PJM Facilities Study Report

For

Network Upgrade N9143

Transition Cycle #1

June 2025

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff and PJM Manuals. The Transmission Owner (TO) is Virginia Electric and Power Company (VEPCO or Dominion).

A. Project Description

The System Impact Study for PJM Interconnection Transition Cycle #1 has identified the need for PJM Network Upgrade N9143. The scope of this Network Upgrade includes the following:

- Upgrade 1.45 miles of 69 kV line 35 between AltaVista and Gladys Tap.

The Preliminary Scoping Document located in the Appendices, Attachment #1 and #2.

B. Transmission Owner Facilities Study Results

1. Detailed Scope of work for Network Upgrade N9143:

The following is a detailed description of Transmission Owner Upgrades for Network Upgrade N9143. These facilities shall be designed according to the Transmission Owner's Applicable Technical Requirements and Standards. Once built the Transmission Owner will own, operate, and maintain these facilities.

See Preliminary Scoping Summaries located in the Appendices, Attachment #1 and #2.

2. MILESTONE SCHEDULE FOR COMPLETION OF DOMINION WORK

Facilities outlined in this report are estimated to take 20 months to construct, from the time of full execution of the Generation Interconnection Agreement and completion of a construction kickoff call. This schedule may be impacted by the timeline for procurement and installation of long lead items and the ability to obtain outages to construct and test the proposed facilities.

Description	Start month	Finish month
Engineering	1	8
Permitting/Procurement	3	17
Construction	17	20

Due to outage congestion, Network Upgrades and/or internal Dominion projects have been identified as having possible outage conflicts with this network upgrade that may affect the estimated milestones listed above. Additional outage sequencing may be required that includes, but not limited to, the following projects:

- Coordinate with AEP

3. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

- The preliminary construction schedule is dependent on outage availability.
- See Attachment 1 – Preliminary Scoping Summary – Substation for additional assumptions
- See Attachment 2 – Preliminary Scoping Summary – Transmission line for additional assumptions

4. LAND REQUIREMENTS

Dominion will be responsible for the following expectations in the area of Real Estate:

- Any additional land needed for Storm Water Management, Landscaping, and Wetlands/Wetlands Mitigation.
- Any other Land/Permitting requirements required by the Network Upgrade

5. ENVIRONMENTAL AND PERMITING

Dominion will be responsible for the following expectations in the area of Environmental and Permitting:

- Assessment of environmental impacts related to the Network Upgrade including:
    - Environmental Impact Study requirements
    - Environmental Permitting
- A stormwater easement and/or specific stormwater design BMP's to allow access to and use of the facilities, including a maintenance agreement for said stormwater facilities.
- Conditional Use Permit for Substation
- Any additional land needed for Storm Water Management, Landscaping, and Wetlands/Wetlands Mitigation
- Any other Permitting requirements required by the Network Upgrade

C. APPENDICES

Attachment #1: Preliminary Scoping Summary – Substation Altavista

Attachment #2: Preliminary Scoping Summary – Transmission

Attachment #1

Project Number: N9143 – Altavista Substation

Project Description: Replace Line Lead for Line 35

SUBSTATION SCOPE OF WORK

Date: 06/20/2025

Revision Number: 0

Project Summary

Network upgrade N9143 provides for the uprate of line 35 at Altavista Substation in Campbell County, Virginia.

Assumptions & Clarifications:

1. REA will need to update Line Leads for line 35 at Gladys Tap due to line 35 replacement.

Purchase and install substation material – Network Upgrade:

1. Conductors, connectors, and grounding materials as per engineering standards

Purchase and install relay material – Network Upgrade:

1. One (1), 1340 – 24” dual SEL-411L DCB/PLC line panel

Remove relay material – Network Upgrade:

1. Remove Panel No. 11

Attachment #2

69 kV LINE #35

Altavista – Gladys Tap

PROJECT N9143

PRELIMINARY SCOPING SUMMARY

This project serves to reconductor 69 kV Line 35 from Altavista Substation to Gladys Tap for approximately 1.20 miles, which is located in Campbell County, VA and Pittsylvania County, VA. In addition, this project will rebuild the span that crosses over Roanoke River, which is approximately 0.25 miles from structure 35/14 (191/14) and 35/15 (191/15). See **Figure 1** for the project location. Line 35 crosses over Otter River Substation. An additional 10' of ROW will be required from Otter River Substation to Gladys Tap. This project will install a total of two (2) new structures, and it will not require a CPCN filing.

The portion of the existing line included in this scope consists primarily of 115 kV double circuit weathering steel monopoles, built in 1991 and 1993. The proposed structures to be installed are one (1) 115 kV double circuit steel H-frame and one (1) 115 kV double circuit steel 3-pole structure. The existing 3-phase single (1) 721 ACAR (18/19) conductor on Line 35 will be replaced with 3-phase single (1) 768.2 ACSS/TW/HS (20/7) "Maumee" conductor. The existing two (2) 3#6 Alumoweld shield wire will be replaced with two (2) DNO-11410 OPGW.

This scope assumes that the existing shield wire and conductor for Line 191 will be transferred to onto proposed structures 35/14 (191/14) and 35/15 (191/15), since Line 35 and Line 191 share double circuit structures throughout this project. The new conductor hardware for Line 191 will not be included in the scope of this project.

Design Considerations:

EXISTING FACILITIES TO BE REMOVED:

1. Remove one (1) existing 115 kV double circuit weathering steel H-frame structure as follows:
    a. Structure 35/14 (191/14)

2. Remove one (1) existing 115 kV double circuit weathering steel 3-pole structure as follows:
    a. Structure 35/15 (191/15)

3. Remove approximately 1.45 miles of 3-phase single (1) 721 ACAR (18/19) conductor from existing backbone structure 35/1A to existing structure 35/15 (191/15).

4. Remove approximately 1.45 miles of two (2) 3#6 Alumoweld shield wire from existing backbone structure 191/1A to existing structure 35/15 (191/15).

EXISTING FACILITIES TO BE MODIFIED:

1. Transfer the existing 3-phase single (1) 721 ACAR (18/19) conductor for Line 35 from the **ahead side** of existing structure 35/15 (191/15) to the **ahead side** of proposed structure 35/15 (191/15).

2. Transfer the existing 3#6 Alumoweld shield wire as follows:
    a. Two (2) 3#6 Alumoweld shield wire for Line 191 from the **ahead side** of existing structure 35/15 (191/15) to the **ahead side** of proposed structure 35/15 (191/15).

3. Remove and replace three (3) over-insulated 69 kV conductor strain crossing assemblies [Reference Drawing 31.330] on the following four (4) structures:
    a. Structures 35/1A, 35/1 (191/1), 35/10 (191/10), and 35/11 (191/11) (191/11A)

4. Remove and replace three (3) over-insulated 69 kV conductor strain assemblies [Reference Drawing 31.530] on the following three (3) structures:
    a. Structures 35/1 (191/1), 35/10 (191/10), and 35/11 (191/11) (191/11A)

5. Remove and replace six (6) over-insulated 69 kV conductor strain assemblies [Reference Drawing 31.530] on the following four (4) structures:
    a. Structures 35/2 (191/2), 35/7 (191/7), 35/9 (191/9), and 35/13 (191/13)

6. Remove and replace three (3) over-insulated 69 kV conductor suspension assemblies [Reference Drawing 31.510] on the following six (6) structures:
    a. Structures 35/3 (191/3) - 35/6 (191/6), 35/8 (191/8), and 35/12 (191/12)

7. Remove and replace three (3) over-insulated 69 kV conductor training insulator assemblies [Reference Drawing 31.640] on the following seven (7) structures:
    a. Structures 35/1 (191/1), 35/2 (191/2), 35/7 (191/7), 35/9 (191/9), 35/10 (191/10), 35/11 (191/11) (191/11A), and 35/13 (191/13)

8. Remove and replace three (3) over-insulated 69 kV conductor jumper loop assemblies [Reference Drawing 39.225] on the following seven (7) structures:
    a. Structures 35/1 (191/1), 35/2 (191/2), 35/7 (191/7), 35/9 (191/9), 35/10 (191/10), 35/11 (191/11) (191/11A), and 35/13 (191/13)

9. Remove and replace four (4) shield wire strain assemblies with OPGW strain assemblies [Reference Drawing 96.060] on the following seven (7) structures:
    a. Structures 35/1 (191/1), 35/2 (191/2), 35/7 (191/7), 35/9 (191/9), 35/10 (191/10), 35/11 (191/11) (191/11A), and 35/13 (191/13)

10. Remove and replace two (2) shield wire strain assemblies with OPGW strain assemblies [Reference Drawing 96.061], and two (2) shield wire safety catches with OPGW safety catch assemblies [Reference Drawing 96.100] on the following structure:
    a. Structure 191/1A

11. Remove and replace two (2) shield wire suspension assemblies with OPGW suspension assemblies [Reference Drawing 96.020] on the following six (6) structures:
    a. Structures 35/3 (191/3) – 35/6 (191/6), 35/8 (191/8), and 35/12 (191/12)

12. In addition to the assemblies to be installed, three (3) floating dead-end assemblies [(2) of 31.530 and (1) of 39.225 per assembly] are included in the estimate for five (5) suspension structures:
    a. The quantity of floating deadends provided is based on conceptual scope note 1.

PERMANENT FACILITIES TO BE INSTALLED:

1. Install one (1) 115 kV double circuit engineered steel double deadend H-frame structure [Reference Drawing 12.215 (115 kV spacing)] on foundations as follows:
    a. Structure 35/14 (191/14)
    b. See **Figure 2** for a visual of the proposed structure design.

2. Install one (1) 115 kV double circuit engineered steel double deadend 3-pole structure [Reference Drawing 12.231 (115 kV spacing)] on foundations as follows:
    a. Structure 35/15 (191/15)
    b. See **Figure 3** for a visual of the proposed structure design.

3. Install approximately 1.45 miles of 3-phase single (1) 768.2 ACSS/TW/HS (20/7) “Maumee” conductor for Line 35 from existing backbone structure 35/1A to proposed structure 35/15 (191/15).

4. Install approximately 1.45 miles of two (2) DNO-11410 OPGW from existing backbone structure 191/1A to proposed structure 35/15 (191/15).
    a. This includes the installation of six (6) splices as follows:
        i. Two (2), one on each leg, on existing backbone structure 191/1A [Reference Drawing 96.601].
        ii. Two (2) on proposed structure 35/15 (191/15) [Reference Drawing 96.510].
        iii. Two (2) on existing structure 35/7 (191/7) [Reference Drawing 96.600].

CONCEPTUAL SCOPE NOTES:

1. No PLS-CADD modeling was done for this project. Instead, a design span was used to determine the difference in sags between the existing and proposed conductors at max sag conditions. The resulting change in max sags is approximately 2.93'. Existing structures 35/14 (191/14) and 35/15 (191/15) are considered insufficient for the proposed conductor, resulting in the need for the line to be partially rebuilt. However, the remaining structures in the project area are sufficient for the proposed conductor. For every 1' difference in maximum operating temperature sag, 75% of the existing suspension structures will have floating deadend assemblies provided for them.
    a. Design Span Length = 650'
    b. Existing Design Tension = 6,800 lbs NESC Heavy
    c. Proposed Design Tension = 6,800 lbs NESC Heavy

2. Structures 35/14 (191/14) and 35/15 (191/15) were replaced like for like and estimated using typical transmission right of way characteristics.

3. Structures are designed based off the following NESC code parameters: NESC Heavy, 90 mph wind, ¾" Ice & 30 mph wind regardless of project location.

4. It is assumed for detailed engineering that a LiDAR survey will be required.

5. Any potential height restrictions were not accounted for in this design.

6. The existing right of way widths are as follows:
    a. Approximately 155' wide from Altavista Substation to Otter River Substation.
    b. Approximately 140' wide from Otter River Substation to Gladys Tap.
        i. An approximately 10' wide easement exists from structure 35/14 (191/14) to Roanoke River. This section's total right of way width is 150'.

   This project assumes that approximately 0.47 miles of 10' wide of additional right of way will be required from Otter River Substation to Gladys Tap.

7. A wetland delineation has not been completed as part of this conceptual package.

8. Wire reel lengths were not accounted for this line design. The assumed pull pad locations to avoid tension splices will be determined during detailed design.

9. Lines 35 and 191 cross over Roanoke River between structures 35/14 (191/14) and 35/15 (191/15).

10. Lines 35 and 191 cross over a Norfolk Southern Railroad between structures 35/13 (191/13) and 35/14 (191/14).

11. This project assumes that the risers for Line 35 at Altavista Substation will be replaced. Coordination will be required during detailed design.

12. This project assumes that there is sufficient conductor and shield wire lengths to transfer the **ahead spans** of wire from existing structure 35/15 (191/15) to proposed structure 35/15 (191/15).

13. It is assumed that outages can be obtained for Lines 35 and 191. No temporary structures are included in this scope.

14. It is assumed that all existing structures impacted by this project can withstand the new loading applied to them and can therefore be reused.

15. Lines 35 and 191 share a corridor with Line 31.

16. In order to utilize standard Dominion conductor assemblies, it is assumed that "over-insulated 69 kV" conductor assemblies are equivalent to the standard Dominion 115 kV conductor assemblies (8 insulator bells).

CONCEPTUAL ESTIMATE NOTES:

1. Engineered steel pole costs were determined based off typical wind and weight spans, line angles, and average structure heights in the typical right of way associated with the structure type.

2. Steel pole foundation costs were based off the projects' location and structure type in the regional soil profile map. The regional soil profile map used for this project is Piedmont.

3. The conceptual estimate assumes that a laydown yard is required for this project.

4. The new right of way is assumed to be acquired by the developer and transferred to Dominion. As such, the costs for acquiring the land rights are not included in this estimate.

5. Prior to detailed engineering, a full land rights review would be required. A desktop review was completed to estimate the project cost.

6. Access estimate cost inputs include the following assumptions:
    a. Work pad totals based on provided SOW and assumptions from kmz file. Assume 15 mats for tangents and 30 mats for angles at each work pad for reconductor work and 50 mats per pull pad.
    b. DDE structures assumed based off of wire reel lengths - based off of pull pad locations.
    c. Pull pad locations based on location of major road/water crossings and line mileage.
    d. Assuming that existing stone in Substations will be used for access per SOW and that access is existing or will be built by others before the start of construction. Assumes that the substations will be constructed with access roads built to and from Substations and work from inside the substations for Backbone installation.
    e. Assumes no delays due to permitting or real estate issues after work begins. Assume no schedule compressions from SOC/PJM.
    f. Assumes all clearing and forestry costs have been captured by others. No access costs for forestry activities included in this pricing.
    g. Stream crossing based on estimates from aerial imagery.
    h. Assumes that all existing roads may be dressed with stone that can remain at the end of the project. Assumes existing two track roads in many locations will be impermeable. No costs for stone road removal are included.

Figure 1 – Project Location

Figure 2 – Proposed Structure Configuration

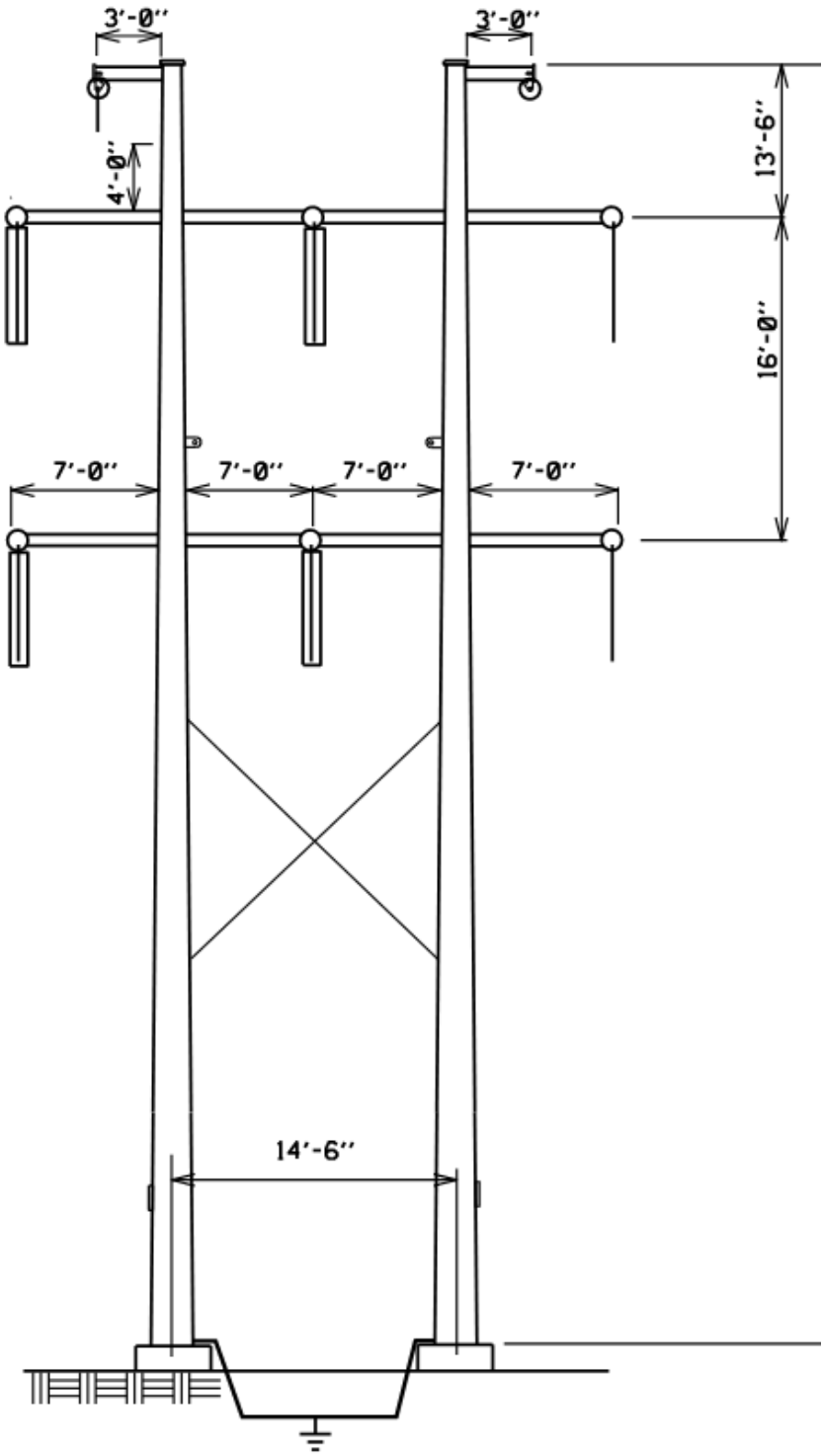
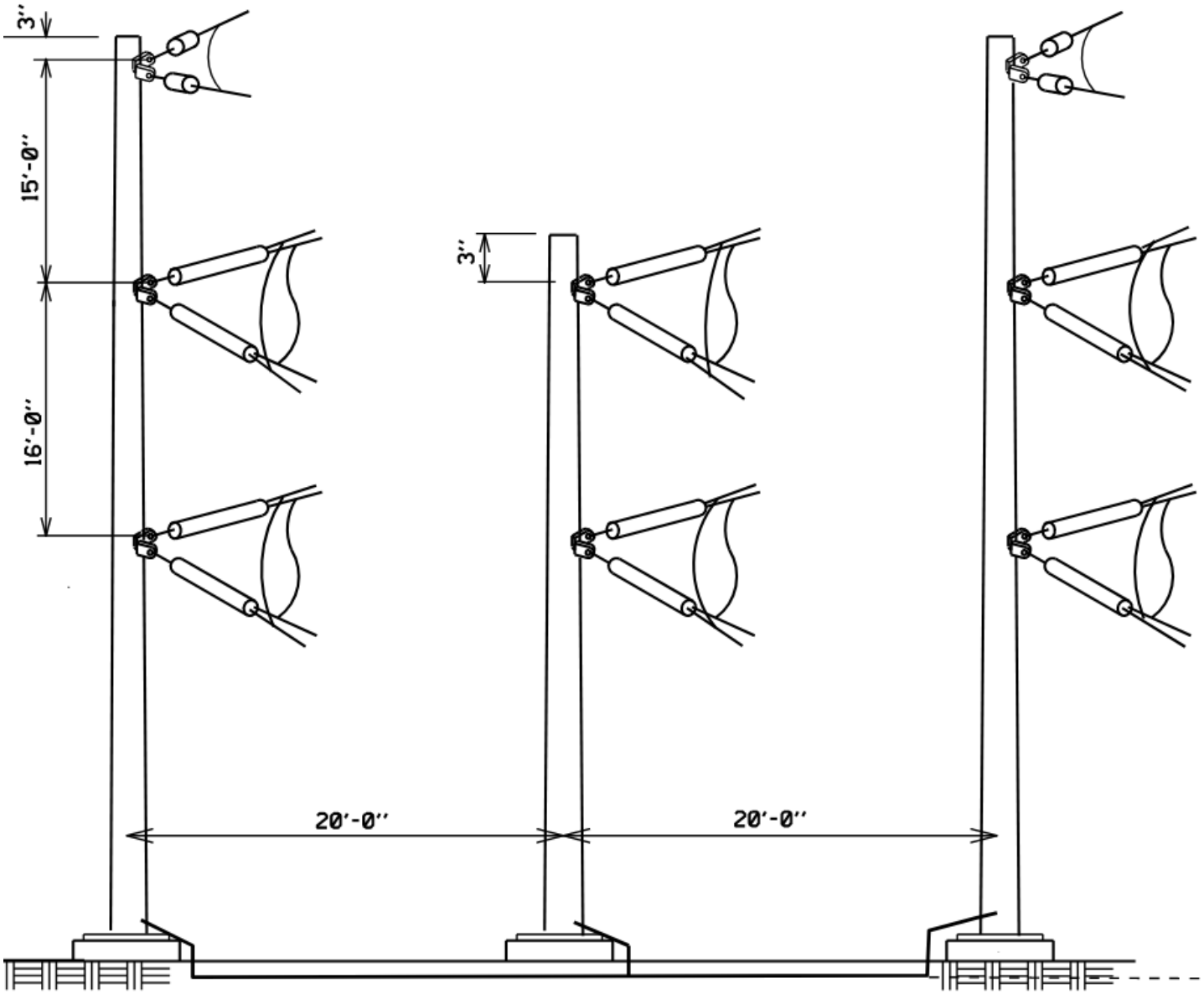


Figure 3 – Proposed Structure Configuration



Required Material Summary

Item	Qty
Engineered Structures	2
12,000-Ft OPGW Reels	2
12,000-Ft Conductor Reels	3