the existing ROW, similar in character to the existing structures, and the structures are only approximately five feet taller than existing structures; therefore, new aesthetical impacts are minimal. However, as noted earlier, four additional structures are necessary to avoid existing land uses. The Company chose galvanized steel for the proposed structures due to its durability and proven reliability in this region.

Q: DESCRIBE THE PROPOSED ROW NEEDED FOR THE PROJECT.

A: The ROW for the Project will generally be 100 feet wide in areas of new, supplemental,

or existing easements. Areas where the transmission line will be rebuilt within the existing ROW are subject to existing easements, dating from the 1920s and 1930s and will be supplemented, if needed. Proposed structures 62-84A through 62-86B will be built on property owned by the Company. Proposed structure 62-89A will be built on existing ROW. Proposed structures 62-86C through 62-88A will require new ROW parallel to or overlapping the existing ROW.

Q: IS THERE ANY PART OF THE PROJECT THAT MAY REQUIRE MORE THAN A 100-FOOT-WIDE ROW?

A: In one location (at this time, final design is not complete), it is expected that the ROW width will be increased from 100 feet to approximately 110 feet to account for conductor sway clearances.

Q: PLEASE DESCRIBE THE ROW ACQUISITION STATUS AT THE TIME OF THIS FILING.

A: Appalachian ROW agents have been in contact with all landowners affected by the Project's proposed one-mile transmission line rebuild. Again, a combination of supplemental and new ROW easements will be necessary in, near or adjacent to the existing ROW. The Project and necessary easement general locations have been described to each landowner and voluntary permission to survey forms have been signed by all affected property owners. To date, no Project opposition or issues have been identified and the Company plans to continue working respectfully with the landowners.

Q: PLEASE DESCRIBE ANY OTHER WORK RELATED TO THE CONSTRUCTION OF THE TRANSMISSION LINE COMPONENTS OF THE PROJECT.

A: Temporary material laydown yards and access roads for structure erection and conductor stringing will be necessary. The final location and extent of required laydown yards and access roads cannot be determined until after completion of final line design, environmental studies, and subsequent field reconnaissance by the Company's construction representatives and land agents.

Q: DESCRIBE THE CONSTRUCTION ACTIVITIES FOR THE TRANSMISSION LINE COMPONENTS OF THE PROJECT.

A: Project construction activities include the installation and maintenance of soil erosion and sedimentation control measures; access road construction; removal of the existing transmission line wire, structures, and foundations; foundation, structure, and wire installation; and the subsequent rehabilitation of all areas disturbed during construction. All required environmental compliance permits and studies will be completed, and a stormwater pollution prevention plan will be developed and implemented under the state's "General Permit for Discharges of Stormwater from Construction Activities." Additionally, portions of the line that are located in new ROW will be constructed prior to beginning the circuit outage in each section. Further details of each step of the construction activities can be found in Section II.A.10.

Q: DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A: Yes.

APCo Exhibit No. ____
Witness: CRP

DIRECT TESTIMONY OF
CHARLES R. PARMAIN, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

APCo Exhibit No. ____
Witness: CRP

SUMMARY OF DIRECT TESTIMONY OF CHARLES R. PARMAIN, P.E.

My direct testimony supports Appalachian Power Company's ("Appalachian" or "Company") Application and Response to Guidelines in connection with the Abingdon 138-kV Substation Transmission Project ("Project"). I sponsor (1) the information describing the substation engineering components of the Project set forth in Section II.C of the Response to Guidelines, (2) Exhibit 12, and (3) Confidential Exhibit 12-C. The substation components of the Project consist generally of expanding the existing Abingdon Substation yard and upgrading equipment within the substation. Section II.C of the Response to Guidelines describes the technical features of the substation.

The Project connects the existing Broadford – Wolf Hills 138-kV Circuit located on the Saltville – Kingsport 138-kV Transmission Line into the Abingdon Substation. To terminate the circuit into the substation, expansion of and improvements to the existing Abingdon Substation are necessary.

DIRECT TESTIMONY OF
CHARLES R. PARMAIN, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

Q: PLEASE STATE YOUR NAME, PRESENT POSITION AND BUSINESS ADDRESS.

A: My name is Charles R. Parmain. I am Supervisor, Station Engineering for American Electric Power Service Corporation ("AEPSC"). AEPSC is a subsidiary of American Electric Power Company, Inc. ("AEP") that provides corporate support services to the operating subsidiaries of AEP, including Appalachian. My business address is 40 Franklin Road SW, Roanoke, Virginia 24011.

Q: PLEASE REVIEW YOUR EDUCATIONAL BACKGROUND AND YOUR WORK EXPERIENCE.

A: In 1990, I received a Bachelor of Science degree in Electrical Engineering from the University of Tulsa. I am a licensed professional engineer in Oklahoma. I joined the Company in 1990 as an Electrical Engineer. I was promoted to the position of Planning and Engineering Supervisor with AEPSC in 2010. I am responsible for coordinating and directing the station engineering for the AEP transmission system (including stations operating at voltages from 34.5 kV through 765 kV) in Virginia and Tennessee.

Q: MR. PARMAIN, WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to support certain aspects of Appalachian's Application to this Commission for approval and certification of the Project. I am sponsoring various

sections of the Response to Guidelines filed by the Company together with the Application in response to the Commission Staff's "Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia."

Q: WHAT ARE YOUR RESPONSIBILITIES AS RELATED TO THE PROJECT?

A: As Supervisor, Station Engineering, my primary duties involve the oversight of the engineering, logistical, and other technical requirements associated with the construction of the station components of the Project.

Q: WHICH SECTIONS IN THE RESPONSE TO GUIDELINES AND EXHIBITS ARE YOU SPONSORING?

A: I am sponsoring (1) the information describing the substation engineering components of the Project set forth in the Response to Guidelines, Section II.C, (2) Exhibit 12, and (3) Confidential Exhibit 12-C.

Q: WERE THE PORTIONS OF APPALACHIAN'S FILING THAT YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: PLEASE DESCRIBE THE PROJECT'S SUBSTATION ENGINEERING COMPONENTS.

A: The substation components of the Project consist generally of expanding the existing Abingdon Substation by approximately 25 feet by 98 feet to the northeast, constructing two new 138-kV bays, and other equipment upgrades. These Project station-engineering

components are shown in Exhibit 12 (Abingdon Substation Layout, Maps and Aerial Views) to the Company's Response to Guidelines.

Q: MR. PARMAIN, WHAT IS THE GENERAL PURPOSE OF THIS PROPOSED STATION WORK?

A: As described in more detail in Company witness Moore's testimony, the Project's proposed baseline solution is to connect the existing Broadford – Wolf Hills 138-kV Circuit into the Abingdon Substation creating two new 138-kV sources. Currently, this existing circuit spans over the existing substation. To connect the circuit into this space-constrained substation (i.e., existing equipment, existing transmission lines, and adjacent building structures, see Exhibit 3), the substation must first be expanded to the northeast, two new 138-kV bays added, and other equipment upgrades. As described in Company witness Woody's direct testimony, the existing transmission line location must be adjusted and then connected/terminated into the substation.

Q: MR. PARMAIN, PLEASE DESCRIBE THE EXISTING ABINGDON SUBSTATION.

A: The substation, built in 1946, is space constrained due to existing substation equipment and transmission lines and has evolved with various upgrades. The existing Abingdon 34.5-kV/138-kV Bus Tie #3 138-kV Transmission Line currently connects an existing 34.5-kV substation bay on the northwestern side of the Abingdon Substation to a 138-kV substation bay on the southeastern side of the Abingdon Substation. The substation currently includes two 138-kV/34.5-kV transformers, one 138-kV/12-kV transformer,

and one 138-kV/69-kV transformer (to be retired before the proposed Project is constructed).

Q: PLEASE DESCRIBE IN MORE DETAIL THE PROPOSED PROJECT'S SUBSTATION UPGRADES.

A: Section II.C of the Response to Guidelines describes the substation work in detail. However, the Company generally proposes to expand the gravel fenced portion of the existing Abingdon Substation (approximately 25-foot by 98-foot expansion, 2,450 square feet) entirely located on Appalachian property. Additionally, the Abingdon Substation upgrades involve installing four 138-kV, 3000A, 63kA circuit breakers to upgrade the 138-kV substation configuration and protection controls and installing all associated new bus work and structures to connect the Broadford – Wolf Hills 138-kV Circuit into the substation. For operational features of the proposed substation design, please see the direct testimony of Company witness Moore and Section I of the Response to Guidelines.

Q: PLEASE GENERALLY DESCRIBE THE CONSTRUCTION ACTIVITIES FOR THE PROJECT.

A: Construction activities for this Project will include grading of the Abingdon Substation site; foundation, structure, equipment, and wire installations; and the subsequent rehabilitation of all areas disturbed during construction. If approved by the Commission, the station work will begin in 2025, will be coordinated with the transmission line work to avoid customer outages and disruptions (see Section II.A.10), and will be completed in approximately June 2027. Further, the Company will complete all required environmental compliance permits and studies.

Q: DOES THIS CONCLUDE YOUR TESTIMONY?

A: Yes.

Exhibit No.___
Witness: MB

DIRECT TESTIMONY OF
MARY BERKLEY, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

Exhibit No.___
Witness: MB

SUMMARY OF DIRECT TESTIMONY OF MARY BERKLEY, P.E.

My direct testimony supports Appalachian Power Company's ("APCo," "Appalachian," or "Company") Application and Response to Guidelines. I sponsor Section IV of the Response to Guidelines.

The proposed Abingdon 138-kV Substation Transmission Project (the "Project") involves substation improvements and the rebuild of approximately one mile of an existing 138-kV transmission line. Assuming a 100-foot-wide right-of-way ("ROW"), my testimony summarizes the maximum electric and magnetic field ("EMF") levels expected to occur at the ROW edge of the Project's 138-kV transmission line. The maximum expected EMF levels at the edge of the ROW for this Project are 0.22 kilovolts per meter and 14.49 milligauss, as described in the testimony. The maximum existing EMF levels for the existing structures of the double-circuit transmission line are 0.197 kV/m and 20.52 mG, respectively.

The maximum EMF levels, detailed in Section IV of the Response to Guidelines, for the proposed transmission line are typical and expected results for such transmission lines and well within the limits specified in the Institute of Electrical and Electronics Engineers' ("IEEE") Standard C95.6™-2002, which sets the safety levels with respect to human exposure to electromagnetic fields.

Appalachian considered the presence and proximity of dwellings, schools, hospitals, and other community facilities as features to avoid wherever practical during its route selection process to minimize EMF exposure. No significant adverse health effects will result from the construction and operation of the Project. Section IV of the Response to Guidelines provides further documentation and detail regarding the absence of adverse health effects from the construction and operation of the Project.

DIRECT TESTIMONY OF
MARY BERKLEY, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

Q: PLEASE STATE YOUR NAME, PRESENT POSITION AND BUSINESS ADDRESS.

A: My name is Mary Berkley. I am the Manager of System Performance Analysis for American Electric Power Service Corporation ("AEPSC"). AEPSC is a subsidiary of American Electric Power Company, Inc. ("AEP") that provides corporate support services to the operating subsidiaries of AEP, including Appalachian. My business address is 1 Riverside Plaza, 11, Columbus, OH 43215.

Q: PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND CURRENT POSITION.

A: I received a Bachelor of Science and a Master of Science degree, both in Electrical Engineering, from The Ohio State University. I am a licensed professional engineer in the state of Ohio. My current position with AEPSC is Manager of System Performance Analysis. I joined AEPSC in 2016 as an Engineer Intern. In 2017, I became an Engineer Associate and then in 2019, I became an Engineer. Two years later, in 2021, I was promoted first to Senior Engineer and then to Supervisor. In 2024, I was promoted to my current position.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to support certain aspects of Appalachian's Application to this Commission for approval and certification of the Project as they relate to EMF.

Q: WHICH SPECIFIC MATERIALS INCLUDED IN THE APPLICATION ARE YOU SPONSORING?

A: I am sponsoring Section IV, Health Aspects of EMF of the Response to Guidelines filed by the Company in response to the Commission Staff's *Guidelines for Transmission Line Applications Filed under Title 56 of the Code of Virginia*.

Q: WERE THE PORTIONS OF THE FILING THAT YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: WHAT IS EMF?

A: EMF is short for electric and magnetic fields, which exist wherever there is a flow of electricity. Electric transmission and distribution lines, electrical wiring in homes, and electric appliances all have electric and magnetic fields associated with their use. Electric fields are produced by the voltage gradient between a power line and ground; their strength is dependent upon the voltage difference of the energized line to ground, the physical characteristics of the line, and the distance from the line to the observation point at which the field strength is measured. The electric field strength is commonly measured in kilovolts per meter ("kV/m"). Magnetic fields are created by the flow of electric current in a conductor. The magnetic field density generated by a transmission line varies with the load current of the line, the physical characteristics of the line, and the distance from the line to the observation point at which the magnetic field density is measured. The magnetic field density is measured in units known as gauss, or milligauss ("mG"). The electric and magnetic fields associated with power lines and electric appliances in the United States have a frequency of 60 hertz ("Hz"), or 60 cycles per second.

Q: PLEASE DETAIL FOR THE COMMISSION YOUR EXPERIENCE IN CALCULATING AND ANALYZING EMF.

A: I have over seven years of experience conducting, managing, and directing the calculation and analysis of a variety of issues in power systems for safe, reliable, economic, and environmentally compatible operation of power equipment and transmission lines, for high-voltage grid development, for system voltage coordination, for power flow and congestion analysis, and for development and implementation of advanced technologies. I was an adjunct faculty member at The Ohio State University in Power Systems in 2019 and have spent a year leading the System Performance Analysis team of experts who perform EMF calculations and analysis at AEP.

Q: MS. BERKLEY, WHAT ARE THE CALCULATED MAXIMUM EMF LEVELS ASSOCIATED WITH THE PROPOSED 138-kV TRANSMISSION LINE IN THIS PROJECT?

A: As set forth in Section IV.A of the Response to Guidelines, this Project consists of rebuilding a double-circuit transmission line from proposed structure 62-84A to proposed structure 62-89A, replacing the existing structures 62-84 through 62-89. Assuming a 100-foot-wide ROW, the maximum EMF levels expected to occur at the edge of the ROW for the proposed project are 0.22 kV/m and 14.49 mG, respectively.

The maximum existing EMF levels for the existing structures of the double-circuit transmission line are 0.197 kV/m and 20.52 mG, respectively.

Q: ARE THE CALCULATED MAXIMUM EMF LEVELS FOR THE PROPOSED TRANSMISSION LINE EXTRAORDINARY?

A: No. The calculations are typical and expected results for such transmission lines. The maximum EMF levels for the proposed Project are 0.22 kV/m and 14.49 mG (assuming a 100-foot-wide ROW). Both EMF levels drop sharply from the centerline to the edge of the ROW and will continue to drop with distance from the ROW edge. These field levels are well within the limits specified in IEEE Standard C95.6™-2002, which sets the safety levels with respect to human exposure to electromagnetic fields.

Q: DOES THE COMPANY HAVE AN OPINION ON WHETHER ANY SIGNIFICANT ADVERSE HEALTH EFFECTS WILL RESULT FROM THE CONSTRUCTION AND OPERATION OF THE PROJECT?

A: Based upon the Company's ongoing review of the scientific literature on EMF, the Company's experience with its existing 138-kV transmission lines, and the fact that the calculated maximum EMF levels at the edges of the ROW for the proposed line are well within the limits specified in IEEE Standard C95.6™-2002, the Company is of the opinion that no significant adverse health effects will result from the construction and operation of the Project. This position is consistent with the conclusions expressed in the final report to the Virginia General Assembly, dated October 31, 2000, by Vickie L. O'Dell and Khizar Wasti, Ph.D. of the Virginia Department of Health, in association with this Commission, entitled "Monitoring of Ongoing Research on the Health Effects of High Voltage Transmission Lines (Final Report)" and subsequent assessments as listed in Section IV of the Response to Guidelines.

Q: DOES THIS CONCLUDE YOUR TESTIMONY?

A: Yes.

APCo Exhibit No. ____
Witness: DF

DIRECT TESTIMONY OF
DANIEL FRASER, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

APCo Exhibit No. ____
Witness: DF

SUMMARY OF DIRECT TESTIMONY OF DANIEL FRASER, P.E.

My direct testimony supports the route development and environmental analysis aspects of Appalachian Power Company's ("Appalachian" or "Company") Application and Response to Guidelines for the Abingdon 138-kV Substation Transmission Project ("Project"). Specifically, I sponsor:

- Sections II.A.1, 2, 3, and 9, Section III, and Section V of the Response to Guidelines
- Exhibit 1: Project Area Map
- Exhibit 3: GIS Constraints Map
- Exhibit 11: Photo Simulation
- Exhibit 13: Public Notice Map
- Virginia Department of Environmental Quality Supplement ("VDEQ Supplement")

The Company retained POWER Engineers, Inc. ("POWER") to evaluate the existing Saltville – Kingsport 138-kilovolt ("kV") Transmission Line and conduct a routing study for the transmission line work between existing structures 62-83 and 62-90 that is needed to support the improvements at the Abingdon Substation. My testimony describes the process followed by the Siting Team, which included representatives from the Company and POWER, to identify the proposed route for the Project.

The Siting Team used a traditional siting methodology that identified constraints and opportunities, evaluated the feasibility of rebuilding the transmission line within the existing right-of-way ("ROW"), gathered and incorporated feedback from stakeholders and landowners, and conducted field reviews to select a proposed route. The Company considered feedback from federal, state, and local agencies and/or officials and undertook public outreach efforts to promote meaningful engagement from each community affected by the Project. The Project is not anticipated to have a disproportionately high or adverse impact on environmental justice or fenceline communities. The Company has obtained permission to survey from each landowner crossed by the proposed route and will continue to work with all affected landowners as the design is completed.

Because there are buildings in the existing ROW and new 138-kV bays at the Abingdon Substation to connect to, the Siting Team developed minor adjustments to the existing line route rather than developing alternative routes. These adjustments are described in detail in my testimony. I also explain that there are no historic properties or conservation easements in the Project area; therefore, the Project is not anticipated to result in adverse impacts to cultural or recreational resources.

Finally, I describe the proposed route and the corridor within which the Company proposes to engineer, construct, operate, and maintain the Project.

DIRECT TESTIMONY OF
DANIEL FRASER, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2024-00169

Q: PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A: My name is Daniel Fraser. My business address is 6641 West Broad Street, Suite 405, Richmond, Virginia 23230.

Q: BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?

A: I am employed in the Environmental Division of POWER Engineers, Inc. ("POWER") where I am a Project Manager for electric transmission projects.

Q: DOES POWER HAVE EXPERIENCE IN ENVIRONMENTAL ANALYSIS AND ROUTING TRANSMISSION LINES?

A: Yes. POWER is an engineering and environmental consulting firm with approximately 4,000 employees across North America specializing in integrated solutions for clients in the power delivery, power generation, food and beverage, government, renewables and storage, campus energy, and oil and gas industries. POWER was founded in 1976 and has successfully sited and/or permitted hundreds of transmission line projects covering thousands of miles of high-voltage transmission lines and associated facilities. POWER has previously supported or provided written testimony to this Commission for nine Appalachian Power Company ("Appalachian" or "Company") projects, including the Stuart Area 138-kilovolt ("kV") Transmission Improvements Project (SCC Case No. PUR-2023-00024), Reusens to Roanoke 138-kV Rebuild Project (SCC Case No. PUR-2022-00163), Fieldale to Ridgeway 138-kV Rebuild Project (SCC Case No. PUR-2021-

00219), Reusens to New London 138-kV Rebuild Project (SCC Case No. PUR-2021-00049), Central Virginia Transmission Reliability Project (SCC Case No. PUR-2021-00001), Glendale Area Improvements 138-kV Transmission Project (SCC Case No. PUR-2018-00188), South Abingdon 138-kV Extension Transmission Line Project (SCC Case No. PUE-2016-00011), Huntington Court – Roanoke 138-kV Transmission Line Project (SCC Case No. PUE-2008-00096), and Matt Funk 138-kV Transmission Line Project (SCC Case No. PUE-2008-00079).

Q: HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?

A: Yes, I previously testified as the Company's witness for the route development process and environmental analysis for the Reusens to Roanoke 138-kV Rebuild Project. Additionally, although I did not offer testimony, I supported the development of four of the Company's previous filings to the Commission: Stuart Area 138-kV Transmission Improvements Project, Fieldale to Ridgeway 138-kV Rebuild Project, Glendale Area Improvements 138-kV Transmission Project, and South Abingdon 138-kV Extension Transmission Line Project.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to describe the route development process and environmental analysis completed for the Abingdon 138-kV Substation Transmission Project ("Project") as part of the Company's Application to the Commission.

Q: WHICH SPECIFIC MATERIALS ARE YOU SPONSORING?

A: I am sponsoring:

- Sections II.A.1, 2, 3, and 9, Section III, and Section V of the Response to Guidelines
- Exhibit 1: Project Area Map

- Exhibit 3: GIS Constraints Map
- Exhibit 11: Photo Simulation
- Exhibit 13: Public Notice Map
- Virginia Department of Environmental Quality Supplement (the "VDEQ Supplement")

Q: WERE THE PORTIONS OF APPALACHIAN POWER'S FILING THAT YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A: I received a Bachelor of Science degree in Civil Engineering from Clemson University. I am a licensed professional engineer in the state of South Carolina. In 2016, I joined POWER as a transmission line engineer and have held various roles in transmission line engineering, environmental planning, and project management. In these roles, I have supported electric transmission projects in Florida, Indiana, Kentucky, Ohio, South Carolina, Tennessee, Texas, Virginia, and West Virginia. In my current position, which I have held since 2021, I oversee the work of POWER's technical staff members who are responsible for routing and siting transmission lines and substations, engaging stakeholders and landowners, and permitting electric transmission projects.

Q: SPECIFICALLY, HOW IS THIS PRIOR EXPERIENCE APPLICABLE TO THE CURRENT PROJECT?

A: My experience in engineering and routing electric transmission facilities has equipped me

to determine the information and analyses necessary to develop a feasible transmission line route that minimizes impacts to the natural and human environments. I have an understanding of the opportunities and constraints, such as existing and future land uses, historic resources, and geologic formations, which are common within the Project area. I have executed routing and siting studies across various land use types, including developed (densely populated or planned for development) and undeveloped (agricultural, forested, or mountainous) areas. I have applied this engineering and routing experience to the Project which is in a moderately developed portion of Washington County, Virginia.

Q: PLEASE DESCRIBE FOR THE COMMISSION YOUR PRIMARY DUTIES AS RELATED TO THE PROPOSED PROJECT.

A: The Company retained POWER to evaluate the existing Saltville – Kingsport 138-kV Line ROW and identify a route for the transmission line to be rebuilt and relocated to accommodate the improvements at the existing Abingdon Substation. As the routing and siting Project Manager for the Project, I planned and oversaw the following general activities:

- Identifying constraints and opportunities between the Project end points.
- Evaluating the feasibility of rebuilding the transmission line entirely within the existing ROW.
- Incorporating feedback received from stakeholders and landowners within the Project area.

- Selecting a proposed route that reasonably avoids or minimizes adverse impacts on the community, historic resources, and the natural environment in the Project area, and is consistent with general routing guidelines and technical criteria.

Q: WHO IDENTIFIED THE PROPOSED ROUTE FOR THE PROJECT?

A: The proposed route for the Project was selected by a multi-disciplinary team, including employees from the Company, POWER, and other consultants retained by or on behalf of the Company, who supported the route development and public involvement process (the "Siting Team"). Members of the Siting Team represented transmission line, substation, and distribution engineering, ROW, public outreach, environmental, outage planning, and construction management. The Siting Team members have extensive experience in transmission line siting and impact assessment for natural resources, land uses, and constructability.

Q: DID THE SITING TEAM CONSIDER ANY GENERAL OR TECHNICAL CRITERIA FOR THE EXISTING LINE TO BE REBUILT?

A: Yes. The Siting Team followed specific siting guidelines during the route development process for the Project. Generally, using existing Company ROWs for transmission lines is preferred and, when using the existing ROW is not a practical solution, paralleling an existing ROW is a preferred alternative. Using or paralleling existing ROWs generally minimizes impacts on the natural and human environments and is consistent with Sections 56-46.1 and 56-259 of the Code of Virginia, which suggest that existing ROWs should be given priority when adding new transmission line facilities.

Technical criteria considered by the Siting Team included maximizing the separation distance from residences, businesses, and community facilities, minimizing

tree clearing, avoiding land use conflicts, minimizing the total transmission line length, and avoiding large line angles. The Siting Team considered the terrain along the routes, which impacts structure and access road design, and considered safety with respect to construction, maintenance, and operation of the transmission line. Additionally, potential impacts on environmental justice communities, namely communities of color and low-income communities, within the study area were considered. The Siting Team considered these criteria in addition to stakeholder and landowner input received about the Project.

Q: PLEASE DESCRIBE THE SITING METHODOLOGY EMPLOYED FOR THE PROJECT.

A: Using the Company's technical routing criteria and publicly available data, the Siting Team identified constraints and opportunities between the Project endpoints. Constraints are specific areas that should be avoided to the extent practical (e.g., buildings, cultural resources, environmentally sensitive areas) and opportunities are compatible land uses and/or existing linear features that can be paralleled. The primary constraints identified for the Project were commercial development along U.S. Route 58 Alternate/U.S. Route 19 (Porterfield Highway) and residential development in the Quail Ridge Subdivision and along State Route 825 (Elementary Drive) near Abingdon Elementary School. Opportunity features were property lines, the existing Saltville – Kingsport 138-kV Transmission Line ROW, and an existing 69-kV ROW from a transmission line the Company plans to retire in 2025.

After identifying the constraints and opportunities within the Project area, the Siting Team reviewed aerial imagery of the existing ROW and visited the Project site to determine the feasibility of rebuilding the transmission line entirely within the existing

ROW. Because there are buildings within the existing ROW, the Siting Team identified route adjustments on Company-owned property and near the existing ROW to connect the Project endpoints and avoid the buildings. The Company then engaged stakeholders, including federal, state, and local officials, and the communities near the Project, to gather feedback on the identified study segments. Based on the publicly available data, field reconnaissance, engineering requirements, and feedback received, the Siting Team selected the proposed route.

Q: WAS THE SITING METHODOLOGY CONSISTENTLY EMPLOYED FOR THE PROJECT?

A: Yes. The siting methodology evaluated constraint and opportunity areas, engineering requirements, and stakeholder input along the entire portion of transmission line to be rebuilt.

Q: MR. FRASER, PLEASE DESCRIBE THE LINE ROUTE ADJUSTMENTS IDENTIFIED BY THE SITING TEAM.

A: The existing transmission line crosses through an area with limited opportunities for alternative routes. Additionally, the distance between the Project end points is only about one mile, with two existing transmission lines connecting into this short section of the existing Saltville – Kingsport 138-kV Transmission Line. Because there were limited opportunities for alternative routes, buildings in the existing ROW, and new 138-kV bays at the Abingdon Substation, the Siting Team developed minor adjustments to the existing line route. The Siting Team also considered a route adjustment to move the transmission line to an open field north of the Quail Ridge Subdivision between existing structures 62-83 and 62-85. The route adjustment was presented during the open houses; however,

landowner and community input indicated that moving the line to the open field may result in new, greater visual impacts. On the northeast side of the Abingdon Substation, the modified line route avoids a transmission building and garage that are in the existing ROW and moves the line to an existing ROW for a 69-kV transmission line that will be retired before the Project is constructed. On the southwest side of the Abingdon Substation, the adjusted line route avoids a veterinary clinic that is within the edge of the existing ROW near the U.S. Route 58 Alternate/U.S. Route 19 (Porterfield Highway) crossing. The adjusted route crosses an open gravel lot approximately 180 feet north of the existing centerline. The line route then connects to the existing South Abingdon 138-kV Extension Transmission Line and generally follows the existing ROW to existing structure 62-90.

Q: DID THE COMPANY CONSIDER STAKEHOLDER AND PUBLIC INPUT DURING THE ROUTE DEVELOPMENT AND DATA COLLECTION PROCESS?

A: Yes. Stakeholder input and public participation is an important component of the siting process that the Company uses to gather information, develop routes, and inform decisions. The Siting Team contacted and obtained information from various federal, state, and local agencies and/or officials. Multiple meetings were held with officials from Washington County to inform them of the Project, gather input, and provide updates on the status of the Project. Members of the Siting Team met virtually with Washington County officials on December 14, 2022, to introduce the Project and request input on the initial study segments. An update was then sent to Washington County officials on July 16, 2024, providing a new estimated date for the Project to be filed with the Commission.

During an in-person meeting with Washington County officials on August 26, 2024, the Company provided updated information about the Project status and answered questions from local officials. On July 16, 2024, the Siting Team also contacted 32 state and federal agency officials and 22 responses were received. A list of agencies contacted and copies of the correspondence are included as Attachment 2.0.1 to the VDEQ Supplement.

Previously, on January 19, 2023, the Company announced the related Saltville to Wolf Hills 138-kV Rebuild Project to the public and invited landowners to attend in-person open houses in the Project area or to view the virtual open house on the Project website. Notifications and invitations were sent to 738 landowner addresses within 1,000 feet of the entire 26-mile rebuild project; 56 comments were received via comment cards, emails, or phone calls. Following the open houses, the Siting Team corresponded with affected landowners throughout 2023 to gather additional feedback and adjust the study segments to reasonably minimize impacts to the community.

Q: PLEASE DESCRIBE THE OPEN HOUSES THAT WERE HELD FOR THE PROJECT.

A: The Company hosted two in-person open houses in early-2023 to introduce the related Saltville to Wolf Hills 138-kV Rebuild Project, which would rebuild the existing Saltville – Kingsport 138-kV Transmission Line between the Company's Saltville Substation and an existing structure near the Company's Wolf Hills Substation. The landowners notified included those within area around the Abingdon 138-kV Substation Transmission Project. The open houses were held from 5:00 p.m. to 7:00 p.m. on February 7 and 8, 2023, at Abingdon Elementary School and Saltville Elementary School, respectively. At the open houses, representatives from the Siting Team provided information about the

Project and were available to answer questions and collect comments. Study segments were displayed on printed maps at a scale of 1 inch equal to 200 feet for the public to view and comments from the community were recorded directly on the maps or on comment cards. Additionally, the public was invited to review Project information and comment electronically through a virtual open house on the Project website. Many of the comments received from the public noted potential land use conflicts and requested general information about the Project and proposed structures. Several landowners requested specific information about the effect of the Project on their property and provided input on the placement of the proposed structures and route adjustments.

Q: HOW MANY LANDOWNERS WILL BE AFFECTED BY THE ABINGDON 138-KV SUBSTATION TRANSMISSION PROJECT AND WHAT FEEDBACK HAVE THE LANDOWNERS PROVIDED?

A: Based on preliminary engineering, 42 landowners are within the filing corridor, and eight landowners are within the proposed ROW.

Since the open houses were held, the Company's ROW agents have communicated with the landowners affected by the Project to update them on the status and solicit feedback. Permission to survey has been obtained from all landowners crossed by the proposed route and the Company will continue to work with affected landowners throughout the detailed engineering and construction process. Company witness Woody describes the ROW requirements of the Project in more detail.

Q: REGARDING THE VIRGINIA ENVIRONMENTAL JUSTICE ACT (§ 2.2-234 ET SEQ. OF THE CODE OF VIRGINIA), DID THE SITING TEAM RESEARCH THE DEMOGRAPHICS OF THE COMMUNITIES SURROUNDING THE PROJECT?

A: Yes. It is the Company's standard practice in its route development processes to avoid or reasonably minimize impacts to the human environment, which includes environmental justice and fenceline communities as defined in the Virginia Environmental Justice Act (§ 2.2-234 *et seq.* of the Code of Virginia). The Siting Team used the EJSCREEN tool, developed by the United States Environmental Protection Agency, and referenced 2024 data from the United States Census Bureau-American Community Survey ("ACS") to identify potential environmental justice and fenceline communities. Per the available EJSCREEN and ACS data, there are two Census Block Groups within one mile of the Project. Neither Census Block Groups meets or exceeds the Commonwealth's threshold for an environmental justice community. Therefore, the Project is not anticipated to have a disproportionately high or adverse impact on environmental justice communities.

Q: HOW DID THE SITING TEAM USE FIELD REVIEWS DURING THE ROUTE DEVELOPMENT PROCESS?

A: I, along with members of the Siting Team, reviewed the Project area multiple times to evaluate the feasibility of rebuilding the line in or near the existing ROW, identify study segments to avoid buildings, and determine structure locations that would accommodate the proposed substation improvements. During these field reviews, the Siting Team confirmed the desktop constraint and opportunity data, evaluated potential structure locations, and reviewed specific locations of interest identified by the public.

Q: WERE ALTERNATIVE ROUTES CONSIDERED FOR THE PROJECT?

A: No viable alternative routes were identified that would address the needs of the Project as well as minimize impacts to the human and natural environments. The Project must connect to the Abingdon Substation and two existing transmission lines in a short, approximately one-mile-long section of line, which limits the opportunities for alternative routes. The proposed route was selected based on available data, field reviews, engineering requirements, feedback received from the public and a comparative analysis of potential impacts.

Q: PLEASE DESCRIBE THE PROPOSED ROUTE.

A: The proposed route for the Project is approximately one mile long between the existing structure 62-83 and the Company's Abingdon Substation, and between the Abingdon Substation and existing structure 62-90. The proposed route is largely near or adjacent to the existing transmission line ROW to minimize impacts to the human and natural environments. Approximately 0.3 miles of the proposed route is on Company property or within the existing transmission line ROW. The remaining 0.7 miles of the proposed route will require new or supplemented ROW to terminate into the new 138-kV bays at the Abingdon Substation and avoid buildings that are within the existing ROW. The proposed route is further described in Section V of the Response to Guidelines and depicted in Exhibit 13.

Q: PLEASE DESCRIBE TO THE COMMISSION THE FILING CORRIDOR USED FOR THE PROPOSED ROUTE?

A: A typical 100-foot-wide ROW will be sited within an approximately 300-foot-wide filing corridor, which may be expanded up to 500 feet in one area as shown in Exhibit 3 (the

"Filing Corridor"). Based on the preliminary engineering analysis to date, the Company believes that the proposed route is the most suitable alignment; however, the Company requests the flexibility to shift the centerline up to 100 feet from the centerline. The Filing Corridor is expanded near the Abingdon Substation to allow coordination with affected landowners and address changes needed based on additional surveys and detailed engineering. The final line route and structure locations will be determined during detailed engineering and after additional studies including, but not limited to, ground surveys, geotechnical and environmental studies, and additional interviews with landowners are completed.

Q: ARE THERE ANY CONSERVATION EASEMENTS OR AREAS CROSSED BY THE PROJECT?

A: No conservation easements were identified between the Project end points and none are crossed by the proposed route.

Q: WILL THE PROJECT CROSS ANY NATIONAL REGISTER OF HISTORIC PLACES SITES?

A: No. As discussed in the Pre-Application Analysis of Cultural Resources which is included in the Company's Application, there are no designated National Historic Landmarks within 1.5 miles of the Project; no properties listed in the National Register of Historic Places, no historic landscapes, and no battlefields located within 1.0 mile of the Project; and no properties that have been determined eligible for listing in the National Register of Historic Places located within 0.5 mile of the Project.

Q. WILL STUDIES FOR FEDERALLY OR STATE PROTECTED SPECIES BE COMPLETED?

A. Where applicable, habitat assessments and/or species-specific surveys will be conducted prior to construction of the Project to identify, avoid, and/or mitigate to the extent practical potential impacts to federally or state protected species. During detailed engineering, Appalachian will coordinate with applicable federal and state agencies to determine appropriate surveys.

Compliance with regulations and laws relating to protected species is of high importance to Appalachian and POWER. Accordingly, POWER prepared the VDEQ Supplement to facilitate review and analysis of the Project by the VDEQ and other relevant agencies. Based on the available data, it is anticipated that the Project will not result in significant impacts to any protected species.

Q: DOES THIS CONCLUDE YOUR TESTIMONY?

A: Yes.

SECTION I. NECESSITY FOR THE PROPOSED PROJECT

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

Response:

Appalachian Power Company ("Appalachian" or "Company"), an affiliate of American Electric Power Company, Inc. ("AEP"), adheres to the transmission reliability criteria defined in AEP's FERC Form 715 filing (the "AEP Criteria"), which includes the contingency categories defined in NERC Reliability Standard TPL-001-4. AEP is a member of the Regional Transmission Organization ("RTO") PJM Interconnection L.L.C. ("PJM"). To ensure that the regional transmission system owned by its members can reliably meet the projected demand of the customers served by that system, PJM conducts an ongoing Regional Transmission Expansion Plan ("RTEP") study process. RTEP studies are conducted on a five-year-out, "top-down" basis and involve an exhaustive review of all PJM bulk electric system facilities (including AEP's transmission facilities of 138-kilovolts ["kV"] and greater) for compliance with applicable reliability criteria. AEP also conducts an exhaustive parallel, "bottom-up" assessment of its entire transmission system (including sub-138-kV facilities) using PJM's RTEP models to ensure that its system continues to comply with the AEP Criteria under projected future conditions.

The proposed Abingdon 138-kV Substation Transmission Project (the "Project") supports the Abingdon area of Virginia and additional loads served from other substations in Washington County, Virginia. Today, the 69-kV network in the Abingdon area is ultimately sourced from the 138-kV substations at Clinch River, Wolf Hills, and Saltville, as shown in **Exhibit 1**, Project Area Map. The Clinch River Substation serves the Abingdon Substation, which feeds into the South Abingdon Substation and steps down to the 69-kV network; the Wolf Hills Substation directly serves the South Abingdon Substation where it steps down to 69-kV; and the Saltville Substation steps down to 69-kV to serve the 69-kV network. Under certain contingency scenarios described in detail below, the Company can lose two of these three sources to the area, which leaves the 69-kV network in a radial configuration. Moreover, in the scenarios described below, the 69-kV network at times may be serving load on the 138-kV network at the Abingdon and South Abingdon Substations. This puts a lot of stress on that 69-kV network and, because of the small conductor size on some sections of line, these lines will overload.

Using the 2027 summer and winter cases developed by PJM in the 2022 RTEP, AEP's assessment identified thermal and voltage violations of the AEP Criteria on several 69-kV sub-transmission facilities under certain N-1-1 contingencies in the Abingdon area. The violations occur on facilities serving the Company's customers located in the Abingdon Load Area (~140 megavolt ampere ["MVA"] summer and ~240 MVA winter)

shown on the figure below, which is in Washington and Smyth Counties and the Town of Abingdon.

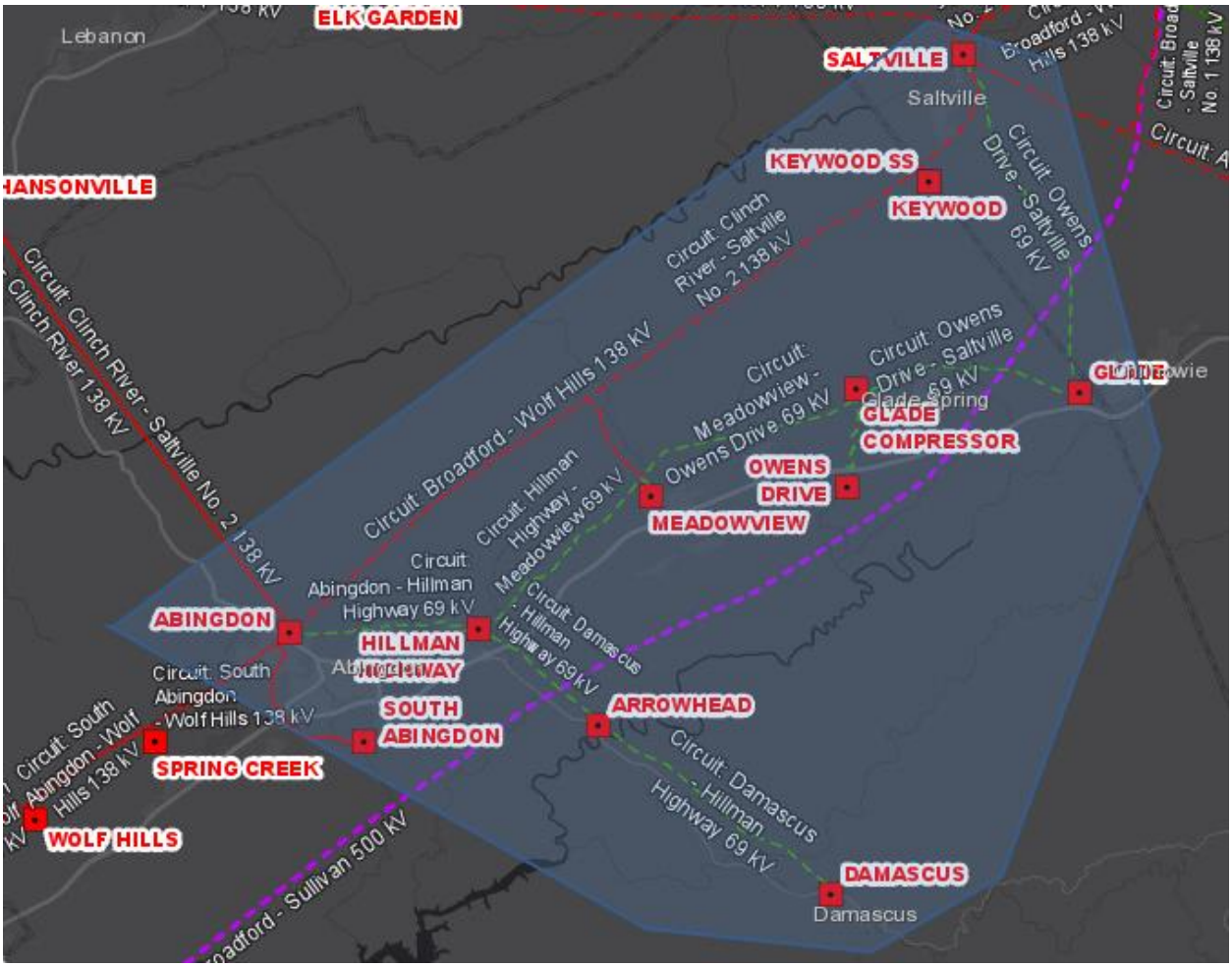


Figure I-1
Abingdon Load Area (Current System Configuration)

The first N-1-1 contingency scenario involves the loss of the North Bristol – Wolf Hills 138-kV Circuit and the Abingdon – South Abingdon 138-kV Circuit, which causes a thermal violation on the Arrowhead – Hillman Highway 69-kV circuit section.

The second N-1-1 contingency scenario involves the loss of the Abingdon – Clinch River 138-kV Circuit and the South Abingdon – Wolf Hills 138-kV Circuit, which causes a thermal violation on the Arrowhead – Hillman Highway 69-kV circuit section. That contingency also causes voltage violations on the 69-kV system in the area at the Arrowhead, Damascus, Hillman Highway, and South Abingdon 69-kV Substations.

The foregoing contingency scenarios and resulting violations of the AEP Criteria are described in more detail in Section I.D. below.

To address the criteria violations, the Company is seeking the Virginia State Corporation Commission's ("SCC" or "Commission") approval for the following improvements (collectively, the "Project" or the "baseline work" unless otherwise noted):

- Terminate (connect) the existing Broadford – Wolf Hills 138-kV Circuit into the existing Abingdon Substation, resulting in two new circuits and sources for the Abingdon Substation. The existing circuit currently bypasses the Abingdon Substation.

- Improvements at the existing Abingdon Substation—including four new 138-kV circuit breakers, new bays, associated disconnect switches, and new bus work—to bifurcate the existing circuit and provide additional protection and controls. The improvements require a small expansion of the substation fenced area within Appalachian property.

- Transmission line work between existing structure 62-83 and existing structure 62-90. This includes a rebuild of approximately one mile of the existing double-circuit Saltville – Kingsport 138-kV Transmission Line asset between existing structure 62-84, east of the Abingdon Substation, and existing structure 62-89, west of the Abingdon Substation. The spans of existing conductor from structures 62-83 and 62-90 will be reconnected to proposed structures 62-84A and 62-89A, respectively. The proposed rebuild is within, parallel to, or near the existing right-of-way ("ROW").

- Reconnect two transmission lines that tap off the Saltville – Kingsport 138-kV Transmission Line to maintain service to the Clinch River, Hansonville, and South Abingdon Substations. The existing conductor from the Clinch River – Abingdon 138-kV Transmission Line will be reconnected to proposed structure 62-85A. New conductor will be installed on the South Abingdon 138-kV Extension Transmission Line to reconnect to proposed structures 62-87A and 62-87B.

- Relocate the existing Abingdon 34.5-kV/138-kV Bus Tie #3 138-kV Transmission Line to make space for the new substation bays. The existing single-span bus tie will be attached to proposed structure 62-86A to connect the 34.5-kV and 138-kV substation yards.

Additionally, see **Confidential Exhibit 2-C**, which shows the existing and resulting proposed circuit configurations.

Other future and existing work (see **Exhibit 1**) in the Project area for which the Company is not seeking the Commission's approval in this Application is provided below for context:

- Future Project: Excluding this Project's proposed rebuild of the existing Saltville – Kingsport 138-kV Transmission Line between existing structure 62-84 and existing structure 62-89, the Company plans to file a separate application in 2025 for approval to rebuild the remaining approximately 25 miles of the 138-kV transmission line between the Saltville and Wolf Hills Substations due to independent asset renewal

needs. The proposed Project is designed to connect to this future rebuild to avoid any wasteful duplication.

- Existing Project: Construction of the new Arrowhead – South Abingdon 69-kV Transmission Line located in Washington County. This work also includes the reconfiguration of the Arrowhead 69-kV Extension Transmission Line and the retirement of the Abingdon – Hillman Highway 69-kV Transmission Line. The construction of the Arrowhead – South Abingdon 69-kV Transmission Line and Arrowhead 69-kV Extension Transmission Line will be completed during the winter of 2024. The removal of the Abingdon – Hillman Highway 69-kV Transmission Line will be completed in the summer of 2025. Appalachian has received local approval for this work and does not intend to file an application with the Commission.

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

Response:

The Project is required to address the reliability criteria violations (detailed in **Sections I.A.** and **I.D**. of this Response to Guidelines). Reliability criteria violations are identified through the PJM RTEP process, which is governed by PJM Manual 14b and AEP's transmission planning requirements as defined in AEP's FERC Form 715 Part 4. The PJM manual describes the base case building procedure used to develop load flow models where the reliability criteria violations were identified. This procedure includes all known projects at the time of the base case build for the entire PJM region, including any such projects located in the Abingdon Load Area. As of the filing date of this Application, there are no future projects not already in service in the Abingdon Load Area that need to be included in the base case used to identify the reliability criteria violations detailed in **Sections I.A.** and **I.D.** of this Response to Guidelines.

The Project is located in the southwestern part of Appalachian's service territory near the Town of Abingdon and encompasses the Company's transmission facilities serving commercial and residential loads in Washington County.

The Project addresses the identified baseline needs in the following ways:

- Establishes the Abingdon – Broadford 138-kV Circuit and Abingdon – Wolf Hills 138-kV Circuit, which creates two new 138-kV sources to the Abingdon area and the 69-kV network downstream.

- Provides redundancy to the transmission network at the Abingdon Substation to withstand the various N-1-1 contingencies described above without causing thermal or voltage violations in the area.

- Improves operational flexibility for scheduling maintenance outages on the area transmission network by installing appropriate sectionalizing to better withstand planned and unplanned system outages.

C. Describe the present system and detail how the proposed project will effectively satisfy present and projected future electrical load demand requirements. Provide pertinent load growth data (at least five years of historical summer and winter peak demands and ten years of projected summer and winter peak loads where applicable). Provide all assumptions inherent within the projected data and describe why the existing system cannot adequately serve the needs of the Applicant (if that is the case). Indicate the date by which the existing system is projected to be inadequate.

Response:

The present-day Project area transmission system depends on the Abingdon Substation, which is supported by two primary 138-kV sources from the Clinch River and Wolf Hills Substations via the South Abingdon Substation. The N-1-1 contingency scenarios described above result in losing both sources into the Abingdon Substation and create a scenario where all the load served out of both the Abingdon and South Abingdon Substations is radialized and forced to be served from the 69-kV network. This causes a significant amount of power to flow from the Meadowview 138/69-kV transformer down the 69-kV network, through the Arrowhead – Hillman Highway 69-kV circuit section and then back up to the South Abingdon 138/69-kV transformer, to serve the load at both the Abingdon 138-kV and South Abingdon 138-kV Substations. This scenario causes multiple voltage criteria violations at the 69-kV and 138-kV buses as well as a thermal violation on the Arrowhead – Hillman Highway 69-kV circuit section.

Terminating (connecting) the Broadford – Wolf Hills 138-kV Circuit into the Abingdon Substation will provide additional 138-kV sources to the Abingdon Substation and eliminate all the reliability criteria violations for the facilities under the projected future load conditions (**Figure I-2**, **Confidential Figure I-3-C**).

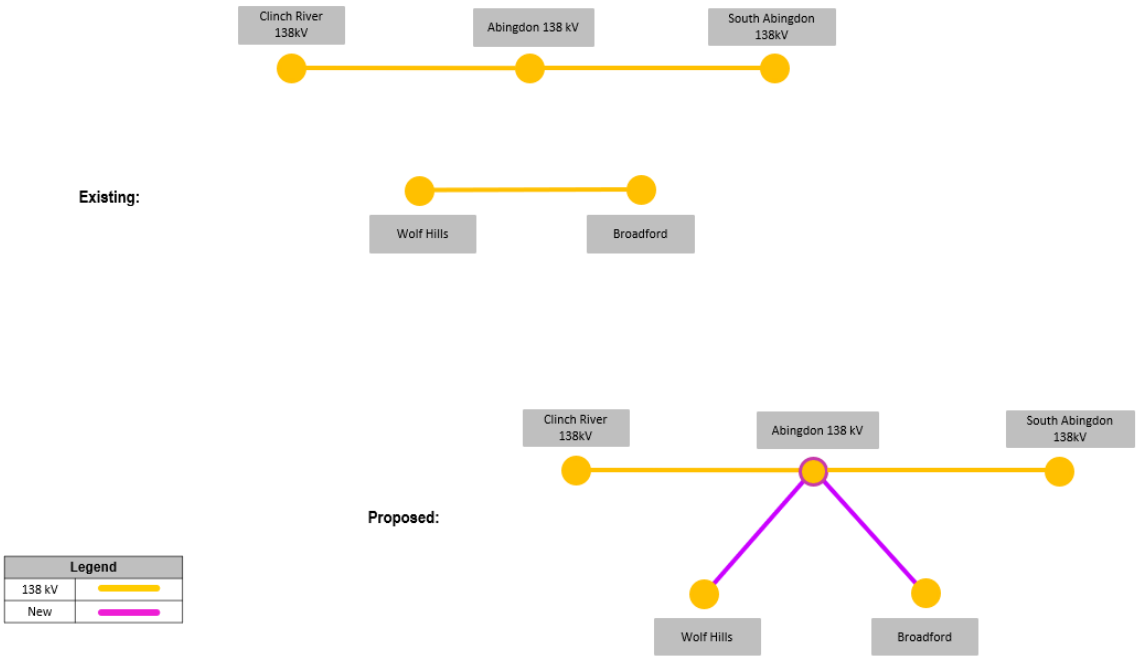


Figure I-2
Existing and Proposed Circuit Configurations at the Abingdon, Clinch River, South Abingdon, Wolf Hills, and Broadford Substations

AEP developed a load forecast for the Abingdon Load Area using an econometric model that forecasts peak demand. This model had explanatory variables for the real personal income per capita product for the Abingdon Statistical Area; the combined, minimum and maximum temperatures on the day of the peak; and binary variables. The Abingdon Load Area is winter peaking. The model used historical data from the winter of 2013/14 through the summer of 2023. Real personal income and population forecast data were obtained from Moody's Analytics. AEP developed forecasts of maximum and minimum temperatures on the day of the peak from an average of historical temperatures.

Tables I-1 and **I-2** and **Figures I-4** and **I-5** show historical and projected summer and winter peak loads for the Abingdon Load Area. These figures show the actual summer and winter peak loads for the previous ten years and the projected summer and winter peak loads for the next ten years.

Abingdon Load Area

	Actual Peak Load (MW)										Projected Peak Load (MW)									
Summer Peak	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
	132.9	135.6	143.8	133.4	136.4	131.2	141.1	145.3	141.9	135.8	139.0	140.4	142.4	144.9	147.8	150.4	152.9	154.9	156.9	158.9

Table I-1
Historical and Forecasted Summer Peak Load Data

Abingdon Load Area

	Actual Peak Load (MW)										Projected Peak Load (MW)									
Winter Peak	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
	259.9	265.2	204.7	193.4	228.9	207.7	187.3	191.9	189.9	241.6	221.7	221.5	223.6	225.8	228.6	231.3	233.9	236.1	238.1	240.1

Table I-2
Historical and Forecasted Winter Peak Load Data

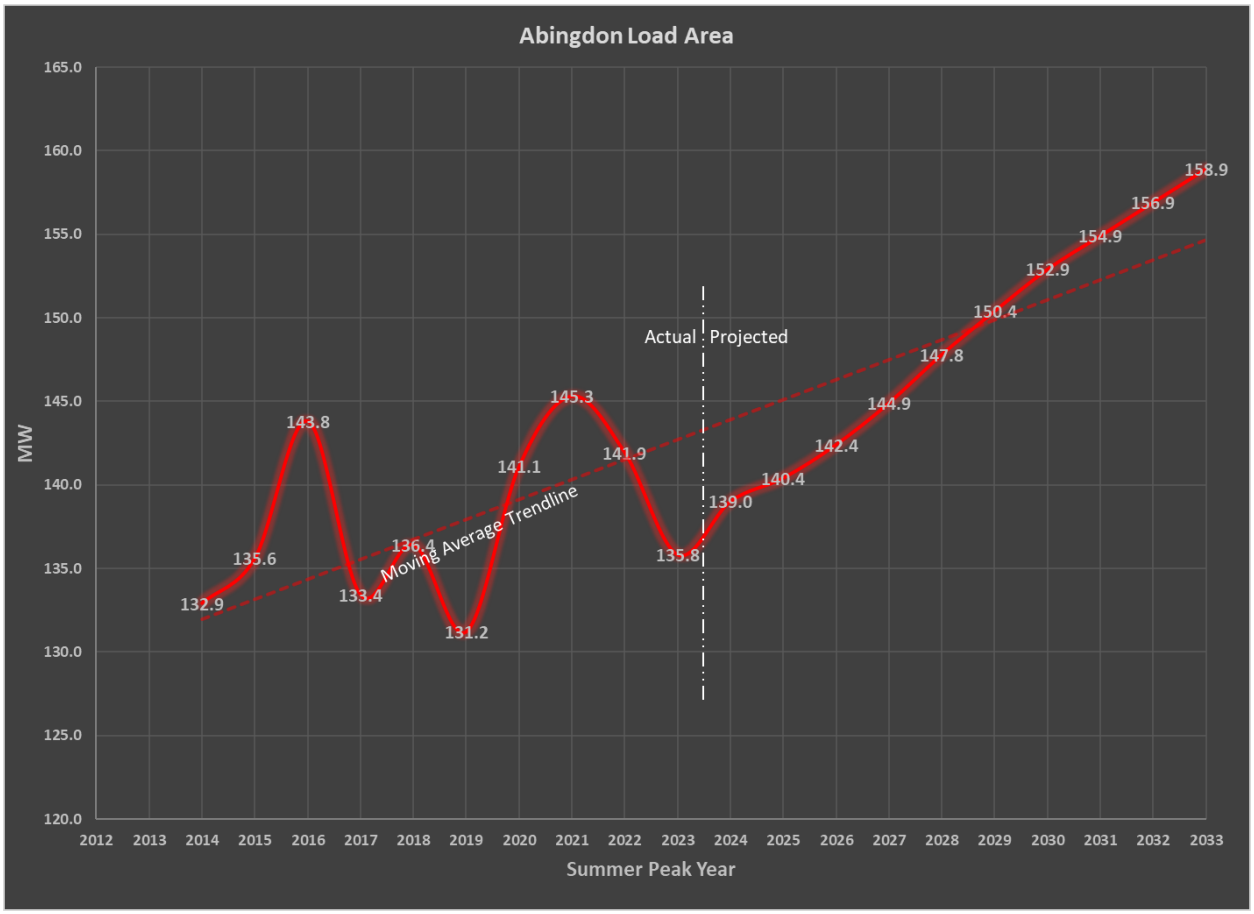


Figure I-4
Abingdon Load Area
Historical and Forecasted Summer Peak Load Data

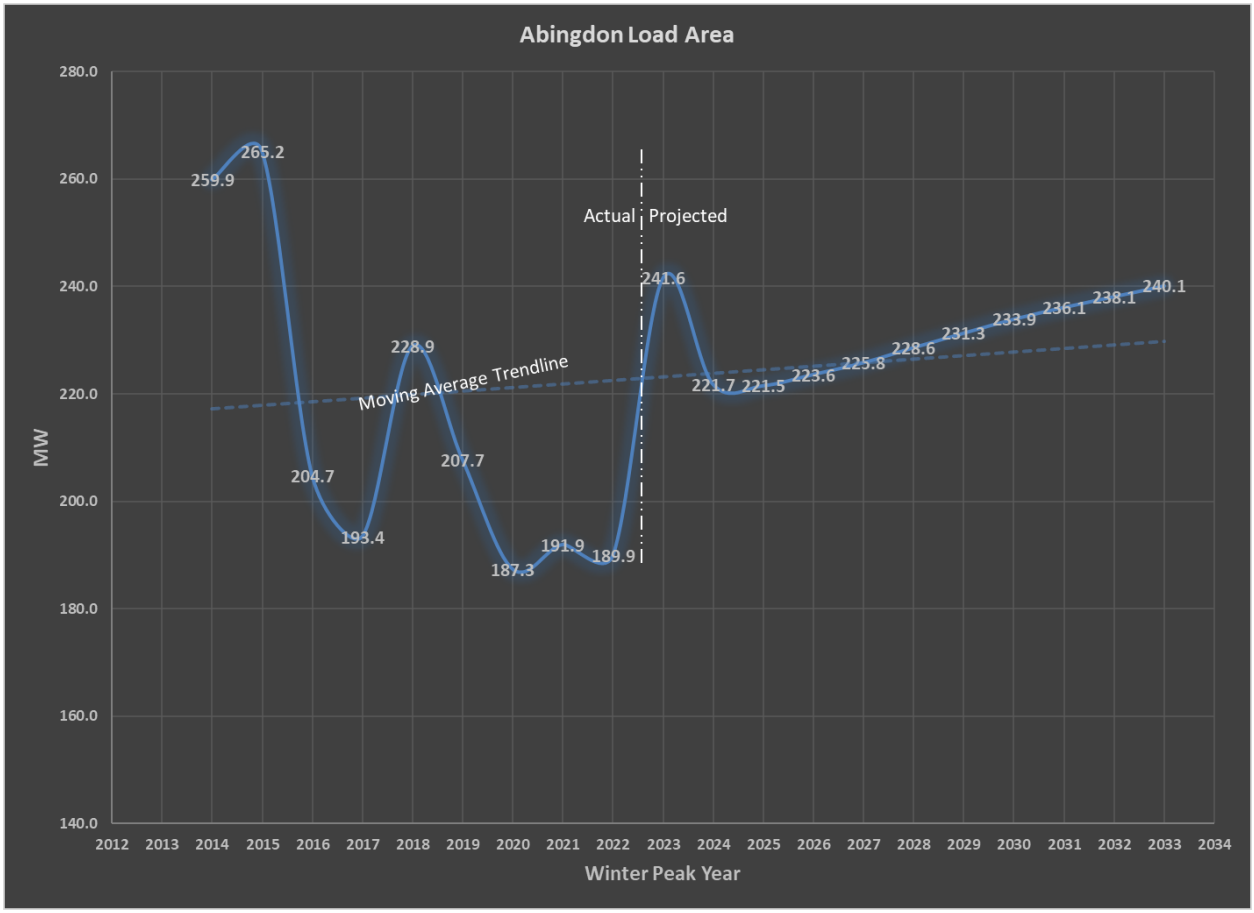


Figure I-5
Abingdon Load Area
Historical and Forecasted Winter Peak Load Data

The Abingdon Load Area summer and winter peak demand are anticipated to grow at an average annual rate of approximately 1.0% over the course of the next ten years, beginning in 2024.

D. If power flow modeling indicates that the existing system is, or will at some future time be, inadequate under certain contingency situations, provide a list of all these contingencies and the associated violations. Describe the critical contingencies including the affected elements and the year and season when the violation(s) is first noted in the planning studies. Provide the applicable computer screenshots of single-line diagrams from power flow simulations depicting the circuits and substations experiencing thermal overloads and voltage violations during the critical contingencies described above.

Response:

Using the 2027 summer and winter cases developed by PJM in the 2022 RTEP, AEP's assessment identified thermal and voltage violations of the AEP Criteria on several 69-kV sub-transmission facilities serving Appalachian's customers located in the Abingdon Load Area shown in **Figure I-1** above.

Two critical N-1-1 contingency scenarios cause voltage deviation violations (voltage deviations of 8% or more), low voltage magnitude violations (substation voltages lower than 0.92 per unit), and thermal loading violations (loading exceeds the facility's emergency thermal rating) in the Abingdon Load Area. AEP considers these outage scenarios critical because they cause thermal and voltage violations on the 69-kV system serving the Abingdon Load Area.

The N-1-1 contingency scenario in the 2027 summer RTEP case involving the loss of the North Bristol – Wolf Hills 138-kV Circuit and the Abingdon – South Abingdon 138-kV Circuit resulted in a thermal violation on the Arrowhead – Hillman Highway 69-kV circuit section. See **Confidential Figure I-6-C** in Volume 2: Confidential Appendix.

The N-1-1 contingency scenario in the 2027 winter RTEP case involving the loss of the Abingdon – Clinch River 138-kV Circuit and the South Abingdon – Wolf Hills 138-kV Circuit resulted in a thermal violation on the Arrowhead – Hillman Highway 69-kV circuit section and voltage violations at the following buses: Arrowhead, Damascus, Hillman Highway, and South Abingdon. See **Confidential Figure I-7-C** in Volume 2: Confidential Appendix.

E. Describe the feasible project alternatives, if any, considered for meeting the identified need including any associated studies conducted by the Applicant or analysis provided to the RTO. Explain why each alternative was rejected.

Response:

As an alternative solution to address the identified reliability criteria violations, Appalachian considered the following: (1) rebuild approximately 3.6 miles of the Arrowhead – Hillman Highway 69-kV circuit section, and (2) install a new 34.6 MVAR capacitor bank at the South Abingdon Substation.

Although the alternative solution would address the identified reliability criteria violations on the transmission system serving the Abingdon Load Area, this option was not chosen because it does not provide the added benefit of supplying the Abingdon area with the additional 138-kV sources that the proposed Project would provide. Both options are comparable in cost so long as we exclude the portion of work associated with the Saltville – Kingsport 138-kV Transmission Line that will be addressed as part of this project off-setting the need to do that work in the future transmission line rebuild project between the Saltville and Wolf Hills Substations. See description of future projects referenced above in Section I.A.

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

Response:

No facilities are being removed, replaced, or taken out of service.

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

Response:

See **Exhibit 1, Project Area Map**.

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

Response:

The desired in-service date of the proposed project is June 1, 2027.

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

Response:

Functional estimated substation related cost is approximately $6.6 million.

Functional estimated transmission line related cost is approximately $13.5 million.

Estimated total cost of the Project is approximately $20.1 million.

Estimated conceptual cost for the alternative is approximately $13.3M. See explanation of estimated cost of the alternative in Section 1.E. above.

J. If the proposed project has been approved by the RTO, provide the line number, regional transmission expansion plan number, cost responsibility assignments, and cost allocation methodology. State whether the proposed project is considered to be a baseline or supplemental project.

Response:

The proposed Project is baseline and has been assigned PJM project number b3735.

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

Response:

Not applicable.

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

Response:

Not applicable.

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

1. The full name of the NUG as it appears in its contract with the utility and the dates of the initial contract and any amendments;

2. A description of the arrangements for financing the facilities, including information on the allocation of costs between the utility and the NUG;

3. a. For Qualifying Facilities ("QFs") certificated by FERC order, provide the QF or docket number, the dates of all certification or recertification orders, and the citation to FERC Reports, if available;

b. For self-certified QFs, provide a copy of the notice filed with the FERC;

4. In addition to the information required in 3a or 3b, provide the project number and project name used by the FERC in licensing hydro-electric projects, also provide the dates of all orders and citations to FERC Reports, if available; and

5. If the name provided in 1 above differs from the name provided in 3 above, give a full explanation.

Response:

Not applicable.

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

Response:

No new substations, switching stations, or other facilities are being proposed as part of this Project.

SECTION II. DESCRIPTION OF THE PROPOSED PROJECT

A. ROW

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

Response:

The proposed route for the portion of the Saltville – Kingsport 138-kV Transmission Line that will be rebuilt as part of the Project is approximately one mile long and is on Company property or near the existing ROW. The proposed route for the rebuild begins near existing structure 62-84, which is northeast of the Company's existing Abingdon Substation, and ends near existing structure 62-89, which is southwest of the Abingdon Substation in Washington County, Virginia. The proposed filing corridor is typically 300 feet wide, though may be expanded up to 500 feet wide, within which the 100-foot-wide ROW will be located in depending on final engineering, and includes the areas between existing structures 62-83 and 62-90 on the Saltville – Kingsport 138-kV Transmission Line, existing structures 71-84/71 and 71-84/72 on the Clinch River – Abingdon 138-kV Transmission Line, and existing structures 62-87 and 1192-1 on the South Abingdon 138-kV Extension Transmission Line to allow the proposed rebuild portion of the transmission line to be reconnected to the existing tap lines. The width of the ROW may be more than 100 feet wide depending on safety, engineering, or operational requirements.

No viable alternative routes were identified that would address the needs of the Project as well as minimize impacts to the human and natural environments. The Project must connect to the Abingdon Substation and two existing transmission lines, which limits the opportunities for alternative routes. The route development process for the Project is described in detail in **Section II.A.9** of the Response to Guidelines.

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

Response:

A Project Area Map is attached as **Exhibit 1**. Detailed GIS constraints mapping

illustrating the Project in relation to existing facilities, various resources, and sensitive features is attached as **Exhibit 3**. A shapefile of the proposed route will be provided electronically to the Commission along with the Application.

In locations where the Project will be rebuilt in new ROW, it is anticipated that the unused portion of the existing ROW will be quitclaimed or otherwise relinquished as part of a supplemental agreement with the landowner.

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

   Response:

   See **Exhibit 3**, GIS Constraints Map.

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

   Response:

   A portion of the proposed route (0.3 miles) will be constructed on Company property or largely within the existing transmission line ROW. Approximately 0.7 miles of the proposed route is within new or supplemental ROW to accommodate the improvements at the Abingdon Substation, including expanding the 138-kV substation yard, and installing four new circuit breakers and all associated buswork and structures. New ROW is also required to avoid a commercial building that is within the existing ROW at the United States ("U.S.") Route 58 Alternate/ U.S. Route 19 (Porterfield Highway) crossing.

   The Company's ROW agents have spoken with and/or met with each landowner affected by the Project to discuss the proposed route and new or supplemental easements that may be needed. The Company has obtained permission to survey from all affected landowners.

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

    a. **ROW width for each cross-section drawing.**

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

    c. **Existing utility facilities on the ROW.**

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

    Response:

    (a-c) See **Exhibits 4** and **5** for the typical existing ROW cross sections.

    (d) See **Exhibits 6** through **8** for the proposed ROW cross sections.

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

    Response:

    The portions of the proposed route that are subject to existing or supplemental easements and those where new easements will be required are described below:

    - Between proposed structure 62-84A and the Abingdon Substation and between the Abingdon Substation and proposed structure 62-86C, the Project will be constructed on Appalachian-owned property and no new easements are needed.

    - Between proposed structures 62-86C and 62-86D, new easements will be needed. Based on preliminary engineering, the Company will seek to obtain new ROW easements from two landowners and to supplement the existing easement from one property owner for the relocation of the transmission line.

    - Between proposed structures 62-86D and 62-89A, the Company plans to supplement the existing easements or obtain new easements unless the existing easements allow for the relocation of the transmission line.

    The ROW for the Project will generally be 100 feet wide in areas of new, supplemental, or existing easements. In some locations, the ROW width will be increased as needed to comply with safety requirements. This typically occurs where long-span conductors are displaced beyond the typical ROW width during extreme weather conditions.

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

Response:

The following are the Company's typical transmission line ROW clearing, restoration, and maintenance practices. Case-by-case exceptions are considered to address sensitive environmental areas/features and/or property owner requests while maintaining Company and NESC safety clearances and complying with North American Electric Reliability Corporation requirements.

ROW Clearing

a. In areas with 125 feet or more vertical (conductor-to-ground) design clearance, the ROW is typically not cleared, except in the following instances:

    - Trees with less than 25 feet clearance from the conductor (at maximum sag conditions) will be removed.
    - Where a conductor stringing path is specified.
    - Where wire setup areas and other work areas are required.

b. In locations with less than 125-foot vertical clearance from conductor (at maximum sag conditions) to ground, all woody stemmed vegetation will be removed to the appropriate ROW width, leaving the cleared area of the ROW populated with grasses and herbaceous growth.

c. Cutting vegetation will be done by either manual or mechanical methods. Worker safety is first and foremost in determining a method; land use and landowner preference may influence the method utilized. Factors influencing safety include terrain, access, tree height, etc. Manual clearing involves the use of contract personnel using chain saws to cut vegetation. Mechanical clearing includes mowers, feller-bunchers, and other heavy operator-run equipment. Mechanical pruning operations employ a variety of configurations of boom-mounted saws mounted on vehicles capable of traversing the ROW. In very difficult terrain or inaccessible areas (high safety-risk areas), an aerial saw may be employed for side trimming the ROW.

d. Where reasonable and practical, the Company will utilize selective clearing methods to retain low-growth shrubs and herbaceous vegetation within:

    - Fifty feet of all year-round streams, ponds, or wetlands and will undertake erosion control measures where necessary.
    - Fifty feet of road crossings.
    - Twenty-five feet of karst features and outcrops of limestone or dolomite rock.

e. Trees will be felled in a manner to minimize damage to crops, fences, and other facilities.

f. Where tree pruning is required, standards established by the International Society of Arboriculture, the American Standards Institute, and the Tree Care Industry Association will be used together with best management practices.

g. Logs, including fallen timber, may be left in tree lengths, log lengths, or as otherwise designated by the property owner. The property owner will retain ownership of all logs and may dispose of them by commercial sale, use them as firewood, or provide them for use as firewood by others. If the property owner does not want to retain ownership and wants the logs removed, the Company will dispose of them in a suitable location.

h. The disposal by the Company of all trees, brush, and slash will, where possible, be consistent with property owner preferences, wildlife values, and particular site conditions. Typical disposal methods consist of one or more of the following:

- Windrowing — the cut material will be laid in parallel rows along either or both sides of the ROW. This is the preferred method where slopes are 30% or less.

- Chipping — woody vegetation will be chipped and either scattered over the ROW area or disposed of in a suitable location. Logs will be windrowed (i.e., laid in parallel rows) on either or both sides of the ROW, as designated. The ROW must be accessible to chipping equipment for this option to be viable.

- Let Lie — the cut material will be left in a scattered manner over the ROW area. This is recommended where slopes exceed 30% to reduce erosion and otherwise minimize impact on soils. All woody vegetation will be lopped and scattered so that it lays as close to the ground as practical, but not to exceed two feet in height. This will accelerate the decomposition of this material and will improve the aesthetic impact by allowing more rapid vegetation coverage of the cut material.

i. All clearing debris will be kept out of streams, ponds, and other water areas, wetlands, pastures, and fields.

<u>ROW Restoration</u>

a. Where stream banks are disturbed, they will be restored (i.e., by planting herbaceous vegetation, where necessary) to prevent bank erosion.

b. The Company will take measures to drain and stabilize the surfaces of all construction roads both during construction and during future line maintenance phases.

c. Restoration, including temporary and permanent seeding, will be coordinated with the construction activities to ensure that revegetation and soil stabilization are achieved at the earliest practical time. Following construction, all structure sites, construction/wire stringing sites and access roads will be seeded with a suitable grass seed mixture.

d. Revegetation techniques will, where possible, seek to enhance the ROW for wildlife food and habitat.

e. Qualified personnel will perform all permanent reseeding and revegetation.

f. Fences and gates will be kept in sufficient state of repair to confine livestock satisfactorily and gates will be kept closed when not in immediate use. All fences cut or damaged will be restored to a condition as good as, or better than, the condition as found. Where frequent access is required, gates will be installed at no cost to the property owner.

ROW Maintenance

g. All herbicides used will be applied in accordance with applicable state and federal laws and regulations.

h. All herbicides used shall be registered with the United States Environmental Protection Agency and with the Virginia Department of Agriculture and Consumer Services. Herbicides will be used in accordance with label and manufacturer directions.

i. All herbicide applications will be performed under the direct supervision of certified applicators.

j. Regarding herbicide applications:

- Herbicides will not be applied when rainfall is imminent, during rainfall or within one day of large rain events (usually greater than 1.0 centimeter) that result in soil moisture capacity occurring above field capacity.

- Buffer zones will be maintained and used in accordance with herbicide label and manufacturer directions around streams, ponds, springs, wetlands, water supply wells, channelized drainage ways (e.g., perennial or intermittent), and karst features.

Long-term ROW Maintenance Plan

The Company will implement a comprehensive vegetation management program designed to ensure that vegetation along each transmission line is managed at the proper time, and in the most cost-effective, environmentally sound manner. The plan will be reviewed periodically to ensure that the goals and objectives are addressed.

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

Response:

Under the existing, new, and/or supplemental transmission line easements, the property owner will generally retain the right to use the easement area for grazing, pasture lands, gardens, cultivated fields, driveways, parking, and bike and walking paths, or any other use that is not inconsistent with the Company's right to construct, operate, maintain, access, or remove its electric transmission line. The Company retains the right to clear and keep the easement clear of buildings and/or other obstructions together with the right to clear any woody vegetation within the ROW or which is adjacent to the ROW, but which may endanger the safe operation of the electric transmission line.

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

Response:

The Project's route development process is summarized below. The direct testimony of Company witness Fraser further discusses route development. Also, see Section V of the Response to Guidelines for a detailed description of the proposed route.

In general, the route selection process for transmission projects begins by forming a multidisciplinary team (the "Siting Team") to review the existing ROW and necessary reconfigurations to accommodate changes at substations. Using the existing ROW generally minimizes impacts on the natural and human environments. Specifically, this approach is consistent with Sections 56-46.1 and 56-259 of the Virginia Code, which provide that existing ROWs should be given priority when adding new transmission facilities, and which promote the use of existing ROW for new transmission facilities. The Company's engineers simultaneously review the operational constraints in the load area to determine when the circuits may be taken out of service to construct within the existing ROW. Outage windows often restrict the length of line that can reasonably be rebuilt within the existing ROW. Considering these constraints, the Siting Team identified routing options that accommodate the substation improvements, minimize new impacts to the natural and human environments, and reduce the duration of circuit outages.

The routing options were evaluated by the Siting Team considering stakeholder and

community input, site visit evaluations, and a comparative analysis process to identify the proposed route. No viable alternative routes were identified that would address the needs of the Project as well as minimize impacts to the human and natural environments; the Project must connect to the Abingdon Substation and two existing transmission lines, which limits the opportunities for alternative routes. The rationale for the proposed route is derived from accumulated siting decisions made throughout the process, Siting Team knowledge and experience, public and regulatory agency comments, and the comparative analysis of potential impacts. The proposed route is depicted in **Exhibit 3**.

Based on the information available, the proposed route does not cross any land managed by federal, state, or local agencies or conservation easements or open space easements qualifying under §§ 10.1-1009 – 1016 or §§ 10.1-1700 – 1705 of the Code (or a comparable prior or subsequent provision of the Code).

10. Describe the Applicant's construction plans for the project, including how the Applicant will minimize service disruption to the affected load area. Include requested and approved line outage schedules for affected lines as appropriate.

Response:

Project construction activities include the installation and maintenance of soil erosion and sedimentation control measures; access road construction; removal of the existing transmission line wire, structures, and foundations; foundation, structure, and wire installation; and the subsequent rehabilitation of all areas disturbed during construction. All required environmental compliance permits and studies will be completed, and a stormwater pollution prevention plan will be developed and implemented under the state's "General Permit for Discharges of Stormwater from Construction Activities." The Company estimates that it will take approximately two years to engineer, procure material, and build the Project. The desired in-service date of the Project is June 1, 2027.

Where the proposed route is located within the existing ROW, circuit outages are needed on the Clinch River – Saltville No. 2, Broadford – Wolf Hills, Abingdon – Clinch River, Abingdon – South Abingdon, and South Abingdon – Wolf Hills 138-kV circuits to remove and rebuild the transmission line, as well as on the Abingdon 34.5-kV/138-kV Bus Tie at the Abingdon Substation. Circuit outages are also required to construct any portion of the proposed route that crosses the existing 138-kV transmission line.

To minimize service disruptions to the Abingdon Load Area, the Company plans to construct portions of the line that are in new ROW "in the clear" prior to beginning the circuit outage in each section ("in the clear" work can be safely completed without an outage on an existing transmission circuit). Following the Commission's approval of the Project, engineering, RTO outage approvals, and ROW acquisition, the estimated construction sequence can be summarized briefly as follows (refer to **Confidential Exhibit 9-C**, Construction and Outage Sequence):

1. Begin work between the South Abingdon tap structures 62-87A and 62-87B and the Abingdon Substation, performing any in the clear work and time-sensitive foundation installations prior to the outage.

2. Take an outage on the Broadford – Wolf Hills 138-kV Circuit (section between Saltville and Wolf Hills) and the South Abingdon – Wolf Hills 138-kV Circuit (section between Spring Creek and South Abingdon) to construct between structures 62-87A and 62-87B and structure 62-89A.

3. Construct temporary structures near South Abingdon tap structures 62-87A and 62-87B and then re-energize the South Abingdon – Wolf Hills 138-kV Circuit.

4. Maintain an outage on the Broadford – Wolf Hills 138-kV Circuit; take an outage on the Clinch River – Saltville No. 2 138-kV Circuit. Construct the spans between structure 62-84A and the Abingdon substation. Re-energize the new Abingdon – Broadford 138-kV Circuit (keep remaining portion of the existing Broadford – Wolf Hills 138-kV Circuit between Abingdon and Wolf Hills de-energized).

5. Take an outage on the Abingdon – Clinch River 138-kV and Abingdon – South Abingdon 138-kV Circuits to remove existing structures and construct between Clinch River tap structure 62-85A and South Abingdon tap structures 62-87A and 62-87B. Re-energize the Abingdon – Clinch River 138-kV Circuit into the new bay position at the Abingdon Substation. Re-energize the Clinch River – Saltville No. 2 138-kV Circuit.

6. Take an outage on the South Abingdon – Wolf Hills 138-kV Circuit (between Spring Creek and South Abingdon). Make final jumper connections at South Abingdon tap structures 62-87A and 62-87B and remove temporary structures. Construct final structure inside the Abingdon Substation and make final connections at the Abingdon Substation. Re-energize the Abingdon – South Abingdon and South Abingdon – Wolf Hills 138-kV Circuits; energize the new Abingdon – Wolf Hills 138-kV Circuit.

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

Response:

Protecting environmental resources such as natural, historic, scenic, and recreational values is of high importance to the Company. The siting and construction phases of the Project will follow the above-referenced guidelines to the extent practical. For a detailed discussion of the attention given to environmental resources and siting process used for this Project, see **Section III** of this Response to Guidelines and the Virginia Department of Environmental Quality ("VDEQ") Supplement.

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

Response:

The Project is in Washington County, which is in the southwestern part of Appalachian's certificated service area. The Project will not be located outside of Appalachian's certificated service area, and will not cross any other electric utility's facilities.

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

Response:

The Company will provide a digital copy of the VDOT General Highway Maps for Washington County to the Commission Staff with this Application in lieu of providing three hardcopies. Reduced copies of these maps are included as **Confidential Exhibit 10-C** to this Application. These maps include the proposed Project and the Company's existing high-voltage transmission facilities.

B. Line Design and Operational Features

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

Response:

The proposed rebuild of the Saltville – Kingsport 138-kV Transmission Line between existing structures 62-84 and 62-89 will be a double-circuit transmission line, with each circuit composed of a three-phase design with a nominal phase-to-phase voltage of 138-kV. A voltage upgrade is not anticipated for the Project. The maximum load transfer capability of the new overhead conductor is 360 MVA (summer emergency rating) and 404 MVA (winter emergency rating). The overall ratings for each line section are provided in **Section I** of this Response to Guidelines.

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

Response:

The proposed three-phase 138-kV circuits will consist of 795,000 circular mils ("cmil") aluminum conductor steel reinforced ("ACSR") "Drake" conductors with 26/7 stranding (1.108-inch diameter). One conductor will be installed per phase. The circuit will typically be arranged in a vertical configuration with one circuit on each side of the structure.

The proposed double-circuit transmission line section will typically use one 7 #8 Alumoweld ground wire (0.385-inch diameter) and one 144-fiber, 0.646-inch diameter Optical Ground Wire ("OPGW") for lightning protection. The OPGW is composed of aluminum clad steel strands surrounding a stainless-steel tube containing fiber optic strands used for utility operations and communication.

The proposed conductors and ground wires were selected to meet the electrical requirements of the Project including load capacity, system stability, and efficiency. The mechanical strength and impacts on constructability are also considered in the selection process.

3. **With regard to the proposed supporting structures over each portion of the ROW for the preferred route, provide diagrams (including foundation reveal) and descriptions of all the structure types, to include:**

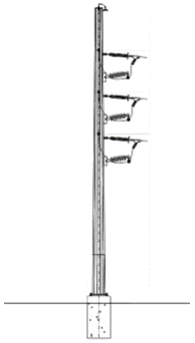
    a. **Mapping that identifies each portion of the preferred route.**
    b. **The rationale for the selection of the structure type.**
    c. **The number of each type of structure and the length of each portion of the ROW.**
    d. **The structure material and rationale for the selection of such material.**
    e. **The foundation material.**
    f. **The average width at cross arms.**
    g. **The average width at the base.**
    h. **The maximum, minimum and average structure heights.**
    i. **The average span length.**
    j. **The minimum conductor-to-ground clearances under maximum operating conditions.**

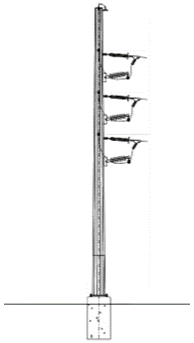
Response:

Final structure types will be determined during final engineering, which includes ground surveys and geotechnical studies. Nevertheless, based on preliminary engineering, the Company anticipates primarily using double-circuit lattice steel

towers and steel monopole structures for the rebuilt 138-kV transmission line. The Company plans to remove seven lattice steel towers. This includes six lattice steel towers on the Saltville – Kingsport 138-kV Transmission Line and one lattice steel tower (Structure 74-84/72) on the Clinch River – Abingdon 138-kV Transmission Line. Proposed structure types and quantities of installations can be found in **Table II-1** below. All values and figures in **Table II-1** below are approximations based on best available data until a detailed design has been finalized.

Table II-1
Proposed Structures

Structure Type	 **138-kV Lattice Tower** See **Exhibit 8**	 **138-kV Monopole w/ Davit Arms** See **Exhibit 7**	 **138-kV Monopole Dead-end** See **Exhibit 6**
a. Mapping that identifies each portion of the preferred route.	See **Exhibit 3**	See **Exhibit 3**	See **Exhibit 3**
b. Rationale for the selection of the structure type.	The proposed 138-kV lattice tower structure is best suited for medium to long spans in mountainous and agricultural areas.	The proposed 138-kV davit arm monopole structure is best suited for medium to long spans in developed or constrained areas.	The proposed 138-kV monopole dead-end structure is best suited for taps into substations, heavy line angle locations, and breaking wire tension.
c-1. Estimated number of each type of structure.	2	7	2
c-2. Estimated length of each portion of the ROW.	0.2 miles	0.75 miles	0.05 mile
d-1. Structure material.	Galvanized steel	Galvanized steel	Galvanized steel
d-2. Rationale for the selection of such material.	Galvanized steel was chosen for its durability and proven reliability in this region.	Galvanized steel was chosen for its durability and proven reliability in this region.	Galvanized steel was chosen for its durability and proven reliability in this region.

Structure Type	 **138-kV Lattice Tower** See **Exhibit 8**	 **138-kV Monopole w/ Davit Arms** See **Exhibit 7**	 **138-kV Monopole Dead-end** See **Exhibit 6**
e. Foundation material.	Four earth grillages will be installed per structure to an average depth of 12' or four drilled concrete piers per structure to an average depth of 20'.	Drilled concrete pier with an average depth of 30'. The typical concrete pier reveal height will be 1' above grade.	Drilled concrete pier with an average depth of 30'. The typical concrete pier reveal height will be 1' above grade.
f. Average width at cross arms.	27'	20'	N/A
g. Average width at the base.	35' Tower Width 4' Diameter Concrete Pier if earth grillages are not used	5' Diameter Pole 6' Diameter Concrete Pier	5' Diameter Pole 6' Diameter Concrete Pier
h-1. Approximate average height of structures (above ground).	125'	110'	110'
h-2. Approximate typical structure height range (above ground).	105' to 145'	95' to 130'	90' to 120'
i. Average span length.	500'	800'	200'
j. Minimum conductor-to-ground clearances under maximum operating conditions.	24'-7"	24'-7"	24'-7"

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

   Response:

   The anticipated heights of the proposed structures on the Project range between 86 and 145 feet, with an average structure height of 110 feet.

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

   Response:

   See **Exhibit 3**, GIS Constraints Map.

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

   Response:

   See **Exhibits 4** and **5** for photographs of existing structures, **Exhibits 6** to **8** for representations of proposed structures, and **Exhibit 11** for a photo simulation representing the proposed condition of the Project from U.S. Route 58 Alternate/U.S. Route 19 (Porterfield Highway). No eligible historic locations were identified within one mile of the proposed centerline; therefore, no additional simulations were prepared.

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

Response:

No new substations are included within the scope of the Project.

The Company proposes expanding the existing Abingdon Substation. The proposed substation work at the Abingdon Substation is described in more detail as follows. One-lines for the substation can be found in **Confidential Exhibit 12-C**.

The existing Abingdon 138-kV Substation will be expanded. The expansion area will be approximately 25 feet by 98 feet (2,450 square feet) and will be constructed on Appalachian property.

The Abingdon Substation expansion includes the following:

- Install four new 138-kV circuit breakers and associated disconnect switches.
- Install two new box bay structures and bus work.
- Install new cable trench to support the additional equipment.

See **Exhibit 12** for the substation location, layout, and photograph.

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

The VDEQ Supplement addresses scenic, environmental, and historic features associated with the Project. Brief responses to the Section III guideline questions are provided below, but for in-depth discussion of these issues, please refer to the VDEQ Supplement. A Project Area Map is included as **Exhibit 1**, and a more detailed GIS constraints map, which illustrates the various resources and sensitive features relative to the proposed Project, is included as **Exhibit 3**.

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

Response:

The Project will expand an existing substation on Appalachian-owned property and rebuild approximately one mile of the Saltville – Kingsport 138-kV Transmission Line between existing structure 62-84 and existing structure 62-89 on Company property or largely within the existing transmission line ROW. The Project area, crossed by several existing transmission lines, is characterized by rolling terrain in the Valley and Ridge Province of the Appalachian Mountains. Residential and commercial development are common throughout the Project area. The United States Geological Survey's National Land Cover Database ("NLCD") indicates the Project area is primarily composed of urban development and croplands. The Project crosses multiple streams included in the National Hydrography Dataset. A Desktop Wetland and Stream Delineation Report was prepared for the Project and is included in the VDEQ Supplement (see **Attachment 2.D.1**).

There are 12 dwellings located within 500 feet; two dwellings located within 250 feet; and no dwellings located within 100 feet of the centerline of the proposed route for the Project. Approximately nine acres of farmland and approximately three acres of forested land are within the typical 100-foot-wide ROW of the proposed route.

The estimates provided above of the dwellings, farmland, and forested land are based on a typical 100-foot-wide ROW centered on the route and consider Light Detection and Ranging ("LiDAR") survey, NLCD data, and features digitized from aerial imagery.

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

Response:

The Siting Team obtained information from or contacted various federal, state, and local agencies and/or officials to inform them of the Project and request data for the route development process. A letter dated July 16, 2024, was sent to 32 local, state, and federal

representatives to inform the agencies that the Abingdon Substation would be expanded and request input. A total of 22 responses were received.

The Company met virtually with local officials from Washington and Smyth Counties, and the Town of Saltville on December 14, 2022, to introduce the Company's Saltville to Wolf Hills 138-kV Rebuild Project and to obtain information to aid in the routing process. Officials from Washington County were informed via letter on July 16, 2024, that the existing Abingdon Substation would be expanded in coordination with the previously announced Saltville to Wolf Hills 138-kV Rebuild Project. The Company will continue to coordinate with federal and state organizations throughout the Project, as applicable.

In addition to the correspondence and meetings with local and state officials, the Siting Team gathered input from the public during the route development process for the Saltville to Wolf Hills 138-kV Rebuild Project. The Project was publicly announced with a news release and launch of a Project-specific website on January 19, 2023. A virtual open house was posted to the Project website with information related to the Project need, transmission line engineering and design, ROW activities, and construction process.

Mailings were sent to 738 landowner addresses to announce the Saltville to Wolf Hills 138-kV Rebuild Project, request feedback from the public, and invite landowners to attend an in-person open house meeting. The Company hosted two in-person open house meetings from 5:00 p.m. to 7:00 p.m. on February 7 and 8, 2023, at Abingdon Elementary School (19431 Woodland Hills Road) and Saltville Elementary School (1013 East Main Street), respectively. A total of 62 people attended the in-person open houses, and 56 comments were returned to the Company via comment cards, emails, and phone calls.

Based on preliminary engineering, 42 landowners are within the filing corridor, and eight landowners are within the proposed ROW. The Company's ROW agents have discussed the Project with the landowners within the proposed ROW.

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

Response:

Based on preliminary engineering analysis, the Company may remove or relocate one temporary construction building and approximately six residential garden sheds to construct the Project as proposed (see **Exhibit 11**).

Additionally, there is an abandoned water tank located on Company property that will be removed to accommodate the expansion of the existing Abingdon Substation (see **Exhibit 12**).

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

Response:

The Project will largely be constructed on Appalachian-owned property or within the existing ROW of the Saltville – Kingsport 138-kV Transmission Line. The transmission line to be rebuilt does not parallel any other facilities.

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

Response:

The Company considers potential impacts to existing and future land uses that may not be compatible with transmission facilities. The Siting Team reviewed the land use plans adopted by Washington County and met with officials from Washington County to discuss existing and future land use plans in the Project area. No potential conflicts between the Project and any specific land use plans were identified in the adopted plans or by the Washington County officials.

F. Government Bodies

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

Response:

After reviewing available planning documents and meeting with officials of the affected localities, the Siting Team determined that the Project does not cross any designated important farmlands in Washington County.

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

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

Response:

Not applicable.

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

Response:

Not applicable.

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

Response:

Not applicable.

G. Identify the following that lie within or adjacent to the proposed ROW:

Per the *Guidelines for Assessing Impacts of Proposed Electric Facilities on Historic Resources in the Commonwealth of Virginia* (2008) (the "Guidelines"), issued by the Virginia Department of Historic Resources ("VDHR"), the Company contracted POWER and Dutton + Associates, LLC to complete a Pre-Application Analysis for the proposed Project (see **Attachment 2.H.1** to the VDEQ Supplement).

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

Response:

None.

2. Any historic architectural, archeological, and cultural resources, such as historic landmarks, battlefields, sites, buildings, structures, districts or objects listed or determined eligible by the VDHR;

Response:

None.

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

Response:

None.

4. **Any state archaeological site or zone designated by the Director of the VDHR, or its predecessor, and any site designated by a local archaeological commission, or similar body;**

   Response:

   None.

5. **Any underwater historic assets designated by the VDHR, or predecessor agency or board;**

   Response:

   None.

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

   Response:

   None.

7. **Any area or feature included in the Virginia Registry of Natural Areas maintained by the VDCR;**

   Response:

   None.

8. **Any area accepted by the Director of the VDCR for the Virginia Natural Area Preserves System;**

   Response:

   None.

9. **Any conservation easement or open space easement qualifying under §§ 10.1-1009 – 1016, or §§ 10.1-1700 – 1705, of the Code (or a comparable prior or subsequent provision of the Code);**

   Response:

   None.

10. Any state scenic river;

Response:

None.

11. Any lands owned by a municipality or school district; and

Response:

One parcel owned by Washington County (Washington County Sherriff's Office) is crossed by the proposed route within an existing transmission line ROW near the Company's Abingdon Substation. One parcel owned by the Washington County School Board (Abingdon Elementary School) is crossed by the Project largely within the existing transmission line ROW.

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

Response:

None.

H. List any registered aeronautical facilities (airports, helipads) where the proposed route would place a structure or conductor within the federally-defined airspace of the facilities. Advise of contacts, and results of contacts, made with appropriate officials regarding the effect on the facilities' operations.

Response:

No conflicts with federally defined airspace are expected. Nonetheless, the Virginia Highlands Airport ("VJI") is located within 20,000 linear feet of the Project. Any portion of the Project that is within 20,000 linear feet of an airport and/or reaches a height of 200 feet above ground level requires a 7460 Airspace Study be submitted to the Federal Aviation Administration for review.

The Siting Team requested input on the Project from the Virginia Department of Aviation and the Virginia Highlands Airport Authority.

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

Response:

None.

J. Identify coordination with appropriate municipal, state, and federal agencies.

Response:

The Siting Team contacted various federal, state, and local agencies and/or officials to inform them of the Project and obtain relevant information. A full list of agencies contacted and responses received are provided in **Attachment 2.0.1** of the VDEQ Supplement.

K. Identify coordination with any non-governmental organizations or private citizen groups.

Response:

No non-governmental organizations and/or private citizen groups were identified by the Company. The Company undertook outreach efforts to solicit information and gain feedback on the Project from the public.

L. Identify any environmental permits or special permissions anticipated to be needed.

Response:

The following is a list of environmental permits or special permissions that are anticipated to be needed for the Project:

- General Virginia Pollutant Discharge Elimination System Permit for Discharges of Stormwater from Construction Activities from VDEQ.
- Surveys and coordination with the United States Fish and Wildlife Service and the Virginia Department of Wildlife Resources for potential occurrence of state and federally protected species.
- Local building permits where applicable for the Project.

SECTION IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS

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

Response:

The following is an analysis of EMF associated with the transmission line components of the Project:

The transmission line rebuild portion of this project consists of a double-circuit transmission line from proposed structure 62-84A to proposed structure 62-89A, replacing the existing structures 62-84 through 62-89.

EMF levels were computed at the ROW edges of the existing and proposed line configurations at the point of minimum ground clearance, where EMF is the highest. Lower EMF levels are expected beyond the ROW edges, as levels decline with distance.

Factors that affect EMF include the ROW width, operating voltage, current flow and direction, electrical unbalance, line configuration, conductor height above ground, and other nearby objects. Nominal voltages and balanced conditions are assumed, with maximum current levels and directions expected during normal system operation. No trees, shrubs, buildings, or other objects that can block EMF are assumed in proximity to the existing and proposed lines.

Normal maximum loading levels, representing peak load conditions, were assumed in the analysis to maximize the calculated magnetic fields. These loading levels are based on winter 2028 projected system conditions. Daily/hourly loads will fluctuate below these levels. All calculations were obtained at the height of 3.28 feet (one meter) above ground using the Electric Power Research Institute ("EPRI") EMF Workstation computer program.

Assuming a 100-foot-wide ROW, the maximum EMF levels expected to occur at the edge of the ROW for the proposed Project are 0.22 kilovolt/meter ("kV/m") and 14.49 mG, respectively. The maximum existing EMF levels for the existing structures of the double-circuit transmission line are 0.197 kV/m and 20.52 mG, respectively.

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

Response:

EMF occurs naturally in the environment. An electric field is present between the earth and its atmosphere and can discharge as lightning during thunderstorms. The earth also has a magnetic field, which provides an operating basis for the magnetic compass. EMF exists wherever there is a flow of electricity, including electrical appliances and power equipment.

Electric fields are produced by voltage or electric charge. A lamp cord that is plugged in produces an electric field even if the lamp is turned off. These fields commonly are measured in kV/m; the higher the voltage, the greater the electric field. Magnetic fields are created by the flow of current in a wire. As current increases, the magnetic field strength also increases; these fields are measured in units known as gauss or mG.

Electric fields are blocked by trees, shrubs, buildings, and other objects. Magnetic fields are not easily blocked and can pass through most objects. The strength of these fields decreases rapidly with distance from the source.

EMF associated with power lines and household appliances oscillate at the power frequency (60 Hertz ["Hz"] in the U.S.). When people are exposed to these fields, small electric currents are produced in their bodies. These currents are weaker than natural electric currents in the heart and nervous system.

Possible health effects from exposure to EMF have been studied for several decades. Initial research, focused on electric fields, found no evidence of biologic changes that could lead to adverse health effects. Subsequently, a large number of epidemiologic studies examined the possible role of magnetic fields in the development of cancer and other diseases in adults and children. While some studies have suggested an association between magnetic fields and certain types of cancer, researchers have been unable to consistently replicate those results in other studies. Similarly, inconclusive or inconsistent results have been reported in laboratory studies of animals exposed to magnetic fields that are representative of common human exposures. A summary of such exposures, found in residential settings, is provided in **Table IV-1** below.

Appliance Type	Number of Devices	Magnetic Field (mG)		
		1.2" (0.1 feet)	12" (1.0 feet)	User Distance
AC Adapters	3	1.4 – 863	0 - 7.5	0 - 0.8
Blood Pressure Monitors	4	4.2 - 39.6	0 - 0.3	0 – 0.2
Bluetooth Headsets	3	0	0	0
Coffee Grinders	3	60.9 – 779	0.3 – 6.5	0.8 - 40.9
Compact Fluorescent Bulbs	15	0 – 32.8	0 - 0.1	0 - 0.6
Compact Fluorescent Bulb Ballast	1	8.5 – 23.5[1]	0 – 0.1[1]	0 - 0.1[1]
Computers, Desktop	3	3.8 – 68.9	0 -1.1	0.1 – 0.5
Computers, Laptop	4	0 – 5.1	0	0 – 0.1
Digital Cameras	3	0	0	0
Digital Photo Frames	5	0	0	0
Digital Video Recorders	4	0 – 29.6	0 – 0.2	0
Dimmer Switches	4	11.5 – 32.1	0 – 0.8	0 – 0.8
DVD Players	5	0 – 28.9	0 – 0.5	0
Electric Lawn Mower	1	1939	156	14.1
Electric Leaf Blowers	4	272 – 4642	17.1 – 155	28.3 – 61.5
Electric Toothbrushes	5	3.6 - 742	0 – 4.8	3.6 – 742
Electric Toothbrush Chargers	5	0 – 4.2	0	0
External Hard Drives	4	0.6 – 1.7	0	0
Gaming Consoles	10	0 – 215	0 – 0.5	0 – 0.6
GPS, Handheld	5	0 – 0.1	0	0
Hobby Tools	2	126 – 438	1.4 – 2.4	1.4 - 438
Hot Glue Guns	3	0 – 0.9	0	0
LCD Computer Monitors	4	0 – 4.5	0	0
LCD Televisions	4	1.1 – 3.9	0 – 2.5	0 – 0.6
Massagers/Massage Chairs	3	81.9 – 500	0.6 – 2.3	21.4 - 500
MP3 Players	5	0	0	0
Noise Cancellation Headphones	1	0	0	0
Paper Shredders	4	11.0 – 4841	0.5 – 102	0.5 – 33.4
Plasma Televisions	2	45.1 – 73.6	1.4 – 2.2	0 – 0.1
Power Tools – Corded	3	784 – 982	8.8 – 31.3	46.8 - 123
Power Tools – Cordless	6	9.0 – 227	0 – 2.2	0 – 13.7
Printers	5	0.1 – 6.2	0 – 0.3	0 – 0.3
Scanners	3	0.6 – 6.7	0 – 0.3	0
Security System Panels	3	0 – 0.3	0	0
Tankless Hot Water Heater	1	10.1 – 21.9[2]	1.2	0.2
Track Lighting	5	0.2 – 4.0	0 – 0.3	0
Vacuum Cleaners, Personal/Car	3	75.5 – 2226	0.6 – 23.3	0.1 – 23.1
Wireless Game Controllers	11	0	0	0
Wireless Routers	4	0 – 0.5	0	0-0.3

Table IV-1
Magnetic Fields from Household Electrical Appliances and Devices
Source: Electric Power Research Institute[1]

As part of the Energy Policy Act of 1992, U.S. Congress enacted the Electric and Magnetic Fields Research and Public Information Dissemination ("EMF RAPID") program. The National Institute of Environmental Health Sciences ("NIEHS") was charged with overseeing the health research and conducting an EMF risk evaluation. In its final report to Congress, issued in 1999, NIEHS concluded that power-frequency "EMF exposure cannot be recognized at this time as entirely safe because of weak

scientific evidence that exposure may pose a leukemia hazard." Nonetheless, the report stated that "this finding is insufficient to warrant aggressive regulatory concern."[2]

In 2001, the Standing Committee on Epidemiology of the International Commission on Non-Ionizing Radiation Protection wrote in its review of the epidemiologic literature on EMF and health that "given the methodological uncertainties and in many cases inconsistencies of the existing epidemiologic literature, there is no chronic disease outcome for which an etiological [causal] relation to EMF exposure can be regarded as established."[3]

Also, in 2001, International Agency for Research on Cancer ("IARC") published the results of an EMF health risk evaluation conducted by an expert scientific working group, which concluded that power-frequency "magnetic fields are 'possibly carcinogenic to humans,' based on consistent statistical associations of high level residential magnetic fields with a doubling of risk of childhood leukemia." [4] IARC assigns its "possibly carcinogenic to humans" classification (Group 2B) if there is "limited evidence" of carcinogenicity in both humans and experimental animals, or if there is "sufficient evidence" in animals, but "inadequate evidence" in humans. Group 2B includes some 288 "agents" such as coffee, pickled vegetables, carpentry, textile manufacturing and gasoline, among others (last update: October 26, 2015).

A comprehensive assessment of the EMF health risks was published by the World Health Organization ("WHO") in 2007. In its assessment, WHO wrote: "Scientific evidence suggesting that every day, chronic, low-intensity (above 0.3-0.4 μT) [3-4 mG] power-frequency magnetic field exposure poses a possible health risk is based on epidemiological studies demonstrating a consistent pattern of increased risk for childhood leukemia."[5] It added, however, that "virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF [extremely low frequency] magnetic fields and changes in biological function or disease status. Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern."

Regarding acute effects, the WHO noted, "Acute biological effects have been established for exposure to ELF electric and magnetic fields in the frequency range up to 100 kilohertz ("kHz") that may have adverse consequences on health. Therefore, exposure limits are needed. International guidelines exist that have addressed this issue. Compliance with these guidelines provides adequate protection for acute effects."[5]

In summary, some studies have reported an association between long-term magnetic field exposure and particular types of health effects, while other studies have not. The nature of the reported association remains uncertain as no known mechanism or laboratory animal data exists to support the cause-and-effect relationship.

In view of the scientific evidence, the Institute of Electrical and Electronics Engineers ("IEEE") and other organizations have established guidelines limiting EMF exposure for workers in a controlled environment and for the general public. These guidelines focus on

prevention of acute neural stimulation. No limits have been established to address potential long-term EMF effects, as the guideline organizations consider the scientific evidence insufficient to form the basis for such action. For power-frequency EMF, IEEE Standard C95.6™-2002[6] recommends the following limits:

	General Public	Controlled Environment
Electric Field Limit (kV/m)	5.0	20.0*
Magnetic Field Limit (mG)	9,040	27,100

*10.0 kV/m within power line ROW.

To address public concerns about EMF, the Government of Canada in 2012 updated its website with the latest knowledge on the subject. It contains the following statements on the EMF health-related risks: "Health Canada does not consider that any precautionary measures are needed regarding daily exposures to EMFs at ELFs. There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line corridors."[7]

Similarly, in 2013, the updated website of the WHO concluded: "[T]o date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health."[8]

Most recently, in its January 2015 report, the Scientific Committee on Emerging and Newly Identified Health Risks, an independent advisory body to the European Commission on Public Health, issued the following opinion: "Overall, existing studies do not provide convincing evidence for a causal relationship between ELF MF [extremely low frequency magnetic field] exposure and self-reported symptoms."[9]

AEP has been following the EMF scientific developments worldwide, participating in and sponsoring EMF studies, and communicating with customers and employees on the subject. Also, AEP is a member of Electric Power Research Institute, an independent, non-profit organization sponsoring and coordinating EMF epidemiological, laboratory and exposure studies.

The transmission line rebuild construction proposed in this Project will be compliant with the EMF limits specified in IEEE Standard C95.6™-2002.

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

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

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

3. Have been subjected to peer review.

Response:

In its report to the Virginia General Assembly, issued on October 31, 2000, the Virginia Department of Health stated: "[T]he Virginia Department of Health is of the opinion that there is no conclusive and convincing evidence that exposure to extremely low frequency electromagnetic fields emanated from nearby high voltage transmission lines is causally associated with an increased incidence of cancer or other detrimental health effects in humans."[10]

Key publications on the subject, which became available after that report, are included below as references to the discussion contained in **Section IV.B** and **C** of this Response to Guidelines.

Section IV References

[1] "Magnetic Fields from Electrical Appliances and Devices," Electric Power Research Institute, Product ID 1021221, September 28, 2010.

[2] "NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields," National Institute of Environmental Health Sciences, National Institutes of Health, NIH Publication No. 99-4493, May 4, 1999 (http://www.niehs.nih.gov/about/materials/niehs-report.pdf).

[3] "Review of the Epidemiologic Literature on EMF and Health," International Commission for Non-Ionizing Radiation Protection (ICNIRP) Standing Committee on Epidemiology, Environmental Health Perspectives, Volume 109, Supplement 6, December 2001 (http://www.icnirp.de/documents/epireview1.pdf).

[4] "IARC Finds Limited Evidence that Residential Magnetic Fields Increase Risk of Childhood Leukemia," International Agency for Research on Cancer, Press Release No 136, June 27, 2001 (http://www.iarc.fr/en/media-centre/pr/2001/pr136.html).

[5] "Extremely Low Frequency Field (Environmental Health Criteria 238)," World Health Organization, June 1, 2007 (http://www.who.int/peh-emf/publications/Complet_DEC_2007.pdf).

[6] "C95.6™ IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0-3 kHz," IEEE Standards Coordinating Committee 28, October 23, 2002.

[7] "Electric and Magnetic Fields from Power Lines and Electrical Appliances," Healthy Canadians, November 7, 2012 (http://www.healthycanadians.gc.ca/environment-environnement/home-maison/emf-cem-eng.php).

[8] "What are Electromagnetic Fields? Summary of Health Effects," World Health Organization, 2013, (http://www.who.int/peh-emf/about/WhatisEMF/en/index1.html)

[9] "Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF)," Scientific Committee on Emerging and Newly Identified Health Risks, SCENIHR, January 27, 2015 (http://ec.europa.eu/health/scientific_committees/emerging/docs/scenihr_o_041.pdf).

[10] "Monitoring of Ongoing Research on the Health Effects of High Voltage Transmission Lines (Final Report)," Virginia Department of Health, October 31, 2000 (http://www.vdh.state.va.us/Epidemiology/DEE/publichealthtoxicology/documents/pdf/highfinal.PDF).

SECTION V. NOTICE

A. Furnish a proposed route description to be used for public notice purposes. Provide a map of suitable scale showing the route of the proposed project. For all routes that the Applicant proposes to be noticed, provide minimum, maximum and average structure heights.

Response:

A description of the proposed route is provided below. The requested public notice map is included as **Exhibit 13**.

The proposed Project will upgrade and install new equipment at Appalachian's existing Abingdon Substation at 20241 Rustic Lane, north of the Town of Abingdon in Washington County, to address thermal and voltage violations identified in PJM Interconnection's 2022 Regional Transmission Expansion Plan Window. The Abingdon Substation will be expanded on Appalachian's existing property to accommodate the upgrades and an approximately one-mile-long portion of the existing Saltville – Kingsport 138-kilovolt ("kV") Transmission Line will be rebuilt to connect into the substation.

The approximately one-mile-long proposed rebuild route begins at existing structure 62-83 on the Saltville – Kingsport 138-kV Transmission Line, located east of State Route 1518 (Delano Drive), and traverses approximately 0.2 miles southwest to connect to Appalachian's existing Clinch River – Abingdon 138-kV Transmission Line. After the junction with the existing Clinch River – Abingdon 138-kV Transmission Line (which will be reconnected to the rebuilt Saltville – Kingsport 138-kV Transmission Line from existing structure 71-84/71 within existing right-of-way ["ROW"]) the proposed route traverses southwest for approximately 0.1 miles and connects to the existing Abingdon Substation. The approximately 0.3-mile-long section of the proposed route between existing structure 62-83 and the Abingdon Substation is located in existing ROW or on Appalachian's property.

The proposed route exits the northwest side of the Abingdon Substation for about 0.1 miles before turning southwest parallel to the existing Saltville – Kingsport 138-kV Transmission Line in new ROW, for approximately 0.3 miles crossing Rustic Lane and U.S. Route 58 Alternate/U.S. Route 19 (Porterfield Highway). The proposed route connects to Appalachian's existing South Abingdon 138-kV Extension Transmission Line southwest of U.S. Route 58 Alternate/U.S. Route 19 (Porterfield Highway) which will be reconnected to the rebuilt Saltville – Kingsport 138-kV Transmission Line from existing structure 1192-1. From the South Abingdon 138-kV Extension Transmission Line, the proposed route parallels the north side of the existing Saltville – Kingsport 138-kV Transmission Line ROW for approximately 0.3 miles before joining the existing ROW northwest of the Abingdon Elementary School and ending near existing structure 62-90, northwest of the State Route 825 (Elementary Drive) and State Route 681 (Woodland Hills Drive) intersection.

Final structure types for the rebuilt transmission line will be determined after additional studies are completed, including ground surveys and geotechnical studies. Based on

preliminary engineering, the Company anticipates primarily using double-circuit lattice steel towers and monopole structures with a galvanized finish. Proposed structure heights are anticipated to range from 86 to 145 feet tall, with an average height of 110 feet (approximately five feet taller than the average height of the existing structures) to meet current design standards.

B. List Applicant offices where members of the public may inspect the application. If applicable, provide a link to website(s) where the application may be found.

Response:

This Application and all exhibits, tables, and maps made a part hereof will be available for inspection at the following location:

Washington County Public Library – Abingdon Library
205 Oak Hill Street NE
Abingdon, VA 24210

A link to the Commission docket will also be made available on the Project website: www.AppalachianPower.com/Saltville-WolfHills.

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

Response:

Federal

United States Army Corps of Engineers, Norfolk District, Western Virginia Regulatory Section
United States Department of Agriculture, Natural Resources Conservation Service
United States Department of Transportation, Federal Highway Administration, Virginia Division
United States Environmental Protection Agency, Region 3
United States Fish and Wildlife Service, Virginia Field Office
United States House of Representatives, 9th District (H. Morgan Griffith)*

State

Virginia Department of Agriculture and Consumer Services
Virginia Department of Aviation
Virginia Department of Conservation and Recreation
Virginia Department of Energy
Virginia Department of Environmental Quality*
Virginia Department of Forestry
Virginia Department of Health, Office of Drinking Water

Virginia Department of Historic Resources
Virginia Department of Transportation, Bristol District
Virginia Department of Wildlife Resources
Virginia Marine Resources Commission
Virginia Outdoors Foundation
Senate of Virginia, 6th District (Todd E. Pillion)*
Virginia House of Delegates, District 44 (Israel D. O'Quinn)*

Local

Washington County, Board of Supervisors (Mike Rush, Board Chair)
Washington County, Board of Supervisors (Randy Pennington, Vice Chair)
Washington County, Administrator (Jason Berry)**
Washington County, Attorney (Brandon Snodgrass)

**The Company will provide access to an electronic copy of the Application and related materials to these officials or agencies.*

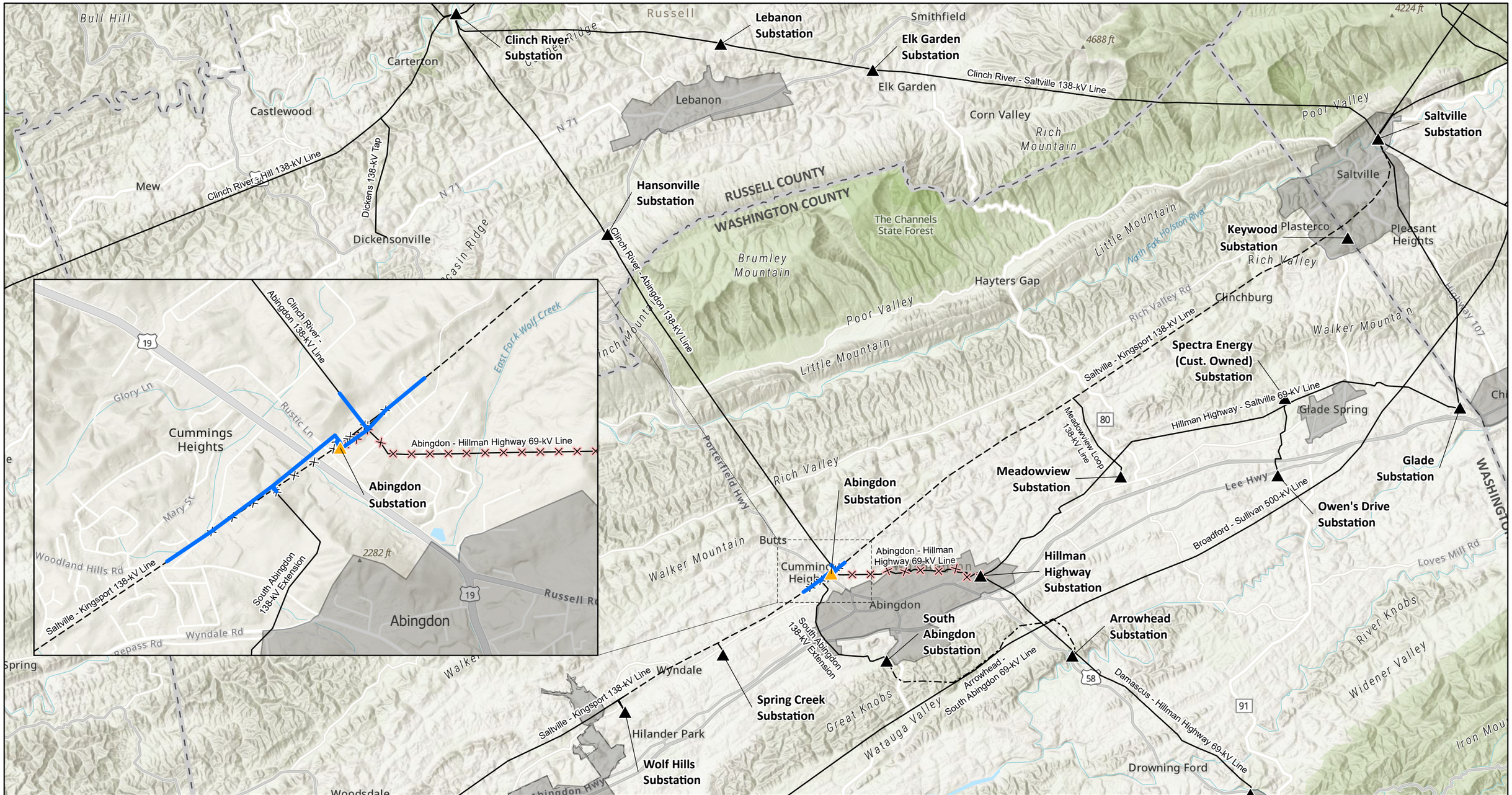
***The Company will distribute a hard copy of the Application and related materials to these officials.*

D. If the application is for a transmission line with a voltage of 138 kV or greater, provide a statement and any associated correspondence indicating that prior to the filing of the application with the SCC the Applicant has notified the chief administrative officer of every locality in which it plans to undertake construction of the proposed line of its intention to file such an application, and that the Applicant gave the locality a reasonable opportunity for consultation about the proposed line (similar to the requirements of § 15.2-2202 of the Code for electric transmission lines of 150 kV or more).

Response:

As detailed in **Section III.B.**, the Company met virtually with local officials from Washington and Smyth Counties and the Town of Saltville on December 14, 2022, to introduce the related Saltville to Wolf Hills 138-kV Rebuild Project and to receive feedback. Officials from Washington County were informed via letter on July 16, 2024, that the existing Abingdon Substation would be expanded in coordination with the previously announced Saltville to Wolf Hills 138-kV Rebuild Project. Washington County officials were invited to provide input on the Project and advised of the Company's plan to file an application with the SCC for approval of the Abingdon 138-kV Substation Transmission Project in fall 2024.

EXHIBIT 1: PROJECT AREA MAP



- APCo Substation Proposed to be Expanded and Improved (Seeking SCC Approval)
- APCo Existing Substation
- Proposed Route (Seeking SCC Approval)
- Future Project to Rebuild a 25-mile Portion of the Saltville - Kingsport 138-kV Line
- Transmission Line Under Construction as Part of Another Project (Ordinary Extension)
- Existing Transmission Line to be Removed (Seeking SCC Approval)
- Existing Transmission Line to be Removed after the Arrowhead - South Abingdon 69-kV Line is Completed (Ordinary Extension)
- Existing Transmission Line
- City/Town/Municipal Area
- County Boundary

Washington County, Virginia

NAD 1983 StatePlane Virginia South FIPS 4502 Feet Lambert Conformal Conic

September 24, 2024

Exhibit 1: Project Area Map

APPALACHIAN POWER
An AEP Company

Abingdon 138-kV Substation Transmission Project

0 2.5 5
Miles

EXHIBIT 2: EXISTING AND PROPOSED TRANSMISSION LINE CIRCUIT CONFIGURATIONS

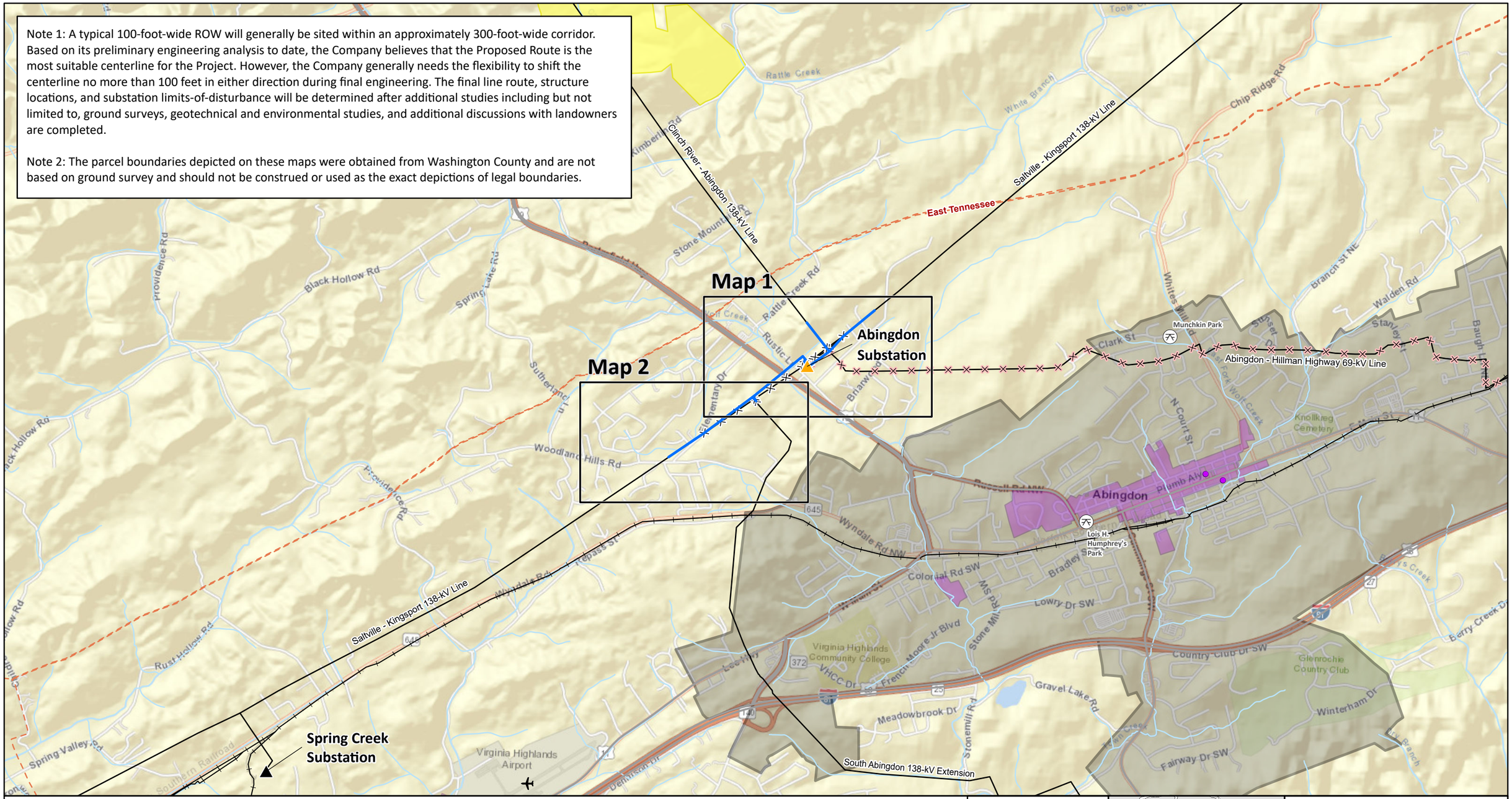
CONFIDENTIAL INFORMATION

SEE VOLUME 2: CONFIDENTIAL APPENDIX - EXHIBIT 2-C
FOR EXISTING AND PROPOSED TRANSMISSION LINE
CIRCUIT CONFIGURATIONS

EXHIBIT 3: GIS CONSTRAINTS MAP

Note 1: A typical 100-foot-wide ROW will generally be sited within an approximately 300-foot-wide corridor. Based on its preliminary engineering analysis to date, the Company believes that the Proposed Route is the most suitable centerline for the Project. However, the Company generally needs the flexibility to shift the centerline no more than 100 feet in either direction during final engineering. The final line route, structure locations, and substation limits-of-disturbance will be determined after additional studies including but not limited to, ground surveys, geotechnical and environmental studies, and additional discussions with landowners are completed.

Note 2: The parcel boundaries depicted on these maps were obtained from Washington County and are not based on ground survey and should not be construed or used as the exact depictions of legal boundaries.



Washington County, Virginia

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic

October 10, 2024

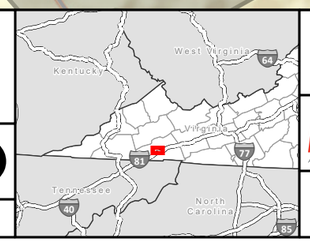


Exhibit 3: GIS Constraints Map

Index

APPALACHIAN POWER
An AEP Company

Abingdon 138-kV Substation Transmission Project

0 0.5 1
Miles

See Notes 1 and 2 on the Index Map

East Tennessee

Clinch River - Abingdon 138-kV Line

Rattle Creek Rd

Rustic Ln

Elk

Quail Ridge Way

Delano Dr

Keys Dr

Briarwood Ln

Exist. Str. 71-84/71
Exist. Ht. 91.4'

Prop. Str. 62-84A
Prop. Ht. 141'

Exist. Str. 62-83
Exist. Ht. 96.5'

The existing conductor in this span from existing structure 71-84/71 to proposed structure 62-85A will be reconnected.

Exist. Str. 71-84/72
Exist. Ht. 94'

The existing conductor in this span from existing structure 62-83 to proposed structure 62-84A will be reconnected.

Exist. Str. 62-84
Exist. Ht. 96.5'

Prop. Str. 62-86C
Prop. Ht. 112'

Transmission Building

Transmission Garage

Exist. Str. 62-85
Exist. Ht. 100.5'

Prop. Str. 62-86B
Prop. Ht. 102'

Prop. Str. 62-85A
Prop. Ht. 106'

Exist. Str. 62-86
Exist. Ht. 117.5'

Prop. Str. 62-85B
Prop. Ht. 86'

Abingdon Substation

Prop. Str. 62-86A
Prop. Ht. 121'

Abingdon - Hillman Highway 69-kV Line

Prop. Str. 62-86D
Prop. Ht. 145'

Veterinary Clinic

Washington County Sheriff's Office

Map 2

Prop. Str. 62-87A
Prop. Ht. 90'

Saltville - Kingsport 138-kV Line

Prop. Str. 62-87B
Prop. Ht. 103'

New conductor will be installed in this span from proposed structures 62-87A and 62-87B to existing structure 1192-1.

Prop. Str. 62-88A
Prop. Ht. 97'

Exist. Str. 62-87
Exist. Ht. 117.5'

Exist. Str. 62-88
Exist. Ht. 96.5'

Exist. Str. 1192-1
Exist. Ht. 85'

Worthing Way

Piper Spring Ave

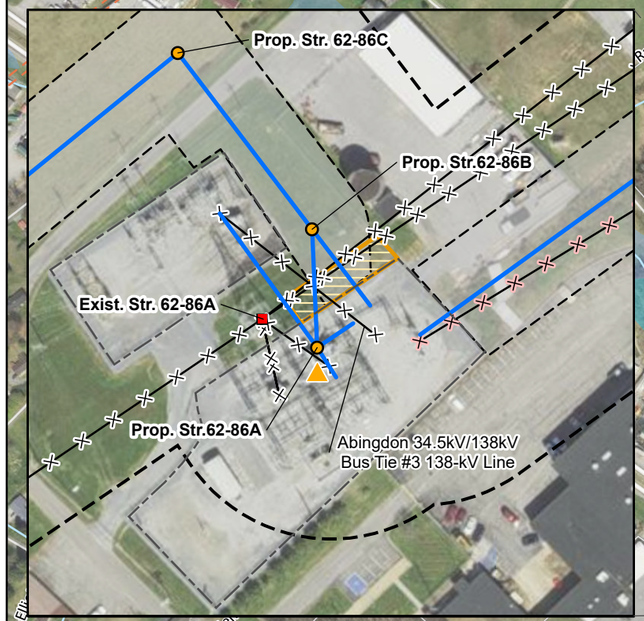
Chatham Ct

Spring House Ct

Porterfield Hwy

Sheffield Ct

Proposed Structures: 62-84A to 62-88A
Existing Structures: 62-83 to 62-88



- APCo Substation to be Expanded
- Proposed Structure
- Proposed Route
- Filing Corridor
- Proposed Right-of-Way
- Substation Expansion Area
- APCo Transmission Structure to be Removed
- APCo Transmission Structure to be Removed as Part of Another Project (Oridinary Extension)
- APCo Transmission Structure to Remain
- Existing Transmission Line to be Removed
- Existing Transmission Line to be Removed as Part of Another Project (Ordinary Extension)
- Existing Transmission Line
- Existing Right-of-Way
- Existing Substation Fence
- Natural Gas Pipeline
- Stream (NHD)
- Habitable Building (within Filing Corridor)
- Non-Habitable Building (within Filing Corridor)
- Parcel Boundary (within Filing Corridor)
- Waterbody (NHD)
- Wetland (NWI)
- Floodplain (100 Year)
- Map Tile

Washington County, Virginia

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic

October 10, 2024

Exhibit 3: GIS Constraints Map

Map 1 of 2

APPALACHIAN POWER
An AEP Company

Abingdon 138-kV Substation Transmission Project

0 400 800
Feet

See Notes 1 and 2 on the Index Map

Prop. Str. 62-87A
Prop. Ht. 90'

Prop. Str. 62-87B
Prop. Ht. 103'

New conductor will be installed in this span from proposed structures 62-87A and 62-87B to existing structure 1192-1.

Prop. Str. 62-88A
Prop. Ht. 97'

Exist. Str. 62-87
Exist. Ht. 117.5'

Exist. Str. 62-88
Exist. Ht. 96.5'

Exist. Str. 1192-1
Exist. Ht. 85'

Prop. Str. 62-89A
Prop. Ht. 128'

Exist. Str. 62-89
Exist. Ht. 96.5'

The existing conductor in this span from proposed structure 62-89A to existing structure 62-90 will be reconnected.

Exist. Str. 62-90
Exist. Ht. 106.5'

Map 1

Cornerstone Christian Academy

Woodland Hills Christian Church

Providence Community Church

Free Pentecostal Assembly-Abingdon

Abingdon Elementary School

Saltville - Kingsport 138-kV Line

South Abingdon 138-kV Extension

Proposed Structures: 62-87A to 62-89A
Existing Structures: 62-87 to 62-90

- Proposed Structure
- Proposed Route
- Filing Corridor
- Proposed Right-of-Way
- APCo Transmission Structure to be Removed
- APCo Transmission Structure to Remain
- Existing Transmission Line to be Removed
- Existing Transmission Line
- Existing Right-of-Way
- Place of Worship
- School
- Stream (NHD)
- Habitable Building (within Filing Corridor)
- Non-Habitable Building (within Filing Corridor)
- Parcel Boundary (within Filing Corridor)
- Waterbody (NHD)
- Wetland (NWI)
- Floodplain (100 Year)
- City/Town/Municipal Area
- Map Tile

Washington County, Virginia

NAD 1983 StatePlane Virginia South FIPS 4502 Feet
Lambert Conformal Conic

October 10, 2024

RUSSELL COUNTY
WASHINGTON COUNTY

Exhibit 3: GIS Constraints Map

Map 2 of 2

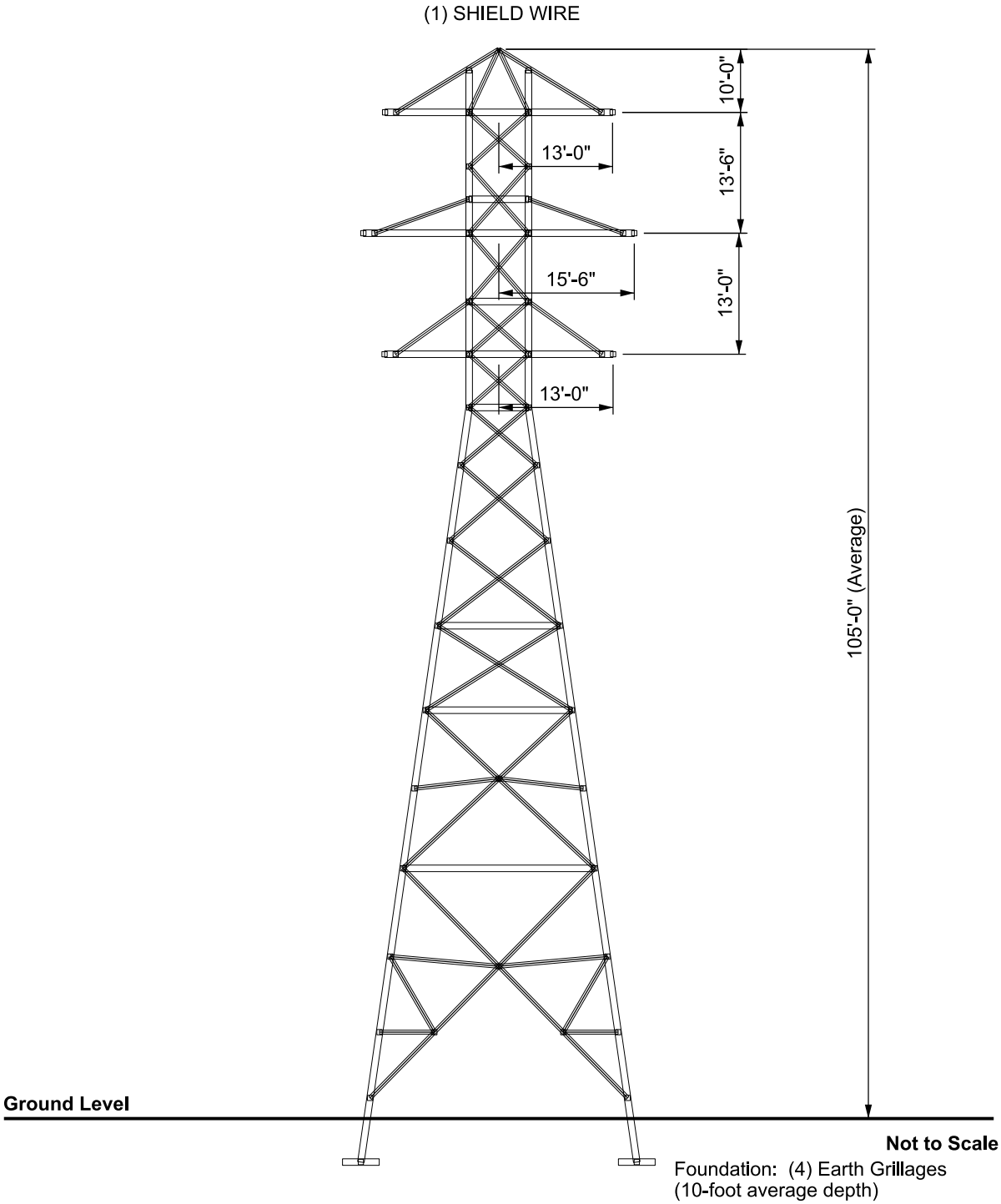
APPALACHIAN POWER
An AEP Company

Abingdon 138-kV Substation Transmission Project

0 400 800
Feet

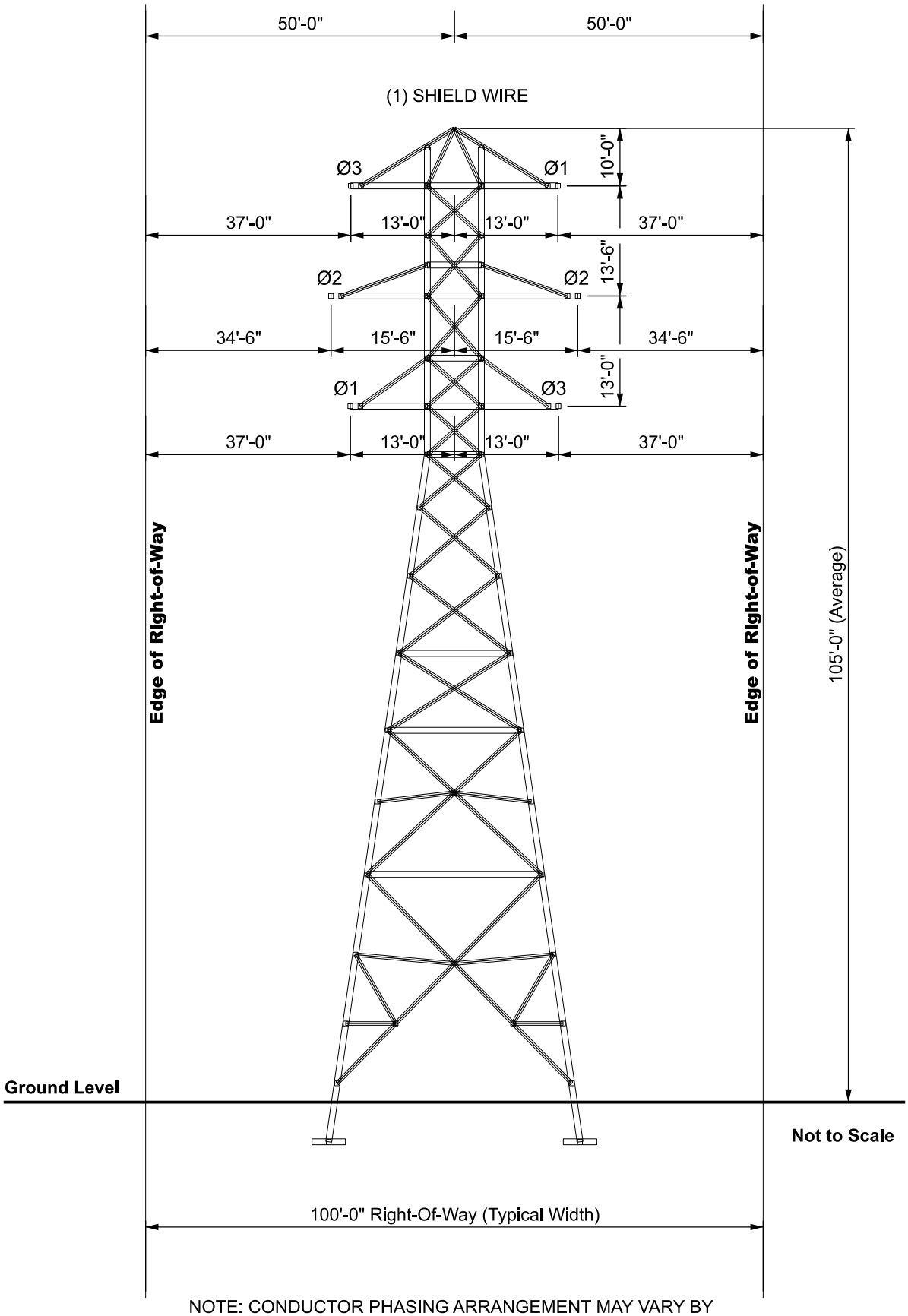
EXHIBIT 4: EXISTING STEEL LATTICE TOWER DEAD-END (DOUBLE-CIRCUIT)

STEEL LATTICE TOWER DEAD-END (DOUBLE CIRCUIT)



TYPICAL SCHEMATIC

STEEL LATTICE TOWER DEAD-END (DOUBLE CIRCUIT)



NOTE: CONDUCTOR PHASING ARRANGEMENT MAY VARY BY CIRCUIT. THE PHASING SHOWN ABOVE IS REPRESENTATIVE OF THE PREDOMINATE ARRANGEMENT ONLY

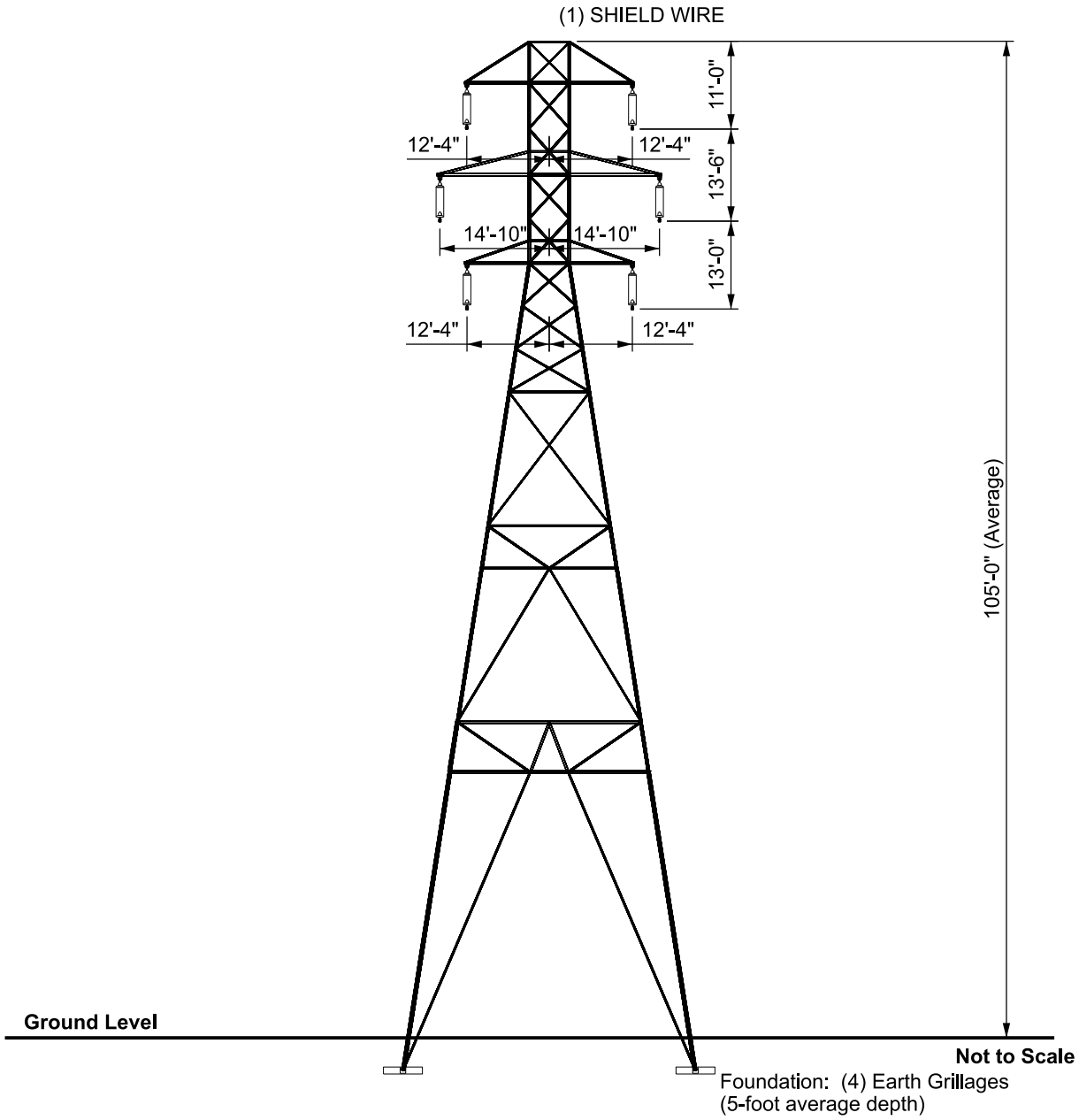
TYPICAL RIGHT-OF-WAY CROSS SECTION

STEEL LATTICE TOWER DEAD-END (DOUBLE CIRCUIT)

EXISTING SALTVILLE - KINGSPORT 138-kV LINE
STEEL LATTICE TOWER, DEADEND

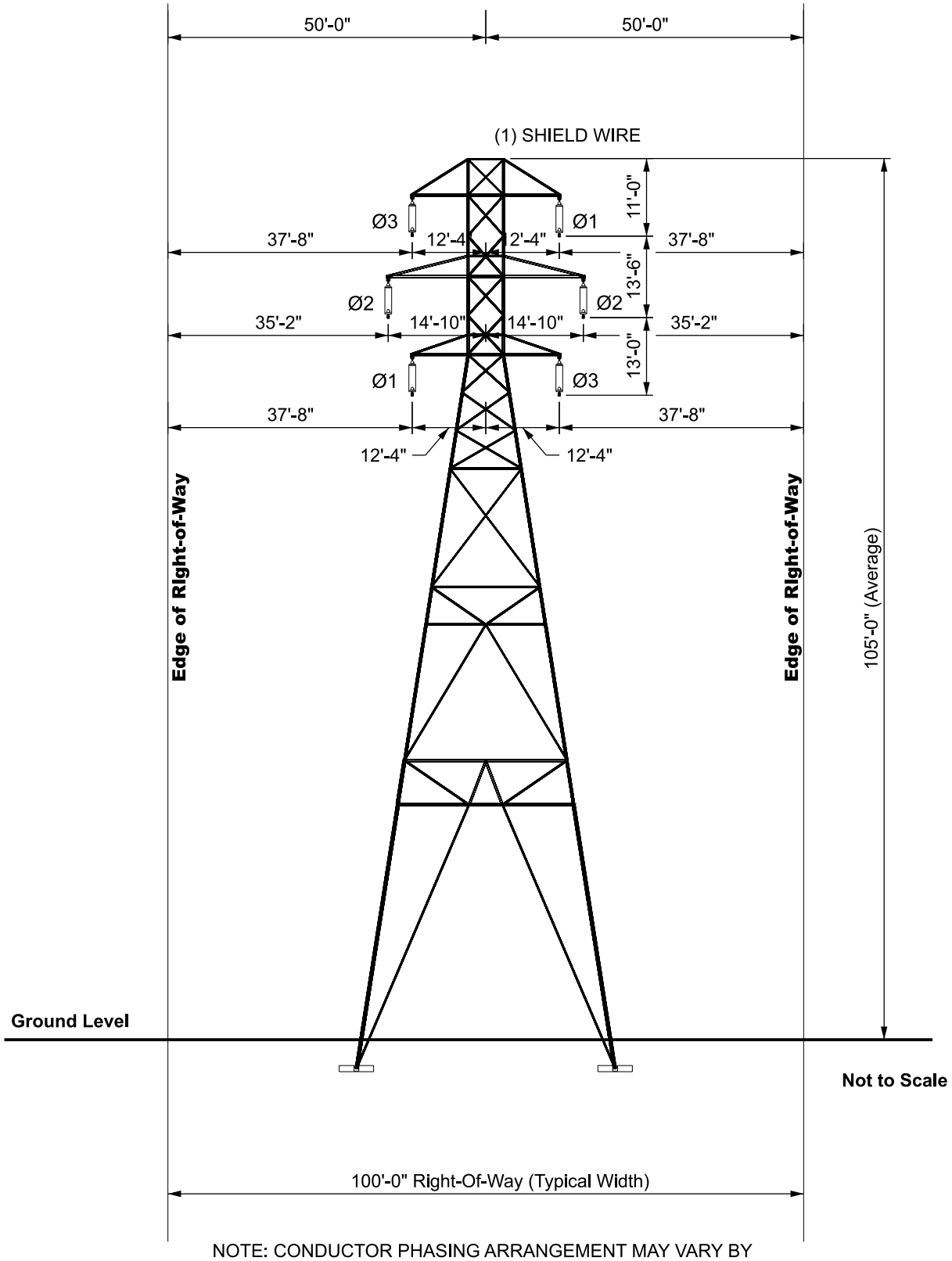
EXHIBIT 5: EXISTING STEEL LATTICE TOWER TANGENT (DOUBLE-CIRCUIT)

STEEL LATTICE TOWER TANGENT (DOUBLE CIRCUIT)



TYPICAL SCHEMATIC

STEEL LATTICE TOWER TANGENT (DOUBLE CIRCUIT)



NOTE: CONDUCTOR PHASING ARRANGEMENT MAY VARY BY CIRCUIT. THE PHASING SHOWN ABOVE IS REPRESENTATIVE OF THE PREDOMINATE ARRANGEMENT ONLY

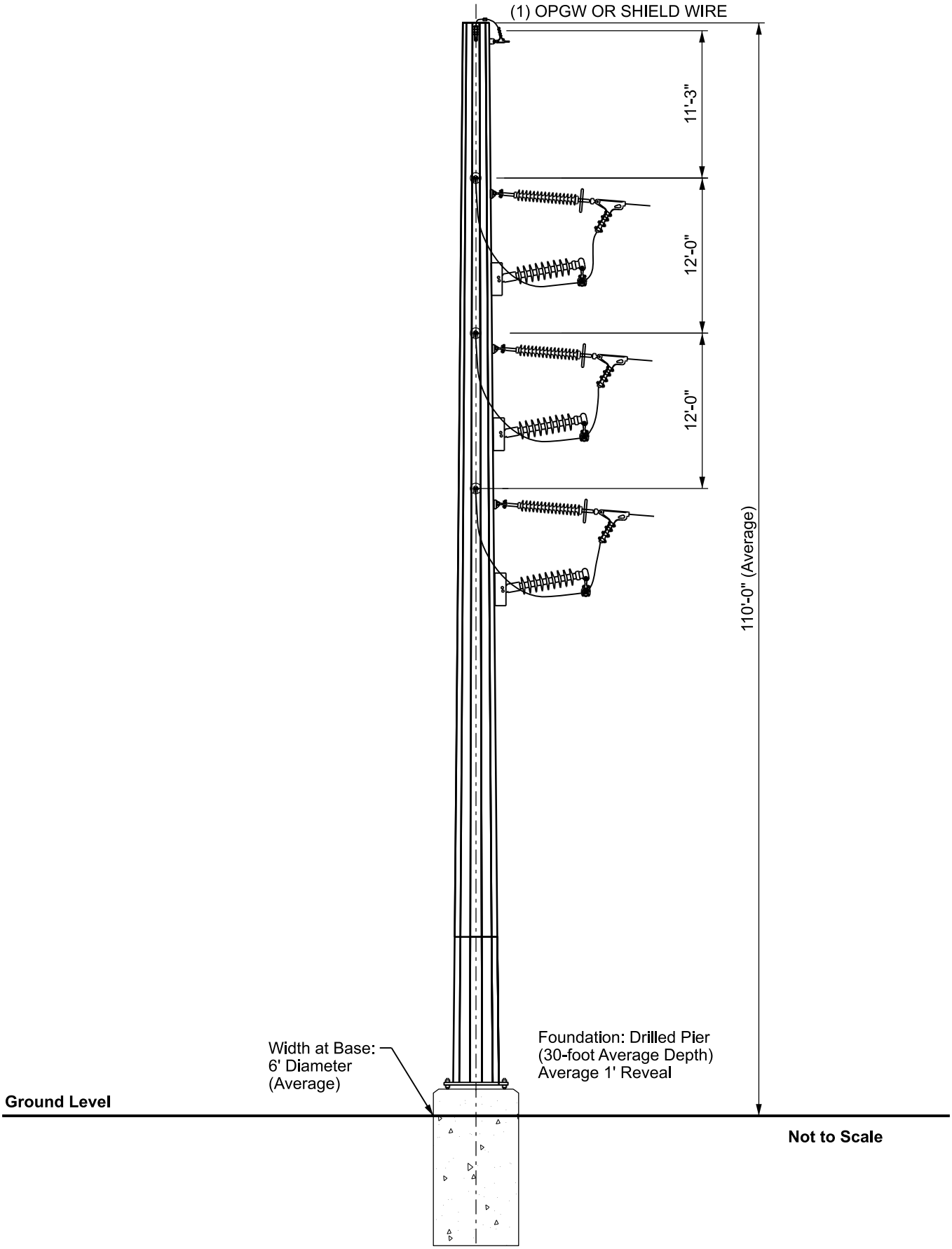
TYPICAL RIGHT-OF-WAY CROSS SECTION

STEEL LATTICE TOWER TANGENT (DOUBLE CIRCUIT)

EXISTING SALTVILLE - KINGSPORT 138-kV LINE
STEEL LATTICE TOWER, SUSPENSION

EXHIBIT 6: PROPOSED STEEL MONOPOLE DEAD-END (SINGLE-CIRCUIT)

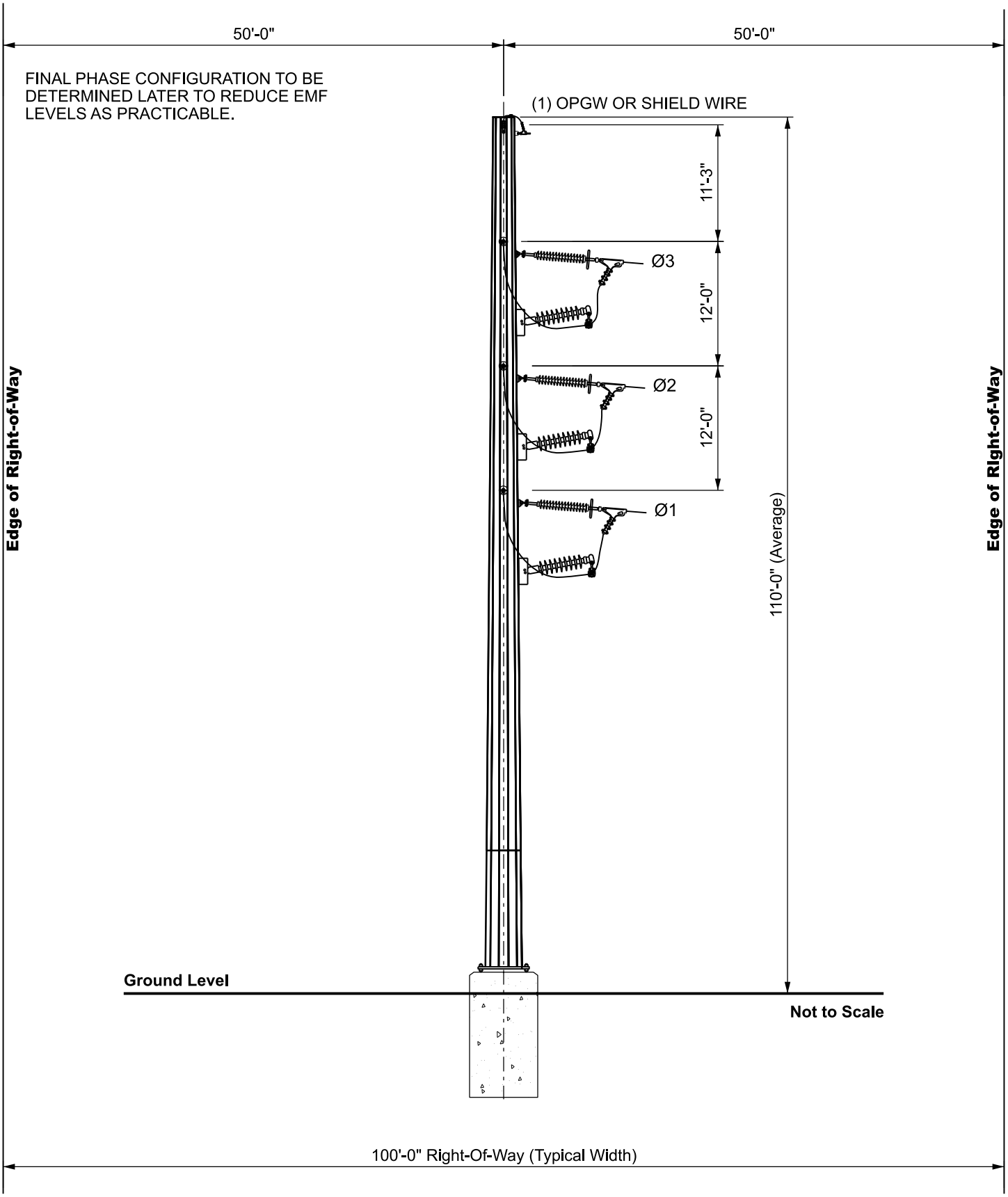
STEEL MONOPOLE DEAD-END (SINGLE CIRCUIT)



TYPICAL SCHEMATIC

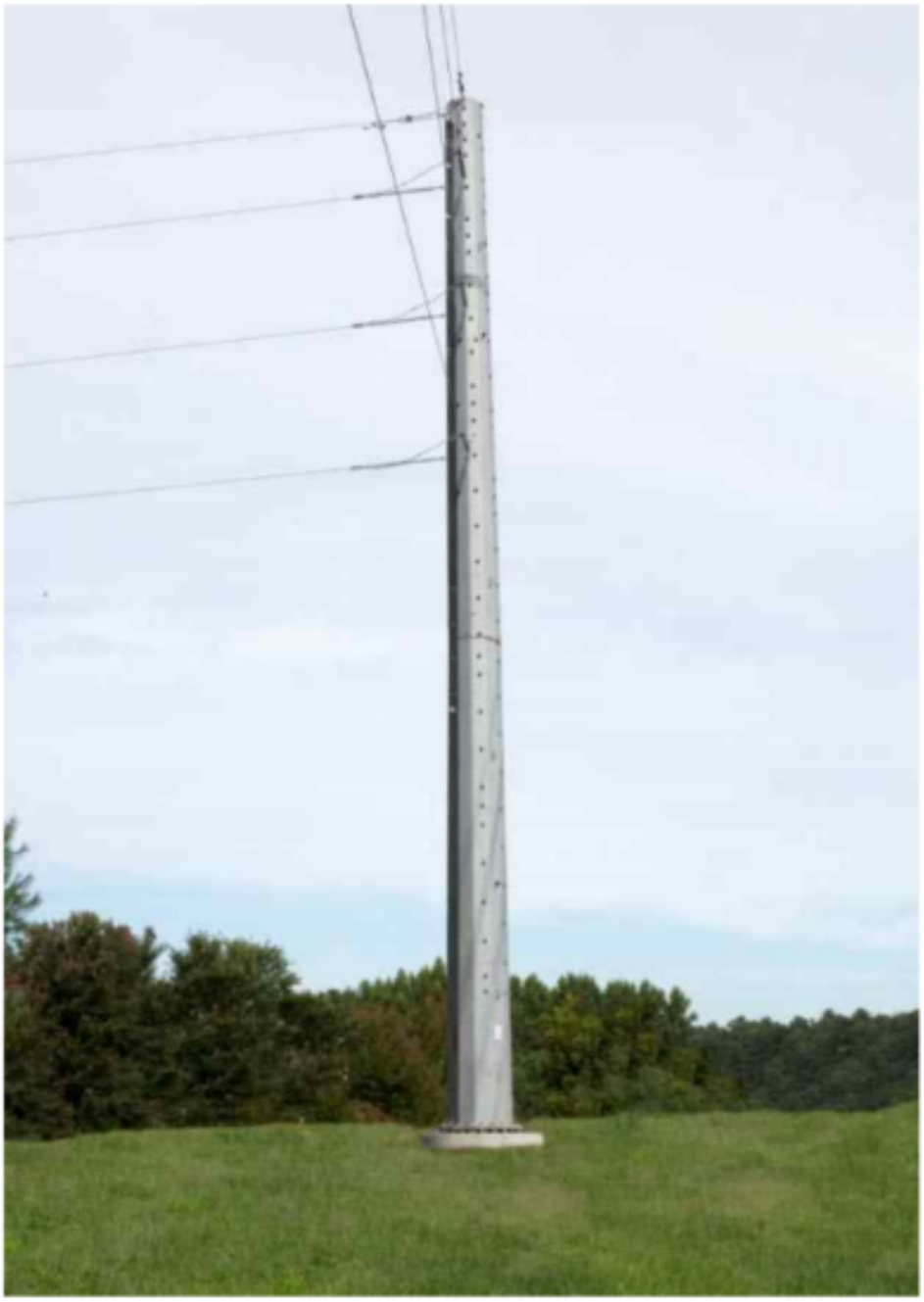
EXHIBIT 6
PROPOSED 138-kV TRANSMISSION STRUCTURES (Page 2 of 3)

STEEL MONOPOLE DEAD-END (SINGLE CIRCUIT)



TYPICAL RIGHT-OF-WAY CROSS SECTION

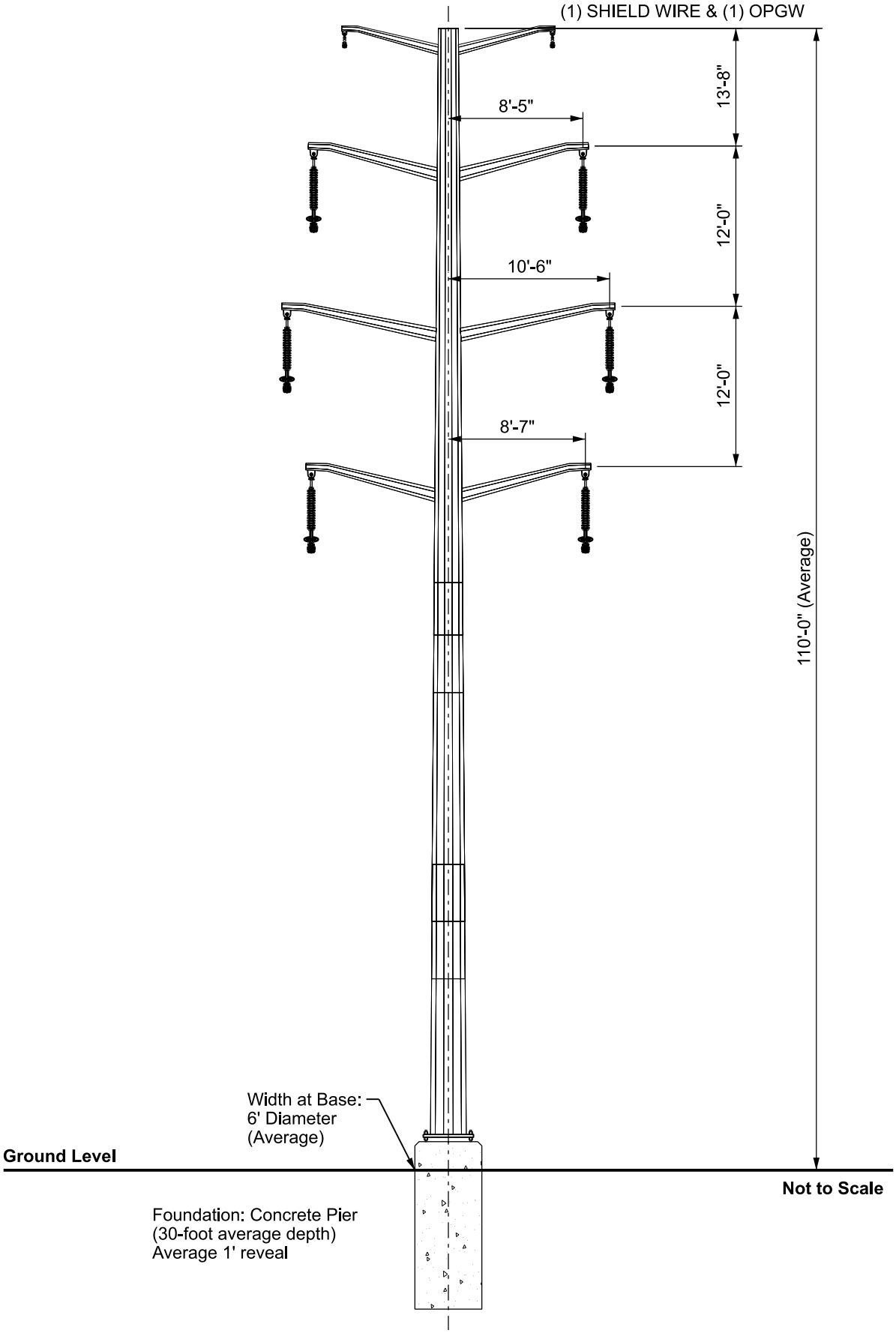
STEEL MONOPOLE DEAD-END (SINGLE CIRCUIT)



COMPARABLE EXISTING STRUCTURE PHOTOGRAPH

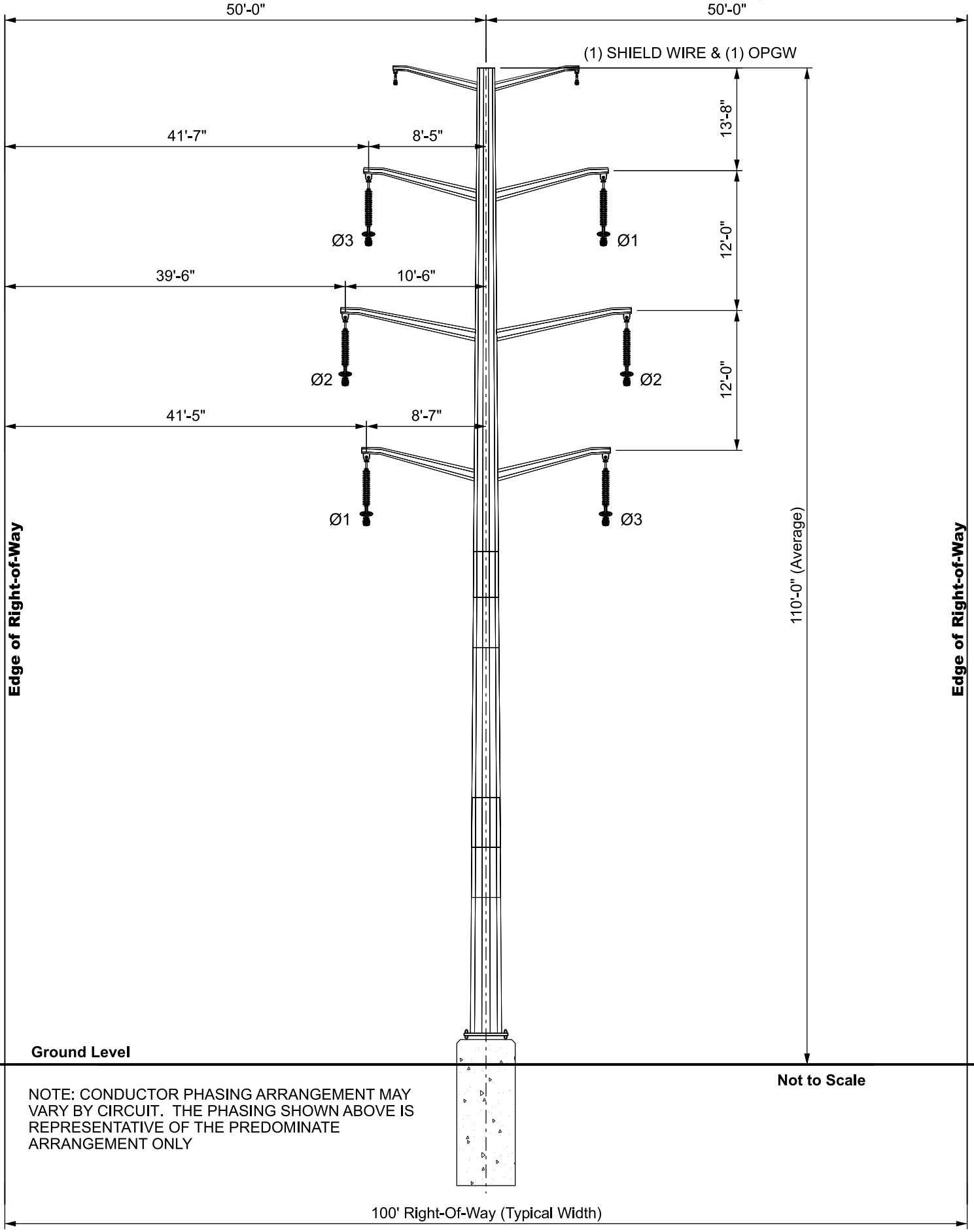
EXHIBIT 7: PROPOSED STEEL MONOPOLE WITH DAVIT ARMS (DOUBLE-CIRCUIT)

STEEL MONOPOLE WITH DAVIT ARMS (DOUBLE CIRCUIT)



TYPICAL SCHEMATIC

STEEL MONOPOLE WITH DAVIT ARMS (DOUBLE CIRCUIT)



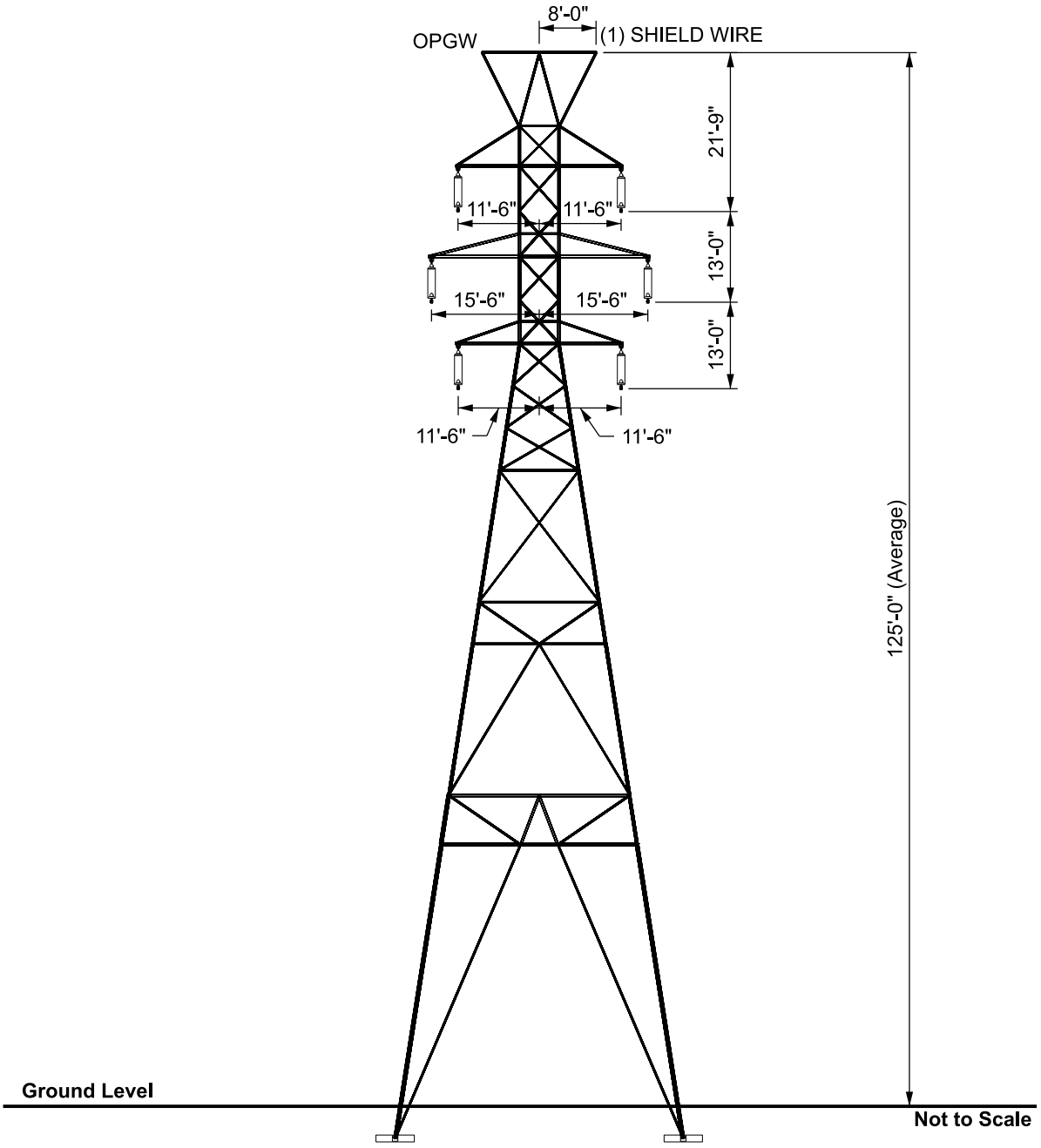
TYPICAL RIGHT-OF-WAY CROSS SECTION

STEEL MONOPOLE WITH DAVIT ARMS (DOUBLE CIRCUIT)

COMPARABLE EXISTING STRUCTURE PHOTOGRAPH

EXHIBIT 8: PROPOSED STEEL LATTICE TOWER (DOUBLE-CIRCUIT)

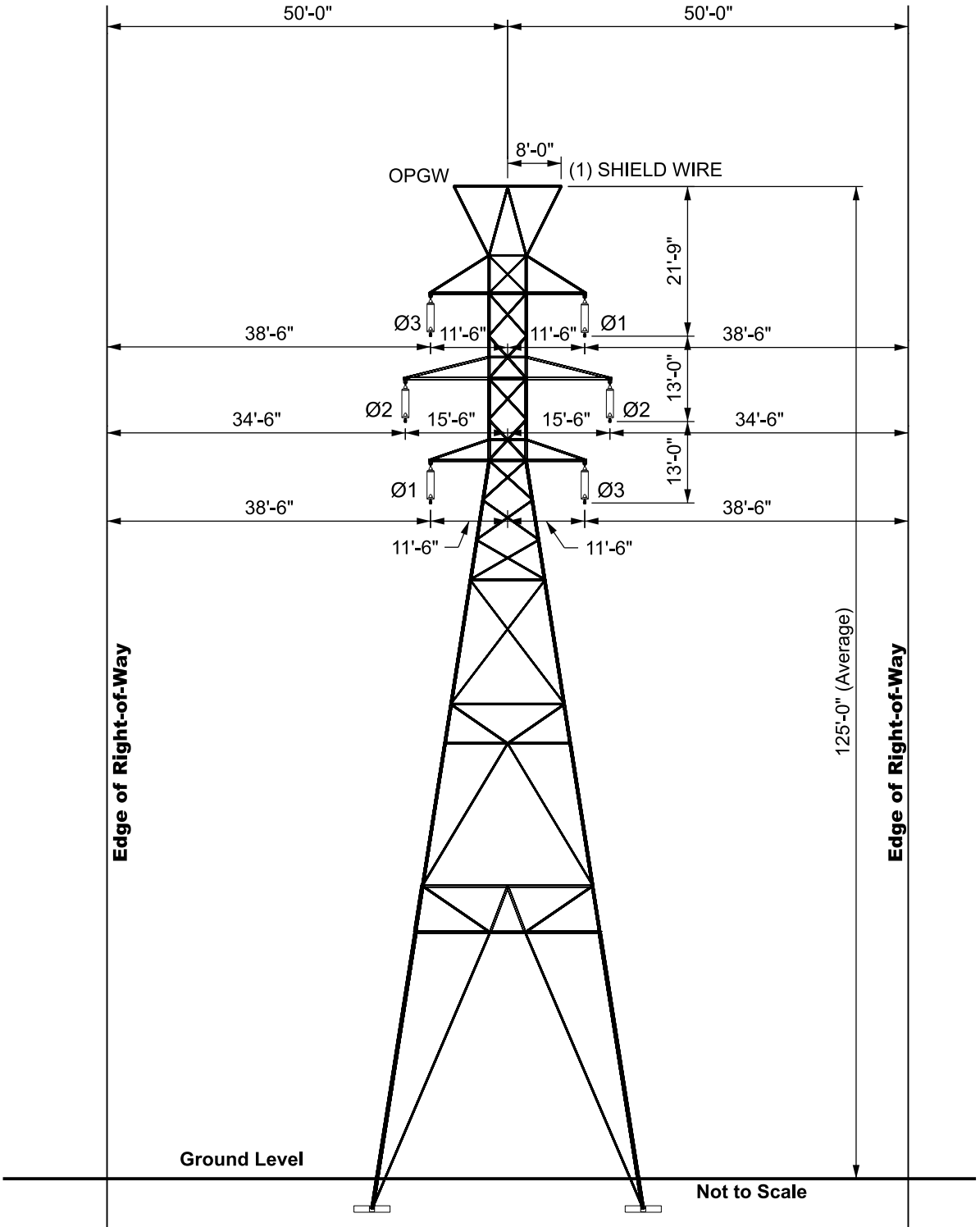
STEEL LATTICE TOWER (DOUBLE CIRCUIT)



Foundation: (4) Earth Grillages
(12-foot average depth)

TYPICAL SCHEMATIC

STEEL LATTICE TOWER (DOUBLE CIRCUIT)



NOTE: CONDUCTOR PHASING ARRANGEMENT MAY VARY BY CIRCUIT. THE PHASING SHOWN ABOVE IS REPRESENTATIVE OF THE PREDOMINATE ARRANGEMENT ONLY

100'-0" Right-Of-Way (Typical Width)

TYPICAL RIGHT-OF-WAY CROSS SECTION

STEEL LATTICE TOWER (DOUBLE CIRCUIT)

COMPARABLE EXISTING STRUCTURE PHOTOGRAPH