

PJM 'Data Center Planning Initiative'

2022 RTEP Window 3

Regional Transmission Expansion Planning

Transmission Planning & Potential Impacts to Prince William County, VA

Researched by Karen Sheehan
Haymarket, Prince William County, VA
Aug->Sept. 22, 2023

This Deck: Provides maps and high-level breakdown of information provided by PJM

(only as correct as the information which has been provided):

- Sources of information
- Description, What is Being Proposed, Where is Power Generated
- Scope, Purpose, Objective of Initiative
- What is 'Reliability'?
- Costs, Competitive Bids, Timeline
- Magnitude of Proposals: Transmission Lines, Substations, ROW
- Maps – PJM Transmission service Area, PJM Virginia Transmission service area
- **Prince William County, VA impacting proposals – 15**
 - Waterways, Historic Communities, Parks impacted
 - Maps, Scope components, Costs, Impacts
 - **North-South – 9** *(includes additional from combined proposals)*
 - **West-East – 7** *(includes additional from combined proposals)*
 - **Eastern part of County – 3**
- Prince William, Fauquier, Fairfax, All Other areas - Overviews

PJM Descriptions of Regional Transmission Expansion Program 2022 RTEP Window 3 Proposals – Source Documents

- [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals
 - 72 Proposals - 15 directly impacting PWC
- **MAPS:**
 - [20230808-item-07---reliability-analysis-update.ashx \(pjm.com\)](#) Updated “complete” deck. August 30, 2023.
 - **However, there are still multiple issues with maps in this version as will be noted.**
 - Maps were also provided on August 25, 2023 and July 11 2023, but had many errors, discrepancies, and omissions.
- [PJM Regional Transmission Expansion Planning Update \(pjm.com\)](#)
 - Powerpoint deck (March 27, 2023) explaining the 2022 RTEP Window 3 initiative – Purpose, Objective, Requirements (pages 3-7). *Data Centers a factor on every page.*
- [PJM 2022 Regional Transmission Expansion Plan - dated March 14, 2023](#)
 - Section 1 - Page 2 -- PJM Backbone Transmission System (as of March 2023) (included on Slide 12)
 - Section 6.11 - Page 221 -- PJM Service Area in Virginia - map of 345, 500, 765 kV transmission lines (as of March 2023). (Included on Slide 13)
 - **Page 44:** (emphasis added)
 - *“In the PJM 2022 Load Forecast Report, Dominion requested that PJM consider a forecast adjustment to account for the growth of data centers in northern Virginia. This adjustment has been in place in some form since the 2014 Load Forecast Report. The rationale for making an adjustment for data centers is that these centers have a load impact that is disproportionate with their economic impact. Data centers generally require minimum staffing and thus would not have a significant impact on economic variables, but do have a considerable impact on energy demand.”*
- **Other presentation decks accessed from PJM and Dominion websites:**
 - [20230207-item-09---2022-window-3-update.ashx \(pjm.com\)](#) Dated Feb. 7, 2023
 - [item-04---data-center-load-planning.ashx \(pjm.com\)](#) Dated Jan. 10, 2023
 - [item-04---data-center-industry-digital-realty.ashx \(pjm.com\)](#) Dated Sept. 12, 2022
 - [item-09---reliability-analysis-update.ashx \(pjm.com\)](#) Dated Aug. 9, 2022
 - [item-08---dominion-northern-virginia---immediate-need.ashx \(pjm.com\)](#) Dated July 12, 2022
 - [reliability-briefing---dominion-data-centers-alley.ashx \(pjm.com\)](#) Dated June 7, 2022
 - Dominion IRP – [2023 Integrated Resource Plan](#) Filed May 1, 2023
- **Access more published information:** [‘PJM’s Data Center Planning Initiative’ / ‘NoVa Dominion Data Center Alley’ – The Coalition to Protect Prince William County \(protectpwc.org\)](#)

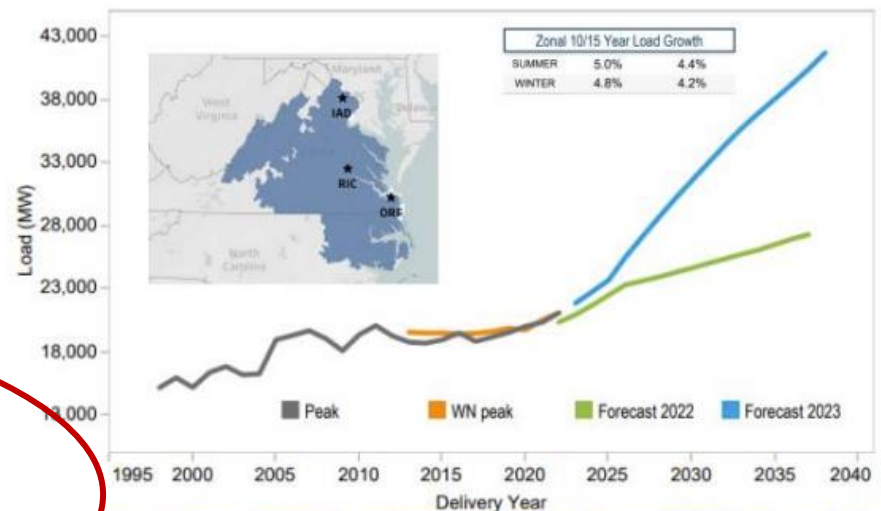
- Energy providers (PJM, Dominion, et al) are openly declaring that this transmission expansion initiative is to address overload violations on the grid caused by *currently operating* Data Centers...
- → **Violations** occurring on the grid -- **which could cause blackouts** -- **primarily because of all the Data Centers being brought onto the grid in Northern Virginia**
 - **NOTE: Data Centers**, which require many more times the power than ANY OTHER Industrial use, are being approved and tapping into the electrical grid all across the state of Virginia
- → Data Centers in Prince William County, VA, being *approved and supported by the current Chair and majority Supervisors on the PWC Board, are significantly contributing to the grid issues;* as well as approvals coming out of Loudoun County, VA
- Although SOME proposals in this initiative would add grid functionality which MAY benefit SOME Data Center applications making their way through the PWC/regional consideration pipeline...
- The power for more yet-to-be approved Data Centers will be served by OTHER and ADDITIONAL PJM/Dominion transmission line and substation projects -- when and if any *other* Data Center plans are approved
- → **As more Data Center applications are approved, there will be EVEN MORE transmission lines and substations added to what is proposed here – This was CONFIRMED by PJM in a 9/5/23 meeting**
- **NOTE:** Data Centers required for AI (Artificial Intelligence) are predicted to require 7-8 times MORE than the power required by today's Data Centers

PJM RTEP Planning Update – Dated March 27, 2023



2022 Competitive Window 3 – Data Center Load Planning Update

- Earlier in 2022, PJM shared its forecast for 2022 and indicated high Data Center Load growth activity, particularly in Northern VA
- In July 2022, PJM directed an Immediate Need transmission project to enable the integration of the forecasted load within the Dominion Data Center Alley up to and including year 2025
- Since then, Data Center Loads within Northern Virginia has been increasing at an unprecedented rate (2022 Summer Peak recorded 21,156 MW – Forecast 20,424 MW)
- The 2028 timeframe load will require major transfer reinforcements into the Doubs/Northern Virginia region to support high flows and VAR requirements
- PJM is working towards opening a competitive window in early February 2023 to address the identified violations



<https://pjm.com/-/media/library/reports-notice/load-forecast/2022-load-report.ashx>

What Is Being Proposed in the 'PJM Data Center Planning Initiative' 2022 RTEP Window 3?

- Add more NEW transmission lines
 - 230kV
 - 500kV
 - 765kV
- Add more NEW substations
 - 230kV/500kV
 - 500kV
 - 765kV
- Upgrade existing transmission lines from 230kV to 500kV
- Upgrade existing 230kV and 500kV substations with more 500kV functionality
- Increase Amps to 4000 or 5000 Amps; more
- Replace aging equipment
- **Connecting the Dots - What Will Be On New PJM Lines?**

What and Where is the Power Generated for MOST of these Transmission Proposals?

- **Ohio, West Virginia from the West**
 - First Energy's coal-fired Fort Martin Power Station, Fort Martin, WV
 - First Energy's coal-fired Harrison Power Station, Haywood, WV
 - AEP's Ohio fossil fuel plants
- **Pennsylvania from the Northeast**
 - Peach Bottom Atomic Power Station in Delta, PA
 - Gas-fired York Energy Center, Delta, PA
- **Why are new electrical transmission lines having to originate from outside of Virginia?**
- **We are also experiencing a POWER GENERATION problem**

Scope – PJM RTEP Update dated March 27, 2023 - (direct quotes)

Window Opened; February 24, 2023

- PJM posted preliminary planning basecases on January 31st 2023
- Window Closed – May 10, 2023

Purpose:

- **Address reliability needs in the Dominion and APS zones primarily associated with Data Center Load forecasts (up to 7,500 MWs by 2027-28)**
- Seeking robust and flexible solutions to address the reliability needs in those specific areas

Objective:

- Develop robust, holistic and expandable solutions that address the **2027-28 baseline violations** associated with:
 - **Local constraints: resulting from directly serving the data center loads in APS and Dominion zones through the respective 230 kV networks and into the points of delivery:**
 - Goose Creek- Ashburn – Mars - Wishing Star and Brambleton – Loudoun Co
 - **Regional constraints resulting from imports into load center areas (500 kV primarily):**
 - Doubs - Goose Creek – Frederick MD-Loudoun Co
 - Front Royal - Morrisville – Vint Hill – Loudoun/Mosby - Warren Co-Fauquier Co-Loudoun Co
 - Meadow Brook - Loudoun/Mosby – Loudoun Co
 - Morrisville – Bristers - Ox – Fauquier Co-Fairfax Co
 - Peach Bottom – Conastone – Brighton – Doubs – Maryland
 - **Needed reactive power VAR reinforcements, both static and dynamic as deemed necessary, to address the reactive power needs of the system for the 2027-28 baseline scenario**

Requirements:

- Holistic solutions are to be designed such that they are robust and **expandable as the load grows within the area.**
- **A scalable solution ensures, at a minimum, near-term reliability needs are addressed while also enabling future expansion (beyond the 2027-28 baseline levels) as data center load increases in the Dominion and APS zones.**
 - Consider flexibility, robustness and scalability of 2027-28-baseline solutions against the Interim 2027-28 Summer, Winter and Light Load basecases.
 - Evaluate proposals for **their effectiveness towards existing reactive interfaces in the area, particularly those supporting the Dominion and APS zones.**
 - Evaluate the **effectiveness of the proposed solutions towards the transmission system load deliverability into the Dominion and APS zones (CETL).**

What is 'Reliability'?

- PJM has identified MULTIPLE N-1-1 violations in their transmission region
- N-1-1 means that you could experience interruptions of power on MORE than one transmission line
- N-1-1 = Threats of significant violations that could cause power disruptions ie: BLACKOUTS

2022 RTEP Window 3 – 72 Proposals

Estimated Costs - \$51,192,146,194 - \$51.1B

- Not all proposals, or all components in proposals, will be selected
- Some components and costs are repeated and counted multiple times across multiple proposals

- **PWC** Directly Impacting Proposals - **15**: **\$19,586,399,352 - \$19.5B** **THIS DECK**
 - Include impacts to other Counties and States
- **Loudoun County** Directly Impacting Proposals - **28**: **\$26,745,769,448 - \$26.7B** [Overview](#)
 - Include impacts to other Counties and States
 - Loudoun County is also impacted by multiple PWC proposals
- **Fauquier County** Directly Impacting Proposals - **1**: **\$320,266,203 - \$320.2M** [Overview](#)
 - Include impacts to other Counties and States
 - Fauquier County is also impacted by multiple PWC and Loudoun proposals
- **Fairfax County** Directly Impacting Proposals - **2**: **\$895,459,401 - \$895.4M** [Overview](#)
 - Include impacts to other Counties and States
 - Fairfax County is also impacted by multiple PWC and Loudoun proposals
- **All Other Va. Counties and MD & PA** Directly Impacting Proposals - **26**: **\$3,644,251,790 - \$3.6B** [Overview](#)
 - These others are also impacted by multiple PWC, Loudoun, Fauquier, and Fairfax proposals

Competitive Bids

- Many TO (Transmission Operator) energy providers have submitted bids to PJM in this 2022 RTEP Window 3 (72 proposals)
- *Not all work possibly to be awarded in the Dominion Zone will be done by Dominion Energy*
- Bids from competitors:
 - AEP - [AEP.com](https://www.aep.com)
 - Exelon - [Exelon Corporation - Home - Exelon](https://www.exeloncorp.com)
 - First Energy - [FirstEnergy Corp. Home](https://www.firstenergy.com)
 - LS Power - [LS Power | Innovation and Investment in Energy](https://www.lspower.com)
 - Nextera - [NextEra Energy](https://www.nexteraenergy.com)
 - PPL - [PPL Corporation \(pplweb.com\)](https://www.pplweb.com)
 - PSEG - [PSE&G \(pseg.com\)](https://www.pseg.com)
 - Transource - [About Us \(transourceenergy.com\)](https://www.transourceenergy.com)

Timeline

- PJM selection process:
 - **Oct. 3:** Announce top 3-4 “scenarios”- made up from 72 proposals
 - **Oct. 3 – 31:** Stakeholder feedback on “scenarios”
 - 1st read
 - 2nd read
 - **Dec. 5:** PJM TEAC bring final recommended solution to PJM Board from 3-4 scenarios
 - **TBD: Board approval**
 - Dec. 2023 in original timeline – not clear if that is still the plan
 - After PJM Board approval, winning providers take filings to their respective State Commissions (ie VA SCC)

NEW Transmission Lines & NEW Substations

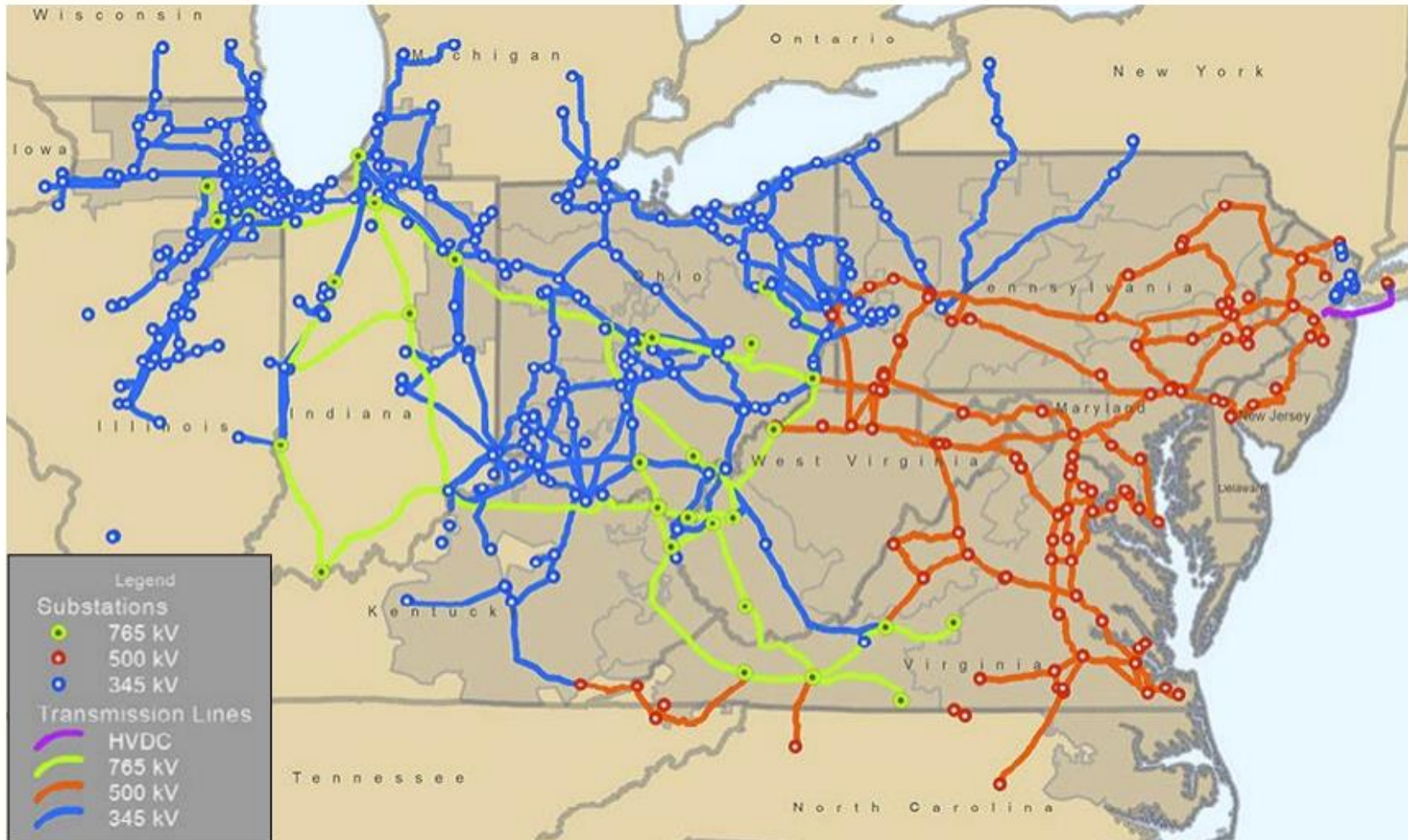
- *Totals are still being verified*
- **NEW 500 kV** transmission lines in **~43 of the 72 proposals**
- **New 500kV** substations in **~37 of the 72 proposals**
- Remaining scope is mostly bringing 500kV upgrades to existing lines and substations **across Virginia and in NJ, DEL, PA, WVA, MD**
- ALL bringing greater capacity to Loudoun and PWC to support current data center load demands and the grid reliability violations they are causing
- **Undergrounding**: Primarily in Loudoun County or under waterways
 - **7 NEW 500kV transmission lines proposed solutions - complete or partial undergrounding: #419, 445, 548, 691, 728, 846, 858**
 - **3 NEW partially undergrounded 230kV lines: 385, 564, 948**

NEW ROWs (Right of Way) & Land Acquisitions

- **NO ROUTES OR LOCATIONS IN THE PLAN ARE FIRMLY ESTABLISHED**
- Transmission providers will not finalize new line or substation routes/locations until later in the process. PJM does not determine routes or substation locations.
- Maps only serve as an *estimate* of line corridor, not a firm route. And a *hoped-for location* for new substation.
- Many proposals are silent as to ROW or land acquisitions
- Much of the specific ROW/Real Estate information is redacted
- Even upgraded substations and lines may require larger footprint/wider ROW
- **ASSUME NEW ROW AND LAND ACQUISITIONS FOR ANYTHING NEW - AND FOR MANY UPGRADES**
- Will involve condemnations and eminent domain “takes” across the region

PJM Backbone Transmission System Map - Existing

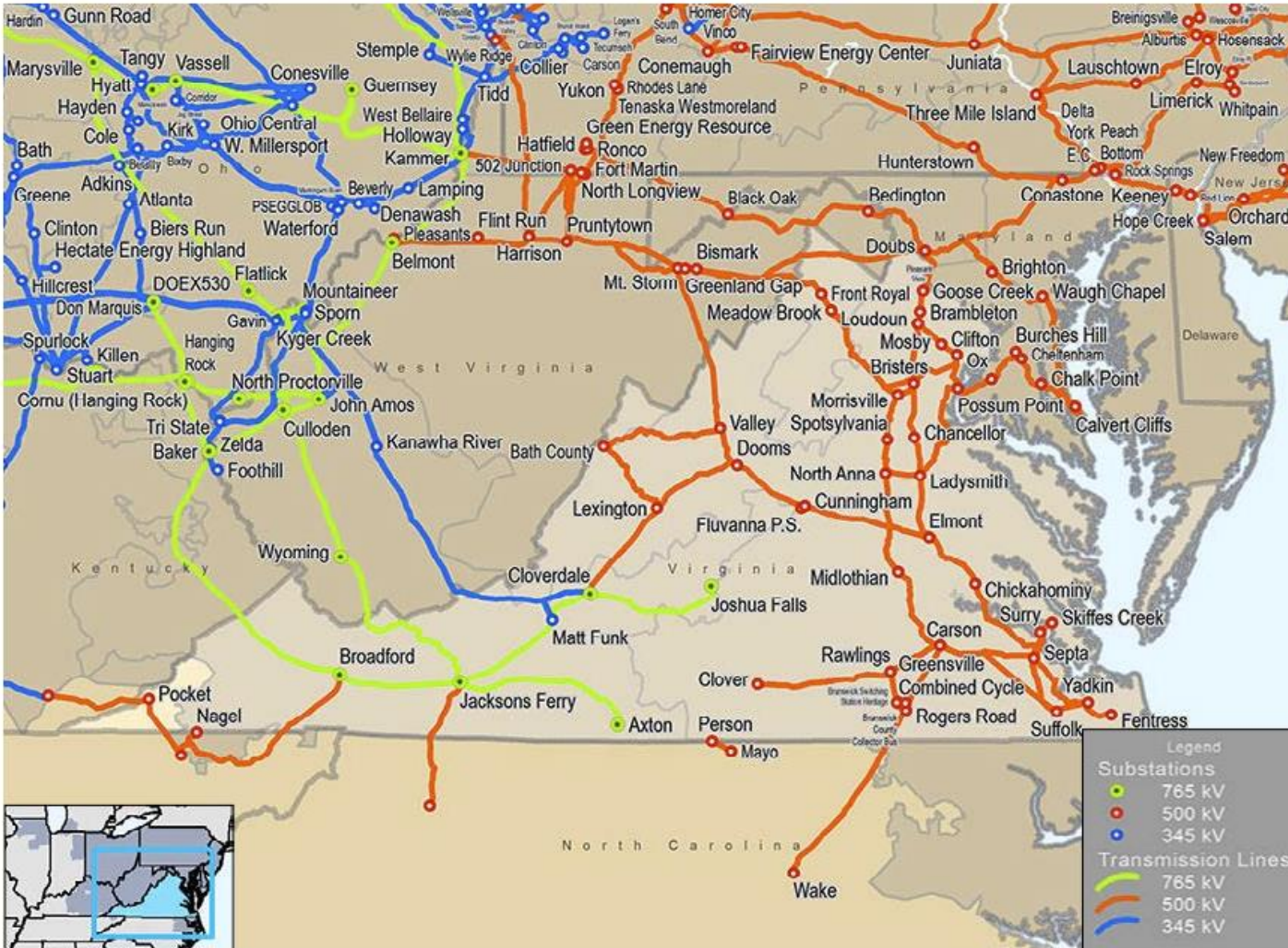
Map 1.1: PJM Backbone Transmission System



- Source: [2022-rtep-report.ashx \(pjm.com\)](https://www.pjm.com/2022-rtep-report.ashx) Dated March 13, 2023 Page 2
- **Does NOT show existing 230kV lines and substations**

PJM Service Area in Virginia – Existing

Map 6.46: PJM Service Area in Virginia



- Source: [2022-rtep-report.aspx](https://www.pjm.com/2022-rtep-report.aspx) ([pjm.com](https://www.pjm.com/)) Dated March 13, 2023 Page 221
- Does NOT show ANY existing 230kV lines and substations

PWC impacting Proposals

- **PROPOSALS = 15** (*Actually 19 from combined proposals*)
 - North-South – 9 (*includes additional from combined proposals*)
 - 129 (711, 231, 516, 692, 923, 671), 904, 325, 577
 - West-East – 7 (*includes additional from combined proposals*)
 - 766, 175 (663, 948, 853), 598 (385, 548, 977)
 - Eastern part of County – 3
 - 691, 24, 125
- **TOTAL COSTS = \$19.5 BILLION** (\$19,586,399,352.00)
 - *Not all proposals, or all components in proposals, will be selected*
 - *Some components and costs are repeated and counted multiple times across multiple proposals*
- Proposals impacting PWC include Lines/Substations *also* impacting other Va. counties &/or other states:
 - Loudoun = 12 (#129, 175, 231, 325, 548, 577, 598, 663, 711, 766, 904, 977)
 - Fauquier = 12 (#129, 175, 231, 325, 548, 577, 598, 663, 711, 766, 904, 977)
 - Fairfax = 3 (#711, 904, 977)
 - Other VA counties and other states = 30
 - Amherst, Albemarle, Augusta, Bedford, Buckingham, Campbell, Caroline, Culpeper, Fluvanna, Frederick Co (VA), Lexington, Louisa, Nelson, North Anna, Orange, Rappahannock, Rockbridge, Saltville, Smyth, Spotsylvania, Stafford, Staunton, Warren. Washington; Frederick MD, MD, PA, WVA, DEL, NJ

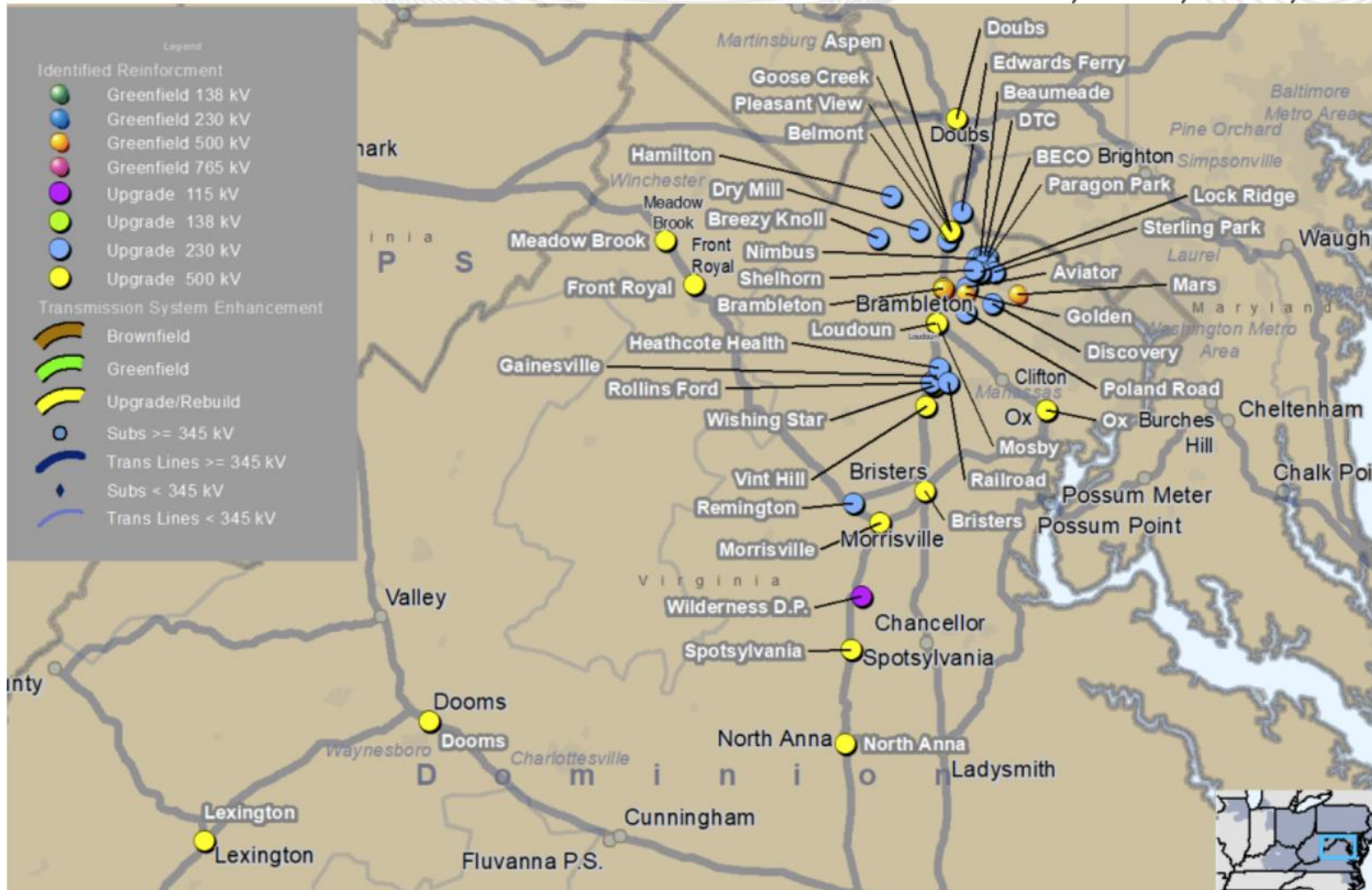
Impacted Waterways – as noted in 15 PWC-impacting proposals

- Potomac River
- James River
- Choptank River
- Youghiogheny River
- Shenandoah River
- Monocacy River
- Delaware River
- Monongahela River
- North River
- Rappahannock River
- Patapsco River
- Rivanna River
- South Anna River
- Buffalo River
- Tye River
- Rockfish River
- Hardware River
- Rapidan River
- Mechums River
- Juniata River
- Chesapeake Bay
- Cheat Lake
- Chesapeake and Delaware Canal
- Broad Run
- Kettle Run
- Goose Creek
- Bull Run
- Cedar Run
- Markee Creek
- East Licking Creek
- Nunn Creek
- Millville Dam
- Lake Manassas
- Lake Anna

Impacted Historic Communities and Parks – as noted in 15 PWC-impacting proposals

- Waterford Historic District
- Hamilton
- Middleburg/Rte 50 corridor
- Beverly Mills historic district
- Unison Battlefield Area
- Elixir Farm
- Shenandoah National Park
- Monongahela National Forest
- C&O Canal National Historic Park
- Dickerson Conservation Park
- Capon Chapel
- Appalachian Trail
- Catoctin Mountain
- Sugarloaf Mountain Historic Landmark
- Appalachian Mountains
- Allegheny Mountains
- Appalachian Highlands

Dominion #129



KSheehan Sept. 22, 2023

- Combines 6 proposals for 'PJM Data Center Planning Initiative'
 - 711, 231, 516, 692, 671, 923
- **This MAP:**
 - **ONLY depicts SOME impacted substations**
 - **DOES NOT reflect all NEW substations contained in the scope of the 6 proposals**
 - **DOES NOT depict ANY transmission lines**
- **See following slides and maps for more complete details**
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

129 - Combines 6 Dominion Proposals

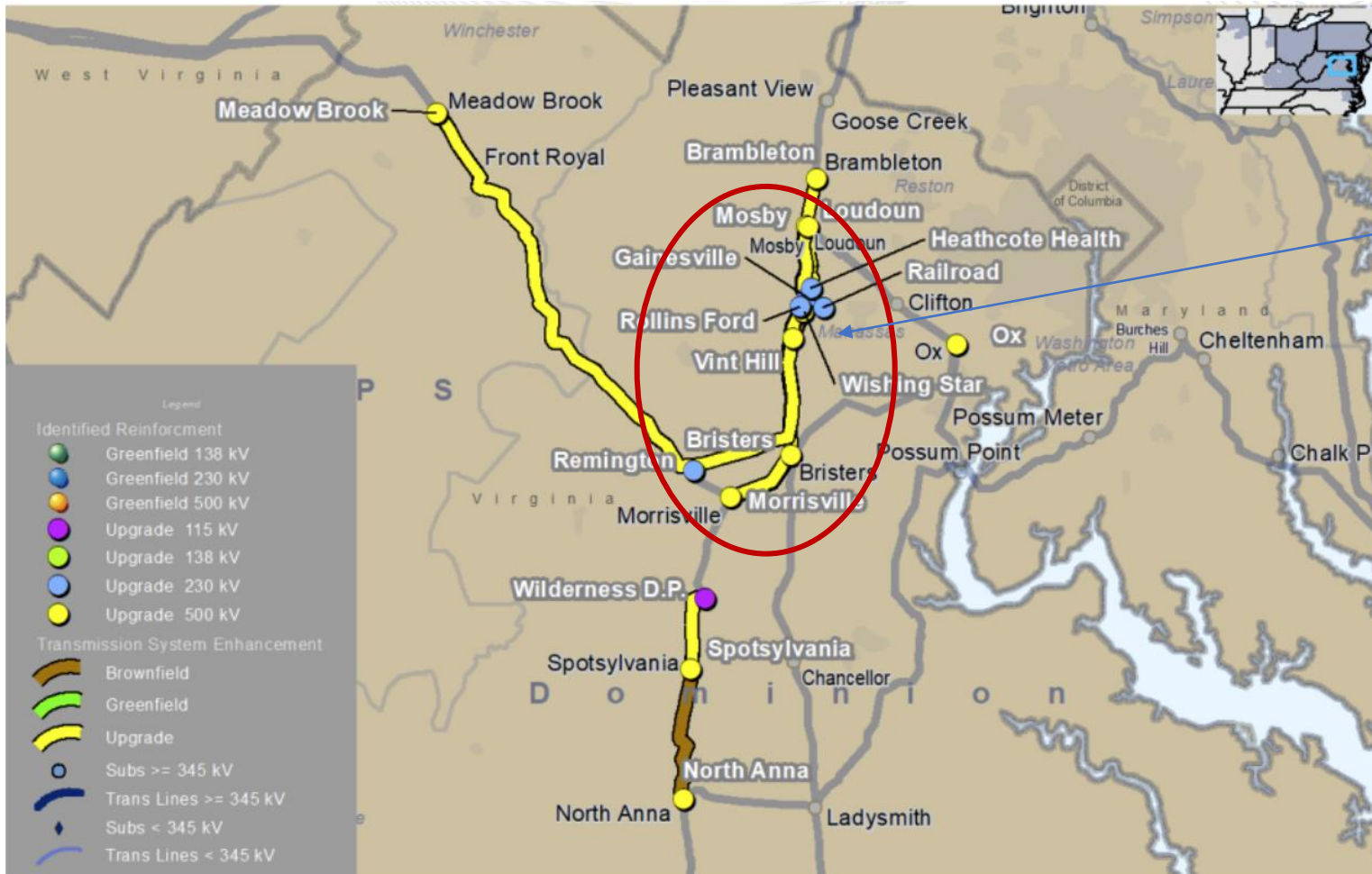
TOTAL ESTIMATED COST: \$3,177,521,803 - \$3.1B

- Dominion 711 – PWC
 - \$1,315,021,919 - **\$1.3B**
- Dominion 231 – PWC
 - \$166,884,253 - **\$166M**
- Dominion 516 – Loudoun
 - \$66,105,092 - **\$66M**
- Dominion 692 – Loudoun
 - \$1,060,579,078 - **\$1B**
- Dominion 671 – Fauquier
 - \$320,266,203 - **\$320M**
- Dominion 923 – Augusta
 - \$248,665,258 - **\$248M**

NEW ROW-Land Acquisitions:

- Not all proposals are consistent. Most land acquisition plan info is redacted.
- Since PJM doesn't set transmission routes or substation locations, and this is a proposal:
 - **ASSUME ANY NEW TRANSMISSION LINE AND SUBSTATION WILL REQUIRE NEW ROW/LAND ACQUISITION**
 - **MANY LINE UPGRADES WILL REQUIRE WIDENED ROW WHICH MEANS LAND IMPACTS**
 - **MANY SUBSTATION EXPANSIONS COULD REQUIRE ADDITIONAL FOOTPRINT, WHICH MEANS LAND ACQUISITIONS**

Dominion 129 – Proposal 711



Impacts: PWC, Loudoun, Fauquier, Fairfax, Warren, North Anna, Spotsylvania, Louisa

- PWC scope:
 - NEW Vint Hill-Wishing Star 500kV line routes through PWC from substation in Fauquier to substation in Loudoun
- “Comprehensive solution to add new 500 kV Transmission Lines from North Anna substation to Wishing Star Substation (North Anna-Spotsylvania-Vint Hill-Wishing Star)”
- Ignore “Brownfield” – Line is NEW Greenfield
- 711 is included twice in proposals:
 - Component of 129
 - Stand-alone proposal

Dominion 129 - Proposal 711 Components

1. New 500 kV Line (North Anna - Spotsylvania) (993169)

2. North Anna Equipment Uprate (993169)

3. Spotsylvania Equipment Uprate (993169)

4. Loudoun 230 kV Overduted Breaker Replacement (993208_2)

5. North Anna 500 kV Overduted Breaker Replacement (993208_2)

6. Ox 500kV overduted Breaker Replacement (993208_2)

7. New 500 kV Line (Spotsylvania to Vint Hill) (993232)

8. New 500 kV Line (Vint Hill to Wishing Star) (993232)

9. Line #37 (Spotsylvania - Wilderness D.P.) Rebuild

10. Line #545 (Bristers - Morrisville) Rebuild

11. Line #569 (Loudoun to Morrisville) Rebuild

12. Line #535 (Meadow Brook-VintHill- Loudoun) Rebuild

13. Line #546 (Mosby - Wishing Star) Rebuild

14. Line #590 (Mosby - Wishing Star) Rebuild

15. Line #2030 (Gainesville - Loudoun) Rebuild

16. Line #2045 (Loudoun - Brambleton) Rebuild

17. Line #2094 & 2227 (Brambleton - Racefield - Loudoun) Rebuild

18. Line #2101 (Bristers - Vint Hill) Rebuild

19. Line #2114 (Remington CT - Rollin Ford) Rebuild

20. Line #2140 (Loudoun - Heathcote) Rebuild

21. Line #2151 (Railroad DP - Gainesville) Rebuild

22. Line #2163 (Vint Hill - Liberty) Rebuild

23. Line #2176 (Heathcote - Gainesville) Rebuild

24. Line #2222 (Rollins Ford - Gainesville) Rebuild

25. Line #183 (Bristers - Ox) Rebuild

26. Line #535 (Meadow Brook-VintHill- Loudoun) Resag

27. Bristers Substation

28. Brambleton Substation

29. Dawkins Branch Substation

30. Gainesville Substation 2022-W3-711-2

31. Heathcote Substation

32. Loudoun Substation

33. Mint Springs Substation

34. Morrisville Substation

35. Mosby Substation

36. North Star Substation

37. Racefield Substation ?

38. Railroad Substation

39. Spotsylvania Substation

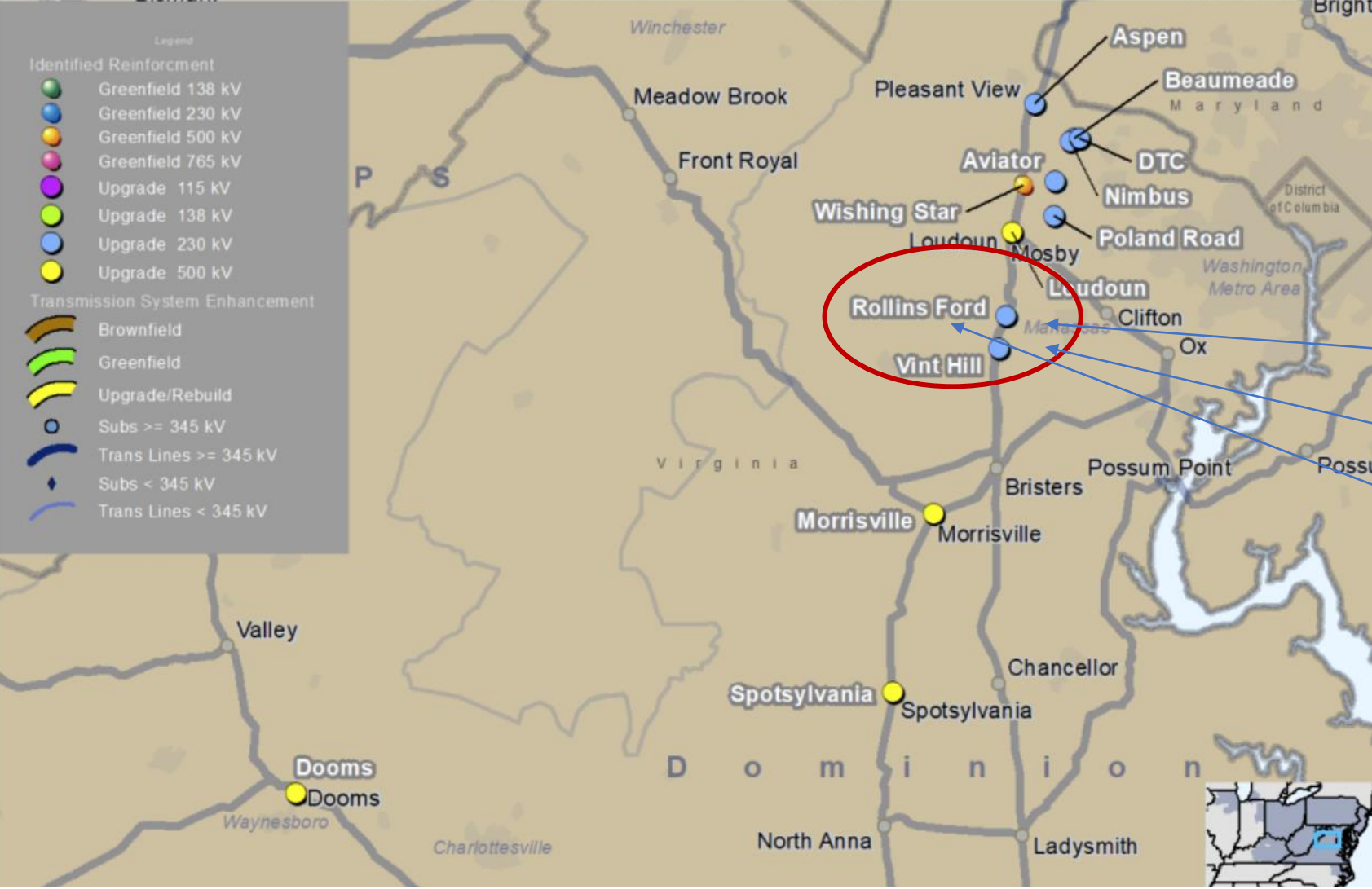
40. Vint Hill Substation

41. Wishing Star Substation

42. Youngs Branch Substation

- Yellow is PWC impacts
- Green is NEW
- NEW Vint Hill-Wishing Star 500kV line routes through PWC from substation in Fauquier to substation in Loudoun
- 10 500kV upgrades to lines routing through PWC
- 5 500kV upgrades to substations in PWC
- Racefield is NEW proposed 500kV substation in Loudoun near Brambleton – just North of PWC (also in Nextera 577 and 766)
- This Component does not call out Greenfield - ?
- Upgrade 17 lines to 500kV in PWC, Loudoun, Fauquier
- Upgrade 17 substations in PWC, Loudoun, Fauquier, Spotsylvania, Louisa
- **Waterways/History/Parks:** Cedar Run, Broad Run, Bull Run
- **Estimated Cost:** \$1,315,021,919 - \$1.3B
- 711 is submitted 2x as a proposal
 - Component in 129
 - Stand-alone proposal
 - Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Dominion 129 – Proposal 231



Impacts: PWC, Loudoun, Fauquier, Staunton, Spotsylvania

- Scope is upgrades to 21 Virginia substations
 - 500kV and 230kV
- PWC scope:
 - Rixlew substation is proposal scope Component 15 – not on map
 - Youngs Branch substation is proposal scope Component 21 – not on map
 - Rollins Ford substation is on map
- 231 is included twice in proposals:
 - Component of 129
 - Stand-alone proposal

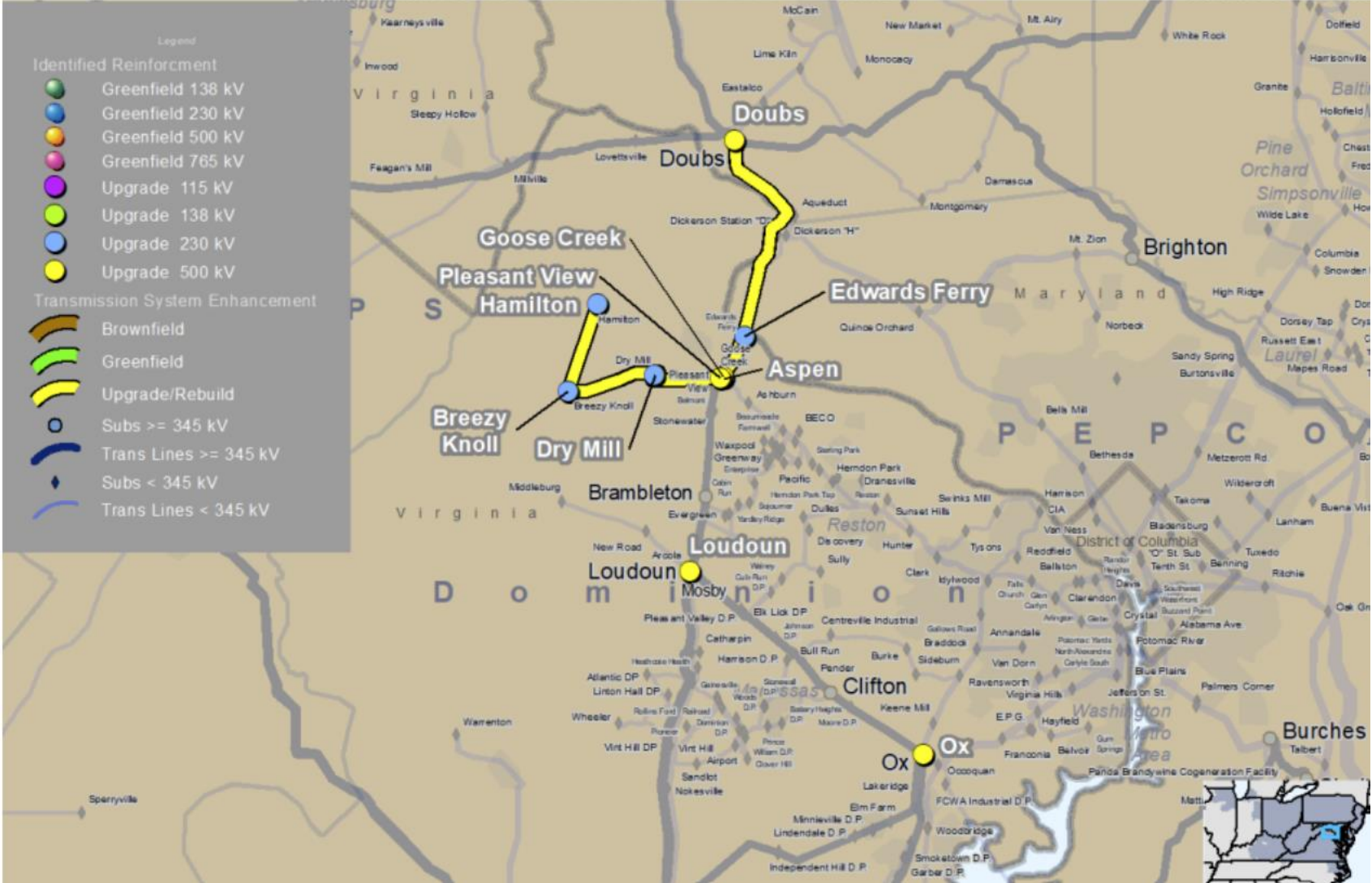
Dominion 129 – Proposal 231 components

1. Aspen Substation
2. Aviator Substation
3. Barrister substation
4. Beaumeade Substation
5. Dawkins Branch Substation
6. Doms Substation
7. DTC Substation
8. Golden Substation
9. Loudoun Substation
10. Mars Substation

11. Morrisville Substation
12. Nimbus Substation
13. Ocean Court Substation
14. Poland Road Substation
15. Rixlew Substation
16. Rollins Ford Substation
17. Spotsylvania Substation
18. Stratus Substation
19. Vint Hill Substation
20. Wishing Star Substation
21. Youngs Branch Substation

- **Yellow** is PWC impacts
- **Green** is NEW
- **Upgrades** 21 PWC, Loudoun, Fauquier, Spotsylvania, and Staunton substations – increasing capacity to 500kV
- Proposals are conflicting in redacted info as to Rixlew – NEW or Existing?
- **MISSING from maps: Rollins Ford and Youngs Branch substations**
- NO Land Acquisitions called out – BUT site grading and fencing included for some, in provided redacted information
- **Waterways/History/Parks:** None called out in redacted info
- **Estimated Cost:** \$166,884,253
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Dominion 129 – Proposal 516 map



Impacts: Loudoun, Fairfax, Frederick MD

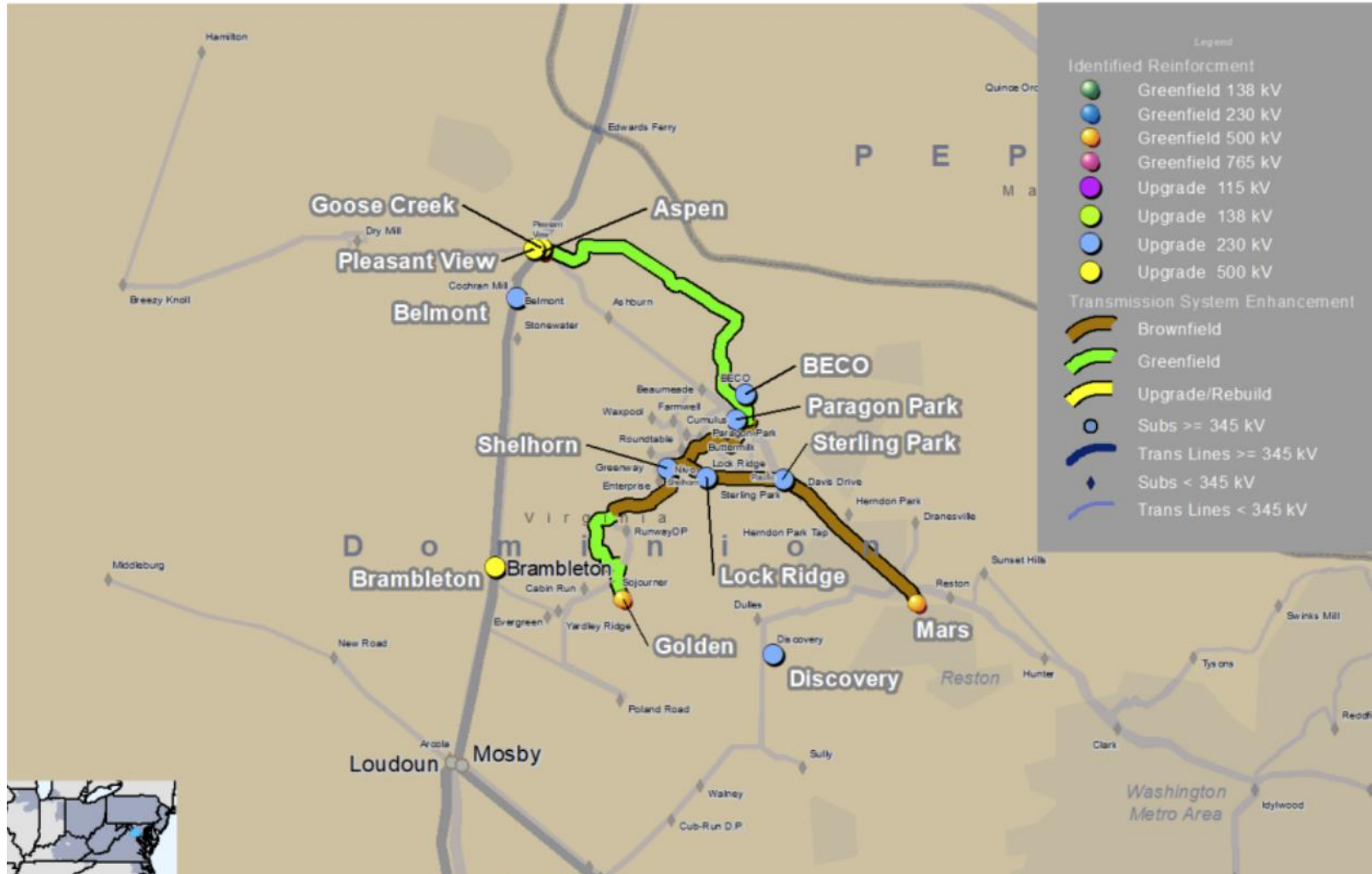
- No impacts within PWC

Dominion 129 – Proposal 516 components

1. Aspen Substation Terminal Equipment Installation for 5000A Line to Doubs
2. Breezy Knoll Relay Reset
3. Dry Mill South Relay Reset
4. Goose Creek Substation Equipment Upgrade
5. Hamilton Relay Reset
6. Pleasant View Substation Equipment Upgrade
7. Line #203 (Pleasant View - Dickerson) Rebuild
8. New 500 kV Line (Aspen to Doubs)
9. Line #514 (Goose Creek - Doubs) Rebuild
10. Line #2098 (Pleasant View - Hamilton) Partial Rebuild
11. Loudoun Substation Overdutied Breaker Replacement
12. Ox Substation Overdutied Breaker Replacement
13. Pleasant View Substation Overdutied Breaker Replacement
14. Edwards Ferry Substation Equipment Upgrade

- **Yellow** is PWC impacts
- **Green** is NEW
- No PWC impacts
- NEW 500kV line from Doubs in Frederick, MD to Aspen substation in Loudoun
- Multiple 500kV upgrades to other lines and substations in Loudoun
- Line and substation upgrades in and around **Hamilton, VA**
- 500kV upgrade to Ox (Occoquan) substation in Fairfax Co.
- ROW 3.1 miles 25' width Aspen-Doubs 500kV line
- **Waterways/History/Parks:** **Goose Creek**
- **Estimated Cost:** \$66,105,092
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Dominion 129 – Proposal 692 map



Impacts: All in Loudoun County

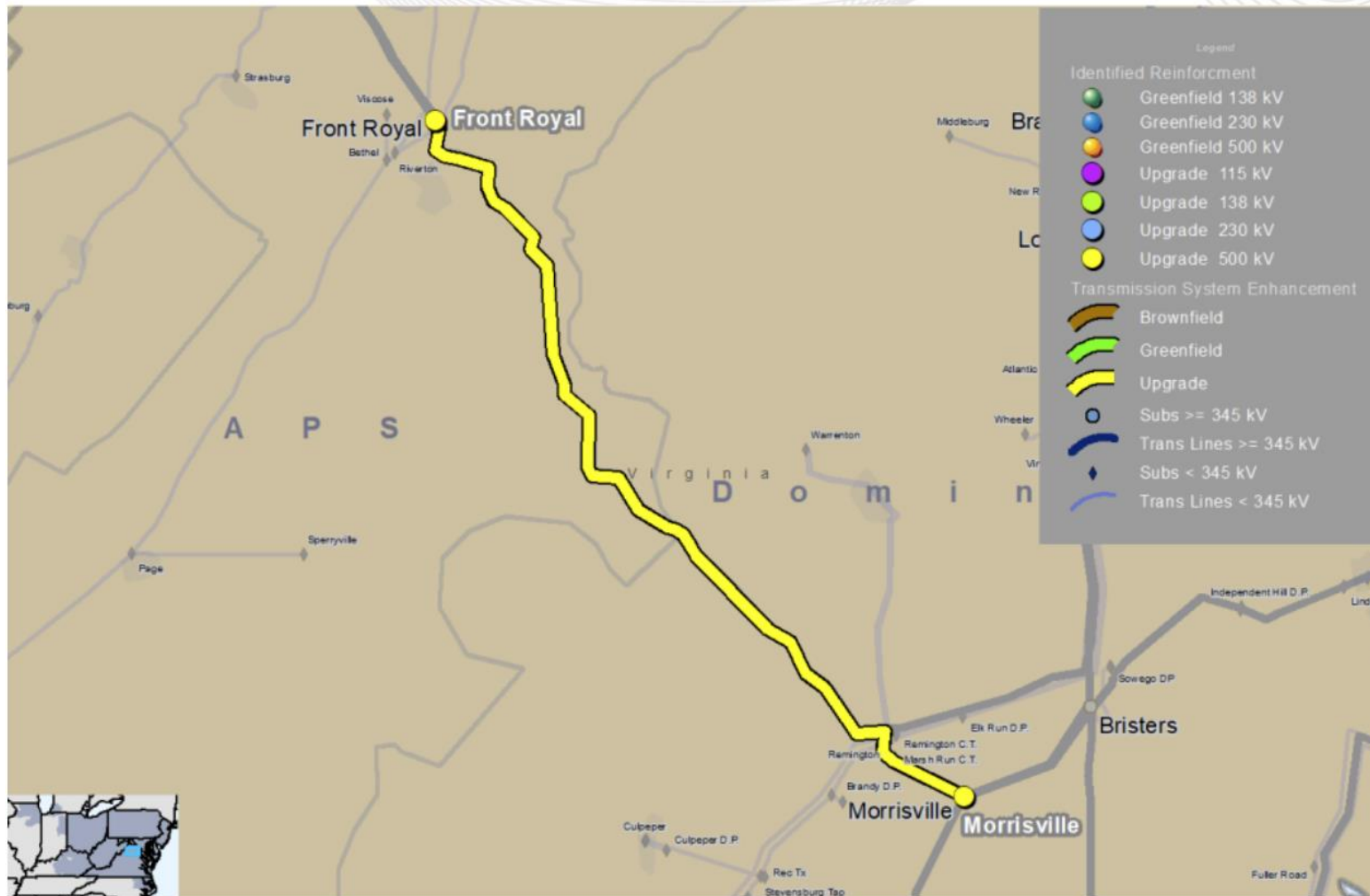
- No impacts within PWC
- ‘Data Center Alley Local Solution’
 - Ignore Brownfield – scope is NEW Greenfield lines

Dominion 129 – Proposal 692 components

1. Aspen - Golden 500kV Line Build (99-2971)
2. Mars 500-230 kV Transformer Installation (99-3197)
3. Line #2150 (Golden to Paragon Park Circuit 1) Reconductoring (99-3188)
4. Line #2081 (Golden to Paragon Park Circuit 2) Reconductoring (99-3188)
5. Paragon Park Substation Equipment Rating Upgrade (99-3188)
6. Golden Relay Setting Upgrade Reset (99-3188)
7. Line #2207 (Paragon Park - Beco) Reconductoring (99-3200)
8. Paragon Park Substation Equipment Rating Upgrade (99-3200)
9. Beco Substation Equipment Rating Upgrade (99-3200)
10. New Mars-Lockridge -Golden 230 kV Lines Construction (99-2970)
11. New Mars-Golden 500 kV Line Construction (99-2970)
12. 500kV Line # 558 (Brambleton-Goose Creek) Cut-In to Aspen (99-2971)
13. New 500kV Line from Aspen to Goose Creek (99-2971)
14. Line #2150 (Sterling Park to Paragon Park Circuit 1) Cut-In to Golden (99-2971)
15. Line #2081 (Sterling Park to Paragon Park Circuit 2) Cut-In to Golden (99-2971)
16. New 230kV Line from Aspen - Golden (99-2971)
17. Golden Substation (99-2970)
18. Lockridge Substation (99-2970)
19. Mars Substation (99-2970)
20. Beaumeade Substation Overdutied Breaker Replacement (99-3208)
21. Beco Substation Overdutied Breaker Replacement (99-3208)
22. Belmont Substation Overdutied Breaker Replacement (99-3208)
23. Discovery Substation Overdutied Breaker Replacement (99-3208)
24. Pleasant View 230 kV Substation Overdutied Breaker Replacement (99-3208)
25. Shellhorn Substation Overdutied Breaker Replacement (99-3208)
26. New Aspen 500/230 kV Substation (99-2971)
27. New Golden 500/230 kV Substation (99-2971)
28. Brambleton Substation (99-2971)
29. Goose Creek Substation (99-2971) 2022-W3-692 2
30. Paragon Park Substation (99-2971)
31. Sterling Park Substation (99-2971)
32. Sycolin Creek Substation (99-2971)

- **Yellow** is PWC impacts
- **Green** is NEW
- All in Loudoun County – No impacts within PWC
- 4 NEW lines in Loudoun Co:
 - Aspen-Golden 230kV
 - Mars-Golden 500kV
 - Aspen-Goose Creek 500kV
 - Mars-Lockridge-Golden 230kV
- 2 NEW 500kV substations in Loudoun Co
 - Aspen
 - Golden
- Multiple 500kV upgrades to other lines and substations in Loudoun
- Each substation upgrade will support new conductor rating of 4000 Amps
- **ROW-Land Acquisitions:**
 - ROW 8.3 miles 150' width Mars-Lockridge-Golden 230kV line and Mars-Golden 500kV line
 - **NEW ROW** for Aspen-Goose Creek 500kV line – no dimensions provided
 - NEW Golden 230/500kVsubstation lists Real Estate and Permitting Summary
- **Waterways/History/Parks:** Goose Creek, Broad Run
- **Estimated Cost:** \$1,060,579,078 - \$1.0B
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Dominion 129 – Proposal 671 map



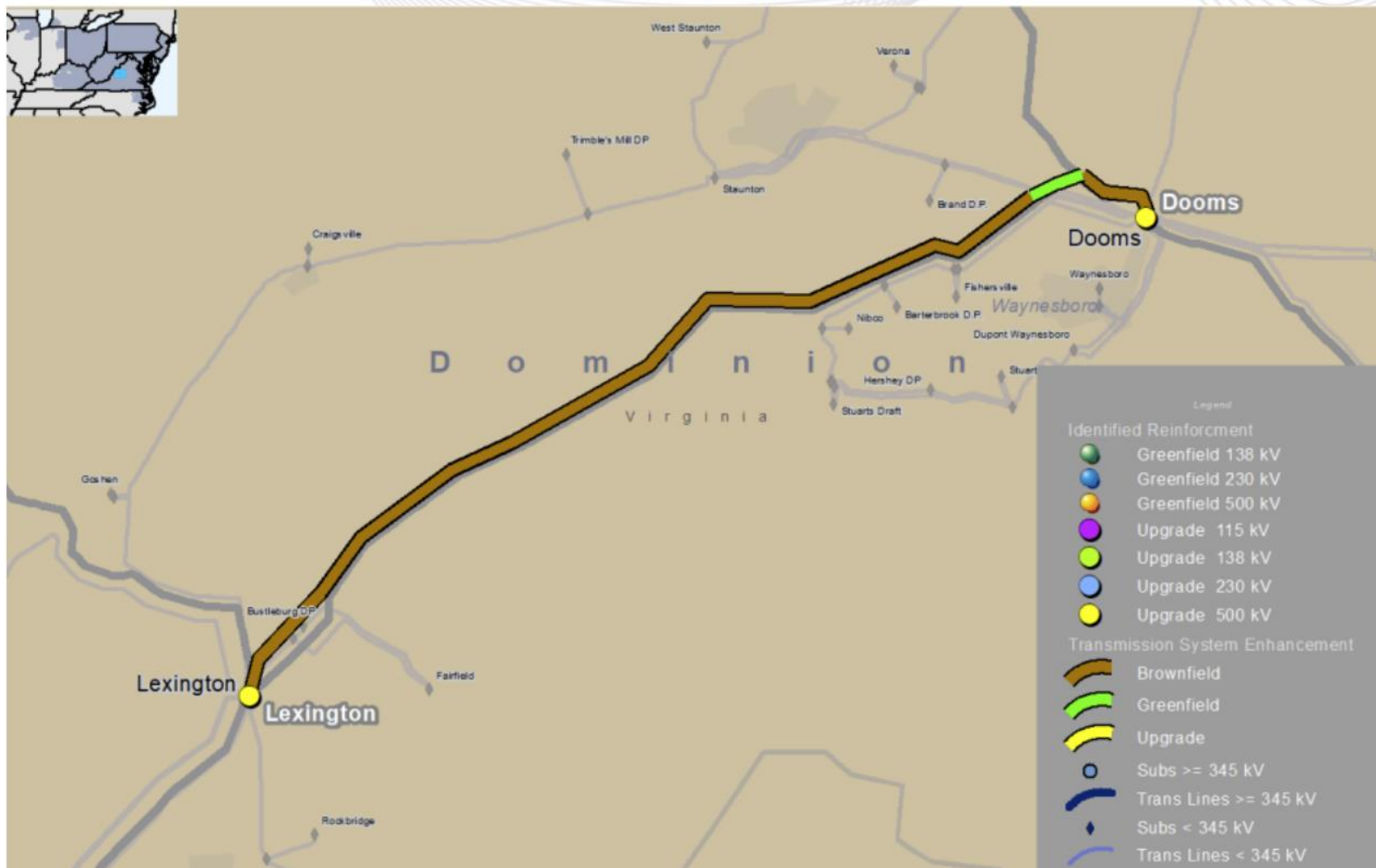
Impacts:
Fauquier, Warren

- No impacts within PWC

Dominion 129 – Proposal 671 components

1. Front Royal Substation Terminal Equipment Upgrade
 2. Morrisville Substation Terminal Equipment Upgrade
 3. Line # 541 (Front Royal to Morrisville) Rebuild
- **Yellow** is PWC impacts
 - **Green** is NEW
 - All in Fauquier-Warren Counties – No impacts within PWC
 - Upgrade Morrisville-Front Royal to 500kV – approx. 47 miles
 - Upgrade Morrisville and Front Royal substations to 500kV
 - **Waterways/History/Parks:** Shenandoah and Rappahannock Rivers, several small streams, Appalachian Trail
 - **Estimated Cost:** \$320,266,203
 - Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Dominion 129 – Proposal 923



Impacts: Augusta,
Lexington,
Rockbridge

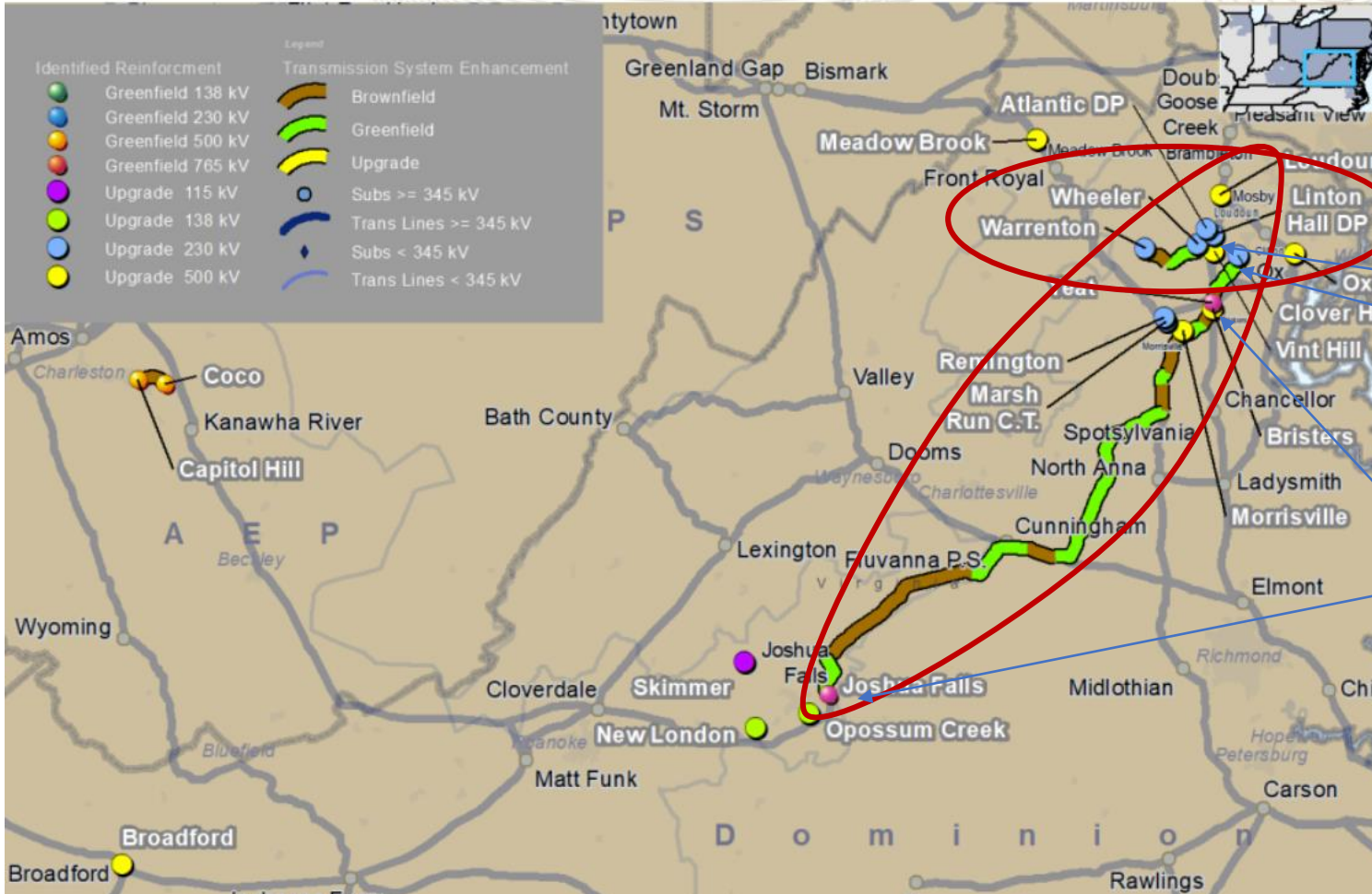
- No impacts within PWC
- Ignore Brownfield
- Transmission line is NEW-Greenfield

Dominion 129 – Proposal 923 components

1. New 500 kV Line (Lexington to Dooms)
2. Dooms Substation
3. Lexington Substation

- Yellow is PWC impacts
- Green is NEW
- No impacts within PWC
- #923: adds a new 500kV line from upgraded Dooms in Augusta, Co to upgraded Lexington in Rockbridge, Co.
- NEW ROW for new 500kV line
- **Waterways/History/Parks:** Several small streams
- **Estimated Cost:** \$248,665,258
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows : >2022 Window 3 Redacted Proposals](#)

Transsource 904



Impacts: PWC, Loudoun, Fauquier, Fairfax, Amherst, Albemarle, Buckingham, Campbell, Culpeper, Fluvanna, Louisa, Nelson, Orange, Spotsylvania, Bedford, Smyth, Washington, Saltville, WVA

- **PWC scope**

- 2 NEW 230kV lines
 - Warrenton-Wheeler
 - Yeat-Clover Hill
- 2 230kV line upgrades
- Wheeler substation 230 kV upgrade

NEW 765kV line Joshua Falls-new 765 Yeat substation comes to near Bristers substation in Fauquier Co. – *just outside PWC* – Exact route TBD

- Ignore Brownfield on map – entire 765KV line is NEW-Greenfield
- Other scope is transmission line substation upgrades in other counties and WVA

Transource 904 - Components

1. Joshua Falls- Yeat 765 kV Greenfield Transmission Line

2. Yeat Greenfield Station

3. Bristers – Ox 500 kV, and Meadowbrook – Vint Hill 500 kV Tie-in Lines

4. Yeat – Clover Hill 230 kV Greenfield Transmission Line

5. Warrenton - Wheeler 230 kV Greenfield Transmission Line

6. Vint Hill - Morrisville Series Reactor

7. Vint Hill - Loudoun 1 Series Reactor

8. Marsh Run – Remington Ct 230 kV Line Upgrade

9. Wheeler - Linton Tap - Atlantic 230 kV Line Upgrade

10. Bristers – Yeat 500 kV Line Upgrade

11. Wheeler Station 230 kV Breaker Upgrade

12. Opossum Creek Series Reactor

13. New London Station Series Reactor

14. Broadford Station Upgrade

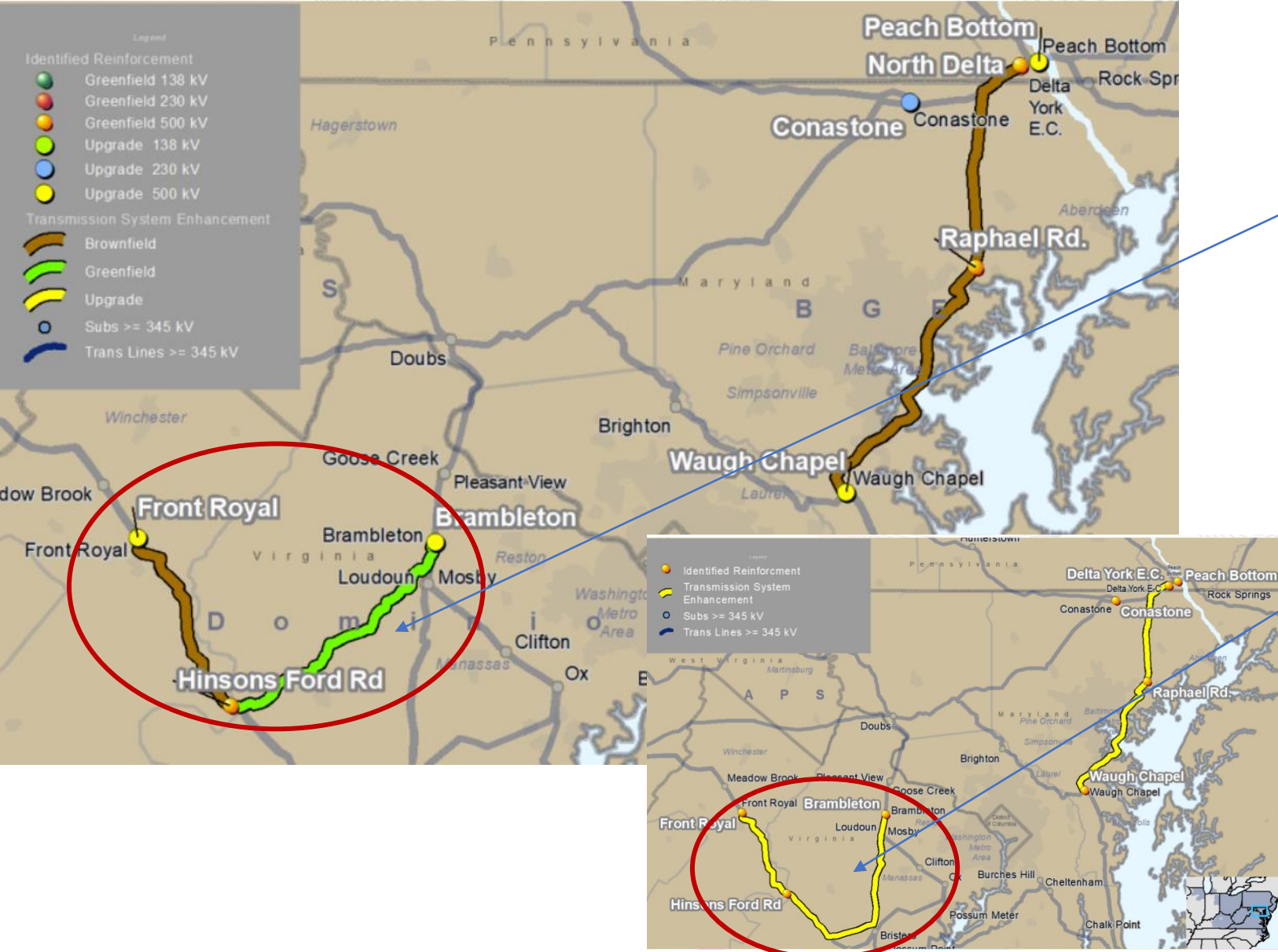
15. Skimmer Station Upgrade

16. Coco - Capitol Hill 500 kV Line Upgrade

17. Joshua Falls Station Upgrade

- **Yellow** is PWC impacts
- **Green** is NEW
- NEW 765kV line, ~135 miles, being brought farther into Virginia from Joshua Falls in Amherst Co up to NEW Yeat substation in Fauquier Co. just over PWC line
- One residential parcel on 39 acres of land targeted for NEW Yeat substation
- Substation: Phase 1 500/230kV; Phase 2 765kV. 1,010'X570' fenced area
- Bristers-Ox and Meadow Brook-Vint Hill tie-ins require new ROW - ~3 miles in Fauquier Co.
- 2 NEW PWC 230kV Lines – NEW ROW
- Yeat-Clover Hill – ~11.7 miles; Warrenton-Wheeler - ~8.8 miles
- 3 substation upgrades
 - Vint Hill-Loudoun reactor – routes through PWC?; Wheeler-Linton-Atlantic; Wheeler
- **Waterways/History/Parks:** James River (6X), Buffalo River, Tye River, Rockfish River, Hardware River, Rivanna River, South Anna River, Rapidan River, Rappahannock River, Kettle Run, Broad Run, Lake Manassas
- **Estimated Cost:** \$1,220,485,415 - \$1.2B
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

PSEG 325



Impacts: PWC, Loudoun, Fauquier, Warren, Rappahannock, MD, PA

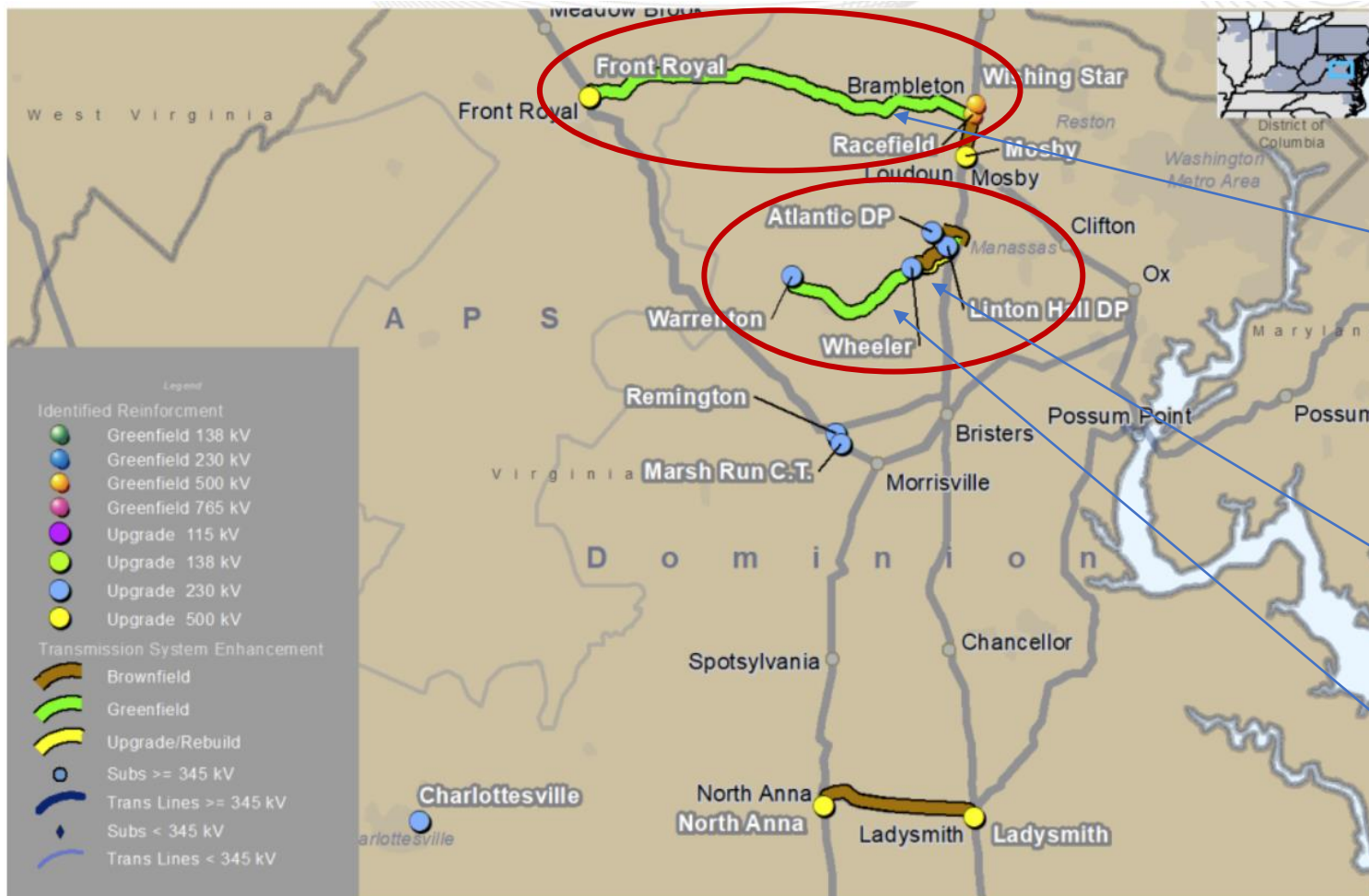
- NEW 500kV line will cross PWC anywhere between Hinsons Ford in Rappahannock Co to Brambleton in Loudoun Co
- Previous map had route along existing ROW from Hinsons Ford down close to Bristers and then up to Loudoun
- Updated map cuts straight across PWC
- Proposal estimates route to be 34 miles

PSEG 325 - Components

1. North Delta 500kV Upgrade
2. Raphael Rd 230kV Upgrade
3. Waugh Chapel 500kV Upgrade
4. Peach Bottom 500kV Upgrade
5. Conastone 230kV Short Circuit Upgrade
6. North Delta-New Raphael 500kV
7. New Raphael-Waugh Chapel 500kV
8. Reconductor North Delta-Peach Bottom 500kV
9. New Brambleton to Hinsons Ford Rd 500kV line
10. Reconductor Front Royal-Hinson Ford Rd 500kV
11. New Raphael 500kV Station
12. Hinsons Ford Rd 500kV

- **Yellow** is PWC impacts
- **Green** is NEW
- PWC scope – **NEW Brambleton-Hinsons Ford 500kV line:**
 - July map and August maps differ in route location – **newer map cuts straight across PWC** rather than longer from Fauquier to Brambleton through PWC – **Proposal says 34 miles long**
- ROW impacts either redacted or NOT declared in redacted proposal info
- 2 NEW 500kV lines
 - North Delta-New Raphael – MD
 - New Raphael-Waugh Chapel – MD
- 2 NEW 500kV substations
 - New Raphael – MD
 - Hinsons Ford – Rappahannock, VA
- **Waterways/History/Parks:** Patapsco River, could be more depending on where Brambleton-Hinsons Ford 500kV line actually routes
- **Estimated Cost:** \$1,026,627,758 - \$1.2B
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Nextera 577



Impacts: PWC, Loudoun, Fauquier, Warren, Caroline, Louisa, Spotsylvania

- NEW ~48 mile 500kV corridor from Warren Co Front Royal-NEW Racefield substation in Loudoun is just North of PWC line – actual route TBD.

- This NEW 500kV Front Royal-Racefield corridor is repeated in 3 Nextera proposals: 663, 577, 766*

MISSING from map:

- NEW Wheeler-Cedar Hill 230kV corridor thru PWC

- NEW Cedar Hill substation in PWC
- A NEW Warrenton-Wheeler line IS NOT in this proposal**

Nextera 577 - Components

1. 1B - New 500kV Transmission Line from Allegheny Substation Front Royal to new Racefield switchyard

2. 33h - Marsh Run to Remington 230kV upgrade

3. 33D - New double circuit 230kV transmission line from new Cedar Hill substation to Wheeler substation

4. 33i - Wheeler to Linton Hall 230kV upgrade

5. 33j - Linton Hall to Atlantic 230kV upgrade

6. 33k - Remington to Remington CT 230kV upgrade

7. 33A - New 230kV transmission line from Dominion North Anna to Lady Smith

8. 01A - New 500kV line termination at Front Royal substation

9. 1F - New Racefield GIS Substation - 5 terminal

10. 33F - Wheeler substation 230kV expansion

11. 33B - North Anna substation 230kV expansion

12. 33C - Lady Smith substation 230kV expansion

13. 33E - Warrenton substation 230kV ring bus expansion

14. 50C - Mosby to Wishing Star 500kV Upgrade

- **Yellow** is PWC impacts

- **Green** is NEW

- Components 3, 4, 5, 10 impact PWC

- NEW Cedar Hill-Wheeler 230kV transmission line – no length specified

- Two 230kV line upgrades – use existing ROW “to extent practicable” - ~9 miles

- One 230kV substation upgrade

- **Where is NEW Cedar Hill-Wheeler 230kV line on map?**

- **Where is component and cost for NEW Cedar Hill substation? – not listed in this proposal scope**

- NEW Front Royal-Racefield 500kV corridor – all NEW ROW 48 miles

- “...Colocates with Rte. 50 for ~9 miles to reduce viewshed impact, then deviates to the south from Highway 50 to the west of Middleburg to avoid significant residential and building impacts, for total of ~10 miles, before co-locating with Highway 50 for 3 miles...” – **where exactly does this traverse?**

- NEW 500kV Racefield substation – “~7 acre property near existing Buttermilk and planned Wishing Star substations” in Loudoun Co – Land Acquisition Plan redacted

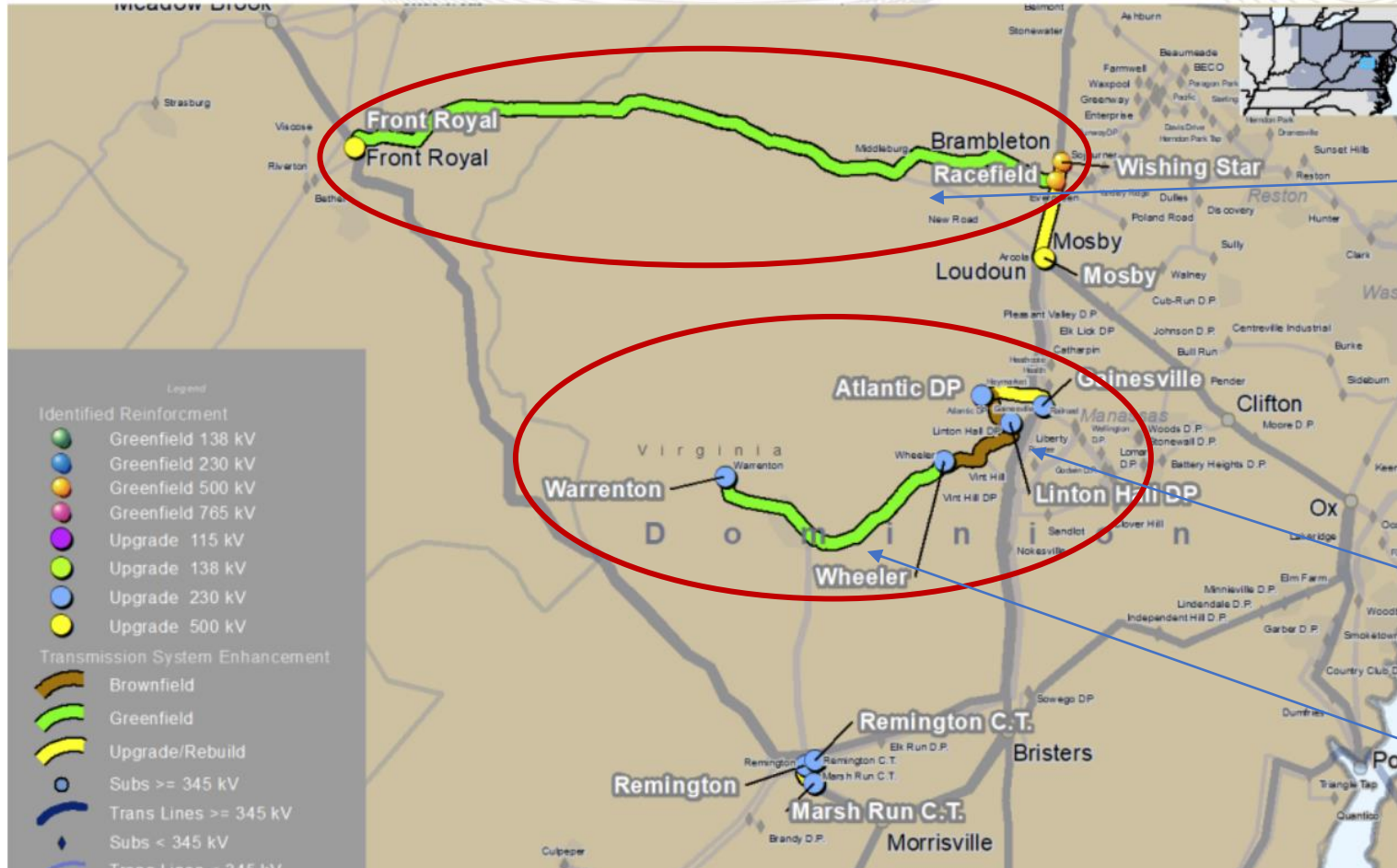
- Warrenton substation upgrade in Fauquier appears to require land acquisition: “Area west of the substation appears to be available.”

- **Waterways/History/Parks:** Middleburg/Rte 50 area, Shenandoah River, Appalachian Trail, Unison Battlefield Area, 9 “waterbodies,” Lake Anna

- **Estimated Cost:** \$273,272,920

- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Nextera 766



Impacts: PWC, Loudoun, Fauquier, Warren, Spotsylvania

- NEW ~48 mile 500kV corridor from Warren Co Front Royal-NEW Racefield substation in Loudoun is just North of PWC line – actual route TBD.
- *This NEW 500kV Front Royal-Racefield corridor is repeated in 3 Nextera proposals: 663, 577, 766*
- MISSING from map:
 - NEW Wheeler-Cedar Hill 230kV corridor thru PWC
 - NEW Cedar Hill substation in PWC
- A NEW Warrenton-Wheeler line IS NOT in this proposal

Nextera 766 – Components

1. 1B - New 500kV Transmission Line from Allegheny Substation Front Royal to new Racefield switchyard
2. 33h - Marsh Run to Remington 230kV upgrade
3. 33D - New double circuit 230kV transmission line from new Cedar Hill substation to Wheeler substation
4. 33i - Wheeler to Linton Hall 230kV upgrade
5. 33j - Linton Hall to Atlantic 230kV upgrade
6. 33k - Remington to Remington CT 230kV upgrade
7. 33L - Atlantic to Gainesville 230kV upgrade
8. 01A - New 500kV line termination at Front Royal substation
9. 1F - New Racefield GIS Substation - 5 terminal
10. 33F - Wheeler substation 230kV expansion
11. 28G - Wishing Star substation 500/230kV transformer addition
12. 33E - Warrenton substation 230kV ring bus expansion
13. 50C - Mosby to Wishing Star 500kV Upgrade

Yellow is PWC impacts

Green is NEW

NEW Front Royal-Racefield 500kV corridor – all NEW ROW 48 miles

- “...Colocates with Rte. 50 for ~9 miles to reduce viewshed impact, then deviates to the south from Highway 50 to the west of Middleburg to avoid significant residential and building impacts, for total of ~10 miles, before co-locating with Highway 50 for 3 miles...” – where exactly does this traverse?

NEW 500kV Racefield substation – “~7 acre property near existing Buttermilk and planned Wishing Star substations” in Loudoun Co – Land Acquisition Plan redacted

Where is NEW Cedar Hill-Wheeler 230kV line on map?

Where is component and cost for NEW Cedar Hill substation? – not listed in this proposal scope

Warrenton substation upgrade in Fauquier appears to require land acquisition: “Area west of the substation appears to be available.”

Waterways/History/Parks: Middleburg/Rte 50 area, Shenandoah River, Appalachian Trail, Unison Battlefield Area, 9 “waterbodies,” Lake Anna

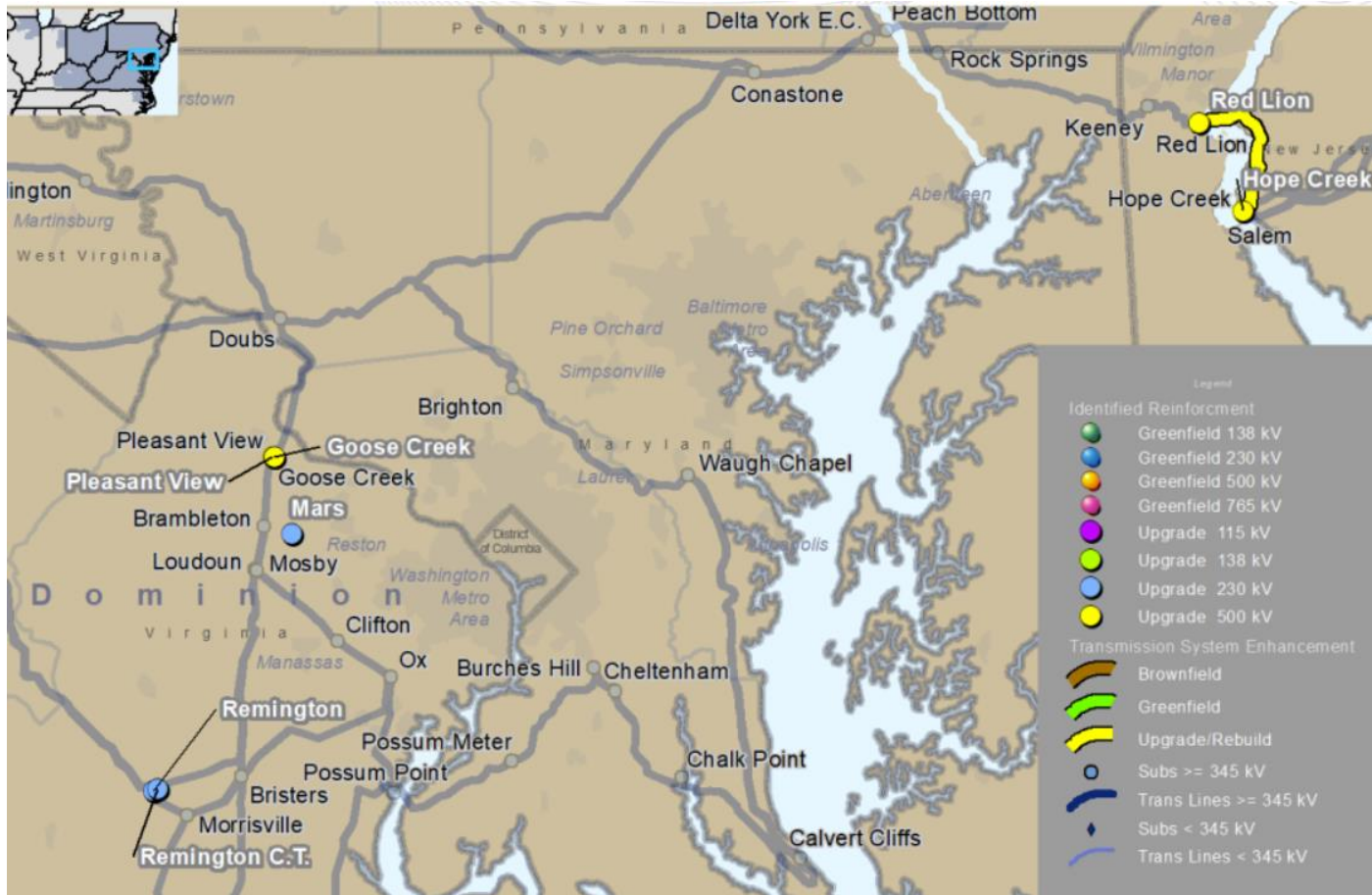
Estimated Cost: \$233,093,012

Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Nextera 175 – Combines 3 proposals + stand-alone scope

- Stand-alone scope not from 3 below combined proposals
- 663 – PWC – Repeated in both 175 and 598.
- 853 – Loudoun – Repeated in both 175 and 598.
- 948 – Loudoun

Nextera 175 – Scope not in 3 combined proposals



Impacts: Loudoun, Caroline, Albemarle, Fauquier, DEL, NJ

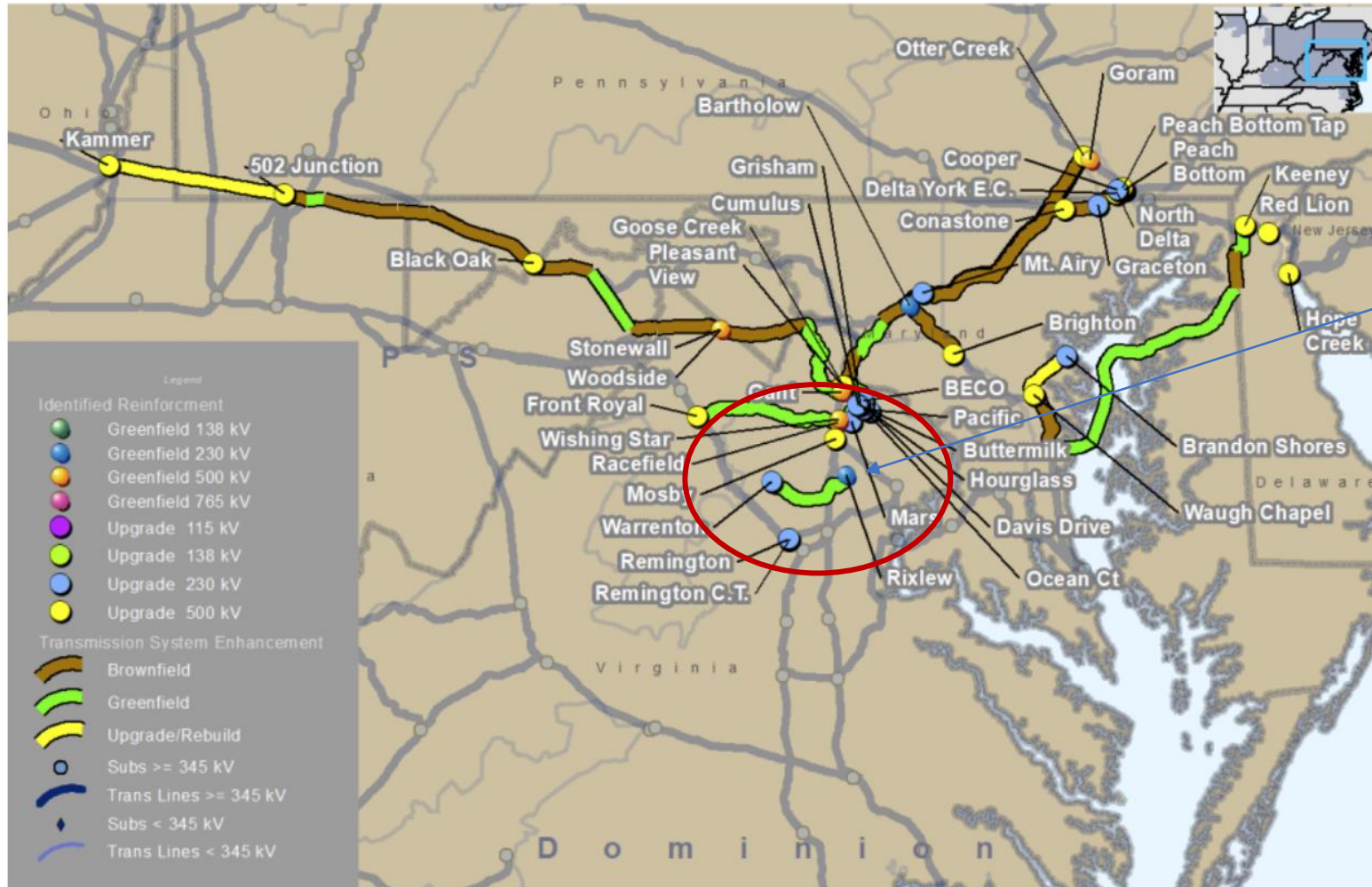
- Map is missing Components: 5, 6, 7, 8, 9, 11
 - All are line upgrades (see next slide)

Nextera 175 – Components not in combined scope

1. 50d - Add 2nd Transformer and SVC & Cap Bank to future Mars Substation
2. 50P - Red Lion to Hope Creek 500 kV Upgrade
3. 50e - Upgrade Transformer 1 and add new Transformer 2 at existing Pleasant View substation
4. 50g - Add 2nd Transformer at existing Goose Creek substation
5. 50i - Lady Smith CT to St. John's 230kV Upgrade
6. 50j - Lady Smith CT to Summit 230 kV Upgrade
7. 50k - Cashes's Corner to Hollymeade 230kV upgrade
8. 50L - Cashes's Corner to Gordonsville 230kV upgrade
9. 50M - Charlottesville to Proffit DP 230kV upgrade
10. 50n - Remington CT to Remington 230kV upgrade
11. 50o - Remington CT to GIM Run 230kV upgrade

- **Yellow** is PWC impacts
- **Green** is NEW
- No impacts within PWC
- Impacts:
 - Loudoun, Caroline, Albemarle, Charlottesville, Fauquier
 - Delaware & New Jersey
- All Upgrades: Adding transformers (1440 MVA) and more at substations to remove violation
- **Many component scope items missing from map: 5, 6, 7, 8, 9, 11**
- **Waterways/History/Parks:** None called out in redacted proposal
- **Estimated Cost: \$48,494,912**
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

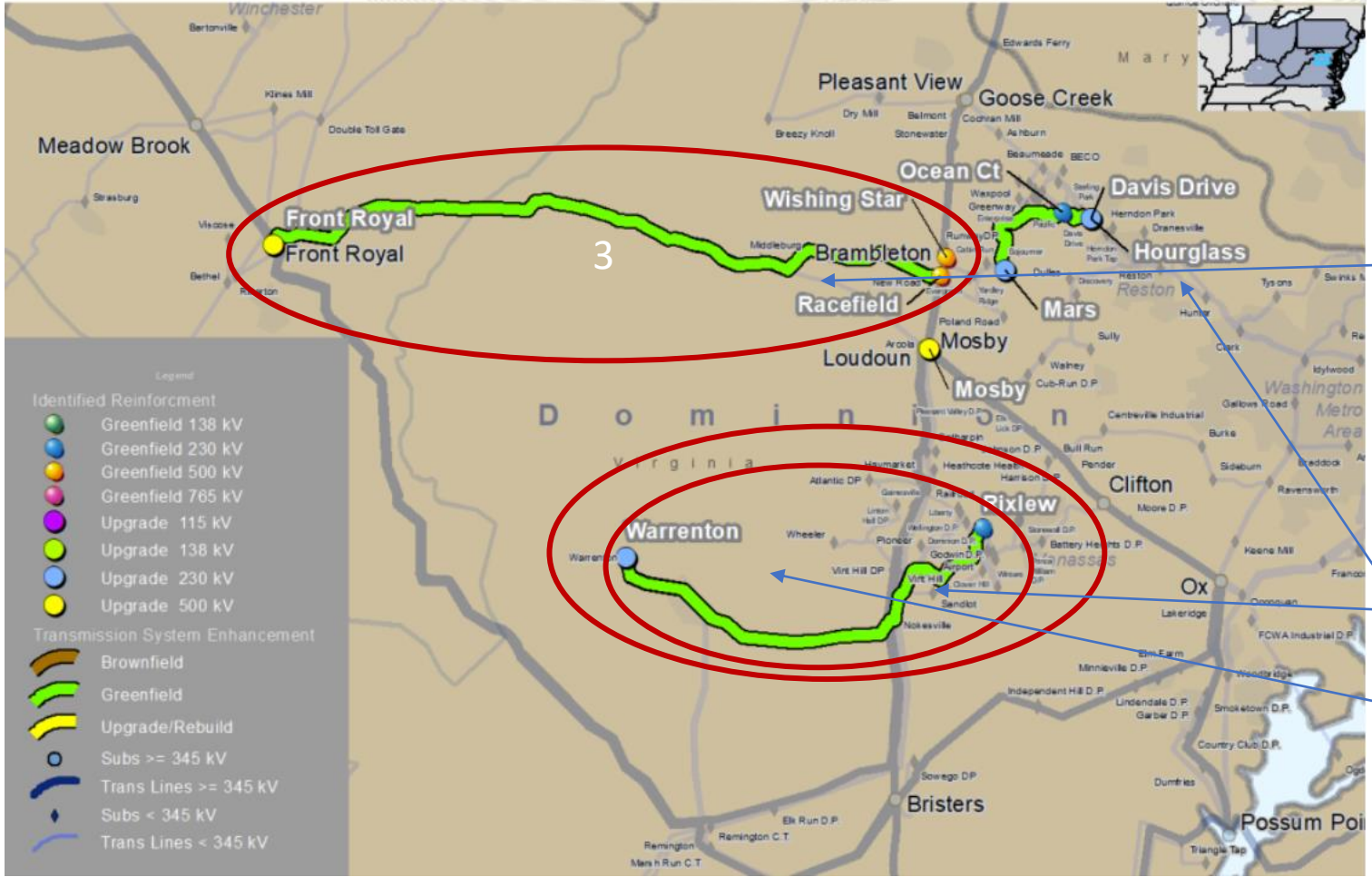
Nextera 175 – Combined Scope



12. Combination: 43 - PEBO
215A + WOP 1F + SOP 8E

- 663 PWC
- 948 – Loudoun
- 853 – Loudoun

175 & 598 - Nextera 663



Impacts: PWC, Fauquier, Warren

- 633 is included 3X in proposals:
 - Component of #175
 - Component of #598
 - Stand-alone proposal
- NEW ~48 mile 500kV corridor from Warren Co Front Royal-NEW Racefield substation in Loudoun is just North of PWC line – actual route TBD.
 - **This NEW 500kV Front Royal-Racefield corridor is repeated in 3 Nextera proposals: 663, 577, 766**
- NEW 230kV Warrenton to Rixlew
- **Exact corridor across PWC TBD**
- **MISSING – NEW 230kV Warrenton to Hourglass in PWC Innovation Park - ~16 miles**
 - Hourglass substation is NOT in Loudoun Co.

175 & 598 - Nextera 663 - Components

1. 1B - New 500kV Transmission Line from Allegheny Substation Front Royal to new Racefield switchyard

2. 01A - New 500kV line termination at Front Royal substation

3. 1F - New Racefield GIS Substation - 5 terminal

4. 33E - Warrenton substation 230kV ring bus expansion

5. 40C - Mars substation 230kV ring bus expansion

6. 40a - New 230kV transmission line from existing Mars substation to existing Ocean Court substation

7. 40b - New 230 kV transmission line from existing Ocean Court substation to existing Davis Drive substation

8. 40f - New 230kV transmission line from existing Warrenton substation to existing Hourglass substation

9. 40g - New 230kV transmission line from existing Warrenton substation to future Rixlew substation

10. 40D - Ocean Court substation 230kV Ring Bus Expansion

11. 40E - Davis Drive 230kV line termination

12. 40h - Hourglass substation 230kV single breaker expansion

13. 40i - Rixlew substation 230kV single breaker expansion

14. 50C - Mosby to Wishing Star 500kV Upgrade

- **Yellow** is PWC impacts

- **Green** is NEW

- NEW Front Royal-Racefield 500kV corridor – all NEW ROW 48 miles – Just North of PWC – Exact route TBD

- “...Colocates with Rte. 50 for ~9 miles to reduce viewshed impact, then deviates to the south from Highway 50 to the west of Middleburg to avoid significant residential and building impacts, for total of ~10 miles, before co-locating with Highway 50 for 3 miles...” – where exactly does this traverse?

- NEW 500kV Racefield substation – “~7 acre property near existing Buttermilk and planned Wishing Star substations” in Loudoun Co – Land Acquisition Plan redacted

This is adding 2 more lines from Warrenton into and across PWC – in addition to the Warrenton-Wheeler line in Transource 904!

Are PWC Hourglass and Rixlew NEW substations or existing? Is this scope adding to NEW substation scope in another project? Neither of these two are operational yet.

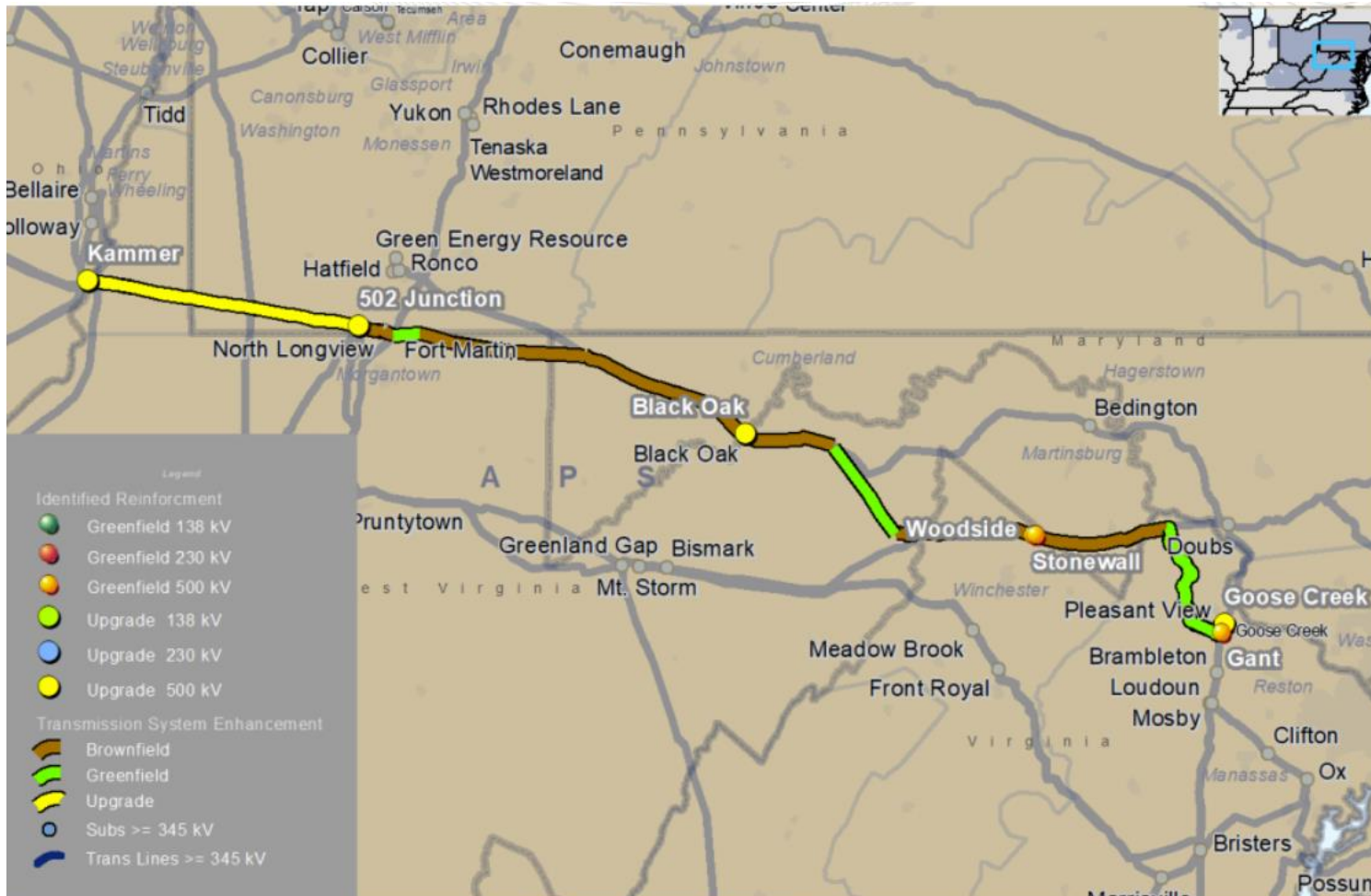
Warrenton-Hourglass route is not on map.

- **Waterways/History/Parks:** Middleburg/Rte 50 area, Shenandoah River, Appalachian Trail, Unison Battlefield Area, 9 “waterbodies,” Lake Anna

- **Estimated Cost:** \$299,141,792

- Scope repeated 3X: 175, 598, and stand-alone 663

175 & 598 – Nextera 853



Impacts: Loudoun, Frederick Co, VA, WVA

- No impacts within PWC
- 853 is included 3X in proposals:
 - Component of 175
 - Component of 598
 - Stand-alone proposal
- Ignore Brownfield – Line is NEW Greenfield

175 & 598 – Nextera 853 Components

1. 4CA - New 500kV transmission line from existing Black Oak substation and new Woodside substation

2. 10C1A - New 500kV transmission line from new Woodside substation to Goose Creek substation

3. 23s5 - New Woodside Substation - 6 terminal

4. 23sb - Stonewall substation two 138kV breaker expansion

5. 04AE - Black Oak substation 500kV six breaker and new transformer expansion

6. 10C3 - New 500kV line between new Woodside substation and new Gant substation

7. 39a3 - New Gant substation - 3 terminal

8. 46a - New 500kV line from existing 502 Junction substation to existing Black Oak substation

9. 46b - 502 Junction substation two 500 kV circuit breaker expansion

10. 46b1 - Kammer to 502 Junction 500kV upgrade

- **Yellow** is PWC impacts
- **Green** is NEW
- Most scope is in WVA (Monangalia, Preston, others) and MD (Garrett, Allegany), bringing 500kV functionality into Loudoun at Goose Creek
- New ROW for 80% of route.
- Land Acquisitions
- Proposal indicates could be Pike instead of Woodside substation.
- Potential impact to **Waterford Historic District** (10C3 scope item repeated in 3 other proposals (642, 676, 347) Loudoun Co impacting. Another Waterford-impacting scope item 10C2 repeated across 6 other proposals: 279, 719, 846, 951, 28, 685.
- Proposal indicates AEP or APS could be responsible for construction
- **Waterways/History/Parks:** “64 waterbodies”, Potomac River, North River, Appalachian Mountains, Appalachian Trail, Shenandoah River, Millville Dam, Waterford Historic District, Allegheny Mountains,
- **Estimated Cost: \$730,797,212**
- 853 scope repeated 3X: 175, 598, and stand-alone 853
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

175 – Nextera 948 Components

1. 24e - North Delta to Cooper 230kV rebuild

2. 24f - North Delta to Graceton 230kV rebuild

3. 26A - New 500kV transmission line from new North Delta substation to BGE's Conastone substation.

4. 40AB1 - New two single circuit 230kV transmission lines from new Bartholow substation to new Grisham substation

5. 27d - North Peach Bottom to South Peach Bottom 500kV upgrade

6. 39H1 - New Grisham Substation- 6 terminal

7. 45F1 - New Bartholow Substation - 12 terminal

8. 26b2 - New North Delta Substation - 10 terminal

9. 26c2 - Conastone substation 500kV and 230kV substation expansion

10. 39h1a - Nimbus to Buttermilk 230kV loop in/out work

11. 39h1b - Pacific to Beco 230kV loop in/out work.

12. 47ab - New 230kV transmission from new Goram substation to existing Otter Creek substation

13. 47abc - New 500kV transmission line from new Goram substation to new Bartholow substation

14. 47ad - New 230kV transmission line from existing Otter Creek substation to new Bartholow substation

15. 47b - New double circuit 230kV transmission from the existing Conastone substation to new Bartholow substation

16. 47A - New Goram substation

17. 47ax - Loop in Conastone to Brighton 500kV line to new Bartholow substation

18. 43EF - Mt Airy 230kV substation single breaker expansion

19. 43e - New 230kV transmission line from new Bartholow substation to existing Mt. Airy substation

20. 48b - Two (2) new 230kV single circuit transmission lines from the existing Keeney substation to existing Waugh Chapel substation

21. 47ac - Otter Creek 230kV four circuit breaker expansion

22. 48C - Keeney substation two (2) new 230kV terminations

23. 48d - Waugh Chapel substation two (2) new 230kV terminations

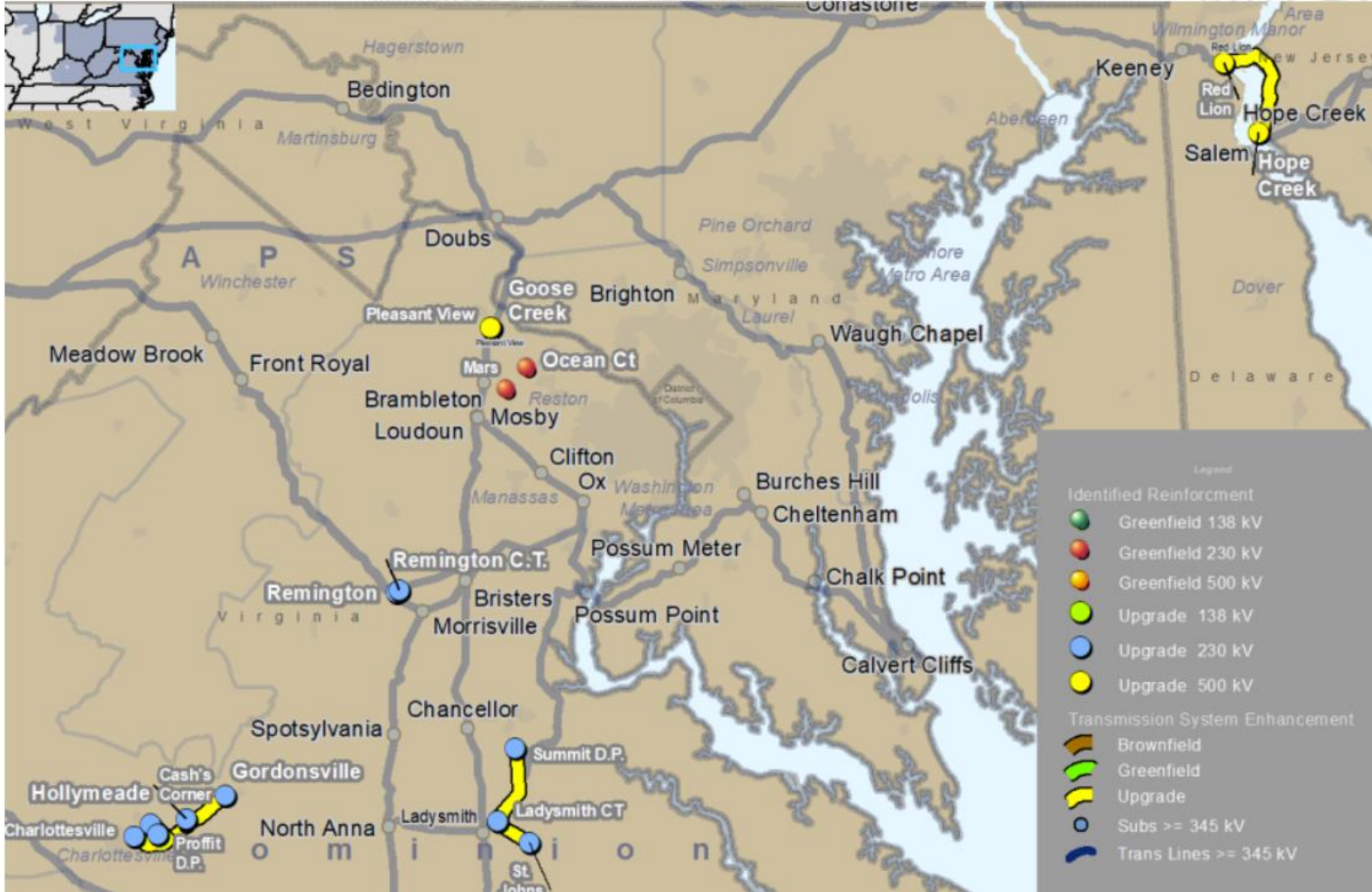
24. 50B - Peach Bottom to North Delta 500kV Upgrade

- **Yellow** is PWC impacts
- **Green** is NEW
- No impacts within PWC
- Partial **underground** 230kV in Loudoun
- **Waterways/History/Parks:** Elixir Farm, Potomac River, Chesapeake & Ohio National Historic Park, Sugarloaf Mountain Historic Landmark, Chesapeake and Delaware Canal, Chesapeake Bay
- **Estimated Cost:** \$1,724,434,379 - \$1.7B
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Nextera 598 – Combines 3 Proposals + stand-alone scope

- Stand-alone scope not from 3 below combined proposals
- 385 – Loudoun
- 663 – PWC – Repeated in 175 and 598.
 - See previous 663 map and identical scope in 175 detail
- 853 – Loudoun – Repeated in 175 and 598.
 - See previous 853 map and identical scope in 175 detail

Nextera 598 - Scope not in 3 combined proposals



Impacts: Loudoun, Fauquier, Caroline, Spotsylvania, Albemarle, Warren, DEL, NJ

Nextera 598 – Additional scope (not in 3 combined proposals)

2. 50d - Add 2nd Transformer and SVC & Cap Bank to future Mars Substation

3. 50e - Upgrade Transformer 1 and add new Transformer 2 at existing Pleasant View substation

4. 50g - Add 2nd Transformer at existing Goose Creek substation

5. 50P - Red Lion to Hope Creek 500 kV Upgrade 2022-W3-598 1

6. 50i - Lady Smith CT to St. John's 230kV Upgrade

7. 50j - Lady Smith CT to Summit 230 kV Upgrade

8. 50k - Cashes's Corner to Hollymeade 230kV upgrade

9. 50l - Cashes's Corner to Gordonsville 230kV upgrade

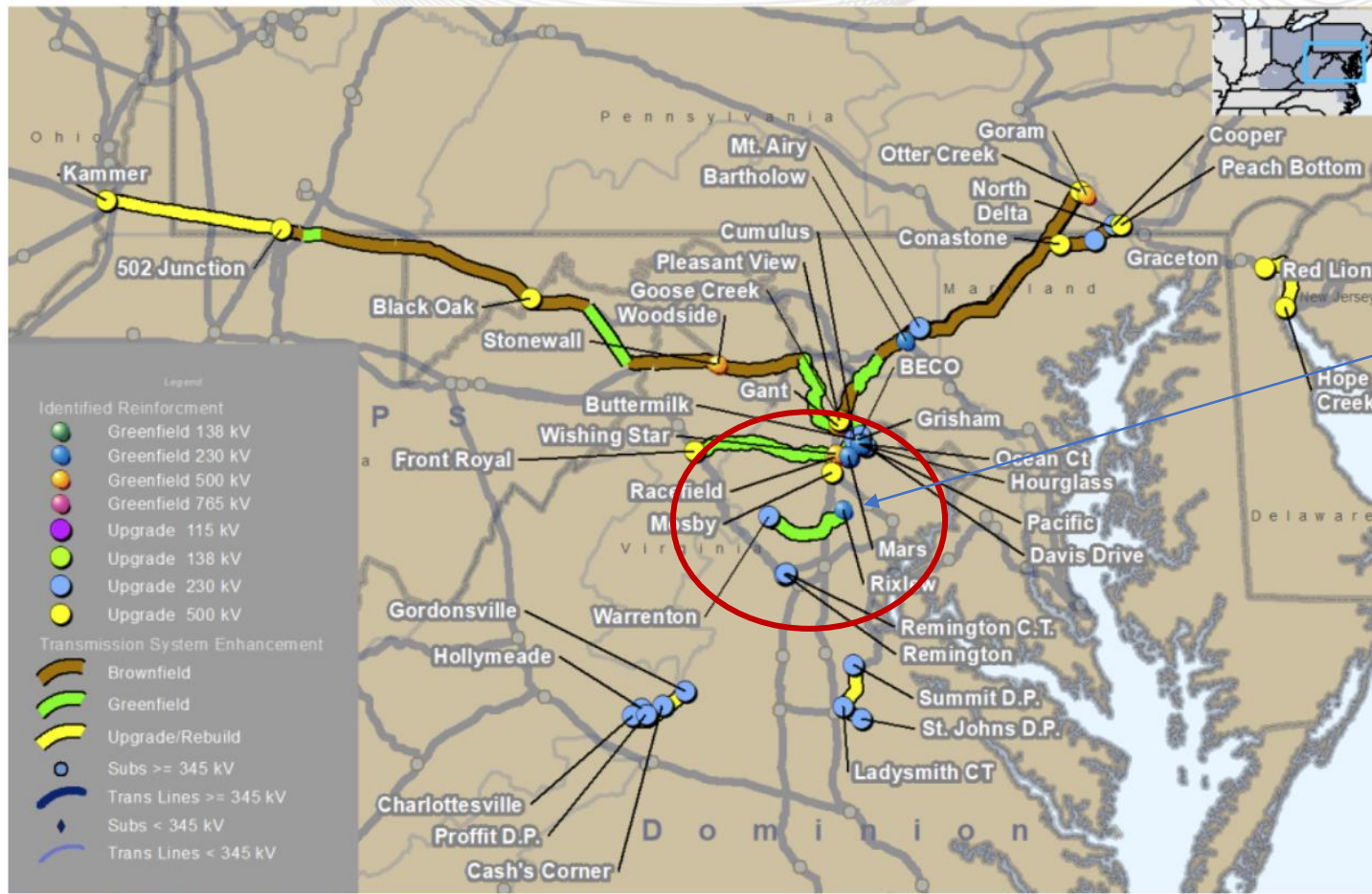
10. 50m - Charlottesville to Proffit DP 230kV upgrade

11. 50n - Remington CT to Remington 230kV upgrade

12. 50n - Remington CT to GIM Run 230kV upgrade

- **Yellow** is PWC impacts
- **Green** is NEW
- No impacts within PWC
- All upgrades: Loudoun, Fauquier, Caroline, Spotsylvania, Albemarle, Warren, DEL, NJ
- **Proposal component 2 refers to Mars substation as NEW and as Existing – Which is it?**
- Waterways/History/Parks: None called out in components
- Estimated Cost: \$48,494,912
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Nextera 598 – Combined Scope



12. Combination 43 - PEBO 215A + WOP 1F + SOP 8E

- 385 – Loudoun
- 663 – **PWC** (see details in 175 slides)
- 853 – Loudoun (see details in 175 slides)

- Impacts: PWC, Loudoun, Fauquier, Caroline, Albemarle, Warren, Frederick Co, VA, MD, PA, WVA, DEL, NJ

598 – Nextera 385



Impacts: Loudoun, MD, PA

- No impacts within PWC
- All lines are Greenfield-NEW routes
- Ignore “Brownfield”

598 – Nextera 385 Components

1. 24e - North Delta to Cooper 230kV rebuild

2. 24f - North Delta to Graceton 230kV rebuild

3. 26A - New 500kV transmission line from new North Delta substation to BGE's Conastone substation.

4. 40AB1 - New two single circuit 230kV transmission lines from new Bartholow substation to new Grisham substation

5. 27d - North Peach Bottom to South Peach Bottom 500kV upgrade

6. 39H1 - New Grisham Substation- 6 terminal

7. 26b2 - New North Delta Substation - 10 terminal

8. 26c2 - Conastone substation 500kV and 230kV substation expansion

9. 39h1a - Nimbus to Buttermilk 230kV loop in/out work.

10. 39h1b - Pacific to Beco 230kV loop in/out work

11. 47ac - Otter Creek 230kV four circuit breaker expansion

12. 43EF - Mt. Airy 230kV substation single breaker expansion

13. 43e - New 230kV transmission line from new Bartholow substation to existing Mt. Airy substation

14. 47ab - New 230kV transmission from new Goram substation to existing Otter Creek substation

15. 47abc - New 500kV transmission line from new Goram substation to new Bartholow substation

16. 47ad - New 230kV transmission line from existing Otter Creek substation to new Bartholow substation

17. 47b - New double circuit 230kV transmission from the existing Conastone substation to new Bartholow substation

18. 47ax - Loop in Conastone to Brighton 500kV line to new Bartholow substation

19. 50A - Conastone to Brighton 500kV Upgrade

20. 50B - Peach Bottom to North Delta 500kV Upgrade

21. 47A - New Goram substation

22. 45F1 - New Bartholow Substation - 12 terminal

- **Yellow** is PWC impacts
- **Green** is NEW
- No impacts within PWC
- Impacts: Loudoun, MD, PA
- Partial undergrounding NEW 230kV in Loudoun
- NEW ROW and Land Acquisitions – see all Green
 - Parcel already under purchase option
 - “Use of existing ROW to extent practicable”
 - “Expansion of existing transmission corridor for ~90% of route length” and “entire length.”
 - Land acquisitions
- **Waterways/History/Parks:** Potomac River, Chesapeake & Ohio National Historic Park, Sugarloaf Mountain Historic Landmark, 42 waterbodies, Appalachian Highlands
- **Estimated Cost:** \$1,238,657,537 - \$1.2B
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

LS Power 548 – Components

- 1. Bethel/Riverton 138kV Terminal Equipment Upgrade
- 2. Morgan/Cherry Run 138kV Terminal Equipment Upgrade
- 3. Grand Point/Fayetteville 138kV Terminal Equipment Upgrade
- 4. Glen Falls/Harrison Reserve 138kV Terminal Equipment Upgrade
- 5. Lewistown/Reeds Gap 115kV Terminal Equipment Upgrade
- 6. Dickerson Station D/Dickerson H 230kV Terminal Equipment Upgrade
- 7. 502 Junction Substation Upgrade
- 8. Beaumeade Substation Upgrade
- 9. Black Oak Substation Upgrade
- 10. Conastone Substation Upgrade
- 11. Doubs Substation Upgrade
- 12. Goose Creek Substation Upgrade
- 13. Hunterstown Substation Upgrade
- 14. North Delta Substation Upgrade
- 15. Vint Hill Substation Upgrade
- 16. DTC Substation Upgrade
- 17. Mars Substation Upgrade
- 18. Rollins Ford Substation Upgrade
- 19. NOVI Substation Upgrade
- 20. Bristers Substation Upgrade
- 21. Peach Bottom Substation Upgrade
- 22. Vint Hill - Loudoun Reconductor
- 23. Conastone - Peach Bottom Rebuild
- 24. Beaumeade - BECO - DTC 230kV Transmission Line Upgrade
- 25. 502 Junction - Black Oak 500kV Transmission Line
- 26. Black Oak - Doubs Greenfield 500kV Transmission Line
- 27. Hunterstown - Doubs Greenfield 500kV Transmission Line
- 28. Doubs - Goose Creek Greenfield 500kV Transmission Line
- 29. Black Oak - Doubs Greenfield 500kV Transmission Line (Shared ROW)
- 30. Front Royal Substation Upgrade
- 31. BECO Substation Upgrade
- 32. Hunterstown - Doubs Greenfield 500kV Transmission Line (Shared ROW)
- 33. Doubs - Goose Creek Greenfield 500kV Transmission Line (Shared ROW)
- 34. Front Royal - Vint Hill Greenfield 500kV Transmission Line
- 35. Conastone - North Delta Greenfield 500kV Transmission line (Shared ROW)
- 36. Goose Creek - Beaumeade Greenfield Underground 500kV Double Circuit Transmission Line
- 37. Peach Bottom - North Delta Reconductor

- **Yellow** is PWC impacts
- **Green** is NEW
- PWC impacts:

1 NEW 500kV transmission line – crosses parts of PWC - Front Royal-Vint Hill – does not follow existing corridor?

1 500kV line upgrade – crosses through PWC - Vint Hill-Loudoun

1 PWC 230kV substation upgrade - Rollins Ford

Impacts: PWC, Loudoun, Fauquier, Warren, Frederick MD, WVA, PA, MD

NEW Underground 500kV in Loudoun entire length – +“This path should provide for a lesser impact to the community than going through roads while also reducing the number of underground utility crossings.”

Land Acquisitions/ROW:

“Dominion owns the land north of the current substation” – expanding into new land? ROW redacted

“Their appears to be sufficient land to allow for (a GIS expansion), (substation to expand), (for expansion)”

“Where existing right of way is not available, paralleling existing right of way will be prioritized, with greenfield portions being used as necessary.”

“Parallel existing ROW”

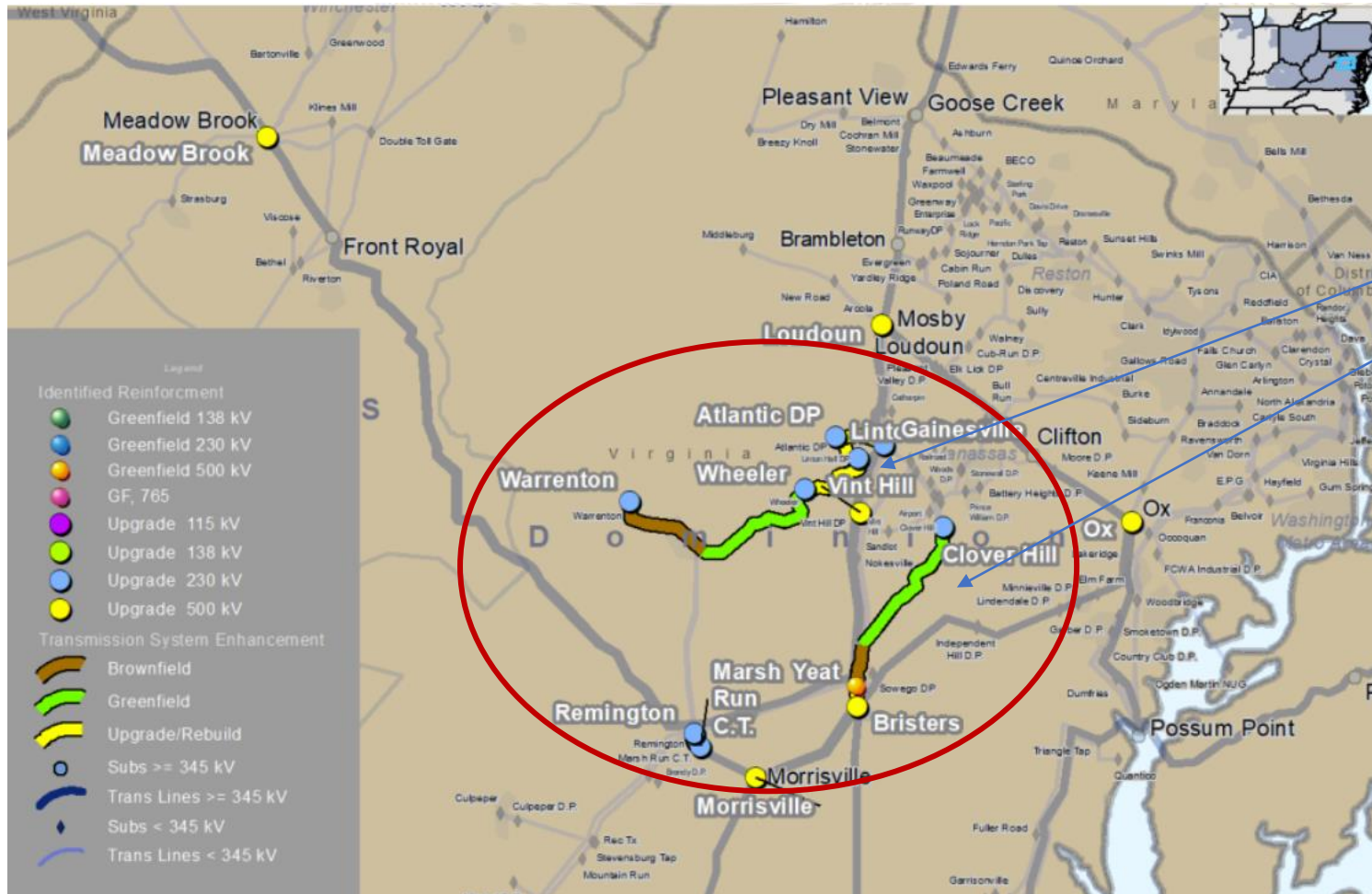
• Further info redacted.

• **Waterways/History/Parks: All specifics redacted**

• **Estimated Cost:** \$3,077,123,844 - \$3.0B

• Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Transource 977



Impacts: PWC,
Loudoun, Fauquier,
Fairfax, Rappahannock

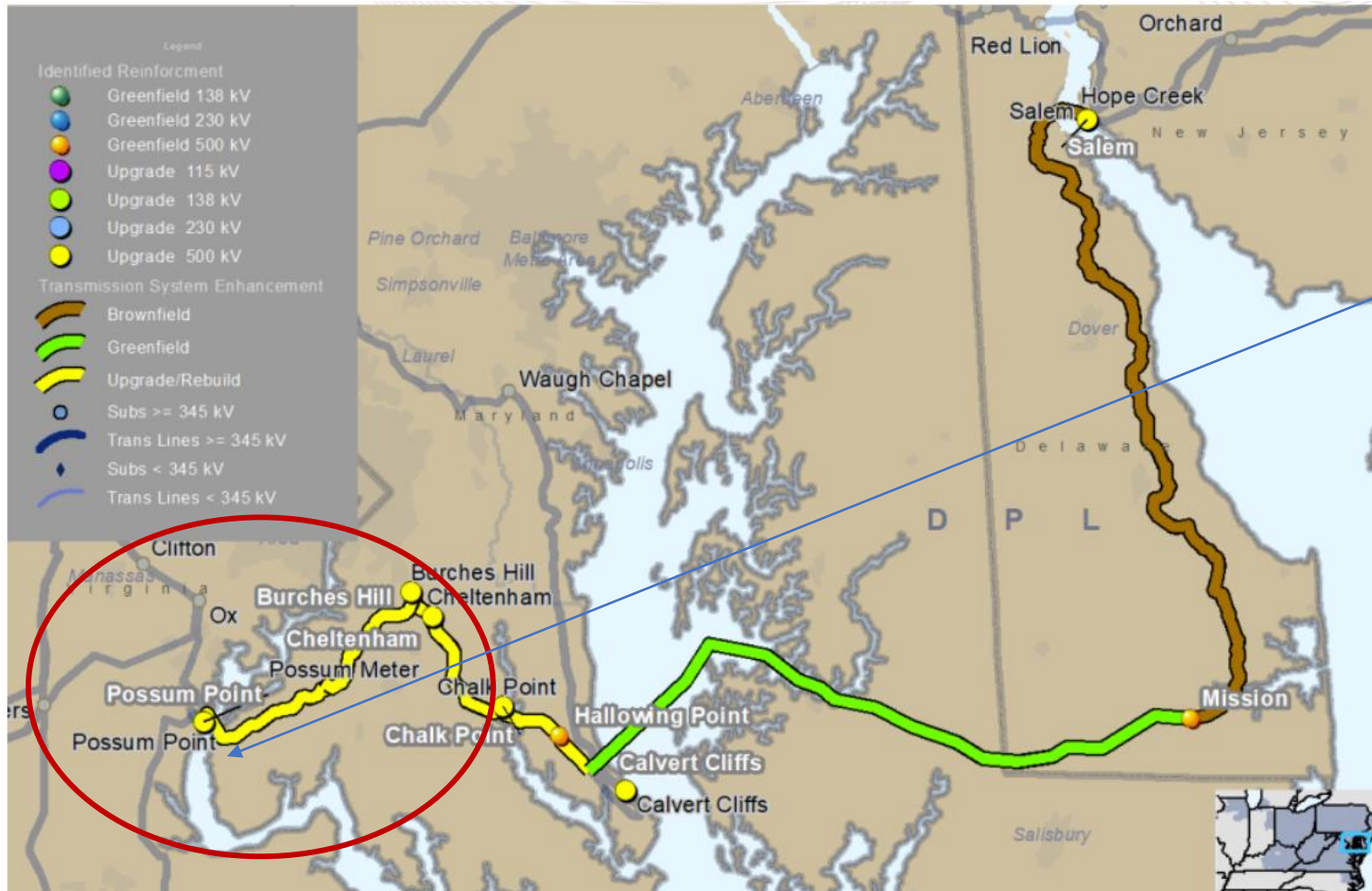
- Ignore “Brownfield.”
Anything brown is
Greenfield – NEW.

Transource 977 - Components

1. Yeat Greenfield Station
2. Bristers – Ox 500 kV, and Meadowbrook – Vint Hill 500 kV Tie-in Lines
3. Yeat – Clover Hill 230 kV Greenfield Transmission Line
4. Warrenton - Wheeler 230 kV Greenfield Transmission Line
5. Vint Hill - Morrisville Series Reactor
6. Vint Hill - Loudon 1 Series Reactor
7. Marsh Run – Remington Ct 230 kV Line Upgrade
8. Wheeler - Linton Tap - Atlantic - Gainesville 230 kV Line Upgrade
9. Bristers – Yeat 500 kV Line Upgrade

- Yellow is PWC impacts
- Green is NEW
- 2 NEW 230kV transmission lines into/through PWC - Yeat-Clover Hill (11.69 mi) and Warrenton-Wheeler (8.8 mi)
- 2 NEW 500kV Tie-in lines - Bristers-Ox & Meadow Brook-Vint Hill – 1.5 mi each. How do tie-in lines traverse/impact PWC?
- 1 230kV transmission line upgrade - Wheeler-Linton-Atlantic-Gainesville
- Remaining scope Fauquier, Loudoun, Fairfax, Rappahannock
- New YEAT 500/230kV substation in Fauquier, near Bristers (Phase 1 only). 20 acres – undeveloped rural land(?)
- NEW ROW required for NEW. **Specific details redacted.**
- **Waterways/History/Parks:** Kettle Run, Broad Run, Cedar Run, Lake Manassas
- **Estimated Cost:** \$261,278,527
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Exelon 691



Impacts: PWC, MD, PA, DEL, NJ

- All NEW (Greenfield) – Ignore Brownfield
- Combination of Overhead, Underground, Submarine

Exelon 691 - Components

1. Hallowing Point HVDC Converter

2. Possum Pt Substation

3. Burches Hill Substation

4. Chalk Point Substation

5. Calvert Cliffs Substation

6. Salem Substation

7. Mission HVDC Converter Station

8. Possum Pt to Burches Hill

9. Burches Hill to Cheltenham

10. Cheltenham to Chalk Pt

11. Chalk Pt to Hallowing Pt

12. Hallowing Pt to Calvert Cliffs

13. HVDC Hallowing Pt to Mission

14. Mission to Salem

- **Yellow** is PWC impacts

- **Green** is NEW

- PWC:

- Upgrade Possum Point substation

- New transmission line from Possum Point to Burches Hill, MD

- Remaining scope: MD, PA, DEL, NJ

- ROW/Land Acquisition specifics: Where applicable – Redacted

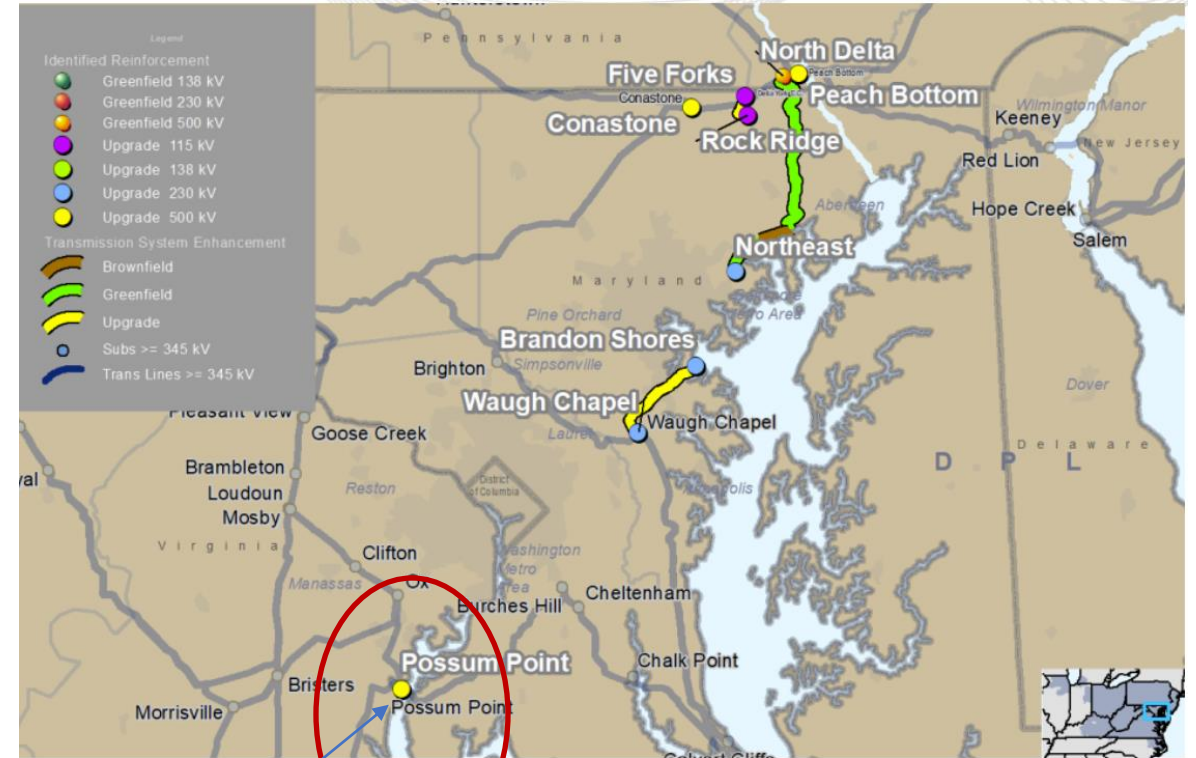
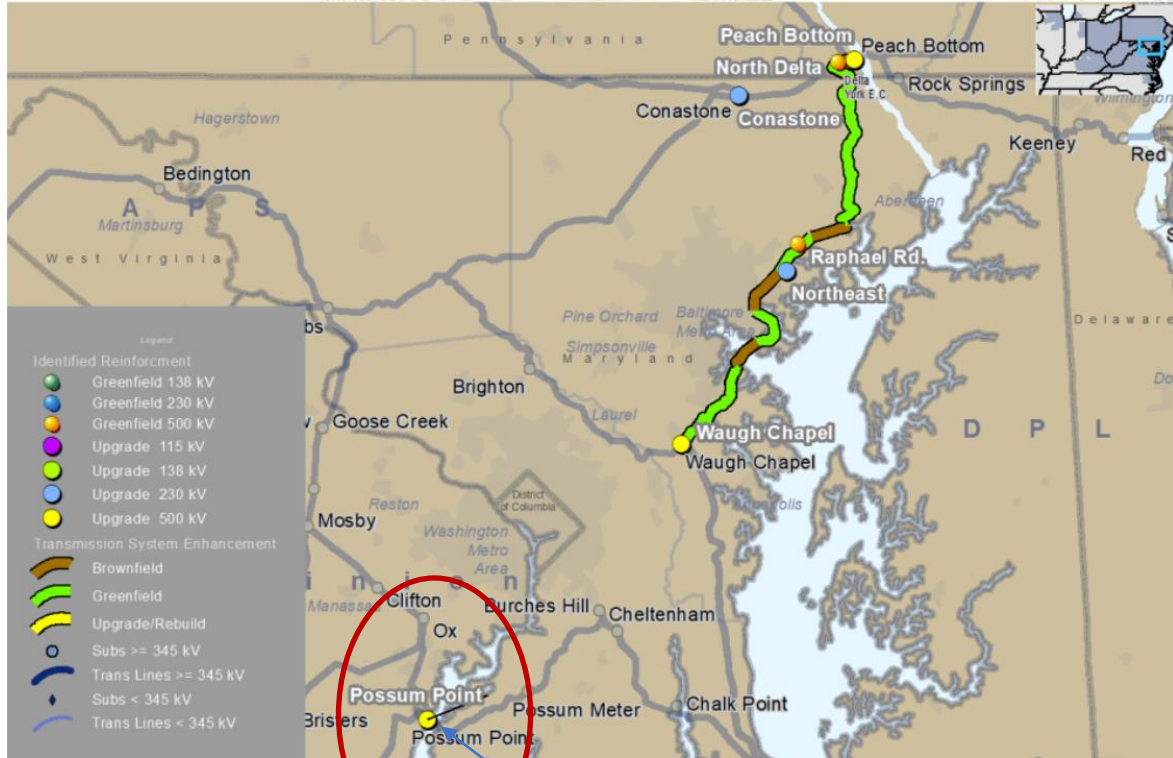
- Underground Hallowing Point Converter Station to Chestnut Landing then transitions Submarine across Chesapeake Bay

- **Waterways/History/Parks:** Chesapeake Bay & Choptank River (3.7 mi **underground**, 39.4 miles **submarine** cables, 40.7 mi overhead HVDC), Delaware River (overhead length TBD), Potomac River (**6 overhead towers in the river**)

- **Estimated Cost:** \$2,232,702,373 - \$2.2B

- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

PSEG 24 & PSEG 125



Both Impact: PWC, MD, PA

- Both proposals contain same **500/230kV upgrades to existing Possum Point substation**
- Opening door for new future transmission lines across eastern portion of PWC connecting to Possum Point

PSEG 24 & 125 - Components

PSEG 24

1. North Delta-New Raphael 500kV
2. New Raphael 500kv Substation
3. Waugh Chapel 500kV Upgrade
4. Peach Bottom 500kV Upgrade
5. Possum Point 500/230kV Upgrade
6. Conastone 230kV Short Circuit Upgrade
7. New Raphael-Waugh Chapel 500kV
8. Reconductor North Delta-Peach Bottom 500kV
9. North Delta 500kV Upgrade
10. Raphael Rd 230kV Upgrade
11. Northeast 230/115kV Upgrade

PSEG 125

1. North Delta 500/230kV Upgrade
2. Northeast 230kV Upgrade
3. Peach Bottom 500kV Upgrade
4. North Delta-Northeast 230kV
5. Reconductor Brandon Shores-Waugh Chapel 230kV DCT
6. Reconductor Five Forks-Rock Ridge 115kV
7. Possum Point 500/230kV Upgrade
8. Conastone 500kV Upgrade

- **Yellow** is PWC impacts
- **Green** is NEW
- Same 500kV upgrade to PWC Possum Point substation in both proposals
- All other scope is in MD
 - 2 NEW 500kV routes
 - 1 NEW 500kV substation
 - 1 NEW 230kV route
 - Remainder 500 & 230kV upgrades
- NEW ROW - required
- **Waterways/History/Parks:** Specifics redacted. Patapsco River mentioned.
- **Estimated Cost:** \$804,069,843
- Full details: [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Loudoun County impacting Proposals

- [See Loudoun County impacting proposals overview](#)
- Don't come into PWC, but bring increased 500kV capacity to substations and more 500kV lines for PWC to connect to
- PROPOSALS = 28
- **Proposals: #23, 28, 116, 255, 279, 347, 385, 419, 445, 487, 516, 564, 600, 642, 660, 676, 685, 692, 719, 728, 741, 837, 846, 853, 858, 948, 951, 962**
- **ESTIMATED TOTAL COSTS = \$26.7 BILLION (\$26,745,769,448.00)**
 - Do not include the proposal costs listed/counted in the PWC totals
- Loudoun proposals include Lines/Substations *also* impacting other Va. counties &/or other states:
 - PWC = 0
 - Fauquier = 0
 - Fairfax = 1 #516
 - Warren = 1 #487
 - Frederick Co, VA = 9 #279, 347, 642, 676, 685, 719, 846, 853, 951,
 - Frederick Co, MD = 12 #23, 28, 116, 255, 419, 445, 516, 660, 741, 837, 846, 962
 - MD = 18 #23, 28, 116, 255, 385, 419, 445, 487, 564, 600, 660, 728, 741, 837, 846, 948, 962
 - PA = 16 #23, 28, 116, 255, 385, 419, 445, 487, 564, 600, 660, 741, 837, 846, 948, 962
 - WVA = 13 #23, 28, 279, 347, 487, 642, 676, 685, 719, 837, 846, 853, 951
- Loudoun is also impacted by PWC proposals
- **ALL Loudoun proposals are expanding transmission grid in Loudoun to 500kV – multiple new lines and substations, and upgraded lines and substations.**
- [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

Fauquier & Fairfax Counties VA impacting Proposals

- [See Fauquier & Fairfax impacting proposals overview](#)
- Don't come into PWC or Loudoun, but bring increased 500kV capacity
- **Fauquier County VA:**
 - PROPOSALS = 1
 - **Proposal: #671**
 - Also impact Warren Co, VA, MD, PA
 - **ESTIMATED TOTAL COSTS = \$320,266,203.00**
 - Do not include the proposal costs listed/counted in the PWC, Loudoun, and Fairfax totals
 - Fauquier County is also impacted by PWC and Loudoun proposals – [see those overviews](#)
- **Fairfax County VA:**
 - PROPOSALS = 2
 - **Proposals: #229, 637**
 - Also impact Frederick Co MD, MD, PA
 - **ESTIMATED TOTAL COSTS = \$895,459,401**
 - Do not include the proposal costs listed/counted in the PWC, Loudoun, and Fauquier totals
 - Fairfax County is also impacted by PWC and Loudoun proposals – [see those overviews](#)
- [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals

All Other Va. Counties, MD, & PA impacting Proposals

- [See All Other: VA Counties, MD & PA impacting proposals overview](#)
- Don't come into PWC, Loudoun, Fauquier, or Fairfax, but bring increased 500kV capacity to substations and more 500kV lines
- PROPOSALS = 26
- Proposals: #9, 30, 55, 74, 181, 196, 202, 211, 217, 234, 344, 374, 410, 477, 524, 530, 537, 606, 629, 631, 704, 731, 808, 856, 923, 967
- **PROPOSALS ESTIMATED TOTAL COSTS = \$3.6 BILLION (\$3,644,251,790.00)**
 - Do not include the proposal costs listed/counted in the PWC, Loudoun, Fauquier, and Fairfax totals
- VA counties: Amherst, Augusta, Albemarle, Bedford, Botetourt, Campbell, Caroline, Charlottesville, Fluvanna, Franklin, Fredericksburg, Giles, Gordonsville, Habersham, Leesville, Lexington, Lynchburg, North Anna, Petersburg, Rockbridge, Stafford = 21
- Frederick MD, MD, PA
 - Other Va. Counties and other States are also impacted by PWC, Loudoun, Fauquier, and Fairfax proposals
- [PJM - Redacted Public Proposals for Current and Closed Windows](#) : >2022 Window 3 Redacted Proposals