Sub Regional RTEP Committee
PJM West

December 18, 2020

Changes to the Existing

Baseline Reliability Projects

AEP Transmission Zone
B2555 Scope/Cost Change

B2555:Previously present on 9/2/2014 and 9/25/2014 TEAC

2014 RTEP Proposal Window #1 Violations: Baseline (FG# 133, 204, 205) and Generator Deliverability /Common Mode Outage (FG# 232, 234, 799, 1042)

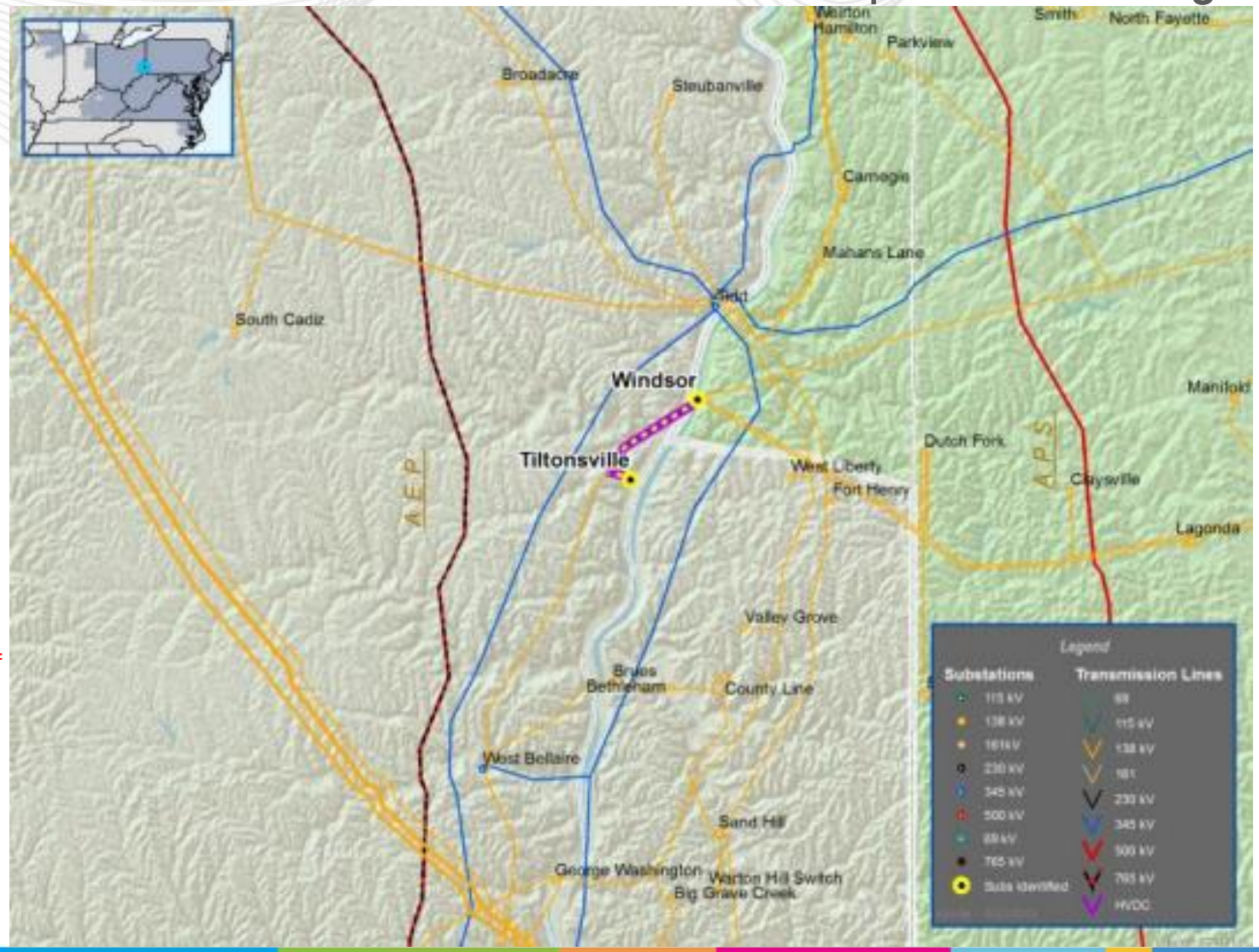
The Tilton – Windsor 138kV is overloaded for system normal and multiple contingencies.

Recommended Solution: Reconductor 0.5 miles of Tiltonsville-Windsor 138 kV and string the vacant side of the 4.5 mile section using 556 ACSR in a six wire configuration. (B2555) (P2014_1-2A)
Updated scope: Reconductor 0.3 miles of Tiltonsville-Windsor 138 kV into Tiltonsville station with 795 ACSS; string the vacant side of the 3.8 mile middle section using 556 ACSR and operate in a six wire configuration; rebuild the 0.9 mile section crossing from Ohio into the Windsor station in West Virginia, using 795 ACSS.

Estimated Project Cost: ~~$2.0M~~ $10.8M
Reasons for the Cost Increase:

- Final 0.9 mile section crossing Ohio River and into Windsor station could not be reconductored due to the age and condition of the towers crossing the Ohio river. The 1916-vintage structures required replacement.
- Higher expected construction access roads.The project area's terrain is very challenging, with rolling hills in the Ohio River valley. Helicopter construction methods are being explored, to hopefully reduce the actual projects costs.

Required IS Date: 6/1/2019
Projected IS Date: 9/1/2021



AEP Transmission Zone
B2670 Cost Change

B2670 previously presented in 9/10/2015 TEAC

Common Mode Outage (FG# 801):

The Lebanon – Elk Garden 138 kV circuit is overloaded for line fault stuck breaker contingency loss of the Broadford – Sullivan 500 kV circuit and Broadford 765/500 kV transformer.

Alternatives considered:

- 2015_1-2B (~~$1.25~~ 4.8M):Lebanon, Elk Garden Switch Replacements
- 2015_1-2C (~~$2.5~~ 11.0M):Clinch River Area Ratings Uprates
- 2015_1-2D ($38.5 M): Construct 22 miles of new 1033 ACSR line between Clinch River and Keen Mtn 138kV stations
- 2015_1-2E ($95 M): Construct 43 miles of new 1033 ACSR line between Clinch River and Beaver Creek 138kV stations

Recommended Solution:

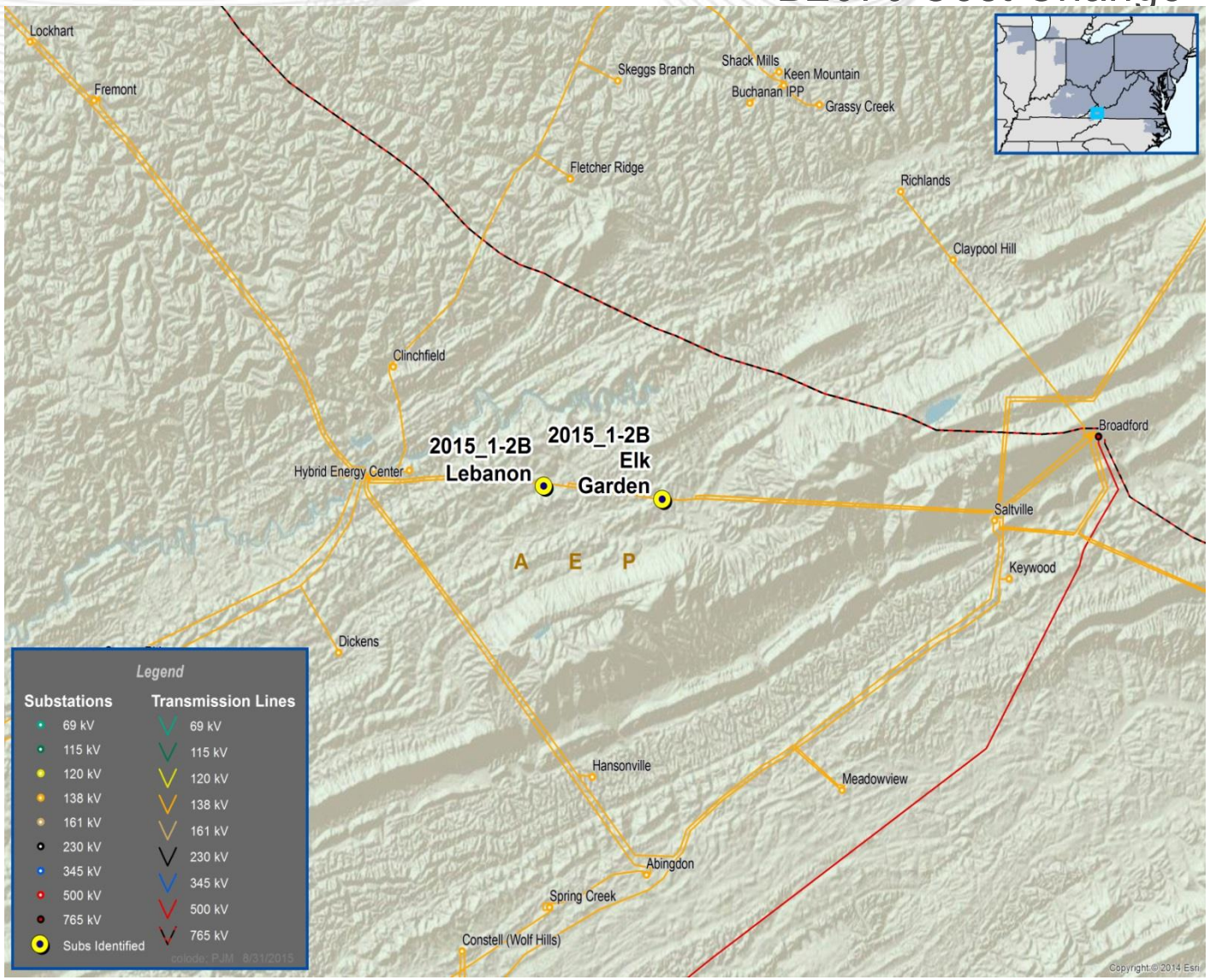
- Replace switches at Elk Garden and Lebanon 138 kV substations (on the Elk Garden – Lebanon 138 kV circuit). (2015_1-2B) (B2670)

Estimated Project Cost: $~~1.25~~ **4.8**M

Reasons for Cost Increase: a mobile transformer install and temporary T-line work required to keep customers in-service from Lebanon and Elk Garden stations. Additionally, there is limited accessibility and rough terrain around the switch locations which increased construction costs. Note: The Lebanon switch replacement was included in the original project submittal but was not mentioned on the slide previously. It was added for clarity to the description.

Required IS Date: 6/1/2020

Projected IS Date: 6/1/202~~0~~**1**



First Review

Baseline Reliability Projects

ATSI Transmission Zone: Baseline Greenfield 69 kV Substation

Process Stage: First Review

Criteria: Short Circuit

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

FG: ATSI-SC100

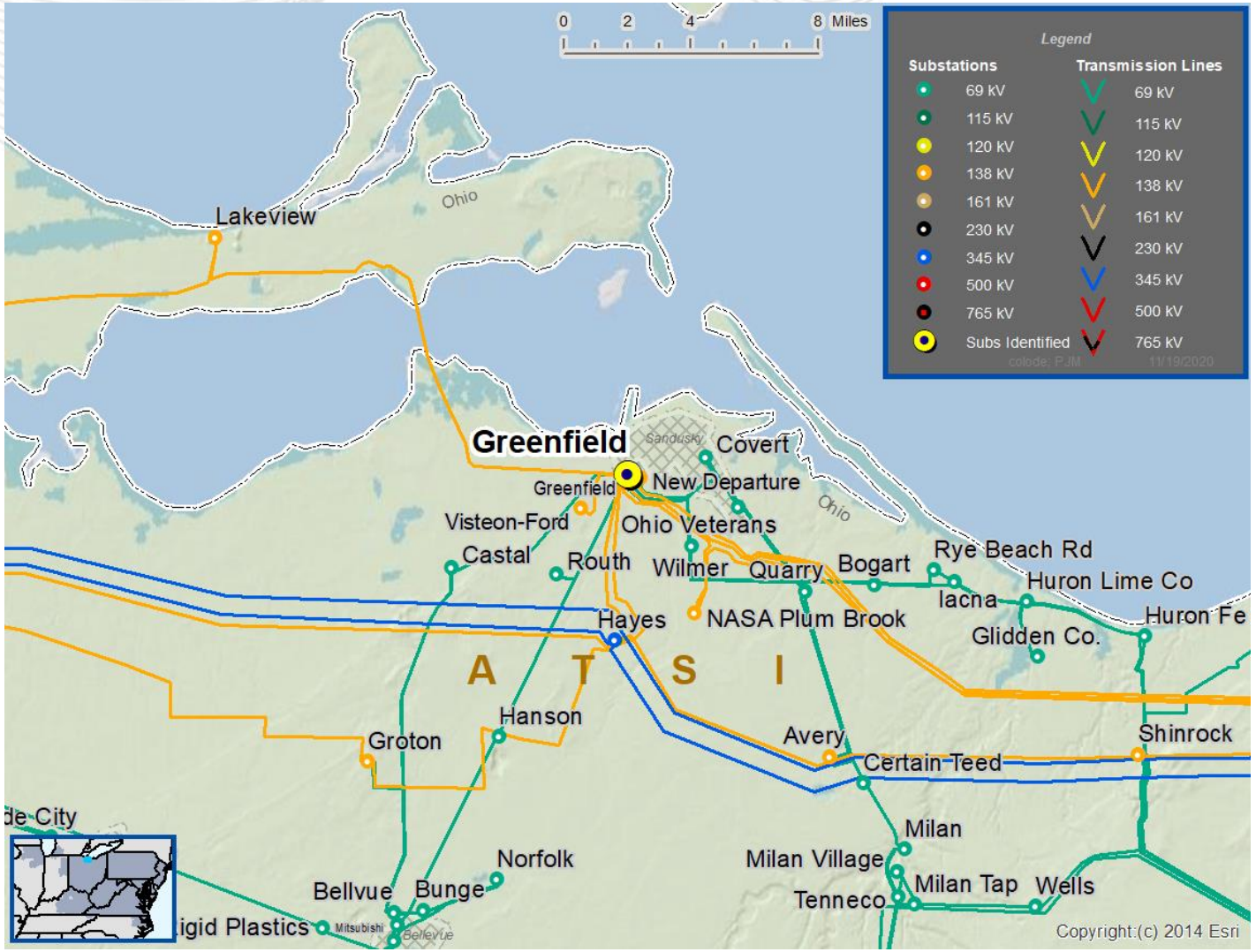
In the 2020 RTEP 2025 FERC 715 analysis breaker 501-B-251 at Greenfield substation was identified as over its Short Circuit capability

Proposed Solution: Replace the existing breaker 501-B-251 with a new 69 kV breaker with a higher (40 kA) interrupting capability

Estimated Cost: $0.86M

Alternatives: N/A

Required In-Service: 12/1/2021



AEP Transmission Zone: Baseline Abingdon Area

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

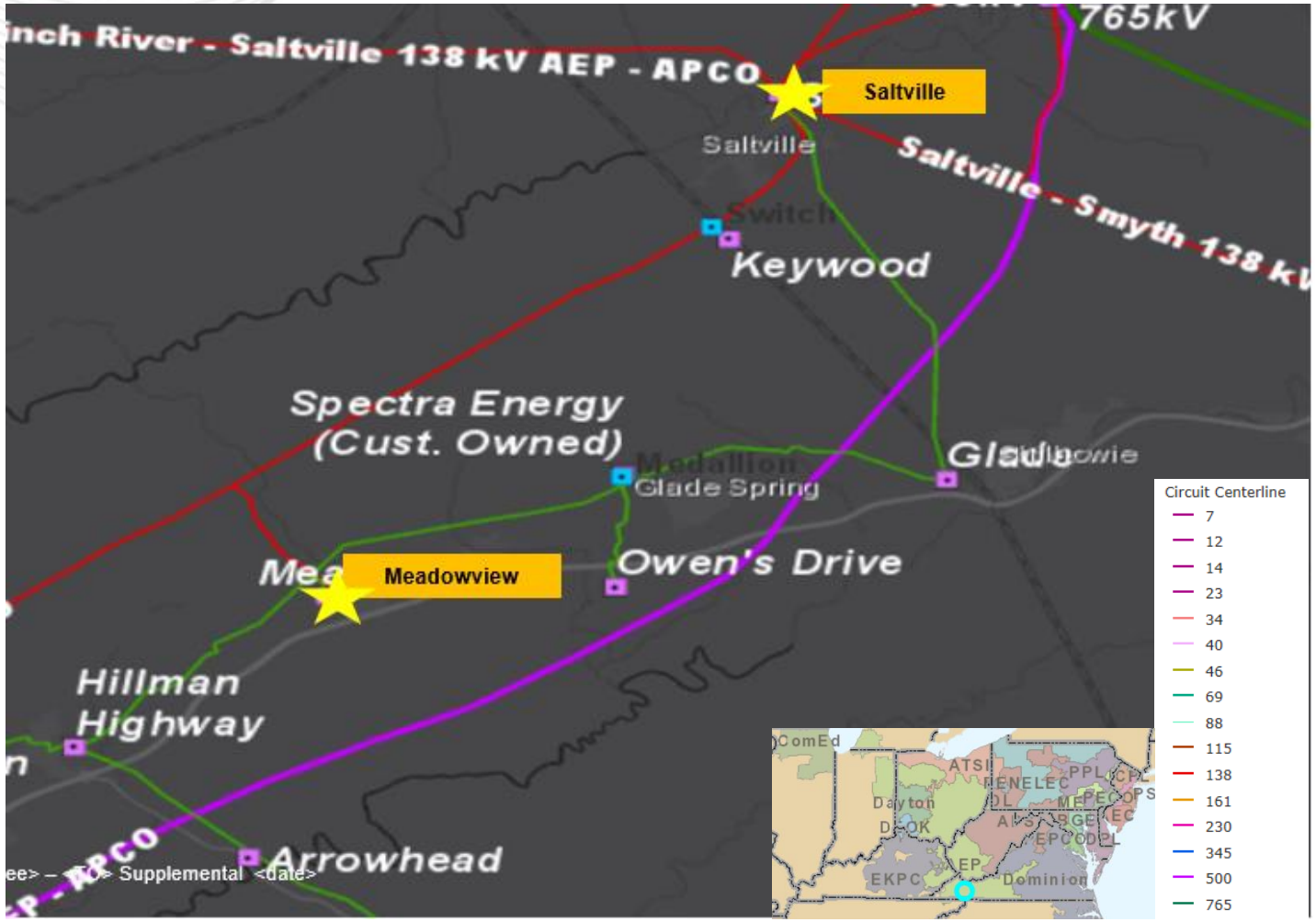
Problem Statement:

FG: AEP-T44, AEP-T45, AEP-T46, AEP-T47, AEP-T48, AEP-T62, AEP-VM121 through AEP-VM132, AEP-VD74 through AEP-VD101

In the 2025 Winter RTEP, for multiple N-1-1 contingency pairs, thermal violation identified on the existing Meadowview's 138/69-34.5 kV TR#2. Furthermore, voltage violations are identified on the existing Glade, Owens Drive, Medallion, Hillman Highway, Arrowhead and Damascus 69KV busses.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05MEADWV – 05MEADWVW 138/69kV	60/70/69/78



AEP Transmission Zone: Baseline Abingdon Area

Proposed Solution:

Saltville Station: Replace H.S. MOAB Switches on the high side of the 138/69-34.5 kV T1 with a H.S. Circuit Switcher. **Estimated Cost:** $0.72M

Meadowview Station: Replace existing 138/69-34.5 kV transformer T2 with a new 130 MVA 138/69-13 kV transformer **Estimated Cost:** $3.14M

Total Estimated Cost: $3.86M

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05MEADWV T2 138/69/13 kV	130/130/130/130

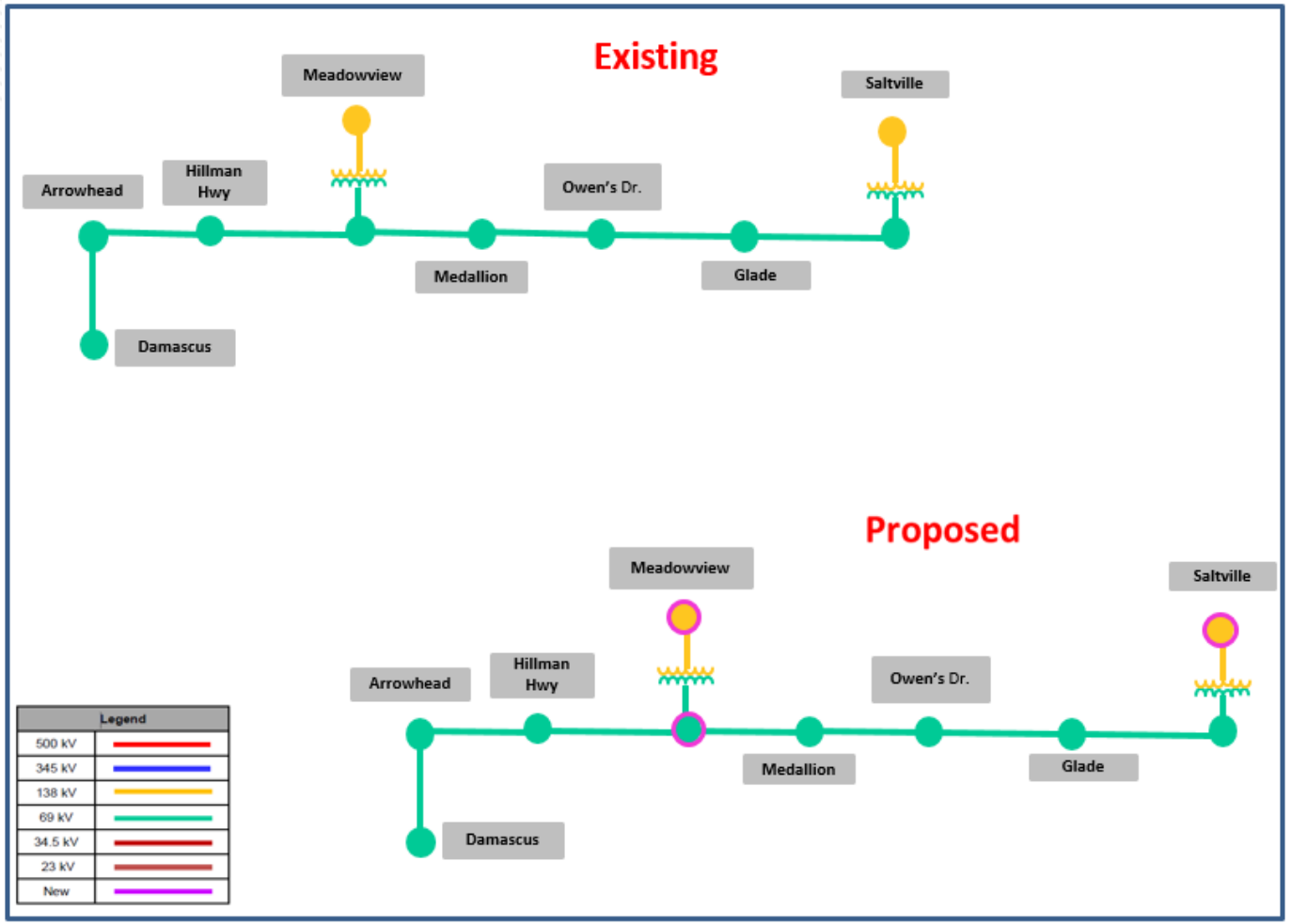
Alternatives:

Glade Station: Replace 69kV 9.6 MVAR cap bank with 14.4 MVAR.

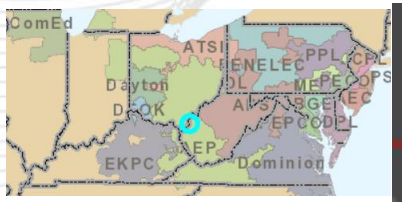
Meadowview Station: Install a 138kV 43.2 MVAR cap bank. This Alternative will load Meadowview's 138/69kV TR2 at 98-99% for the same contingency pairs Estimated Cost: $1M

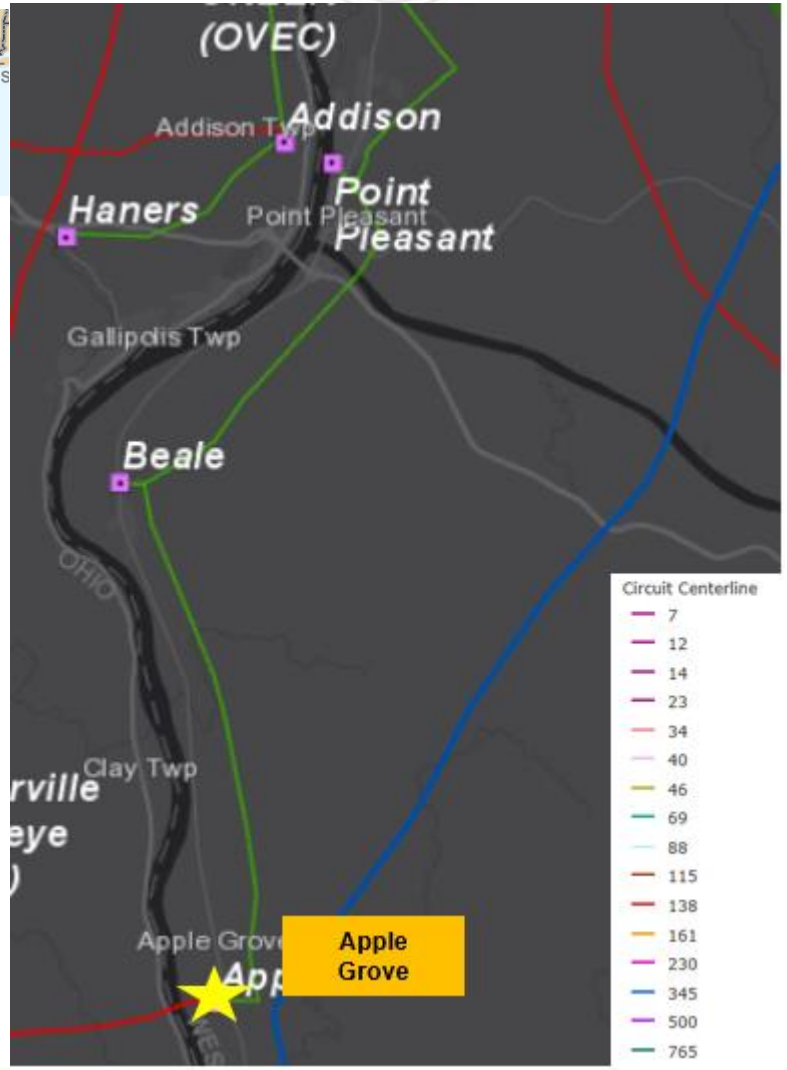
Ancillary Benefits: Addresses Need AEP-2020-AP024 and partially addresses Need AEP-2020-AP037

Required In-Service: 12/1/2025



AEP Transmission Zone: Baseline Apple Grove Cap Bank





Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

FG: AEP-VM89 through AEP-VM120, AEP-VD41 through AEP-VD73, AEP-VD580, AEP-VD583, AEP-VD606, AEP-VD607, AEP-VD608, AEP-VD609, AEP-VD614, AEP-VD615, AEP-VD616, AEP-VD617

In the 2025 RTEP summer, winter and light load cases, there are voltage violations at Apple Grove and Beale 69kV Stations for the tower contingency and multiple N-1-1 scenarios that involve the loss of both 138 kV sources into Apple Grove

AEP Transmission Zone: Baseline
Apple Grove Cap Bank

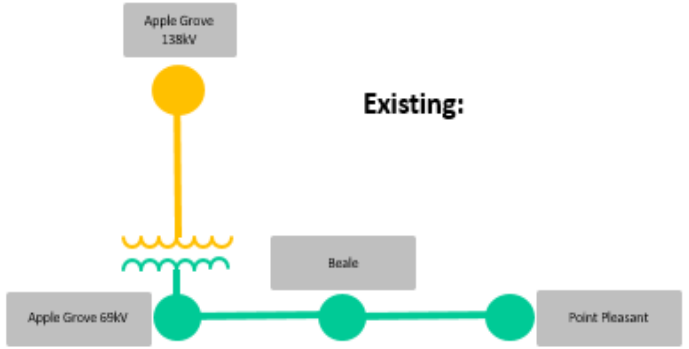
Proposed Solution:

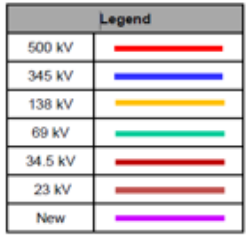
Install a new 138 kV, 21.6 MVAR cap bank and circuit switcher at Apple Grove Station.

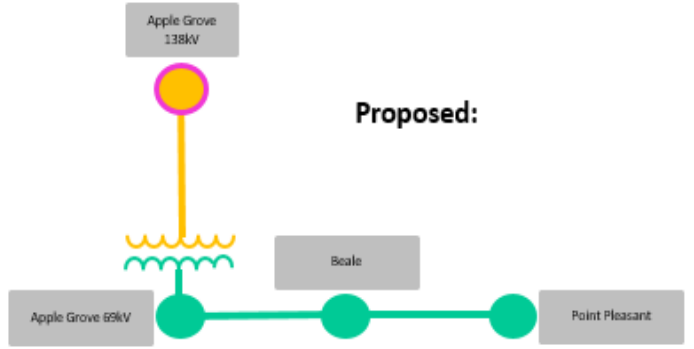
Estimated Cost: $1.0M

Alternatives: N/A

Required In-Service: 6/1/2025







AEP Transmission Zone: Baseline
Cabin Creek – Kelly Creek Rebuild

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

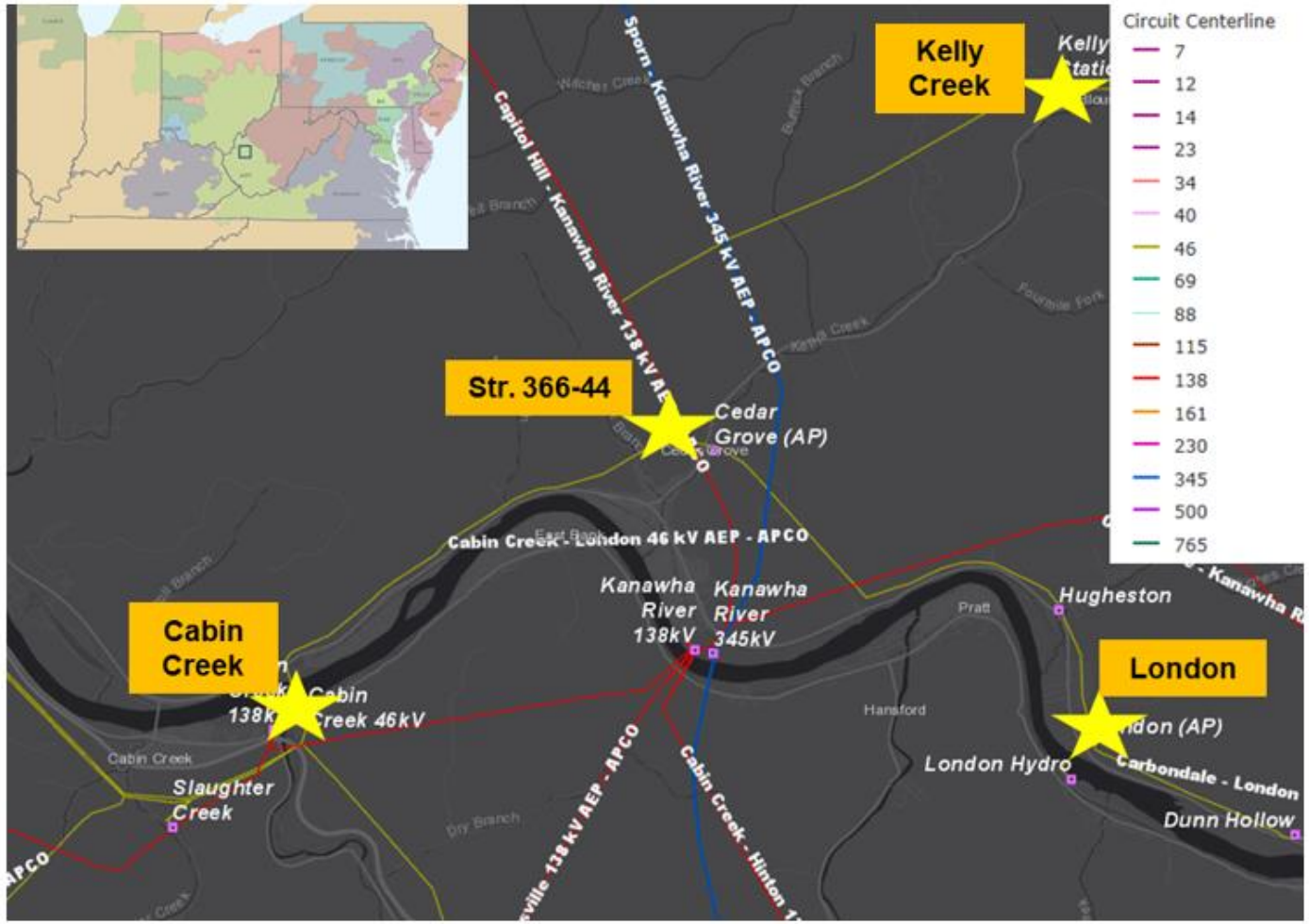
Problem Statement:

FG: AEP-T409 and AEP-410

In the 2025 Summer RTEP case, the Cabin Creek - Kelly Creek 46 kV line is overload for N-1-1 outage of the loss of the Amber Ridge – Linden Road 138kV line and the loss of Jarrett – Flatwood – Coco 138KV line.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
03KELLY CK – 05CABNCRK1 46kV	31/31/43/43



AEP Transmission Zone: Baseline Cabin Creek – Kelly Creek Rebuild

Proposed Solution:

Rebuild the existing Cabin Creek - Kelly Creek 46 kV line (to structure 366-44), approximately 4.4 miles. This section is double circuit with the existing Cabin Creek - London 46 kV line so a double circuit rebuild would be required

Estimated Cost: $17.9M

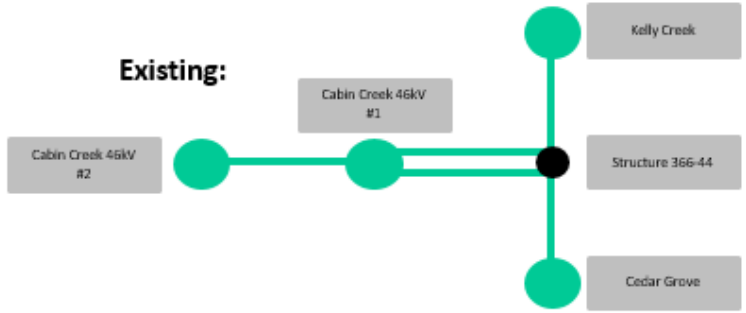
Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05KELLY CK – 05CABNCRK1 46kV	45/50/60/63

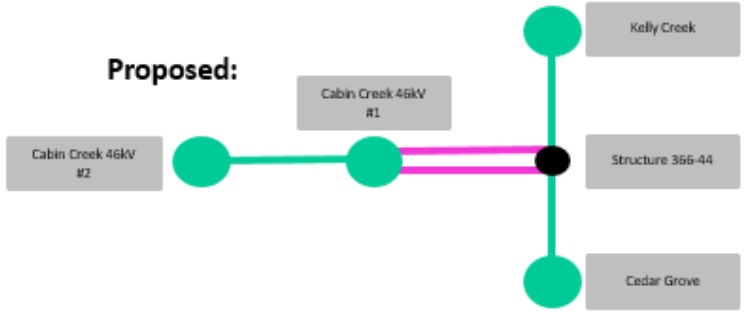
Alternatives:

Reconductor the 3/0 copper sections of line. This option was not feasible from a physical perspective as the existing structures would not be able to be strung with new conductor.

Required In-Service: 6/1/2025



Legend	
500 kV	
345 kV	
138 kV	
46 kV	
34.5 kV	
23 kV	
New	



AEP Transmission Zone: Baseline Sectionalizing at Dewey

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

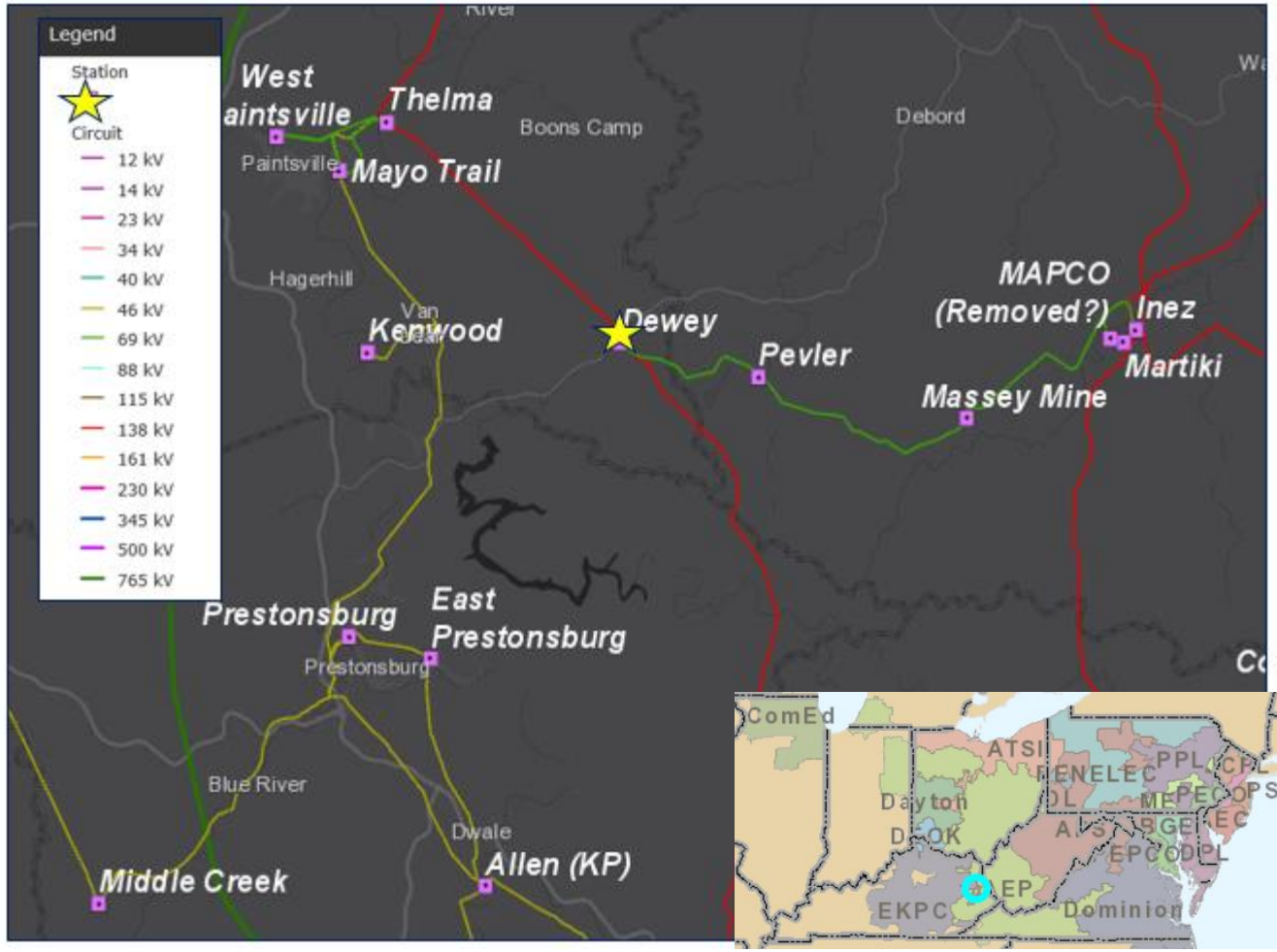
Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

FG: AEP-VM502 through AEP-VM510, AEP-VM561, AEP-VM562, AEP-VM812 through AEP-VM816, AEP-VD481, AEP-VD482, AEP-VD483, AEP-VD1

In the 2025 Winter RTEP case, there are voltage violations at Stanville and Hays Branch 138kV buses , Mayo Trail and West Paintville 69kV buses and Kenwood, Prestonsburg, East Prestonsburg, Allen and Middle Creek 46KV in the event of an N-1-1 scenario that involves the loss of 138 kV sources from Beaver Creek and loss of Dewey 138kV Bus due to 138kV line fault on Stanville or either of the Dewey transformers



AEP Transmission Zone: Baseline Sectionalizing at Dewey

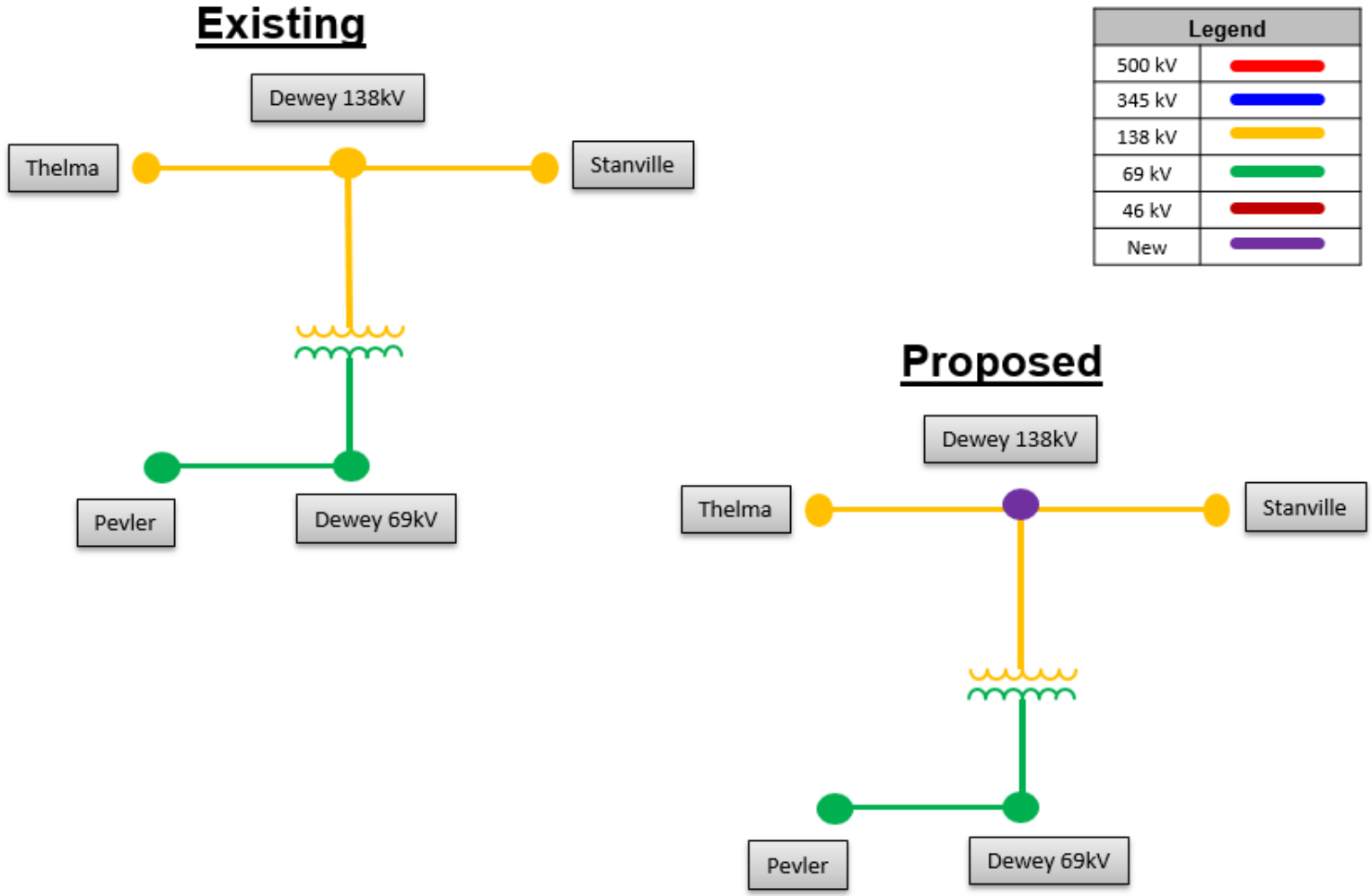
Proposed Solution:

Install 138kV Circuit Switcher on the 138/69kV XF #1 and 138/34.5kV XF #2 at Dewey. Install 138kV 2000A breaker on Stanville line at Dewey 138kV substation.

Estimated Cost: $1.4M

Alternatives: N/A

Required In-Service: 12/1/2025



AEP Transmission Zone: Baseline
East Huntington - North Proctorville 138 kV

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV &Substation equipment exclusion

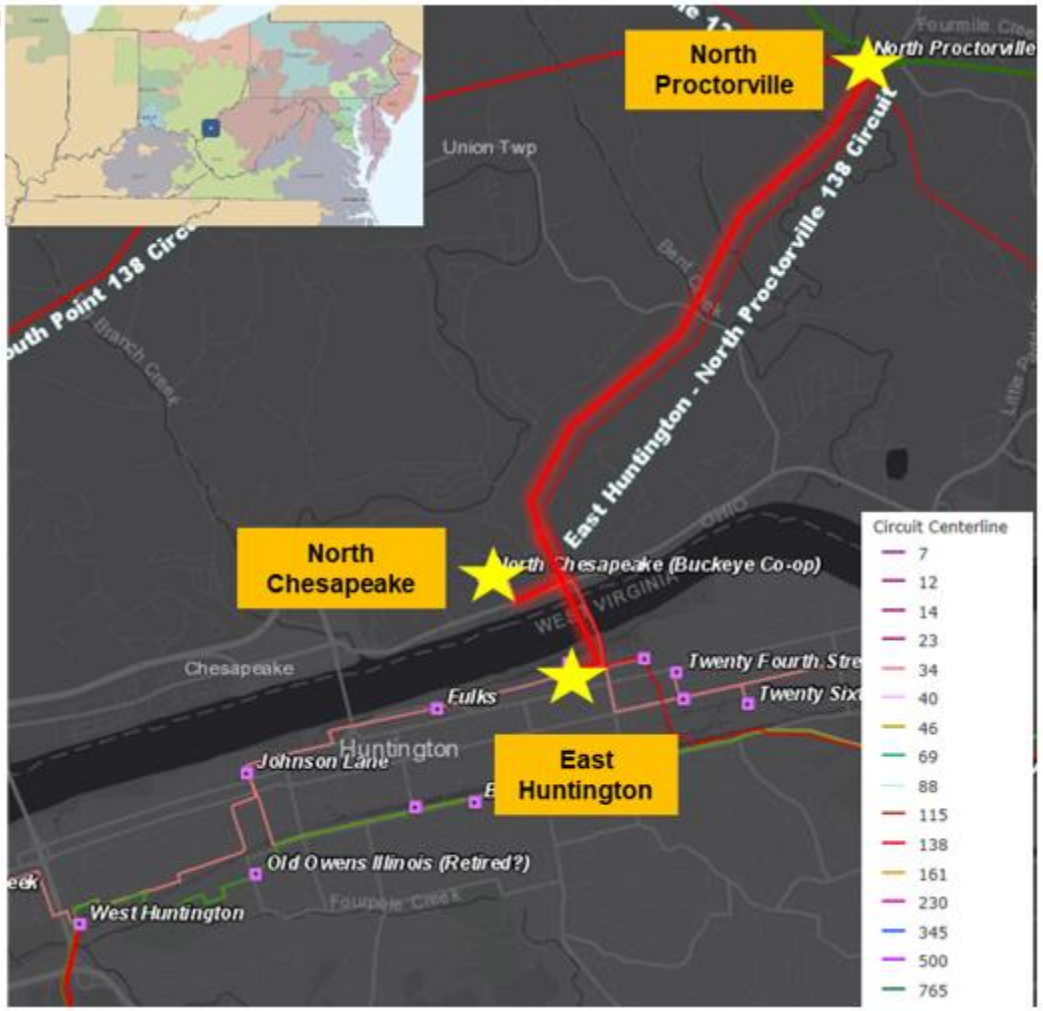
Problem Statement:

FG: AEP-T273, AEP-T274, AEP-VM555, AEP-VM556, AEP-VM557, AEP-VM558, AEP-V653, AEP-VM654, AEP-VM655, AEP-VM656, AEP-VM664, AEP-VM665, AEP-VM670, AEP-VM671, AEP-VM674, AEP-VM675, AEP-VM700, AEP-VM701, AEP-VM702, AEP-VM703, AEP-VM721, AEP-VM722, AEP-VM723, AEP-VM724, AEP-VM725, AEP-VM726, AEP-VM727, AEP-VM728, AEP-VM740, AEP-VM741, AEP-VM789, AEP-VM790, AEP-VM791, AEP-VM792, AEP-VM817, AEP-VM819, AEP-VM828, AEP-VM829, AEP-VM830, AEP-VM831, AEP-VM838, AEP-VM839, AEP-VM840, AEP-VM841, AEP-VD603, AEP-VD604, AEP-VD611, AEP-VD613, AEP-VD738, AEP-VD747, AEP-VD753, AEP-VD754, AEP-VD761, AEP-VD763, AEP-VD765, AEP-VD767, AEP-VD768, AEP-VD772, AEP-VD812, AEP-VD814, AEP-VD829, AEP-VD830, AEP-VD860, AEP-VD865, AEP-VD866, AEP-VD867, AEP-VD871, AEP-VD882, AEP-VD890, AEP-VD894, AEP-VD1012, AEP-VD1013, AEP-VD1022, AEP-VD1023, AEP-VD1117, AEP-VD1118, AEP-VD1119, AEP-VD1120, AEP-VD1126, AEP-VD1127, AEP-VD1129, AEP-VD1130, AEP-T258, AEP-T259, AEP-T266, AEP-T269, AEP-T270, AEP-T278 through T280

In the 2025 Summer case, Fulks – Johnson Lane 34.5kV line is overload and in the 2025 Summer and Winter RTEP cases, voltage violations at East Huntington 138KV buses, 23rd Street, 24th street, 26th Street, BASF, East Huntington, Johnson Lane, Fulks, Connor Street, Inco Fur and Connor F 34.5kV buses due to an N-1-1 scenario involving the loss of the Darrah - East Huntington 138 kV line paired with the loss of the East Huntington - North Proctorville 138 kV line.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05FULKS – 05JOHNSON LN 34.5kV	31/43/45/51



AEP Transmission Zone: Baseline
East Huntington - North Proctorville 138 kV

Preliminary Ratings:

Branch	SN/SE/WN/WE (MVA)
05NPROCT – 05N. CHESPK 138KV	257/360/325/404
05E. HUNTING2 – 05N. CHESPK 138KV	257/360/325/404

Proposed Solution:

Install a second 138 kV circuit utilizing 795 ACSR conductor on the open position of the existing double circuit towers from East Huntington - North Proctorville. Remove the existing 34.5 kV line from East Huntington - North Chesapeake and rebuild this section to 138 kV served from a new PoP switch off the new East Huntington - North Proctorville 138 kV #2 line. **Estimated Cost:** $7.1M

Install a 138 kV circuit breaker at North Proctorville . **Estimated Cost:** $1.4M

Install a 138 kV circuit breaker at East Huntington. **Estimated Cost:** $1.1M

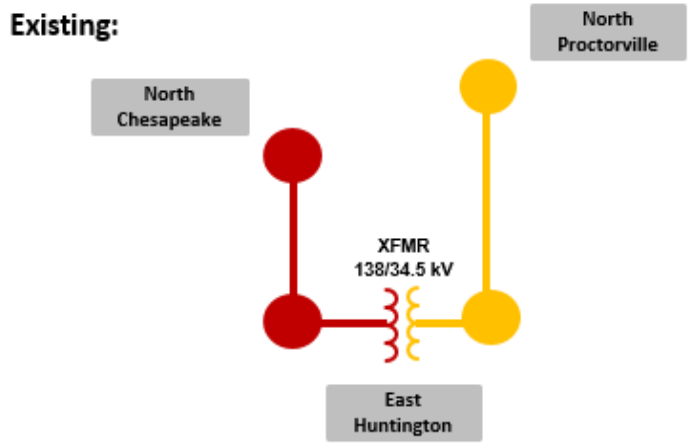
Convert the existing 34/12 kV North Chesapeake to a 138/12 kV station. **Estimated Cost:** $0.8M

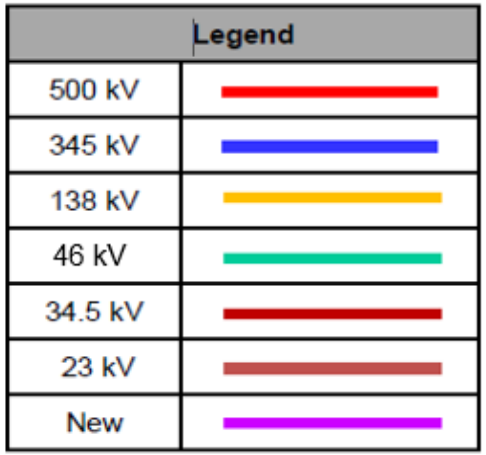
Total Estimated Cost: $10.4M

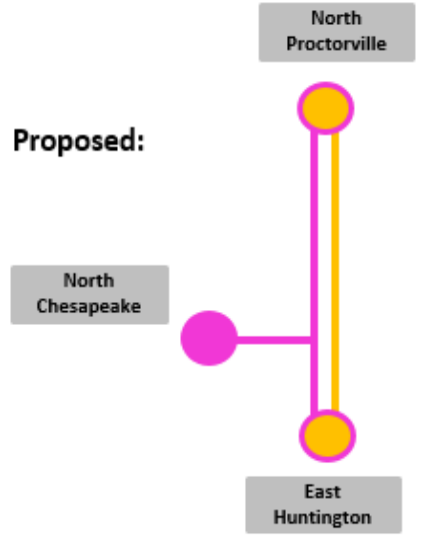
Alternatives:

Mitigating the thermal violations by replacing the low rated equipment as well as installing a large enough cap bank to mitigate the voltage violations was investigated. However, considering the number of cap banks already in the area and difficulty in coordinating a large number of caps in the same area, the cap bank would not be a viable option operationally.

Required In-Service: 6/1/2025







AEP Transmission Zone: Baseline
Inez 138kV

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

FG: AEP-T158, AEP-T160, AEP-T161, AEP-T162

In the 2025 Winter RTEP case, the Inez 138/69kV transformer overloads in the event of an N-1-1 scenario that involves the loss of 138 kV sources from Beaver Creek and loss of Big Sandy - Thelma 138kV line

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05INEZ 138/69KV	70/78/70/78

AEP Transmission Zone: Baseline Inez 138kV

Proposed Solution:

Replace the existing Inez 138/69kV 50 MVA autotransformer with a 138/69kV 90 MVA autotransformer. This is a conversion of part of s2281.1 to baseline.

s2281.1 estimated cost is reduced from $10.7M to $7.74M due to the conversion.

Estimated Cost: $2.96M

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05INEZ 138/69/13KV	90/90/90/90

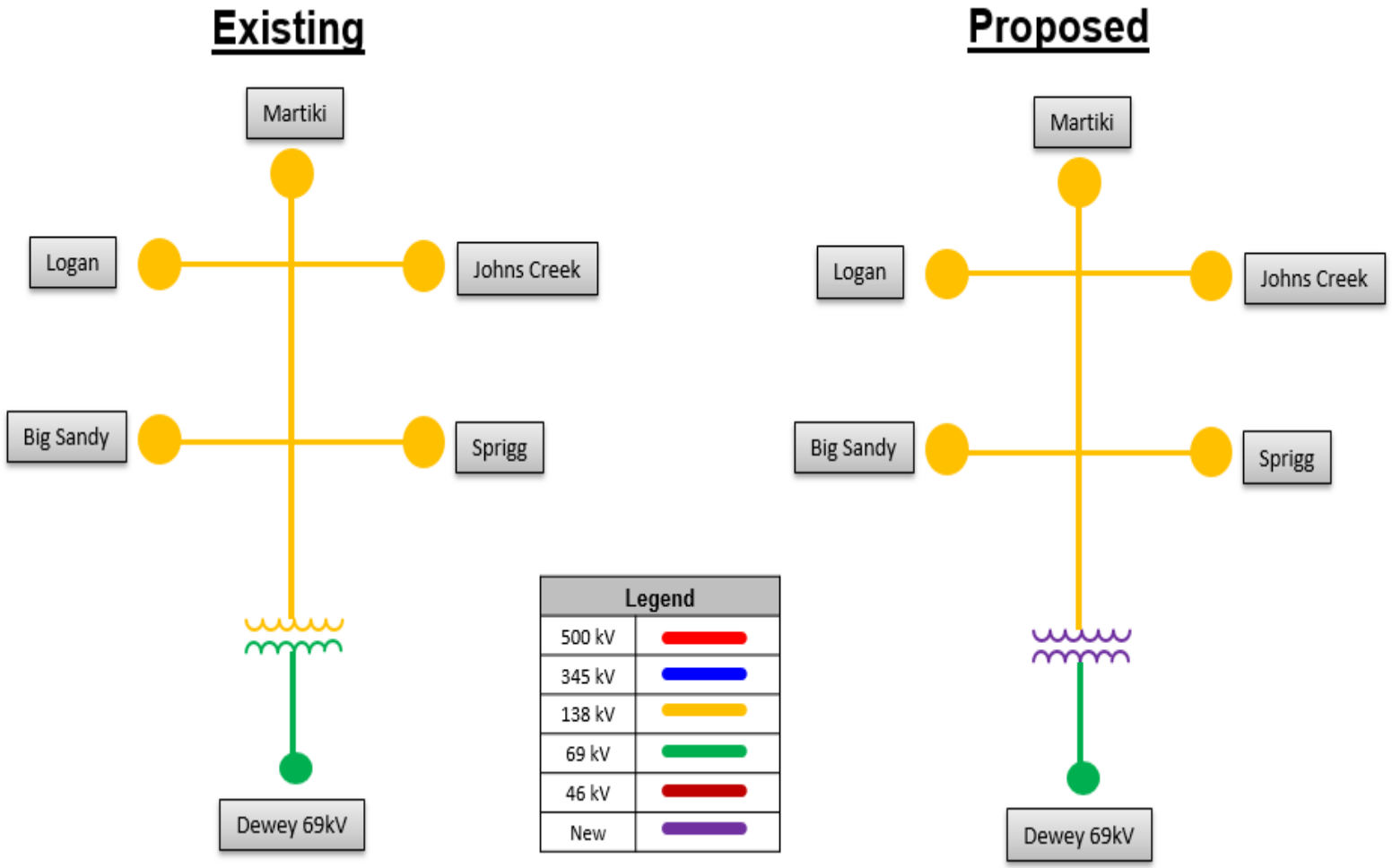
Ancillary Benefits:

This work also addresses the identified issues in AEP-2019-AP047 on the Inez 138/69kV transformer. This proposal is a conversion of a portion of s2281.1 to baseline.

Alternatives:

Install a 138kV 3000A breaker towards Big Sandy at Thelma substation. Breaker install would require additional station expansion ultimately leading to property purchase, flood mitigation studies, civil and site work.

Required In-Service: 12/1/2025



AEP Transmission Zone: Baseline
Lock Lane - Point Pleasant Rebuild

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

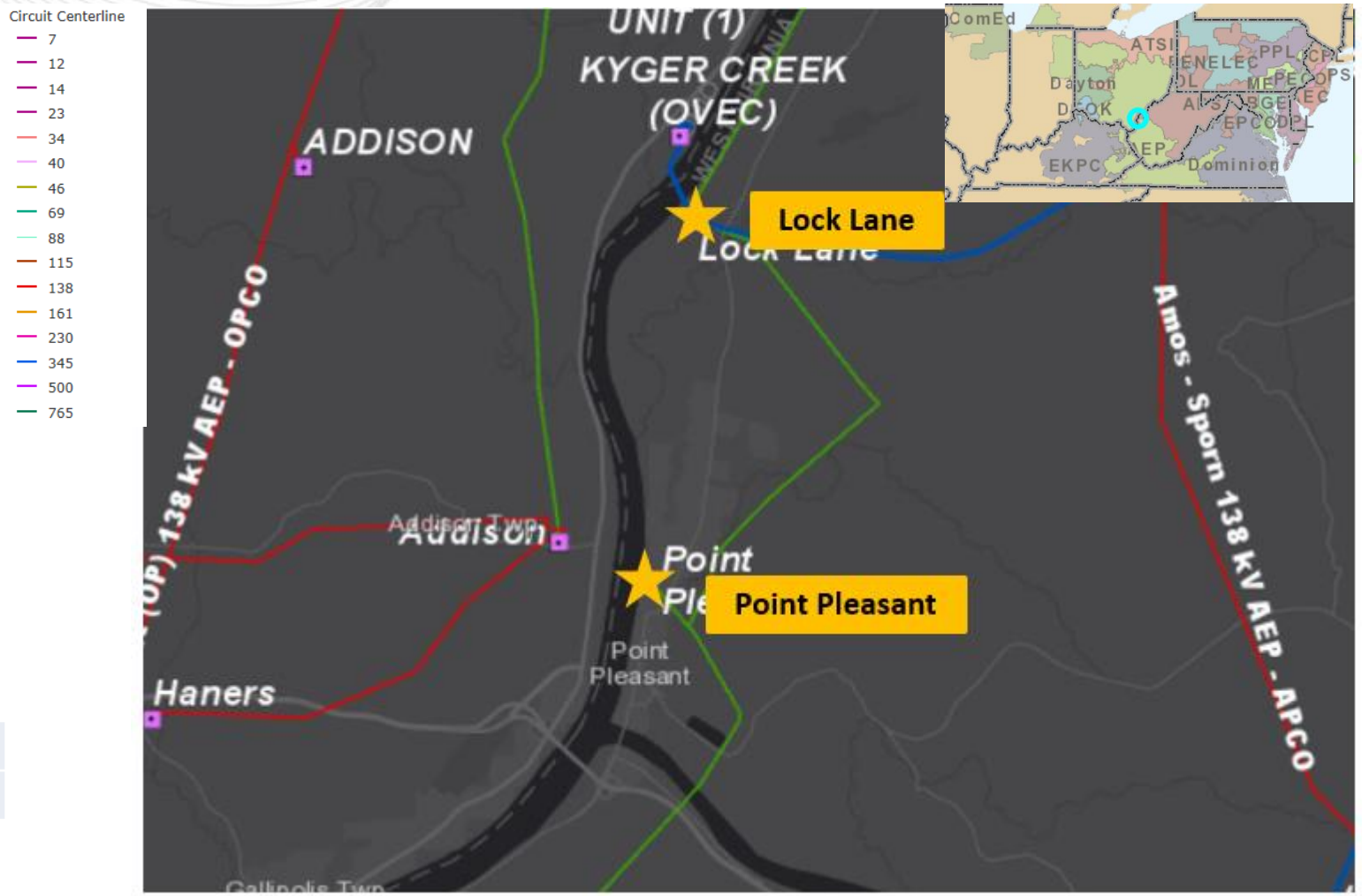
Problem Statement:

FG: AEP-T37,AEP-T38, AEP-T39, AEP-T40, AEP-T41, AEP-T42, AEP-T43

In the 2025 Summer and Winter RTEP cases, the Lock Lane – Point Pleasant 69kV line is overloaded in the event of an N-1-1 scenario that includes the loss of both 138kV sources into Apple Grove (Apple Grove – Sporn 138 kV and Apple Grove – South Point 138 kV).

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05LOCK LAN – 05PTPLEASN 69kV	44/44/56/56



AEP Transmission Zone: Baseline Lock Lane - Point Pleasant Rebuild

Proposed Solution:

Rebuild ~5.44 miles of 69kV line from Lock Lane to Point Pleasant.

Estimated Cost: $13.5M

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05LOCK LAN – 05PTPLEASN 69kV	102/102/129/129

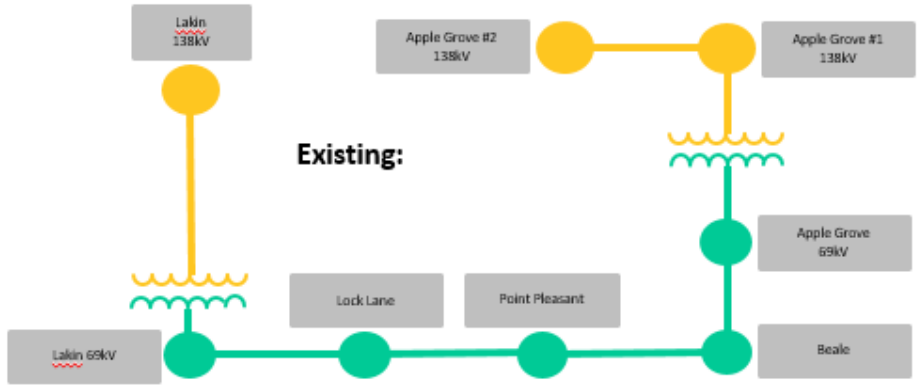
Ancillary Benefits:

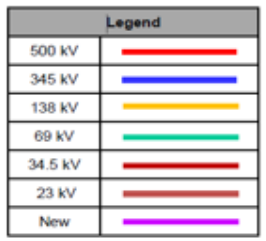
Addresses needs presented to stakeholders as AEP-2020-AP017.

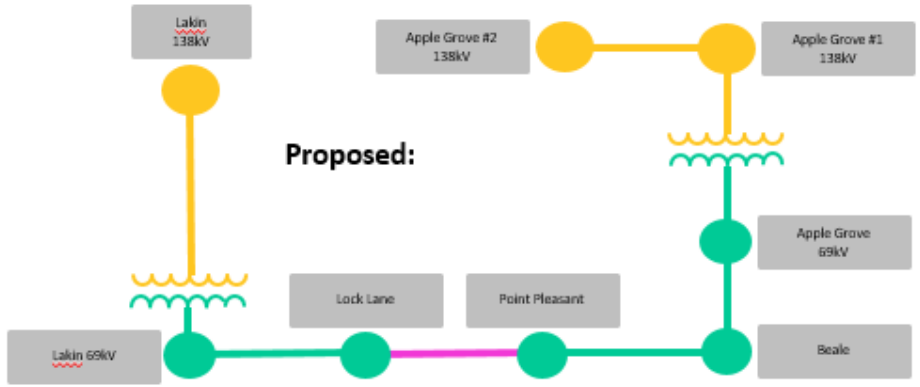
Alternatives:

Construct a new 69 kV line approximately 1.1 miles from Addison (OH) to Point Pleasant Station (WV). Install a new 69 kV breaker at Addison and a new 69 kV breaker at Point Pleasant. Complications with building a new line across the Ohio River along with urban areas around Point Pleasant make this option difficult to complete. This solution would also not address AEP-2020-AP017 Needs

Required In-Service: 6/1/2025







AEP Transmission Zone: Baseline Meigs Area Upgrades

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV & Substation equipment exclusion

Problem Statement:

FG: AEP-T12, AEP-T13, AEP-T14, AEP-T15, AEP-T143, AEP-T144, AEP-T145, AEP-T146, AEP-T182, AEP-T183, AEP-T184, AEP-T185

In 2025 Summer and Winter RTEP cases, the N-1-1 of the Ripley 138/69 kV 130 MVA transformer and the Ravenswood – Racine 69 kV and the N-1-1 of the Leon - Ripley 138 kV and the Ravenswood – Racine 69 kV overloads the following:

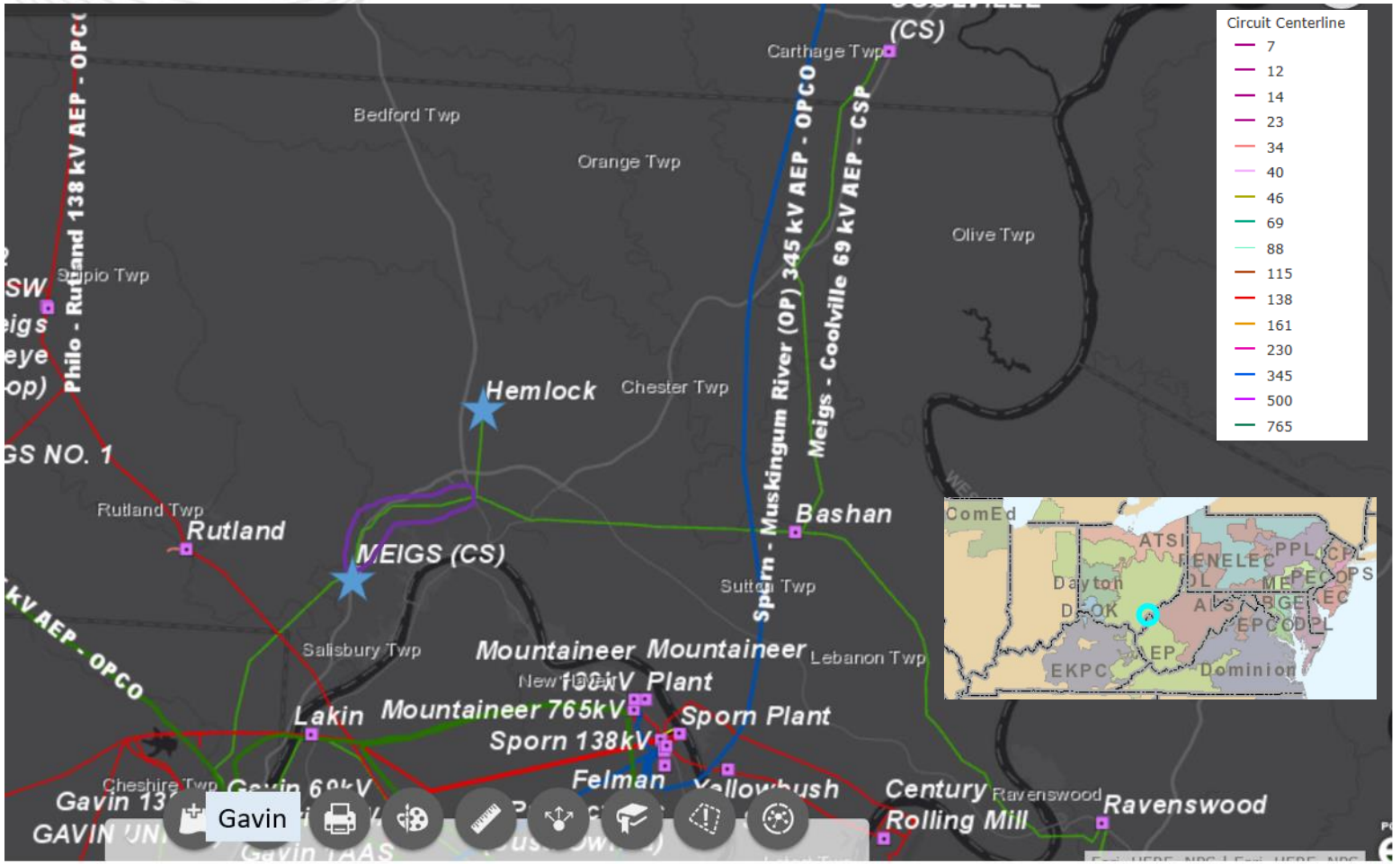
*Meigs – Gavin 69 kV to 101.75% of its WE rating of 82 MVA

*Meigs – Hemlock 69 kV to 120.11% of its WE rating of 63 MVA

*Meigs – Hemlock 69 kV to 121.74% of its SE rating of 50MVA

Existing Facility Rating:

Branches	SN/SE/WN/WE (MVA)
05MEIGS – 05HEMLOCK 69KV	50/50/63/63
05GAVIN1 – 05MEIGS 69KV	55/69/72/82



AEP Transmission Zone: Baseline Meigs Area Upgrades

Proposed Solution:

Replace the Meigs 69 kV 4/0 Cu station riser towards Gavin and rebuild the section of the Meigs – Hemlock 69 kV circuit from Meigs to approximately structure #40 (~4 miles) replacing the line conductor 4/0 ACSR with the line conductor size 556.5 ACSR.

Estimated Cost: $12.14M

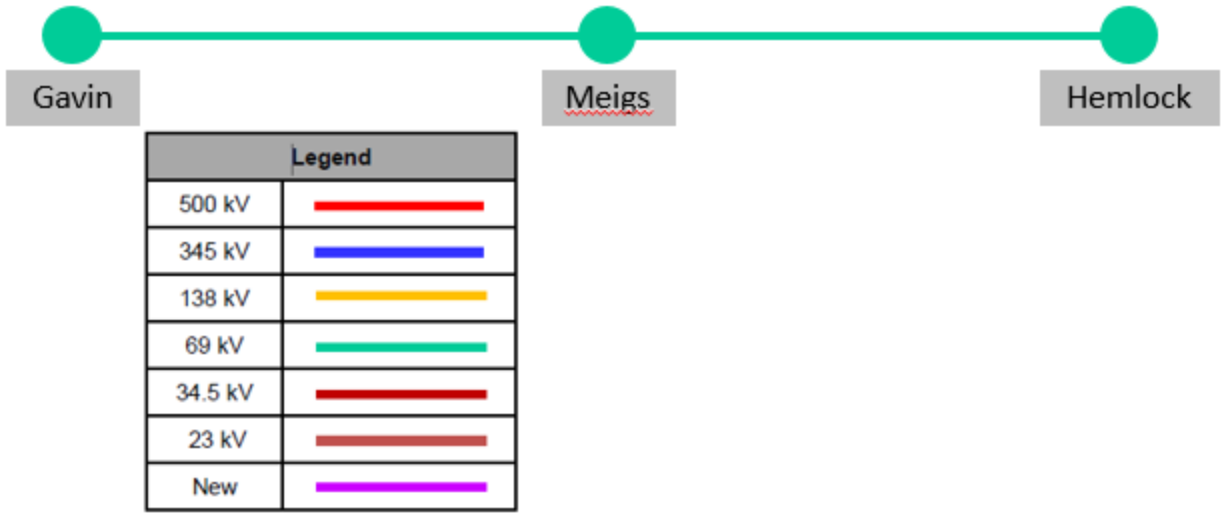
Preliminary Ratings:

Branches	SN/SE/WN/WE (MVA)
05MEIGS – 05HEMLOCK 69KV	79/90/100/109
05GAVIN1 – 05MEIGS 69KV	75/75/94/94

Alternatives: N/A

Required In-Service: 6/1/2025

Existing:



Proposed:

AEP Transmission Zone: Baseline Merrimac - Midway 69 kV Line

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

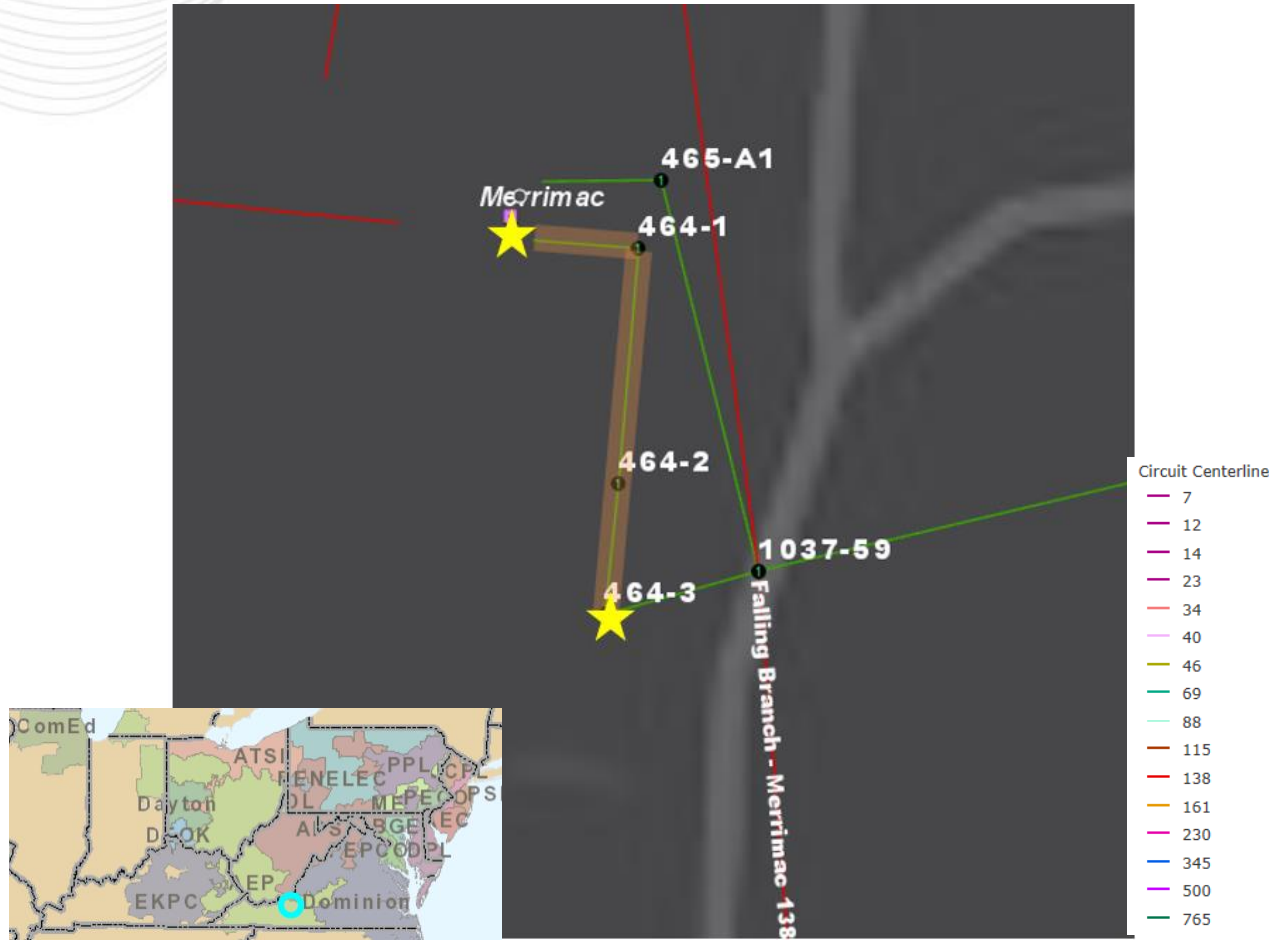
Problem Statement:

FG: AEP-T413, AEP-T414, AEP-T418, AEP-T423

In 2025 Summer and Winter RTEP cases, the Merrimac - Midway 69 kV branch is overloaded for the N-1-1 contingencies of the loss of the Matt Funk – Tech Drive 138kV line and the loss of the South Christiansburg – Claytor - Hazel Hollow 138kV line

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05MERRIMAC – 05MIDWAY 69KV	44/65/56/73



AEP Transmission Zone: Baseline Merrimac - Midway 69 kV Line

Proposed Solution:

To mitigate the thermal violations identified on the existing Merrimac – Midway 69 kV circuit, reconductor the first 3 spans from Merrimac station to Str. 464-3 of 3/0 ACSR conductor utilizing 336 ACSR.

Estimated Cost: $0.45M

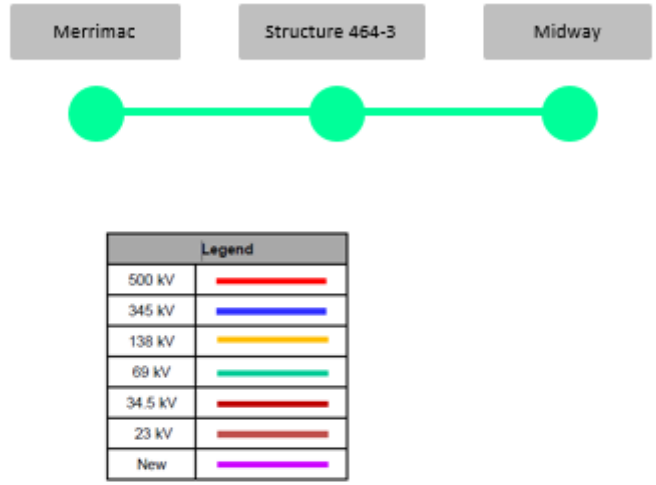
Preliminary Ratings:

Branch	SN/SE/WN/WE (MVA)
05MERRIMAC – 05MIDWAY 69KV	75/110/94/121

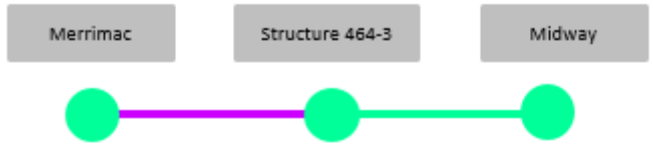
Alternatives: N/A

Required In-Service: 6/1/2025

Existing Configuration:



Future Configuration:



AEP Transmission Zone: Baseline Moundsville 69kV Riser Upgrade

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Substation equipment exclusion

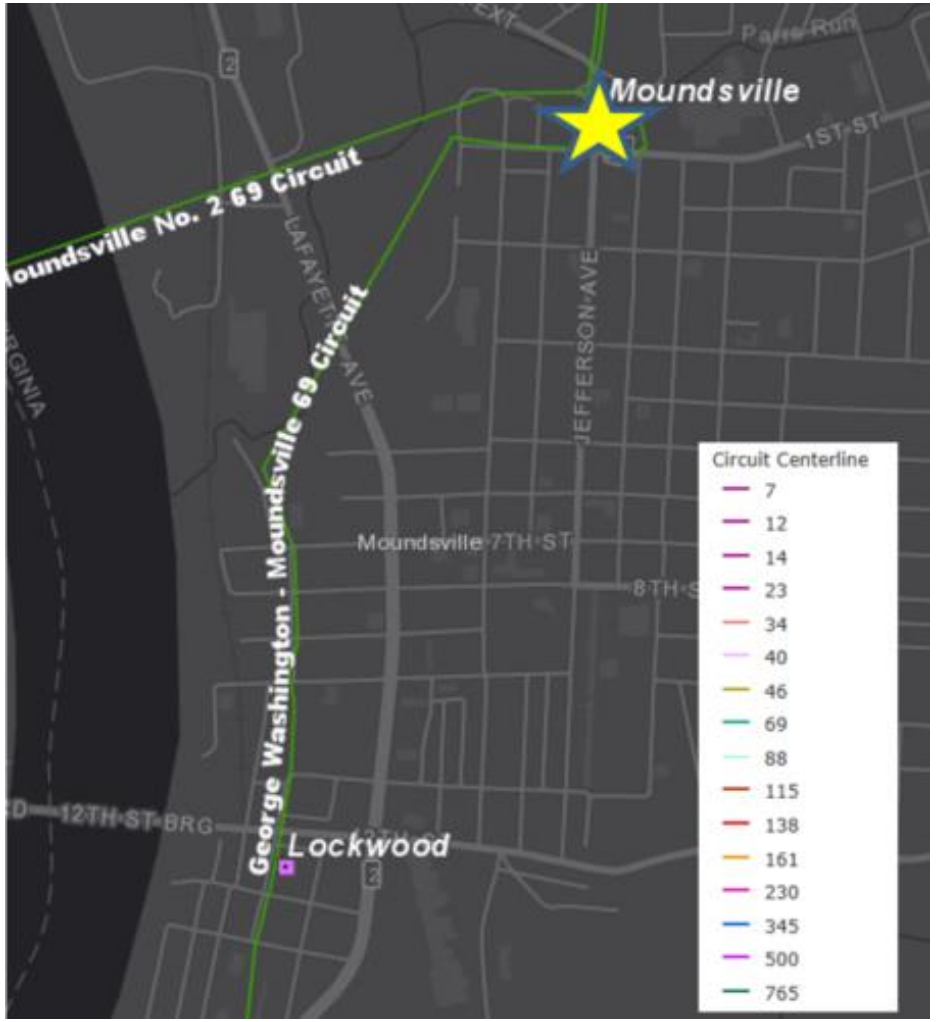
Problem Statement:

FG:AEP-T271, AEP-T272

In 2025 Summer RTEP case, risers at Moundsvile station are overloading for the N-1-1 contingency of the loss of the Kammer – West Bellaire 138kV line and the loss of the West Bellaire 345/138 transformer #3

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05LOCKWOODSS – 05MOUNVIL 69KV	68/86/90/103



AEP Transmission Zone: Baseline Moundsville 69kV Riser Upgrade

Proposed Solution:

Upgrade 69kV risers at Moundsville station towards George Washington.

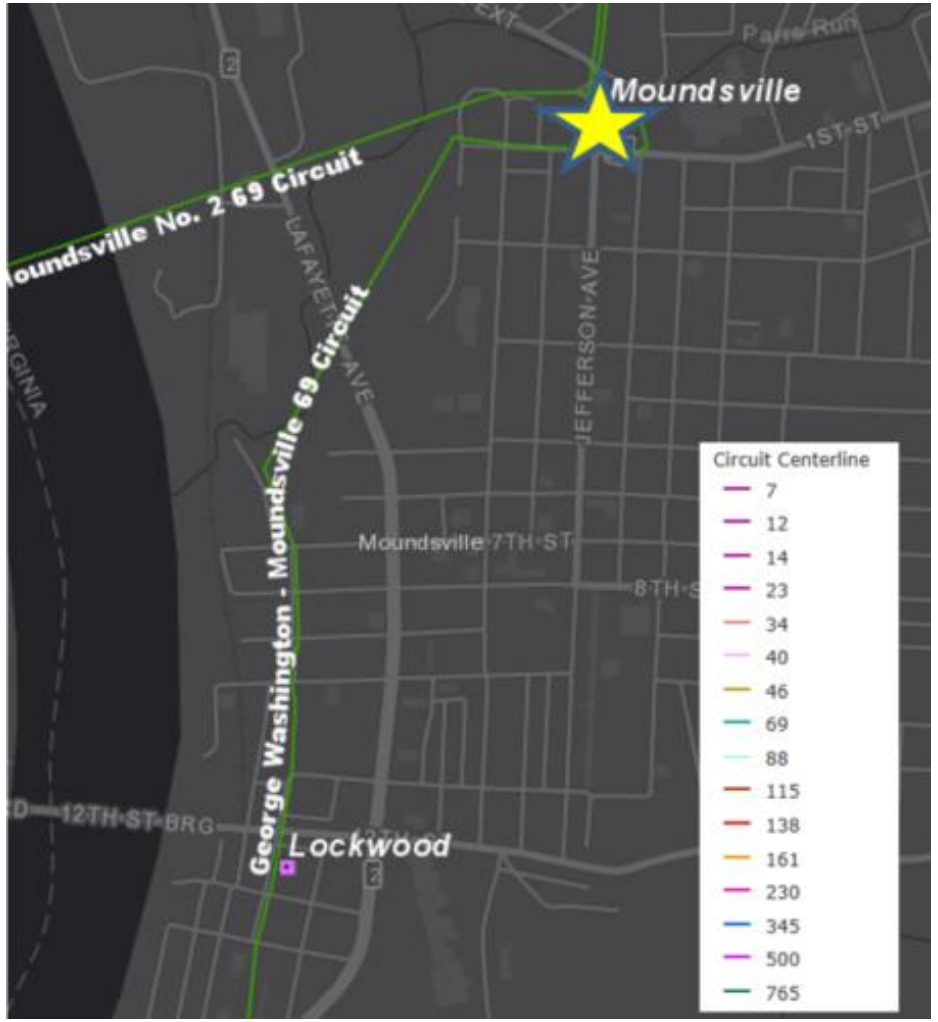
Estimated Cost: $0.05M

Preliminary Ratings:

Branch	SN/SE/WN/WE (MVA)
05LOCKWOODSS – 05MOUNVIL 69KV	110/127/139/152

Alternatives: N/A

Required In-Service: 6/1/2025



AEP Transmission Zone: Baseline New Camp - Stone 69kV

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

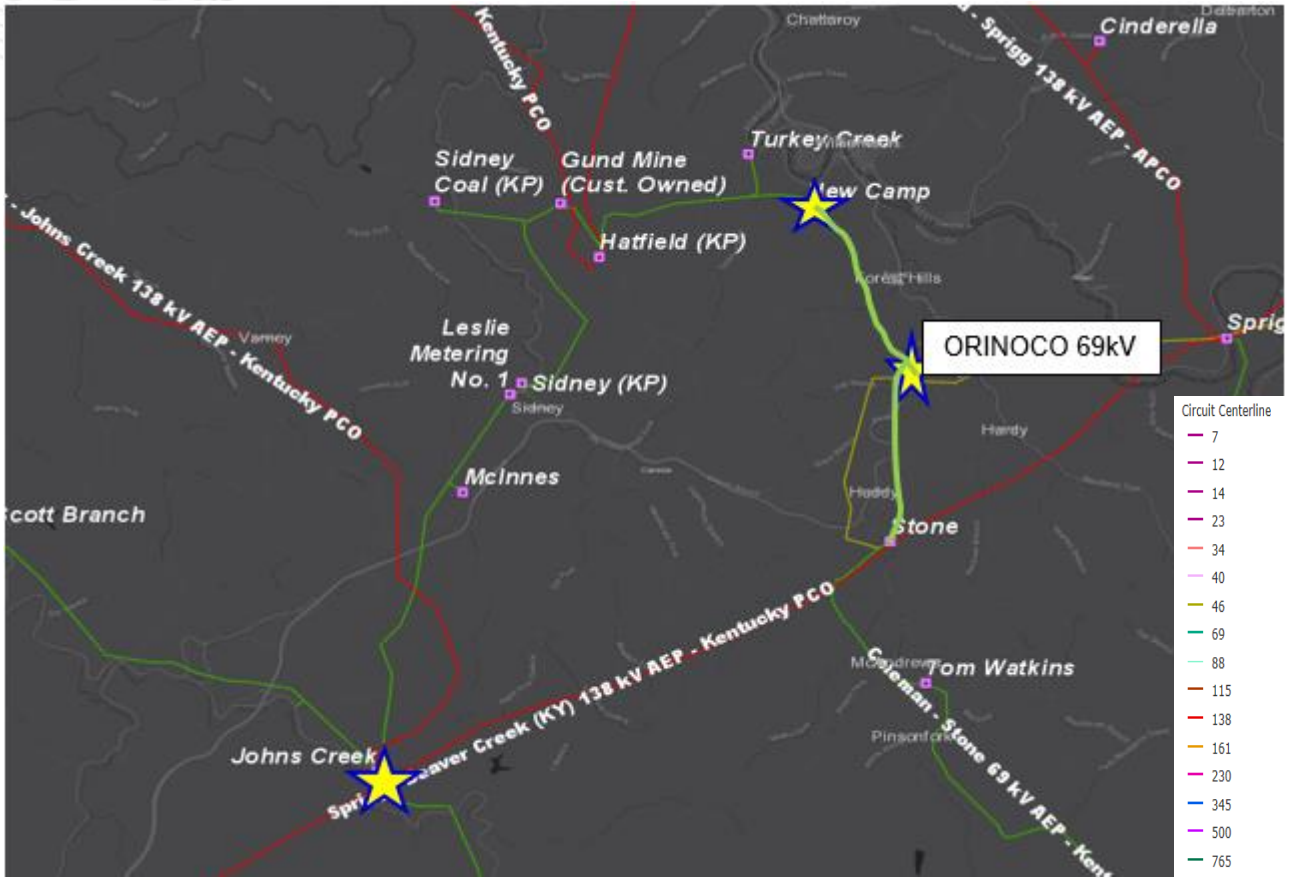
Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

AEP-VD1160, AEP-VD1161.

In the 2025 Winter RTEP case, voltage drop violations at New Camp 69kV in the event of an N-1-1 scenario that involves the loss 138/69 kV transformer at Johns Creek and loss of Inez - Sprigg 138kV line.



AEP Transmission Zone: Baseline New Camp - Stone 69kV

Proposed Solution:

Construct ~ 2.75 mi Orinoco - Stone 69kV transmission line in the clear between Orinoco station and Stone station. **Estimated Transmission Cost: $9.23 M**

Construct ~ 3.25 mi Orinoco – New Camp 69kV transmission line in the clear between Orinoco station and New Camp station. **Estimated Transmission Cost: $9.95 M**

At Stone substation, Circuit breaker A to remain in place and be utilized as T1 low side breaker, Circuit Breaker B to remain in place and be utilized as new Hatfield (via Orinoco and New Camp) 69KV line breaker. Add new 69KV Circuit Breaker E for Coleman Line exit. **Estimated Transmission Cost: $0.66 M**

Reconfigure the New Camp tap which includes access road improvements/installation, temporary wire and permanent wire work along with dead end structures installation. **Estimated Transmission Cost: $0.45 M**

At New Camp substation, rebuild the 69kV bus, add 69KV MOAB W and replace the 69KV Ground switch Z1 with a 69kV Circuit Switcher on the New Camp Transformer. **Estimated Transmission Cost: $1.18 M**

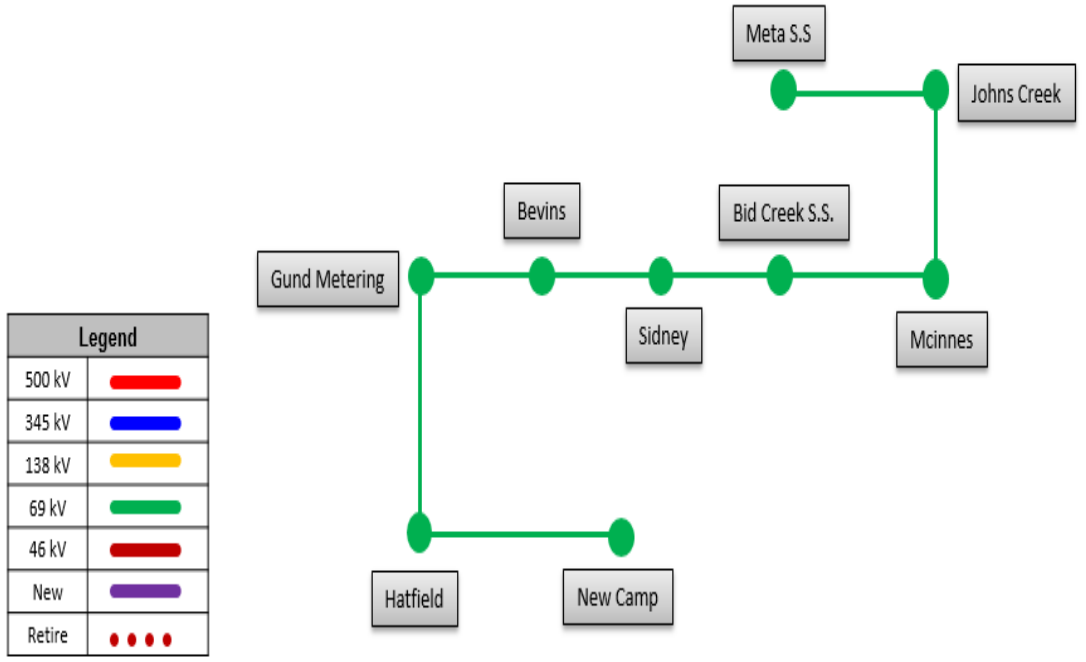
Total estimated baseline Cost: $21.47 M

Preliminary Facility Rating:

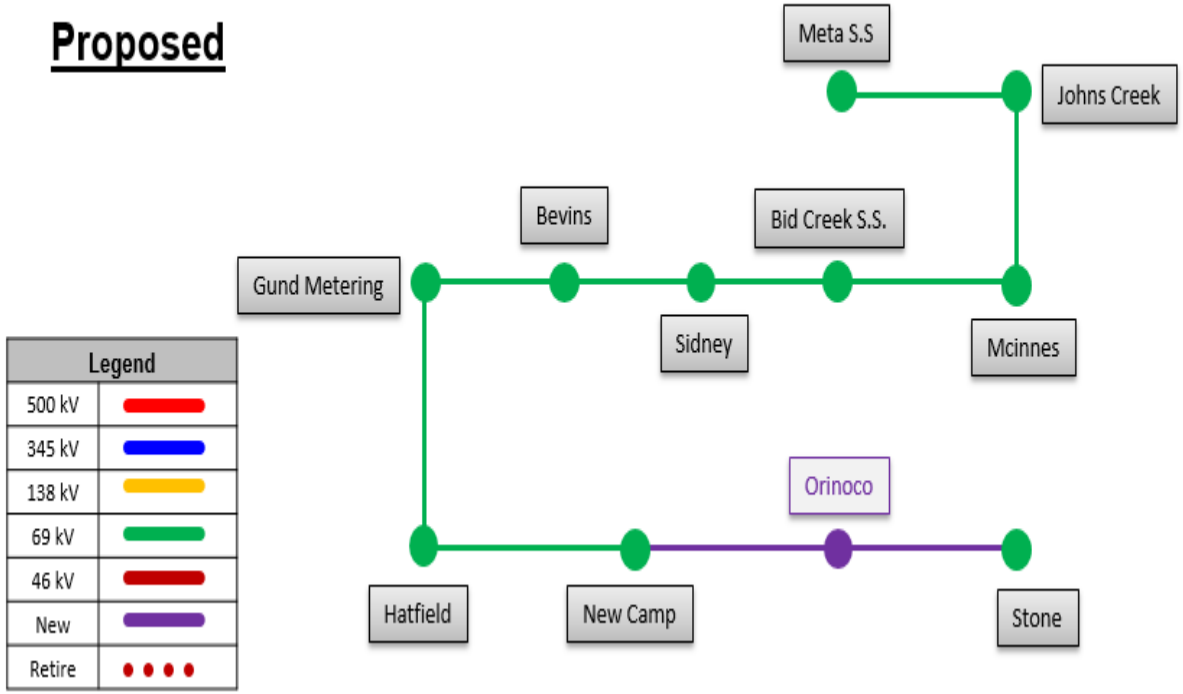
Branch	SN/SE/WN/WE (MVA)
05ORINOCO – 05STONE 69KV	102/142/129/160
05ORINOCO – 05NEWCAMP 69KV	102/142/129/150

AEP Transmission Zone: Baseline New Camp - Stone 69kV

Existing



Proposed



Ancillary Benefits:

This work addresses the needs identified in AEP-2020-AP028. Removal of obsolete ~8.23 mi of 46kV transmission line, Looped service to New Camp station which is served via a radial ~4.14 mile, 69 kV line from Hatfield Station and serves approximately 14.6 MVA of peak load..

Alternatives: Install 28.8 MVAR Cap Bank at Johns Creek substation to address the baseline violations. Cost : $0.368 M

Required In-Service: 12/1/2025

AEP Transmission Zone: Baseline
Roanoke & Huntington Court Circuit Switchers

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Substation equipment exclusion

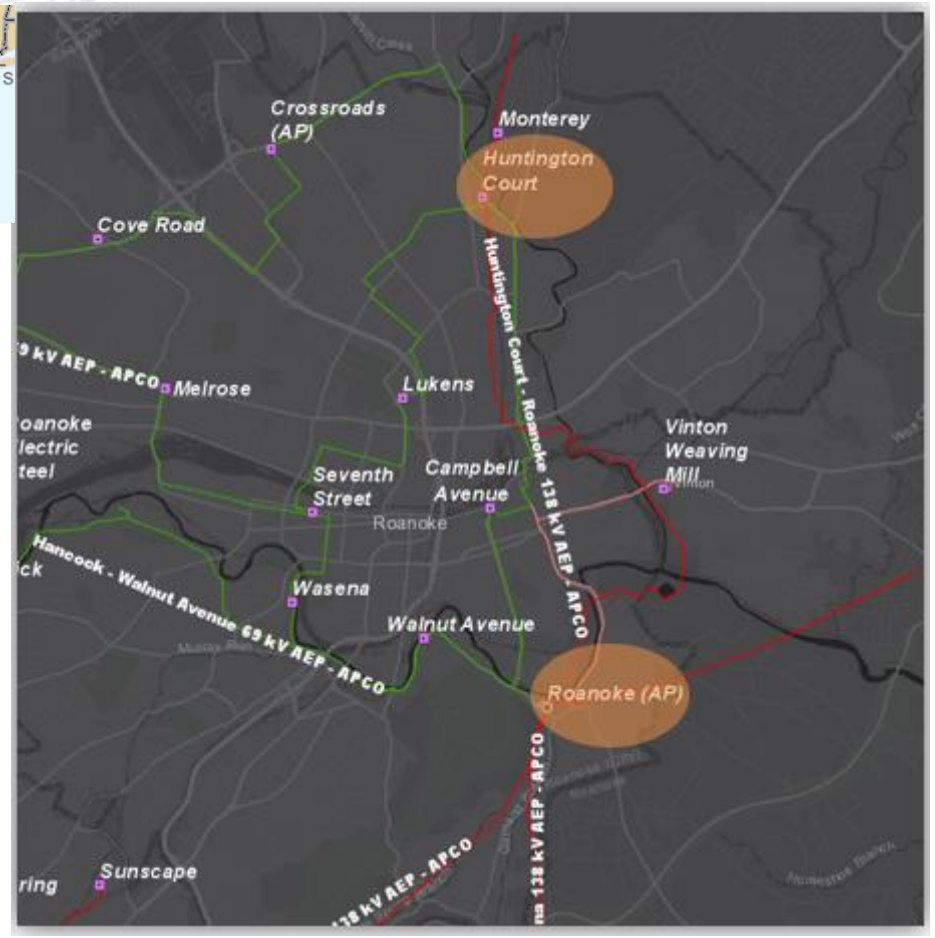
Problem Statement:

FG: AEP-T49, AEP-T50, AEP-T51, AEP-T52, AEP-T53, AEP-T54, AEP-T55, AEP-T56, AEP-T57, AEP-T58, AEP-T59, AEP-T60, AEP-T61

IN 2025 Summer RTEP case, the Cloverdale- Ingersol – Monterey - Huntington Court 69 kV Circuits are overload for multiple N-1-1 contingency pairs.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05CLOV 1 – 05ING RAND 69KV	82/90107/113
ONMONTERAV – 05ING RAND 69KV	79/90/100/109
ONMONTERAV – 05HUNTCRT2 69KV	82/90/107/113



AEP Transmission Zone: Baseline
Roanoke & Huntington Court Circuit Switchers

Proposed Solution:

Roanoke Station: Install high-side circuit switcher on 138/69-12 kV T5 Estimated Cost: $1.102 M

Huntington Court Station: Install high-side circuit switcher on 138/69-34.5 kV T1 Estimated Cost: $1.415 M

Total Estimated Cost: $2.517 M

Preliminary Facility Rating: No change

Ancillary Benefits: Addresses part of AEP-2020-AP033 Need

Alternatives: N/A

Required In-Service: 6/1/2025

AEP Transmission Zone: Baseline Roselms - Kalida 69 kV

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

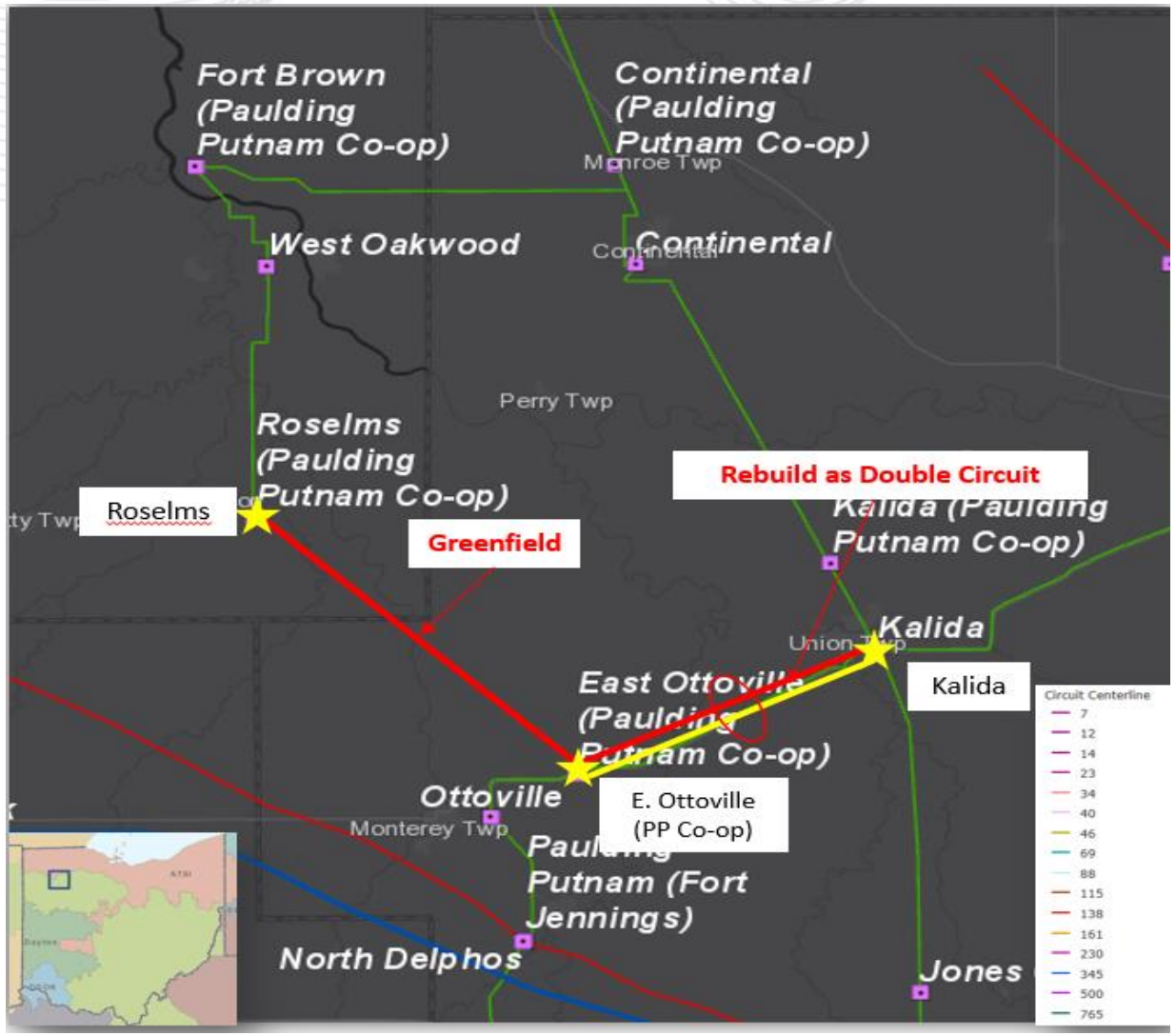
Problem Statement:

FG: AEP-T1 , AEP-T2 and AEP-VD502 through AEP-VD523

In 2025 Summer RTEP case, the Haviland - Paulding 69 kV circuit is overloaded for the N-1-1 contingency of the loss the South Hicksville- Mark Center 69kV line and the loss of the Continental – Kalida 69kV line. In 2025 Summer and Winter RTEP cases, the same N-1-1 contingency pair causes voltage drop violation at Roselms, West Oakwood, Fort Brown, Continental, Auglaize, Sherwood and Mark Center 69 kV buses.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05HAVILAND2 – 05PAULDING 69KV	49/50/54/60



AEP Transmission Zone: Baseline Roselms - Kalida 69 kV

Proposed Solution:

Convert S2215.2: Build 9.4 miles of single circuit 69 kV line from Roselms to near East Ottoville 69 kV Switch. **Estimated Cost:** $13.7M

Convert S2215.3: Rebuild 7.5 miles of double circuit 69kV line between East Ottoville Switch and Kalida Station (combining with the new Roselms to Kalida 69 kV circuit). **Estimated Cost:** $23.6M

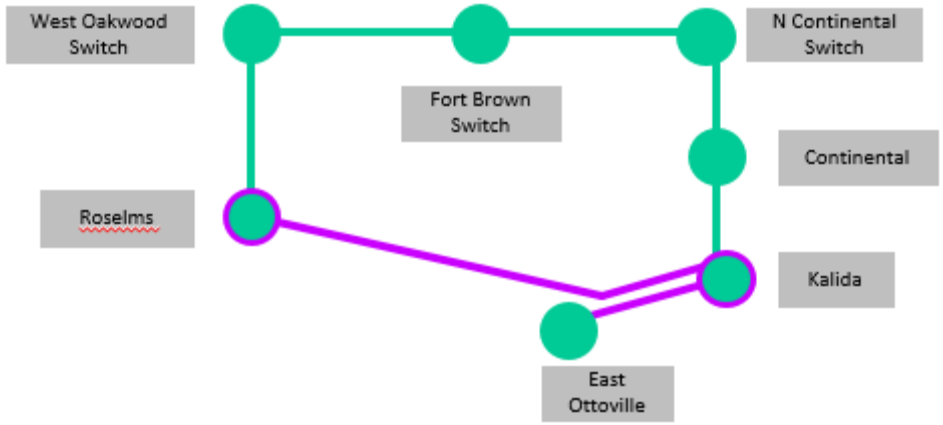
Convert S2215.8: At Roselms Switch, install a new three way 69kV, 1200 A phase-over-phase switch, with sectionalizing capability. **Estimated Cost:** $0.6M

Convert S2215.9: At Kalida station, terminate the new line from Roselms Switch. Move the CS XT2 from high side of T2 to the high side of T1. Remove existing T2 transformer. **Estimated Cost:** $1.0M

Total Estimated Cost: $38.9M

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05KALIDA – 05E.OTTOVLSS 69KV	79/92/100/109
05ROSELMS8 – 05KALIDA 69KV	102/142/129/160



Ancillary Benefits: Most of the Kalida - E. Ottoville line still has the original 4/0 copper 7 conductor from 1914. Proposal converts s2215.2, .3, .8, and .9 to baseline.

Alternatives: Single circuit 69 kV greenfield from Roselms to East Ottoville and 4-breaker ring 69 kV station at E. Ottoville Estimated Cost: $20.3M

Required In-Service: 6/1/2025

AEP Transmission Zone: Baseline Russ St. Switch

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Substation equipment exclusion

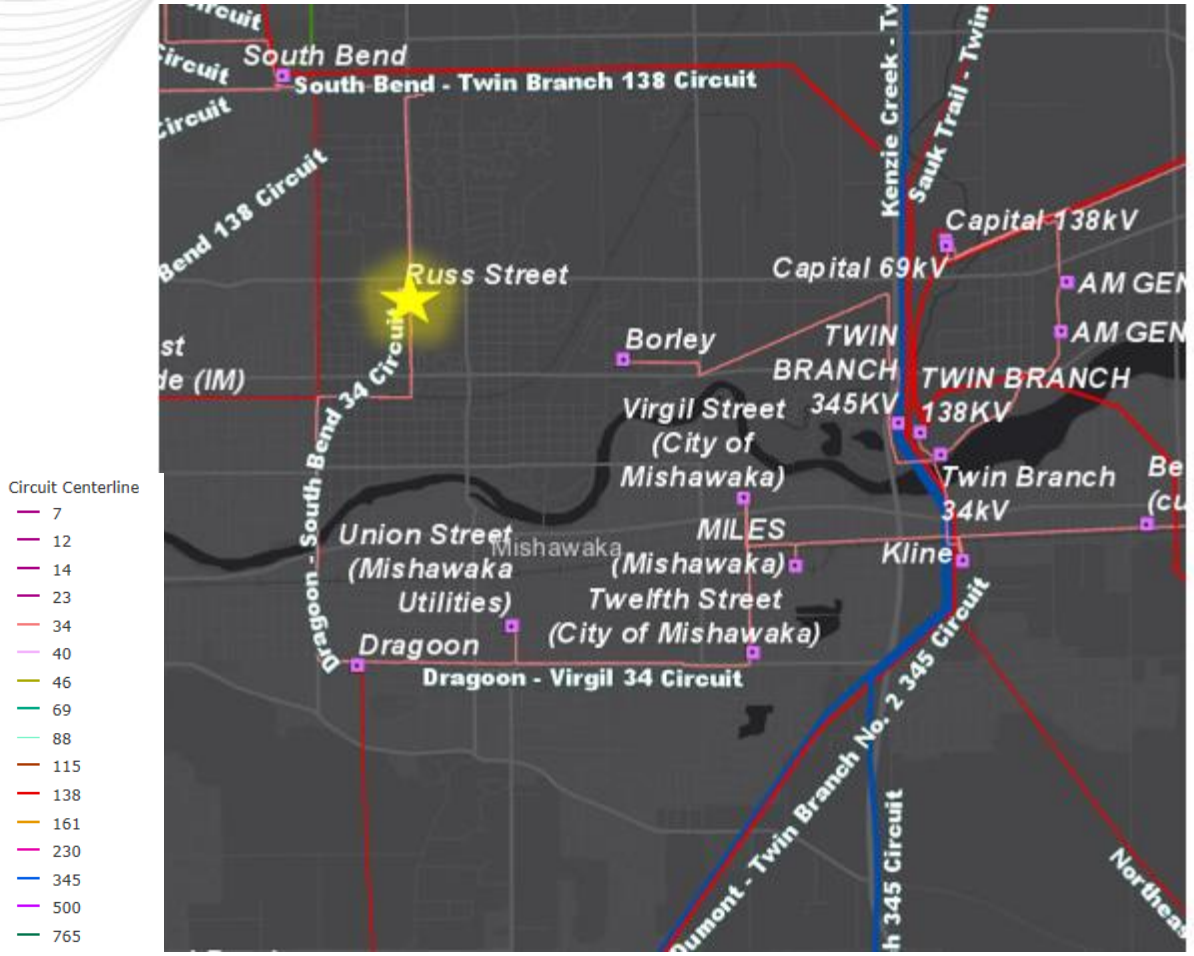
Problem Statement:

FG: AEP-T406, AEP-T425, AEP-T405, AEP-T426, AEP-T294

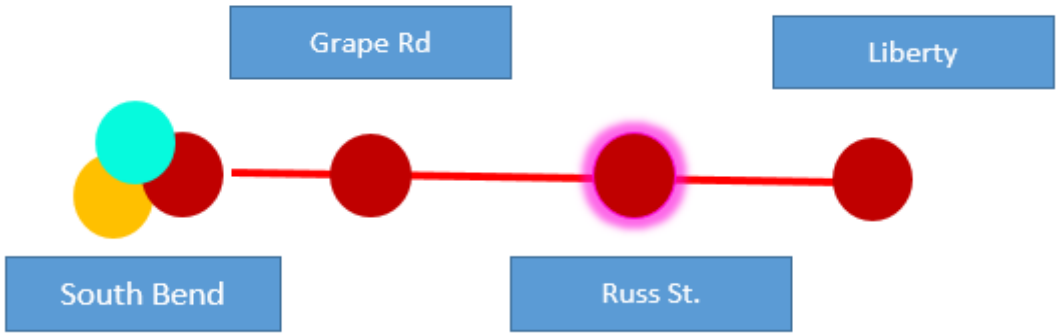
IN 2025 Summer RTEP case, the Russ St. 34.5KV Switch on the Russ St. – Liberty 34.5kV line is overloaded for multiple N-1-1 contingency pairs.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05RUSS ST – 05LIBERTYTSS 34.5KV	41/45/53/57



AEP Transmission Zone: Baseline Russ St. Switch



Proposed Solution:

To mitigate capacity issues on Russ St. – Liberty 34.5kV Branch, replace the Russ St. 34.5kV Switch.

Estimated Cost: $1.5M

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05RUSS ST – 05LIBERTYTSS 34.5KV	62/62/78/78

Alternatives: N/A

Required In-Service: 6/1/2025

Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	

AEP Transmission Zone: Baseline Stuart Cap Bank

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

FG: AEP-VD431, AEP-VD432, AEP-VD433, AEP-VD434, AEP-VD435, AEP-VD437

In 2025 Winter RTEP case, The Stuart 69kV bus has voltage drop violations in multiple contingencies involving the loss of Fieldale – Stuart 69kV line .

AEP Transmission Zone: Baseline Stuart Cap Bank

Proposed Solution:

Replace existing 69 kV capacitor bank at Stuart Station with a 17.2 MVAr capacitor bank

Estimated Cost: $0M ($0.856M Distribution cost)

Alternatives: N/A

Required In-Service: 12/1/2025

AEP Transmission Zone: Baseline Upper Sandusky 69 kV Upgrades

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV & Substation equipment exclusion

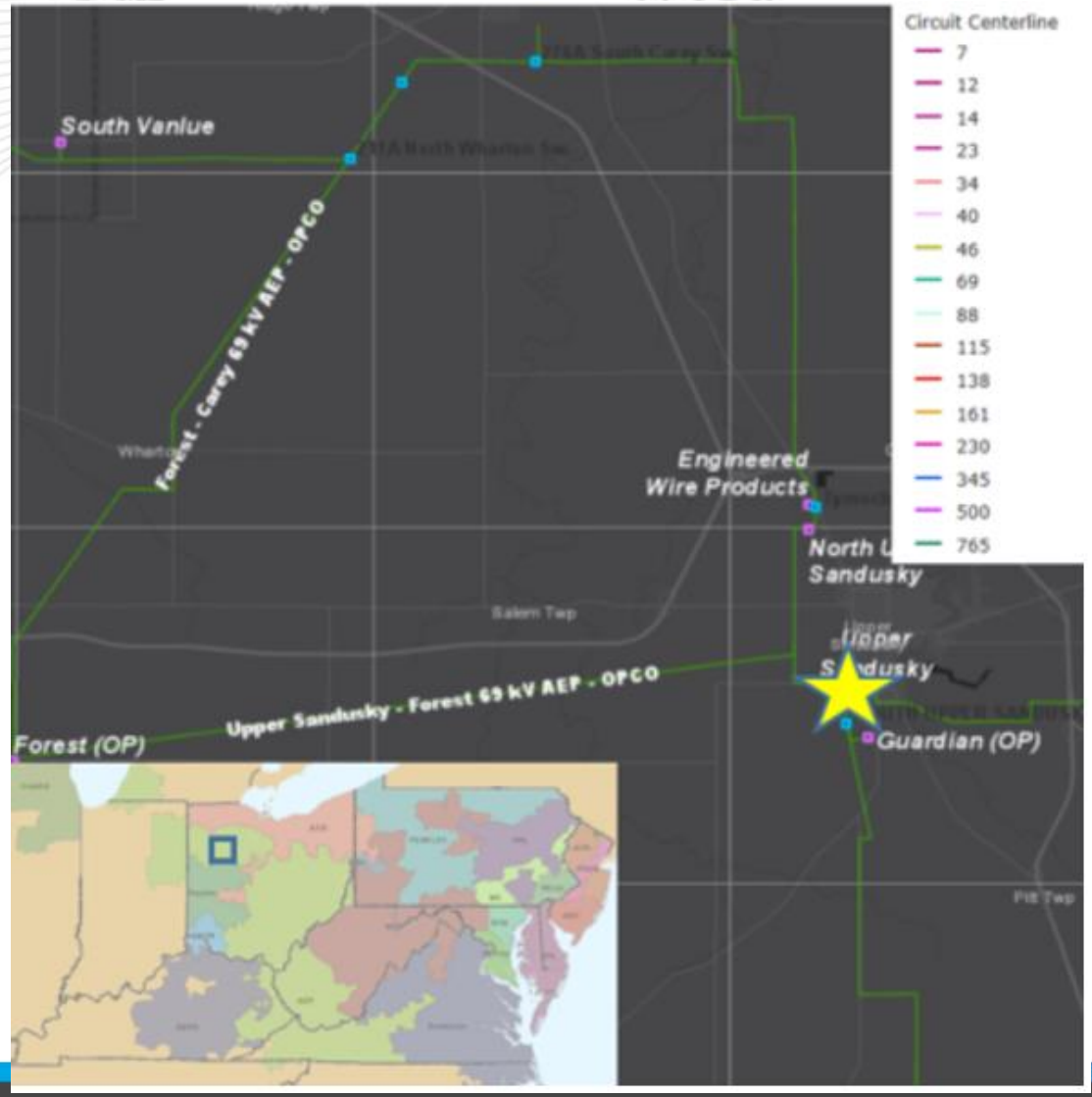
Problem Statement:

FG: AEP-T433, AEP-T438, and AEP-T468

In 2025 Summer RTEP case, the S. Upper Sandusky - Upper Sandusky 69 kV entrance span conductor to Upper Sandusky station and the 69 kV Riser/bus at Upper Sandusky towards Forest are overloaded for the N-1-1 contingency of the loss of and the loss of West Mount Vernon – Academia 138kV line, the HEDDSS- West Mount Vernon 138KV line, Sharp Road –West Mount Vernon 138kV line, the W Mount Vernon 138/69kV transformer and Pittsburgh Ave – West Mount Vernon 69kV line, and the loss of the Lynn – South Kenton 138kV line and South Kenton – Wild Creek 138kV line, South Kenton 138/69kV transformers 1&2 and the Fontaine – South Kenton 69kV line

Existing Facility Rating:

Branches	SN/SE/WN/WE (MVA)
05S.UPSDSS – 05U SANDSK 69KV	40/40/56/56
05FOREST – 05U SANDSK 69KV	55/69/72/82



AEP Transmission Zone: Baseline Upper Sandusky 69 kV Upgrades

Proposed Solution:

Replace 2/0 Cu entrance span conductor on the South Upper Sandusky 69kV line and 4/0 Cu Risers/Bus conductors on the Forest line at Upper Sandusky 69kV Station.

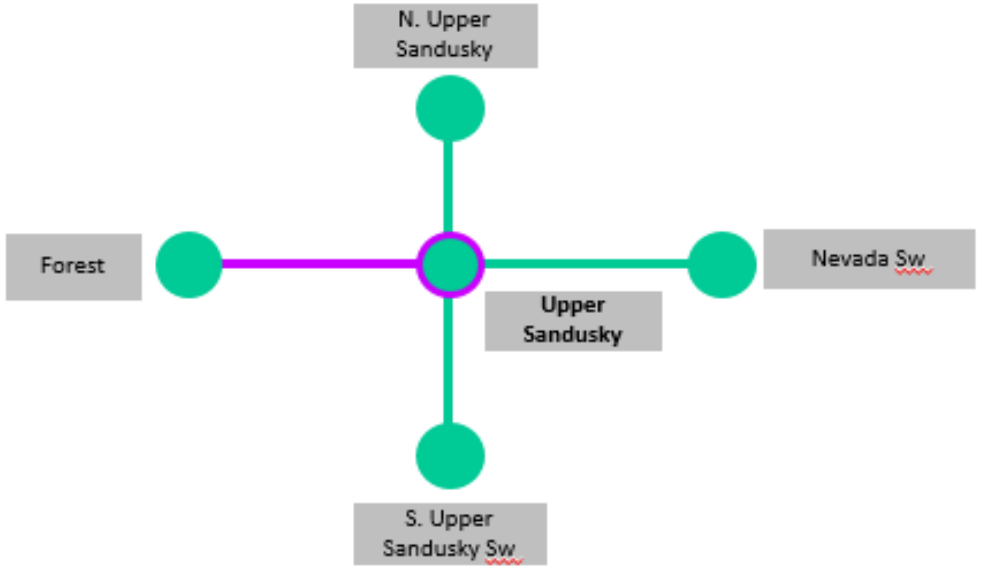
Estimated Cost: $0.54M

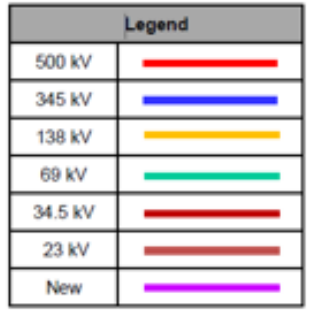
Preliminary Facility Rating:

Branches	SN/SE/WN/WE (MVA)
05S.UPSDSS – 05U SANDSK 69KV	50/50/63/63
05FOREST – 05U SANDSK 69KV	68/86/89/89

Alternatives: N/A

Required In-Service: 6/1/2025





AEP Transmission Zone: Baseline Walnut Ave Switch Replacements

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Substation equipment exclusion

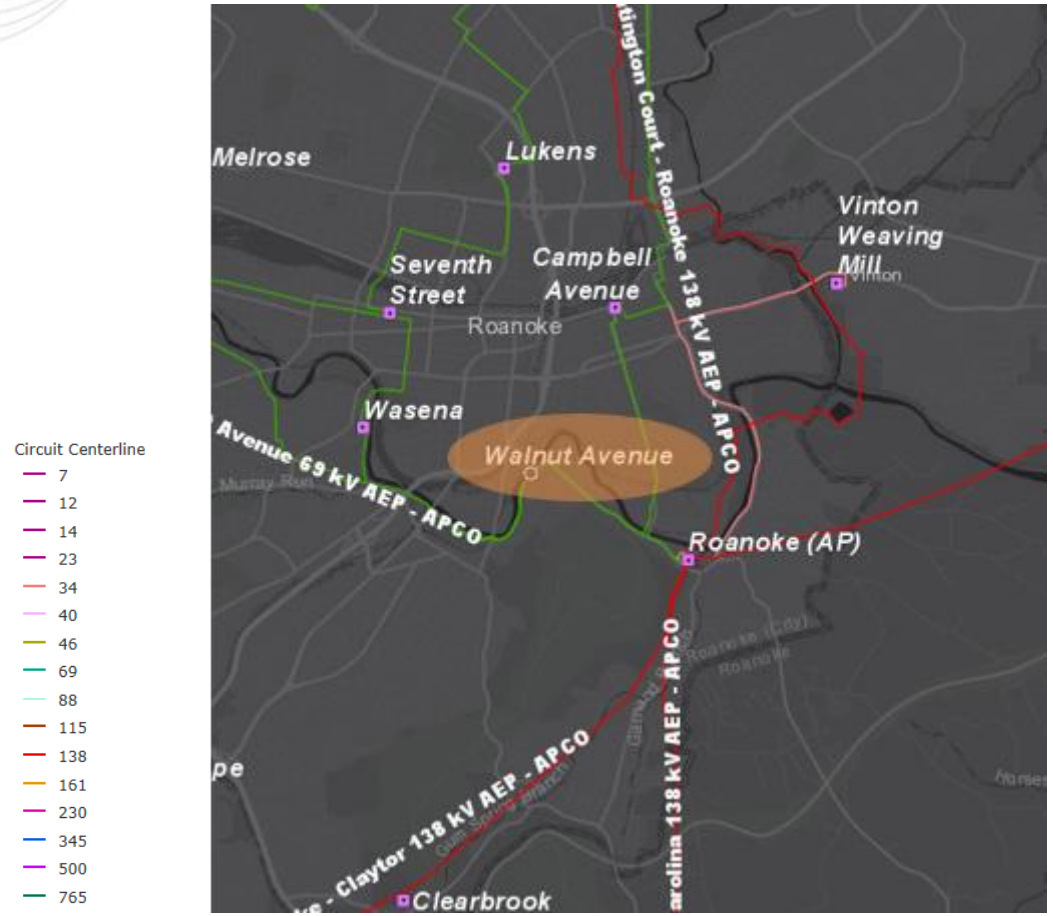
Problem Statement:

FG: AEP-T193, AEP-T194

In 2025 Summer RTEP case, the Roanoke-Walnut Ave 69 kV line is overloaded for the N-1-1 contingencyof the loss of the Hancock 138/69/34.5kV transformer and the loss of the Catawba 138/69/34.5kV transformer, Catawba – Cleveland 69KV line, and Catawba – Mason Creek 69kV line

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05ROANOKE– 05WALNUTA2 69KV	82/90/107/113



AEP Transmission Zone: Baseline Walnut Ave Switch Replacements

Proposed Solution:

Replace existing 69 kV disconnect switches for circuit breaker "C" at Walnut Avenue Station

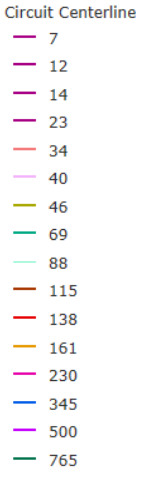
Estimated Cost: $0M ($0.067M distribution cost)

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05ROANOKE– 05WALNUTA2 69KV	99/99/125/125

Alternatives: N/A

Required In-Service: 6/1/2025



AEP Transmission Zone: Baseline Grundy Area

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

FG: AEP-VD704 AEP-VD705 AEP-VD707 AEP-VD708 AEP-VD1002 AEP-VD1084 AEP-VD1085 AEP-VD1088 AEP-VD1089 AEP-VD1091 AEP-VD1092 AEP-VD1093 AEP-VD1148 AEP-VD1149 AEP-VD1150 AEP-VD1151 AEP-VD1152 AEP-VD1153 AEP-VD1154 AEP-VD1155 AEP-VD1156 AEP-VD1157 AEP-VD1158 AEP-VD1159

In the 2025 Summer and Winter RTEP cases, voltage violations are identified on the existing Big Rock 34.5kV, Patrick 34.5 kV, Thomas 34.5 kV, Bull Creek 34.5 kV, Grundy 34.5 kV, Grundy 69kV and Knotty Poplar 69 kV buses for multiple contingencies.

AEP Transmission Zone: Baseline Grundy Area

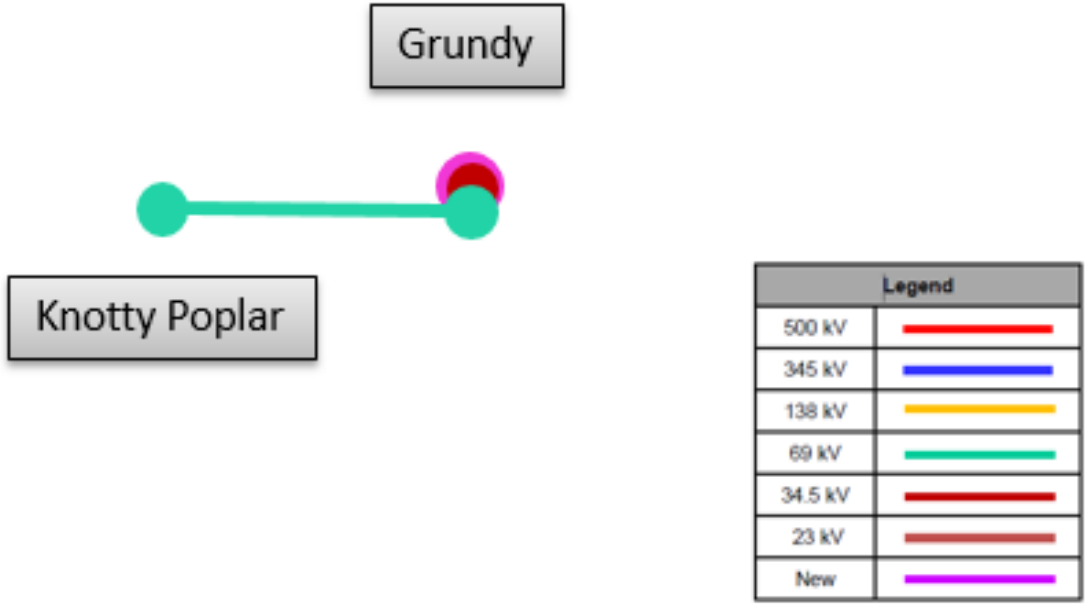
Proposed Solution:

Grundy 34.5 kV: Install a 34.5 kV 9.6 MVAR cap bank

Estimated Cost: $0.8M

Alternatives: Build a ~3.2 miles long 69 KV single circuit line with 556 ACSR conductor from Turkey Pen Station to Grundy Station. Estimated Cost: $8M

Required In-Service: 6/1/2025



AEP Transmission Zone: Baseline Concord-Whitaker 34.5kV Line Rebuild

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

FG: AEP-T83, AEP-T85, AEP-T86, AEP-T87, AEP-VM742, AEP-VM743, AEP-VM744

In 2025 Summer RTEP case, the Concord-Whitaker 34.5kV line is overloaded for the loss of Kline-Bercado 34.5kV line

Existing Facility Rating:

Branches	SN/SE/WN/WE (MVA)
05CONCORD– 05WHITAKER 34.5KV	37/37/47/47
05CONCORD– 05WASTEWAT 34.5KV	37/37/47/47

AEP Transmission Zone: Baseline Concord-Whitaker 34.5kV Line Rebuild

Proposed Solution:

AEP will rebuild the overloaded portion of the Concord-Whitaker 34.5kV line. Rebuild is double circuit and will utilize 795 ACSR conductor. The rebuild is 1.13 miles long.

Estimated Cost: $2.8M

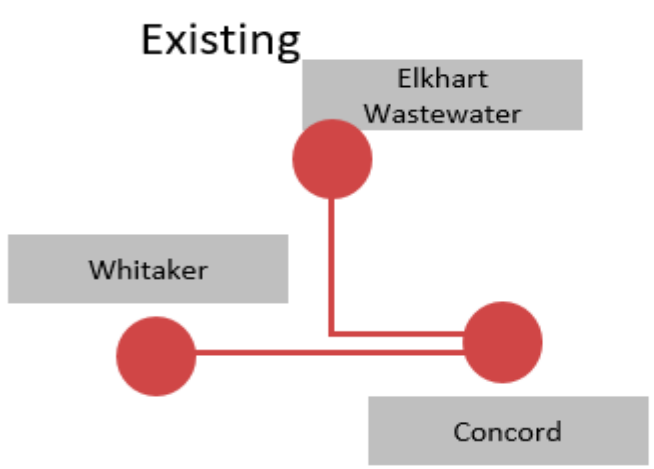
Preliminary Facility Rating:

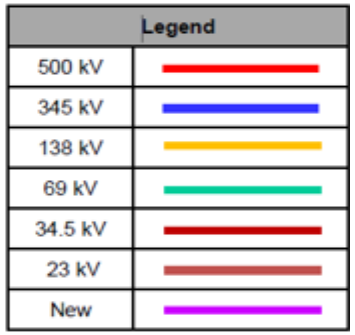
Branches	SN/SE/WN/WE (MVA)
05CONCORD– 05WHITAKER 34.5KV	62/62/78/78
05CONCORD– 05WASTEWAT 34.5KV	41/45/53/57

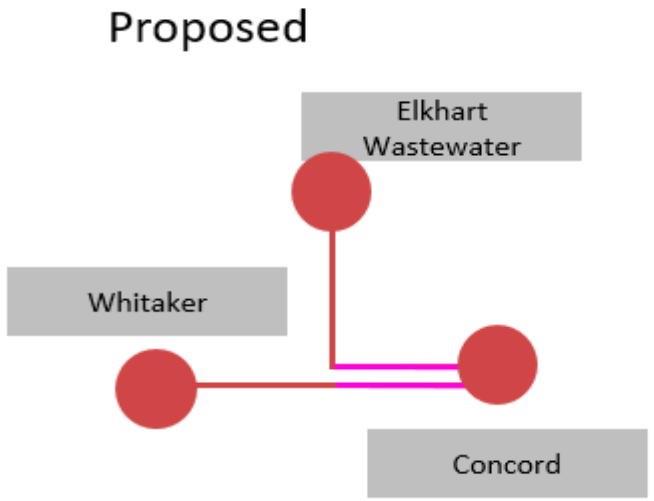
Ancillary Benefits: The existing wood H-Frames are very deteriorated and have cracks in the structures. The existing double circuit wood crossarm structures are also deteriorated, and a lot of these structures have decaying crossarms, woodpecker damage and shell rot. The portion of line to be rebuilt was originally installed in 1956.

Alternatives: Considering the length, condition, and customers served from the line to be rebuilt, no alternatives were considered.

Required In-Service: 6/1/2025







AEP Transmission Zone: Baseline North Columbus 69 kV line Rebuilds

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV & Substation equipment exclusion

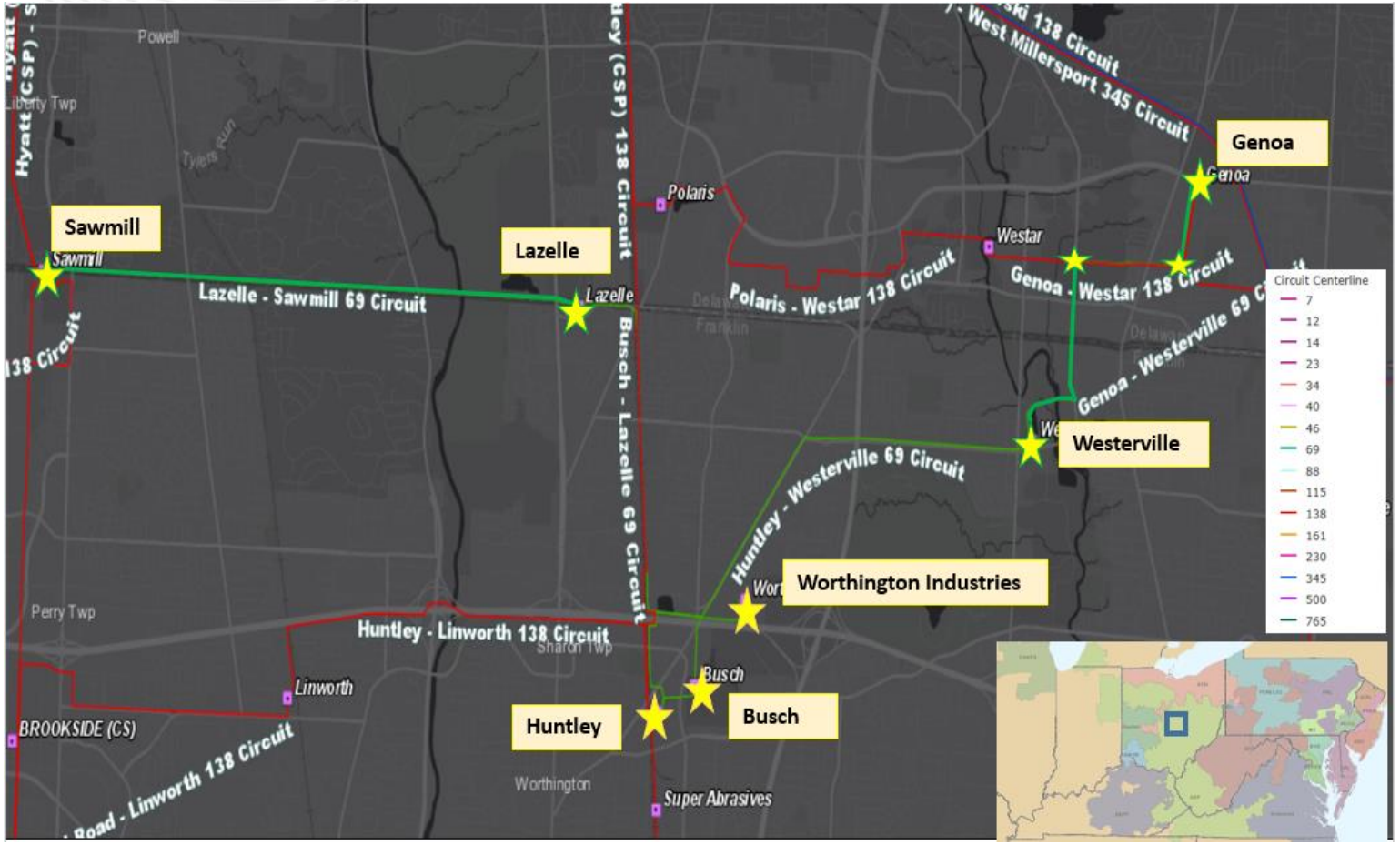
Problem Statement:

FG: AEP-T205 through AEP-T208, AEP-T213, AEP-T218, AEP-T260 through AEP-T262, AEP-T265, AEP-T369, AEP-T370, AEP-T371, AEP-T372

In 2025 Summer RTEP case, the Sawmill - Lazelle and Westerville - Genoa 69 kV lines along with station equipment at Lazelle, Westerville, and Genoa are overloading for N-1-1 contingency scenarios

Existing Facility Rating:

Branches	SN/SE/WN/WE (MVA)
05SAWMILL – 05LAZELLE N 69KV	55/69/72/82
05GENOA – 05WESTERVL 69KV	64/73/81/91
05LAZELLE S– 05LAZELLE N 69KV	55/69/72/82



AEP Transmission Zone: Baseline North Columbus 69 kV line Rebuilds

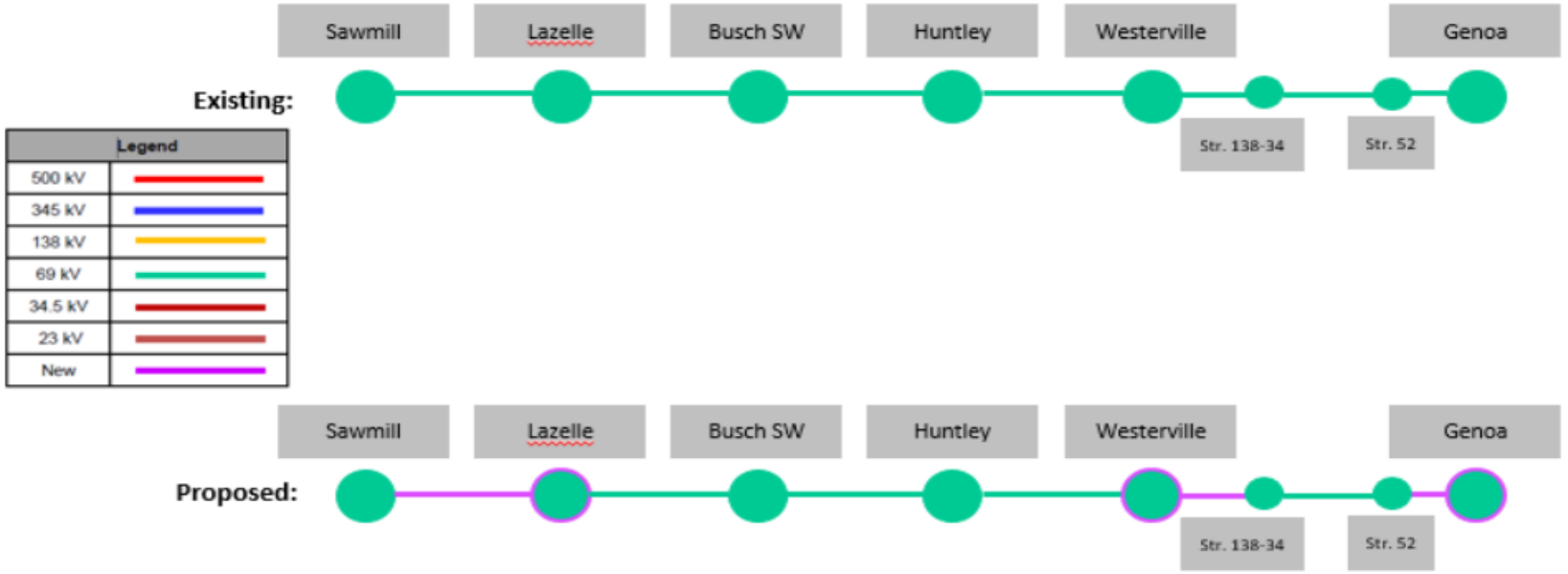
Proposed Solution:

Rebuild 4.23 miles of 69 kV line between Sawmill and Lazelle station, using 795 ACSR 26/7 conductor. **Estimated Cost:** $12.0 M

Rebuild 1.94 miles of 69kV Line between Westerville and Genoa stations, using 795 ACSR 26/7 conductor. **Estimated Cost:** $5.9 M

Replace risers and switchers at Lazelle, Westerville, and Genoa stations. Upgrade associated relaying accordingly. **Estimated Cost:** $1.9 M

Total Estimated Cost: $19.8M



AEP Transmission Zone: Baseline North Columbus 69 kV line Rebuilds

Preliminary Facility Rating:

Branches	SN/SE/WN/WE (MVA)
05SAWMILL – 05LAZELLE N 69KV	121/151/163/185
05GENOA - 05LAZELLE N 69KV	100/111/126/139
05LAZELLE S– 05LAZELLE N 69KV	121/149/162/192

Ancillary Benefits: The proposed solution will rebuild the Sawmill - Lazelle 69 kV line. The majority of the line is made up of wooden structures and conductor that date back to 1926. 25 of the 49 structures that make up the line have at least one open condition attributed to them.

Alternatives:

Consideration was given to converting Lazelle station to 138 kV and retiring the 69 kV between Sawmill and Huntley. This alternative was deemed to be infeasible due to the significant amount of development/enchroachments in the area surrounding the facilities.

Another alternative that was considered involved installation of 2nd 138/69 kV transformer and associated sectionalizing improvements at Huntley station. This option would have taken a significant amount of work to reconfigure Huntley station to accommodate the new transformer. After taking into consideration the emerging asset renewal needs on the Sawmill - Lazelle 69 kV line, this alternative was determined to not be as cost effective as the proposed solution.

Required In-Service: 6/1/2025

AEP Transmission Zone: Baseline
South Toronto - West Toronto 69 kV Rebuild

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

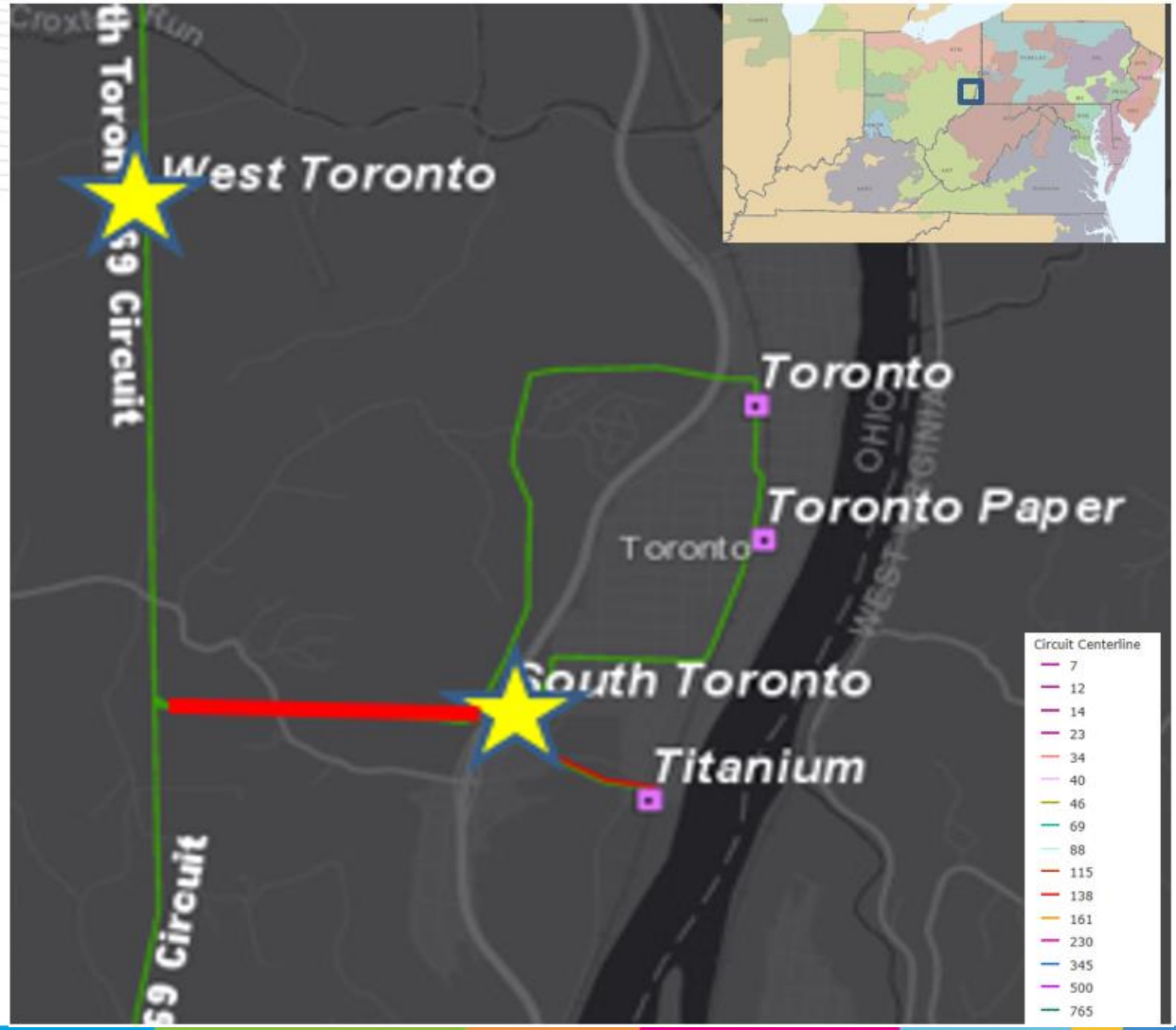
Problem Statement:

FG: AEP-T486, AEP-T487, AEP-T489, AEP-T490, AEP-T492, AEP-T493, AEP-T496, AEP-T497

In 2025 Summer RTEP case, the South Toronto-West Toronto 69kV branch is overloaded for multiple N-1-1 contingency pairs.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05S TORONT– 05W TORONT 69KV	49/49/61/61
05S.TORONTOZ – 05SUNSTBL 69KV	54/54/76/76



AEP Transmission Zone: Baseline
South Toronto - West Toronto 69 kV Rebuild

Proposed Solution:

Rebuild 0.8 miles of double circuit 69kV line between South Toronto and West Toronto. Replace 219 kcmil ACSR with 556 ACSR..

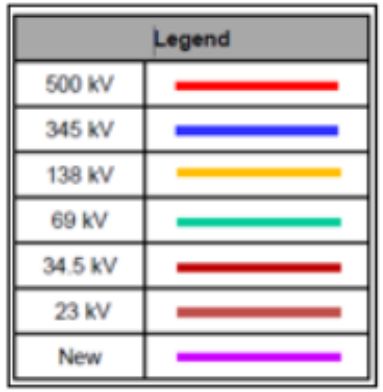
Estimated Cost: $2.83M

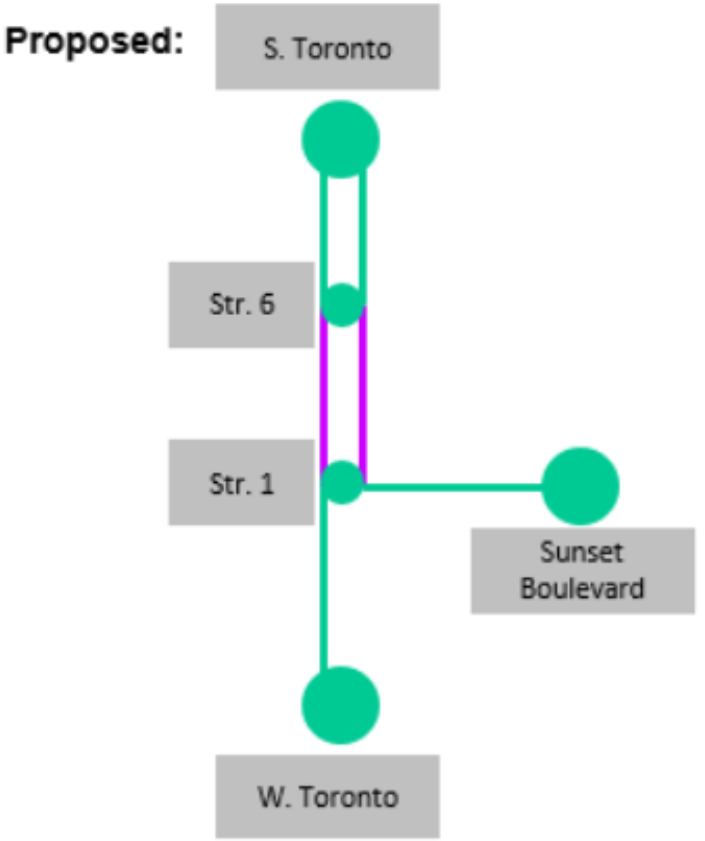
Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05S TORONT – 05W TORONT 69KV	68/68/90/103
05S.TORONTOZ – 05SUNSTBL 69KV	64/64/90/96

Alternatives: N/A

Required In-Service: 6/1/2025





AEP Transmission Zone: Baseline
West End Fostoria - Lumberjack Sw 69 kV Rebuild

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

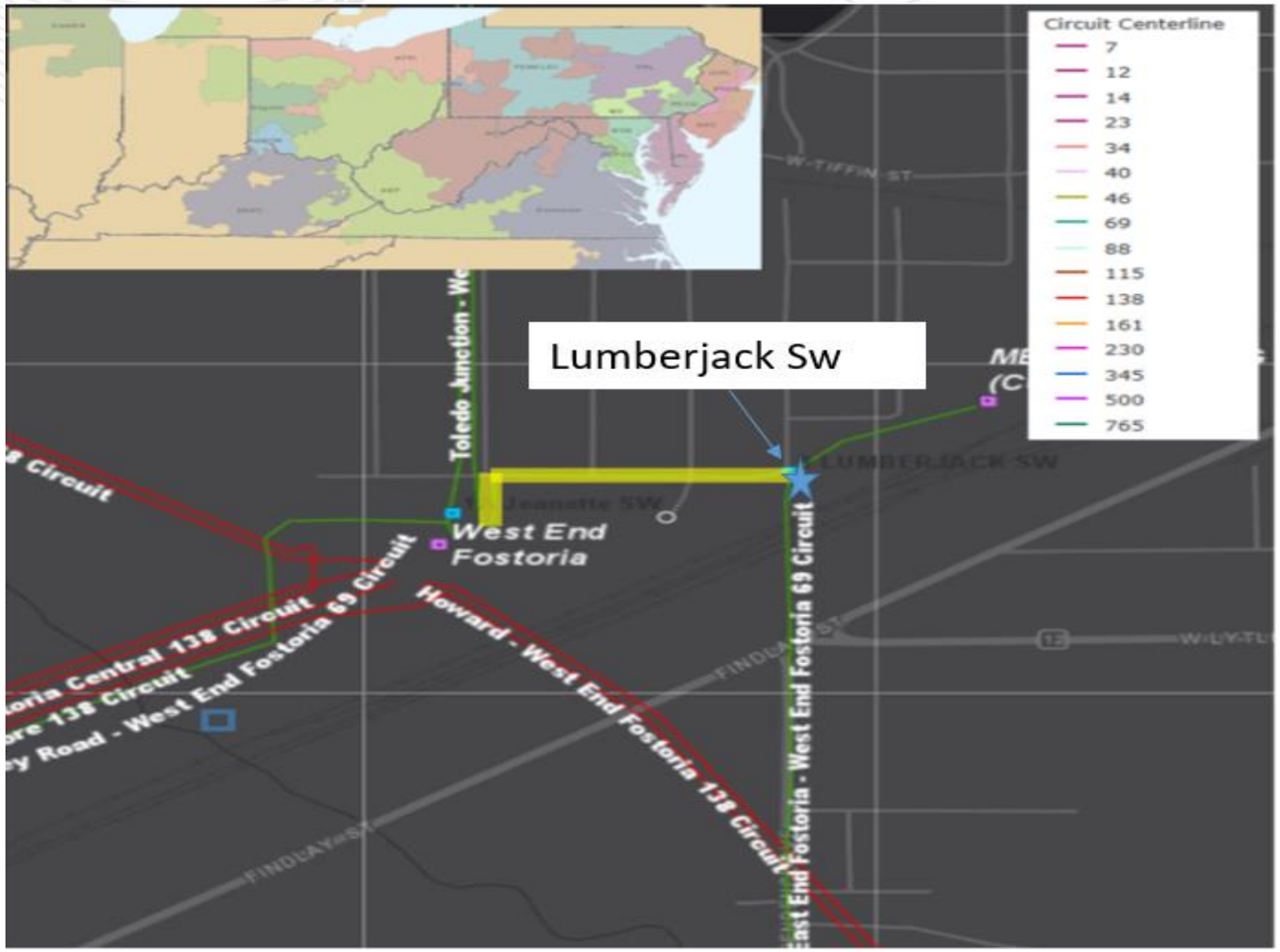
Problem Statement:

FG: AEP-T450, AEP-T451, AEP-T454, AEP-T455

In 2025 Summer RTEP case, the West End Fostoria - Lumberjack Switch 69 kV line is overloaded for multiple N-1-1 contingency pairs.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05W END – 05LUMBERJ SS 69KV	40/40/56/56



AEP Transmission Zone: Baseline
West End Fostoria - Lumberjack Sw 69 kV Rebuild

Proposed Solution:

Rebuild 0.2 mile of the West End Fostoria - Lumberjack Switch 69 kV line with 556 ACSR (Dove) conductors. Replace jumpers on West End Fostoria line at Lumberjack Switch.

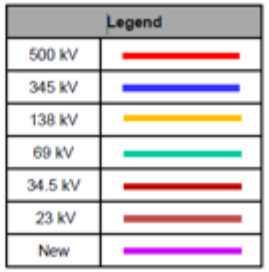
Estimated Cost: $0.47M

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05W END – 05LUMBERJ SS 69KV	102/42/129/160

Alternatives: N/A

Required In-Service: 6/1/2025



AEP Transmission Zone: Baseline Fleming station ring bus

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

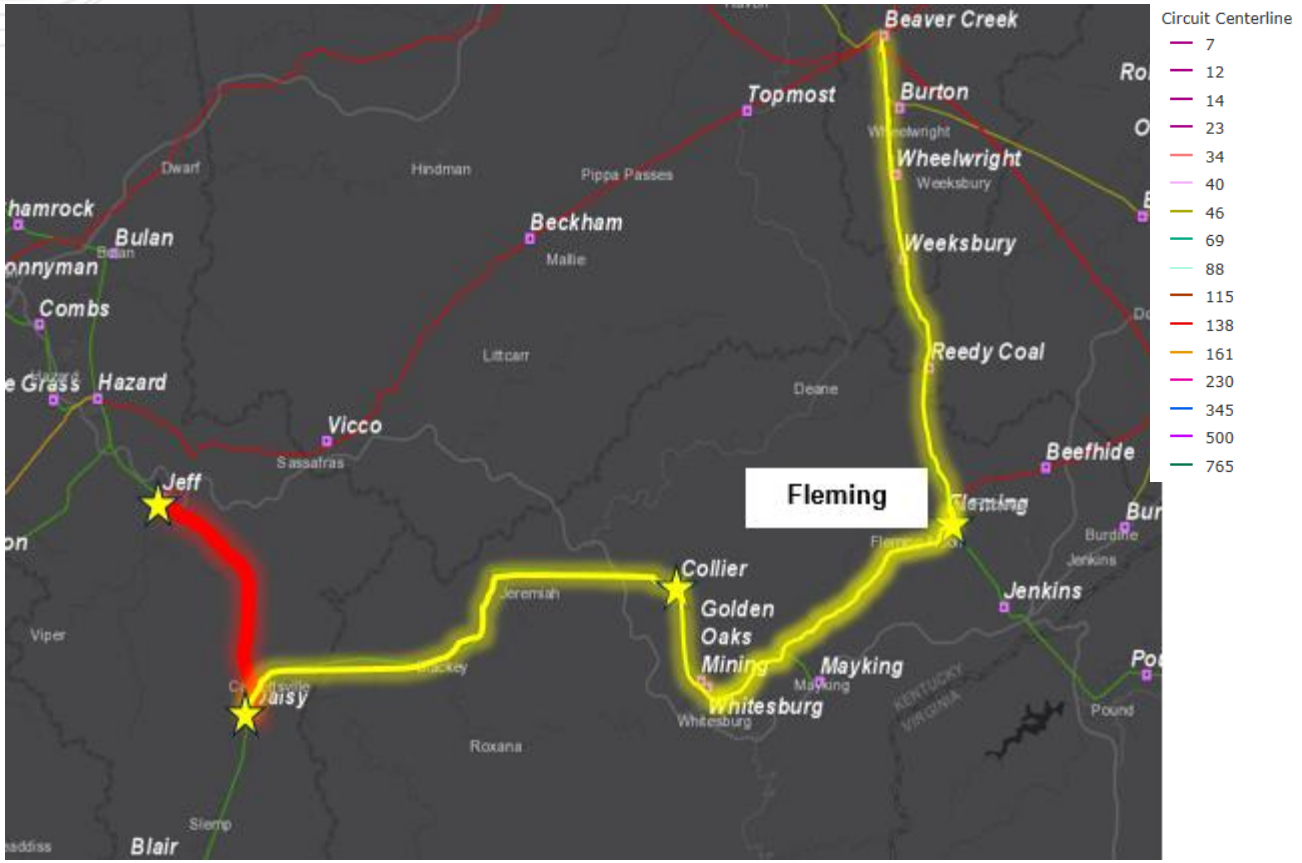
Problem Statement:

FG: AEP-T344, AEP-T345, AEP-T346, AEP-T347, AEP-T348, AEP-T349, AEP-T350, AEP-T351, AEP-VM545 AEP-VM546, AEP-VM547, AEP-VM548, AEP-VM549, AEP-VM550, AEP-VD552, AEP-VD553, AEP-VD554, AEP-VD555, AEP-VD566, AEP-VD567, AEP-VD570, AEP-VD571, AEP-VD556, AEP-VD557, AEP-VD558, AEP-VD559, AEP-VD572, AEP-VD573, AEP-VD574, AEP-VD575, AEP-VD576, AEP-VD577, AEP-VD578, AEP-VD579, AEP-VD526, AEP-VD527, AEP-VD529, AEP-VD531, AEP-VD532, AEP-VD534, AEP-VD536, AEP-VD538, AEP-VD548, AEP-VD549, AEP-VD550, AEP-VD551, AEP-VD560, AEP-VD561, AEP-VD568, AEP-VD569, AEP-VD542, AEP-VD543, AEP-VD546, AEP-VD547, AEP-VD562, AEP-VD563, AEP-VD564, AEP-VD565, AEP-VD540, AEP-VD541, AEP-VD544, AEP-VD545, AEP-VD524, AEP-VD525, AEP-VD528, AEP-VD530, AEP-VD533, AEP-VD535, AEP-VD537, AEP-VD539

In the 2025 Winter RTEP case, the Jeff – Daisy 69KV line overload and voltage violations at Weeksbury, Reedy Coal, Mayking, Daisy, Fleming, Collier, Golden Oaks, Slemp, and Whitesburg 69kV buses are identified for various N-1-1 outages.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05DAISY – 05JEFF 69KV	44/44/56/56



AEP Transmission Zone: Baseline Fleming station ring bus

Proposed Solution:

Convert s2219 to baseline:

Rebuild Fleming station in the clear; Replace 138/69kV Fleming Transformer #1 with 138/69kV 130 MVA transformer with high side 138 kV CB; Install a 5 breaker 69 kV ring bus on the low side of the transformer, replace 69 kV circuit switcher AA, replace 69/12kV transformer #3 with 69/12kV 30 MVA transformer, Replace 12 kV CB A and D. Retire existing Fleming substation.

Estimated Cost: $21.1M

Preliminary Facility Rating:

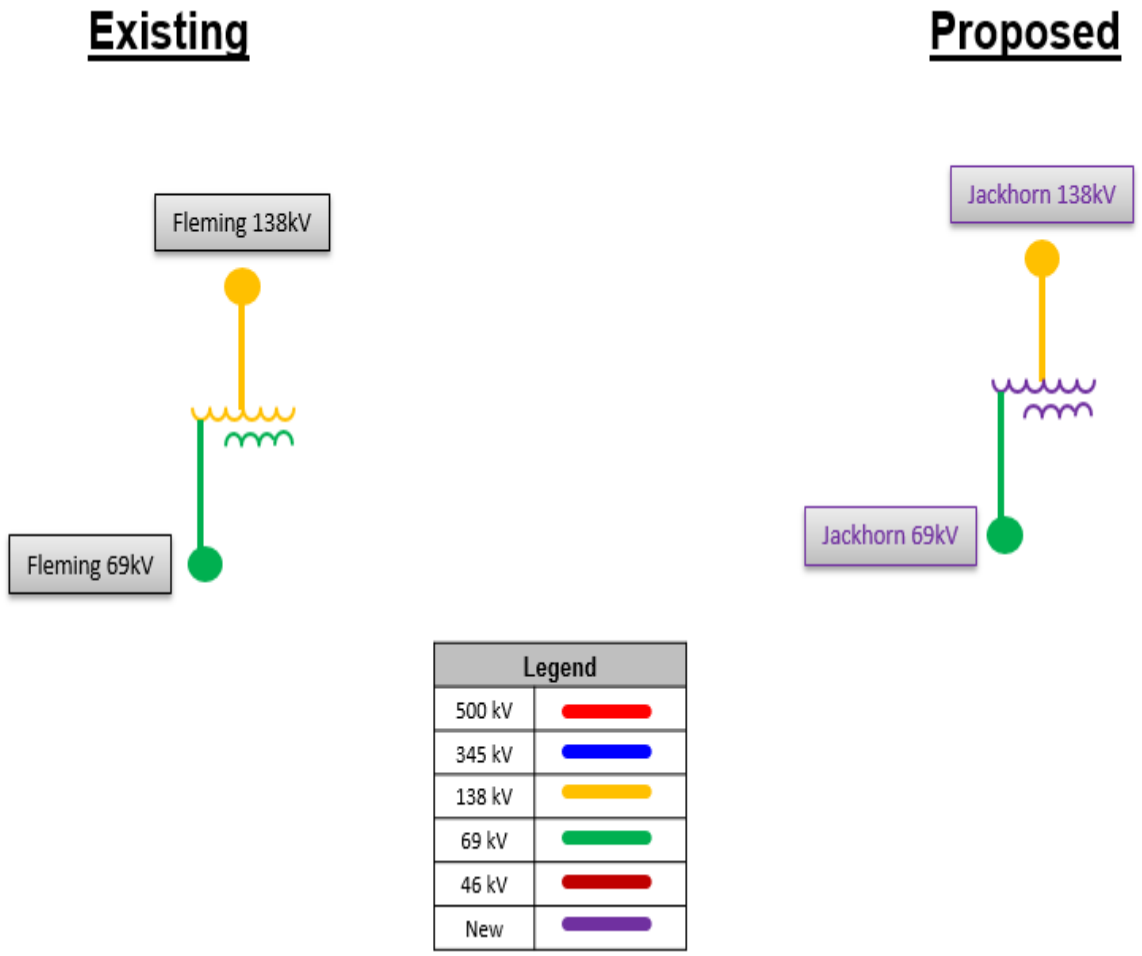
Branches	SN/SE/WN/WE (MVA)
05JACKHORN 138/69kV	130/130/130/130
05JACKHORN – 05BEEFHI 138kV	221/278/279/322
05JACKHORN – 05JENKINS 69V	87/101/110/120

Ancillary Benefits: This project is a conversion of s2219, and no additional costs are incurred to implement a separate baseline solution.

Alternatives:

- A single breaker could be installed on the low side of the existing Fleming transformer. Estimated Cost: $1M. However, this would not address the remaining supplemental needs at the station as solved by s2219. This breaker would then be eliminated as part of the completion of s2219 when Fleming is rebuilt in the clear.
- Another alternative would be to rebuild the overloaded sections of Jeff-Daisy line, approximately 0.6 miles, and install a 7.2 MVAR capacitor bank at Fleming station. Estimated Cost: $3.5M. This solution does not address the supplemental needs solved by s2219.

Required In-Service: 12/1/2025



AEP Transmission Zone: Baseline
Fort Steuben - Sunset Blvd 69kV T-Line Upgrade

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

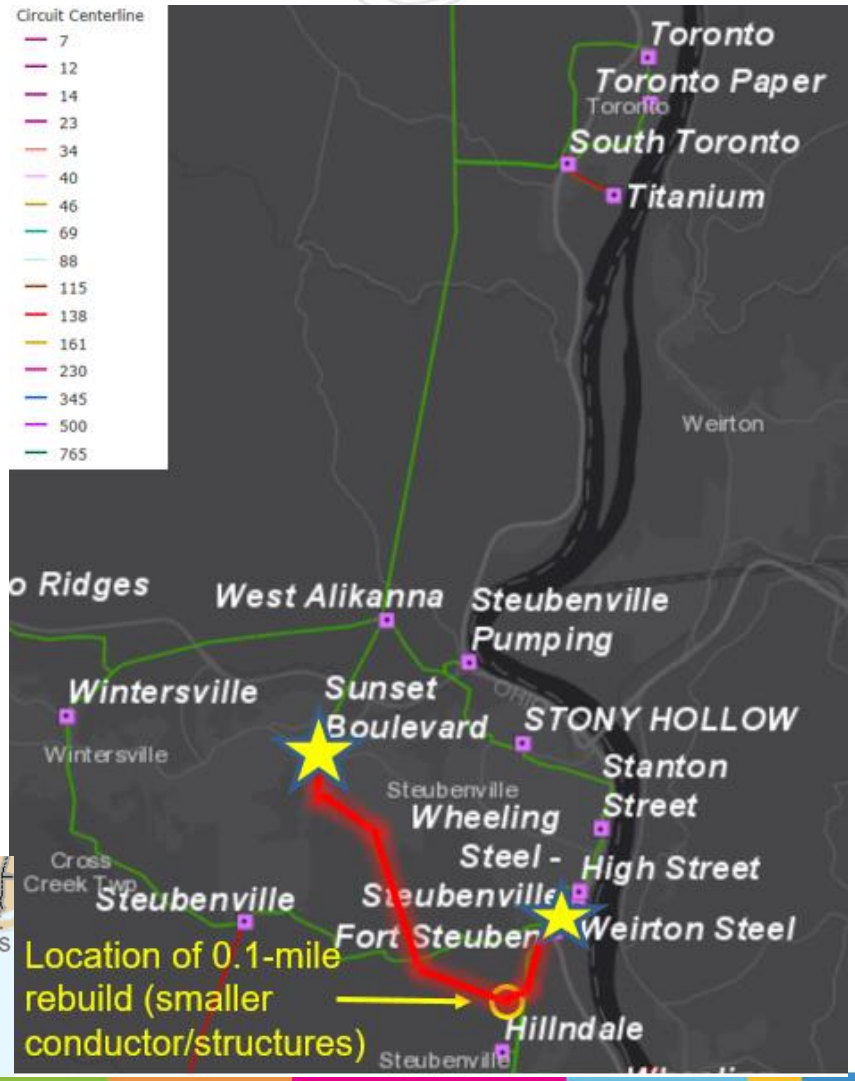
Problem Statement:

AEP-T488; AEP-T491; AEP-T494; AEP-T495

In the 2025 Summer RTEP case, the Fort Steuben-Sunset Blvd 69kV branch is overloaded for various N-1-1 outages.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05FT STB 2 – 05SUNST BL 69KV	54/54/76/76



AEP Transmission Zone: Baseline
Fort Steuben - Sunset Blvd 69kV T-Line Upgrade

Proposed Solution:

Reconductor and rebuild 1 span of T-line on the Fort Steuben-Sunset Blvd 69kV branch with 556 ACSR.

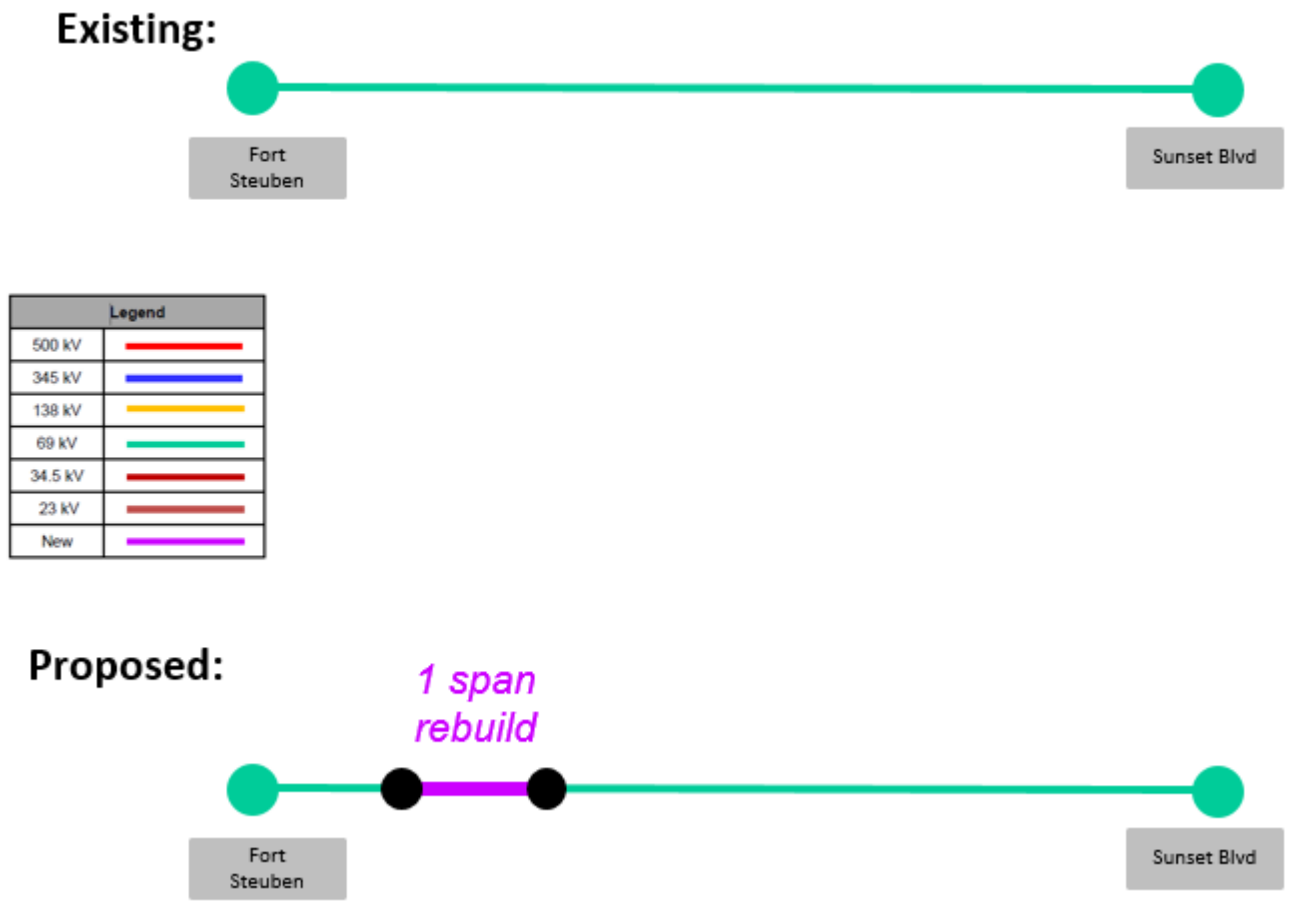
Estimated Cost: $0.73M

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05FT STB 2 – 05SUNST BL 69KV	64/64/90/96

Alternatives: N/A

Required In-Service: 6/1/2025



AEP Transmission Zone: Baseline Greenlawn - East Tiffin

Process Stage: First Review

Criteria: AEP 715 criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV & Substation equipment exclusion

Problem Statement:

AEP-T21 through AEP-T30, AEP-T398, AEP-T399, AEP-T403

In the 2025 Summer and Winter RTEP cases, the Greenlawn – East Tiffin 69KV line overload for various N-1-1 outages and line with stuck breaker contingencies.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05GREENLAW– 05E.TIFF2 69KV	39/39/42/42

AEP Transmission Zone: Baseline Greenlawn - East Tiffin

Proposed Solution:

Rebuild 1.75 miles of the Greenlawn - East Tiffin line section of the Carrothers - Greenlawn 69kV circuit containing 133 ACSR conductor with 556 ACSR conductor. Upgrade relaying as required

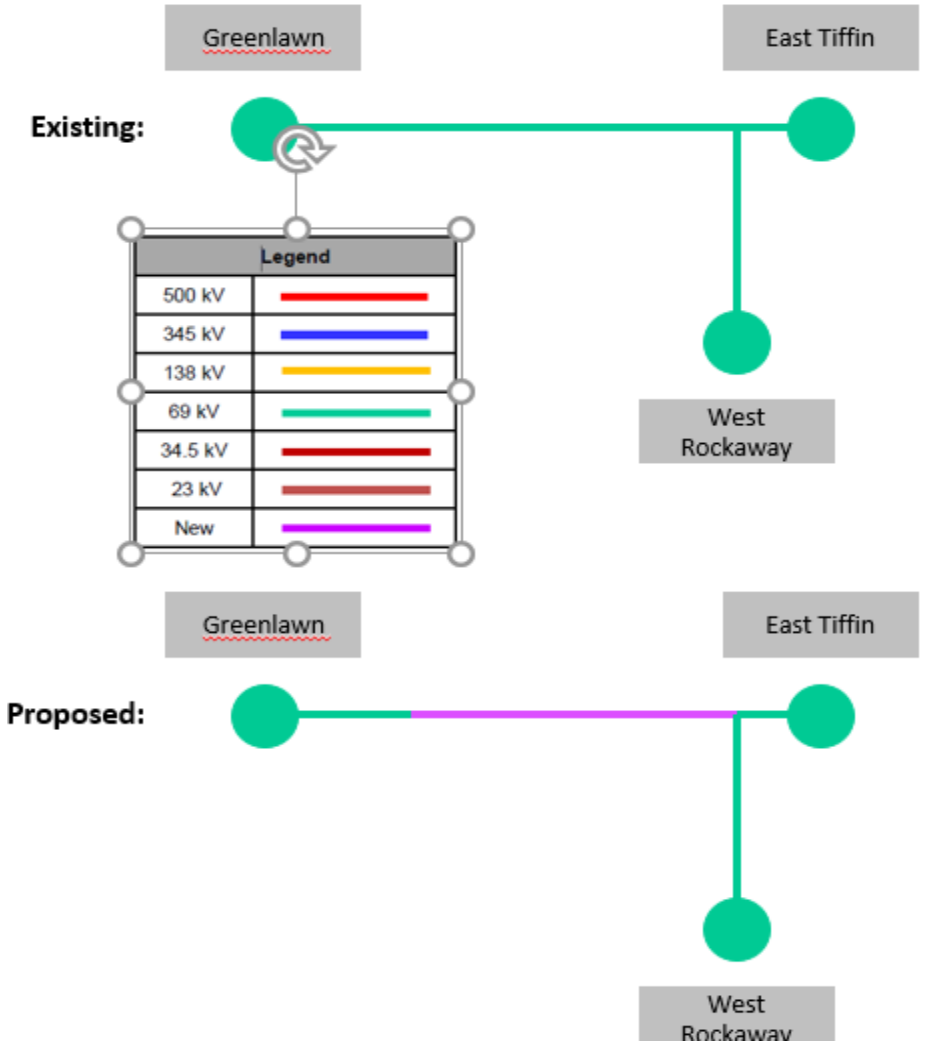
Estimated Cost: $3.45M

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05GREENLAW– 05E.TIFF2 69KV	73/73/91/91

Alternatives: N/A

Required In-Service: 6/1/2025



Recommended Solution

Baseline Reliability Projects

EKPC Transmission Zone: Baseline
Clay Village-Clay Village T metering CT upgrade

Process Stage: Recommended Solution

Criteria: EKPC 715 Criteria

Assumption Reference: EKPC Assumptions Presentation Slide 3-7

Model Used for Analysis: EKPC's internal models representing 2021/22 winter peak conditions that were used for EKPC's annual system screening analysis in 2019. Includes LGE/KU EW Brown Unit 3 off with replacement generation imported from north of EKPC system.

Proposal Window Exclusion: Substation equipment

Problem Statement: FG: EKPC-T1, GD-W14

The Clay Village- Clay Village T 69 KV line section is overloaded for the loss of the Ghent - Owen County Tap 138kV line.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
2CLAY VILLAG – 2CLAY VILG T 69kV	47/47/47/47

Recommended Solution: Upgrade the Metering CT associated with the Clay Village-Clay Village T 69 KV line section to increase the line ratings.(**B3266**)

Preliminary Facility Rating:

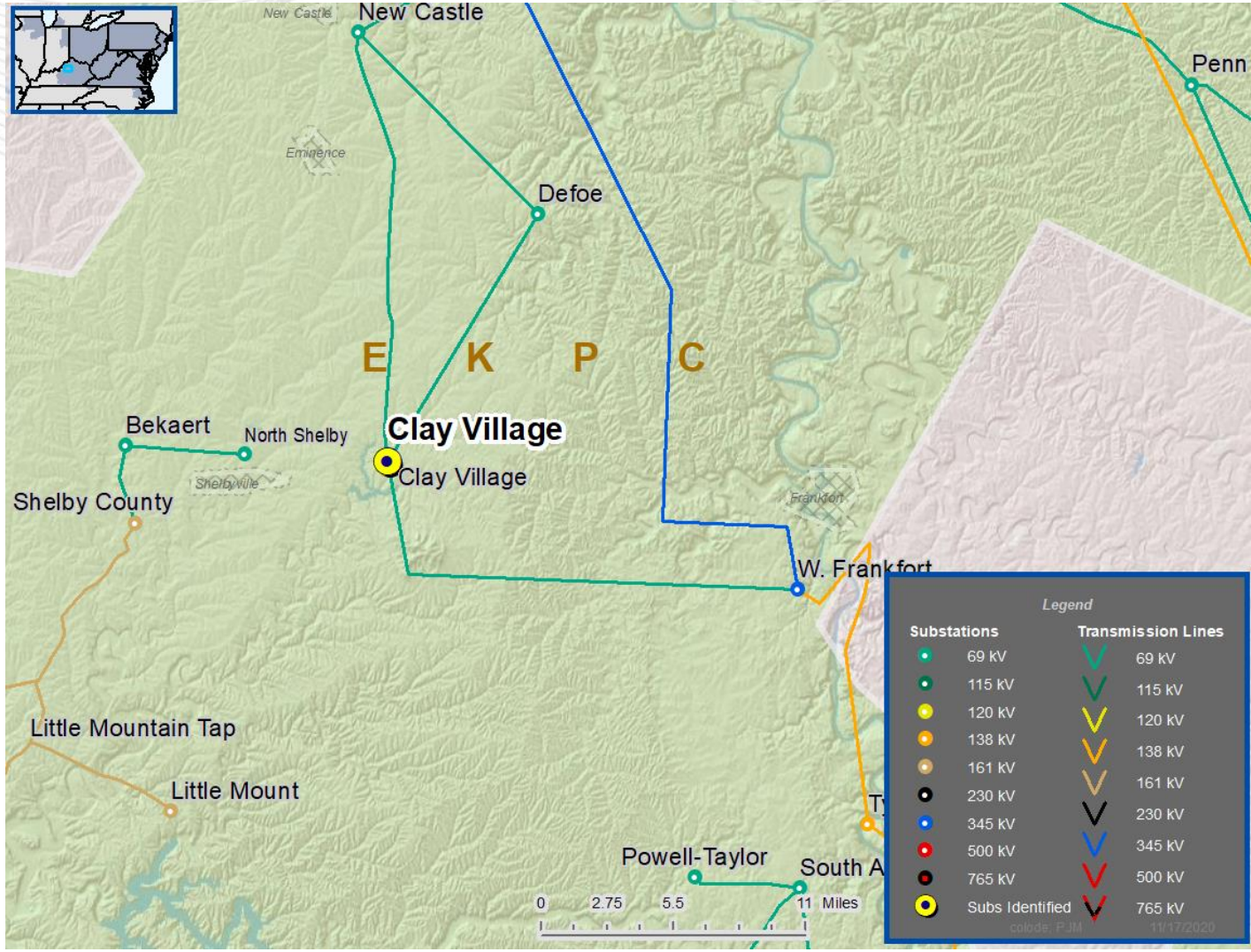
Branch	SN/SE/WN/WE (MVA)
2CLAY VILLAG – 2CLAY VILG T 69kV	49/54/70/73

Estimated Cost: $0.025M

Required In-Service: 12/1/2021

Projected In-Service: 12/1/2021

Previously Presented: 11/20/2020



EKPC Transmission Zone: Baseline Norwood-Shopville 69 KV rebuild

Process Stage: Recommended Solution

Criteria: EKPC 715 Criteria

Assumption Reference: EKPC Assumptions Presentation Slide 3-7

Model Used for Analysis: EKPC's internal models representing 2021/22 winter peak conditions that were used for EKPC's annual system screening analysis in 2019. Includes Cooper Units 1 and 2 off with replacement generation imported from south of EKPC system.

Proposal Window Exclusion: Below 200 kV

Problem Statement: FG: EKPC-VM1

Low voltage at the Brodhead distribution substation of 0.89 PU for the loss of the Brodhead – Three Link 69kV line .

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
2NORWOOD T – 2SHOPVILLE 69kV	49/54/70/73

Recommended Solution: Rebuild the 4/0 ACSR Norwood-Shopville 69 KV line section using 556 ACSR/TW. (**B3267**) **Estimated Cost:** $3.788M

Preliminary Facility Rating:

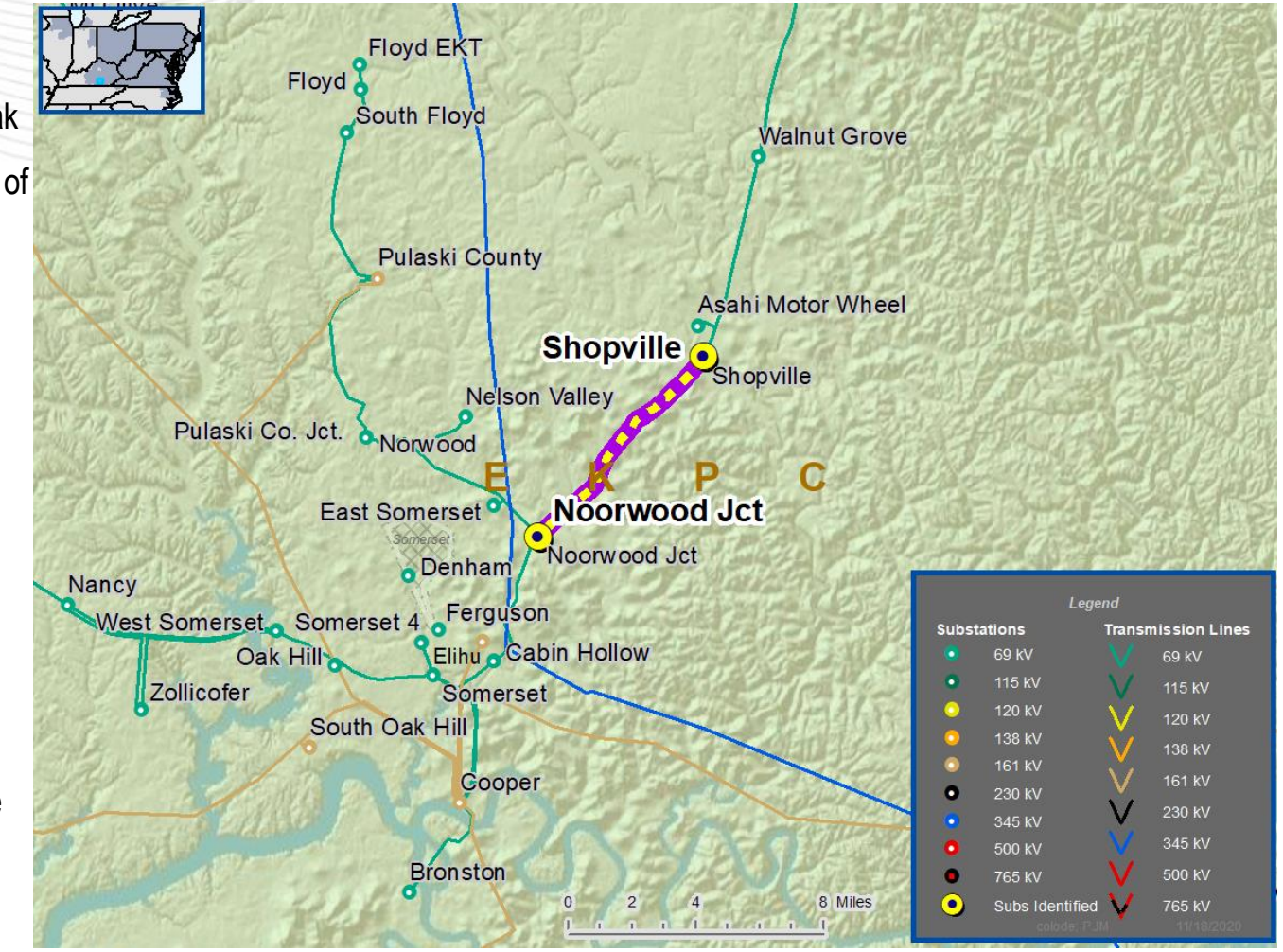
Branch	SN/SE/WN/WE (MVA)
2NORWOOD T – 2SHOPVILLE 69kV	77/90/95/100

Ancillary Benefits: Replacement of Aging Infrastructure, Norwood-Shopville line was constructed in 1959 (61 years old).

Required In-Service: 12/1/2021

Projected In-Service: 12/1/2023

Previously Presented: 11/20/2020



APS Transmission Zone: Baseline
Cherry Run – Morgan 138 kV

Process Stage: Second Review

Criteria: Winter Generator Deliverability

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

FG: GD-W197, GD-W198

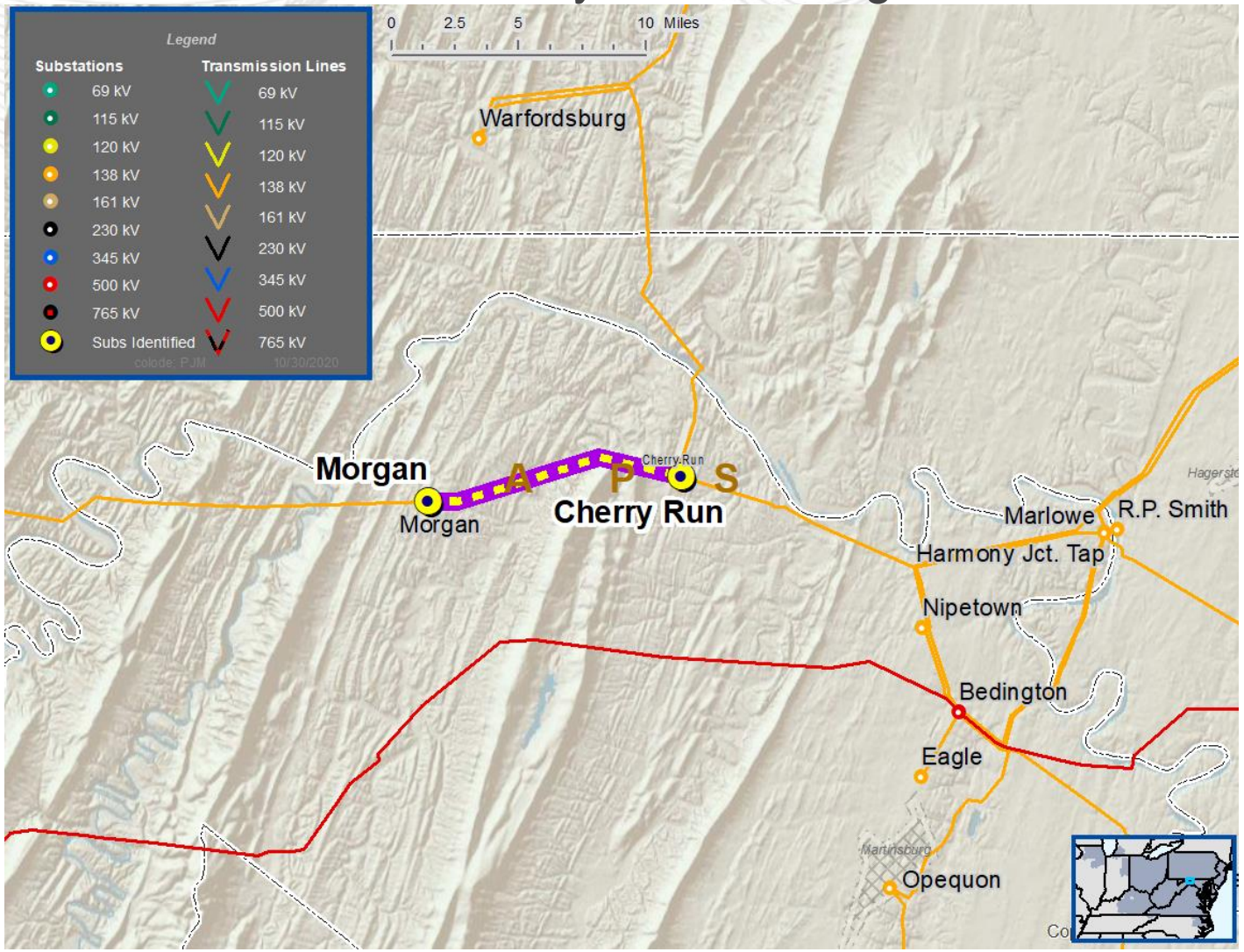
In the 2020 RTEP 2025 Winter Generator Deliverability analysis a stuck breaker of the BDL3 or BDL4 500 kV breakers at Bedington substation results in a thermal violation on the Cherry Run - Morgan 138 kV line at 103.4%.

Recommended Solution: Upgrade Cherry Run and Morgan terminals to make the Transmission Line the limiting component. Morgan: Wave Trap; Cherry Run: Substation conductor, relays, CT (**B3240**)

Estimated Cost: $0.23M

Alternatives: N/A

Required In-Service: 12/1/2025



APS Transmission Zone: Baseline
Hardy 138 kV Capacitor

Process Stage: Second Review

Criteria: N-1 and N-1-1 Summer Voltage Magnitude/Drop; TO Criteria: Voltage Magnitude/Drop

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

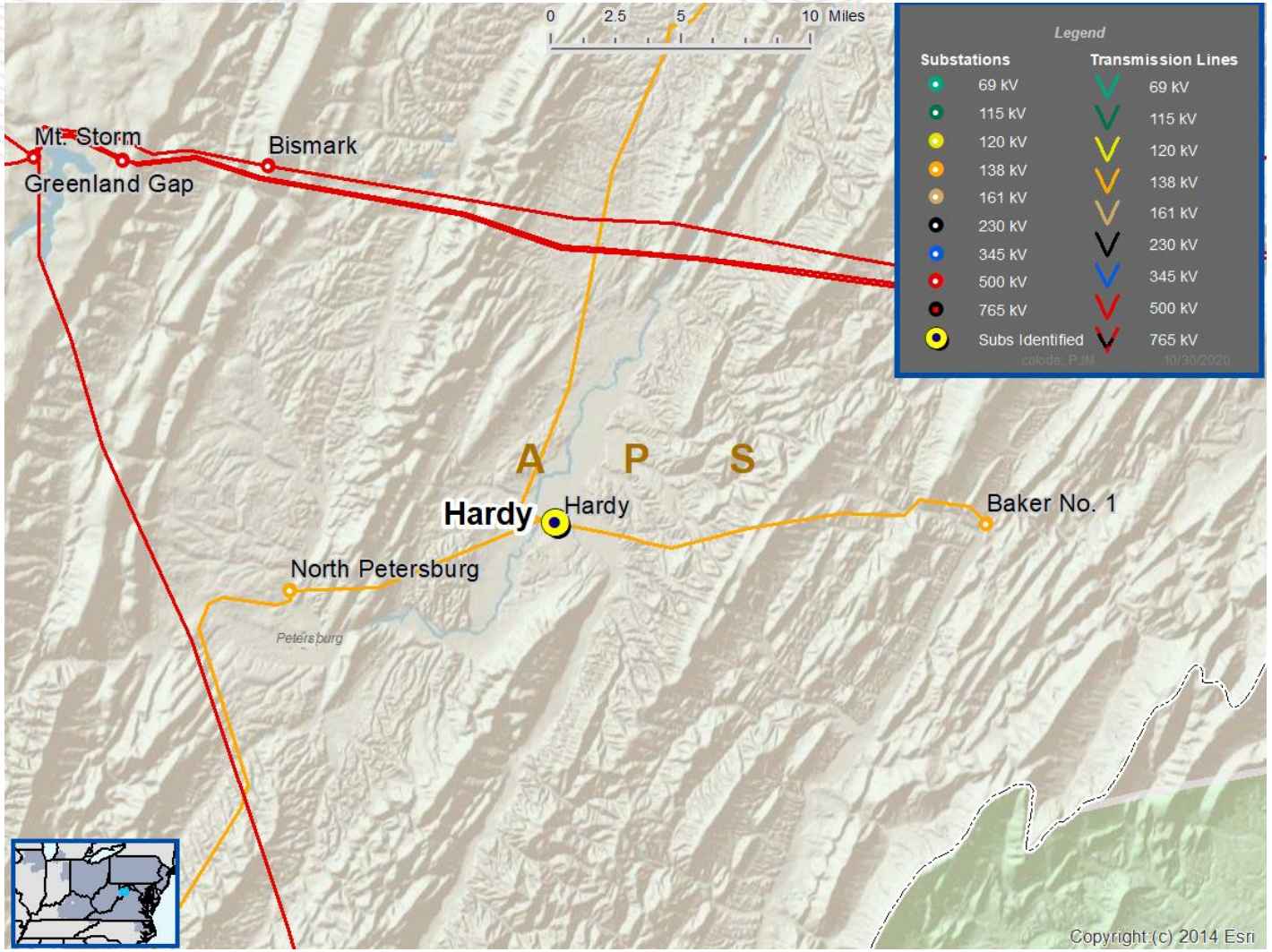
Flowgates:

N1-SVM1, N1-SVM2, N1-SVM3, N1-SVM4, N1-SVM5, N1-SVM6, N1-SVM7, N1-SVM8,

N1-SVD1, N1-SVD2, N1-SVD3, N1-SVD4, N1-SVD5, N1-SVD6, N1-SVD7, N1-SVD8, N1-SVD9, N1-SVD10, N1-SVD11, N1-SVD12,

N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM20, N2-SVM21, N2-SVM22, N2-SVM23, N2-SVM24, N2-SVM25, N2-SVM26, N2-SVM27, N2-SVM28, N2-SVM29, N2-SVM39, N2-SVM40, N2-SVM41, N2-SVM42, N2-SVM43, N2-SVM44, N2-SVM45, N2-SVM46, N2-SVM47, N2-SVM48, N2-SVM49, N2-SVM50, N2-SVM51, N2-SVD2, N2-SVD3,

APS-VM1, APS-VM2, APS-VM3, APS-VM4, APS-VM5, APS-VM6, APS-VM7, APS-VM12, APS-VM13, APS-VM14, APS-VM15, APS-VM16, APS-VM17, APS-VM18, APS-VM19, APS-VM20, APS-VM21, APS-VM22, APS-VM23, APS-VM24, APS-VM34, APS-VM35, APS-VM36, APS-VM37, APS-VM38, APS-VM39, APS-VM40, APS-VM41, APS-VM42, APS-VM43, APS-VM44, APS-VM45, APS-VM46, APS-VM47, APS-VM48, APS-VM49, APS-VM55, APS-VM56, APS-VM57, APS-VM58, APS-VM59, APS-VM60, APS-VM61, APS-VM62, APS-VM78, APS-VM79, APS-VM80, APS-VM81, APS-VM82, APS-VM83, APS-VM84, APS-VM85, APS-VM86, APS-VM87, APS-VM88, APS-VM89, APS-VM90, APS-VM104, APS-VM105, APS-VM108, APS-VM124, APS-VM125, APS-VM126, APS-VM127, APS-VM128, APS-VM129, APS-VM130, APS-VD4, APS-VD9, APS-VD10, APS-VD11, APS-VD12, APS-VD13, APS-VD14, APS-VD15, APS-VD21, APS-VD22, APS-VD23, APS-VD24, APS-VD31, APS-VD32, APS-VD33



APS Transmission Zone: Baseline Hardy 138 kV Capacitor

Problem Statement Con't:

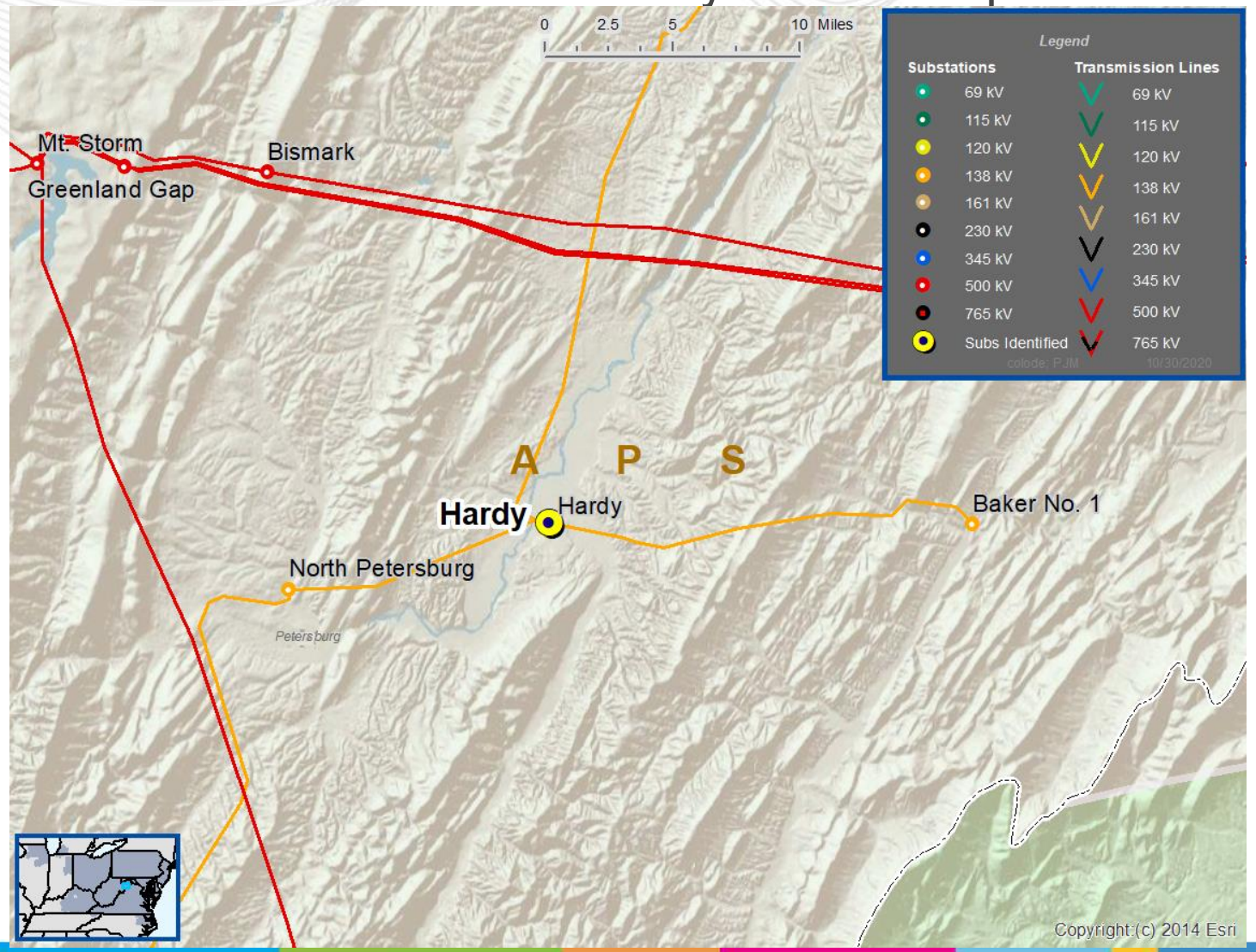
In the 2020 RTEP 2025 Summer Basecase analysis a bus contingency at Junction 138 kV substation results in a low voltage violation at multiple substations. (Baker 138 kV substation at 88% pu.)

Recommended Solution: Install 138 kV, 36 MVAR capacitor and a 5 uF reactor protected by a 138 kV capacitor switcher. Install a breaker on the 138 kV Junction terminal. Install a 138 kV 3.5 uF reactor on the existing Hardy 138 kV capacitor. (**B3241**)

Estimated Cost: $2.85M

Alternatives: N/A

Required In-Service: 6/1/2025



APS Transmission Zone: Baseline Stonewall 138 kV Capacitor

Process Stage: Second Review

Criteria: N-1-1 Summer Voltage Magnitude; TO Criteria: Voltage Magnitude/Drop

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: Below 200 kV

Problem Statement:

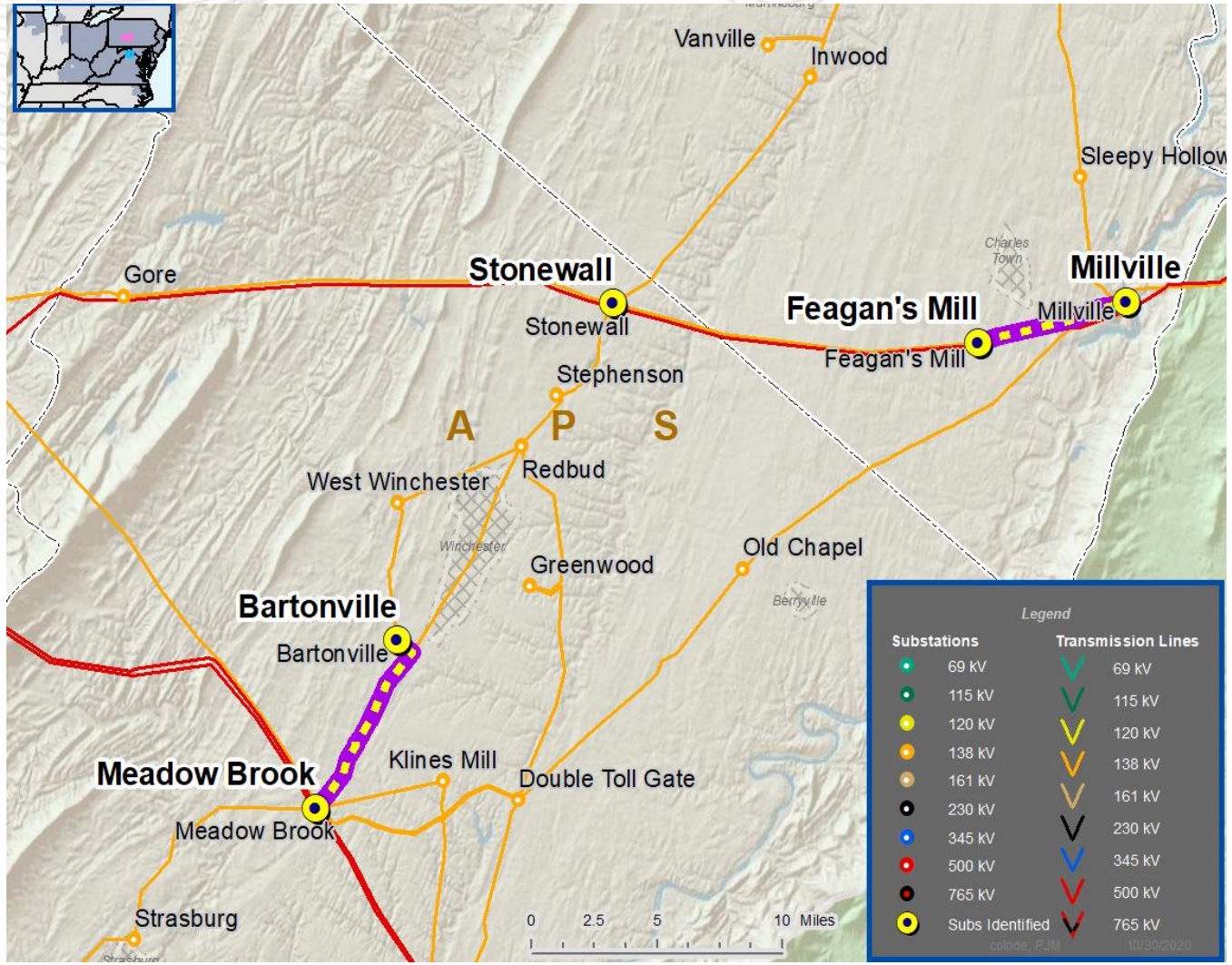
Flowgates:

N2-SVM1, N2-SVM2, N2-SVM3, N2-SVM4, N2-SVM5, N2-SVM6, N2-SVM7, N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM14, N2-SVM15, N2-SVM30, N2-SVM31, N2-SVM32, N2-SVM33, N2-SVM34, N2-SVM35, N2-SVM36, N2-SVM37, N2-SVM38, N2-SVD1,

N2-WVM1, N2-WVM2, N2-WVM3, N2-WVM4, N2-WVM5, N2-WVM6, N2-WVM7, N2-WVM8, N2-WVM9, N2-WVM10, N2-WVM11, N2-WVM12, N2-WVM13, N2-WVM14,

APS-VM8, APS-VM9, APS-VM10, APS-VM11, APS-VM25, APS-VM26, APS-VM27, APS-VM28, APS-VM29, APS-VM30, APS-VM31, APS-VM32, APS-VM33, APS-VM50, APS-VM51, APS-VM52, APS-VM53, APS-VM54, APS-VM63, APS-VM64, APS-VM65, APS-VM66, APS-VM67, APS-VM68, APS-VM69, APS-VM70, APS-VM71, APS-VM72, APS-VM73, APS-VM74, APS-VM75, APS-VM76, APS-VM77, APS-VM91, APS-VM92, APS-VM93, APS-VM94, APS-VM95, APS-VM96, APS-VM97, APS-VM98, APS-VM99, APS-VM100, APS-VM101, APS-VM102, APS-VM103, APS-VM106, APS-VM107, APS-VM109, APS-VM110, APS-VM111, APS-VM112, APS-VM113, APS-VM114, APS-VM115, APS-VM116, APS-VM117, APS-VM118, APS-VM119, APS-VM120, APS-VM121, APS-VM122, APS-VM123, APS-VM131, APS-VM132, APS-VM133, APS-VM134, APS-VM135, APS-VM136, APS-VM137, APS-VM138, APS-VM139,

APS-VD1, APS-VD2, APS-VD3, APS-VD5, APS-VD6, APS-VD7, APS-VD8, APS-VD16, APS-VD17, APS-VD18, APS-VD19, APS-VD20, APS-VD25, APS-VD26, APS-VD27, APS-VD28, APS-VD29, APS-VD30, APS-VD34, APS-VD35, APS-VD36, APS-VD37, APS-VD38, APS-VD39, APS-VD40, APS-VD41, APS-VD42, APS-VD43, APS-VD44



APS Transmission Zone: Baseline Stonewall 138 kV Capacitor

Problem Statement Con't:

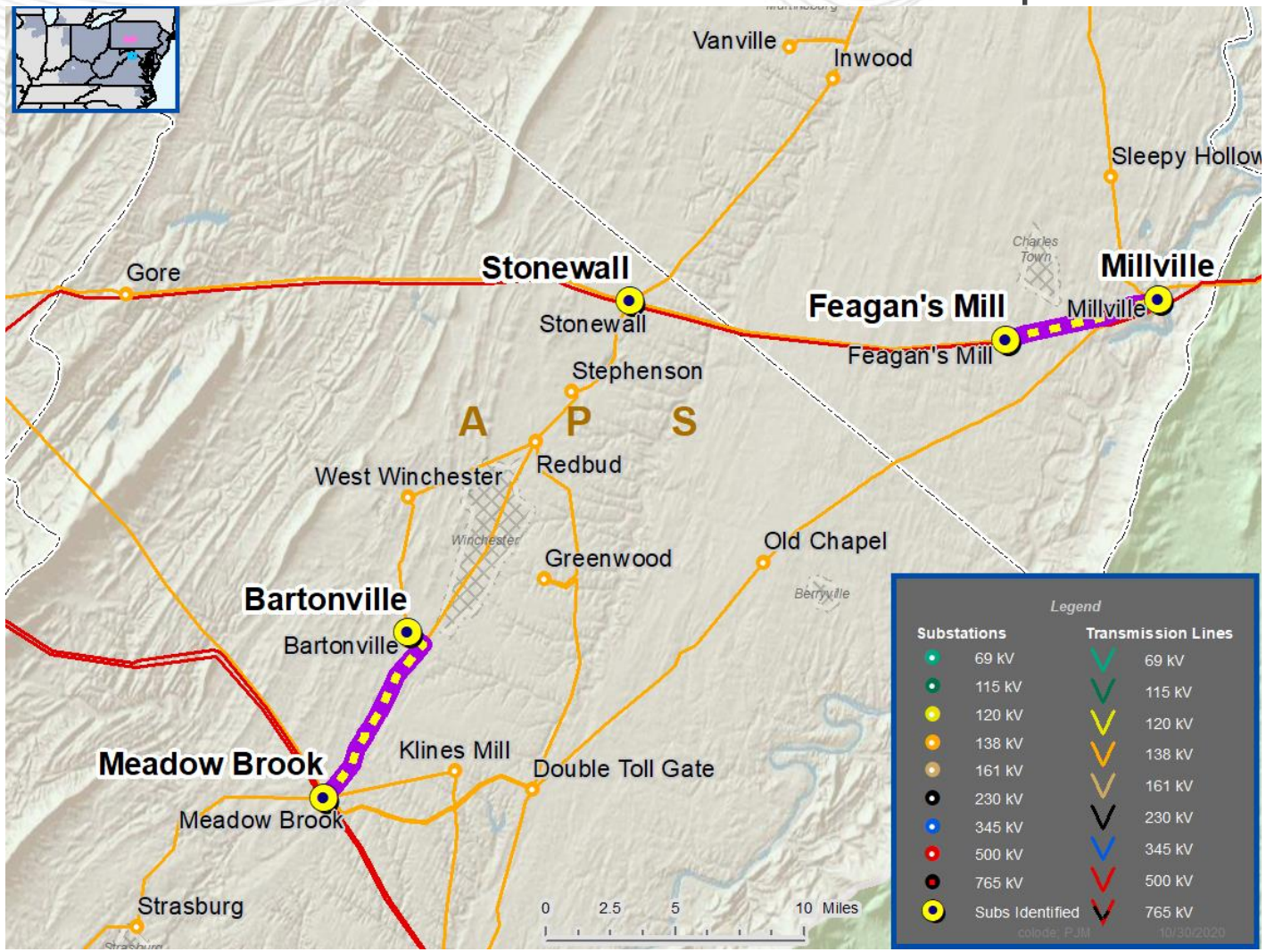
In the 2020 RTEP 2025 Summer Basecase analysis an N-1-1 contingency on the Bartonville - Meadowbrook and Feagans Mill - Millville 138 kV lines results in a low voltage violation at multiple substations (Stonewall 138 kV substation at 89% pu.).

Recommended Solution: Reconfigure Stonewall 138 kV substation from its current configuration to a six-breaker breaker-and-a-half layout and add two 36 MVAR capacitors with capacitor switchers. (**B3242**)

Estimated Cost: $13.3M

Alternatives: N/A

Required In-Service: 6/1/2025



APS Transmission Zone: Baseline
Enon 138 kV Substation

Process Stage: Second Review

Criteria: TO Voltage Magnitude Criteria

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Problem Statement:

FG: APS-VM3, APS-VM4

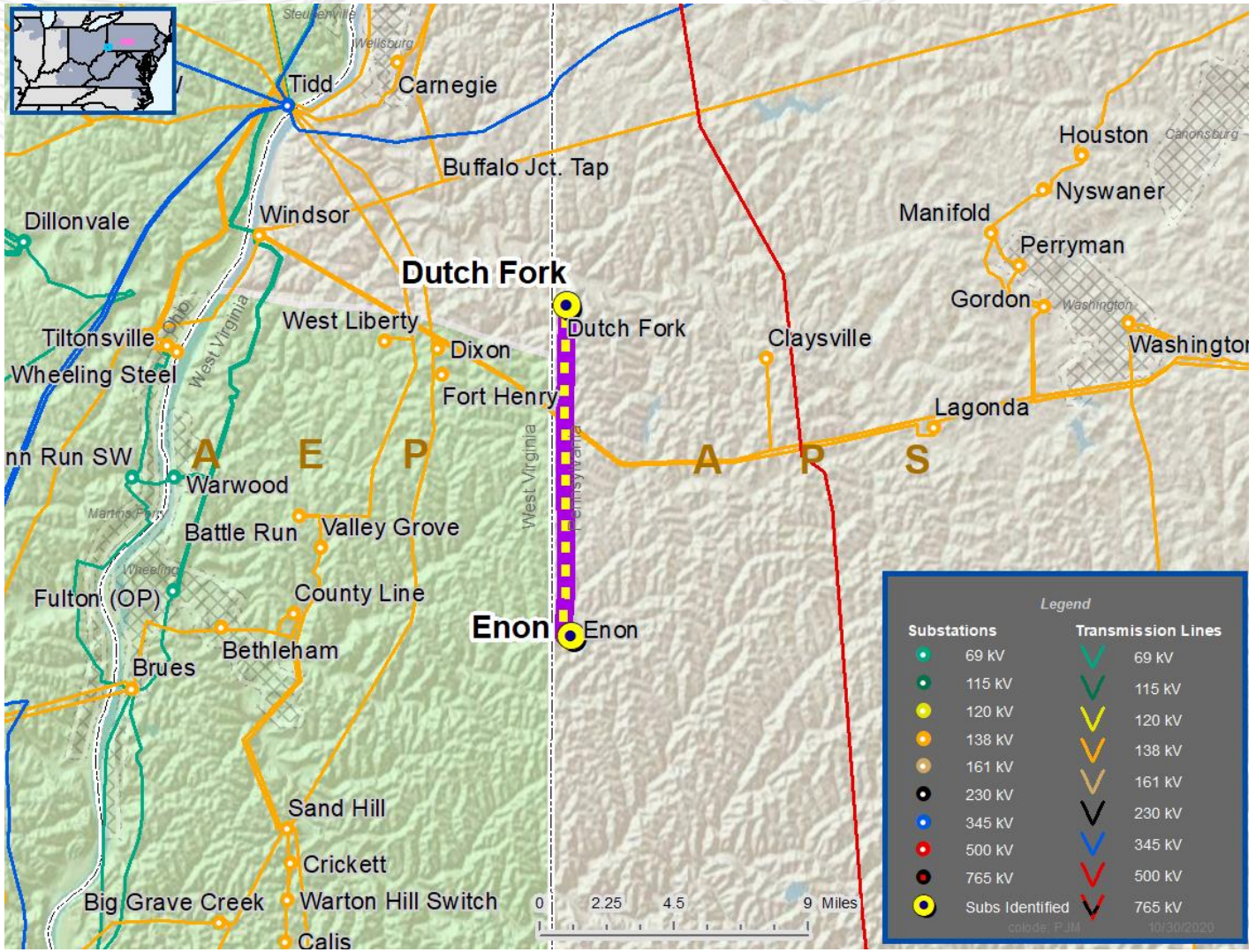
In the 2020 RTEP 2025 summer N-1 analysis, the loss of the Dutch Fork 138 kV capacitor or the Enon 138 kV capacitor the voltage must be adjustable back to the N-0 values (0.95 p.u.) post contingency.

Recommended Solution: At Enon Substation install a second 138 kV, 28.8 MVAR nameplate, capacitor and the associated 138 kV capacitor switcher. (**B3230**)

Estimated Cost: $1.8M

Alternatives: N/A

Required In-Service: 6/1/2025



Questions?

Revision History

- V1 – 12/14/2020 – Original slides posted
- V2 – 12/16/2020 – Slide #55 and #57, Corrected existing facility rating table
- V3 – 12/18/2020 – Slide #24, Changed “rebuild” to “reconductor”
  – Slide #8, Updated proposed solution description
  – Slide #18, Corrected typo S228.1.1 to S2281.1
- V4 – 1/5/2021 – Slide #60, Added GD-W14
- V5 – 2/4/2021 – Slide #44, Added AEP-VM742, AEP-VM743, AEP-VM744
  – Slide #15, Added AEP-T258, AEP-T259, AEP-T266, AEP-T269, AEP-T270, AEP-T278 through T280
- V6 – 3/29/2021 – Slide #46, Corrected typo in the facility rating table
- V7 – 3/31/2021 – Slide #11, Corrected contingency definition