PJM Facilities Study Report

For

Network Upgrade N9681

Transition Cycle #1

December 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 N9861. The scope of this Network Upgrade includes the following:

- Upgrade 1.04 Miles of 230kV transmission line 249 from 249/86 to 249/93

B. Transmission Owner Facilities Study Results

1. Detailed Scope of work for Network Upgrade N9681:

The following is a detailed description of Transmission Owner Upgrades for Network Upgrade N9681. 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.

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.

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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 milestone listed above. Additional outage sequencing may be required that includes, but not limited to the following projects:

- Coordination with projects on, adjacent to, or sharing a corridor with Line 249
  - N9200 – Rebuild line 238 from Sapony – Carson.
  - N9138 – Uprating line 511 from Carson – Rawlings.
  - N9139 – Uprating line 563 from Midlothian – Carson
  - N9249 – Construct new 500kV line from Midlothian – Carson
  - N9250 – Construct new 500kV line from Carson – Rawlings.

ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

- It is assumed that an outage for Line 249 will be required for the work specified in this scope, and no temporary line configurations will be necessary for this project
- The conceptual estimate assumes that a laydown yard is required for this project.
- It is assumed for detailed engineering that a LiDAR survey will be required.

1. 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

2. 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 – Transmission

Attachment #1

Project N9681 – Line 249 Reconductor

Line 249: Str. 249/86 to 249/93

Preliminary Scoping Summary

*This project serves to reconductor approximately 1.04 miles of 230kV line 249 from structures 249/86 to 249/93 in between Locks and Carson Substations in Dinwiddie County, VA. The proposed work requires no additional land and will all be completed within the existing right of way. A Certificate of Public Convenience and Necessity (CPCN) filing will not be needed for this project. This portion of the line primarily consists of double circuit steel towers that were installed in 2023. The existing double circuit towers are being utilized by existing circuits 249 and 238. The existing twin-bundled (2) 636 ACSR "Rook" conductor is to be replaced with twin-bundled (2) 768.2 ACSS/TW/HS "Maumee" conductor. See **Figure 1** for the project location.*

Length of Route	**1.04 miles**
Location of the subject line (County/State)	**Dinwiddie County, VA**
Total Number of Permanent Structures	**None**
Total Number of Temporary Structures	**None**
CPCN/SCC Required?	**No**
New ROW Required?	**No**

This project will utilize current Dominion 230kV standards. The conceptual estimate includes cost for the following:

Existing Facilities to be Removed

Wire: Mileage listed is per circuit.

Length (Miles)	**Circuit**	**# if Bundled-Wire Type "Name"**	**Start-End**
1.04	249	2-636 ACSR "Rook" Conductor	249/86 – 249/93

Permanent Facilities to be Installed

Wire:

1. Mileage listed is per circuit
2. Conductor includes dampers and spacers.

Length (Miles)	Circuit	# if Bundled-Wire Type "Name"	Start-End
1.04	249	2-768.2 ACSS/TW/HS "Maumee" Conductor	249/86 – 249/93

Existing Facilities to be Transferred or Modified

1. Remove and replace a total of twelve (12) conductor dead-end assemblies as follows:
    a. Three (3) each on structures 249/86, and 93.
    b. Six (6) on structure 249/90.
    c. See **Figure 2** for reference drawing 32.630.
2. Remove and replace a total of three (3) conductor post assemblies as follows:
    a. Three (3) on structure 249/86.
    b. See **Figure 3** for reference drawing 32.645.
3. Remove and replace a total of three (3) conductor post assemblies as follows:
    a. Three (3) on structure 249/93.
    b. See **Figure 4** for reference drawing 32.720.
4. Remove and replace a total of twelve (12) conductor V-string suspension assemblies as follows:
    a. Three (3) each on structures 249/88, 89, 91, and 92.
    b. See **Figure 5** for reference drawing 32.857.
5. Remove and replace a total of nine (9) conductor jumper loop assemblies as follows:
    a. Three (3) each on structures 249/86, 90, and 93.
    b. See **Figure 6** for reference drawing 39.227.
6. Additionally, this scope includes a total of three (3) floating dead-end assemblies [(2) of 32.630 and (1) of 39.227 per assembly] as follows:
    a. On one (1) out of the four (4) structures 249/88, 89, 91, and 92.
    b. See scope note 1.

Scope Notes/Assumptions

1. The existing towers and structures were installed within the last 15 years and are assumed to be sufficient to remain. In detailed engineering, existing structures will need to be analyzed. 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 0.88'. All structures in the project area are sufficient for the proposed conductor. For every 1' difference in maximum operating temperature sag, 25% of the existing suspension structures will have floating dead-end assemblies provided for them.
    a. Design Span Length = 1150'
    b. Existing Design Tension = 9,384 lbs NESC Heavy

c. Proposed Design Tension = 9,384 lbs NESC Heavy

2. This project will need to go through full conceptual engineering design prior to detailed engineering.
3. For detailed engineering, it is assumed that LiDAR survey will be required.
4. Structures are designed based off the following NESC 2017 code parameters: NESC Heavy, 90 mph wind, ¾" Ice and 30mph wind regardless of project location.
5. A wetland delineation has not been completed as part of this conceptual package.
6. 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.
7. No potential FAA restrictions have been accounted for in this design.
8. The existing right of way width of 450 ft from existing structure 249/86 to 249/93 is based on Map Viewer. No additional ROW is anticipated to be required.
    a. Line 249 shares the right of way corridor with lines 238, 2002, 563, and 511.
9. This scope assumes that project N9681 occurs prior to other network upgrades included in Transition Cycle 1 Phase 3. The following projects may impact the project scope if this assumption is incorrect:
    a. N9200 – Rebuild line 238 from Sapony – Carson.
    b. N9138 – Uprating line 511 from Carson – Rawlings.
    c. N9139 – Uprating line 563 from Midlothian – Carson
    d. N9249 – Construct new 500kV line from Midlothian – Carson
    e. N9250 – Construct new 500kV line from Carson – Rawlings.

Estimate Notes/Assumptions

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. Due to existing foundation needing to be analyzed in detailed engineering, structural engineering hours and cost were added to the estimate to account for the design work.
4. The conceptual estimate assumes that a laydown yard is required for this project.
5. Prior to detailed engineering, a full land rights review would be required.
6. Due to the time allotted to create an estimate, stakeholders were not consulted for their respective costs. Stakeholder costs were derived as follows:
    a. DEES Permitting costs were based on a cost per mile based off comparable projects in the TC#1 Phase 3 Cycle. Project N9200, which partially rebuilds a portion of line 238 for approximately 11.79 miles, was used to develop the DEES cost per mile due to similar project scope and location.
    b. Siting and Permitting costs were derived using the permitting spreadsheet but not verified by the permitting team.

c. Real Estate acquisition costs are assumed to be zero due to not acquiring any new land for Right of Way.

d. Right of Way Management (Encroachment) costs were based on a cost per mile based off comparable projects in the TC#1 Phase 3 Cycle. Project N9200 was used to develop the ROW Management cost per mile due to similar project scope and location.

e. Forestry, Rehab, and Access costs were based on a cost per mile based off comparable projects in the TC#1 Phase 3 Cycle. Project N9200 was used to develop the Forestry and Access cost per mile due to similar project scope and location.

f. Surveying costs were based on the typical cost to acquire approximately 2 miles of survey and no additional right of way being acquired. These costs were provided by the surveying team as part of the TC#1 Phase 3 process.

g. Communications (Marketing Manager) costs are assumed to be Tier II - $75K due to similar scope of work for project N9199.

h. Telecommunications costs are assumed to be zero due to no fiber being installed for this project.

Figure 1 – Project Location