PJM Facilities Study Report

For

Network Upgrade N9207

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 N9207. The scope of this Network Upgrade includes the following:

- Replace 500/230kV Transformer #1 at Elmont Substation.

B. Transmission Owner Facilities Study Results

1. Detailed Scope of work for Network Upgrade N9207:

The following is a detailed description of Transmission Owner Upgrades for Network Upgrade N9207. 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 59 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	10
Permitting/Procurement	3	45
Construction	47	59

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 other projects associated with Elmont Substation

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

The 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 Elmont

Attachment #2: Preliminary Scoping Summary – Transmission

Attachment #1

Project Number: N9207 – Elmont Substation

Project Description: Replace Transformer Bank #1

SUBSTATION SCOPE OF WORK

Date: 7/1/2025

Revision Number: 0

Project Summary

Network upgrade N9207 provides for the replacement of 500/230kV Transformer Bank #1 at Elmont Substation in Henrico County, Virginia.

Assumptions & Clarifications:

1. *The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary.*
2. *4-hole pad connections must be replaced with 6-hole and 8-hole pad connections to maintain 5000A ratings.*
3. *Transformer conductor sizing to be determined in Detailed Design as per engineering standards*

Purchase and install substation material – Network Upgrade:

1. Four (4), 500-230kV, 480MVA, single phase transmission transformer
2. Four (4), 396kV, 318kV MCOV, surge arrester
3. Four (4), 180kV, 144kV MCOV, surge arrester
4. Steel structures as required including switch stands, oil containment, bus supports, and CCVT supports
5. Foundations as required including equipment and bus support stands
6. Conductors, connectors, conduits, control cables, and grounding materials as per engineering standards

Remove substation material – Network Upgrade:

1. Four (4), 500-230kV, 280MVA, single phase transmission transformer
2. Conductor, connectors, conduit, control cable, foundations, structures, and grounding materials as per engineering standards

Purchase & install relay material – Network Upgrade:

1. Four (4), SPR relay/aux package
2. Four (4), 4510 – SEL-2411 transformer annunciator
3. One (1), 1217 – Dual SEL-487E transmission transformer differential panel
4. Four (4), 4526_C - >=84MVA transformer fiber make-up box

Remove relay material – Network Upgrade:

1. Remove Panel No. 1

Attachment #2

230kV Strain Bus

Elmont Substation

PROJECT N9207

PRELIMINARY SCOPING SUMMARY

This project serves to replace the 500/230kV transformer on the North side of Elmont Substation in Hanover County, VA. To accommodate the substation work, the 230kV strain bus connecting the transformer to the rigid 230kV bus will need to be uprated. See **Figure 1** for the project location. The proposed work requires no additional land and will all be completed within existing substation property. The project will install no new structures. A certificate of public convenience and necessity (CPCN) filing is not expected to be required.

The existing conductor is supported by deadend steel structures within the station which will remain. The existing conductor is predominately 2-1590 AAC Coreopsis will be replaced with 2-2500 ACAR. The existing shield wire will not be impacted by this project.

The conductor and structures referred to in this scope are not transmission structures and as such do not have a circuit number assigned to them. Structure numbers will be referred to as labeled in **Figure 2**.

Design Considerations:

EXISTING FACILITIES TO BE REMOVED:

1. Remove approximately 0.06 miles of 3-phase 2-1590 AAC 230kV conductor from existing structure SB1 to existing structure SB3.

2. Remove approximately 0.03 miles of single phase 2-1590 AAC 230kV conductor from existing structure SB4 to existing structure SB6.

EXISTING FACILITIES TO BE MODIFIED:

1. Replace a total of sixteen (16) conductor crossing strain assemblies [Reference Drawing 32.338] as follows:
    a. Replace one (1) assembly on structures SB4 and SB6.
    b. Replace two (2) assemblies on structure SB5.
    c. Replace three (3) assemblies on structures SB1 and SB3.
    d. Replace six (6) assemblies on structure SB2.

2. Replace a total of four (4) conductor jumper assemblies [Reference Drawing 39.227] as follows:

a. Replace one (1) assembly on structure SB5.
b. Replace three (3) assemblies on structure SB1.

PERMANENT FACILITIES TO BE INSTALLED:

1. Install approximately 0.06 miles of 3-phase 2-2500 ACAR 230kV conductor from existing structure SB1 to existing structure SB3.

2. Install approximately 0.03 miles of single phase 2-1590 AAC 230kV conductor from existing structure SB4 to existing structure SB6.

CONCEPTUAL SCOPE NOTES:

1. No PLS-CADD modeling was done for this project. It is assumed that the structures have the capacity to be reconductored due to the short span lengths and relative similarity between the existing conductor and the proposed.

2. No LiDAR should be required for this project as the as-built survey from the line 73 rebuild project flown in 2023 should be sufficient.

3. The proposed strain bus crosses over line 73. It is assumed an outage on the line can be acquired for this work.

4. The substation operating one line indicates that the strain bus alternates between 2-1590 AAC, 2-2500 ACAR, and 2-2049.5 AAAC but is unclear on the demarcation points between these conductor types. It is assumed that the 2-2500 ACAR and 2-2049.5 AAAC conductor callouts refer to the jumpers/risers connected to the strain bus spans. However, if this is not the case then the existing section of 2-2500 ACAR conductor would not require replacement.

5. This scope is based on the working copy of the N9207 General Arrangement drawing for Elmont Substation dated 4/24/2020. As this is a working copy of the general arrangement, the copy provided with this scope should be considered for reference only. Please refer to the substation conceptual package for the most up to date document.

CONCEPTUAL ESTIMATE NOTES:

1. Due to the time allotted to create an estimate, stakeholders were not consulted for their respective costs. Stakeholder costs were derived as follows:
    a. Permitting, Right of Way Management (Encroachments), Forestry, Rehab, and Access costs were assumed to be $0 due to all of the work occurring within the substation.

b. Real estate acquisition costs were assumed to be $0 due to no additional land being needed.
c. Surveying costs were assumed to be $0 due to no additional structures needing to be spotted and existing Lidar survey being available.
d. Communications (Marketing Manager) costs are assumed to be Tier 1 - $25k due to all the work occurring within the substation.
e. Telecommunications costs are assumed to be $0 due to no fiber work being required.

Figure 1 – Project Location

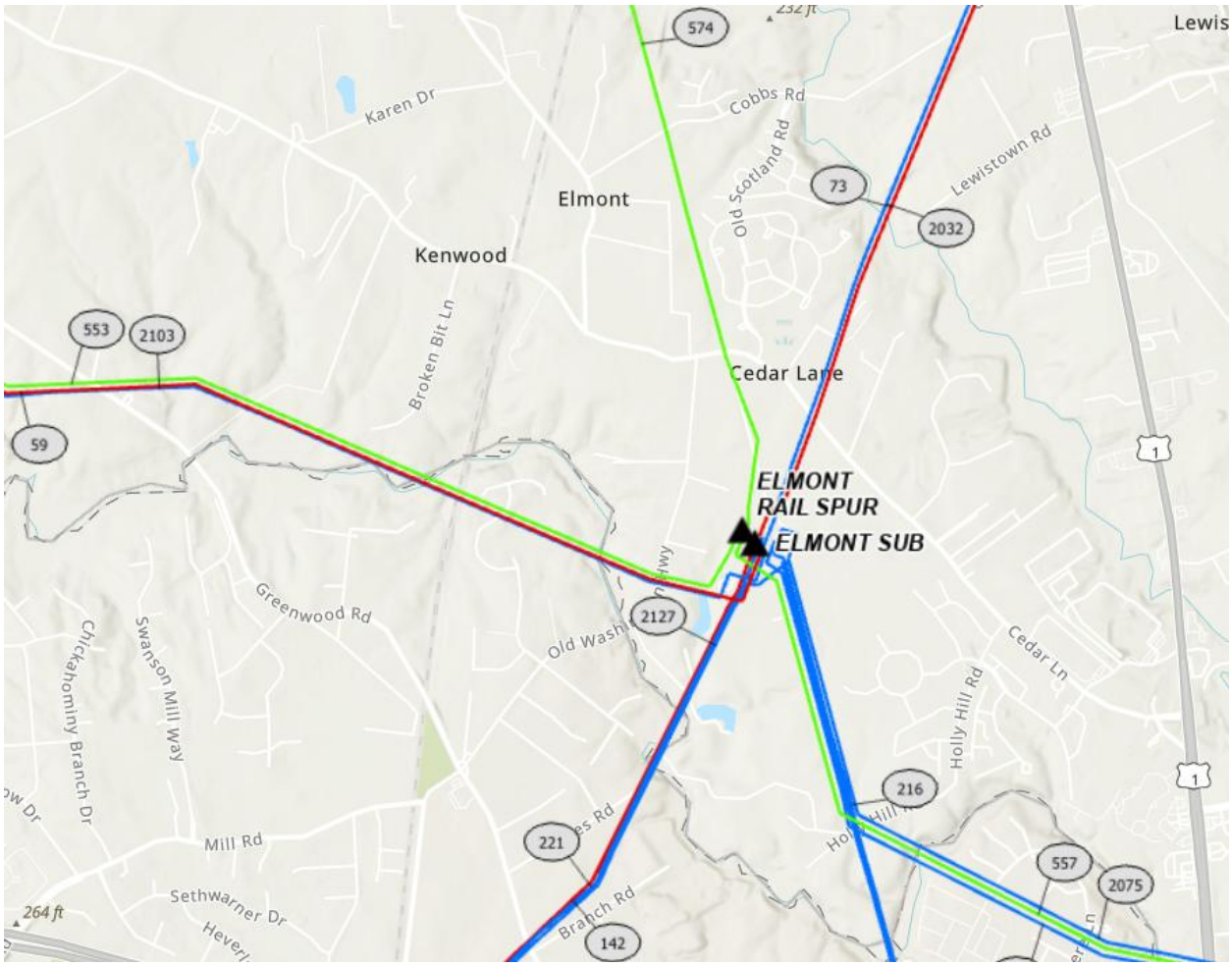

Figure 2 –Structure Naming Convention