

Sub Regional RTEP Committee: Western AEP Supplemental Projects

Sept 16, 2022

Changes to the Existing Projects

AEP Transmission Zone: Supplemental S0350 Cancellation

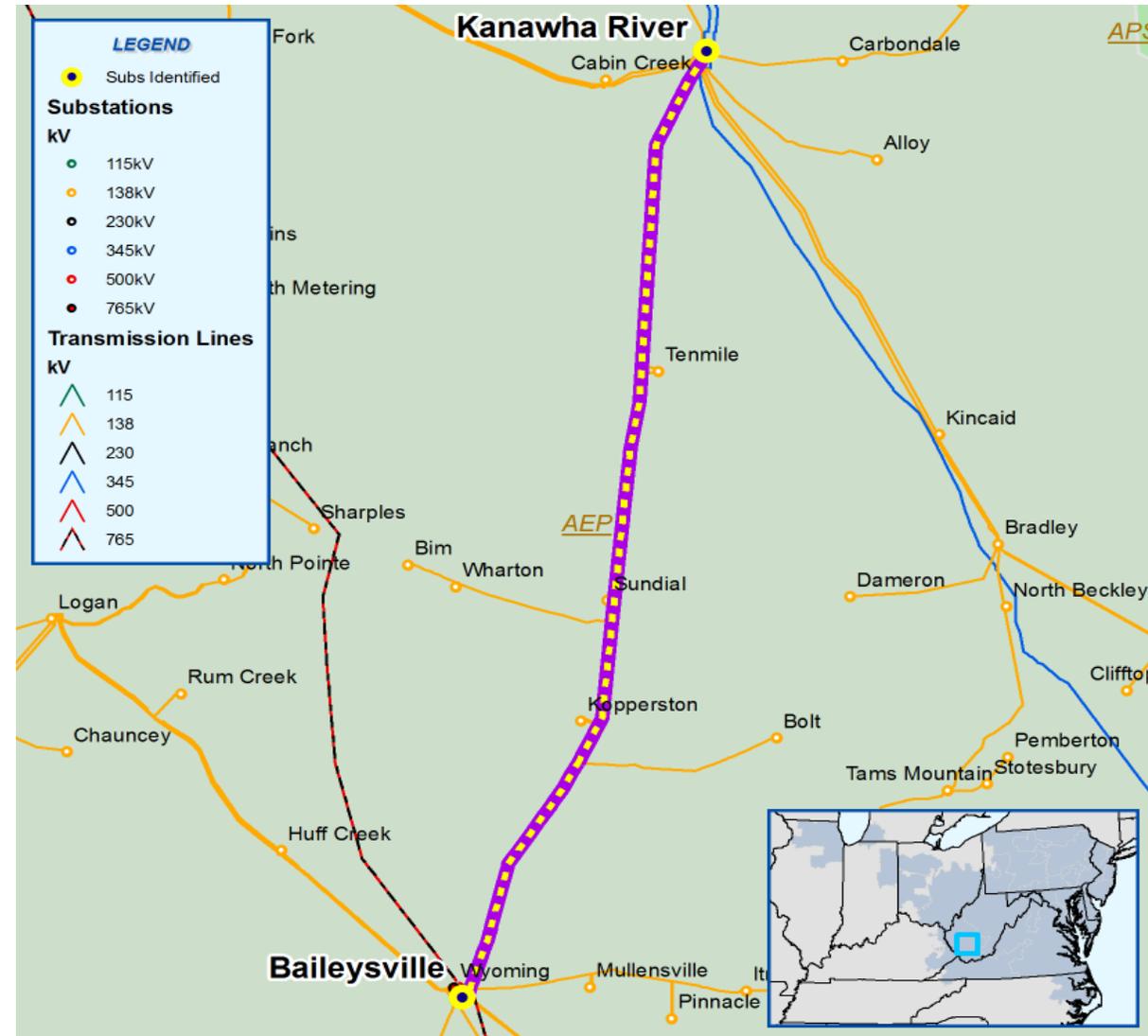
S3050: Presented in 10/27/2011 Western SRTEP

Project Scope: Build a new 138kV double circuit off the Kanawha – Baileysville #2 138kV circuit to Skin Fork Station; Replace 5 Moab's on the Kanawha – Baileysville line with breakers at Sundial 138 kV station. (S0350)

Estimated Project Cost: \$11M

Expected IS date: 10/31/2012

Reason for the cancellation: This work was required to complete baseline work and was absorbed into B1470.3 and B2611. This scope of work is in-service. S0350 can be cancelled.



Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

AEP Transmission Zone: Supplemental New Carlisle, IN

Need Number: AEP-2022-IM018

Process Stage: Needs Meeting 10/14/2022

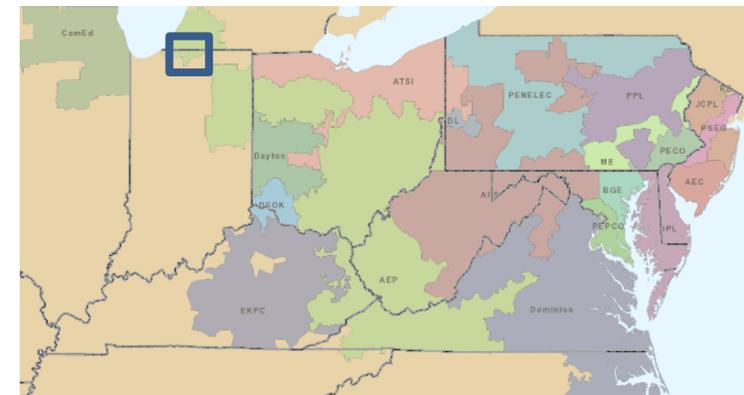
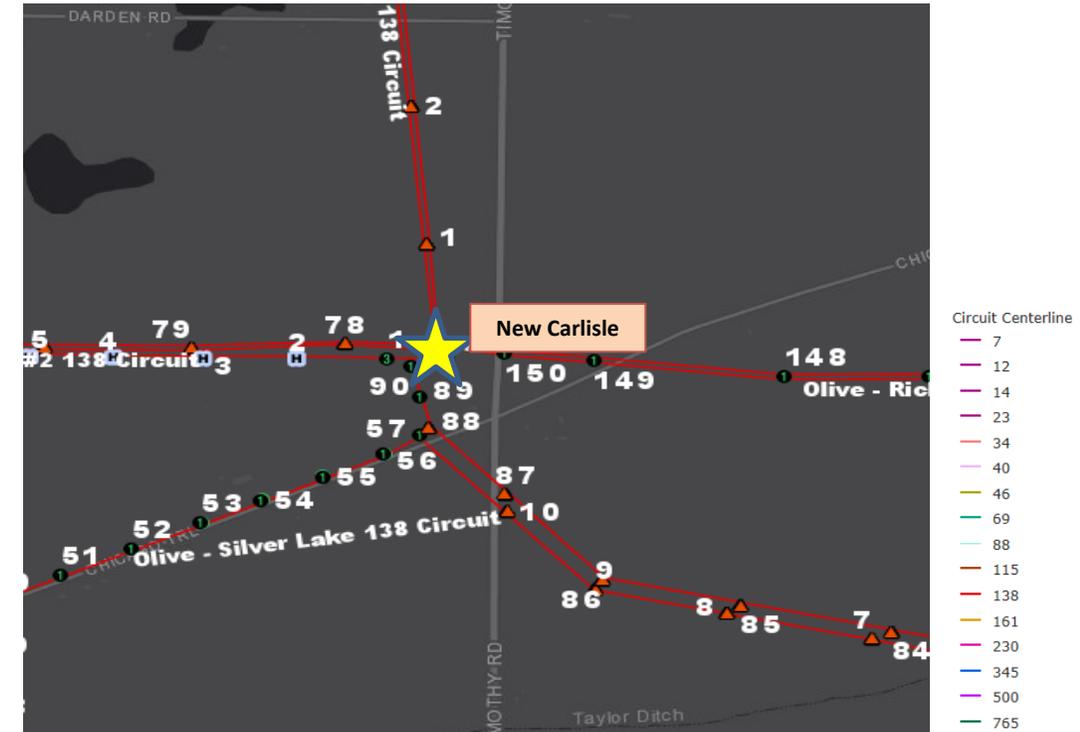
Supplemental Project Driver: Equipment Material/Condition/Performance/Risk

Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

New Carlisle 138kV Circuit Breaker A:

- Only air trip breaker remaining at the station and is subject to large air leaks which will cause the breaker to not trip before a lockout situation occurs.
- The air system is not designed to produce dry air, which in turn means that rusting and damaging components are common. Field services have been called out numerous times in a lockout position due to frozen airlines.
- The pneumatic system is consistently causing tripping issues, especially in the winter.
- Trip timing results are increasing, even after performing maintenance and rebuilding the pilot valve in the breaker. Trip timing results are 9ms longer than what the manufacturer recommends (less than 33 milliseconds are recommended).
- This breaker clearing times are expected to continue to get worse, which will eventually lead to not tripping at all under fault conditions.



AEP Transmission Zone M-3 Process Richland County, OH

Need Number: AEP-2022-OH010

Process Stage: Need Meeting 10/14/2022

Project Driver:

Equipment Material/Condition/Performance/Risk, Operational Flexibility

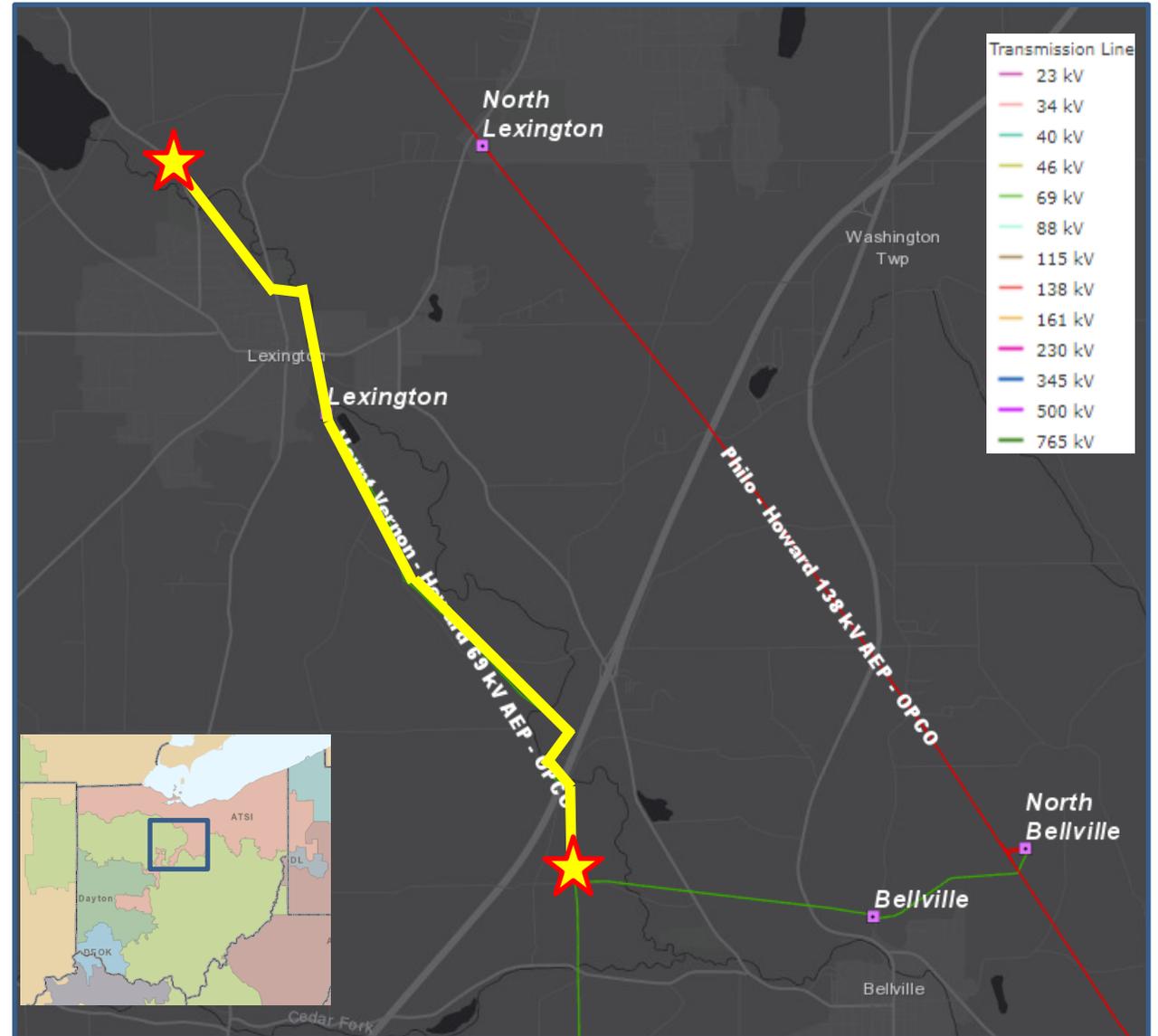
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Mount Vernon – Howard 69kV (Structure 487 – 615):

- Length of Line: 5.6 Miles
- Wooden monopole structures with vertical and horizontal insulators, originally installed in 1935
- Conductor Type: #1 COPPER 3 (#1COP)
- Outage History for 2017-2021: 14 Momentary and 9 Permanent outages
 - 2,998,390 reported CMI.
- Open Conditions: 23 structures with open conditions (28% of structures on this line)
 - 14 structure based open conditions specifically affecting the crossarm, filler block, knee/vee brace, and the pole including rot, split, insect damage, sitting in water, and broken pole conditions.
 - 1 conductor based open condition consisting of a broken dead end of a bird cage.
 - 2 grounding based open conditions consisting of broken ground lead wires.
 - 2 hardware based open conditions consisting of buried guys.
- The line is currently operated normally open at Lexington toward First Energy which results in AEP's Lexington station being served radially. It is operated as a flip flop scheme due to limitations on the FE source and the capacity of the line's conductor. Operation of the scheme requires a drop and pick of the customers at Lexington station.



Need Number: AEP-2022-OH048

Process Stage: Need Meeting 10/14/2022

Project Driver:

Equipment Material/Condition/Performance/Risk

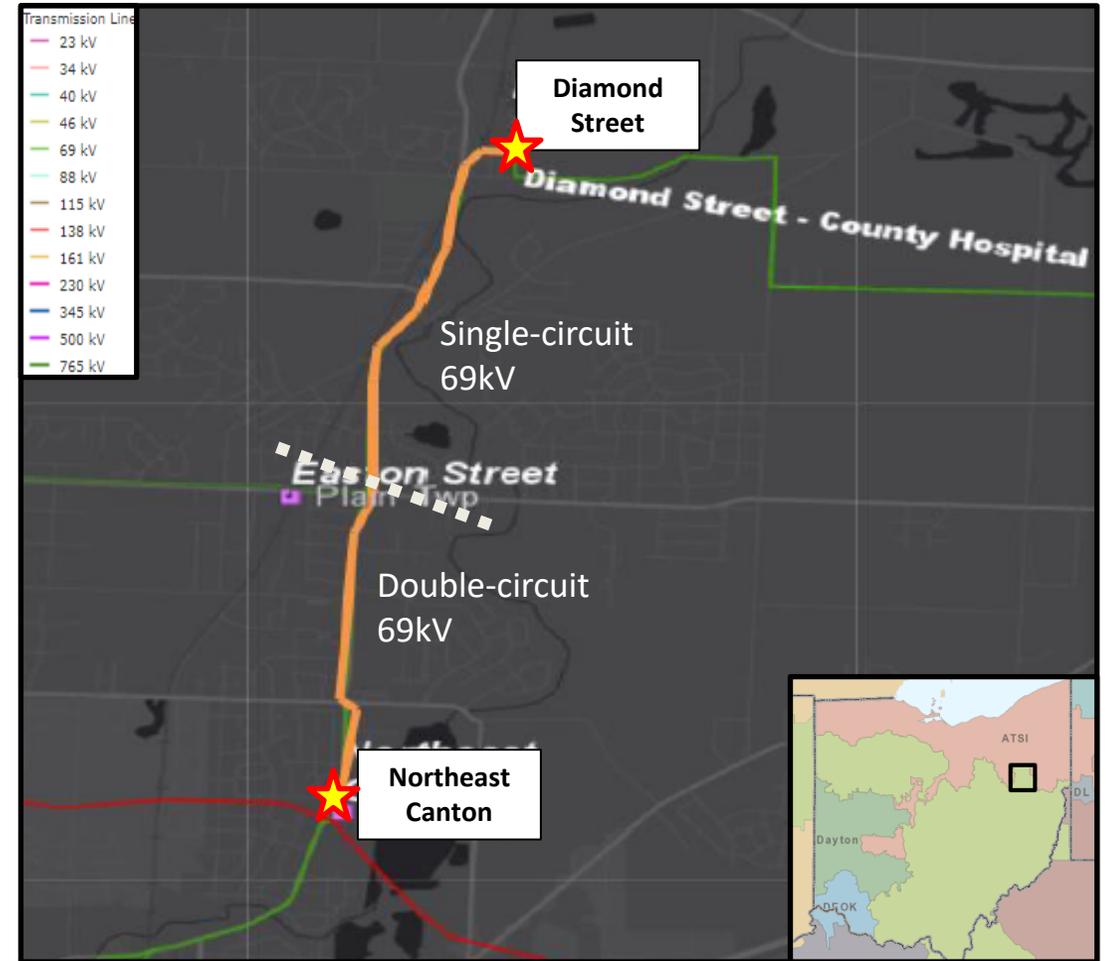
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Northeast Canton – Diamond Street 69kV (1954):

- Length of Line: 3.5 Miles (1.6 miles of which is double-circuit with Northeast Canton-Easton Street)
- Total Structure Count: 125
 - Wood: 123
 - 2 from 1940, 53 from 1950s, 37 from 1960s, 17 from 1970s, 11 from 1980's, 1 from 1992
 - Steel : 2 from 1976
- Conductor Types:
 - 795,000 CM ALUM/1350 from 1954; 2/0 COPPER 7 (20COP) from 1954; 4/0 COPPER 7 (40COP) from 1954
- Outage History: 8 outages with a total duration of 14.49 hours
 - Momentary Outage: 3; Permanent Outage: 5
- 17% of the structures on the line have at least one open condition including structure issues associated with rot heart, rot top, split crossarms, and woodpecker holes.
- The 69kV line does not meet 2017 NESC Grade B loading criteria and does not meet the current AEP structural strength requirements. The line is insulated with vertical post insulators which do not meet current AEP standards for CIFO and minimum leakage distance requirements. The shield angle is inadequate compared to current AEP shield angle requirements.
- Seven representative structures on the line were assessed in detail by a ground crew. All of the sampled structures had conditions. Most common were: shell rot or topper deterioration (6), crossarm cracking (6), rusting of crossarm hardware (5), and woodpecker holes on the pole (4).



Need Number: AEP-2022-OH050

Process Stage: Need Meeting 10/14/2022

Project Driver:

Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Greenlawn Station:

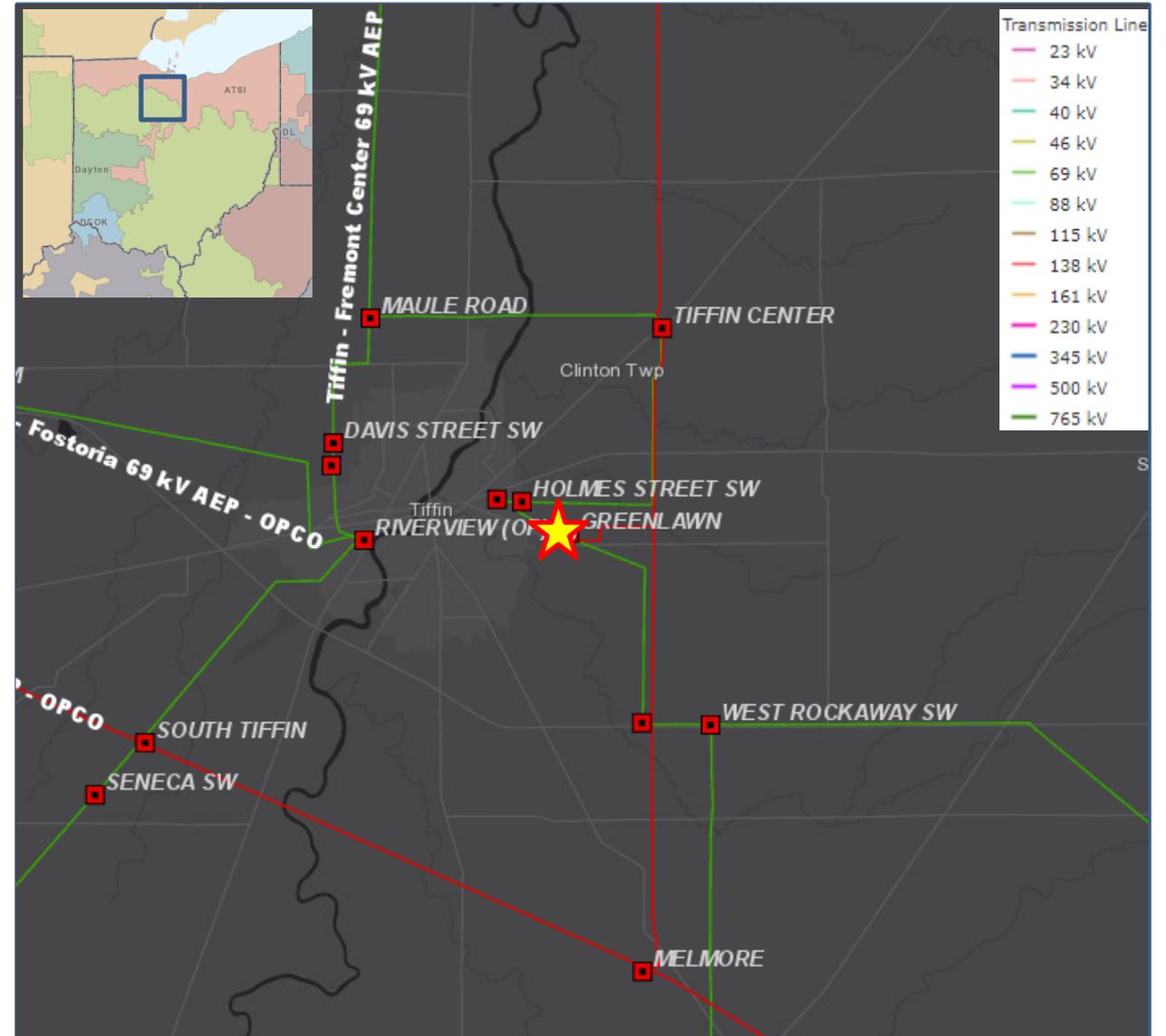
Circuit Breakers G & H:

- Breaker Age: 1973
- Interrupting Medium: Oil
- Fault Operations: G: 7, H: 138
- Manufacturer recommended Number of Operations: 10
- Additional Breaker Information: These breakers are oil filled without oil containment; oil filled breakers have much more maintenance required due to oil handling that their modern, SF6 counterparts do not require.

Circuit Breaker F:

- Breaker Age: 1965
- Interrupting Medium: Oil
- Additional Breaker Information: This breaker is oil filled without oil containment; oil filled breakers have much more maintenance required due to oil handling that their modern, SF6 counterparts do not require. The manufacturer provides no support for the this family of circuit breakers and spare parts are not available.

Relays: Currently, 10 of the 24 relays (44% of all station relays) are in need of replacement. All 10 of these are of the electromechanical type which have significant limitations with regards to spare part availability and fault data collection and retention.



AEP Transmission Zone M-3 Process Richland County, OH

Need Number: AEP-2022-OH051

Process Stage: Need Meeting 10/14/2022

Project Driver:

Equipment Material/Condition/Performance/Risk

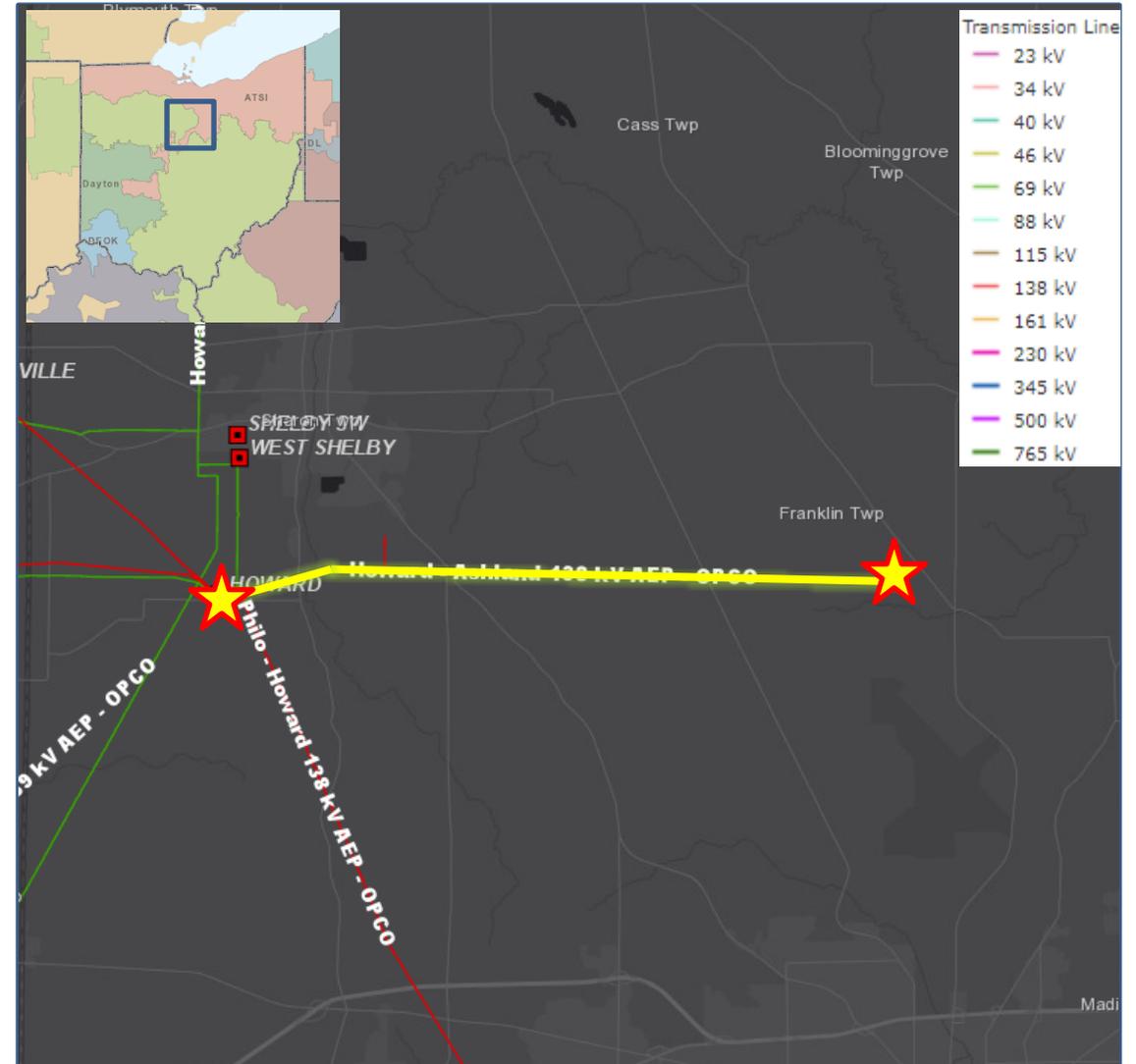
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Howard Ashland 138kV (1930):

- Length of Line: 8.09 Miles
- Total Structure Count: 47
- Steel lattice structures with vertical insulators
- Conductor Types: 397,500 CM ACSR 30/7 (Lark)
- Outage History: 3 Momentary and 3 Permanent outages – average duration of 18.2 hours over the past five years.
- Open Conditions: Currently 37% of the structures on the line have at least one open condition related to hardware issues including loose and burnt insulators.
- This line is primarily made of the original 1938 structures (97.9%). Due to the age of the assets the line is entering its accelerated deterioration phase of life. Significant deterioration results in loss of strength and performance, posing a risk of failure under conditions the assets should be able to withstand. These failures may cause frequent and extended outages, create significant economic losses and endanger public safety
- 12 structures were assessed by an aerial drone outside the typical maintenance cycle. Reported conditions included the following: four structures had flashover-arcing damage to insulators, two structures had polymer insulators damaged and two structures had rust & corrosion to end fittings.
- The line fails to meet 2017 NESC Grade B loading criteria, AEP structural strength requests, and current ASCE structural strength requirements.



Need Number: AEP-2022-OH071

Process Stage: Need Meeting 10/14/2022

Project Driver:

Customer Service

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

- A customer has requested additional 138 kV deliveries to their site in Columbus, Ohio near AEP's proposed Cyprus station (s2526).
- The initial peak demand at these new delivery points will be approximately 200 MW and the ultimate capacity of the customer will be up to 675 MW at the site.



Need Number: AEP-2022-OH074

Process Stage: Need Meeting 10/14/2022

Supplemental Project Driver:

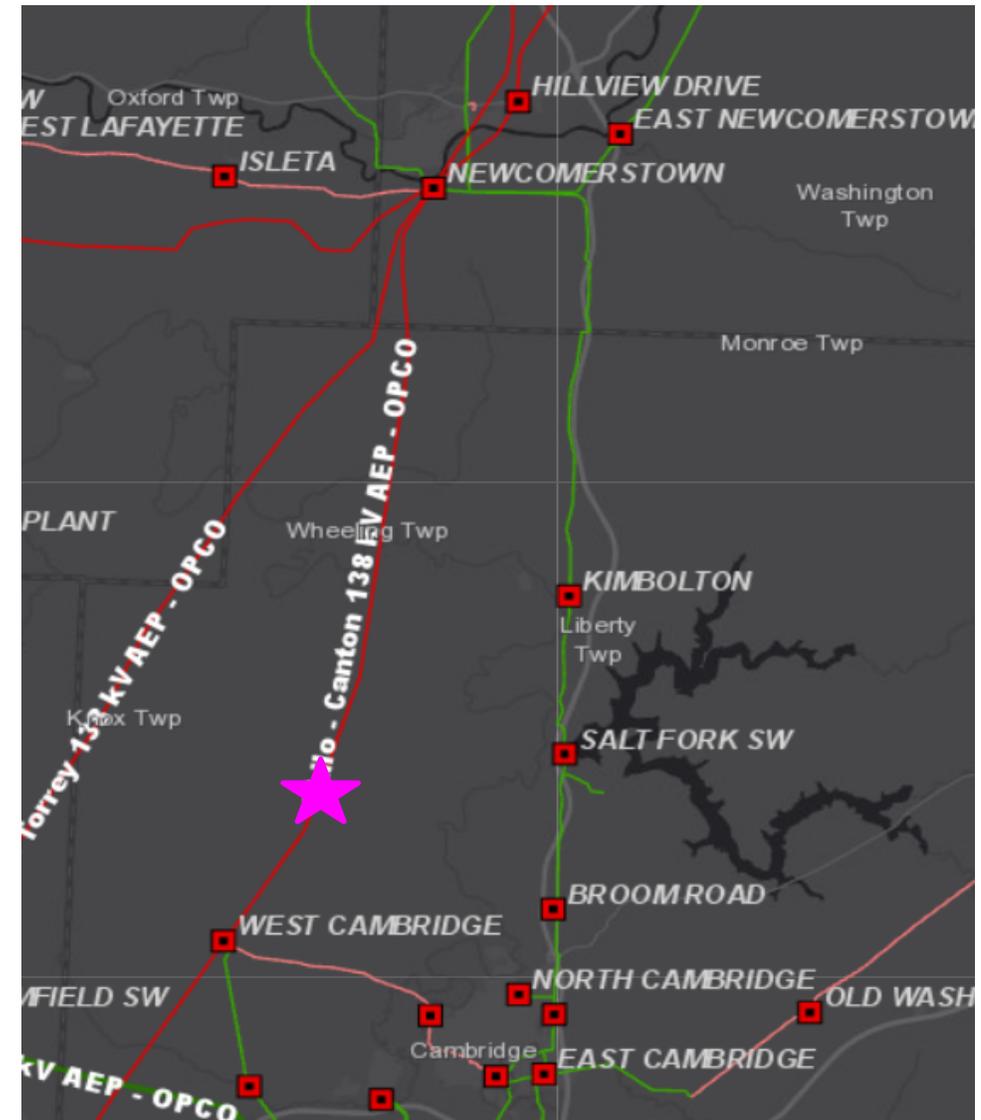
Customer Service

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions slide 7)

Problem Statement:

- Buckeye is requesting on behalf of Guernsey Muskingum Electric Cooperative for a new 138kV delivery point on the Philo-Newcomerstown 138kV Circuit by December 2025. Anticipated load is 6 MW.



Solutions

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

AEP Transmission Zone M-3 Process Wagenhals Station Upgrade

Need Number: AEP-2021-OH001

Process Stage: Solution Meeting 10/14/2022

Previously Presented: Need Meeting 1/15/2021

Project Driver:

Equipment Material/Condition/Performance/Risk; Operational Flexibility and Efficiency

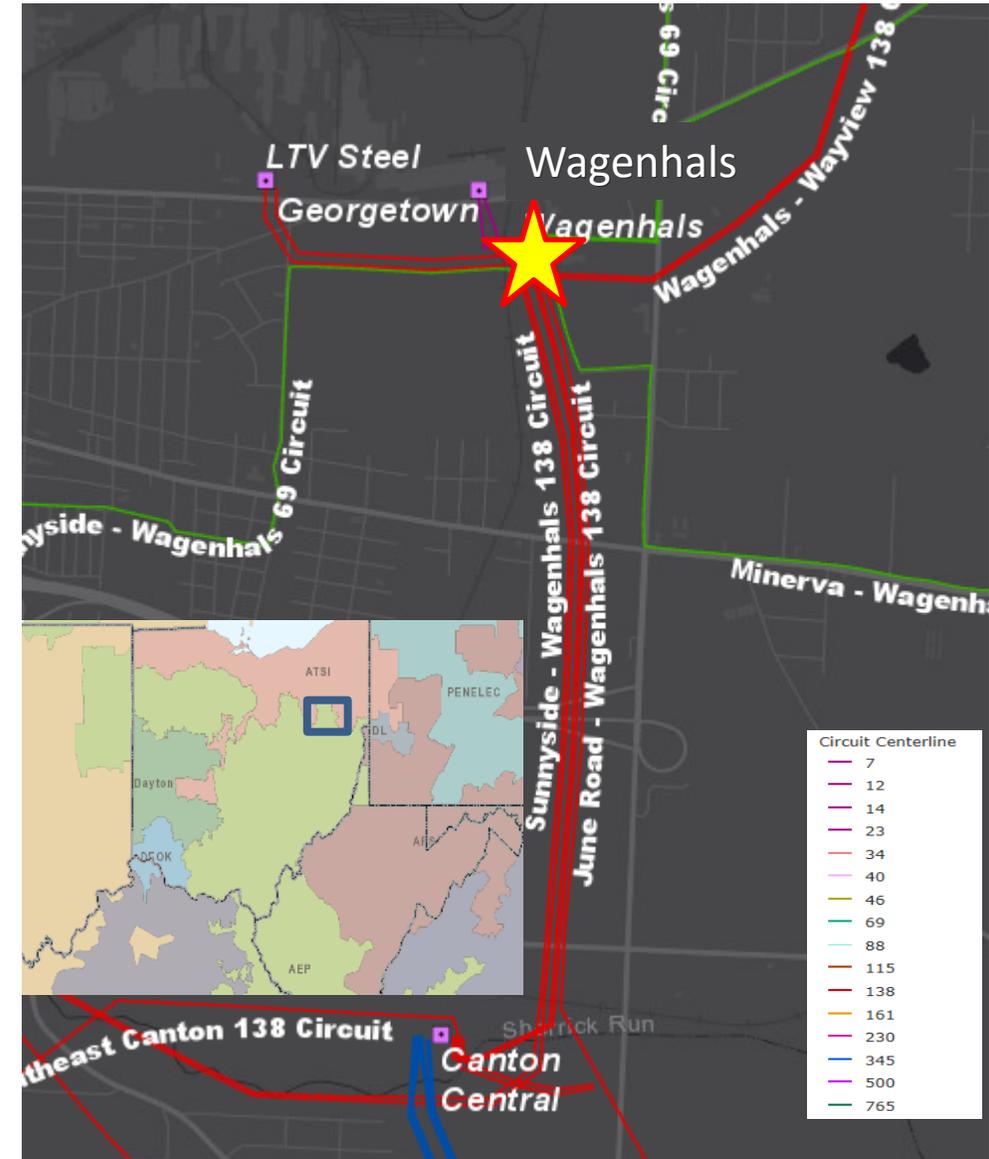
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (slide 13-14)

Problem Statement:

Equipment Material/Condition/Performance/Risk:

- The Wagenhals 138-69-23kV station was originally constructed in 1943.
- The station directly serves approximately 140 MW of industrial load (130 MW steel mill at 138kV; 10 MW casting plant at 23kV).
- The 138-23kV transformer #1 (vintage 1957) has the following asset concerns: insulation breakdown, elevated levels of CO2, high moisture readings, leaks, and wood-tie foundations in poor condition.
- The 138-69-23kV transformer #2 (vintage 1967) has the following asset concerns: insulation breakdown, elevated ethane and ethylene levels, high moisture readings, and low dielectric strength, and wood-tie foundations in poor condition.
- The control house has various issues: water intrusion, animal-related damage, lead paint, leaking roof, and asbestos.
- The 23kV yard has corroded steel and crumbling foundations, along with cap-and-pin insulators. In addition, energized equipment does not meet current clearance requirements.
- There are environmental concerns: positive tests for PCB's; lead paint and asbestos, which are a safety risk to field personnel.
- The ground grid is inadequate and the AC station service and DC cabinets are in very poor condition.
- All 3 station transformers lack an oil containment system.



AEP Transmission Zone M-3 Process Wagenhals Station Upgrade

Need Number: AEP-2021-OH001

Process Stage: Solution Meeting 10/14/2022

Previously Presented: Need Meeting 1/15/2021

Project Driver:

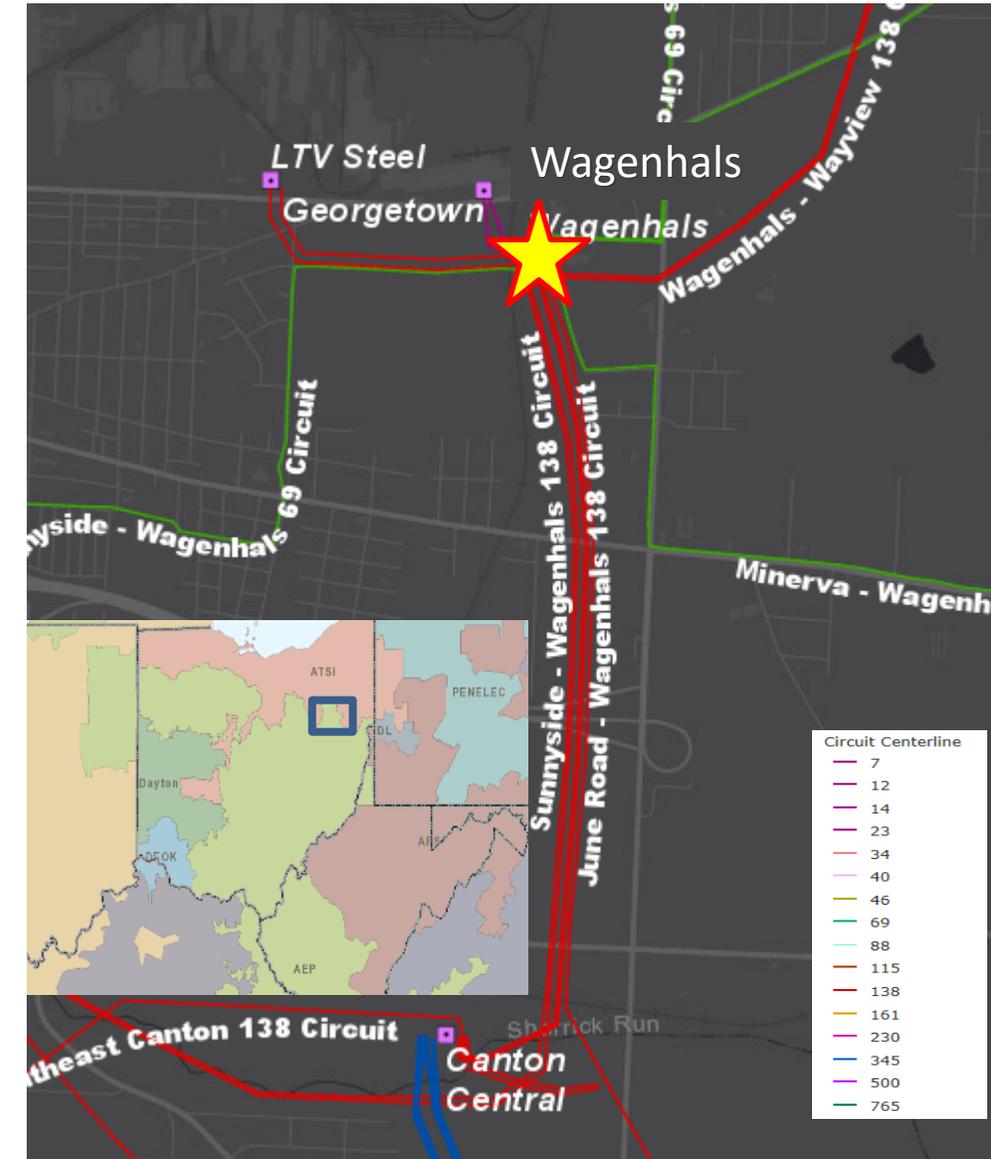
Equipment Material/Condition/Performance/Risk; Operational Flexibility and Efficiency

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (slide 13-14)

Problem Statement:

- 138kV breaker 'H' has routine SF6 leaks and 138kV breaker 'A' has an oil leak.
- There are 3- 69kV oil-filled breakers (P, Q, S), installed between 1962-1970, that are oil filled without oil containment; oil filled breakers have much more maintenance required due to oil handling requirements. In addition, spare parts or technical support for these breakers are not available. This model of breakers has been prone to hydraulic mechanism malfunctions.
- The 2- 23kV breakers are oil-filled and were installed in 1977. These breakers are oil filled without oil containment; oil filled breakers have much more maintenance required due to oil handling that their modern, SF6 counterparts do not require. In addition, spare parts or technical support for these breakers are not available. This model of breakers has been prone to hydraulic mechanism malfunctions.
- There are a large number of 69kV and 23kV transmission hook-stick switches identified in need of replacement with Gang Operated Air-Breaker Switches (GOAB)
- The 138kV & 23kV PT's are original to the station (1943) and have significant rusting and are at risk of oil spills.
- The station contains 103 electromechanical relays and 1 static relay. These relays have significant limitations with regard to spare part availability, SCADA functionality, and fault data collection and retention. In addition, these relays lack vendor support. The relays of concern are involved with 138kV, 69kV, & 23kV circuit protection, 69kV & 23kV bus protection, and transformer protection.



AEP Transmission Zone M-3 Process Wagenhals Station Upgrade

Need Number: AEP-2021-OH001

Process Stage: Solution Meeting 10/14/2022

Previously Presented: Need Meeting 1/15/2021

Project Driver:

Equipment Material/Condition/Performance/Risk; Operational Flexibility and Efficiency

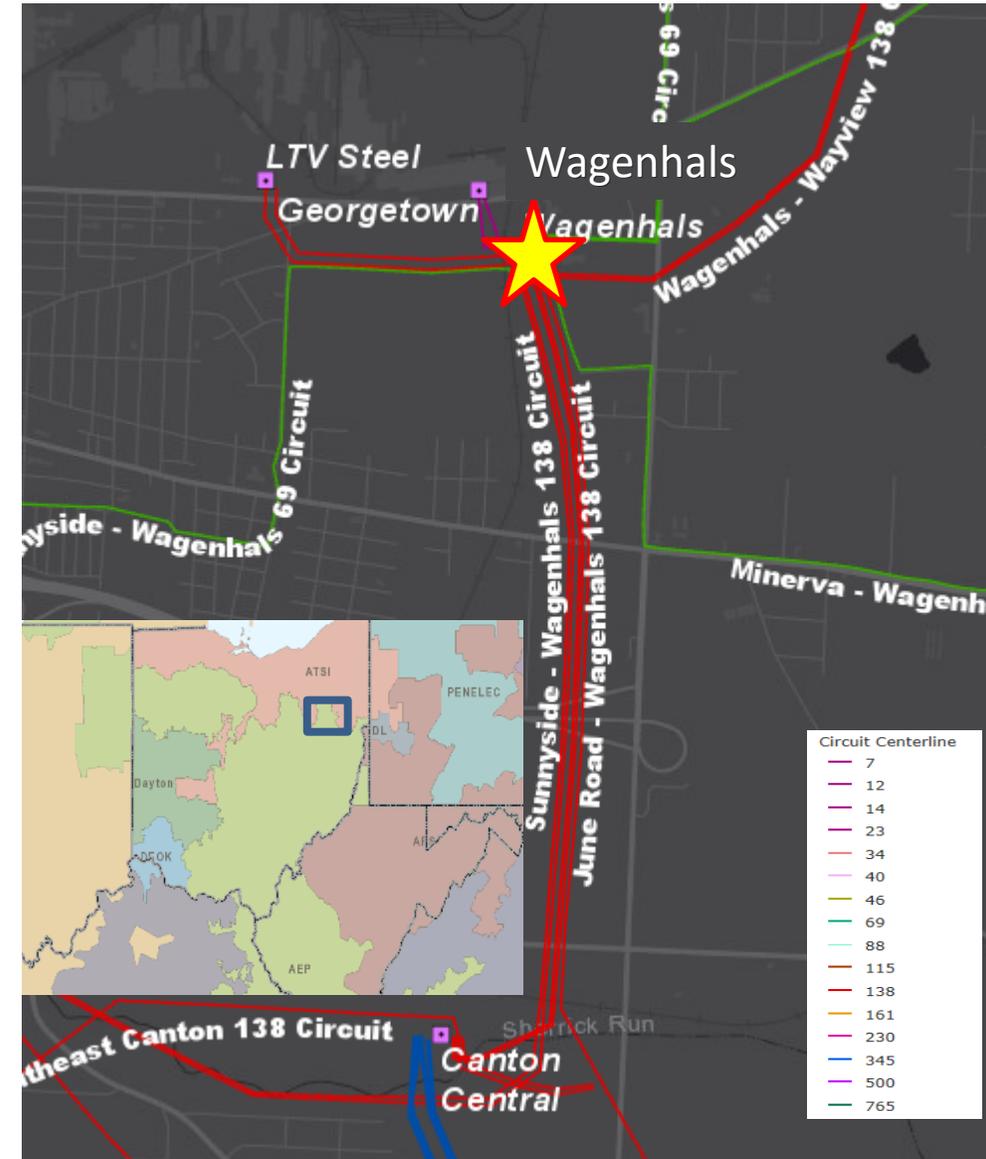
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (slide 13-14)

Problem Statement:

Operational Flexibility and Efficiency:

- The 3- transformers lack a high-side fault interrupting devices and require tripping an entire 138kV bus to clear a fault. These dissimilar zones of protection can cause over tripping and mis-operations.
- The 138kV design consists of 2- straight buses with a single bus-tie breaker, this configuration causes extended outages for maintenance, especially for a station serving a major steel customer. A stuck-breaker contingency on the 138kV bus-tie breaker requires tripping 9- 138kV breakers, 4- 69kV breakers, and 2- 23kV breakers (15 total breakers), taking the entire station out of service. This contingency would result in load loss of approximately 140 MW, loss of a 138kV cap bank, plus the loss of 2 sources to the local 69kV system.



AEP Transmission Zone M-3 Process

Wagenhals Station Upgrade

Need Number: AEP-2021-OH001

Process Stage: Solution Meeting 10/14/2022

Proposed Solution:

Wagenhals Station: Construct a new Wagenhals 138-69kV station on greenfield property owned by AEP to the south of the existing station. The 138kV portion will be a breaker-and-a-half design, with a total of 17 breakers. The 69kV will be a 5-breaker ring bus. The existing 138-69kV transformer #3 and 138kV cap bank will be transferred, while the 138-69-23kV transformer #2 will be retired. **Estimated Cost: \$27.45 Million**

Retire the existing 138-69-23kV station, including structures and control house. **Estimated Cost: \$3.71 Million**

Relocate 8- 138kV transmission lines and 4- 69kV transmission lines to connect to the new station location. **Estimated Cost: \$10.48 Million**

Required environmental remediation at the existing station property. Dispose of PCB-contaminated soils, drainage tile, legacy oil piping and storage tanks, and synchronous condenser system. Final abatement plan to be determined with EPA. **Estimated Cost: \$1.17 - \$23.51 Million**

Wayview: Remote-end 138kV relay upgrades. **Estimated Cost: \$0.36 Million**

Sunnyside: Remote-end 69kV relay upgrades. **Estimated Cost: \$1.02 Million**

Stanley Court: Remote-end 69kV relay upgrades. **Estimated Cost: \$0.49 Million**

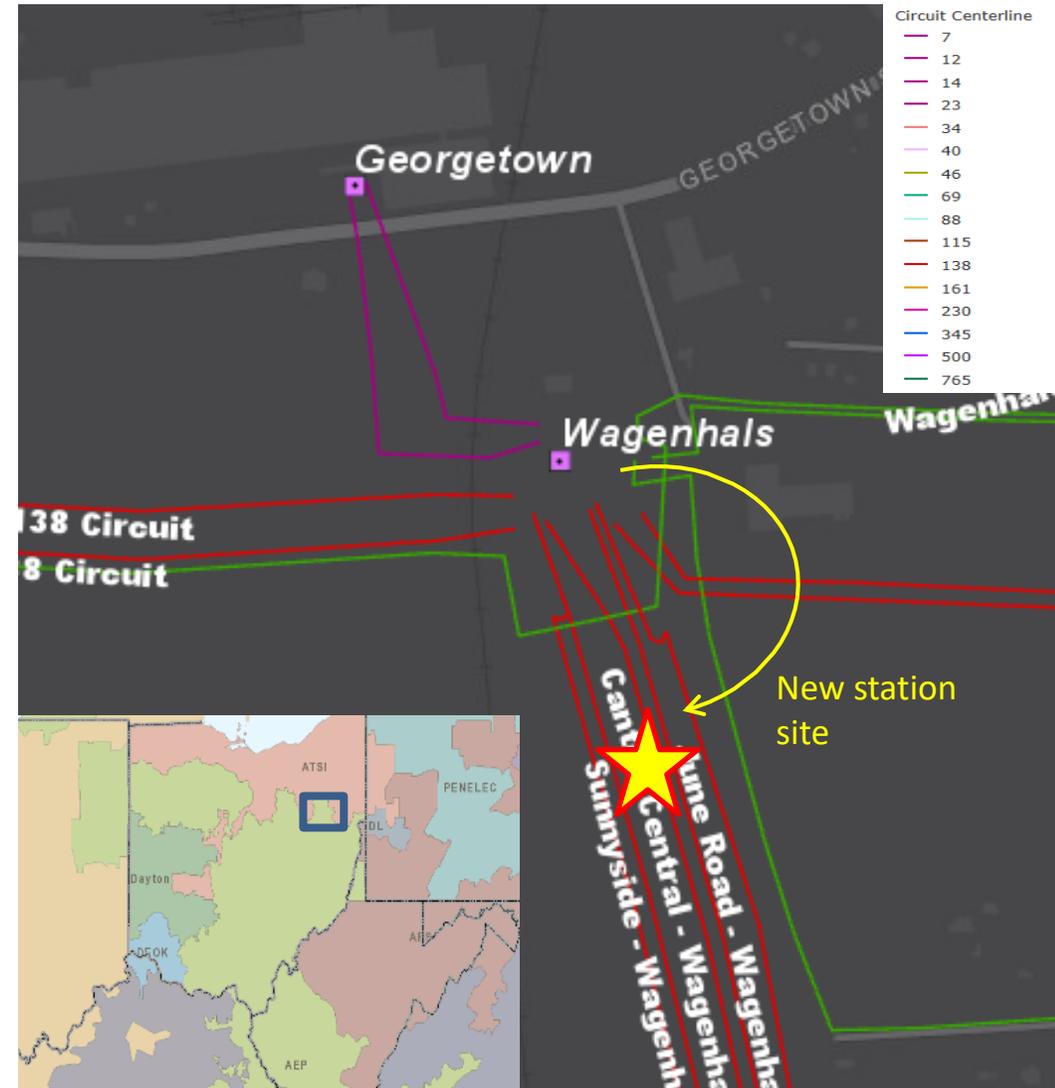
Total Estimated Transmission Cost: \$44.68 - 67.02 Million

Ancillary Benefits: The build-in-the-clear approach allows for the future environmental clean up and remediation of the existing station and also permits continuous service to the two industrial customer facilities served directly from Wagenhals.

Alternatives Considered: No viable alternatives. Given the extensive environmental concerns at the site rebuilding in place would not be feasible given the extended outages that would be required in order to be able to remediate the site.

Project In-Service: 6/1/2025

Project Status: Scoping

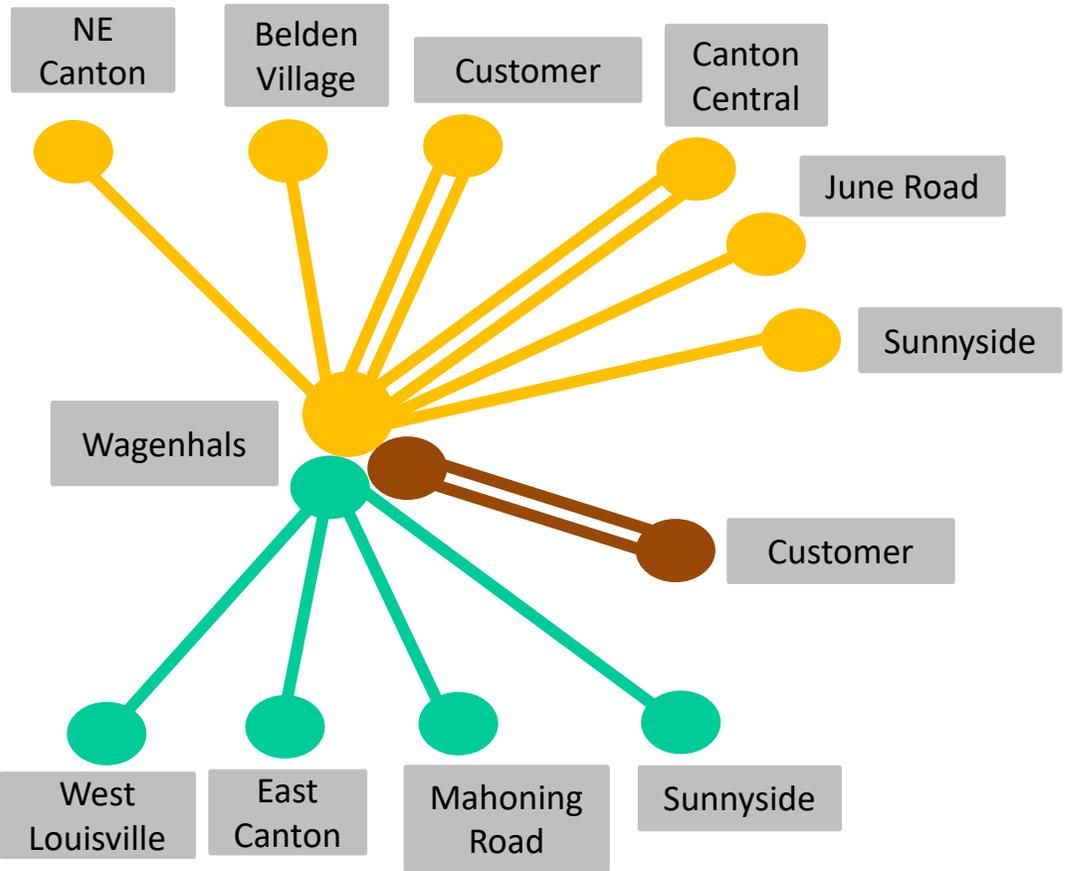


AEP Transmission Zone M-3 Process Wagenhals Station Upgrade

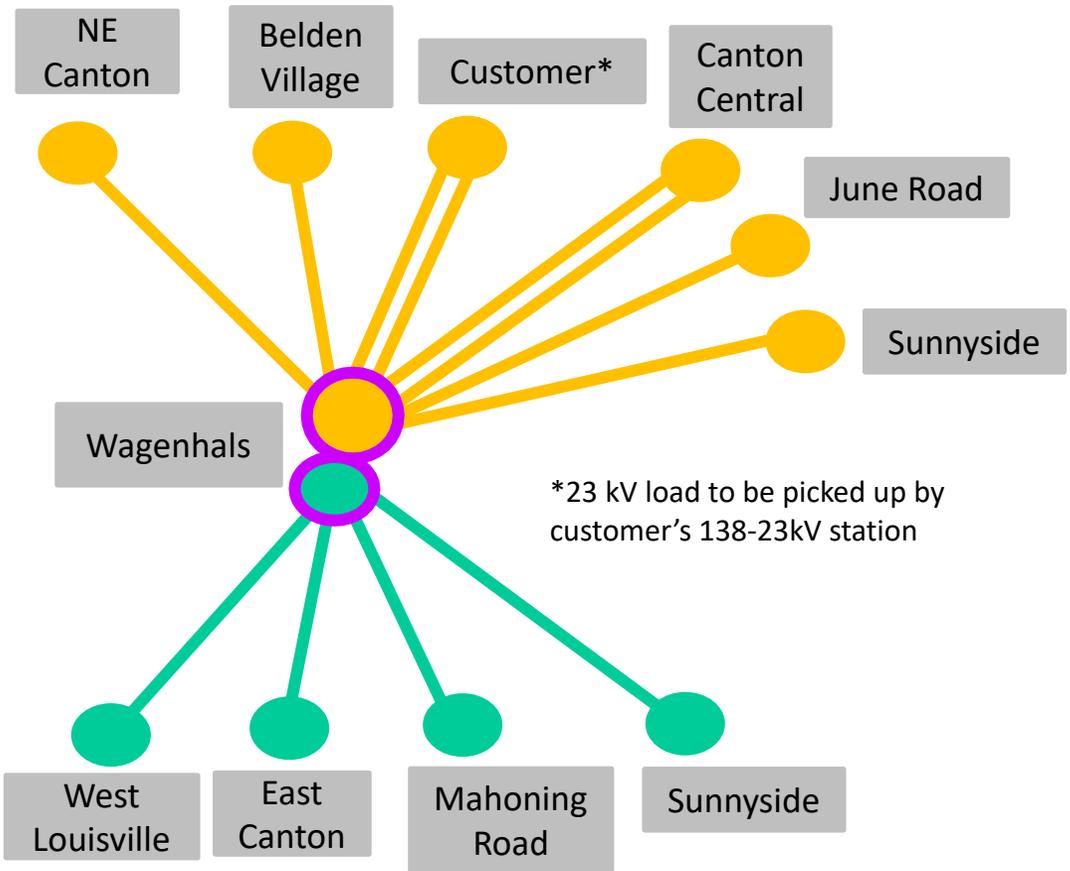
Need Number: AEP-2021-OH001
Process Stage: Solution Meeting 10/14/2022

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

Existing:



Proposed:



AEP Transmission Zone: Supplemental Albion Area Improvements

Need Number: AEP-2021-IM007

Process Stage: Solution Meeting 10/14/2022

Previously Presented: Needs Meeting 5/21/2021

Supplemental Project Driver: Equipment Material/Condition/Performance/Risk

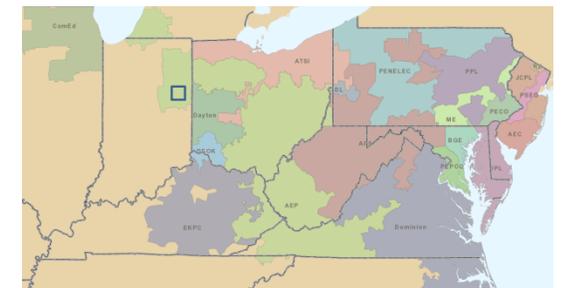
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

Albion 138/69kV

- Circuit Breaker “F” is a 1994 138kV 145-PA type Breaker.
 - The 145-PA Type Breakers are experiencing marked increases in malfunctions. There have been 437 recorded malfunctions on 132 total units of this model type on the AEP System. The most common issues are related to loss of SF6 gas and mis-operations. The expected life of the bushing gaskets and door inspection port seals is 25 years. Seals that are no longer adequate can cause SF6 leaks to become more frequent. Low SF6 pressure in the breaker reduces the ability of the breaker to correctly interrupt a fault. Additionally, low pressure alarms and SF6 leaks lead to increased maintenance costs. The manufacturer provides no support or parts for this model of circuit breakers. Finally, SF6 leaks impact the environment.
 - This breaker has experienced 17 faults, over the manufacturer recommended 10.
- Cap Switcher “BB” is a 1980’s vintage 138kV Mark V Cap Switcher.
 - Due to numerous malfunctions, cost of repair and lack of monitoring, AEP is replacing these units where viable.

Model: N/A



AEP Transmission Zone: Supplemental Albion Area Improvements

Need Number: AEP-2020-IM026

Process Stage: Solution Meeting 10/14/2022

Previously Presented: Needs Meeting 11/20/2020

Supplemental Project Driver: Equipment Material/Condition/Performance/Risk

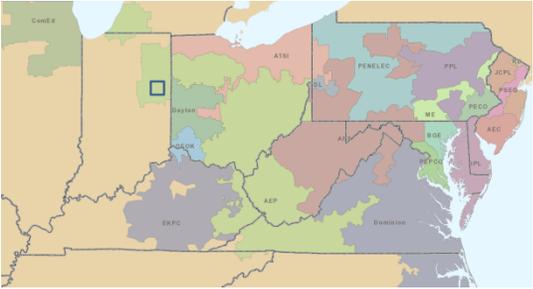
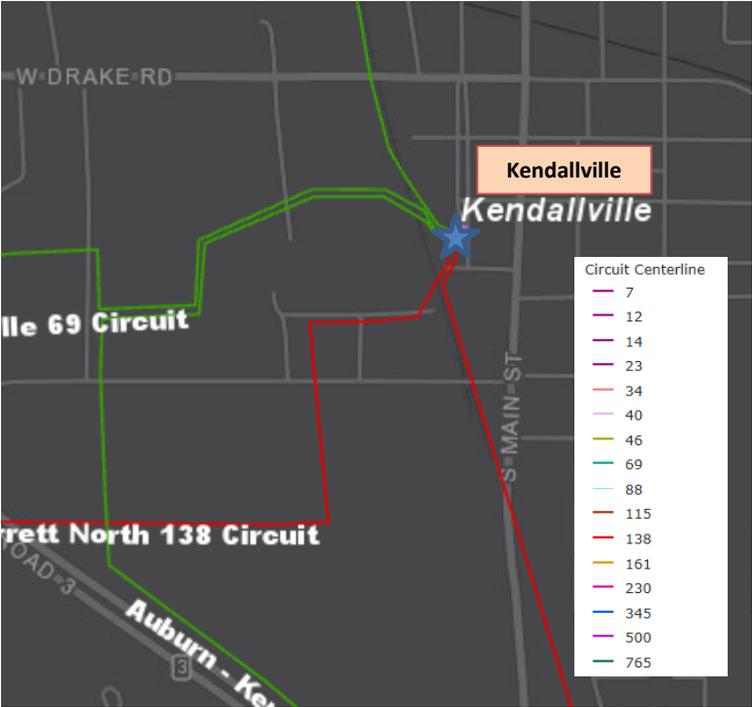
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Problem Statement:

Kendallville 138/69kV Station:

138/69kV Transformer 1

- Manufactured in 1971
- Transformer has increased levels of Ethane and CO2 indicated in the dissolved gas analysis
- Increased levels of CO2 and Ethane indicates decomposition of the paper insulating materials, which impairs the units ability to withstand faults.
- The downward Interfacial Tension trend paired with upward power factor trend and increased moisture content indicate that there are increased particles within the oil, decreasing the dielectric strength of the transformer.



AEP Transmission Zone: Supplemental Albion Area Improvements

Need Number: AEP-2021-IM006

Process Stage: Solution Meeting 10/14/2022

Previously Presented: Needs Meeting 02/17/2021

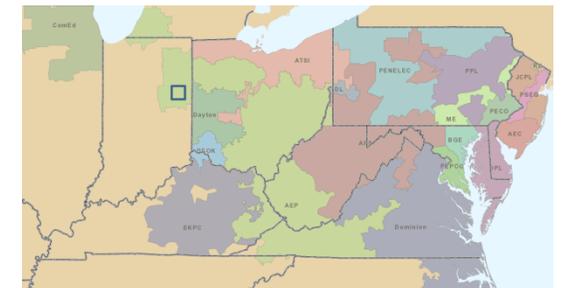
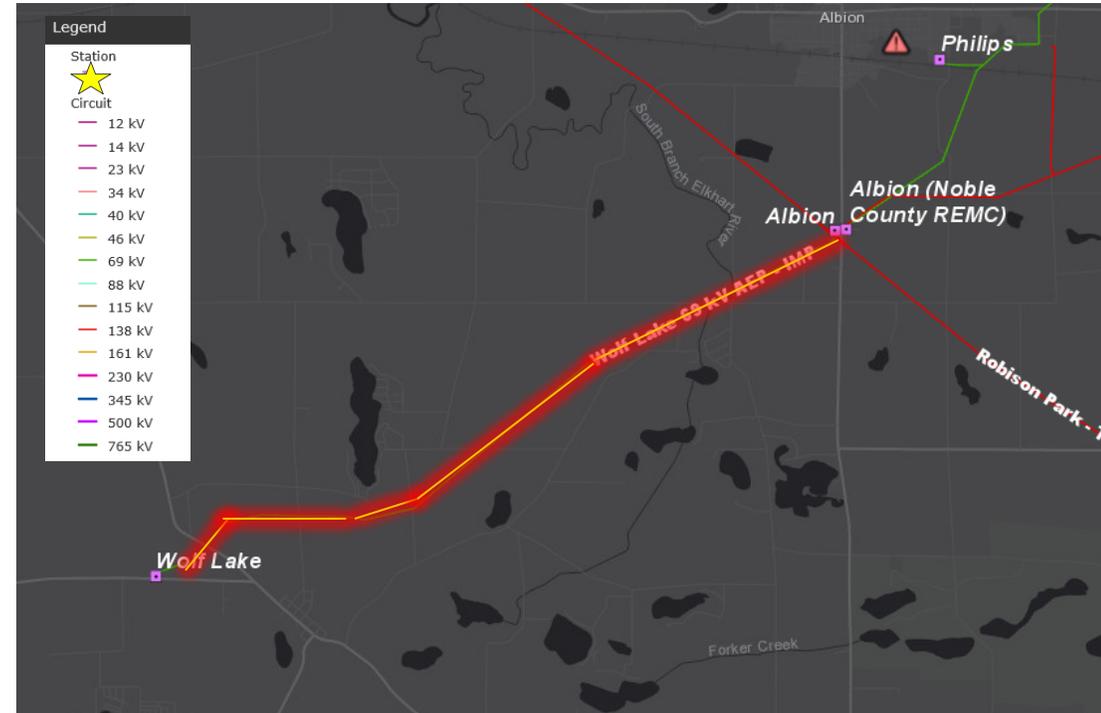
Supplemental Project Driver: Equipment Material/Condition/Performance/Risk

Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Problem Statement:

- **Wolf Lake Tap 69kV ~5.44 Miles**
 - **Original Construction Date:** 1958
 - **Original Construction Type:** Wood pole with 4/0 ACSR conductor (57/68 structures original from 1958)
 - **Outage History (2015-2020)**
 - 697,305 CMI with 8 momentary and 1 permanent outages
 - Radial service to Wolf Lake. Radial service severely restricts the ability to perform routine maintenance and restoration activities, which can degrade the reliability of the associated lines/equipment in comparison to other non-radial facilities.
- **Additional Info:**
 - 12 of 30 structures assessed by ground crew/UAV showed some level of wood pole decay
 - Structures do not meet 2017 NESC Grade B loading criteria, do not meet current AEP structural strength requirements, and do not meet the current ASCE structural strength requirements.

Model: N/A



AEP Transmission Zone: Supplemental Albion Area Improvements

Need Number: AEP-2021-IM031
Process Stage: Solution Meeting 10/14/2022
Previously Presented: Needs Meeting: 11/19/2021
Supplemental Project Driver: Equipment Condition/Performance/Risk
Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)
Model: N/A
Problem Statement:

Albion – Kendallville 138kV line (9.75 miles):

- 1972 wood H frame construction
- Since 2015 there have been 2 momentary outages to this line
- The structures on this line fail to meet NESC Grade B, AEP structural strength standards, grounding standards and shield angle requirements.
- 10 structures were investigated at the ground and 44 structures were assessed by drone. The following conditions were noted.
 - Nearly all structures had moderate to heavy insect or woodpecker damage, and light to moderate shell decay. A few also had decay pockets at ground line.
 - All H Frames have light to moderate decay
 - ~14% had flashed insulators
 - Light to moderate corrosion on hardware
- Currently 23 (25% of line) structures have at least one open condition
 - 28 total conditions include rotting, cracked, burnt, leaning or woodpecker affected structures; broken conductor, shield wire and ground lead wire



AEP Transmission Zone: Supplemental Albion Area Improvements

Need Number: AEP-2022-IM002

Process Stage: Solution Meeting 10/14/2022

Previously Presented: Needs Meeting: 1/21/22

Supplemental Project Driver: Equipment Condition/Performance/Risk

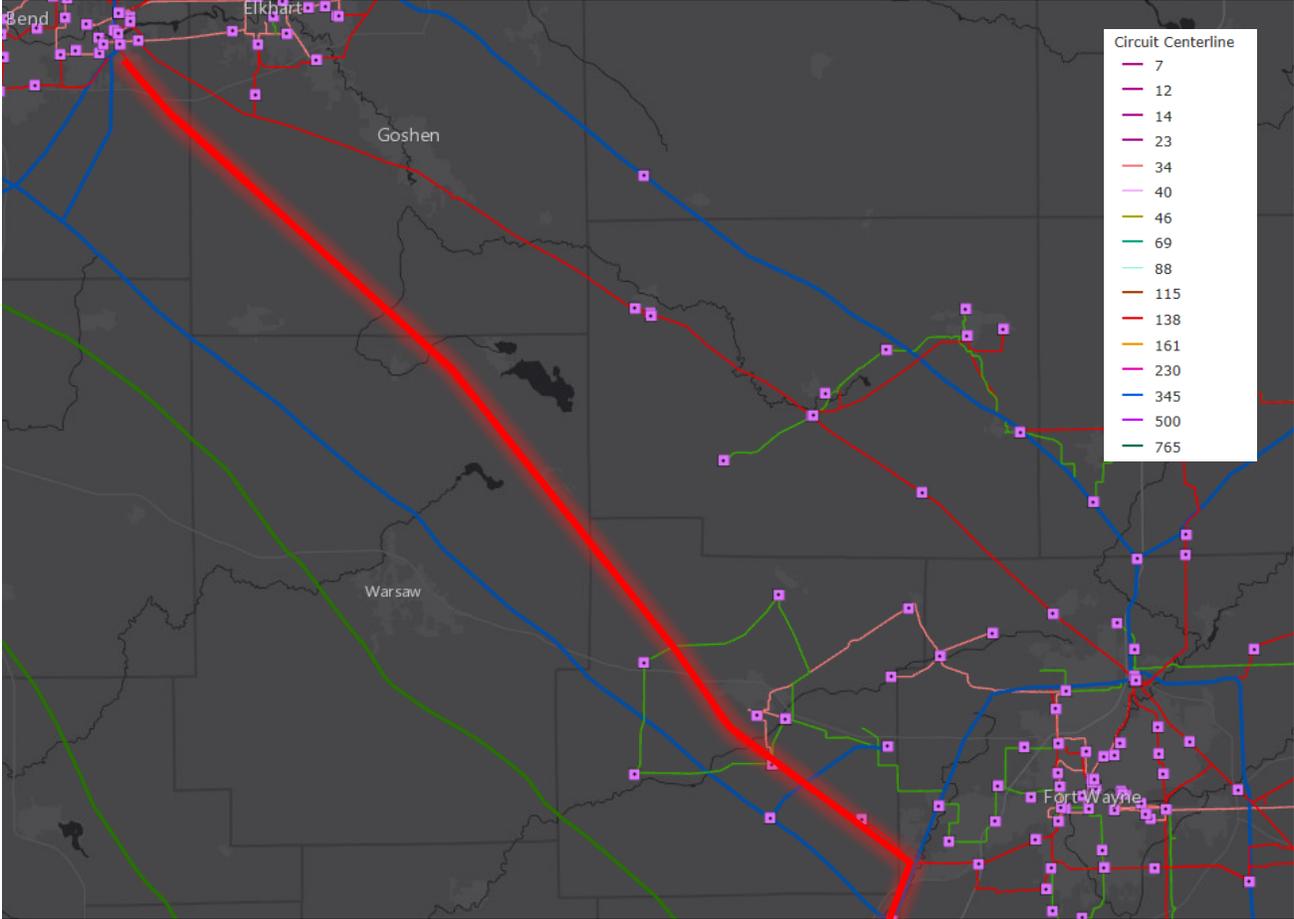
Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)

Model: N/A

Problem Statement:

Twin Branch - Sorenson 138kV line (65.1 miles):

- Line is 1949 Steel lattice construction
- Since 2014 there have been 6 momentary outages to this line
- Currently there are 172 (47%) structures with at least one open condition.
- Currently there are 222 open conditions including damaged legs, broken strands, damaged conductor, broken shield wire strand, broken/burnt insulators, broken/burnt insulators, or broken and missing shield wire hardware.
- The Shielding Angle is inadequate for AEP standards which can lead to poor performance of the line for lightening strikes.

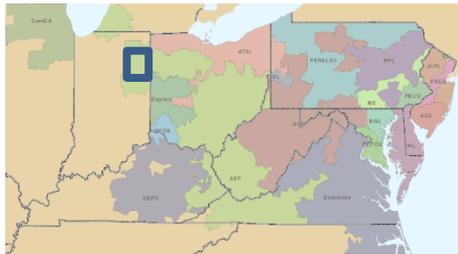


AEP Transmission Zone: Supplemental Albion Area Improvements

Need Number: AEP-2022-IM003
Process Stage: Solution Meeting 10/14/2022
Previously Presented: Needs Meeting: 1/21/2022
Supplemental Project Driver: Equipment Condition/Performance/Risk
Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)
Model: N/A
Problem Statement:
 Line Name: Richland – Tri Lakes 69kV

Original Install Date (Age): 1965

- Length of Line: 8.66 Miles
- Total structure count: 122
- Original Line Construction Type: 1960s Wood Pole
- Conductor Type: 4/0 ACSR
- Outage History since 2015
 - Momentary/Permanent Outages and Duration: 20 Momentary and 6 Permanent
 - CMI: 125,904
- Condition Summary
 - 71 structures (58%) have at least one open condition including cracked, rotten, woodpecker damaged and leaning poles; Chipped, Loose, Contaminated and rusted Insulators.
 - 40 representative structures were assessed by drone with 12 assessed by a ground crew. Of these the following was observed
 - Wood decay was moderate to advanced on structures at ground line and poles have rot top.



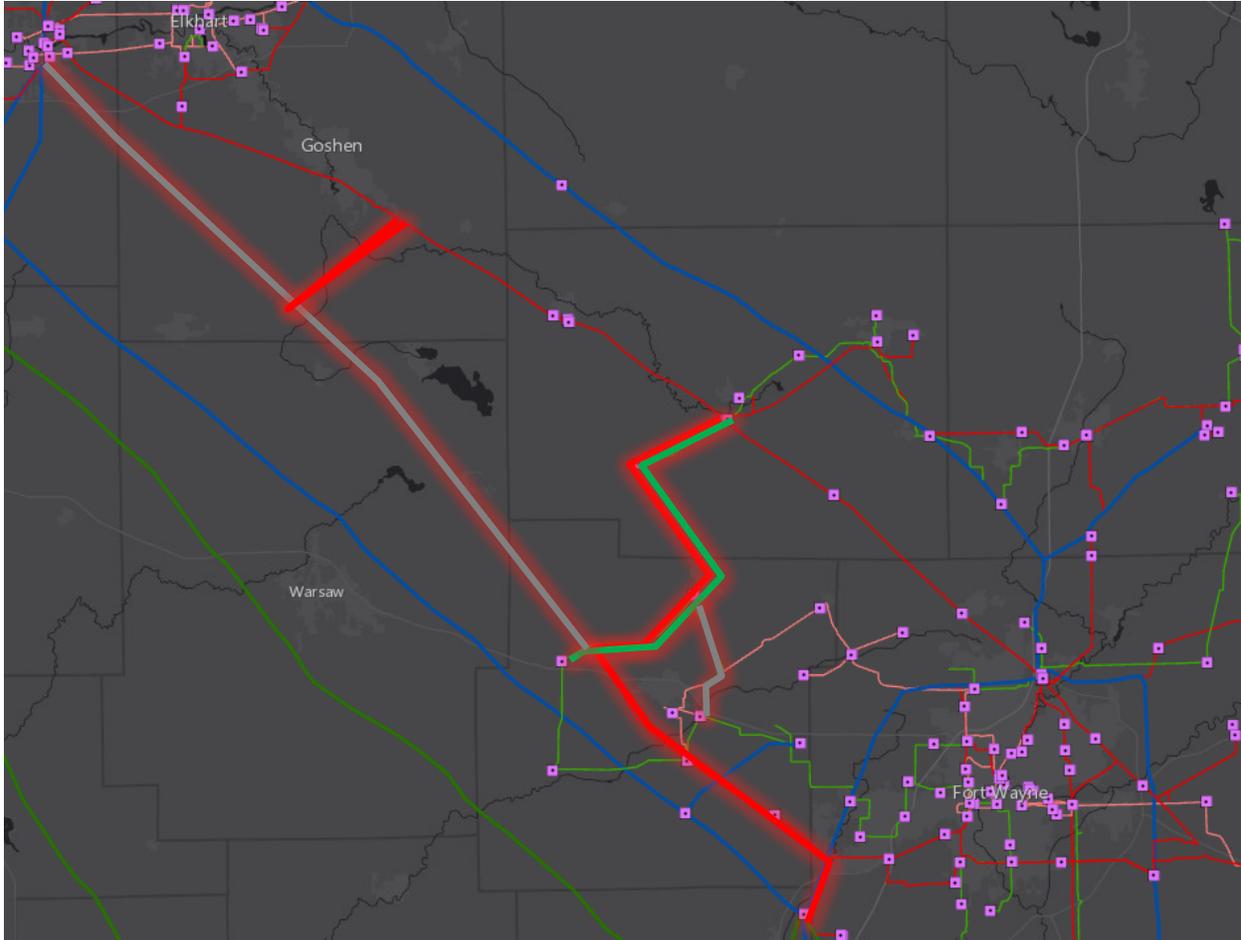
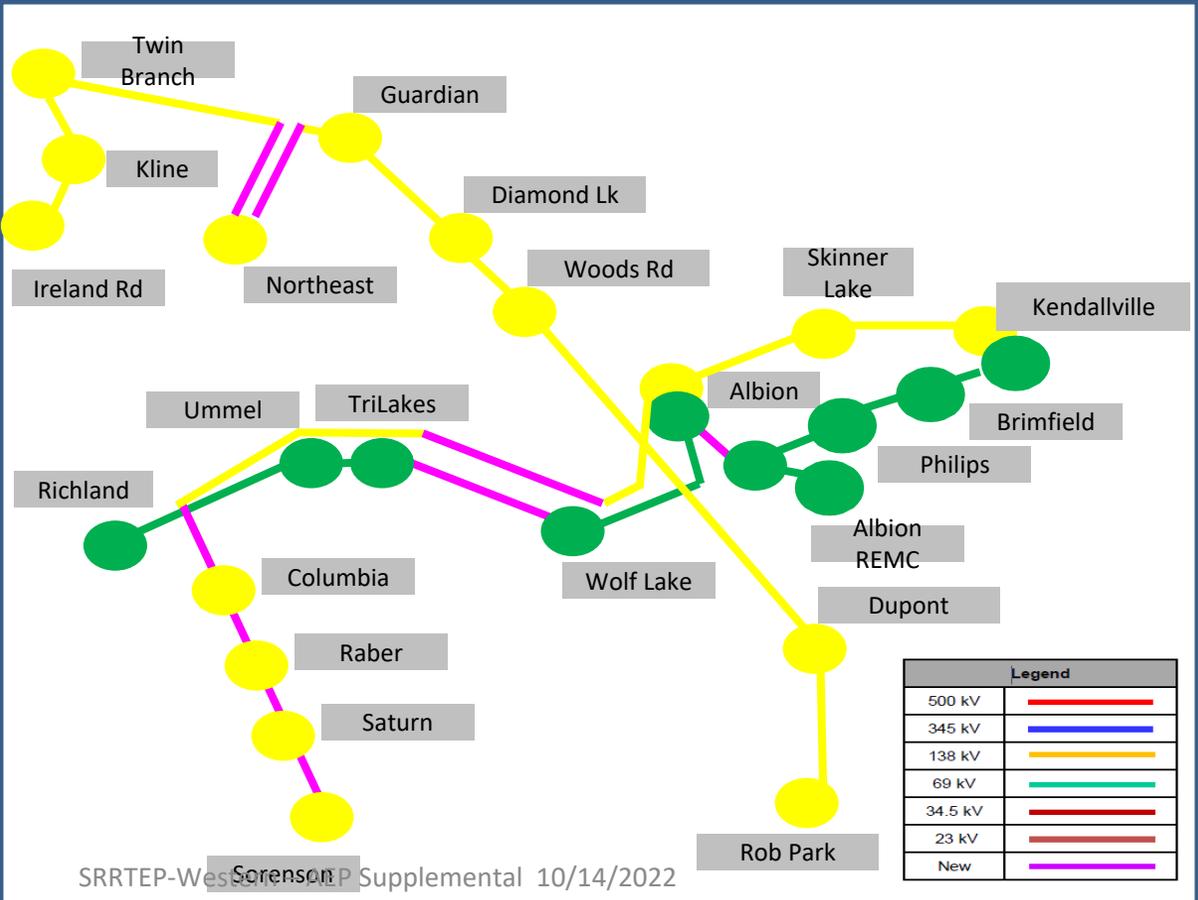
AEP Transmission Zone: Supplemental Albion Area Improvements

Need Number: AEP-2022-IM003, AEP-2021-IM031, AEP-2021-IM007, AEP-2021-IM006, AEP-2020-IM026 & AEP-2022-IM002

Process Stage: Solution Meeting 10/14/2022

138kV Plan summary

Twin Branch – Sorenson is a 65.1 mile 1940’s line that AEP can retire due to other improvements made in the area and multiple paths on both 138 kV and 345 kV lines. By building Richland – Tri Lakes and Wolf Lake tap to 138kV double circuit standards in phase 1, the network is set up so that in phase 2, AEP will not need to rebuild the full 65.1 miles that exist currently and can instead retire a good portion of it.



AEP Transmission Zone: Supplemental Albion Area Improvements Phase 1

Need Number: AEP-2022-IM003, AEP-2021-IM031, AEP-2021-IM007, AEP-2021-IM006, AEP-2020-IM026 & AEP-2022-IM002

Process Stage: Solution Meeting 10/14/2022

Proposed Phase 1 Solution:

Richland – Ummel/Tri Lakes 69kV line:
 Rebuild the ~8.7 mile line using double circuit 138kV construction and 795 ACSR Drake construction but energize only one side at 69kV

Estimated Cost: \$17.1M

Rebuild the Albion – Kendallville 138kV
 Rebuild the ~8.5 mile Albion – Kendallville 138kV circuit using 795 ACSR Drake

Estimated Cost: \$15.8M

Wolf Lake 69kV Tap
 Rebuild the ~5.5 mile Wolf Lake tap as double circuit 138kV using 795 ACSR Drake. This line will be energized at 69kV.

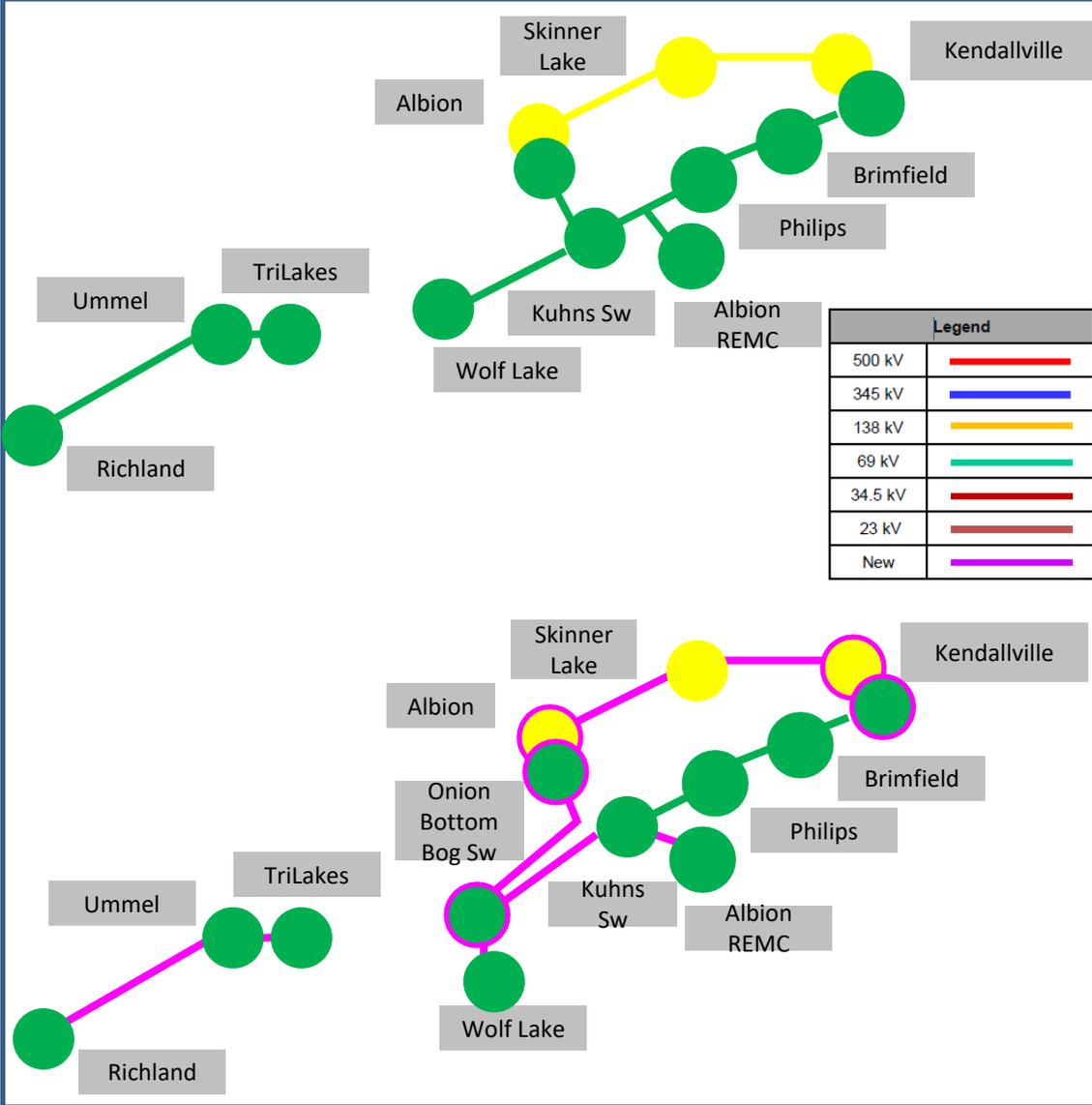
Estimated Cost: \$13.6M

Albion 138/69kV:
 Replace 138kV CB “F” and cap switcher “BB”. In addition to this, this station had significant ancillary work needed including foundation repairs, new control cable runs and DICM installation. Construction at this station will be aligned with B3248

Estimated Cost: \$ 4.6M

Kuhns / Albion REMC 69kV:
 Reconnect Kuhns Sw to serve the currently hard tapped Albion REMC load

Estimated Cost: \$0.6M



AEP Transmission Zone M-3 Process Albion Area Improvements Phase 1

Need Number: AEP-2022-IM003, AEP-2021-IM031, AEP-2021-IM007, AEP-2021-IM006, AEP-2020-IM026 & AEP-2022-IM002

Process Stage: Solution Meeting 10/14/2022

Proposed Phase 1 Solution:

Albion REMC 69kV Radial Tap:
Reterminate the line into Kuhns Sw 69kV.

Estimated Cost: \$0.2M

Albion – Kendallville 69kV Line:
Reterminate the line into Kuhns Sw 69kV.

Estimated Cost: \$0.8M

Kendallville 138/69kV:
Replace the 138/69kV transformer with a 90MVA unit. This work will be aligned with S2431.

Estimated Cost: \$2.2M

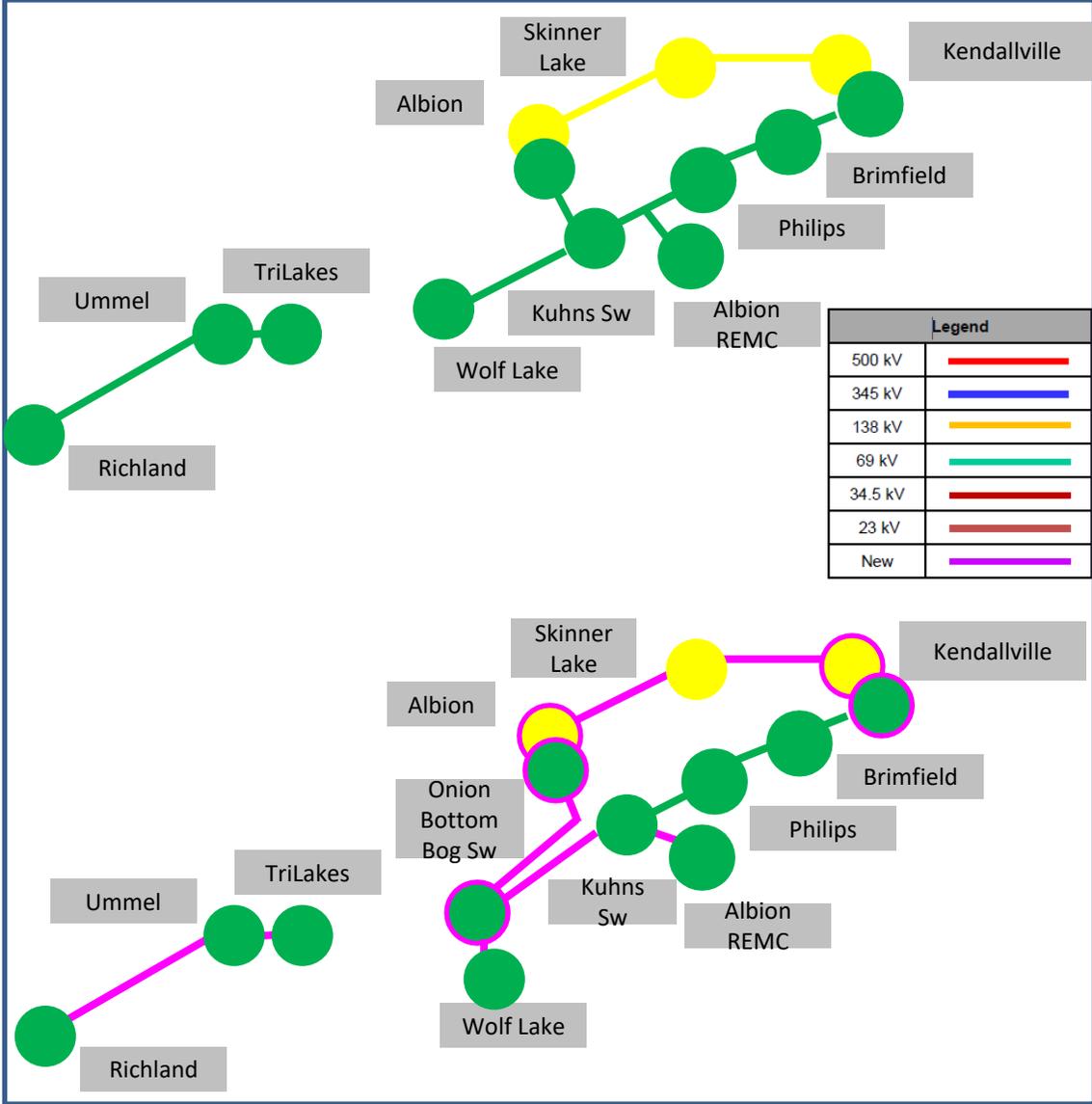
Onion Bottom Bog Sw/Wolf Lake 69kV
Install a 69kV POP “Onion Bottom Bog” Switch to serve Wolf Lake station. This switch will be re-used from the “Whitford Sw” that was removed with S2431

Estimated Cost: \$ 0.4M

Total Estimated Transmission Cost (Phase 1): \$55.3M

Projected In-Service: 11/3/2025

Project Status: Scoping



AEP Transmission Zone M-3 Process Albion Area Improvements Phase 2

Need Number: AEP-2022-IM003, AEP-2021-IM031, AEP-2021-IM007, AEP-2021-IM006, AEP-2020-IM026 & AEP-2022-IM002

Process Stage: Solution Meeting 10/14/2022

Proposed Phase 2 Solution:

Rebuild ~21 miles of the circuit from Sorenson to north of Columbia. Retire the remaining 44.1 miles of the line. **Estimated Cost: \$65.7M**

Build a new ~7.5 mile double circuit extension from the Twin Branch – Guardian line to connect the existing Northeast station. **Estimated Cost: \$21M**

Build a new ~11.7 mile double circuit 138/69kV line from Tri Lakes – Onion Bottom Bog Sw and re-energize the 138kV circuit from Columbia – Albion. **Estimated Cost: \$32.8M**

Retire the ~7.8 mile Tri Lakes – Gateway 69kV line. **Estimated Cost: \$2.3M**

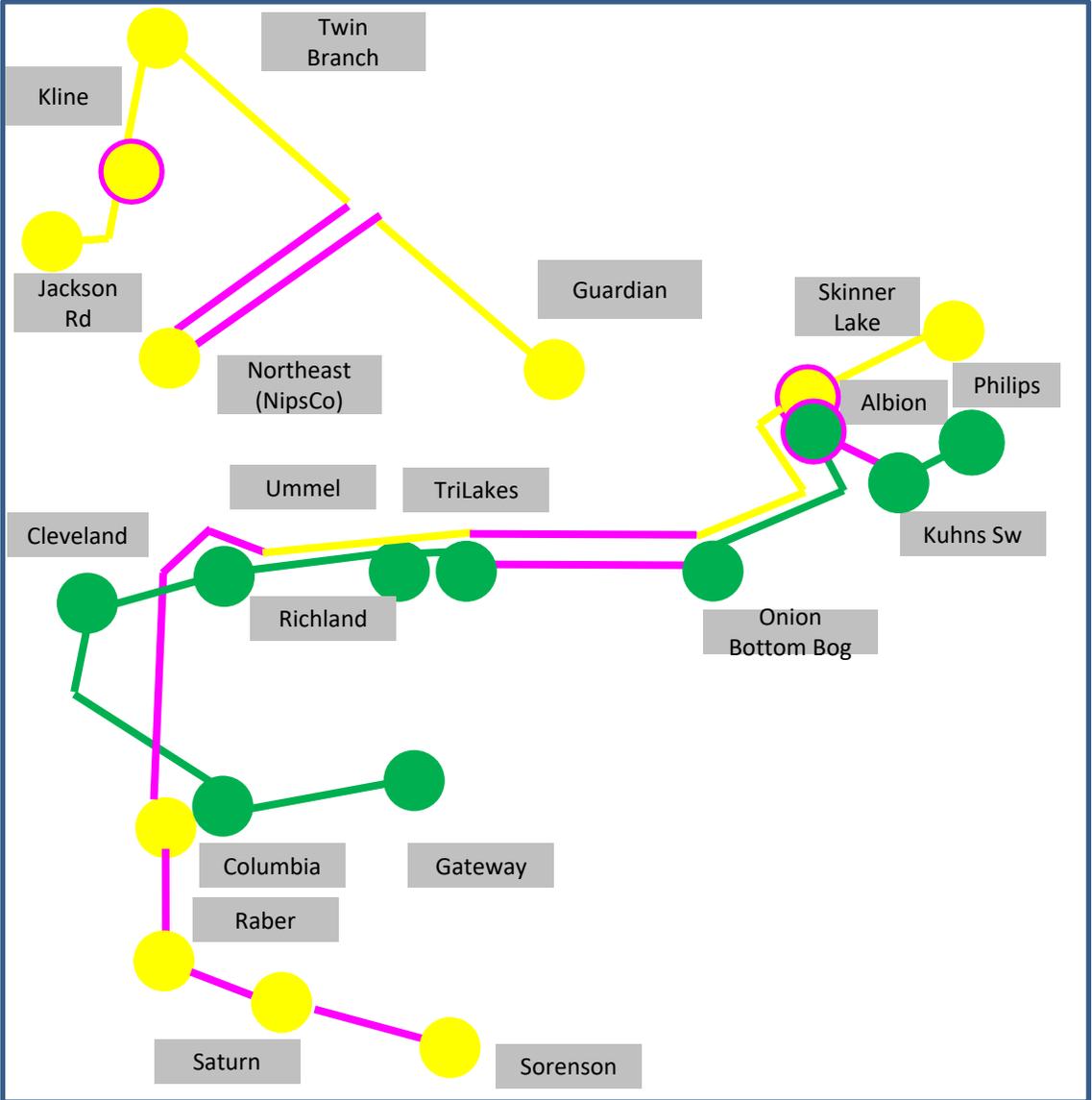
Install a new 138kV CB and a new 69kV CB to connect the new lines at Albion station. **Estimated Cost: \$2M**

Reconnect Kline station to the Twin Branch – Jackson Rd 138kV line and install a new 138kV breaker. **Estimated Cost: \$1M**

Total Estimated Transmission Cost (Phase 2): \$124.8M

Projected In-Service: 12/1/2032

Project Status: Scoping



AEP Transmission Zone M-3 Process Albion Area Improvements

Need Number: AEP-2022-IM003, AEP-2021-IM031, AEP-2021-IM007, AEP-2021-IM006, AEP-2020-IM026 & AEP-2022-IM002

Process Stage: Solution Meeting 10/14/2022

Alternatives Considered:

Alternate 1
Rebuild the ~65.1 mile Sorenson – Twin Branch 138kV as it exists today. Rebuild Richland – Tri Lakes as single circuit 69kV using 556.5 Dove ACSR and rebuild the Wolf Lake tap as single circuit 69kV using 556.5 Dove.

Cost: \$215M

Alternate 2
Instead of building the Northeast Extension, Build a 3 breaker ring and run a single circuit 138kV line to Northeast station. This would be more expensive and would load up the NIPSCO Leesburg – Northeast line to over 97% for N-1-1 scenarios so it wasn't chosen.

Cost: \$187M

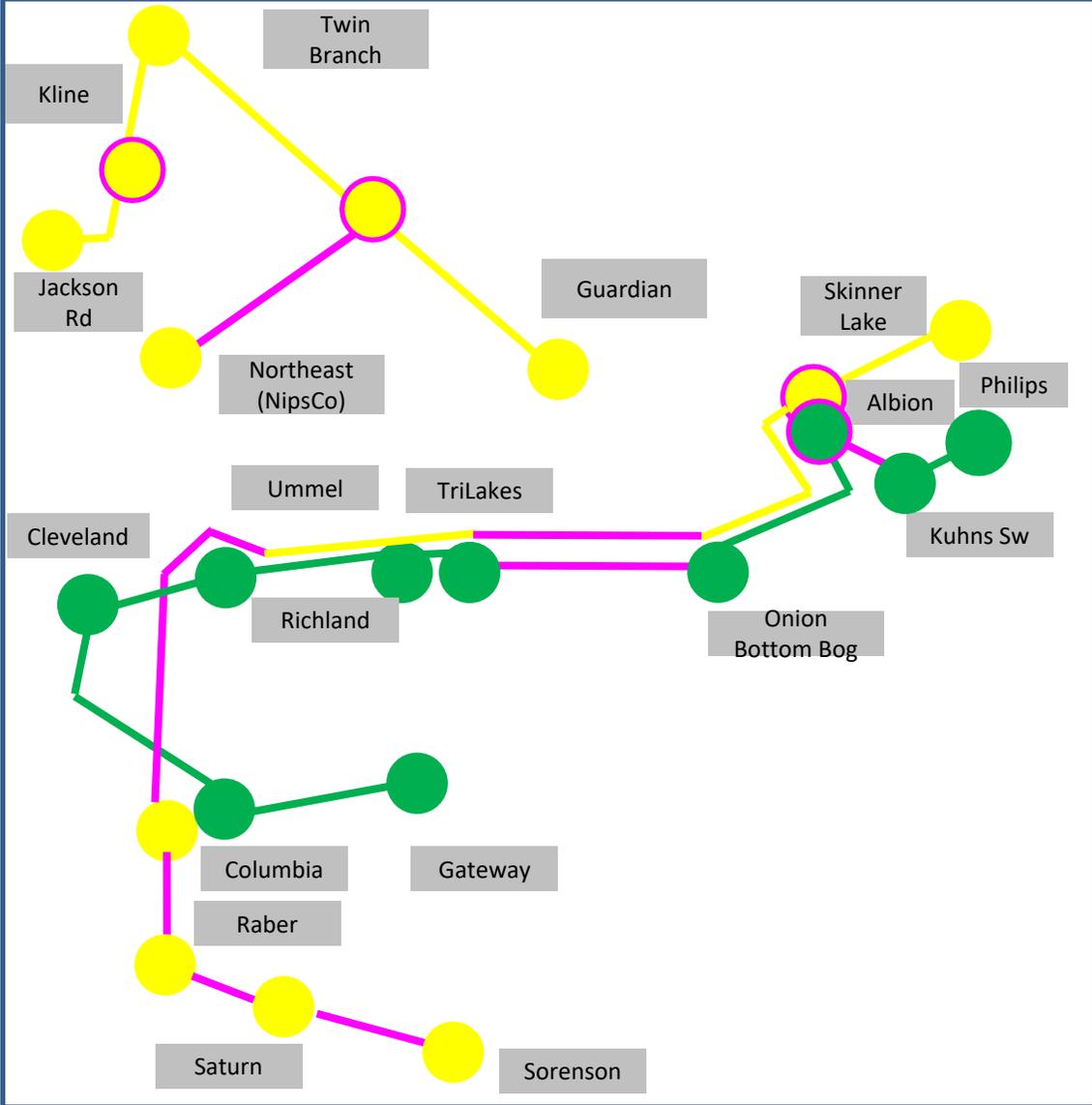
Ancillary Benefits

By looping Wolf Lake, the customers at this station will have increased reliability.
By removing the hard tap feeding Albion REMC, the customers at this station will have improved reliability and the line will not be subject to extended outages due to customer equipment failures.
Looping Tri-Lakes into Onion Bottom Bog allows retirement of Tri-Lakes – Gateway 69kV which is a 1978 wood line.
This connection will also provide more voltage support to the Albion 69kV network

Total Estimated Transmission Cost: \$180M

Projected In-Service: 11/3/2025

Project Status: Scoping



AEP Transmission Zone M-3 Process

Noble Station rebuild

Need Number: AEP-2022-IM011
Process Stage: Solution Meeting: 10/14/2022
Previously Presented: Needs Meeting: 6/15/2022
Supplemental Project Driver: Customer Need
Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13)
Model: N/A
Problem Statement:

Noble 69kV Station:
 Noble Station is a vintage 1950's wood pole station that is currently loaded beyond its capacity. The peak 2021 loading reached 12.04MVA which is 103% over the transformer's capacity.

Because of this, I&M Distribution has requested a new delivery point in this area.



AEP Transmission Zone M-3 Process Albion Area Improvements

Need Number: AEP-2022-IM011
Process Stage: Solution Meeting 10/14/2022

Proposed Solution:

Noble 69kV Station:
 Rebuild Noble 69/12kV distribution station on neighboring property with a bus tie breaker and line Moab.

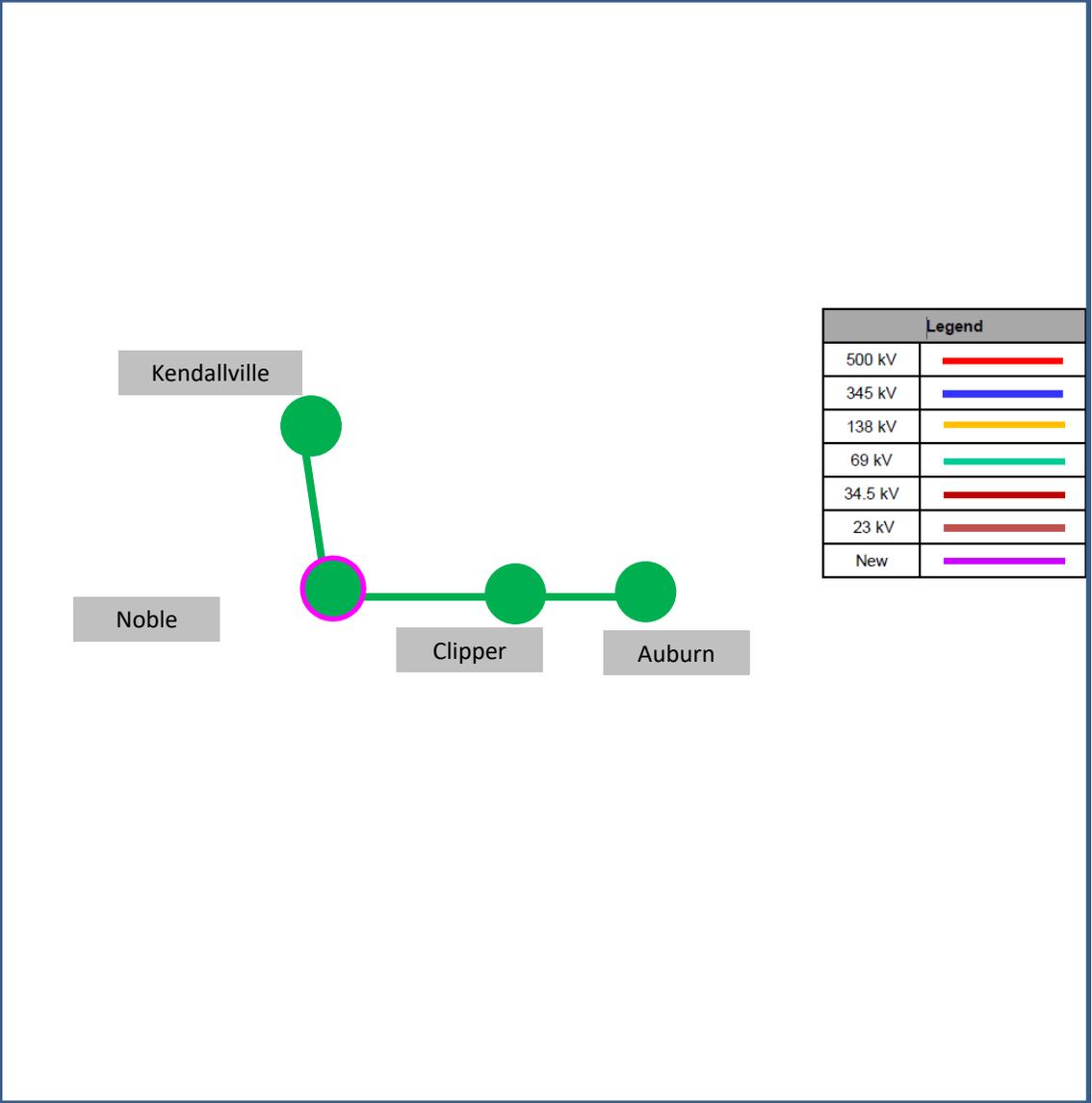
Cost: \$1.5M
 Reconnect the Auburn – Kendallville 69kV line to the new station

Cost: \$0.5M
Total Transmission Cost: \$2M

Alternatives Considered:

Alternate 1
 Rebuild Noble on the neighboring 138kV line. Considering the availability of land in the same area as the existing station and more line work required, this alternative was not chosen. Estimated Cost: \$3M

Projected In-Service: 12/31/2024
Project Status: Scoping



Appendix

High Level M-3 Meeting Schedule

Assumptions	Activity	Timing
	Posting of TO Assumptions Meeting information	20 days before Assumptions Meeting
	Stakeholder comments	10 days after Assumptions Meeting
Needs	Activity	Timing
	TOs and Stakeholders Post Needs Meeting slides	10 days before Needs Meeting
	Stakeholder comments	10 days after Needs Meeting
Solutions	Activity	Timing
	TOs and Stakeholders Post Solutions Meeting slides	10 days before Solutions Meeting
	Stakeholder comments	10 days after Solutions Meeting
Submission of Supplemental Projects & Local Plan	Activity	Timing
	Do No Harm (DNH) analysis for selected solution	Prior to posting selected solution
	Post selected solution(s)	Following completion of DNH analysis
	Stakeholder comments	10 days prior to Local Plan Submission for integration into RTEP
	Local Plan submitted to PJM for integration into RTEP	Following review and consideration of comments received after posting of selected solutions

Revision History

10/4/2022 – V1 – Original version posted to pjm.com