Reliability Analysis Update

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Transmission Expansion Advisory Committee
April 7, 2026

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Outline

- 2026 RTEP - Window 1
  - Schedule Update
- 2025 RTEP - Window 1
  - P5 Updates
- Scope / Cost Changes

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2026 RTEP Window 1 Schedule Update

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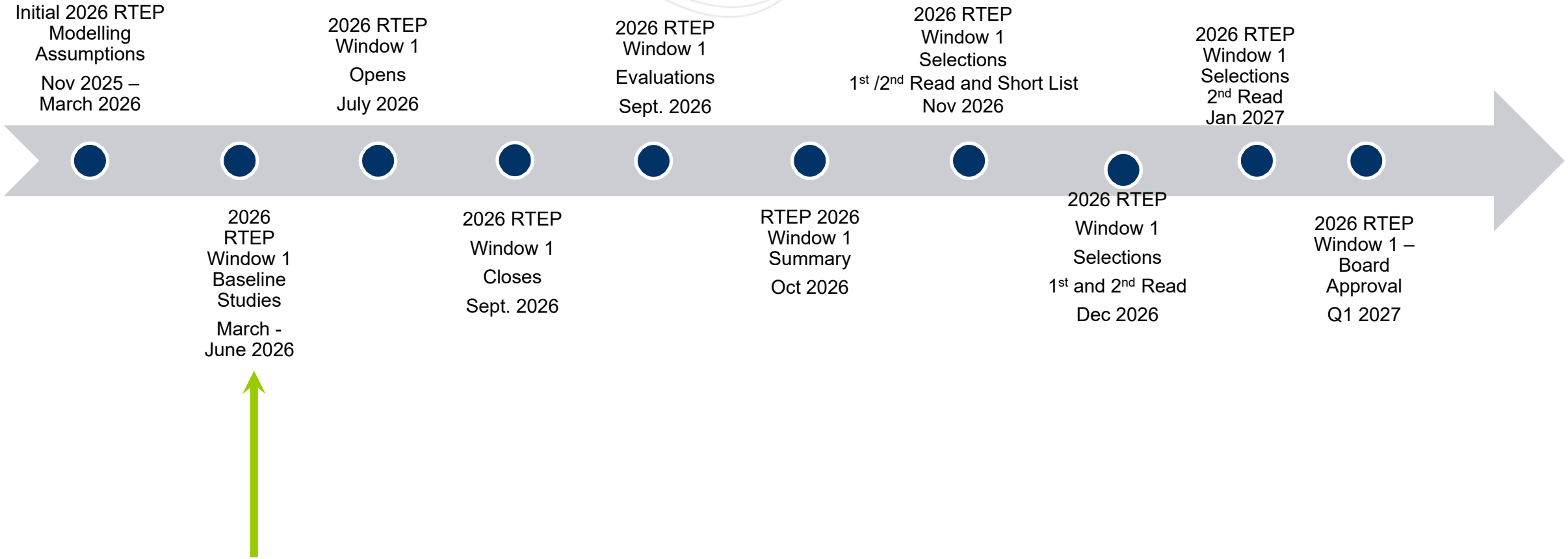
2026 RTEP Window 1 – Timeline



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2025 RTEP Window 1
P5 Updates

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2nd Read

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AEP and DOM
P5 CAPs: Baseline

Process Stage: Second Read

Criteria: Baseline Analysis

Assumption Reference: 2030 RTEP assumption

Model Used for Analysis: 2025 Series RTEP 2030 Summer, Winter & LL cases

Proposal Window Exclusion: Substation Exclusion

Problem Statement: In 2025 Series RTEP 2030 Summer, Winter & LL cases, multiple thermal and voltage violations are observed due to multiple P5 contingencies.

Proposed Solution:

- TOs have submitted P5 mitigation projects that include upgrades listed below designed to eliminate the P5 contingency:
  - Battery Monitoring
  - Relay Upgrades

Transmission Estimated Cost: AEP $1.7 M, DOM $0.02 M

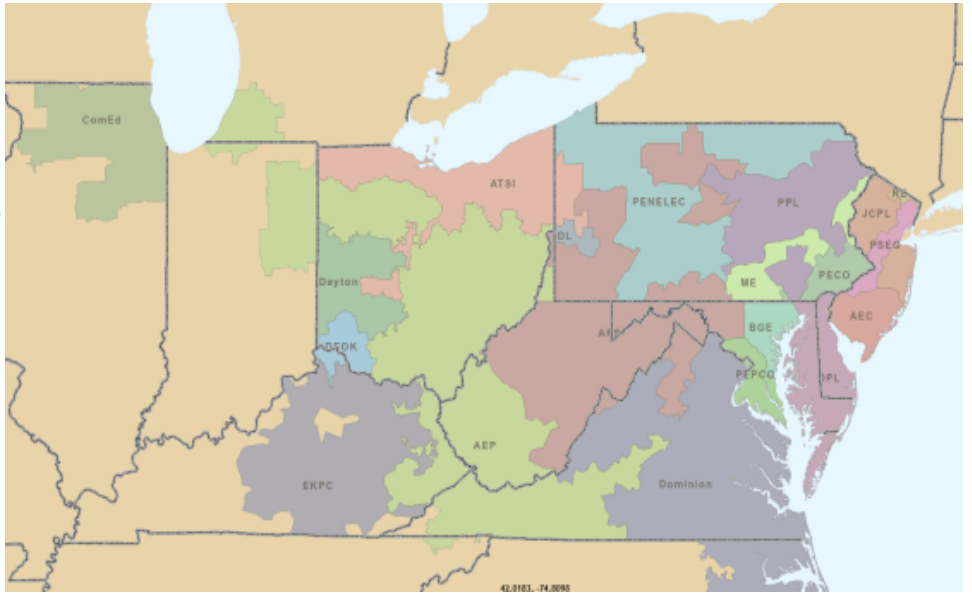
Ancillary Benefits: Installation of redundant equipment will prevent outage scenarios and improve reliability of the transmission system.

Required in-service date:

04/15/2030 (4 AEP and 1 DOM), 06/01/2030(5 AEP), 12/01/2030(3 AEP)

Projected in-service date: 4/15/2030

Upgrade IDs: b4077 (AEP); b4078 (DOM).



TO	Total Cost ($)	# of Substations By kV Level				
		115	138	230	345	500
AEP	$ 1,700,000.00		5		7	
DOM	$ 20,000					1

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1st Read

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AEP and DOM
P5 CAPs: Baseline

Process Stage: First Read

Criteria: Baseline Analysis

Assumption Reference: 2030 RTEP assumption

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Proposal Window Exclusion: Substation Exclusion

Problem Statement: In 2025 Series RTEP 2030 Summer, Winter & LL cases, multiple thermal and voltage violations are observed due to multiple P5 contingencies.

Proposed Solution:

- TOs have submitted P5 mitigation projects that include upgrades listed below designed to eliminate the P5 contingency:
  - Battery Monitoring
  - Relay Upgrades

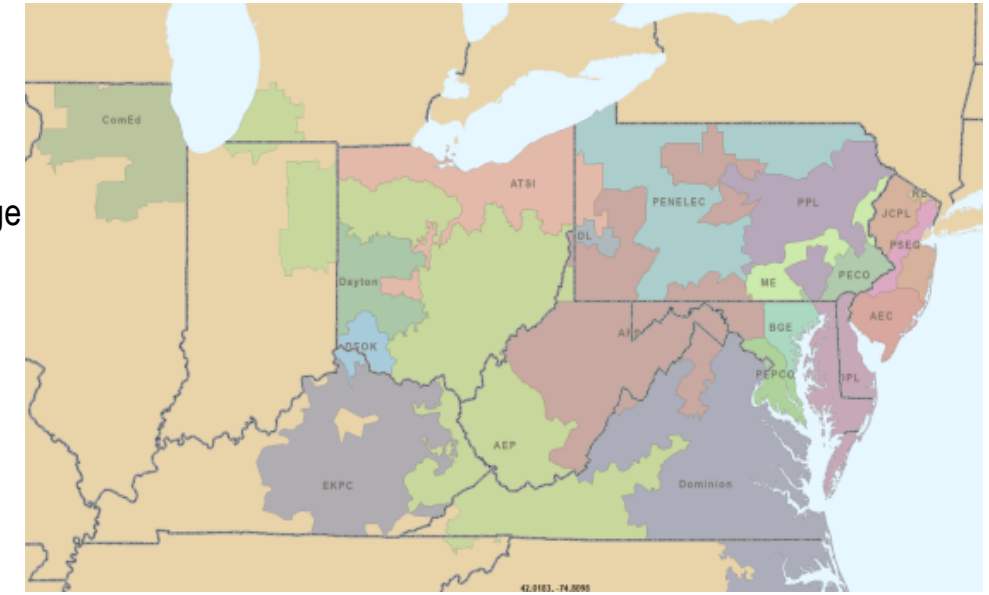
Transmission Estimated Cost: JCPL $0.8 M, ATSI $7.2M, ComEd $0.2M, ACE $0.16M

Ancillary Benefits: Installation of redundant equipment will prevent outage scenarios and improve reliability of the transmission system.

Required in-service date:

04/15/2030(1 JCPL & 1 ATSI, 1 ACE), 06/01/2030(6 ATSI, 1 ComEd), 12/01/2030(1 ATSI)

Projected in-service date: 4/15/2030



TO	Total Cost ($)	# of Substations By kV Level				
		115	138	230	345	500
JCPL	$ 800,000.00			1		
ATSI	$ 7,020,000.00		5		3	
ComEd	$ 200,000.00		2		1	
ACE	$ 160,000.00			1		

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Scope / Cost Changes

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PPL Transmission Zone: Baseline

Process Stage: Additional Scope
Criteria: Winter Generator Deliverability
Assumption Reference: 2027 RTEP assumption
Model Used for Analysis: 2027 RTEP Winter cases
Proposal Window Exclusion: Substation Equipment
Problem Statement:

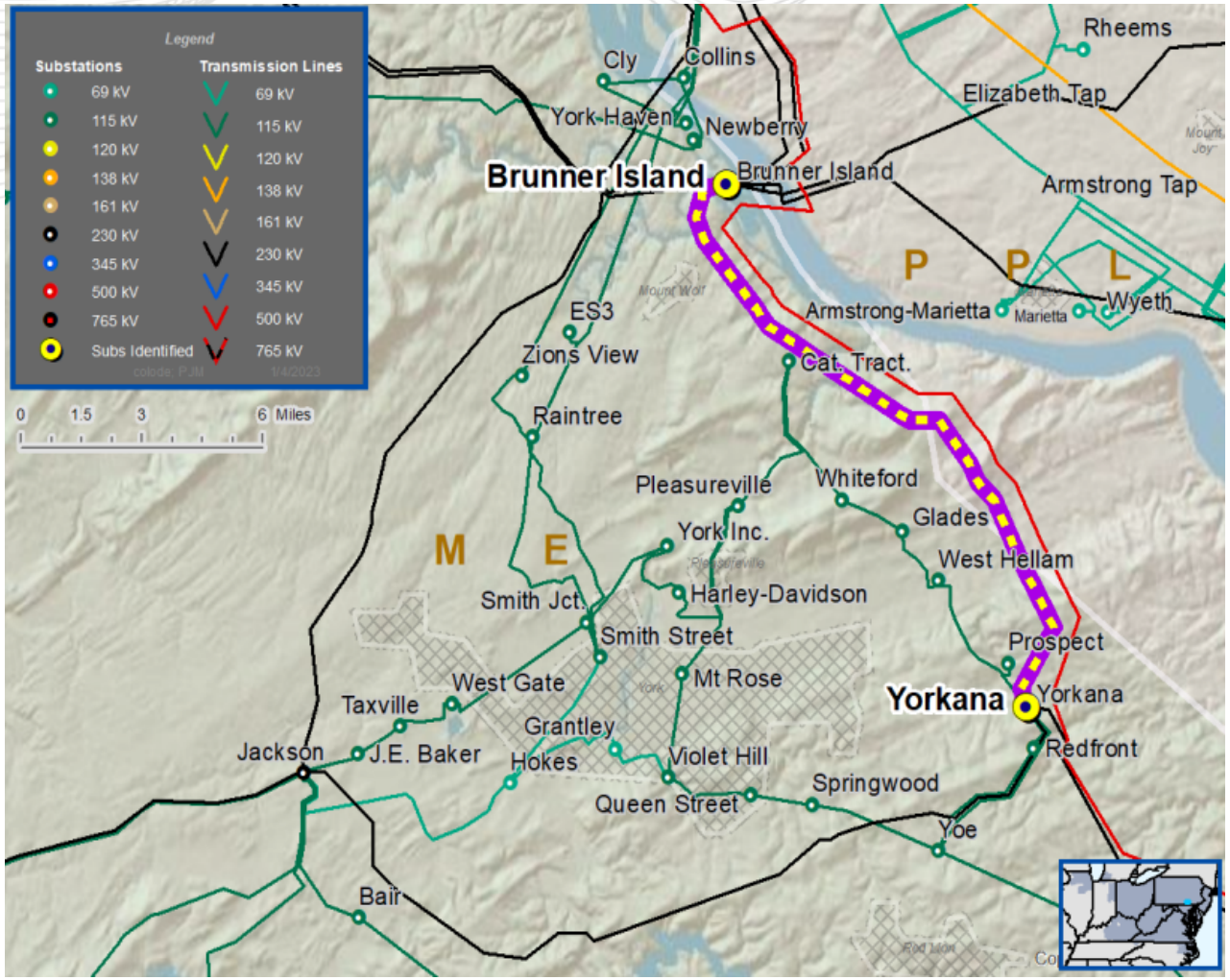
The Brunner Island – Yorkanna 230 kV circuit is overloaded for single contingency.

Existing Facility Rating: 647SN/8041E, 746WN/903WE MVA
Proposed Facility Rating: 709SN/869SE, 805WN/1031WE MVA

Recommended Solution:
Reconductor/rebuild 0.64 miles of the PPL side of the Brunner Island - Yorkana 230 kV circuit. (b3774)

Replace structure 1055-1 with new steel pole dead-end structure at the MAIT/PPL demarcation point on Brunner Island – Yorkana 230kV line. **(b3774.2)**

Estimated Cost: ~~$2.5 M~~ $4.3M (Increase of 1.8 from b3774.2)
Alternatives: N/A
Required In-Service: 6/1/2027
Projected In-Service: 6/1/2027



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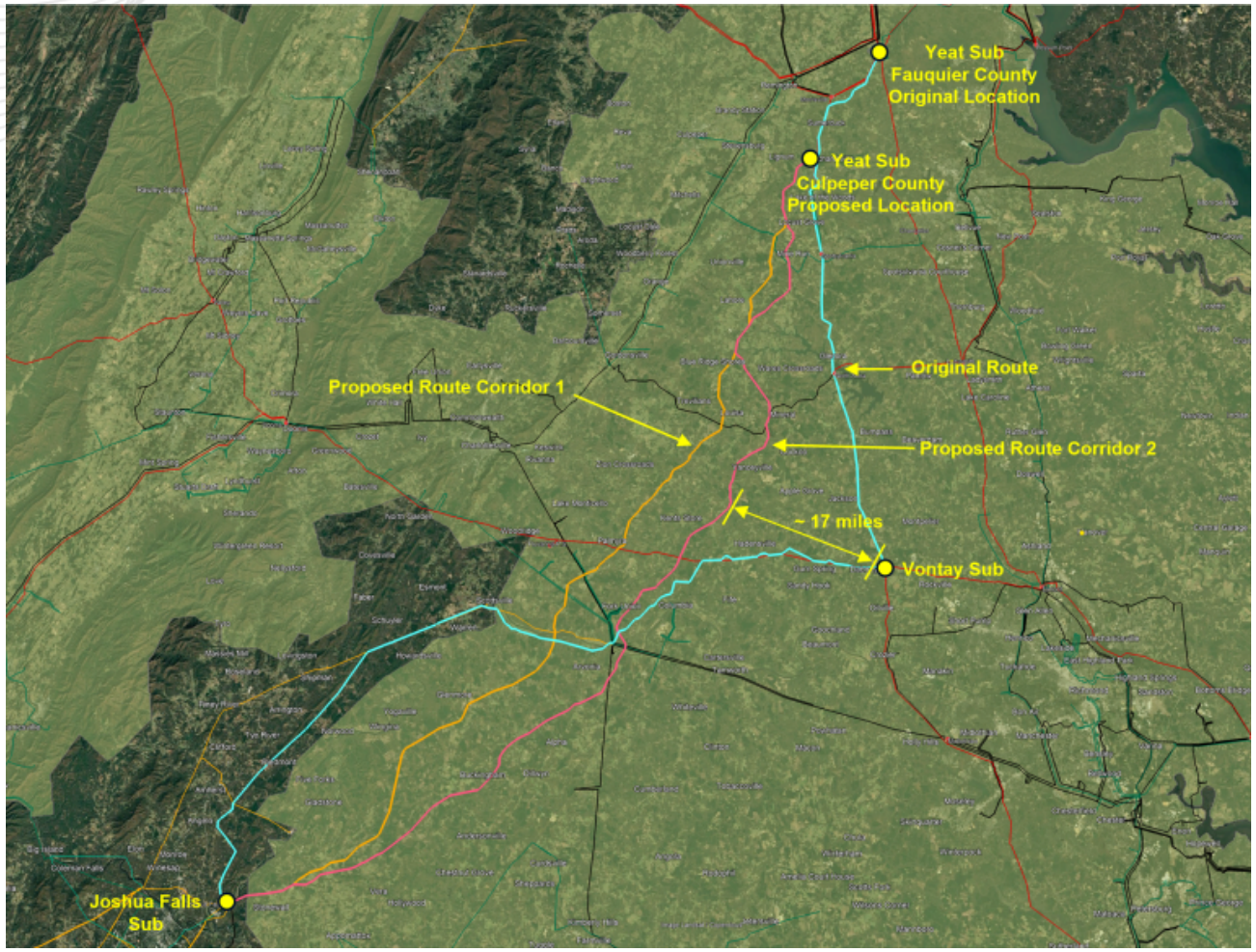
Dominion Transmission Zone: Baseline New 765/500/230kV Yeat Substation

Scope Change Drivers / Considerations:

- Enhancement to schedule certainty to meet project's in-service date
- Reduce potential residential, environmental, cultural and historical impacts
- Consider options to reduce new greenfield 765kV line mileage and associated cost/value benefits
- Offers comparable Transfer limits to the originally approved/selected proposal from 2025-W1
- Requires minor adjustments to earlier approved developments in the area (as will be explained in following slides)

First Read:

- PJM Board approval – Target July 2026
- PJM will model the scope change presented herein part of the 2026 RTEP Competitive Window



*Potential route variations are not shown on the map.

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Dominion Transmission Zone: Baseline New 765/500/230kV Yeat Substation

Scope change for B4000.355 – B4000.359 (New Yeat – Joshua Falls 765kV line, Yeat 765/500/230kV Substation)

Part of the recommended solution for 2024 Window 1 (2024-W1-820) is to construct a new 765/500/230kV substation called Yeat & construct a new 765kV line from Joshua Falls to Yeat.

Original Solution:

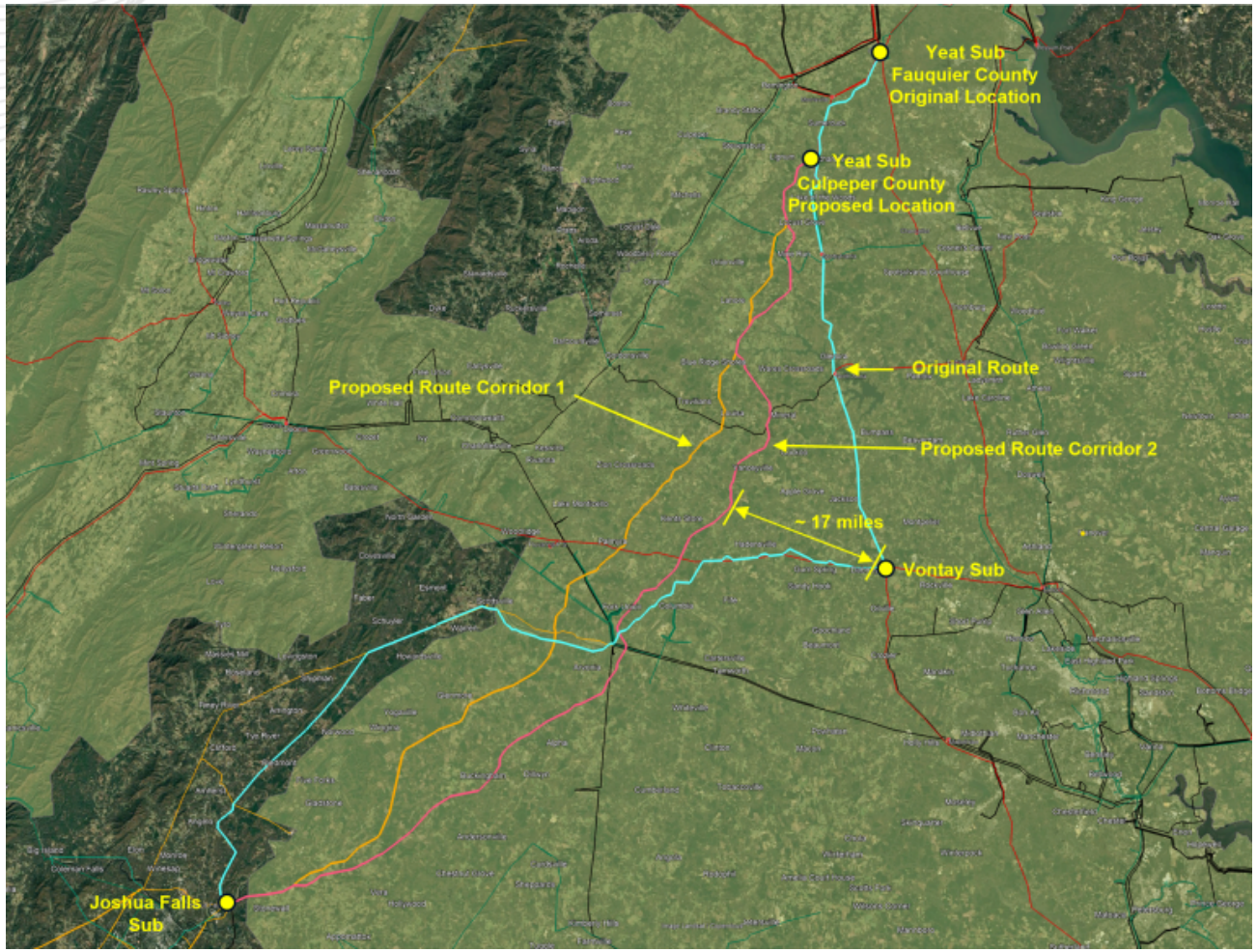
- Build a new 156 mile 765kV line from Joshua Falls – Yeat. (Roughly 69.3 miles in AEP section). **(b4000.355) $341.17M**
- Build a new 156 mile 765kV line from Joshua Falls – Yeat. (Roughly 86.7 miles in Dominion section). **(b4000.356) $426.83M**
- Build a new 765/500/230kV substation called Yeat. Install (2) 765/500 kV transformers. Cut in 500kV line Bristers – Ox and 500kV line Meadowbrook – Vint Hill into Yeat. **(b4000.357) $197.1M**
- At Yeat substation, install (1) 500/230kV transformer. Cut in 230kV line Vint Hill – Elk Run into Yeat substation **(b4000.358) $45.6M**
- Add (2) 765kV breakers at Joshua Falls substation. Substation expansion is required to add the additional breakers. **(b4000.359) $99.19M**

Transmission Estimated Cost: $1,109.89M

Required IS Date: 6/1/2029

Projected IS Date: 6/1/2029

Previously Presented: 01/07/2025



*Potential route variations are not shown on the map.

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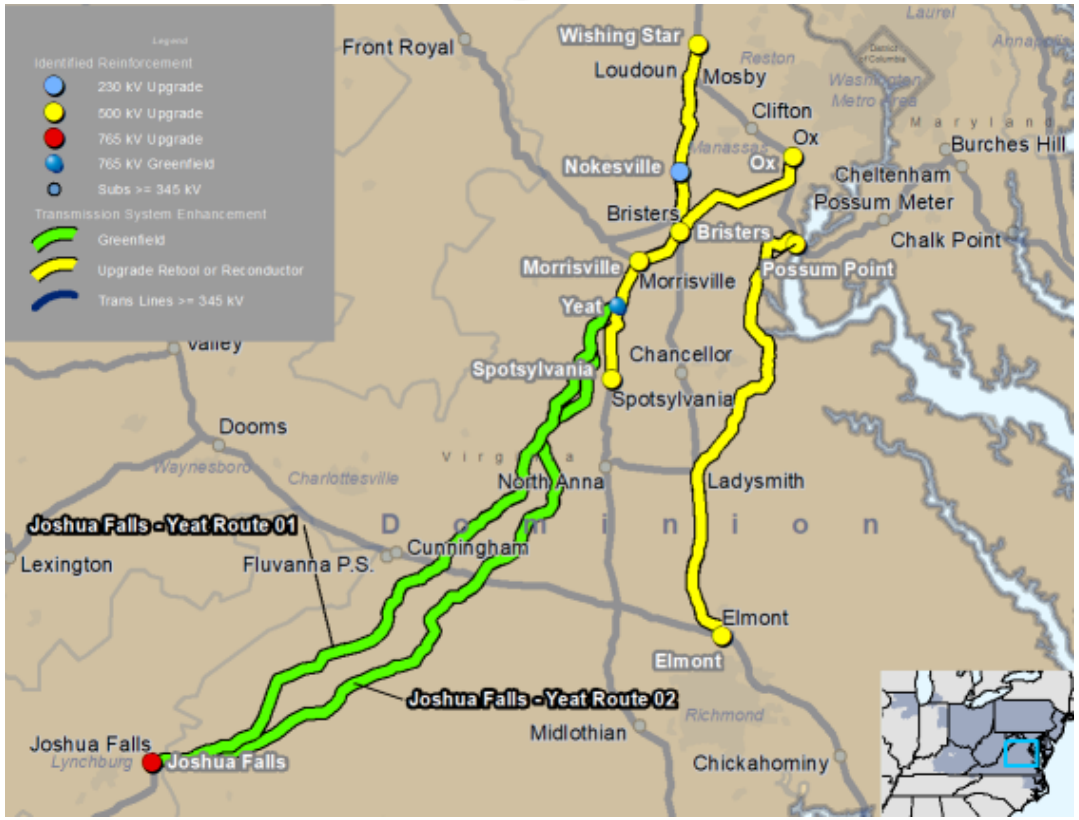
Dominion Transmission Zone: Baseline New 765/500/230kV Yeat Substation

High-Level Overview

- **Yeat Substation Relocation**
  - Relocate Yeat 765kV substation further south by ~15 mi
  - Reduce (shorten) Joshua Falls – Yeat 765kV greenfield line to 115 miles
    - 765kV line will head directly towards Yeat (N-E direction from Joshua as shown in map and will no longer pass by Vontay)
  - Remove 230kV yard at Yeat
  - Cut-in Culpeper Yeat into 500kV Line #594 Spotsylvania - Morrisville
  - Extend Morrisville - Wishing Star 500kV line by 7.5 mi from Morrisville to Culpeper-Yeat (using existing ROW)
  - Move Kraken loop 500 kV line termination to Bristers (Previously Yeat), reducing length by 1.5 mi
- **Additional Reinforcements Required:**
  - Rebuild ~8 miles of existing 500kV Line #594 from Yeat to Morrisville
  - Tie the Morrisville – Bristers and Bristers – Nokesville 230kV lines by removing line terminations at Bristers (bypassing the Bristers substation)
  - Upgrade Bristers 230/115kV transformer
  - Revise the Yeat – Ox 500kV line (~21 mi) rebuild scope from 2025W1 (b4053.23) to rebuild Bristers – Ox 500kV line (~23 mi) (~2 mi extra)
  - Tie the Elmont – Kraken and Kraken – Possum Pt 500kV lines by removing line terminations at Kraken (bypassing the Kraken substation)
  - Rebuild 500kV Line #594 Spotsylvania to Yeat 500kV line (~11 mi)



Preliminary Transmission Arrangement for Yeat substation relocation in Culpeper County & supporting reinforcements

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Dominion Transmission Zone: Baseline New 765/500/230kV Yeat Substation

Scope Change Details to Existing Baseline Projects:

2022 Window 3:

- Build a new 500kV line from ~~Morrisville~~ Culpeper Yeat to Vint Hill. New conductor to have a summer rating of 4357 MVA. Line length is approximately ~~19.71~~ 27.21 miles. **(b3800.357)** ~~**$101.89M**~~ **$150.64M**

- ~~Upgrade and install equipment at Morrisville substation to support the new 500kV conductor termination.~~ Terminal equipment at Morrisville substation to be rated for 5000 A for 500kV Line #545 & #569. Upgrade 500 kV bus 2 to 5000 A. **(b3800.346)** ~~**$17.54**~~ **$12.54**

2024 Window 1:

- Build a 500kV line from a new substation called Kraken to ~~a new substation called Yeat~~ Bristers. New conductor to have a minimum summer normal rating of 4357MVA. **(b4000.345)** ~~**$394.71M**~~ **$384.96M**

- Cut-in 500 kV line from Kraken substation into ~~Yeat~~ Bristers substation **(b4000.346) $5M** (No cost change)

- Build a new ~~156~~ 115 mile 765kV line from Joshua Falls – Culpeper Yeat. (Roughly ~~69.3~~ 1 mile in AEP section). **(b4000.355)** ~~**$341.17M**~~ **$24.62M**

- Build a new ~~156~~ 115 mile 765kV line from Joshua Falls – Culpeper Yeat. (Roughly ~~86.7~~ 114 miles in Dominion section). **(b4000.356)** ~~**$426.83M**~~ **$541.54M**

- Build a new ~~765/500/230kV~~ 765/500kV substation called Culpeper Yeat. Install (2) 765/500 kV transformers. Cut in 500kV line ~~Bristers – Ox and 500kV line Meadowbrook – Vint Hill~~ Spotsylvania – Morrisville into Yeat. **(b4000.357)** ~~**$197.10M**~~ **$187.10M**

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Dominion Transmission Zone: Baseline New 765/500/230kV Yeat Substation

Scope Change Details to Existing Baseline Projects:

2025 Window 1:

- Rebuild approximately ~~22~~ 23 miles of 500 kV line No. 539 ~~Yeat~~ Bristers – Ox using 6000A conductor on double-circuit structures with the option of adding a 230 kV line at a later time. **(b4053.23) $122.66M** (No cost change)
- Construct a new ~~765/~~500 kV Vontay switching station at the crossing of 500 kV line No. 553 Cunningham-Elmont and ~~765 kV line Joshua Falls Yeat~~ 500 kV line No. 576 Midlothian – North Anna. Develop ~~two 765 kV line terminal positions and~~ three 500 kV line terminal positions. ~~Install one 765/500 kV transformer, with provisions for a future second transformer~~. **(b4053.13)** ~~**$217.76 M**~~ **$80.0M**
- Cut and loop Line #5008 into Mosby substation, which will result in two (2) 500 kV lines: Line #5008 ~~Morrisville~~ Culpeper Yeat – Mosby and Line #9573 Mosby – Wishing Star Sub. The proposed structures to be installed are two (2) single circuit engineered steel double dead-end 3-pole structures and one (1) single circuit steel A-frame backbone structure. **(b4053.11) $6.686M** (No cost change)

Cancellations:

- At Yeat substation, install (1) 500/230kV transformer. Cut in 230kV line Vint Hill – Elk Run into Yeat substation **(b4000.358) $45.6M**
- Scope change to b3800.313 from 2025W1 no longer required to reconductor existing 500kV line from Yeat – Vint Hill to 6000A. B3800.313 will remain as originally spec'd.
- Loop 765 kV Joshua Falls – Yeat into the new Vontay substation, which will result in two 765 kV lines: from Joshua Falls – Vontay and Vontay – Yeat. **(b4053.16) $8.36M**

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Dominion Transmission Zone: Baseline
New 765/500/230kV Yeat Substation

New Baseline Projects:

- Rebuild approximately 8 miles of the existing 500kV line from Culpeper Yeat to Morrisville. **$48.75M (b4000.361)**
- Tie the Morrisville – Bristers and Bristers – Nokesville 230kV lines by removing line terminations at Bristers (bypassing the Bristers substation).**$0.5M (b4000.362)**
- Upgrade Bristers 230/115kV transformer. **$2M (b4000.363)**
- Tie the Elmont – Kraken and Kraken – Possum Pt 500kV lines by removing line terminations at Kraken (bypassing the Kraken substation).**$1M (b4053.34)**
- Rebuild approximately 11 miles of 500kV Line #594 Spotsylvania to Culpeper Yeat 500kV line. **$67.03M (b4053.35)**

Total Cost Savings: $250.28M

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Dominion Transmission Zone: Baseline Second Chickahominy 500/230kV Transformer

Previously Presented: 6/2/2020 TEAC & 6/8/2021 TEAC

Baseline Reliability: Generation Deactivation

Problem Statement: Generation Deliverability - Chesterfield 5 and 6

- Chickahominy 500/230 kV transformer is overloaded for loss of Chickahominy – Surry 500 kV line

Recommend Solution: (b3213)

- ~~Install a 2nd Chickahominy 500/230 kV transformer~~
- Reconfigure 500kV portion of substation into a ring bus
- Relocate the Chickahominy – Elmont 500kV line #557 to terminate in a new bay at Chickahominy substation and relocate the Chesterfield – Lanexa 115kV line #92 to allow for the expansion of the Chickahominy substation
- Add three new 500 kV breakers with 50kA interrupting rating and associated equipment

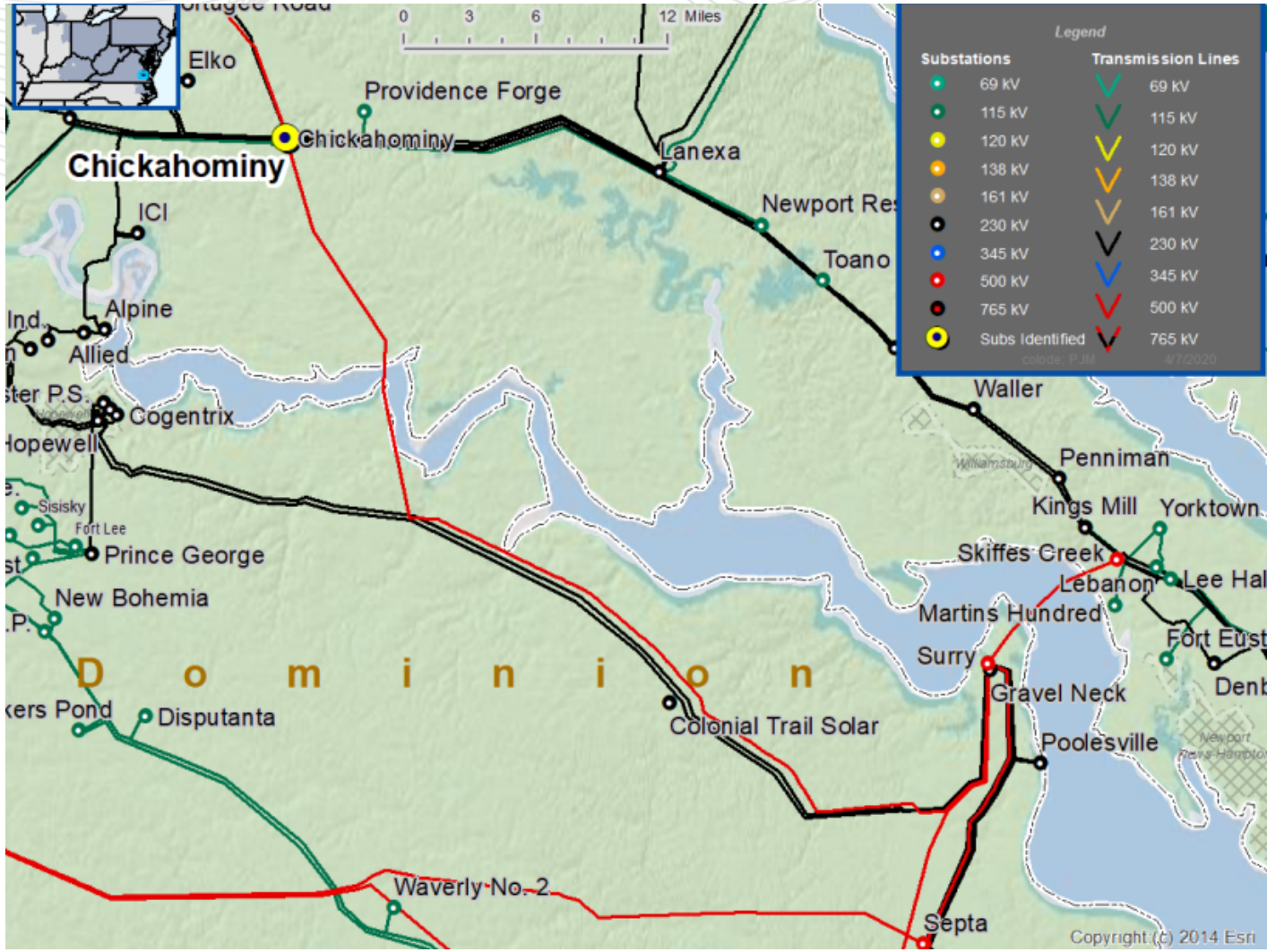
Reason for Change

- 2024 RTEP W1 & 2025 RTEP W1 analysis indicates that the 2nd transformer is not required at this time.

Required In-Service Date: 6/1/2023

Actual In-Service Date: 4/24/2024

Estimated Project Cost: ~~$31.05M~~ $34.03M



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Reliability Analysis Update

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Revision History

Version No.	Date	Description
1	April 3, 2026	• Initial slides posted
2	April 3, 2026	• Added schedule update for 2026 RTEP - Window 1 – slides 2-4
3	April 10, 2026	• Updated baseline ID (b3800.357) and AEP/DOM mileage split on slide 15.

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