Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request

Project ID AG2-384

“Chesterfield 230 kV”

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff, as well as the Application and Studies Agreement between the Project Developer and PJM Interconnection, LLC (PJM or Transmission Provider (TP)). The Transmission Owner (TO) is Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion).

This Facility Study was performed to satisfy the Phase 2 Facility Study requirement of the PJM Tariff. The Facility Study is intended to provide scope, cost and schedule estimates for the project as currently defined and approved for Phase 2 study. In the event project changes are made during DP2 that impact this report, updates will be provided as part of the Phase 3 report. Following execution of the project's final agreement, this report will not be updated to account for other changes made as part of the agreements modification clause and instead the scope change process will be followed.

A. Transmission Owner Facilities Study Summary

1. PROJECT DESCRIPTION

The Project Developer (PD) has proposed a Battery Storage Facility located in, Chesterfield County, Virginia with a designated PJM Project ID of AG2-384. The installed facilities will have a total Maximum Facility Output (MFO) of 60.82 MW with 24 MW of this output being recognized by PJM as Capacity.

2. POINT OF INTERCONNECTION (POI)

AG2-384 will interconnect with the Dominion transmission system via the existing Chesterfield Substation

The proposed generation interconnection is shown on the single line diagram in Attachment #1.

3. POINT OF CHANGE IN OWNERSHIP

The Point of Change in Ownership between the two stations will be the 230kV disconnect switch 4-hole pad on the conduit riser structure at the developer’s project site.

4. SCOPE OF PROJECT DEVELOPER INTERCONNECTION FACILITIES

Project Developer will design, build, own, operate and maintain the Project Developer Interconnection Facilities on Project Developer’s side of the Point of Change in Ownership (PCO). This includes, but is not limited to:

- Circuit breakers and associated equipment located between the high side of the MPT(s) or GSU(s) and the Point of Change in Ownership
- Generator lead line from the Generating Facility to the Point of Change in Ownership
- Relay and protective equipment, telecommunications equipment, and Supervisory Control and Data Acquisition (SCADA) to comply with the TO's Applicable Technical Requirements and Standards

B. Transmission Owner Facilities Study Results

The following is a description of the planned Transmission Owner facilities for the physical interconnection of the proposed AG2-384 projects to Dominion transmission system. These facilities shall be designed according to all Dominion Applicable Technical Requirements and Standards in effect March 20th, 2026. Dominion Energy Virginia – Electric Transmission Facility Interconnection Requirements, Procedure Version 25.0, dated October 1, 2025, shall apply. Once built, Dominion will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES:

The Transmission Owner Interconnection Facilities include the portion of the interconnection switching station which is associated solely with the single feed to the generating facilities collector station. The equipment associated with the Transmission Owner Interconnection Facilities includes the disconnect switch, conductors and connectors.

The proposed Transmission Owner Interconnection Facility scope is detailed in Attachment #3 & Attachment #4.

2. STAND ALONE NETWORK UPGRADES

No Stand Alone Network Upgrades have been identified in this Facility Study Report

3. NETWORK UPGRADES

Substation Expansion at Chesterfield 230kV:

Chesterfield Substation will be expanded to accommodate the new generation interconnection.

The proposed substation expansion scope is shown in Attachment #3 & Attachment #5.

4. OTHER SCOPE OF WORK

Other scope includes the metering accuracy CCVT's, metering accuracy CT's, and associated metering equipment.

5. MILESTONE SCHEDULE FOR COMPLETION OF [TO] WORK

Facilities outlined in this report are estimated to take 47 months to construct, from the time the Generation Interconnection Agreement is fully executed. This schedule may be impacted by the timeline for procurement and installation of long lead items, the ability to obtain outages to construct and test the proposed facilities.

Description	Start month	Finish month
Detailed Design	1	10
Permitting/Procurement	2	37
Construction	27	47

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

Assumptions can be found in Attachments #3-5

7. REVENUE METERING REQUIREMENTS

All revenue metering needed for this interconnection project must meet the metering requirements stated in Appendix 2, section 8 of the AG2-384 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are given in the Dominion Energy Virginia – Electric Transmission Facility Interconnection Requirements (FIR) Rev 25.0 posted on PJM website.

The revenue metering will be installed on the Dominion side of the Point of Change in Ownership will be installed, owned and maintained by Dominion.

8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

Land requirements for the Interconnection Substation needed for this interconnection project must meet the requirements in Dominion's Facility Interconnection Requirements and NERC Compliance Procedure FAC-001 posted on PJM's website.

Dominion would be responsible for the following expectations in the area of Real Estate.

- The land required for Dominion's substation and project specific areas around must be deeded over title-in-fee.

- Any additional land needed for Storm Water Management, Landscaping, and Wetlands/Wetlands Mitigation.
- Dominion Real Estate and Counsel will provide standard real estate checklist word document. Process needs to start at least 6 months prior to closing date.
- Required subdivision plat and associated documentation to be reviewed prior to subdividing parcel with the county.
- Suitable Access Road from Substation to a Virginia/North Carolina State Maintained Roadway.
- Dominion will require access road, transmission line and utilities easement to the Substation.
- Any other Land/Permitting requirements required by the Substation.

The Project Developer is responsible for the following expectations in the area Real Estate.

- Land and/or Permitting associated with the Generation Facility and the Generation Line to the Point of Change in Ownership (PCO) structure.

9. APPLICABLE TECHNICAL REQUIREMENTS AND STANDARDS

These facilities shall be designed according to all Dominion Applicable Technical Requirements and Standards in effect March 20th, 2026. Dominion Energy Virginia – Electric Transmission Facility Interconnection Requirements, Procedure Version 25.0, dated October 1, 2025, shall apply.

10. ENVIRONMENTAL AND PERMITTING

Dominion would be responsible for the following expectations in the area of Environmental and Permitting.

- Assessment of environmental impacts related to the Interconnection Facility and/or Network Upgrades including:

    Environmental Impact Study requirements

    Environmental Permitting

- Dominion will require a stormwater easement for substation specific stormwater design BMP's to allow access to and use of the facilities.

    A maintenance agreement should be in place in perpetuity 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 Substation

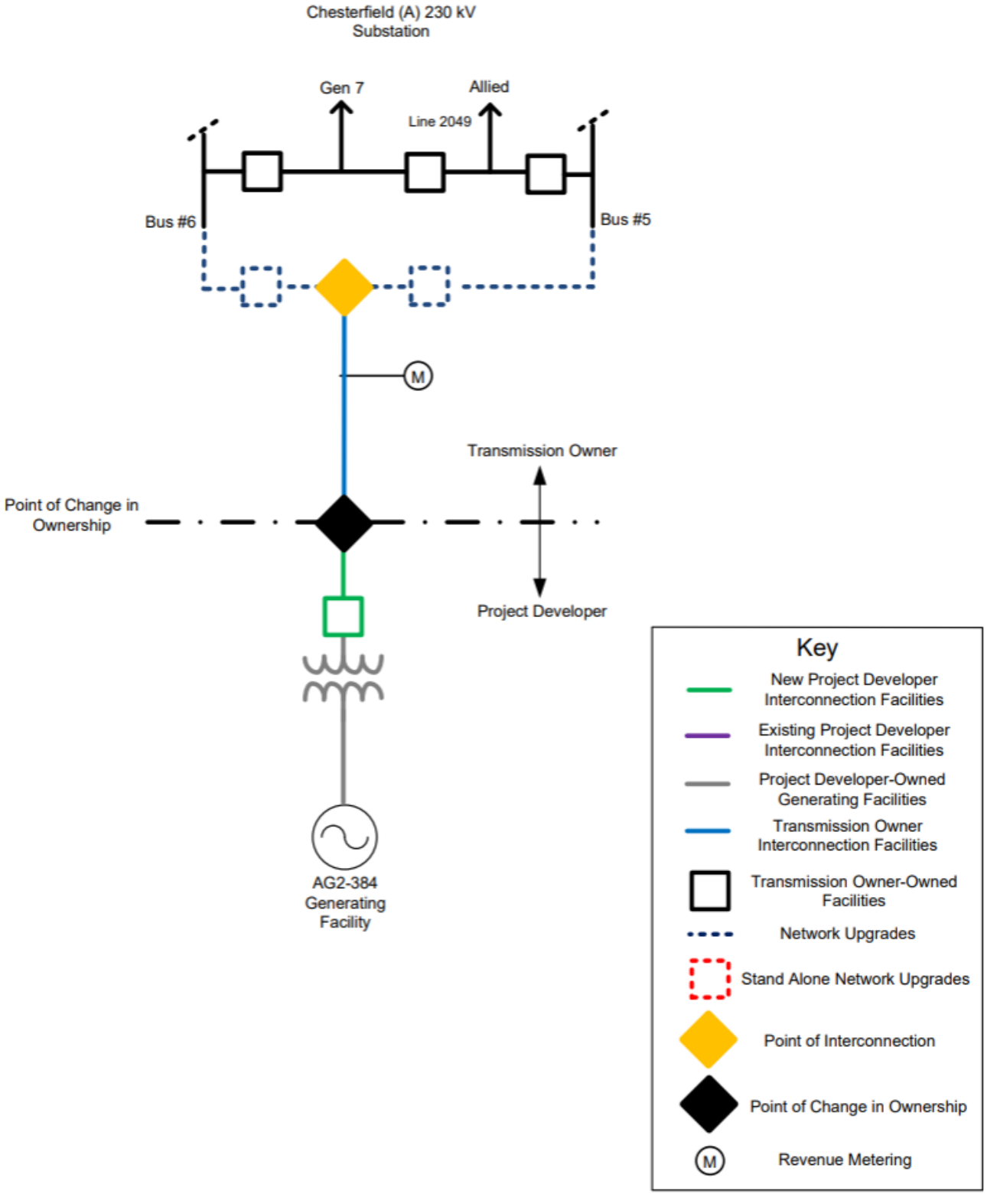
The Project Developer is responsible for the following expectations in the area Environmental and Permitting.

- Environmental and/or Permitting associated with the Generation Facility and the Generation Line to the Point of Change in Ownership (PCO) structure.

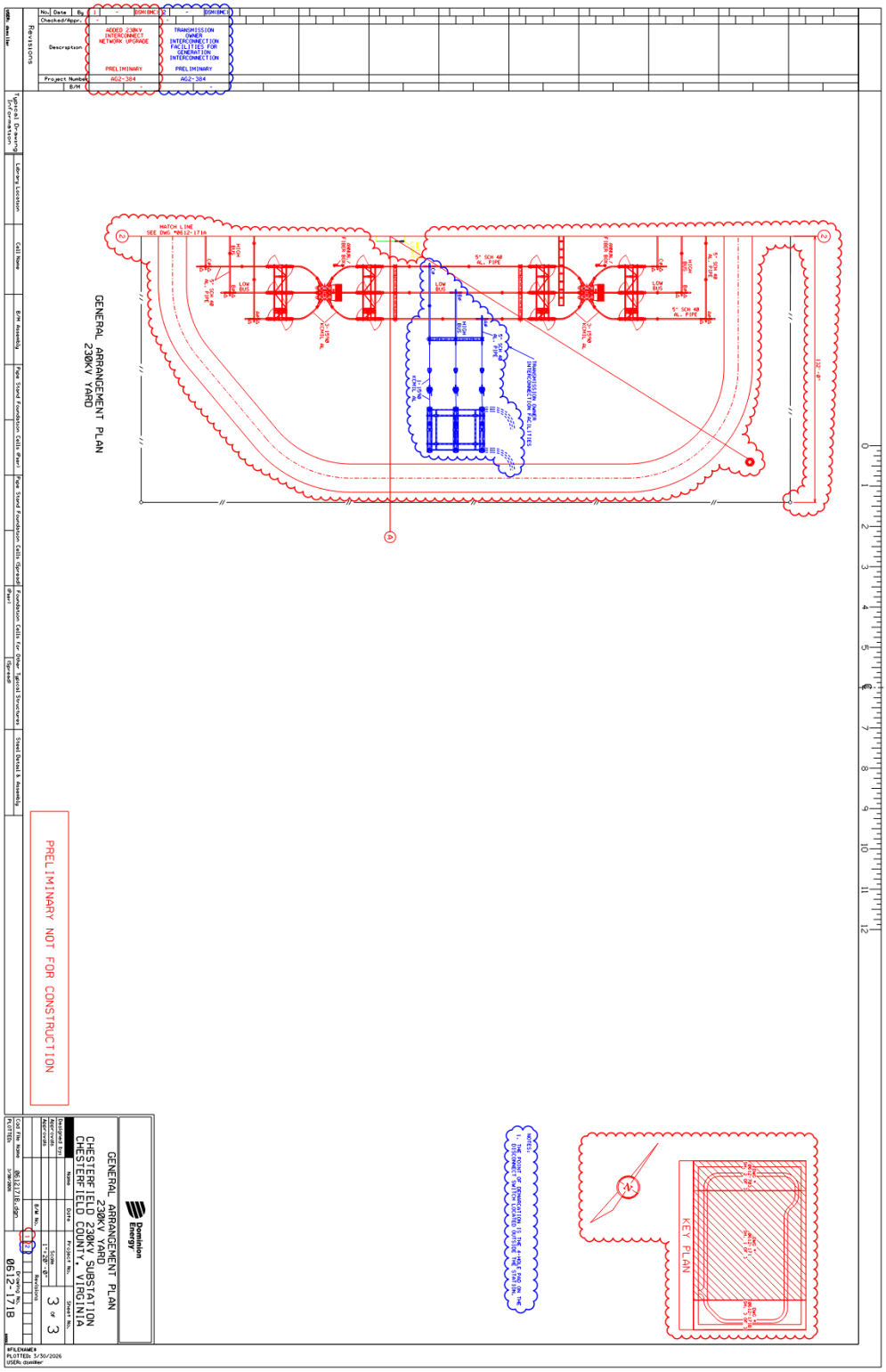
C. APPENDICES

Attachment #1:	Single line Diagram for the Physical Interconnection
Attachment #2:	Substation General Arrangement
Attachment #3:	Network Upgrade & Transmission Owner Interconnection Facility Scope - Substation
Attachment #4:	Transmission Owner Interconnection Facility Scope - Transmission
Attachment #5:	Network Upgrade – Transmission

Attachment #1: Single line Diagram for the Physical Interconnection



Attachment #2: Substation General Arrangement



Attachment #3: Network Upgrade & Transmission Owner Interconnection Facility Scope

Project Summary

Project number AG2-384 provides for the initial construction of a new 230kV generation interconnect line into the existing Chesterfield Substation in Chesterfield County, Virginia.

The objective of this project is to add one new line position and two new 230kV breakers installed at Chesterfield Substation to support the new battery storage system by Project Developer.

The Generating Facilities will be located near Chesterfield substation. The Point of Change in Ownership (PCO) structure will be installed outside the proposed developer collector substation on Dominion owned property. The Point of Change in Ownership between the two stations will be the 230kV disconnect switch 4-hole pad on the conduit riser structure at the developer's project site.

Transmission line engineering is to provide a new number for the new line between Chesterfield Substation and the 230kV battery storage system collector station.

Assumption:

Currently, the scope and estimate assume dominion standard spread footer foundation. Once the soil information is available and it is prudent to change the design to "helical pile foundations" the Dominion team should be informed to adjust the project estimate at the earliest possible opportunity.

Purchase and install substation material – Network Upgrade:

1. Two (2), 230kV, 4000A, 63kAIC, SF-6 circuit breaker
2. Four (4), 230kV, 4000A, 3-phase double end break switch
3. Approximately 80 ft of cable trough
4. 3 ½" to 5" tubular bus couplers as required
5. Station stone as required
6. Station lighting as required
7. Steel structures as required including switch stands, and bus supports
8. Foundations as required including equipment and bus support stands
9. Conductors, connectors, conduits, control cables, cable trough, and grounding materials as per engineering standards

Purchase and install relay material – Network Upgrade:

1. Two (2), 1510 - 24" dual SEL-351-7 transmission breaker with reclosing panel
2. Two (2), 4510 - SEL-2411 breaker annunciator
3. Two (2), 4526_A - circuit breaker fiber optic make-up box
4. One (1), 1603 - 24" SEL-451 Islanding control scheme panel

The Transmission Owner Interconnection Facilities include the portion of the interconnecting switching station which is associated solely with the single feed to the generating facilities collector station. The equipment associated with the Transmission Owner Interconnection Facilities includes disconnect switch, conductors and connectors.

Other Scope includes metering accuracy CCVT's and metering accuracy CT's.

Purchase and install substation material – Transmission Owner Interconnection Facilities Upgrade:

1. One (1), 230kV, underground pothead structure
2. Three (3) 180kV, 144kV MCOV, surge arresters
3. Conductor, connectors, conduits, control cables, foundations, steel structures and grounding material as per engineering standards

Purchase and install relay material – Transmission Owner Interconnection Facilities Upgrade:

1. One (1), 1820 - 24” dual SEL-411L CD/Fiber line panel with lockouts
2. One (1), 1323 - 24” SEL-487E/735 PMU and PQ monitoring panel

Purchase and install metering material – Other:

1. Three (3), 230kV, metering accuracy CCVT
2. Three (3), 230kV, 500:5 metering accuracy CT
3. One (1), 1425 - 24” dual SEL-735 transmission and generator interconnect metering panel
4. One (1), 4524 - revenue metering CT make-up box
5. One (1), 4506 - 3-phase CCVT potential make-up box with metering (P4)

Preliminary Scoping Summary

This project serves to construct a new underground-overhead hybrid 230 kV developer generation tie-in line into existing Chesterfield Substation, which is located in Chesterfield County, VA. The new 230 kV circuit will hereby be referred to as line 2XXX. A 230 kV underground transmission line will be installed from inside existing Chesterfield Substation to a riser transition structure 2XXX/1. A 230 kV overhead transmission line will be installed from riser transition structure 2XXX/1 to the point of change of ownership (PCO) structure 2XXX/2. The PCO structure will be installed outside proposed developer collector substation on Dominion owned property. The PCO structure is the demarcation point between Dominion and the developer. See **Figure 1** for the project location.

This scope only includes the installations associated with the "Transmission Owner Interconnection Facilities" (TOIF)for the overhead transmission gen-tie line outside Chesterfield Substation. See the "Network Upgrade" (NW) scope for the remaining tie line installations.

Underground

This project will consist of a 230 kV underground cable system installed in a concrete encased duct bank. The underground system will consist of one (1) 230 kV underground circuit with one (1) cable per phase. The system will be installed from the inside of existing Chesterfield Substation to the riser transition structure 2XXX/1. Open-trench installation of the duct bank is anticipated for the majority of the underground line with one jack-and-bore railroad crossing. Ampacity calculations were performed to determine that duct bank and cable size necessary to meet the required rating for the Chesterfield Generation Interconnection project utilizing a solid dielectric, cross linked polyethylene (XLPE) cable system.

See "AG2-384_Chesterfield Substation_UG Scope and Estimate" package for the underground scope of work, estimate, and assumptions for the underground work to be completed for project AG2-384.

Overhead

The proposed structures to be installed are one (1) 230 kV single circuit engineered steel double deadend monopole, which will be the riser transition structure between underground and overhead, and one (1) 230 kV single circuit steel backbone structure with a switch attachment. The new conductor and shield wire to be used will be twin bundled (2) 768.2 ACSS/TW (20/7) "Maumee" conductor and two (2) DNO-11410 OPGW.

Length of Underground Route	**0.29 miles**

Length of Overhead Route	**0.07 miles**
Location of the subject line (County/State)	**Chesterfield County, VA**
Total Number of Permanent Structures	**2**
Total Number of Temporary Structures	**0**
CPCN/SCC Required?	**Yes**
New ROW Required?	**No**

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

Overhead Transmission Owner Build - Permanent Facilities to be Installed

Structures: See attached spreadsheet for heights and loading information. All structures will be galvanized steel.

Structure Type	Dwg Number	Str. Qty.
230kV SC ENGR Steel DDE Monopole – Riser Transition Structure between Underground and Overhead	Non-Standard Drawing	1
230 kV SC Steel Backbone Structure with Switch Attachment – Includes a 4000 Amp Horizontal Switch	12.901	1

Notes

1. For proposed riser transition structure 2XXX/1, the following assemblies will be installed:
    a. Three (3) 230 kV conductor strain assemblies
    b. Three (3) 230 kV Arrestor
    c. Three (3) Conductor – Arrestor – Underground terminator Jumper Connection
    d. Two (2) OPGW deadend assemblies

e. Two (2) Grounded Fiber Splices

Wire:

1. Mileage listed is per circuit
2. Conductor includes dampers and spacers. Fiber includes dampers and splices.
    - Estimate includes approximately four (4) fiber splices

Length (Miles)	Circuit	# if Bundled-Wire Type "Name"	Start-End
0.07	1	Twin bundled (2) 768.2 ACSS/TW (20/7) "Maumee" Conductor	Proposed Str. 2XXX/1 – Proposed BB. 2XXX/2
0.07	2	DNO-11410 OPGW	Proposed Str. 2XXX/1 – Proposed BB. 2XXX/2

Overhead Scope Notes/Assumptions

1. The demarcation between overhead and underground work is the underground terminators.
2. Due to allocated amount of time, no PLS-CADD modeling was done for this project, which results in higher level scopes. Projects in the Transition Cycle 2 – Phase 2 will need to go through full conceptual engineering design prior reaching detailed engineering.
3. This project does require acquisition of a laydown yard.
4. The generalized structure heights for this project are 135 ft for 2XXX/1 structure. This was determined based on historical data from previous projects.
5. All deadend engineered steel structures outside the substation (Structures 2XXX/1 and 2XXX/2) will be designed for full-construction deadend loading for construction conditions.
6. Project area code required loading include: NESC Heavy, 95 mph wind, ¾" Ice & 30 mph wind.

7. For detailed engineering, a LiDAR survey is required, including underground survey and ROW file.

8. The work to be completed for this project will all be on Dominion owned property. No additional right of way will need to be acquired.

9. The PCO structure 2XXX/2 is located outside the proposed AG2-384 collector station and will be installed on Dominion owned property. This structure will be the demarcation point between the developer and Dominion.

10. The transmission team has identified no encroachments within the project area based off the .kmz and DEV MapViewer.

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

12. A substation general arrangement was provided by the conceptual substation engineering team. See **Figure 2** and **Figure 3** for the Chesterfield Substation general arrangement used for this project.

13. The assumed reel lengths for this project are 12,000 feet.

14. Cross slopes are not accounted for in this conceptual design. Structures designed assuming a 1.5' foundation reveal at the center of the structure.

15. The collector station is approximately 0.32 miles east of existing Chesterfield Substation.

16. This project scope assumes that it is independent from other projects in the Transition Cycle.

Overhead Estimate Notes/Assumptions

1. This scope and estimate for project AG2-384 refers to the "Transmission Owner Interconnection Facilities" (TOIF). This includes the engineering, project management, and construction costs for the overhead transmission assets associated with the new gen-tie line outside of Chesterfield Substation. See the "Network Upgrade" (NW) scope and estimate for the remaining installations associated with project AG2-384.

    a. One (1) estimate has been provided for this scope.

i. Transmission Owner Interconnection Facilities (TOIF)

2. Engineered steel pole cost for the riser structure was determined utilizing historical data from previous projects.

3. Engineered 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 Coastal Plains West.
    a. Riser structure foundation forces were based off historical data from previous projects. The foundation cost utilized for the riser structure was 12.414 – 230 kV SC DDE monopole structure based off similar foundation forces.

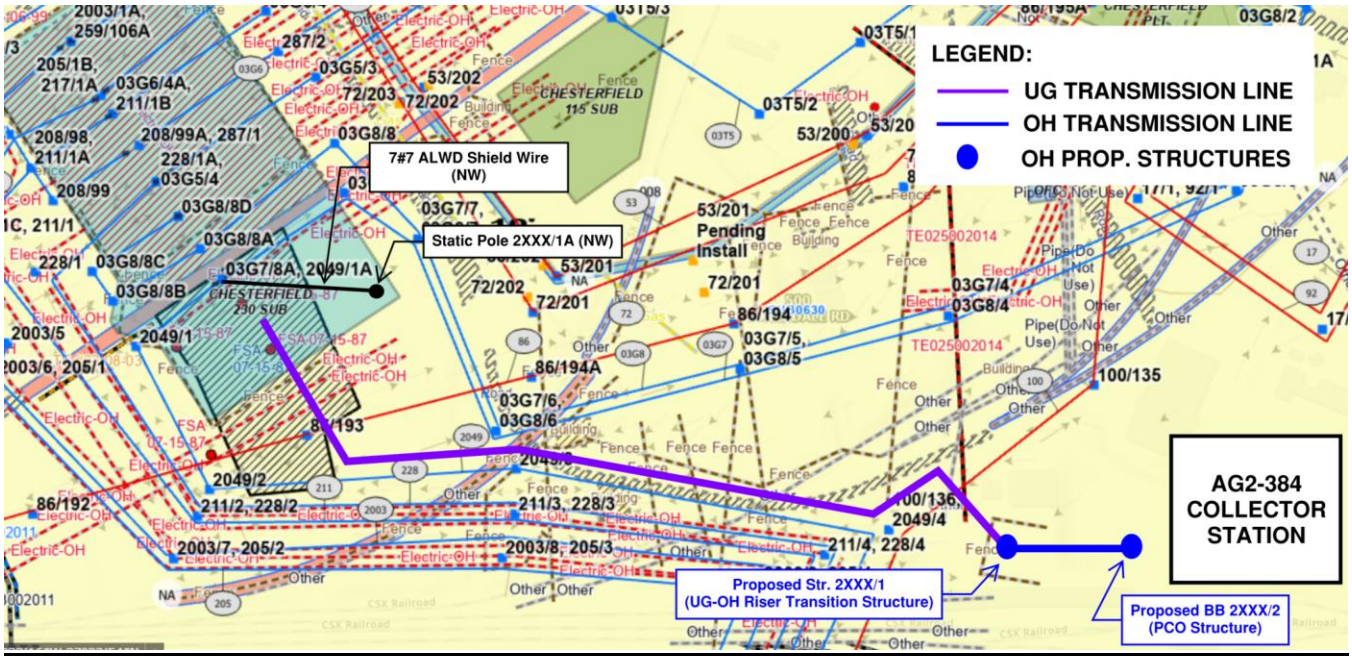
4. Since the proposed project is less than 5 miles from an existing substation, fiber will need to be installed for communication purposes. An additional $5k will be included on the general permitting cost due to the fiber installation.

5. Survey cost were determined based on substation proposed location, fiber installation, and impacts on existing line.

6. The estimate associated with this scope includes a $50,000 cost to account for the AC mitigation study for cathodic protection crossing the UG utilities in the area.

7. Transition Cycle 2 - Phase 2 estimates utilize Dominion 2025 labor and material adjustment rates.

Figure 1 – Project Location



Attachment #5: Network Upgrade - Transmission

Preliminary Scoping Summary

This project serves to construct a new overhead-underground hybrid 230 kV developer generation tie-in line into existing Chesterfield Substation, which is located in Chesterfield County, VA. The new 230 kV circuit will hereby be referred to as line 2XXX. A 230 kV underground transmission line will be installed from inside existing Chesterfield Substation to a riser transition structure 2XXX/1. See **Figure 1** for the project location.

This scope only includes the installations associated with the network upgrades (NW) inside of Chesterfield Substation. See the "Transmission Owner Interconnection Facilities" scope for the remaining tie line installations.

The proposed structure to be installed is one (1) steel static pole. 7#7 Alumoweld will be utilized for shielding within existing Chesterfield Substation.

Length of Route	**0.0 miles**
Location of the subject line (County/State)	**Chesterfield County, VA**
Total Number of Permanent Structures	**1**
Total Number of Temporary Structures	**0**
CPCN/SCC Required?	**No**
New ROW Required?	**No**

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

Transmission Owner Build - Permanent Facilities to be Installed

Structures: See attached spreadsheet for heights and loading information. The structure will be galvanized steel.

Structure Type	Dwg Number	Str. Qty.
Steel Static Pole	9.008	1

Wire:

3. Mileage listed is per circuit
4. Static includes dampers.

Length (Miles)	Circuit	# if Bundled-Wire Type "Name"	Start-End
0.05	1	7#7 Alumoweld Shield Wire	Proposed Static Pole 2XXX/1A – Existing BB 03G7/8A (2049/1A)

Transmission Owner Build - Existing Facilities to be Transferred or Modified

1. Install one (1) new shield wire deadend assembly [Reference Drawing 42.011] and one (1) new shield wire safety catch assembly [Reference Drawing 44.222] on existing backbone 03G7/8A (2049/1A).

Scope Notes/Assumptions

1. Due to allocated amount of time, no PLS-CADD modeling was done for this project, which results in higher level scopes. Projects in the Transition Cycle 2 – Phase 2 will need to go through full conceptual engineering design prior reaching detailed engineering.
2. This project requires the acquisition of a laydown yard.
3. Project area code required loading include: NESC Heavy, 95 mph wind, ¾" Ice & 30 mph wind.
4. For detailed engineering, a LiDAR survey is required, including underground survey and ROW file.
5. A wetland delineation has not been completed as part of this conceptual package.
6. The assumed reel length for 7#7 Alumoweld shield wire is 7,100 feet.
7. Cross slopes are not accounted for in this conceptual design. Structures designed assuming a 1.5' foundation reveal at the center of the structure.

8. This project scope assumes that it is independent from other projects in the Transition Cycle.

Estimate Notes/Assumptions

1. This scope and estimate for project AG2-384 refers to the "network upgrade" (NW). This includes the engineering, project management, and construction costs for the overhead transmission assets within Chesterfield Substation. See the "transmission ownership interconnection facilities" (TOIF) scope and estimate for the remaining installations associated with project AG2-384.
    a. One (1) estimate has been provided for this project.
        i. Network Upgrade (NW)
2. Engineered 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 Coastal Plains West.
3. Survey costs were determined based on substation proposed location, fiber installation, and impacts on existing line.
4. The estimate associated with this scope includes a $50,000 cost to account for the AC mitigation study for cathodic protection for the underground lines inside Chesterfield Substation.
5. Transition Cycle 2 - Phase 2 estimates utilize Dominion 2025 labor and material adjustment rates.

Figure 1 – Project Location

