PJM Facilities Study Report

For

Network Upgrade N9377

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 N9377. The scope of this Network Upgrade includes the following:

- Upgrade 0.18 Miles of 230kV transmission line 2092 from Pembroke Creek and West Albemarle DP.

B. Transmission Owner Facilities Study Results

1. Detailed Scope of work for Network Upgrade N9377:

The following is a detailed description of Transmission Owner Upgrades for Network Upgrade N9377. 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 18 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	18

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 on line 2092

3. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

- The preliminary construction schedule is dependent on outage availability.
- See Attachment 1 and 2– Preliminary Scoping Summary – Substation for additional assumptions
- See Attachment 3 – 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 Pembroke Creek

Attachment #2: Preliminary Scoping Summary – Transmission

Attachment #1

Project Number: N9377 – Pembroke Creek Station

Project Description: Replace Line Lead for Line 2092

SUBSTATION SCOPE OF WORK

Date: 06/20/2025

Revision Number: 0

Project Summary

Network upgrade N9377 provides for the uprate of line 2092 at Pembroke Creek Station in Chowan County, North Carolina.

Assumptions & Clarifications:

1. *None*

Purchase and install substation material – Network Upgrade:

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

Attachment #2

230 kV LINE #2092

Pembroke Creek – West Albemarle DP

PROJECT N9377

PRELIMINARY SCOPING SUMMARY

This project serves to reconductor 230 kV line 2092 from Pembroke Creek to West Albemarle DP for approximately 0.18 miles, which is located in Chowan County, NC. See **Figure 1** for the project location. The proposed work requires no additional land and will all be completed within existing right of way. The project will not install new structures, and the Certification of Public Convenience and Necessity (CPCN) filing is not expected.

The existing line consists mainly of 230 kV weathering steel monopole structures built in 2019. The existing single (1) 1192.5 ACSR 45/7 conductor will be replaced with twin bundled (2) 768.2 ACSS/TW/HS (20/7) "Maumee" conductor.

It is assumed that an outage for Line 2092 will be acquired for the work specified in this scope, and no temporary line configurations will be necessary for this project.

Design Considerations:

EXISTING FACILITIES TO BE REMOVED:

1. Remove approximately 0.18 miles of single (1) 1192.5 ACSR 45/7 conductor from the **ahead side** of existing backbone structure 2092/171 outside West Albemarle DP to the **back side** of existing structure 2092/174 outside Pembroke Creek Substation.

2. Remove one (1) existing 3000 Amp switch attachment on the following one (1) structure:
    a. Structure 2092/172

EXISTING FACILITIES TO BE MODIFIED:

1. Replace three (3) conductor strain assemblies with three (3) conductor crossing strain assemblies [Reference Drawing 32.338] and three (3) jumper loop assemblies with three (3) jumper loop assemblies [Reference Drawing 39.227] on the following one (1) structure:
    a. On the ahead side of existing structure 2092/171

2. Replace three (3) conductor strain assemblies with three (3) conductor strain assemblies [Reference Drawing 32.630], one (1) training insulator assemblies with one (1) training insulator assemblies [Reference Drawing 32.645], and three (3) jumper loop assemblies with three (3) jumper loop assemblies [Reference Drawing 39.227] on the following one (1) structure:
    a. On the back side of existing structure 2092/174

3. Replace six (6) conductor strain assemblies with three (3) conductor strain assemblies

[Reference Drawing 32.630] and three (3) conductor crossing strain assemblies [Reference Drawing 32.338] on the following one (1) structure:

a. Structure 2092/172.

4. Replace six (6) conductor strain assemblies with six (6) conductor strain assemblies [Reference Drawing 32.630], three (3) training insulator assemblies with three (3) training insulator assemblies [Reference Drawing 32.645], and three (3) jumper loop assemblies with three (3) jumper loop assemblies [Reference Drawing 39.227] on the following one (1) structure:

    a. Structures 2092/172A

5. Replace three (3) conductor suspension assemblies with three (3) conductor suspension assemblies [Reference Drawing 32.610] on the following one (1) structure:

    a. Structure 2092/173.

6. Replace one (1) set of 3-phase single (1) 1192.5 ACSR jumper loop assemblies with twin bundled (2) 768.2 kcmil ACSS/TW/HS "Maumee" jumper loop assemblies on the following one (1) structure:

    a. Structure 2092/171A.

7. In addition to the assemblies to be installed, three (3) floating dead-end assemblies [(2) of 32.630 and (1) of 39.227 per assembly] are included in the estimate for one (1) suspension structures.

    a. The quantity of floating deadends provided is based on conceptual scope note 1.

PERMANENT FACILITIES TO BE INSTALLED:

1. Install approximately 0.18 miles of 3-phase twin bundled (2) 768.2 ACSS/TW/HS (20/7) “Maumee” conductor from the **ahead side** of the existing backbone structure 2092/171 to the **back side** of the existing structure 2092/174.

8. Install one (1) 4000 Amp switch attachment on the following one (1) existing structure:

    a. Structure 2092/172.

CONCEPTUAL SCOPE NOTES:

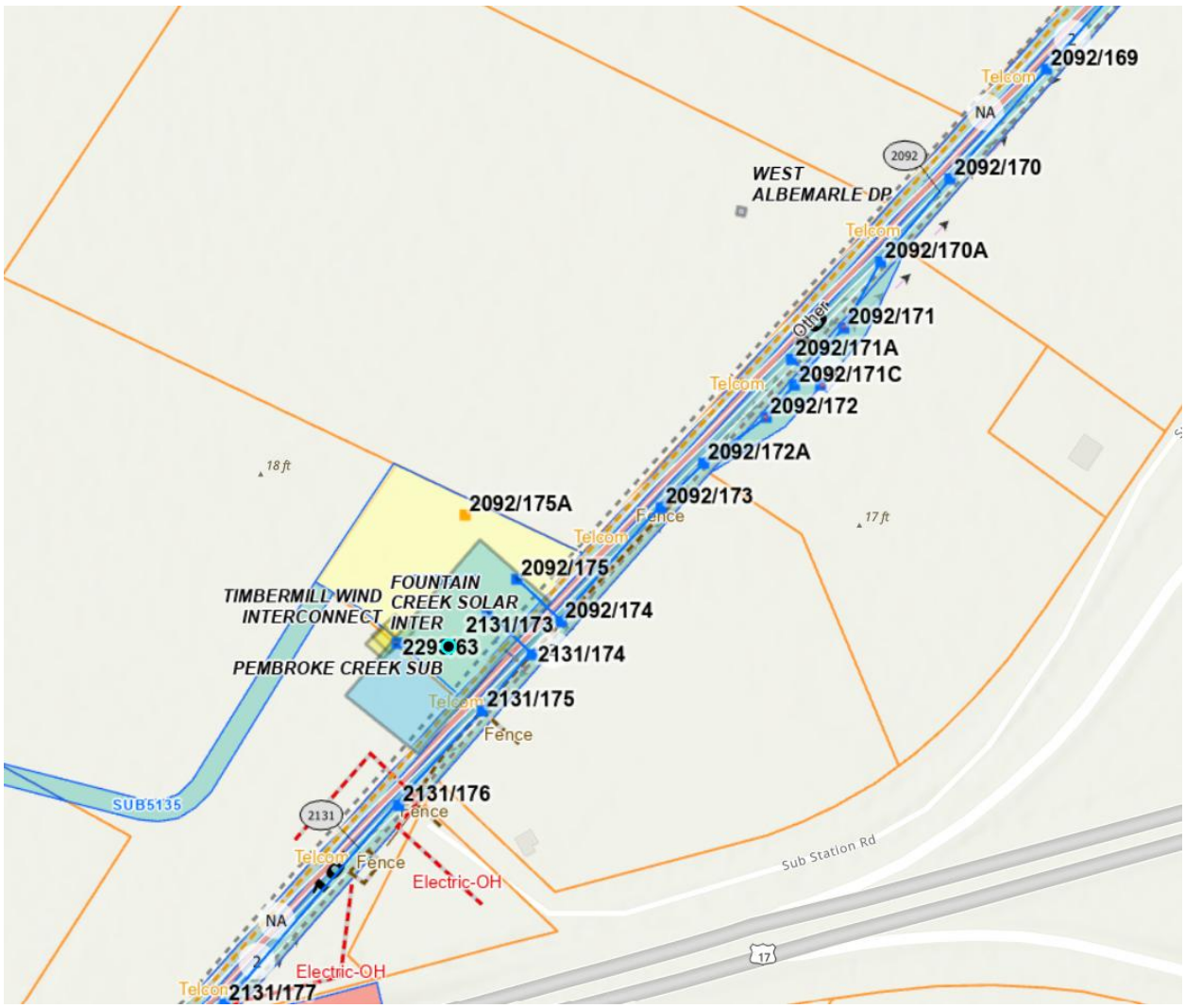
1. No PLS-CADD modeling was done for this project. Instead, a design span was used to determine the difference in sags between the existing and proposed conductors at max sag conditions. The resulting change in max sags for the existing and proposed conductor shows that the proposed conductor sags less than the existing conductor. This change in sags is expected to be feasible to reconductor the line. This scope will still be providing additional floating dead-end assemblies as an alternative method to mitigate potential clearance violations. 25% of the suspension structures will have floating dead-end assemblies provided for them.
    a. Design Span Length = 350 feet
    b. Existing Design Tension = 14,125 lbs NESC Heavy
    c. Proposed Design Tension = 6,500 lbs NESC Heavy
2. It is assumed for detailed engineering that a LiDAR survey will be required.
3. Any potential height restrictions were not accounted for in this design.
4. The existing right of way was identified as 84 ft based on plan and profiles from spec book 992659. Based off existing information, there is an adjacent railroad, which may have a pole line easement in place. Since no additional structures are being installed for this project, no additional right of way will need to be acquired for this project. The existing right of way will need to be confirmed and analyzed in detailed engineering.
5. A wetland delineation has not been completed as part of this conceptual package.
6. Wire reel lengths were accounted for this line design. The assumed pull pad locations to avoid tension splices will be determined during detailed design.
7. It is assumed that no fiber will be installed into West Albermarle DP and Pembroke Creek substation. In detailed engineering, this project will need to discuss this design approach with the telecommunications group.

CONCEPTUAL ESTIMATE NOTES:

1. The conceptual estimate assumes that a laydown yard is required for this project.
2. 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 N9211, which is reconductoring line 123 from Rocky Mount Sub to Battleboro Sub, 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 were assumed to be $0 due to no additional land needed to be acquired
d. Right of Way Management (Encroachment) costs were assumed to be $0 based off MapViewer and google earth analysis.
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 N9211, which is reconductoring line 123 from Rocky Mount Sub to Battleboro Sub, 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 ten miles of survey and acquire new right of way. 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 1 - $25K based off similar linear lengths and locations to projects N9211 and N9145.
h. Telecommunications costs are assumed to be $0 due to no fiber being installed for this project.

Figure 1 – Project Location



Required Material Summary

Item	Qty
12,000-Ft 768.2 ACSS/TW/HS (20/7) “Maumee” conductor	2