



# Reliability Analysis Update

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Transmission Expansion Advisory Committee

November 4, 2020

# Short Circuit Project



# AEP Transmission Zone Baseline Tanners Creek 345kV Circuit Breaker "R1"

**Process Stage:** Recommended Solution

**Criteria:** Overdutied breaker

**Assumption Reference:** PJM Planning criteria

**Model used for analysis:** 2020 Series -2022 Short circuit model

**Proposal window exclusion:** Immediate Need

**Problem Statement:**

The Tanners creek 345 kV circuit breaker "R1" is identified as overdutied after running the breaker analysis following a model review and correction to short circuit base case.

**Existing Facility Rating:** 50kA

**Preliminary Facility Rating:** 63KA

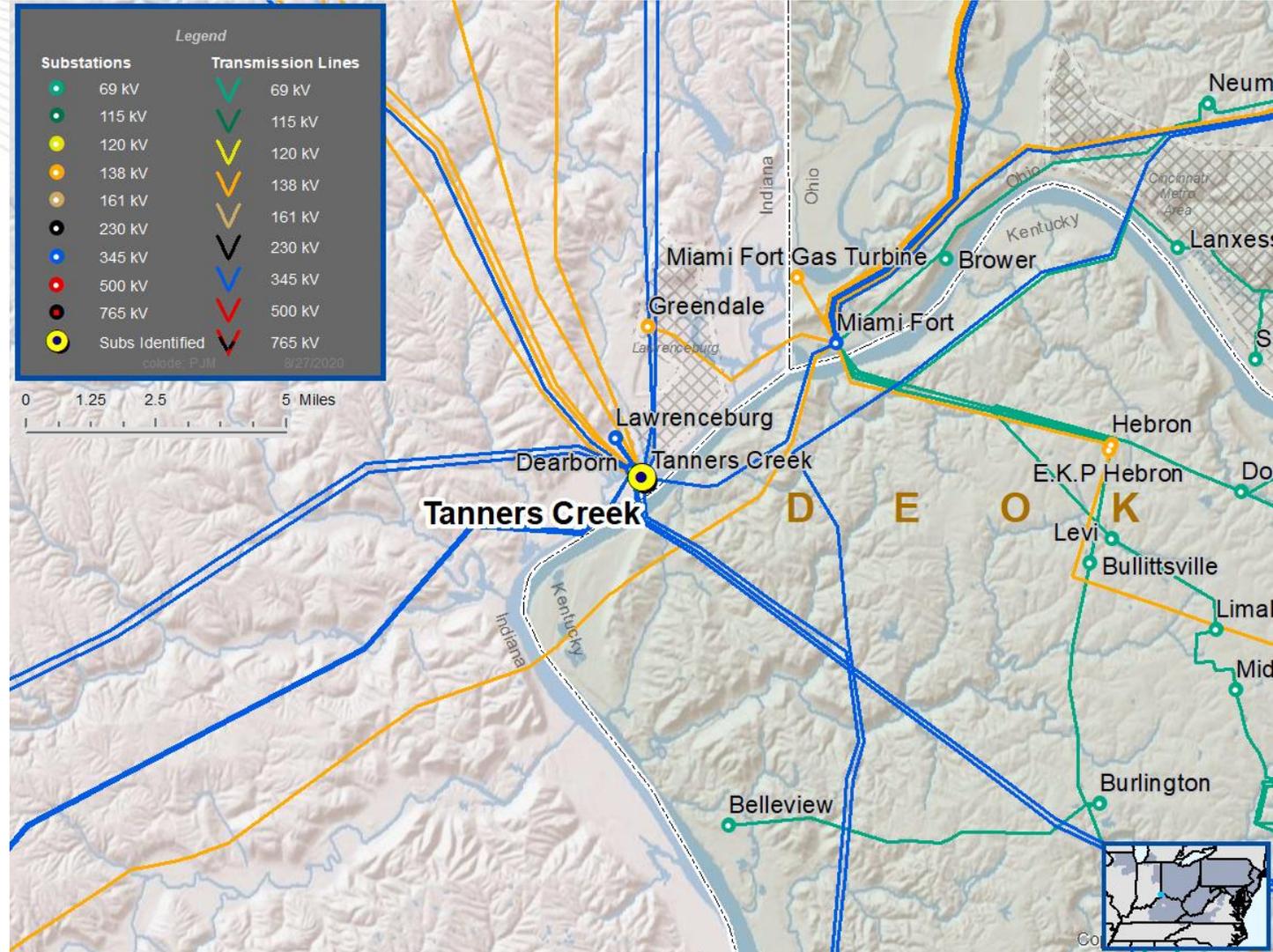
**Recommended Solution:**

TRV capacitors will be added to the breaker "R1" to increase the breaker capacity from 50kA to 63kA. (B3261)

**Estimated Cost:** \$0.05M

**Required In-Service Date:** Immediate need

**Projected In-Service Date:** 12/31/2020



# Chickahominy 230kV Breaker “SC122”, “205022”, “209122”, “210222-2”, “28722”, “H222”, “21922”, “287T2129” Replacements

**Process Stage:** First Review

**Criteria:** Over Duty Breaker

**Assumption Reference:** none

**Model Used for Analysis:** 2025 short circuit model

**Proposal Window Exclusion:** Substation Equipment

**Problem Statement:**

Eight (8) Chickahominy 230kV breakers are over duty: “SC122”, “205022”, “209122”, “210222-2”, “28722”, “H222”, “21922”, “287T2129”

**Significant Driver:**

**b3213:** Install 2<sup>nd</sup> Chickahominy 500/230 kV transformer. (Generator Deactivation of Chesterfield 5 and 6).

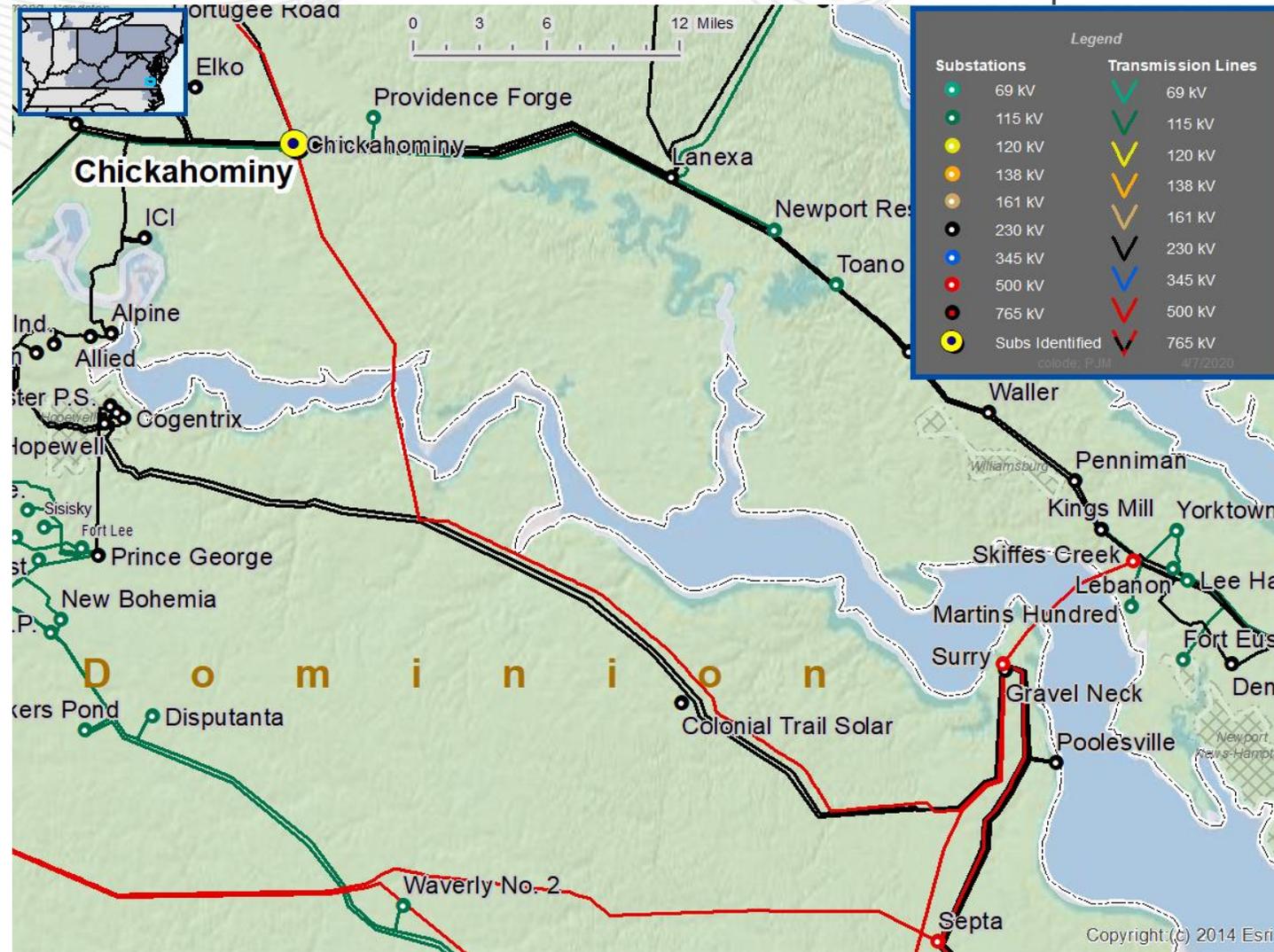
**Existing Facility Rating:** 50kA interrupting rating

**Proposed Solution:**

**b3213.1:** Replace the eight (8) Chickahominy 230kV breakers with 63kA breakers: “SC122”, “205022”, “209122”, “210222-2”, “28722”, “H222”, “21922”, “287T2129”

- **Estimated Cost:** \$3.76M Replace the eight breakers with 63kA breakers (\$0.47M each)

**Required In-Service:** 6/1/2023





# 2020 RTEP Window 1 Competitive Cluster Update

Cluster No.	Status
1	Evaluating, expect first read at December TEAC
2	Evaluating, expect first read at December TEAC
3	Evaluating, expect first read at December TEAC
4	Evaluating, expect first read at December TEAC
5	Cancelled as presented at TEAC on November 4, 2020
6	First read presented at TEAC on November 4, 2020
7	First read presented at TEAC on November 4, 2020
8	First read presented at TEAC on November 4, 2020
9	First read presented at TEAC on November 4, 2020
10	Transferred to 2020 RTEP Window No. 3
11	Update at TEAC on November 4, 2020, except first read at December TEAC

# First Review

## Baseline Reliability Projects

- **Crete – St. Johns 345kV overloads (GD-W3 and GD-W4) in 2025 winter generator deliverability were posted in 2020 RTEP Window 1 opened in July and designated as Cluster No. 5**
- **Changes with significant impact on the line loading after Window #1 opened**
  - Dresden units deactivation request
  - Execution of additional ISAs for generation from the New Services Queue
    - ComEd generation decrease -> loading decrease on Crete – St. Johns 345kV line
    - ComEd generation Increase -> loading increase on Crete – St. Johns 345kV line
- **Based on a re-tool of the 2025 conditions with updates based on current information, PJM has determined that to not pursue mitigation of the violations for the Crete-St. Johns 345kV line as identified in the 2020 RTEP but continue to monitor the conditions in the area in future studies**



# AEP Transmission Zone: Baseline Leipsic area

**Process Stage:** First Review

**Criteria:** AEP FERC 715 Criteria

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 RTEP cases

**Proposal Window Exclusion:** None

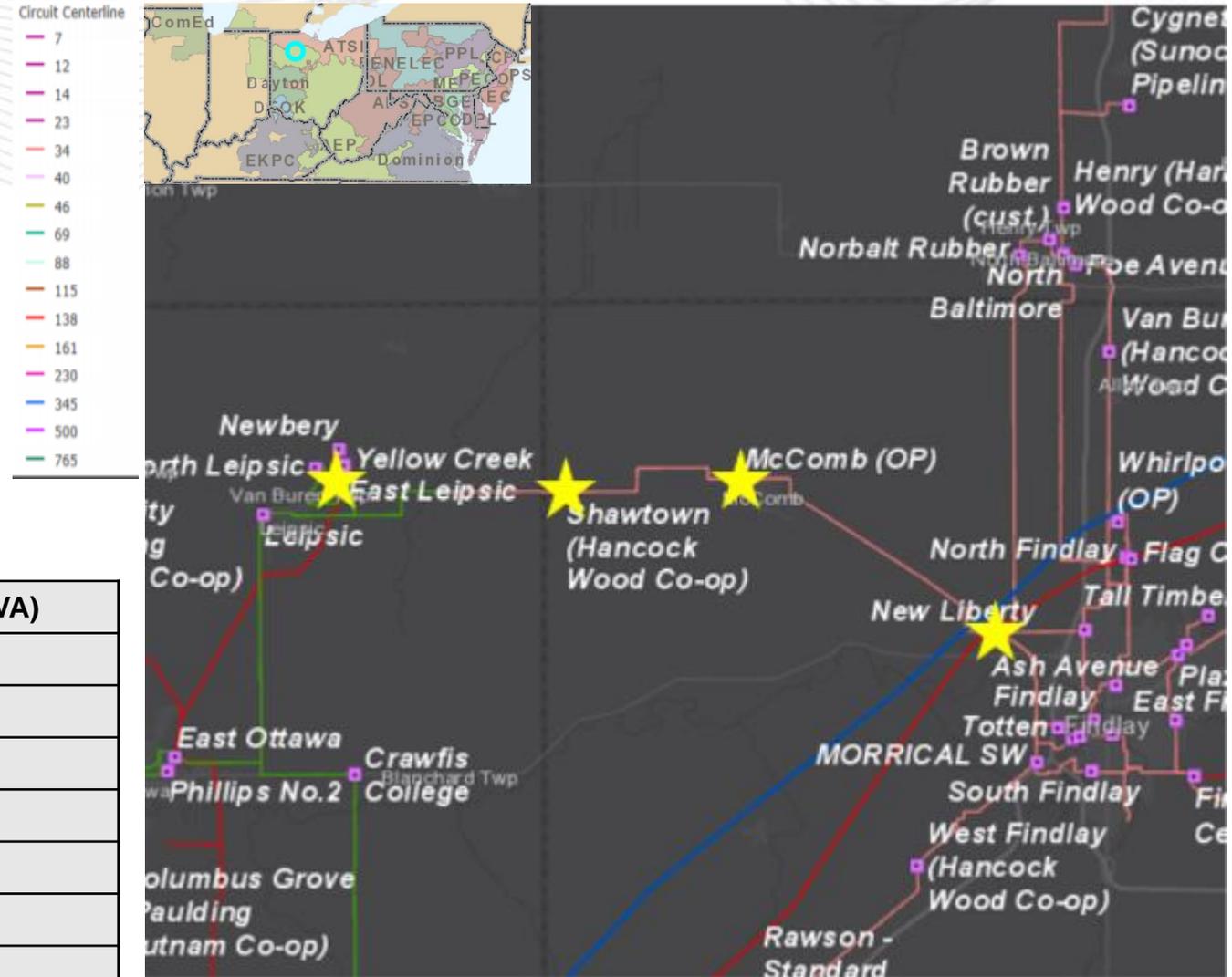
**Problem Statement:**

AEP-T63,AEP-T64,AEP-T65,AEP-T66,AEP-T67,AEP-T68,AEP-T69,AEP-T70,AEP-T71,AEP-T72,AEP-T73

The East Ottawa – Leipsic – Deshler Tap 69kV line, East Leipsic - North Leipsic 69KV line, East Leipsic 138/69kV transformer, Cairo – East Lima 69kV line, and McComb OP – New Liberty 34.5kV line are overloaded for a tower contingency and multiple N-1-1 contingency pairs.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
05E OTTAWA -05LEIPSIC 69KV	68/73/90/91
05LEIPSIC – 05DSCHLERT 69KV	73/73/91/91
05DSCHLERT – 05NLEIP SW 69KV	73/73/91/91
05E.LEIPSC – 05NLEIP SW 69KV	73/73/91/91
05MCCOMB OP – 05NEW LIBR 34.5kV	20/20/28/28
05CAIRO – 05E LIMA 69KV	50/50/63/63
05E.LEIPSIC2 -05E.LEIPSC 138/69kV	59/69/69/75





As part of the 2020 RTEP Window #1, the projects listed in the table below are proposed to address the following violations:  
AEP-T63,AEP-T64,AEP-T65,AEP-T66,AEP-T67,AEP-T68,AEP-T69,AEP-T70,AEP-T71,AEP-T72,AEP-T73

Upgrade ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
602	AEP	North Woodcock-East Leipsic 69 kV Line	25.93
957	AEP	East Leipsic-New Liberty 138 kV Conversion	34.418
317	Transource	Richlands to East Leipsic 138 kV	58.514
341	Transource	East Leipsic-Maroe 69kV Loop	27.149
608	Transource	East Leipsic to Maroe 69 kV Single Circuit	25.157

### AEP Proposed Solution:

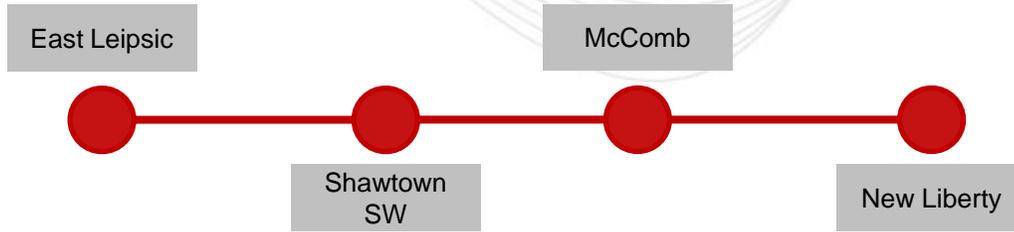
Proposal #2020\_1-957: Rebuild and convert the existing 17.6 miles East Leipsic – New Liberty 34.5 kV circuit to 138 kV using 795 ACSR. Add new 3000A, 40 kA, 138 kV circuit breakers at New Liberty and East Leipsic stations and two 138 kV MOABs and two 138/12 kV transformers with 138 kV circuit switchers at McComb station.

### Preliminary Facility Rating: :

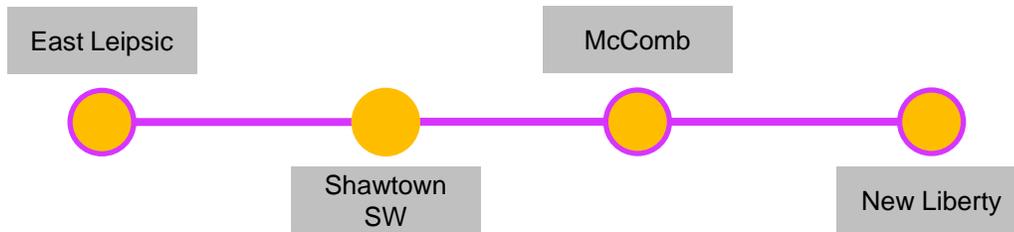
Branch	SN/SE/WN/WE (MVA)
New Liberty to McComb OP 138kV	257/360/325/404
McComb OP to Shawtown 138kV	257/360/325/404
East Leipsic to Shawtown 138kV	257/360/325/404



Existing:



Proposed:



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



## **Additional Benefits:**

- This project completely addresses the needs reviewed with stakeholders under need number AEP-2020-OH020 in the March 19, 2020 SRRTEP Western meeting.
  - Considering the two loads served from the line at Shawtown and McComb stations, retirement of the facilities is not an option for the line reviewed as need AEP-2020-OH020. In order to address the need, the same solution proposed as proposal No. 2020\_1-957 would be the proposed supplemental solution. If a proposal other than proposal No. 957 is chosen, AEP will move forward with to propose this as a supplemental solution in addition to whichever baseline proposal is selected.

## **AEP-2020-OH020 Attachment M-3 need**

AEP no longer maintains 34.5kV installations as part of their standards. The rebuild of the facility for the need would require the use of their 69KV standard or 138kV standard. A rebuild of the facilities for the need using the 138kV standard is estimated by the transmission owner to cost \$34M

There is no 69 kV established on the New Liberty side of the system. If 69 kV construction is used, there would also be the need to establish a new 69 kV yard at New Liberty with a 138/69 kV transformer at some point in the future. The downtown Findlay area (served partially from New Liberty) is all currently constructed using 34.5 kV requirements with 138 kV sources. So rebuilding at 138 kV reduces the need for additional transformation in the future as additional 34.5 kV facilities reach the end of their life.



**Additional Benefits:** (continued)

This project also solves FG#

AEP-VM137,AEP-VM138,AEP-VM139,AEP-VM140,AEP-VM141,AEP-VM142,AEP-VM143,AEP-VM144,AEP-VM145,AEP-VM146,AEP-VM147,AEP-VM148,AEP-VM149,AEP-VM150,AEP-VM151,AEP-VM152,AEP-VM153,AEP-VM154,AEP-VM155,AEP-VM156,AEP-VM157,AEP-VM158,AEP-VM159,AEP-VM160,AEP-VM161,AEP-VM162,AEP-VM163,AEP-VM164,AEP-VM165,AEP-VM166,AEP-VM167,AEP-VM168,AEP-VM169,AEP-VM170,AEP-VM171,AEP-VM172,AEP-VM173,AEP-VM174,AEP-VM175,AEP-VM176,AEP-VM177,AEP-VM178,AEP-VM179,AEP-VM180,AEP-VM181,AEP-VM182,AEP-VM183,AEP-VM184,AEP-VM185,AEP-VM186,AEP-VM187,AEP-VM188,AEP-VM189,AEP-VM190,AEP-VM191,AEP-VM192,AEP-VM193,AEP-VM194,AEP-VM195,AEP-VM196,AEP-VM197,AEP-VM198,AEP-VM199,AEP-VM200,AEP-VM201,AEP-VM202,AEP-VM203,AEP-VM204,AEP-VM205,AEP-VM206,AEP-VM207,AEP-VM208,AEP-VM209,AEP-VM210,AEP-VM211,AEP-VM212,AEP-VM213,AEP-VM214,AEP-VM215,AEP-VM216,AEP-VM217,AEP-VM218,AEP-VM219,AEP-VM220,AEP-VM221,AEP-VM222,AEP-VM223,AEP-VM224,AEP-VD114,AEP-VD115,AEP-VD116,AEP-VD117,AEP-VD118,AEP-VD119,AEP-VD120,AEP-VD121,AEP-VD122,AEP-VD123,AEP-VD124,AEP-VD125,AEP-VD126,AEP-VD127,AEP-VD128,AEP-VD129,AEP-VD130,AEP-VD131,AEP-VD132,AEP-VD133,AEP-VD134,AEP-VD135,AEP-VD136,AEP-VD137,AEP-VD138,AEP-VD139,AEP-VD140,AEP-VD141,AEP-VD142,AEP-VD143,AEP-VD144,AEP-VD145,AEP-VD146,AEP-VD147,AEP-VD148,AEP-VD149,AEP-VD150,AEP-VD151,AEP-VD152,AEP-VD153,AEP-VD154,AEP-VD155,AEP-VD156,AEP-VD157,AEP-VD158,AEP-VD159,AEP-VD160,AEP-VD161,AEP-VD162,AEP-VD163,AEP-VD164,AEP-VD165,AEP-VD166,AEP-VD167,AEP-VD168,AEP-VD169,AEP-VD170,AEP-VD171,AEP-VD172,AEP-VD173,AEP-VD174,AEP-VD175,AEP-VD176,AEP-VD177,AEP-VD178,AEP-VD179,AEP-VD180,AEP-VD181,AEP-VD182,AEP-VD183,AEP-VD184,AEP-VD185,AEP-VD186,AEP-VD187,AEP-VD188,AEP-VD189,AEP-VD190,AEP-VD191,AEP-VD192,AEP-VD193,AEP-VD194,AEP-VD195,AEP-VD196,AEP-VD197,AEP-VD198,AEP-VD199,AEP-VD357,AEP-VD374, which are low voltage magnitude and voltage drop violations at buses COLGRVE 69KV, GLANDORF 69KV, Philips 69KV, East Ottawa 69KV, Leipsic 69KV, East Leipsic 69KV, North Leipsic 69KV, Deshler Tap 69KV, Miller 69KV, Crawfish College 69KV, Cairo 69KV, Shawtown 34.5KV, McComb 34.5kV, East Leipsic 138kV, Rockport 138kV, Newbery 138kV, Yellow Creek 138kV, and Baseline 138kV

**Proposal Window Exclusion:** Below 200kV Exclusion

**Required In-Service:** 6/1/2025



## Alternatives:

- Proposal #2020\_1-317: build a new 27.4 mile-long 138 kV line from First Energy’s Richland 138 kV station to AEP’s East Leipsic 138 kV station using 795 ACSR 26/7 (Drake) conductors. This will require adding new 3000A, 40 kA, 138 kV circuit breakers at Richlands and East Leipsic stations. Note that FE has proposed to rebuild the FE owned portion of the Richlands - East Leipsic 138 kV line (~15.8 miles) under S2246. The Proposing Entity is proposing to modify that proposal to make it a double circuit in conjunction with this proposal. **Estimated Cost: \$58.52M**
- Proposal #2020\_1-341: cut-in the Maroe – Holgate 69 kV line near First Energy’s Maroe 69 kV switch and build greenfield 10.4 miles double circuit 69 kV line to AEP’s East Leipsic 69 kV station using 556 ACSR 26/7 (Dove) conductors. Add two 69 kV, 3000A, 40 kA CB at East Leipsic to terminate the new lines. Replace existing 138/69 kV transformer T3 at East Leipsic with a new 130MVA, 138/69 kV transformer and add a 69 kV, 3000A, 40 kA CB on the low side of this transformer. Replace existing cap bank at East Leipsic 138 kV with a 69.1 Mvar and add a capacitor switching circuit breaker. **Estimated Cost: \$27.15M**
- Proposal #2020\_1-602: construction of ~6.65 miles of new 69 kV line between Crawfish College and East Leipsic station and retirement of ~2.3 miles of existing line between Crawfish College and East Ottawa in order to establish a new 69 kV circuit between East Leipsic and North Woodcock stations. Additionally, AEP proposes a rebuild of approximately 9.9 miles of existing 69 kV line between North Woodcock and Pandora stations and between East Lima and Cairo stations. Remote end work at East Leipsic, East Ottawa, and East Lima stations will be required to upgrade relaying and protection to accommodate the proposed circuit changes. **Estimated Cost: \$25.93M**
- Proposal #2020\_1-608: Build a greenfield 69 kV station (‘West Creek’) near First Energy’s Maroe 69 kV switch and add three 3000A, 40 kA, 69 kV CBs. Build a greenfield 10.4 miles (straightline) 69 kV single circuit line from West Creek to AEP’s East Leipsic 69 kV station using 556 ACSR 26/7 (Dove) conductors. Add a 69 kV, 3000A, 40 kA CB at East Leipsic to terminate the new line. Replace existing 138/69 kV transformer T3 at East Leipsic with a new 130 MVA, 138/69 kV transformer and add a 69 kV, 3000A, 40 kA CB on the low side of this transformer. Replace existing cap bank at East Leipsic 138 kV with a 69.1 Mvar and add a capacitor switching circuit breaker. **Estimated Cost: \$25.16M**



# AEP Transmission Zone: Baseline Newcomerstown –Salt Fork Rebuild

**Process Stage:** First Review

**Criteria:** AEP FERC 715 Criteria

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 Summer case

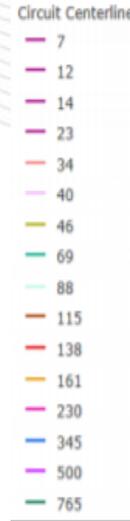
**Proposal Window Exclusion:** None

**Problem Statement:**

AEP-T366,AEP-T367,AEP-T368,AEP-T373

The West Newcomerstown – KimBLTN – SaltFork 69kV line are overloaded for the N-1-1 contingency pair of the loss of the West Cambridge – East New Concord -PHILO 138kV line, West Cambridge138/69 transformer and West Cambridge –Cassell JSS 69kV line, and the loss of the West Byesville – Derwent 69kV line.

As part of the 2020 RTEP Window #1, the projects listed in the table below are proposed to address the above violations.



Upgrade ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
109	AEP	Install 2 <sup>nd</sup> 138/69 kV transformer at West Cambridge station	4.31
182	AEP	Rebuild NewCommerstown-Salt Fork 69kV	15.89



# AEP Transmission Zone: Baseline Newcomerstown –Salt Fork Rebuild

### Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05NEWCOMTW - 05KIMBLTN 69kV	46/46/65/65
05KIMBLTN – 05SALTFRKZ 69kV	46/46/65/65

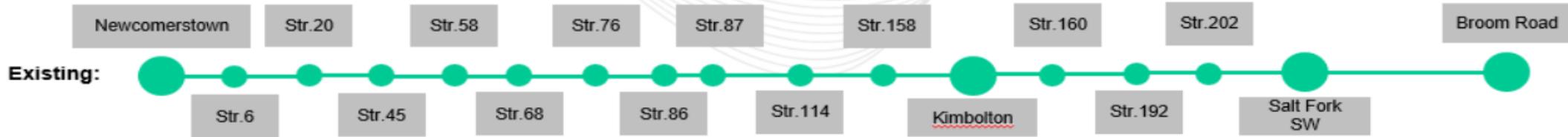
### Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05NEWCOMTW - 05KIMBLTN 69kV	73/73/91/91
05KIMBLTN – 05SALTFRKZ 69kV	73/73/91/91

### Proposed Solution:

Proposal #2020\_1-182: Rebuild approximately 8.9 miles of 69 kV line between Newcomerstown and Salt Fork Switch with 556 ACSR conductor.

**Estimated Cost:** \$15.89M



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





# AEP Transmission Zone: Baseline Newcomerstown –Salt Fork Rebuild

## Proposed Solution:

Proposal #2020\_1-182 (continued)

## Additional Benefits:

Newcomerstown-Broom Road 69 kV Circuit (17.62 miles)

- From 2015 – 2020 this circuit has experienced 11 momentary and 5 permanent outages resulting in approximately 750k CMI.
- The circuit currently has 53 open conditions on 49 structures (23% of the total structures), including pole damage, rot top, rot heart, rotted/split poles, burnt insulators, and missing ground lead wires.
- Structures are made up of 1926 steel lattice towers (5 structures) and wood poles from the 1960s (88 structures) and the 1980s (120 structures).
- The circuit conductor was primarily installed in 1926 consisting of 3/0 Copper (9.76 miles) and 336 ACSR (4.3 miles) from the 1960s.
- Proposal #2020\_1-182 is rebuilding the overloaded 3/0 Copper sections of line between Newcomerstown, Kimbolton, and Salt Fork stations, approximately 8.9 miles.

## Alternatives:

Proposal #2020\_1-109: Install a second 138/69 kV transformer at West Cambridge station. The 69 kV bus will be reconfigured into a 3 breaker ring utilizing the existing 69 kV breaker 'F' along with two new 69 kV circuit breakers. The new transformer will be protected by a high side 138 kV circuit switcher. New transformer branch will be created between bus 243144 and 245483 with an initial SE/SN rating of 124/132 MVA. Existing branch ratings at West Cambridge station will not be changing as a part of this proposal. **Estimated Cost:** \$4.31M

**Required In-Service:** 6/1/2025



# AEP Transmission Zone: Baseline Kammer – Natrium 69kV Rebuild

**Process Stage:** First Review

**Criteria:** AEP FERC 715 Criteria

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 Summer case

**Proposal Window Exclusion:** None

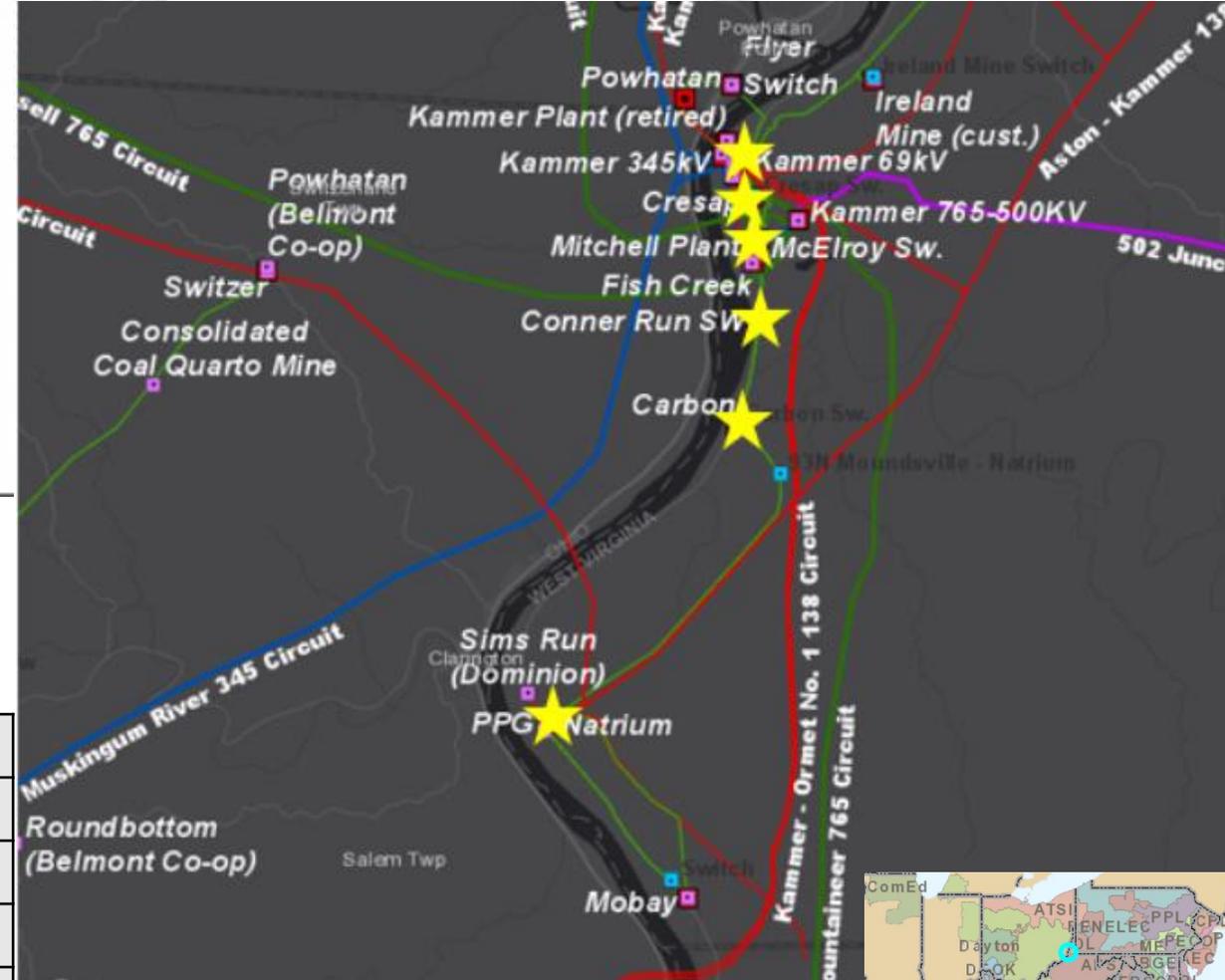
**Problem Statement:**

AEP-T219, AEP-T221, AEP-T222, AEP-T223, AEP-T225, AEP-T226, AEP-T227, AEP-T228, AEP-T229, AEP-T230, AEP-T231, AEP-T232, AEP-T233, AEP-T234, AEP-T237, AEP-T238, AEP-T239, AEP-T240, AEP-T243, AEP-T244, and AEP-T250

The Conner RN – Columbi - Natrium 69kV line and Kammer – Cresaps – McElroy 69KV line are overloaded for a tower contingency and multiple N-1-1 contingency pairs.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
05COLOMBI - 05CONNERRN 69KV	50/50/63/63
05COLOMBI - 05NATRIUM 69KV	50/50/63/63
05CRESAPS – 05KAMMER 69KV	82/90/107/113
05CRESAPS – 05MCELROY 69kV	75/75/94/94





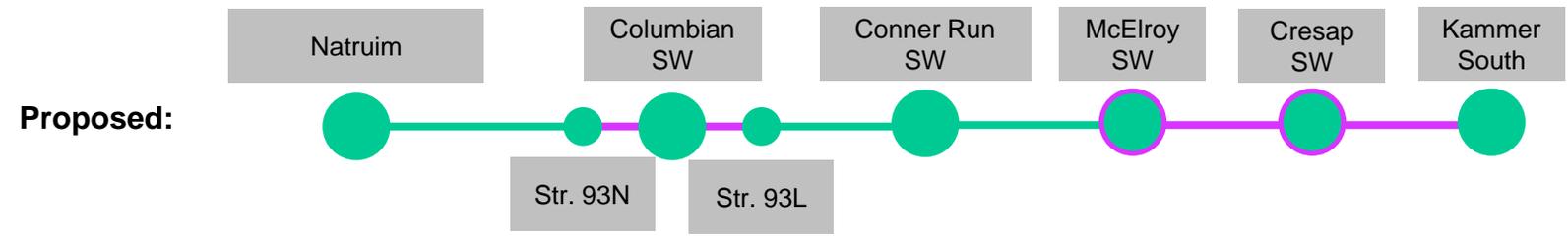
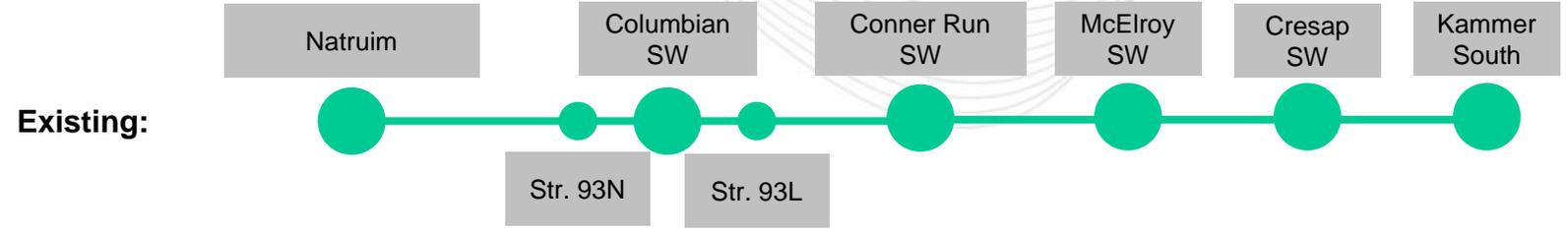
# AEP Transmission Zone: Baseline Kammer – Natrium 69kV Rebuild

As part of the 2020 RTEP Window #1, the projects listed in the table below are proposed to address the following violations: AEP-T219, AEP-T221, AEP-T222, AEP-T223, AEP-T225, AEP-T226, AEP-T227, AEP-T228, AEP-T229, AEP-T230, AEP-T231, AEP-T232, AEP-T233, AEP-T234, AEP-T237, AEP-T238, AEP-T239, AEP-T240, AEP-T243, AEP-T244, and AEP-T250

Upgrade ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
270	Central Transmission / LS Power	Birch Ridge - Natrium 138kV Transmission Project	16.637
804	AEP	Kammer-Natrium Upgrades	4.599
538	AEP	Natrium Area Line Reconfiguration	5.635

### Proposed Solution:

Proposal #2020\_1-804: rebuild approximately 1.9 miles out of the 7.6 total miles of 69kV transmission line along the circuit between Kammer and Natrium 69 kV stations. In addition, AEP proposes to replace the 69kV switch at Cresaps station, reconductor 69kV strain bus and risers at McElroy station, and replace bus conductor at Natrium station. The overloaded line sections are made up of 4/0, 336, and 556 ACSR conductor types. The overloaded bus at Natrium is made up of 500 MCM Copper conductor.



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



# AEP Transmission Zone: Baseline Kammer – Natrium 69kV Rebuild

## Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Natrium12 – Natrium34 138KV	383/449/485/534
Cresaps – Kammer 69KV	129/180/162/202
Cresaps – McElroy 69kV	129/180/162/202
05CRESAPS – 05MCELROY 69kV	102/102/129/129
Columbi to CONNERRN 69kV	82/90/107/113
Columbi to Natrium 69kV	75/75/94/94

**Additional Benefits:** This project also solves N1-ST41, N1-ST42, GD-S298, GD-S446 and GD-S315, which are overloads on Natrium12 – Natrium34 branch for multiple common mode contingencies in summer generation deliverability test and basecase analysis.

Additionally, Kammer-Natrium 69 kV Circuit (7.6 miles) has supplemental needs. From 2015 – 2020 this circuit has experienced 6 momentary and 2 permanent outages resulting in approximately 100k CMI. The circuit currently has 41 open conditions on 19 structures (20% of the total structures), including pole damage, rot top, rot heart, rotted/split poles, burnt insulators, and missing ground lead wires. 55 structures have been replaced in the 2000s; remaining are wood poles from 1950s and 1960s with two steel lattice towers from 1927. The circuit conductor was primarily installed in 1927 consisting of 336 ACSR (3.73 miles) and 556 ACSR (0.5 miles), and 4/0 ACSR (0.8 miles) from 1971. The remainder was replaced in the 2000s with 556 ACSR (2.6 miles).

The baseline proposal is rebuilding overloaded sections of line that consist of the 1927 era 556 and 336 ACSR (1.17 miles) between Kammer and McElroy stations and the 4/0 ACSR sections (0.72 miles) between Connor Run and Natrium stations.

**Alternatives:**

- Proposal #2020\_1-270: The Birch Ridge - Natrium 138kV Transmission Project will include a new 3-position substation interconnecting the Kammer - Ormet #1 138kV transmission line. The proposed project will connect the new substation with a new line position at the Natrium 138kV Bus #1. The proposed project will expand the existing right-of-way from Kammer - Natrium. **Estimated Cost: \$16.637M**
- Proposal #2020\_1-538: Reconfigure the existing Natrium-New Martinsville 138kV line and the Kammer-Ormet #4 138kV line to become Natrium-Ormet and Kammer-New Martinsville. In addition, 3.2 miles of 138kV line into Natrium will need to be rebuilt along with upgrades at Natrium to accommodate the circuit reconfigurations. A span of 4/0 ACSR will be replaced on the Colombian-Conner Run 69 kV line. Proposed increased ratings: 243049 to 246067: 383/449/485/534 245928 to 245951: 82/90/107/113 235378 to 246108: 148/192/180/228 243774 to 246067: 292/330/324/358. **Estimated Cost: \$5.636M**

**Required In-Service: 6/1/2025**

# AEP Transmission Zone: Baseline South Lancaster – Lancaster - Ralston 69kV Rebuild

**Process Stage:** First Review

**Criteria:** AEP FERC 715 Criteria

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 Summer case

**Proposal Window Exclusion:** None

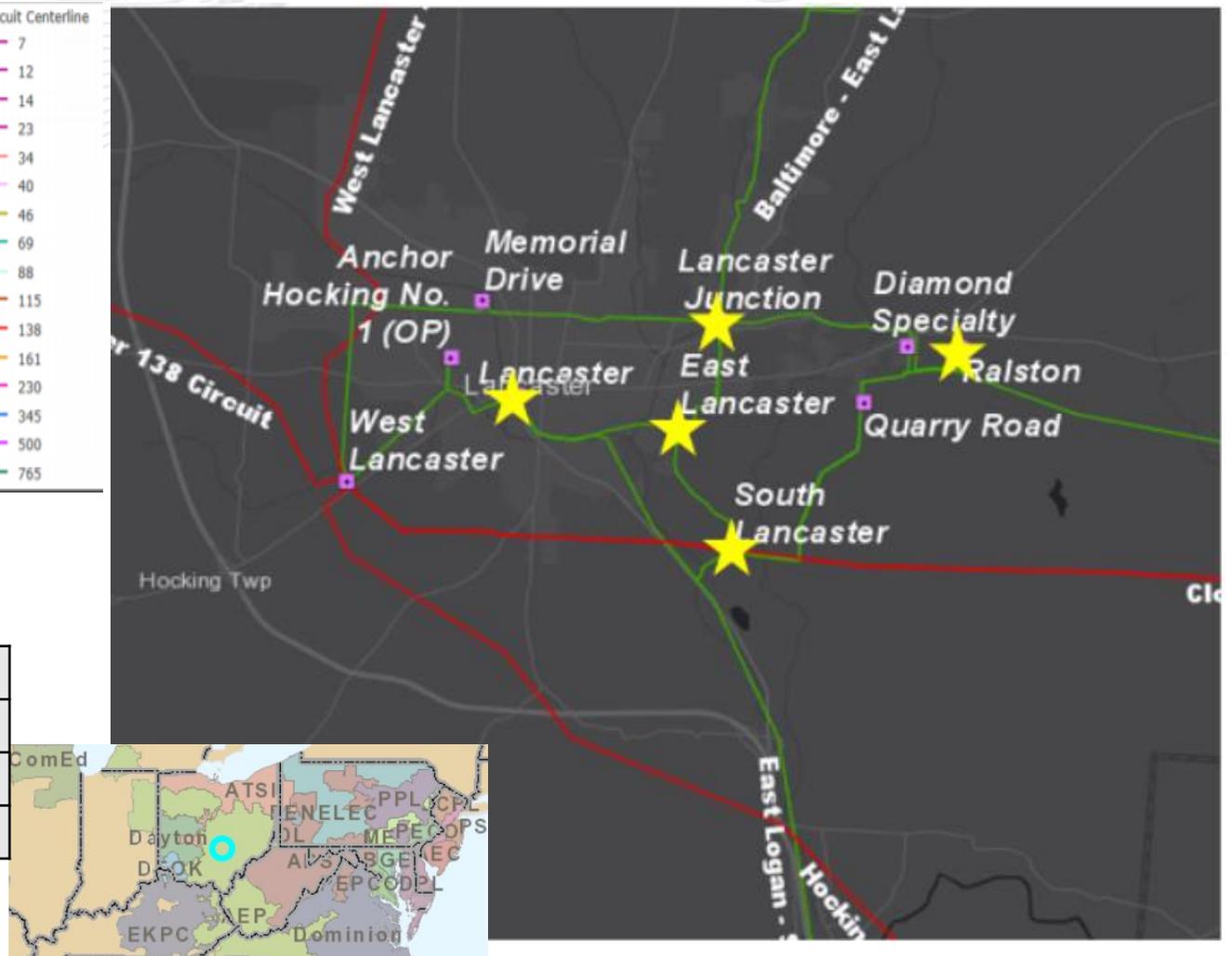
**Problem Statement:**

AEP-T376,AEP-T377,AEP-T384,AEP-T385,AEP-T388,AEP-T389

The East Lancaster – Lancaster 69kV line and Lancaster – South Lancaster 69kV line, Ralston – Lancaster Junction 69kV line are overloaded for multiple N-1-1 contingency pairs.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
05E.LANCAST2 -05LANCASTE 69KV	40/40/56/56
05LANCASTE – 05S.LANCAST1 69KV	40/40/56/56
05RALSTON – 05LANCAST JTZ 69KV	35/35/48/48





# South Lancaster – Lancaster - Ralston 69kV Rebuild

As part of the 2020 RTEP Window #1, the projects listed in the table below are proposed to address the following violations:

AEP-T376,AEP-T377,AEP-T384,AEP-T385,AEP-T388,AEP-T389

Upgrade ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
628	AEP	Install breakers for transformer #2 at South Lancaster station	4.31
915	AEP	Rebuild South Lancaster – Lancaster- Ralston 69kV	11.147

### Proposed Solution:

Proposal #2020\_1-915: Rebuild approximately 6.1 miles of existing copper conductor 69 kV lines around the Lancaster area with 556 ACSR conductor.

**Estimated Cost: \$11.147M**

# South Lancaster – Lancaster - Ralston 69kV Rebuild

## Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05LANCAS JTZ – 05LANCAST JT 69KV	82/90/107/113
05E.LANCASTZ – 05LANCASTE 69KV	68/86/90/103
05S.LANCAST1 – 05LANCASTE 69kV	82/90/107/113
05RALSTON – 05LANCAS JTZ 69kV	82/90/107/113

## Additional Benefits:

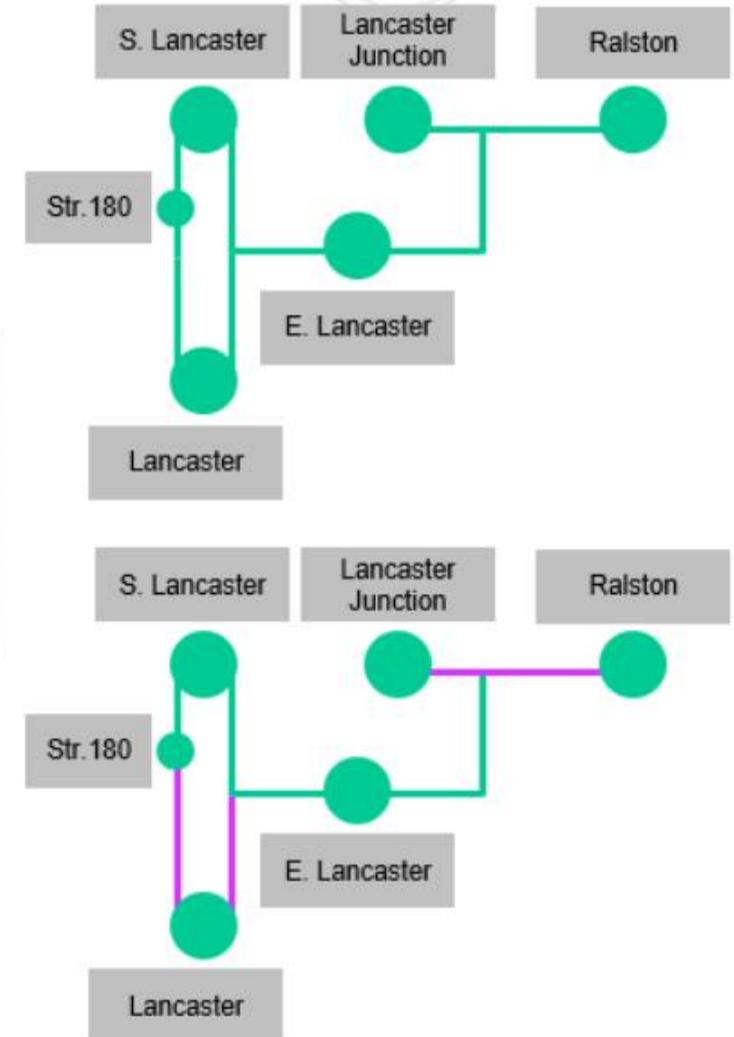
### Lancaster-East Lancaster-South Lancaster 69 kV Circuit (3.35 miles)

- From 2015 – 2020 this circuit has experienced 8 momentary and 2 permanent outages. Since the line does not directly serve customers, there were no CMI.
- The circuit currently has 49 open conditions on 27 structures (47% of the total structures), including bent tower legs, cracked poles, burnt and broken insulators, and heavy rusting.
- Structures are made up of 1923 steel lattice towers (17 structures) and wood poles (41 structures) from the 1950s and 1960s.
- The circuit conductor was primarily installed in 1923 consisting of 2/0 Copper (1.84 miles) and 556 ACSR (1.5 miles) from 1965.
- The baseline proposal is rebuilding the 2/0 Copper single circuit section of line between Lancaster and East Lancaster, approximately 0.8 miles. Approximately 1 mile is a double circuit section that's common to the Lancaster-South Lancaster circuit .

Existing:

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

Proposed:





# South Lancaster – Lancaster - Ralston 69kV Rebuild

## Additional Benefits: (continued)

### Lancaster-South Lancaster 69 kV Circuit (3.3 miles)

- From 2015 – 2020 this circuit has experienced 3 momentary and 2 permanent outages resulting in approximately 1M CMI.
- The circuit currently has 56 open conditions on 30 structures (77% of the total structures), including bent tower legs, cracked poles, burnt and broken insulators, and heavy rusting.
- Structures are made up of 1923 steel lattice towers (25 structures) and wood poles (14 structures) from the 1970s.
- The circuit conductor was primarily installed in 1923 consisting of 2/0 Copper (2.79 miles) and 556 ACSR (0.5 miles) from 1978.
- The baseline proposal is rebuilding the 2/0 Copper sections of line between Lancaster and South Lancaster, approximately 2.8 miles. Approximately 1 mile is a double circuit section that’s common to the Lancaster-East Lancaster circuit.

### Lancaster Junction-Ralston 69 kV Line (3.08 miles)

- From 2015 – 2020 the entire circuit has experienced 12 momentary and 4 permanent outages resulting in approximately 3.1M CMI.
- The line currently has 33 open conditions on 27 structures (36% of the total structures), including damaged braces, rot top, rot heart, burnt insulators, and broken ground lead wires.
- Structures are made up of wood poles from the 1940s (16 structures) and the 1960s (27). Some structures have been replaced since the 1980s (27 structures).
- The circuit conductor was installed in 1955 consisting of 1/0 Copper (1.9 miles), 1/0 ACSR (0.44 miles), and 556 ACSR (0.74 miles).
- The baseline proposal is rebuilding the 1/0 conductor sections of line between Lancaster and South Lancaster, approximately 2.3 miles.

## Alternatives:

- Proposal #2020\_1-628: At South Lancaster station, AEP is proposing to install a high side 138 kV circuit breaker and a low side 69 kV circuit breaker on 138/69 kV transformer #2 and to close the Baltimore 69 kV normally open circuit breaker “E”. No ratings changes to existing branches as a result of the proposed work. **Estimated Cost: \$1.37M**

**Required In-Service: 6/1/2025**

**Process Stage:** First Review

**Criteria:** Summer Generator Deliverability

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 RTEP Summer case

**Proposal Window Exclusion:** None

**Problem Statement:** The Constitution to Concord 115 kV circuits # 110567 and 110568 are overloaded for towerline outage loss of the Brandon Shore to Riverside 230 kV circuits #2344 & 2345. The circuits are overloaded in the Summer generation deliverability test.

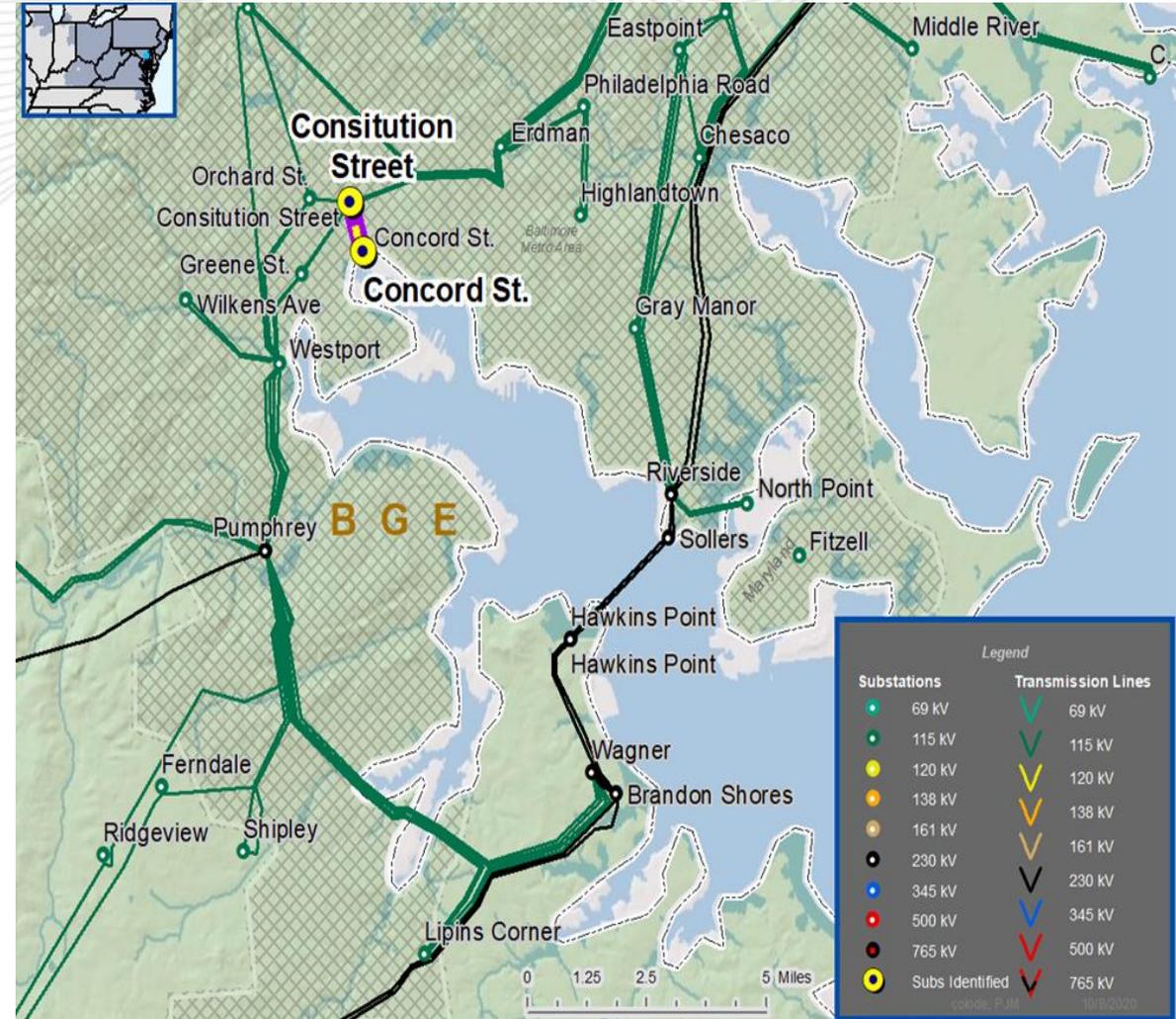
Violations were posted as part of the 2020 Window 1: (FG# GD-S480 and GD-S483 )

**Existing Facility Rating:** 155SN/169SE, 166SN/183SE MVA

**Proposed Solution:**

There were seven projects proposed to address the two violations, see next slide for the detail proposals.

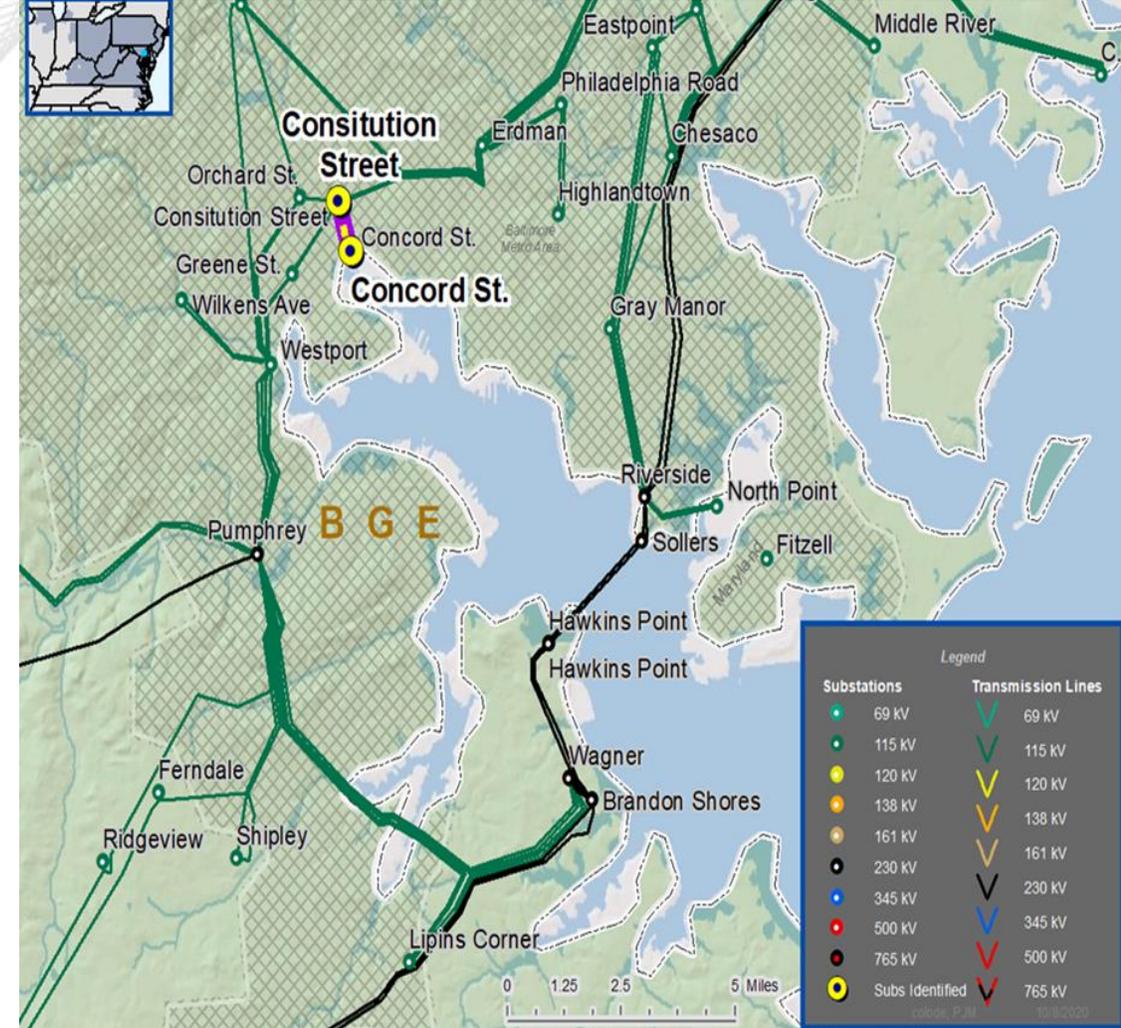
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As part of the 2020 RTEP Window #1, the projects listed in the table below are proposed to address the two violations (FG# GD-S480 and GD-S483).

Upgrade ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
191	BGE	Replace Pumphrey Transformer, Re-conductor Constitution-Concord 110567/110568 Concord-Monument Street 110563/110564 circuits	25.279
420	BGE	Re-conductor Constitution-Concord Street Circuits 110567/110568, Re-conductor partial 110563/110564 circuits	14.730
494	BGE	Replace Pumphrey 230/115kV transformer	4.692
514	BGE	Replace Pumphrey and Graceton Transformers with new transformers	9.009
763	BGE	Re-arrange operating configuration of planned Erdman 115kV substation	0
836	BGE	Re-conductor Constitution-Concord 110567/110568 Concord-Monument Street 110563/110564 circuits	20.587
962	BGE	Replace Pumphrey Transformer, Re-conductor Constitution-Concord 110567/110568 UG Circuits, Partial 110563/110564 Re-conductor	19.422



PJM continue to evaluate the proposals and preliminary evaluation indicates the upgrade ID# 494 (Replace Pumphrey 230/115kV transformer) as primary candidate to solve the violation

**Process Stage:** First Review

**Criteria:** Summer and Winter N-1-1

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 RTEP Summer and Winter cases

**Proposal Window Exclusion:** None

**Problem Statement:** Post contingency high voltage violation on the Pierce Brook 345kV substation. The Pierce Brook 345kV bus has high voltage issue for N-1-1 contingency loss of the Pierce Brook – Five Mile 345 kV circuit plus Pierce Brook shunt reactor, and Pierce Brook – Five Mile 345 kV circuit plus Lewis Run - Pierce Brook 230 kV circuits in both summer and winter analysis results.

Violations were posted as part of the 2020 Window 1: FG# N2-SVM52 to N2-SVM55 and N2-WVM15 to N2-WVM19

**Existing Facility Rating:** N/A

**Proposed Facility Rating:** N/A

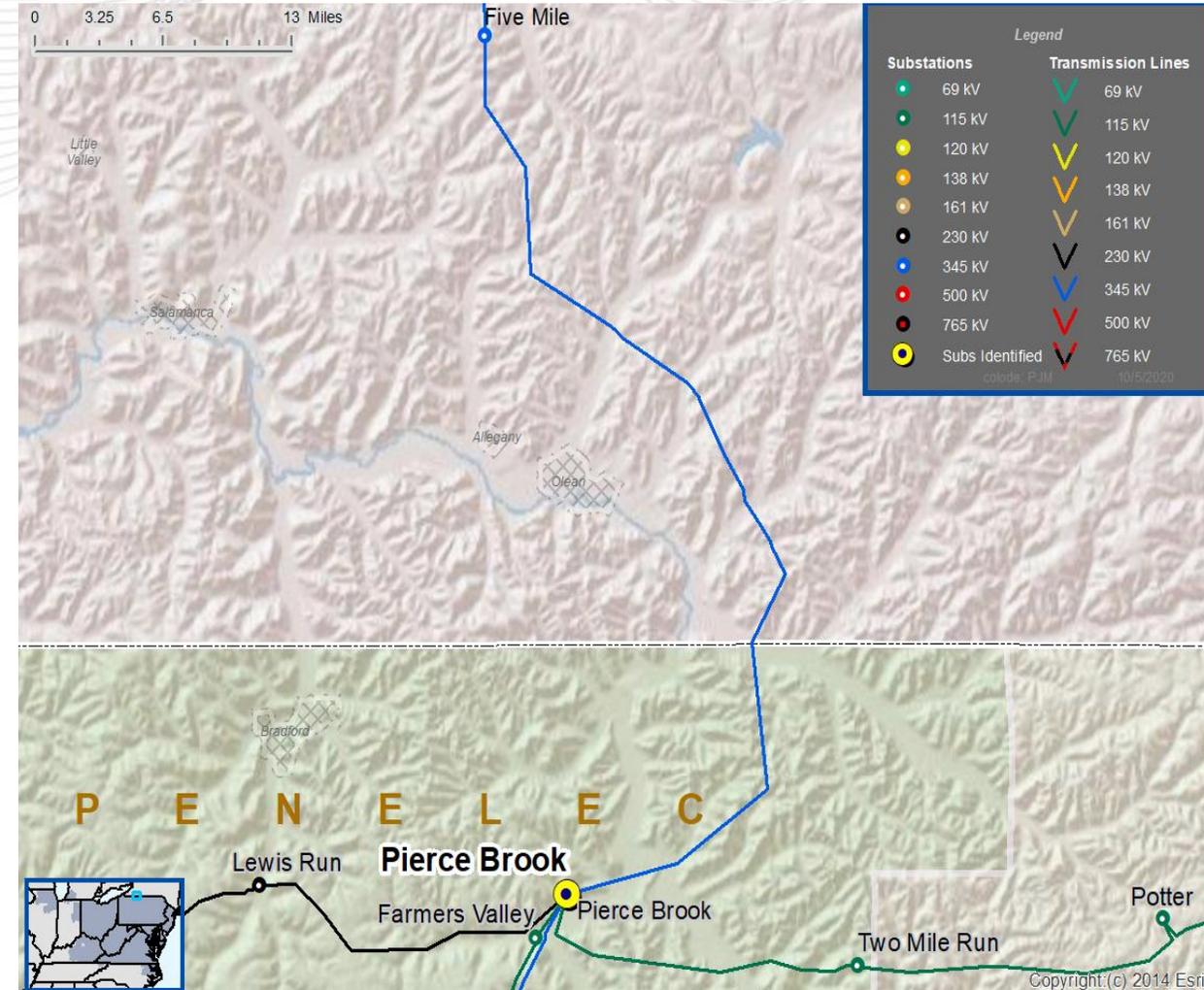
**Proposed Solution:**

Install a second 125 MVAR 345 kV shunt reactor and associated equipment at Pierce Brook Substation. Install a 345 kV breaker on the high side of the #1 345/230 kV transformer..

**Estimated Cost:** \$8.08 M

**Alternatives:** N/A

**Required In-Service:** 6/1/2025



# Second Review

## Baseline Reliability Projects



# AEP Transmission Zone: Baseline West New Philadelphia station

**Process Stage:** Second Review

**Criteria:** AEP FERC 715 Criteria

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 Summer case and 2025 Winter case

**Proposal Window Exclusion:** None

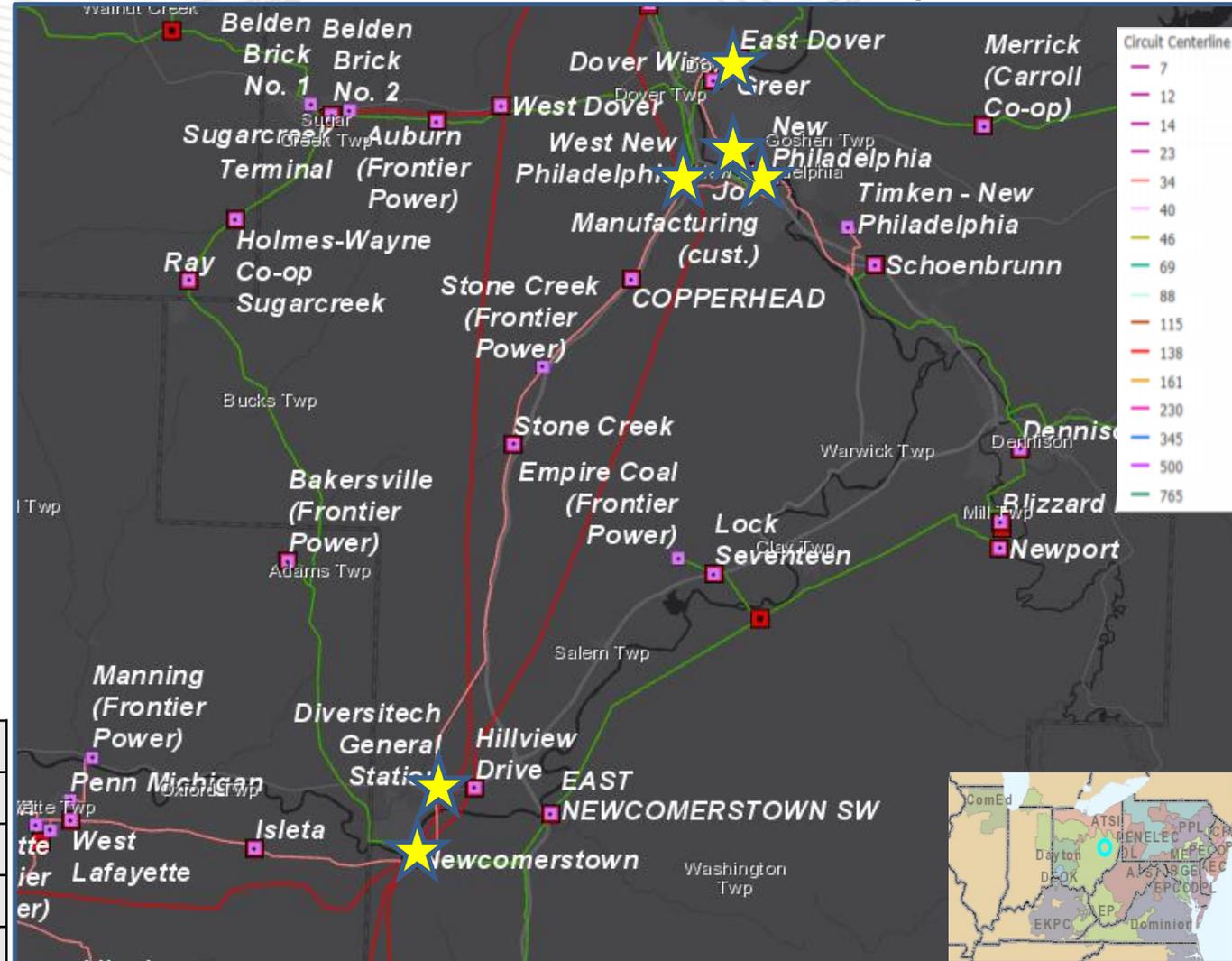
**Problem Statement:**

AEP-T356,AEP-T357,AEP-T358,AEP-T359,AEP-T360,AEP-T361,AEP-T362,AEP-T363,AEP-T364,AEP-T365

The GEN TIRE-Newcomerstown, The GREENR- MILL ST SS, New Philadelphia – New PHILA 34.5kV and GREERZ – GREER 69KV branches are overloaded for the loss of the West New Philadelphia – Newcomerstown 138kV line with West New Philadelphia 139/69kV transformer and the South Canton - Bolivar – North Intertie 138kV line.

**Existing Facility Rating:**

Branches	SN/SE (MVA)	WN/WE (MVA)
The GEN TIRE-Newcomerstown 34.5KV	17/17	24/24
GREENR- MILL ST SS 34.5KV	15/15	22/22
New Philadelphia – New PHILA 34.5KV	23/23	23/23
GREERZ – GREER 69KV	31/31	43/43



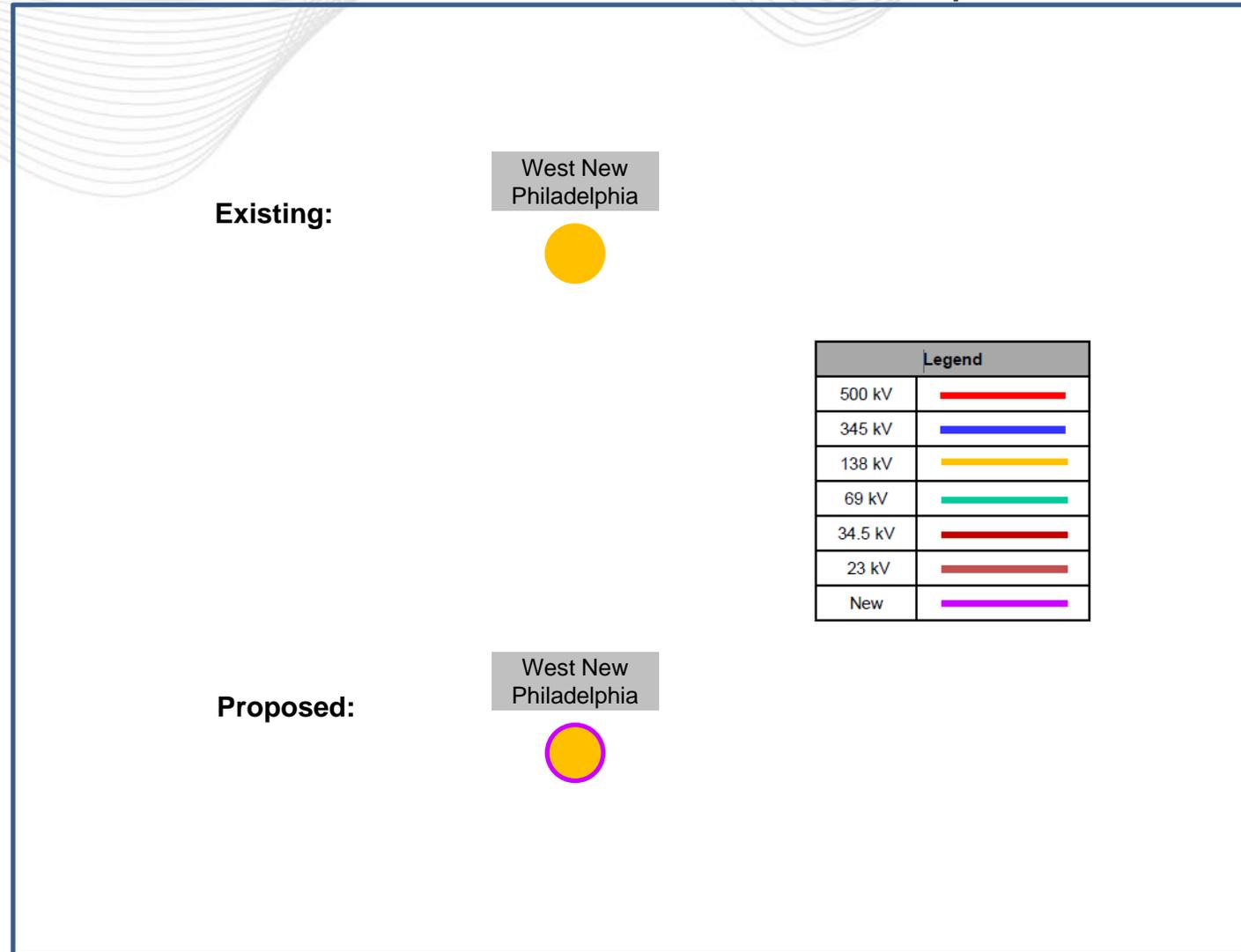
**Preliminary Facility Rating:** No rating change

**Recommended Solution:**

Proposal #2020\_1-179: At West New Philadelphia station, add a high side 138 kV breaker on the 138/69 kV transformer #2 along with a 138 kV breaker on the line towards Newcomerstown.

(B3269)

**Estimated Cost:** \$2.02M





# AEP Transmission Zone: Baseline West New Philadelphia station

**Additional Benefits:** this project also solves FG#

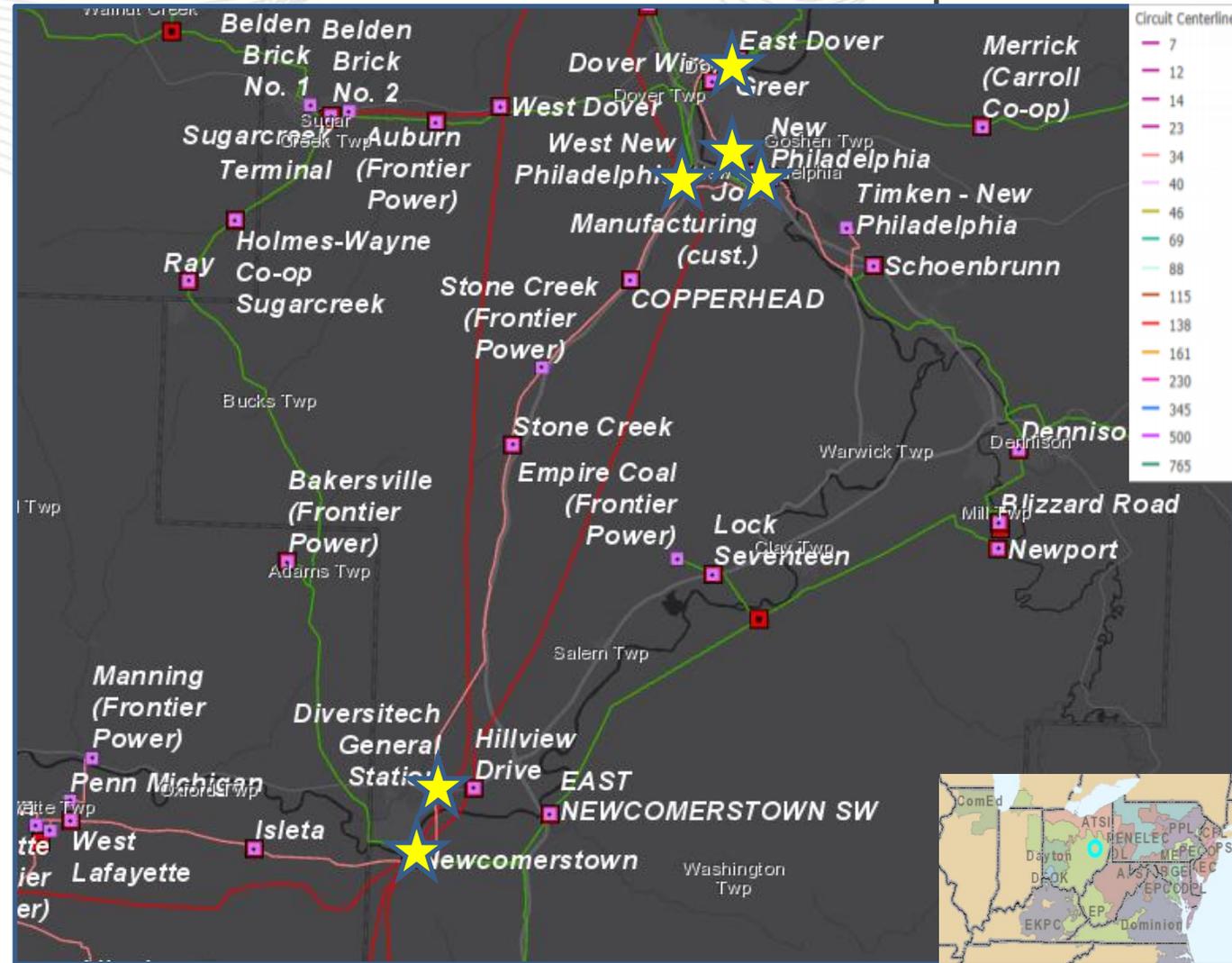
AEP-T187,AEP-T189,AEP-T211,AEP-T212,AEP-T352,AEP-T353,AEP-T374,AEP-T375,AEP-T448,AEP-T449, AEP-VM563,AEP-VM564,AEP-VM567,AEP-VM568,AEP-VM627,AEP-VM628,AEP-VM630,AEP-VM631,AEP-VM632,AEP-VM633,AEP-VM634,AEP-VM635,AEP-VM638,AEP-VM639,AEP-VM704,AEP-VM705,AEP-VM707,AEP-VM708,AEP-VM709,AEP-VM710,AEP-VM711,AEP-VM712,AEP-VM713,AEP-VM714,AEP-VM826,AEP-VM827,AEP-VM836,AEP-VM837,AEP-VD632,AEP-VD633,AEP-VD636,AEP-VD637,AEP-VD681,AEP-VD682,AEP-VD703,AEP-VD722,AEP-VD723,AEP-VD724,AEP-VD726,AEP-VD727,AEP-VD732,AEP-VD734,AEP-VD790,AEP-VD791,AEP-VD792,AEP-VD793,AEP-VD794,AEP-VD796,AEP-VD797,AEP-VD798,AEP-VD799,AEP-VD802,AEP-VD1115,AEP-VD1116,AEP-VD1125,AEP-VD1128, which are overload on W.NEW PHIL 138/34.5kV transformer and low voltage magnitude and voltage drop violations at buses W.NEW PHIL 138kV, NINTIE 138kV, COPPERHE 34.5kV, STONECK8 34.5kV, STONECK 34.5kV, E.MILLSTSS 34.5kV, and GRADALL 34.5kV.

**Proposal Window Exclusion:** Below 200kV Exclusion

**Required In-Service:** 6/1/2025

**Projected In-Service:** 6/1/2025

**Previously Presented:** 10/6/2020





# AEP Transmission Zone: Baseline Dragoon

**Process Stage:** Second Review

**Criteria:** AEP FERC 715 Criteria

**Assumption Reference:** 2025 RTEP assumption

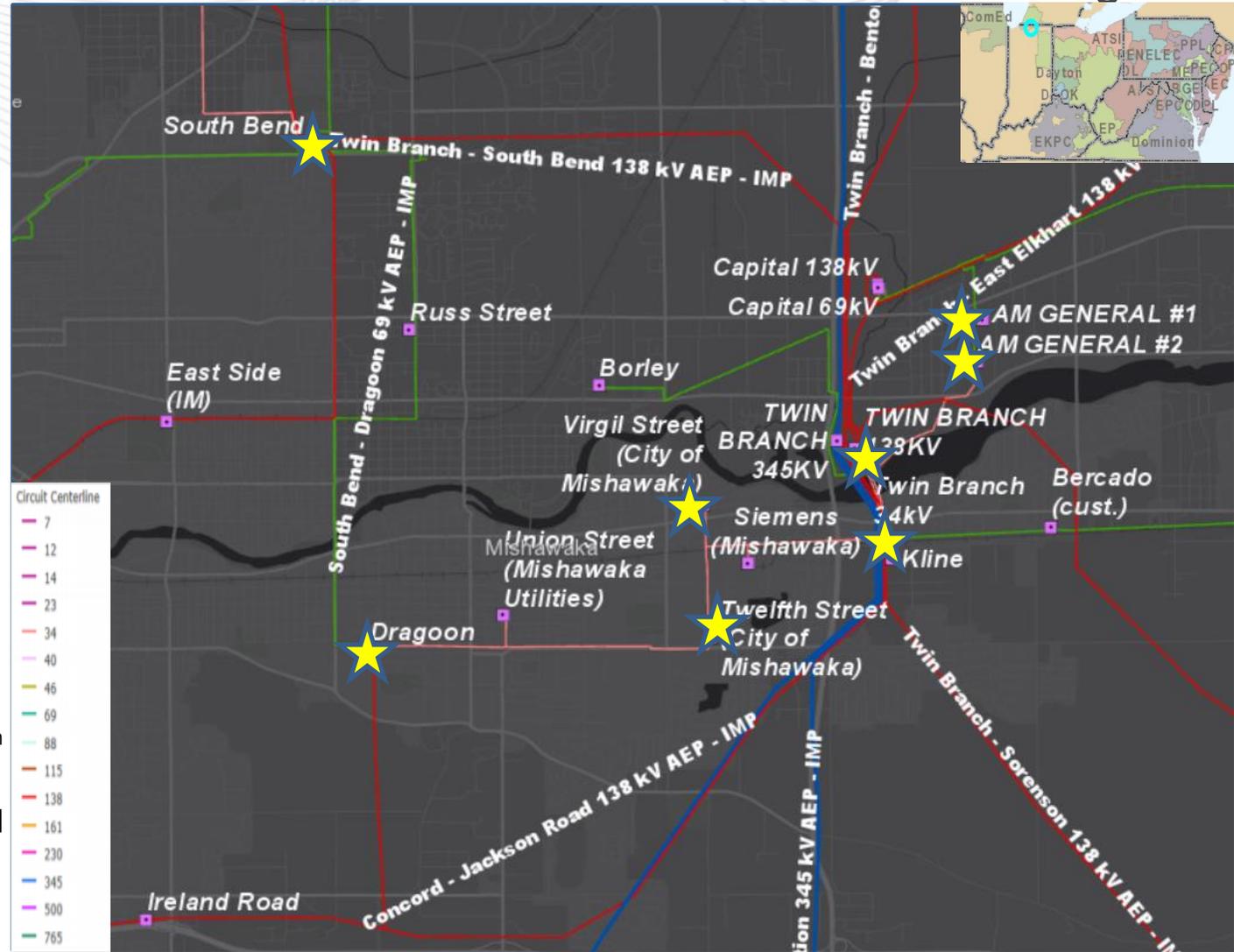
**Model Used for Analysis:** 2025 Summer case and 2025 Winter case

**Proposal Window Exclusion:** None

**Problem Statement:**

AEP-T7,AEP-T8,AEP-T9,AEP-T10,AEP-T11,AEP-T220,AEP-T224,AEP-T235,AEP-T236,AEP-T241,AEP-T242,AEP-T245,AEP-T246,AEP-T247,AEP-T248,AEP-T249,AEP-T254,AEP-T255,AEP-T263,AEP-T264,AEP-T275,AEP-T276,AEP-T282,AEP-T283,AEP-T378,AEP-T379,AEP-T382,AEP-T383,AEP-T386,AEP-T387,AEP-T392,AEP-T393,AEP-T394,AEP-T395,AEP-T396,AEP-T397,AEP-T400,AEP-T401,AEP-T402,AEP-T408,AEP-T411,AEP-T417,AEP-T419,AEP-T420,AEP-T427,AEP-T428,AEP-T435,AEP-T436,AEP-T439,AEP-T440,AEP-T441,AEP-T461,AEP-T462,AEP-T463,AEP-T465

The AM General #2– AM General #1, AM General #2– Twin Branch2, Beiger – Virgil S, BEIGER-Kline, CAP AV – AM General #1, Dodge SS -12<sup>th</sup> St, 12<sup>th</sup> ST – Virgil, Dragoon – Railroad, Grape Rd – South Bend 34.5kV lines and Kline and South Bend 138/69/34.5 kV transformers are overloaded for multiple N-1-1 contingency pairs.





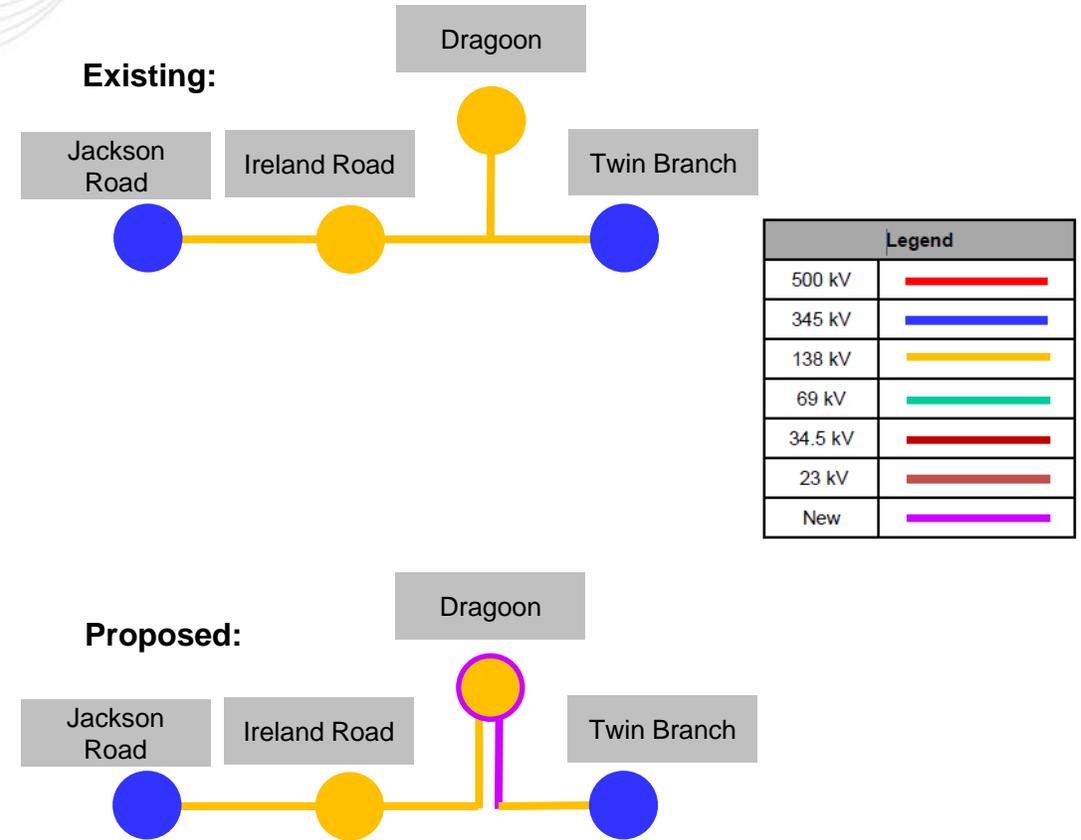
# AEP Transmission Zone: Baseline Draughton

## Existing Facility Rating:

Branches	SN/SE (MVA)	WN/WE (MVA)
05AM GENRL_2 - 05AM GENRL_1 34.5KV	55/62	69/76
05AM GENRL_2 - 05TWIN BRCH2 34.5KV	55/62	69/76
05BEIGER - 05VIRGIL S 34.5KV	76/76	98/98
05BEIGER - 05KLINE 34.5KV	76/76	98/98
05CAP AV - 05AM GENRL_1 34.5KV	62/62	78/78
05DODGE SS - 0512TH ST 34.5KV	41/45	53/57
05DRAGOON - 05RAILROAD 34.5KV	56/56	70/70
05GRAPE RD - 05SOUTHBEN 34.5KV	62/62	78/78
05VIRGIL S - 0512TH ST 34.5KV	41/45	53/57
05KLINE (138/69/34.5KV)	60/60	60/60
05SOUTHBEN (138/69/34.5KV)	55/55	55/55

## Preliminary Facility Rating:

Branches	SN/SE (MVA)	WN/WE (MVA)
05DRAGN – 05IRELAN 138kV	219/251	277/303
05DRAGN – 05TWIN B 138kV	219/251	277/303
05DRAGN 138/69/34.5kV #2	90/90 1 <sup>st</sup> winding 30/30 2 <sup>nd</sup> winding 60/60 3 <sup>rd</sup> winding	90/90 1 <sup>st</sup> winding 30/30 2 <sup>nd</sup> winding 60/60 3 <sup>rd</sup> winding



**Recommended Solution:**

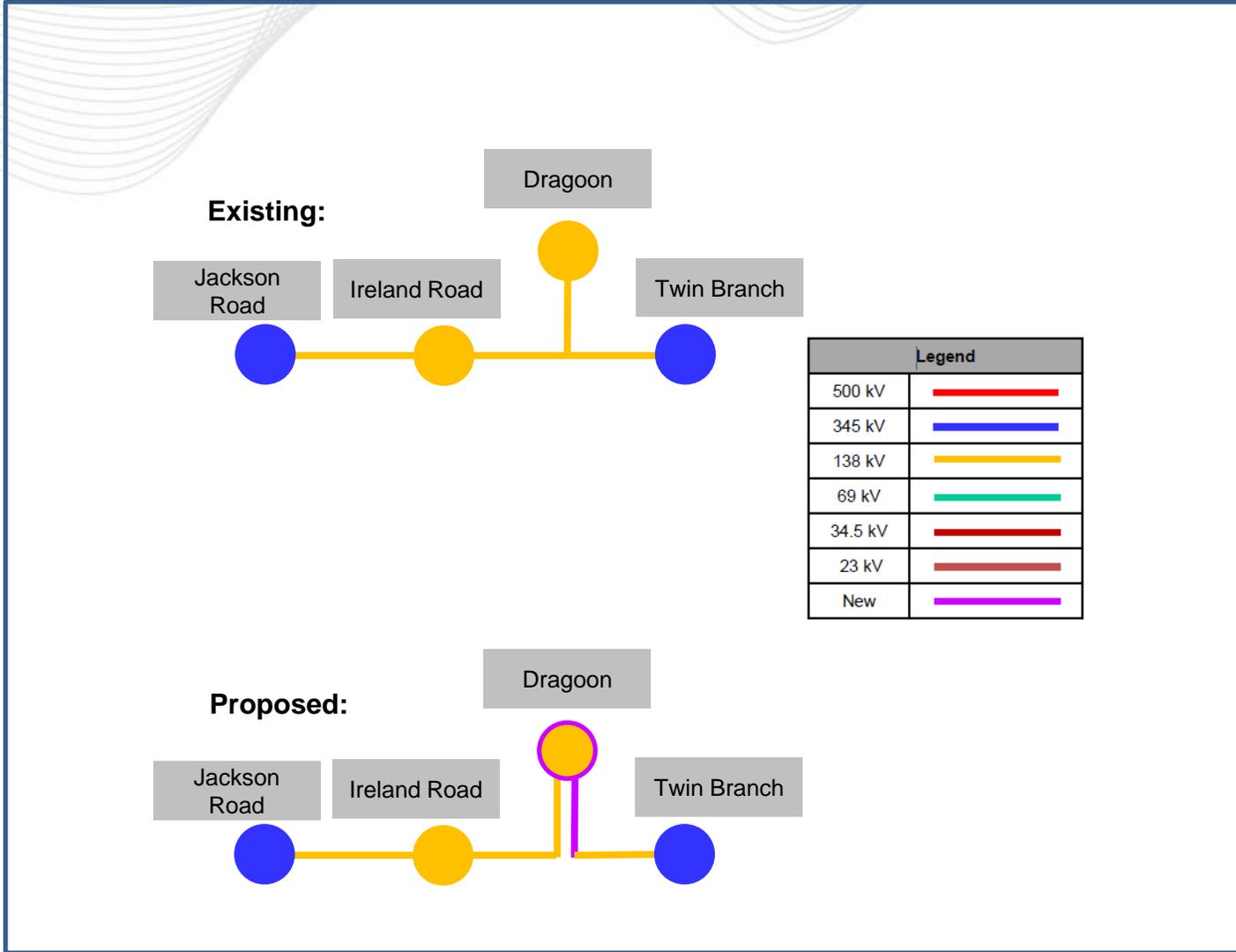
Proposal #2020\_1-308: Install 1.7 miles of 795 ASCR 138kV conductor along the other side of Draughton Tap 138 kV line, which is currently double circuit tower with one position open. Additionally, install a 2nd 138/69/34.5kV transformer at Draughton, install a high side circuit switcher on the current transformer at Draughton Station, and install 2-138kV line breakers on the Draughton-Jackson 138kV and Draughton-Twin Branch 138kV lines. The Draughton-Jackson 138kV branch ratings will be (219/251/277/303). The Draughton-Twin Branch 138kV ratings will be(219/251/277/303). **(B3270)**

**Estimated Cost:** \$4.894M

In PJM's DNH study, Draughton 34.5kV Breakers B, C, D (22KA) are identified to overdutied due to B3270. Additional scope is added: Replace Draughton 34.5kV Breakers B, C, D with 40kA breakers **(B3270.1)**

**Estimated Cost:** \$2M

Note: Draughton 34.5kV Breakers C and D replacement were part of supplemental project S2197. These portion of S2197 is converted to baseline





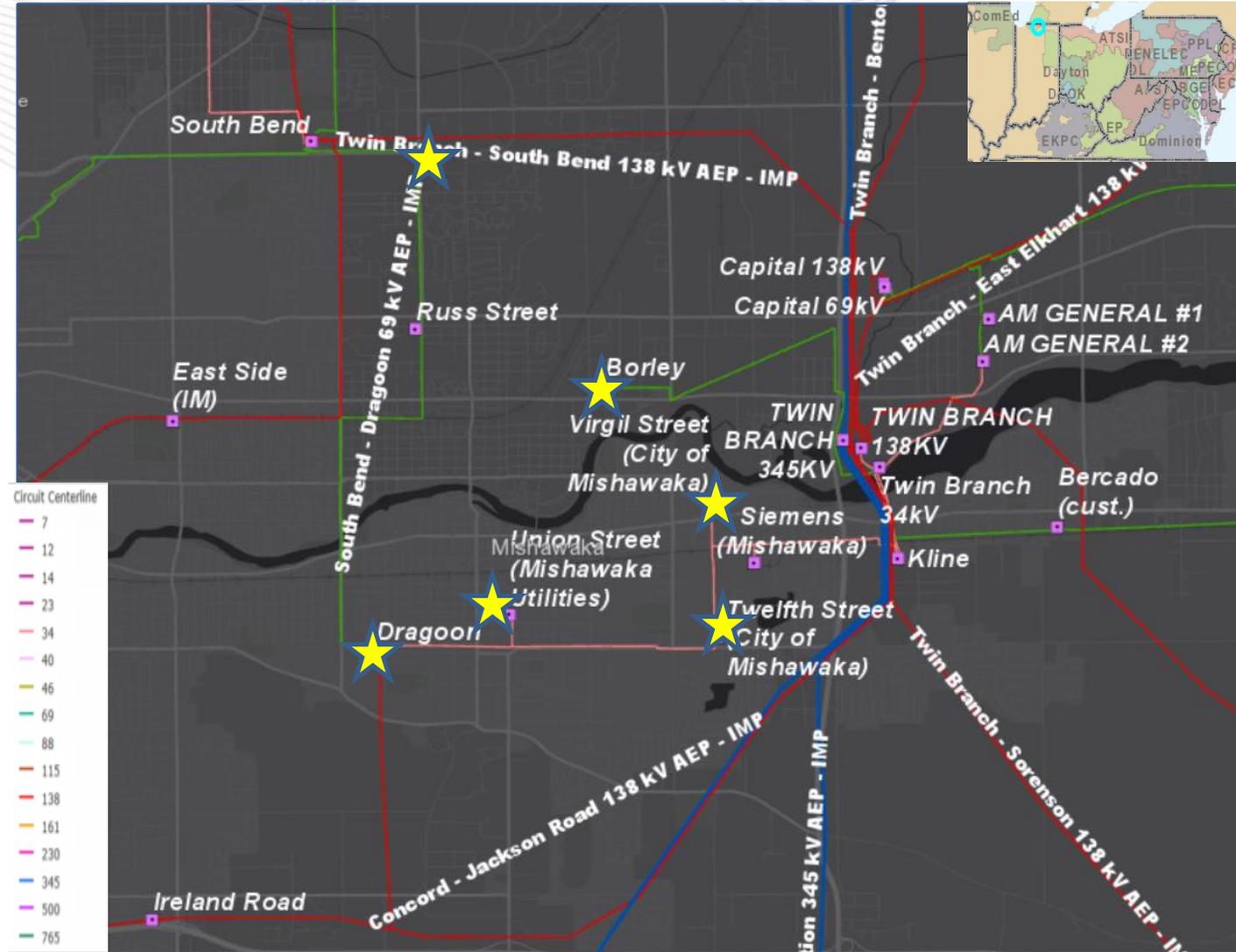
# AEP Transmission Zone: Baseline Draught

**Additional Benefits:** this project also solves FG#

AEP-VM623,AEP-VM624,AEP-VM625,AEP-VM626,AEP-VM629,AEP-VM636,AEP-VM637,AEP-VM641,AEP-VM642,AEP-VM643,AEP-VM644,AEP-VM678,AEP-VM680,AEP-VM684,AEP-VM685,AEP-VM686,AEP-VM687,AEP-VM688,AEP-VM689,AEP-VM690,AEP-VM691,AEP-VM692,AEP-VM693,AEP-VM694,AEP-VM695,AEP-VM696,AEP-VM697,AEP-VM698,AEP-VM699,AEP-VM706,AEP-VM715,AEP-VM716,AEP-VM717,AEP-VM718,AEP-VM719,AEP-VM720,AEP-VM731,AEP-VM749,AEP-VM750,AEP-VM751,AEP-VM752,AEP-VM753,AEP-VM754,AEP-VM755,AEP-VM756,AEP-VM757,AEP-VM758,AEP-VM759,AEP-VM760,AEP-VM765,AEP-VM766,AEP-VM767,AEP-VM768,AEP-VM769,AEP-VM770,AEP-VM771,AEP-VM772,AEP-VM773,AEP-VM774,AEP-VM775,AEP-VM776,AEP-VM777,AEP-VM778,AEP-VM779,AEP-VM780,AEP-VM781,AEP-VM782,AEP-VM784,AEP-VM785,AEP-VM786,AEP-VM787,AEP-VM788,AEP-VM793,AEP-VM794,AEP-VM795,AEP-VM797,AEP-VM798,AEP-VM799,AEP-VD684,AEP-VD700,AEP-VD701,AEP-VD725,AEP-VD728,AEP-VD729,AEP-VD730,AEP-VD731,AEP-VD733,AEP-VD735,AEP-VD736,AEP-VD737,AEP-VD755,AEP-VD770,AEP-VD776,AEP-VD777,AEP-VD781,AEP-VD795,AEP-VD800,AEP-VD801,AEP-VD810,AEP-VD811,AEP-VD863,AEP-VD868,AEP-VD869,AEP-VD872,AEP-VD891,AEP-VD893,AEP-VD956,AEP-VD962,AEP-VD963,AEP-VD964,AEP-VD965,AEP-VD966,AEP-VD967,AEP-VD968,AEP-VD969,AEP-VD970, AEP-VM783, AEP-VM796 which are voltage magnitude and voltage drop violations at buses 12<sup>TH</sup> ST 34.5kV, BEIGER 34.5kV, BORLEY 34.5kV, GRAPE RD 34.5kV, LOGAN ST 34.5kV, MILES MISH 34.5KV, RAILROAD 34.5kV, RUSS ST 34.5KV, UNION 34.5kV, VIRGIL S 34.5KV.

**Proposal Window Exclusion:** Below 200kV Exclusion

**Required In-Service:** 6/1/2025





# AEP Transmission Zone: Baseline Fremont

**Process Stage:** Second Review

**Criteria:** AEP FERC 715 Criteria

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 Summer case and 2025 Winter case

**Proposal Window Exclusion:** None

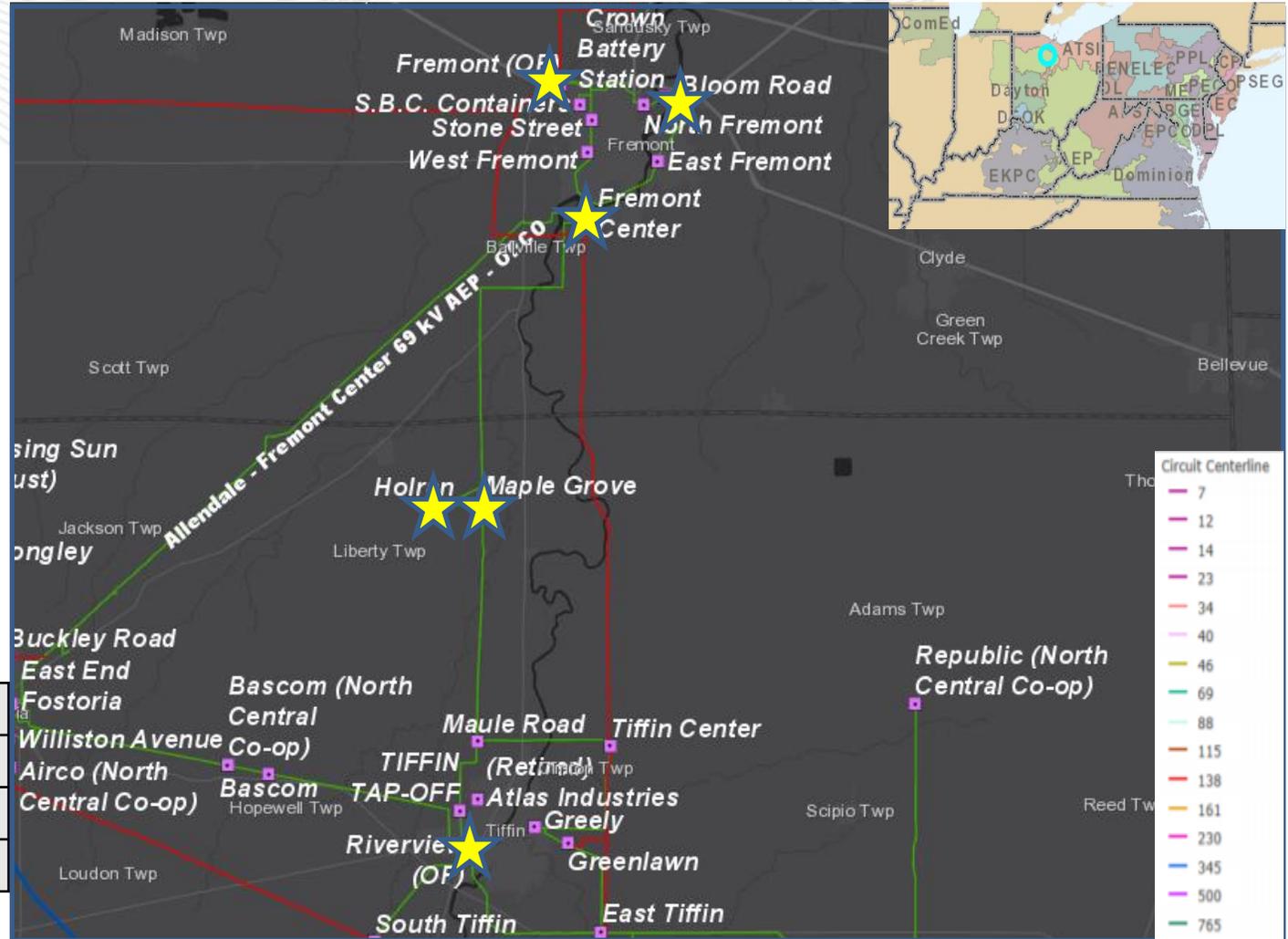
**Problem Statement:**

AEP-T168, AEP-T169, AEP-T170

The Fremont Center – Holran - Maple GR – Riverview 69kV lines are overloaded for AEP\_P4\_#7728\_05FREMCT 138\_C (loss of Fremont Center –Tiffin 138kV line, West Fremont – Fremont – Fremont Center 138kV line, Fremont 138/69/12KV transformer, Fremont Center 138/69KV transformer and Fremont Center 138kV switching shunt).

**Existing Facility Rating:**

Branches	SN/SE (MVA)	WN/WE (MVA)
05MAPLE GR - 05RIVERVIE 69KV	31/31	43/43
05MAPLE GR - 05HOLRAN 69KV	31/31	43/43
05HOLRAN - 05FREMNT C 69kV	31/31	43/43

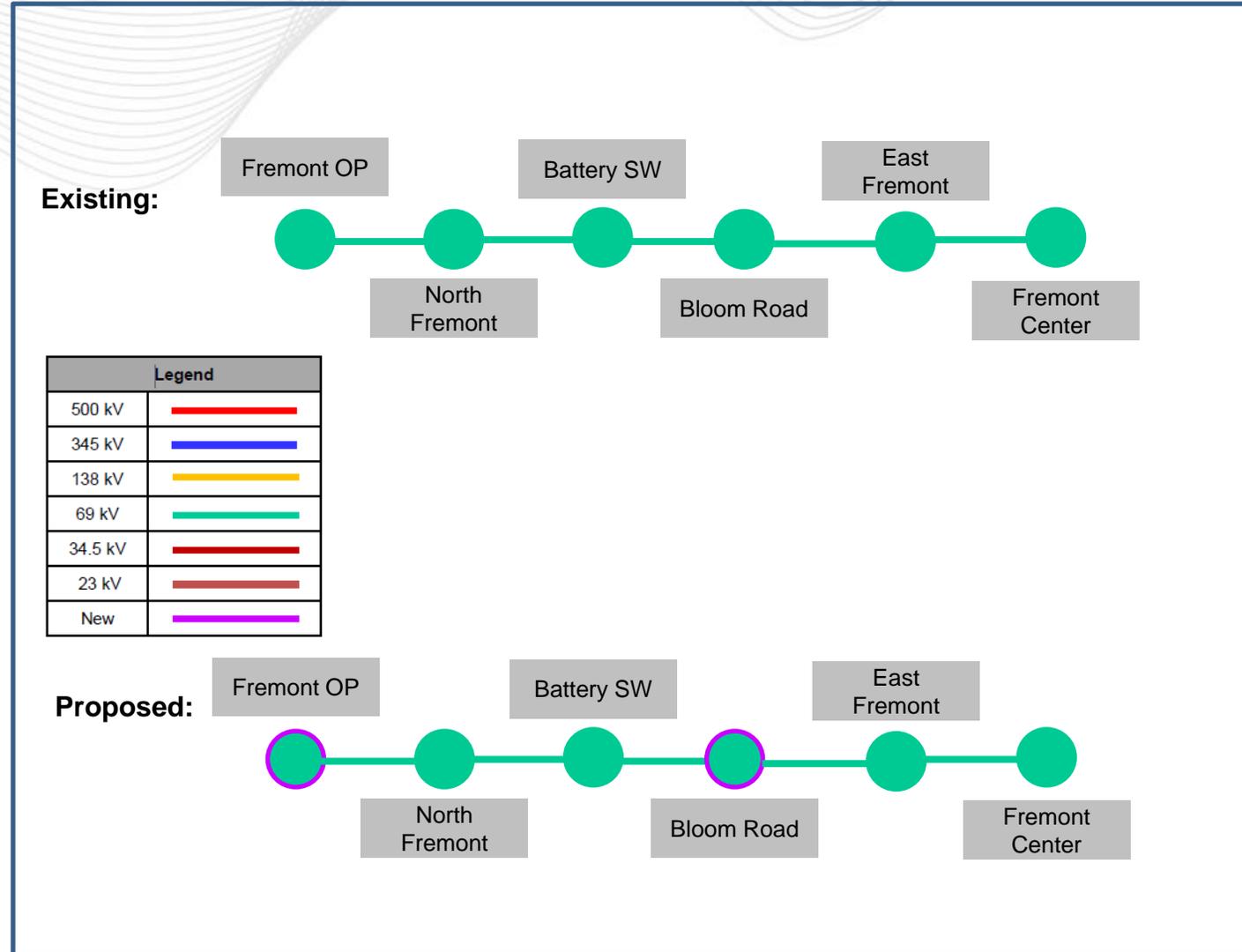


**Preliminary Facility Rating:** No rating change

**Recommended Solution:**

Proposal #2020\_1-503: Install a 138 kV circuit breaker at Fremont station on line towards Fremont Center and install a 9.6 MVAR 69 kV capacitor bank at Bloom Road station. (B3271)

**Estimated Cost:** \$1.758M





# AEP Transmission Zone: Baseline Fremont

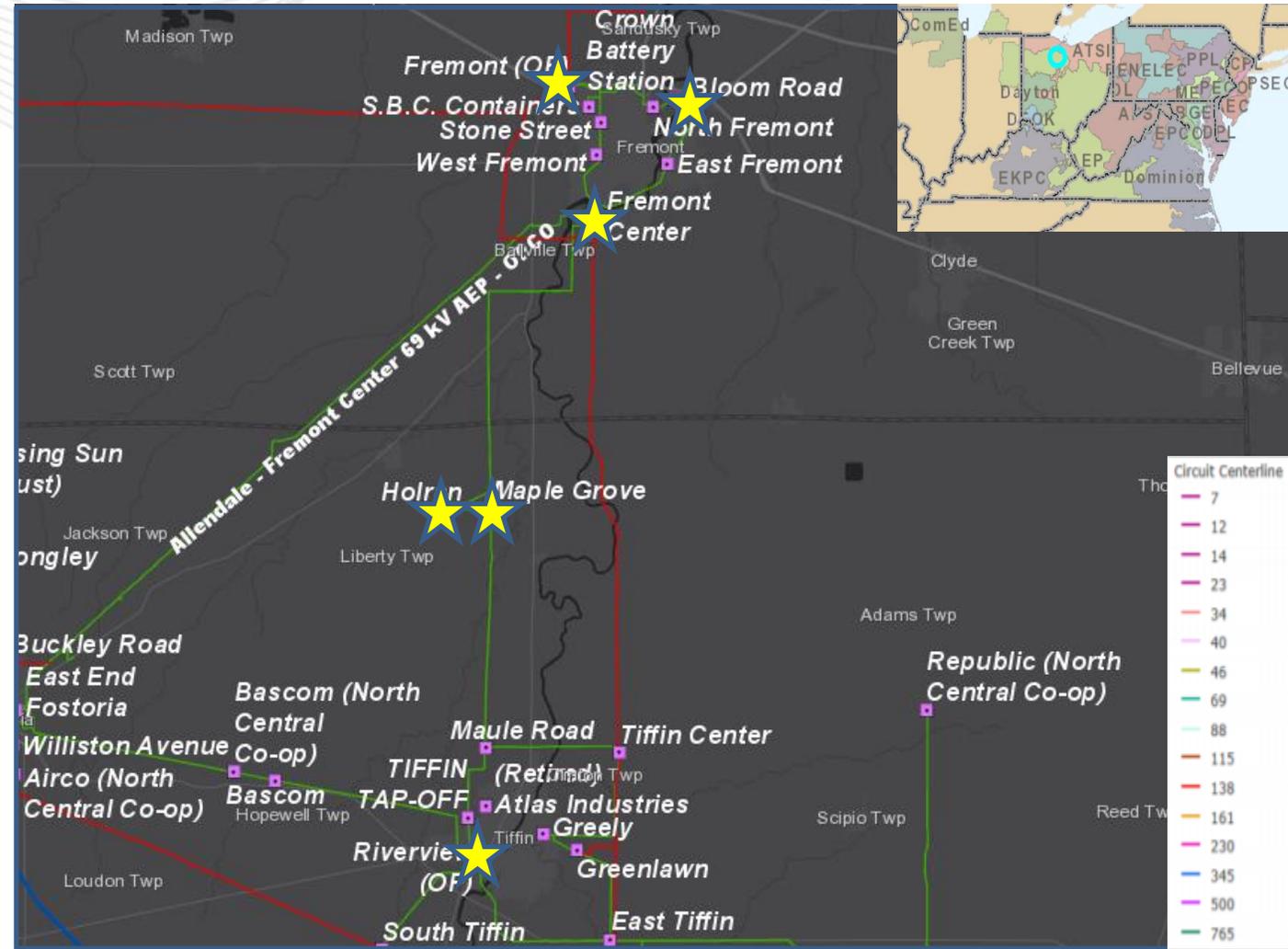
**Additional Benefits:** this project also solves FG# ,AEP-VM551,AEP-VM552,AEP-VM571,AEP-VM572,AEP-VM573,AEP-VM574,AEP-VM575,AEP-VM576,AEP-VM577,AEP-VM578,AEP-VM579,AEP-VM580,AEP-VM581,AEP-VM582,AEP-VM583,AEP-VM584,AEP-VM585,AEP-VM586,AEP-VM587,AEP-VM588,AEP-VM589,AEP-VM590,AEP-VM591,AEP-VM592,AEP-VM593,AEP-VM594,AEP-VM595,AEP-VM596,AEP-VM597,AEP-VM598,AEP-VM599,AEP-VM600,AEP-VM601,AEP-VM602,AEP-VM603,AEP-VM604,AEP-VM605,AEP-VM606,AEP-VM607,AEP-VM608,AEP-VM609,AEP-VM610,AEP-VM611,AEP-VM612,AEP-VM613,AEP-VM614,AEP-VM615,AEP-VM616,AEP-VM617,AEP-VM618,AEP-VM619,AEP-VM620,AEP-VM621,AEP-VM622,AEP-VM804,AEP-VM805,AEP-VM806,AEP-VM807,AEP-VD581,AEP-VD582,AEP-VD618,AEP-VD640,AEP-VD641,AEP-VD642,AEP-VD643,AEP-VD644,AEP-VD645,AEP-VD646,AEP-VD647,AEP-VD648,AEP-VD649,AEP-VD650,AEP-VD651,AEP-VD652,AEP-VD653,AEP-VD654,AEP-VD655,AEP-VD656,AEP-VD657,AEP-VD904,AEP-VD905,AEP-VD906,AEP-VD907,AEP-VD984,AEP-VD985,AEP-VD986,AEP-VD987,AEP-VD988,AEP-VD989,AEP-VD990,AEP-VD991,AEP-VD992,AEP-VD993,AEP-VD1046,AEP-VD1047,AEP-VD1048,AEP-VD1049,AEP-VD1050,AEP-VD1051,AEP-VD1098,AEP-VD1099 which are voltage magnitude and drop violations at buses BATTERY SS 69kV, BLOOM RD 69KV, CLYDE 69KV, E FREMON 69KV, FREMNT C 69KV, HOLRAN 69KV, MAPLE GR 69KV, N FREMON 69KV, SBC COUNT 69KV, STONE ST 69KV and W. FREMONT 69KV.

**Proposal Window Exclusion:** Below 200kV Exclusion

**Required In-Service:** 6/1/2025

**Projected In-Service:** 6/1/2025

**Previously Presented:** 10/6/2020





# AEP Transmission Zone: Baseline Rockhill

**Process Stage:** Second Review

**Criteria:** AEP FERC 715 Criteria

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 Summer case and 2025 Winter case

**Proposal Window Exclusion:** None

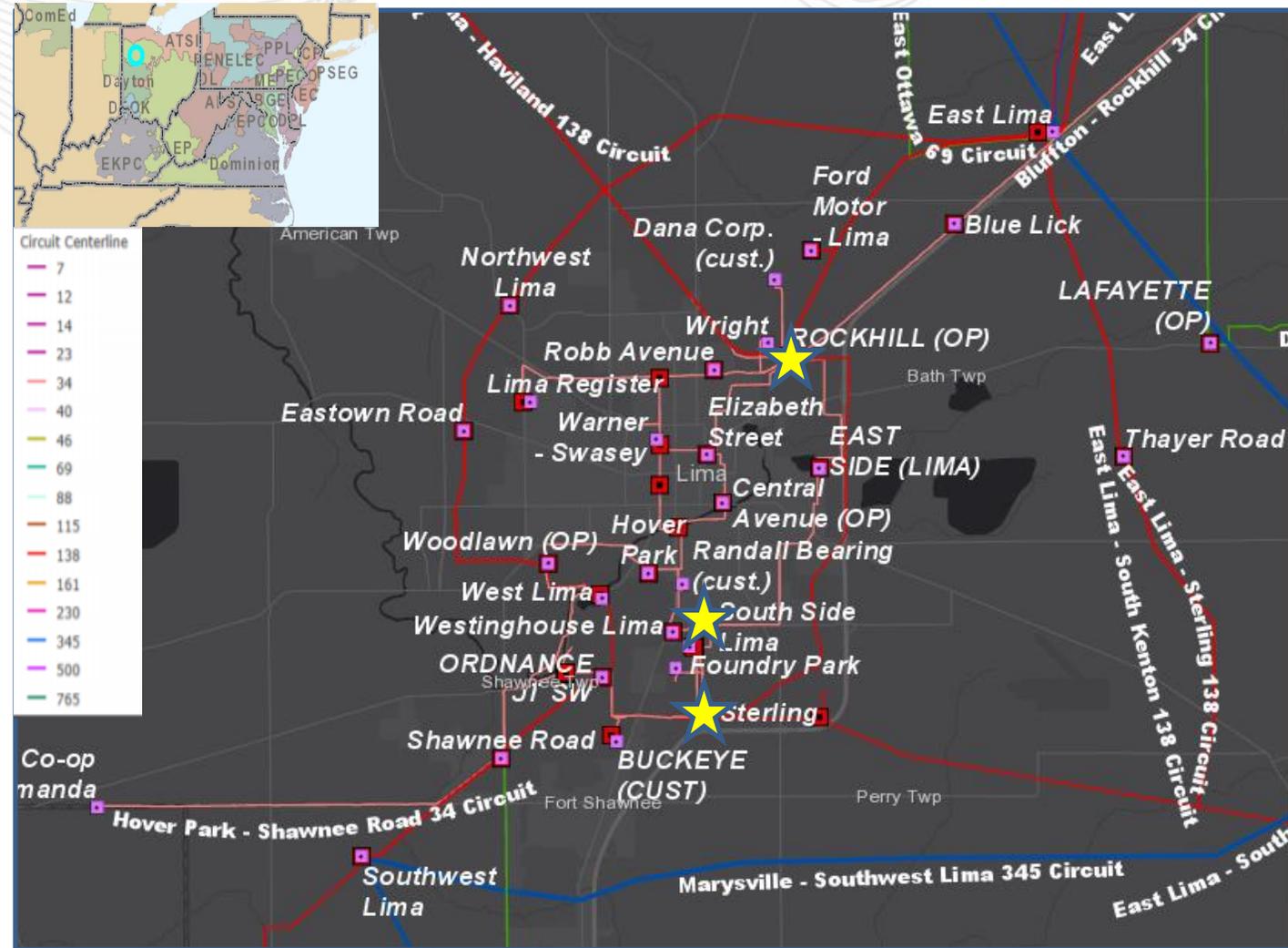
**Problem Statement:**

AEP-T281,AEP-T284,AEP-T285,AEP-T286,AEP-T287,AEP-T288,AEP-T289,AEP-T290,AEP-T291,AEP-T292,AEP-T293,AEP-T298

The Days Inn - Rockhill, Days Inn – South Side, Exc&L PM – South Side, Exc&L PM – Sterling1 34.5kV lines are overloaded for AEP\_P1-3\_#12222\_05ROCKHILL2 138\_1-2 (the loss of East Lima – Rockhill – Eastow 138kV line and Rockhill 138/34.5kV transformers 1&2) and AEP\_P1-2\_#5226\_2061 (The loss of East Lima – Ford Lima2 13kV line)

**Existing Facility Rating:**

Branches	SN/SE (MVA)	WN/WE (MVA)
05DAYS INN - 05ROCKHILL 34.5kV	27/27	38/38
05DAYS INN - 05S SIDE 34.5kV	27/27	38/38
05S SIDE - 05EXC&L PM 34.5kV	34/43	45/51
05EXC&L PM - 05STERLING1 34.5KV	41/45	53/57

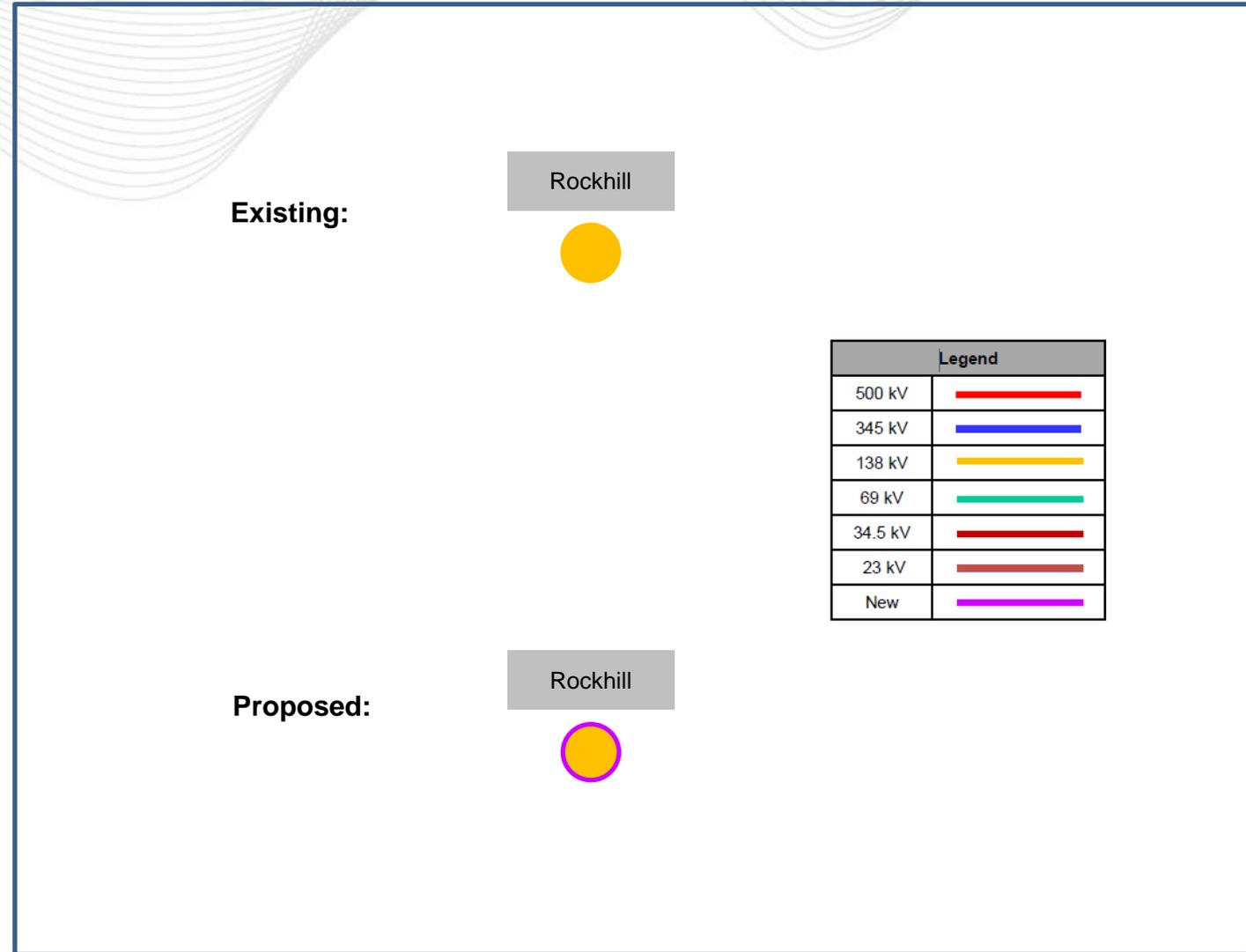


**Preliminary Facility Rating:** No rating change

**Recommended Solution:**

Proposal #2020\_1-848: Install two 138 kV circuit switchers on the high side of 138/34.5 kV transformers #1 & #2 at Rockhill station.  
(B3272)

**Estimated Cost:** \$1.471M





# AEP Transmission Zone: Baseline Rockhill

**Additional Benefits:** this project also solves FG#

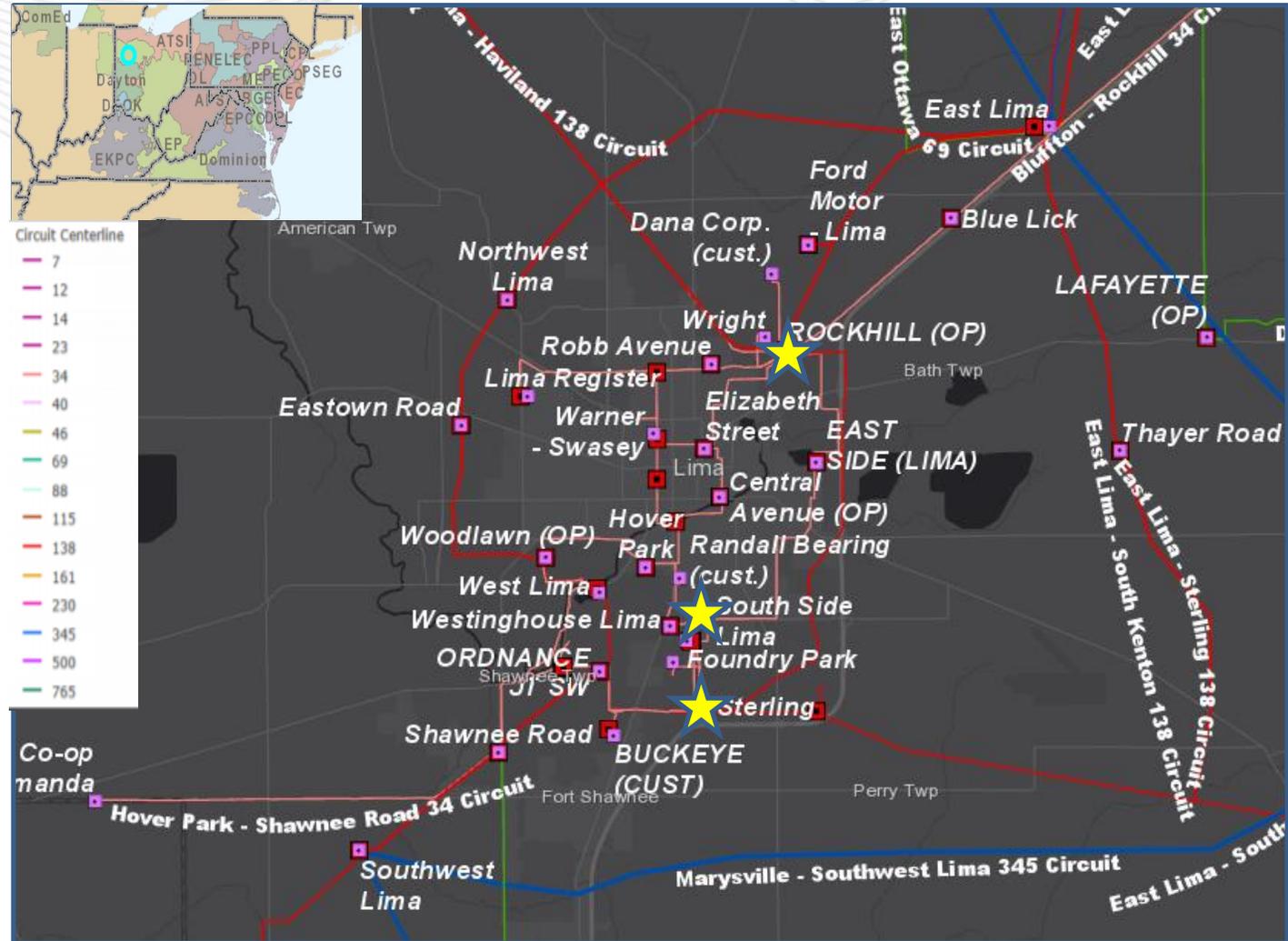
AEP-T267, AEP-T268, AEP-T412, AEP-T416, AEP-VM553, AEP-VM554, AEP-VM559, AEP-VM560, AEP-VM565, AEP-VM566, AEP-VM569, AEP-VM570, AEP-VM640, AEP-VM645, AEP-VM646, AEP-VM647, AEP-VM648, AEP-VM649, AEP-VM650, AEP-VM651, AEP-VM652, AEP-VM657, AEP-VM662, AEP-VM663, AEP-VM672, AEP-VM673, AEP-VM676, AEP-VM677, AEP-VM679, AEP-VM681, AEP-VM682, AEP-VM683, AEP-VM729, AEP-VM730, AEP-VM732, AEP-VM733, AEP-VM734, AEP-VM735, AEP-VM736, AEP-VM737, AEP-VM738, AEP-VM739, AEP-VM745, AEP-VM746, AEP-VM747, AEP-VM748, AEP-VM761, AEP-VM762, AEP-VM763, AEP-VM764, AEP-VM800, AEP-VM803, AEP-VM832, AEP-VM833, AEP-VM834, AEP-VM835, AEP-VM842, AEP-VM843, AEP-VM844, AEP-VM845, AEP-VD602, AEP-VD605, AEP-VD610, AEP-VD612, AEP-VD634, AEP-VD635, AEP-VD638, AEP-VD639, AEP-VD748, AEP-VD749, AEP-VD750, AEP-VD751, AEP-VD752, AEP-VD756, AEP-VD757, AEP-VD758, AEP-VD759, AEP-VD760, AEP-VD762, AEP-VD766, AEP-VD771, AEP-VD774, AEP-VD778, AEP-VD779, AEP-VD780, AEP-VD782, AEP-VD783, AEP-VD784, AEP-VD787, AEP-VD816, AEP-VD817, AEP-VD818, AEP-VD819, AEP-VD820, AEP-VD833, AEP-VD835, AEP-VD838, AEP-VD840, AEP-VD843, AEP-VD859, AEP-VD864, AEP-VD870, AEP-VD873, AEP-VD883, AEP-VD884, AEP-VD885, AEP-VD892, AEP-VD895, AEP-VD896, AEP-VD899, AEP-VD902, AEP-VD903, AEP-VD909, AEP-VD1121, AEP-VD1122, AEP-VD1123, AEP-VD1124, AEP-VD1131, AEP-VD1132, AEP-VD1133, AEP-VD1134, which are overloads on the EXC&L PM- S SIDE 34.5kV line and the EXC&L PM- STERLING1 34.5kV line, and voltage magnitude and/or drop violations at buses BLUELICKSS 34.5kV, CEN AVE 34.5KV, DANA COR 34.5kV, DAYS INN 34.5kV, ELIZABET 34.5kV, JONES CT 34.5kV, MILCORSS 34.5kV, ROBB AVE 34.5kV, ROCKHILL 34.5KV, ST RITA 34.5kV, SUP META 34.5kV, WRIGHT 34.5kV, FORD LIMA1 138kV, FORD LIMA2 138kV, and ROCKHILL1 138kV.

**Proposal Window Exclusion:** Below 200kV Exclusion

**Required In-Service:** 6/1/2025

**Projected In-Service:** 6/1/2025

**Previously Presented:** 10/6/2020



**Process Stage:** Second Review

**Criteria:** Summer Generator Deliverability

**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 RTEP Summer case

**Proposal Window Exclusion:** Substation Equipment

**Problem Statement:** Steel City 500/230 kV transformer #1 is overloaded for single contingency loss of the Hosensack – Steel City 500 kV circuit. (FG# GD-S6)

**Existing Facility Rating:** 685SN/879SE, 864WN/1017WE MVA

**Proposed Facility Rating:** 884SN/SE1200 MVA  
1109WN/WE1200 MVA

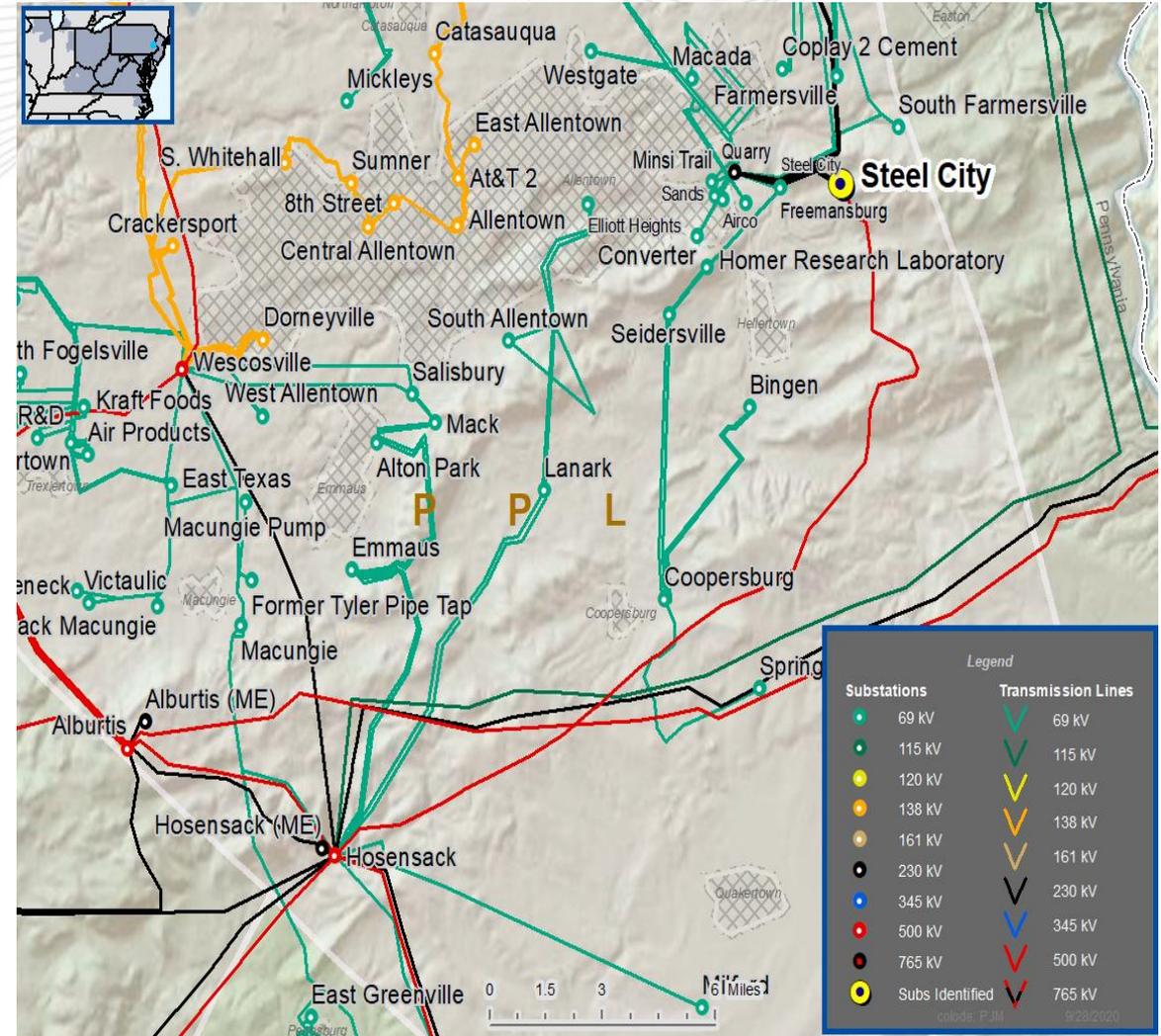
**Recommended Solution:**

Replace terminal equipment (bus conductor) on the 230 kV side of the Steel City 500/230 kV transformer #1. (B3221)

**Estimated Cost:** \$0.091 M

**Alternatives:** N/A

**Required In-Service:** 6/1/2025



# 2020 RTEP Window 3 Update

## Timeline

- Window 3 Opened: September 18, 2020
- Window 3 Closed: October 19, 2020

3 proposals received from 2 entities

- 1 proposal includes cost containment provisions
- 1 proposal is greenfield construction
- Proposal 697 resubmitted from Window 1



# 2020 RTEP Proposal Window 3 - Proposals

Proposal ID#	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate	Cluster
860	Upgrade	West Mount Vernon Area Rebuilds	12.926	AEP	69kV, 138/69kV	Thermal	AEP-T431, AEP-T464, AEP-T475, AEP-T430, AEP-T474, AEP-T485, AEP-T473, AEP-T484, AEP-T472, AEP-T483, AEP-T471, AEP-T482, AEP-T470, AEP-T481, AEP-T480, AEP-T429, AEP-T469, AEP-T424, AEP-T479, AEP-T467, AEP-T478, AEP-T466, AEP-T477, AEP-T476	1
533	Greenfield	Wolf Run - Gambier - Martinsburg Transmission Project	21.129	AEP	69kV, 138/69kV	Thermal	AEP-T431, AEP-T464, AEP-T475, AEP-T430, AEP-T474, AEP-T485, AEP-T473, AEP-T484, AEP-T472, AEP-T483, AEP-T471, AEP-T482, AEP-T470, AEP-T481, AEP-T480, AEP-T429, AEP-T469, AEP-T424, AEP-T479, AEP-T467, AEP-T478, AEP-T466, AEP-T477, AEP-T476	1
697	Upgrade	Mount Vernon Area Line Reconfiguration	1.286	AEP	69kV, 138kV	Thermal	AEP-T431, AEP-T464, AEP-T475, AEP-T430, AEP-T474, AEP-T485, AEP-T473, AEP-T484, AEP-T472, AEP-T483, AEP-T471, AEP-T482, AEP-T470, AEP-T481, AEP-T480, AEP-T429, AEP-T469, AEP-T424, AEP-T479, AEP-T467, AEP-T478, AEP-T466, AEP-T477, AEP-T476	1

Note: Proposal 697 resubmitted from Window 1



# RTEP 2020 15 Year Analysis Results

2019 RTEP 15 Year Analysis - Single Result							
Fr Bus	Fr Name	To Bus	To Name	CKT	KVs	Areas	100% Year
213543	CROYDO N30	219102	BURLING	1	230/230	230/231	2032

2019 RTEP 15 Year Analysis - Tower Result							
Fr Bus	Fr Name	To Bus	To Name	CKT	KVs	Areas	100% Year
No reliability violations identified							

- Per PJM Manual 14B section C.4.4, the outcome of the long-term deliverability analysis will identify the need to include in the RTEP any:
  - New 230 kV or 345 kV circuits to support load growth in years 6 through 8,
  - Right-of way acquisition for any new 230 kV or 345 kV circuits to support load growth in years 9 and 10,
  - New 500 kV or greater circuits to support load growth in years 6 through 12.
- PJM identified one 230 kV overload in year 12 but there are no requirements to address the overload at this point.

- If you have any questions related to Competitive Planning Process and Competitive Planner Tool, please contact [ProposalWindow-Admin@pjm.com](mailto:ProposalWindow-Admin@pjm.com)
- If you need an assistance with registration to Competitive Planner Tool, please contact [AccountManager@pjm.com](mailto:AccountManager@pjm.com)
- PJM Competitive Planning Process Webpage  
<https://www.pjm.com/planning/competitive-planning-process.aspx>
- Access Competitive Planner tool through PJM Planning Center Webpage  
<https://www.pjm.com/markets-and-operations/etools/planning-center.aspx>
- Competitive Planner Tool Updates at Tech Change Forum  
<https://www.pjm.com/committees-and-groups/tech-change-forum.aspx>

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## Reliability Analysis Update



### Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

# Questions?



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2020

- TEAC meetings are the following Tuesdays or Wednesday in 2020
- 1/7, 2/4, 3/10, 4/14, 5/12, 6/2, 7/7, 8/4, 9/1, 10/6, 11/4 (Wednesday), 12/1.

Version No.	Date	Description
1	10/23/2020	<ul style="list-style-type: none"> <li>Original slides posted to include Tanners Creek 345kV Circuit Breaker “R1” Immediate-need Reliability Project slide</li> </ul>
2	10/30/2020	<ul style="list-style-type: none"> <li>Updated Window 3 statistics with Proposal 697</li> </ul>
3	11/2/2020	<ul style="list-style-type: none"> <li>Updated Window 3 statistics with Proposal 697</li> </ul>
4	11/2/2020	<ul style="list-style-type: none"> <li>Updated Slide #34, Added additional scope, B3270.1, to fix the overdutied breakers identified in the PJM’s DNH study</li> <li>Added Slide #39 - #41, Project B3272 for the 2<sup>nd</sup> read</li> </ul>
5	11/5/2020	<ul style="list-style-type: none"> <li>Updated Window 3 statistics Proposal 697 flowgate list</li> <li>Slide #23, Updated estimated costs for Proposal 915</li> <li>Correct location of slide seven (slide was previously slide five) and corrected spelling on the slide</li> <li>Add cluster numbers t1/5/2020 o slides which refer to clusters</li> <li>Add new slide 5 which provides summary of the status for RTEP Window 1 competitive clusters</li> <li>Updated format of revision slide</li> </ul>

Version No.	Date	Description
6	12/2/2020	<ul style="list-style-type: none"><li>• Slide #34, Updated the preliminary rating for the new 2<sup>nd</sup> Dragoon transformer</li><li>• Slide #35, Corrected the 2<sup>nd</sup> Dragoon transformer KV level from 138/34.5KV to 138/69/34.5kV</li></ul>
7	1/8/2021	<ul style="list-style-type: none"><li>• Slide #33, Corrected type “Ben” to “Bend”</li></ul>
8	2/5/2021	<ul style="list-style-type: none"><li>• Slide #36, Added FGs: AEP-VM783, AEP-VM796</li></ul>