



Reliability Analysis Update

Subregional RTEP Committee
PJM West

December 1, 2016



EKPC Transmission Area

EKPC Transmission Owner Criteria Violation

Problem Statement:

Low voltage at Asahi M W 69kV bus for the loss of the Norwood-Shopville 69kV line and Brown unit #3.

Potential Alternative Solutions Considered:

Rebuild Brodhead – Three links Junction using 556.5 MCM ACSR/TW (8.2 miles).

Build a new Floyd – Woodstock 69kV line section using 556.5 MCM ACSR/TW (7.2 miles).

Immediate need:

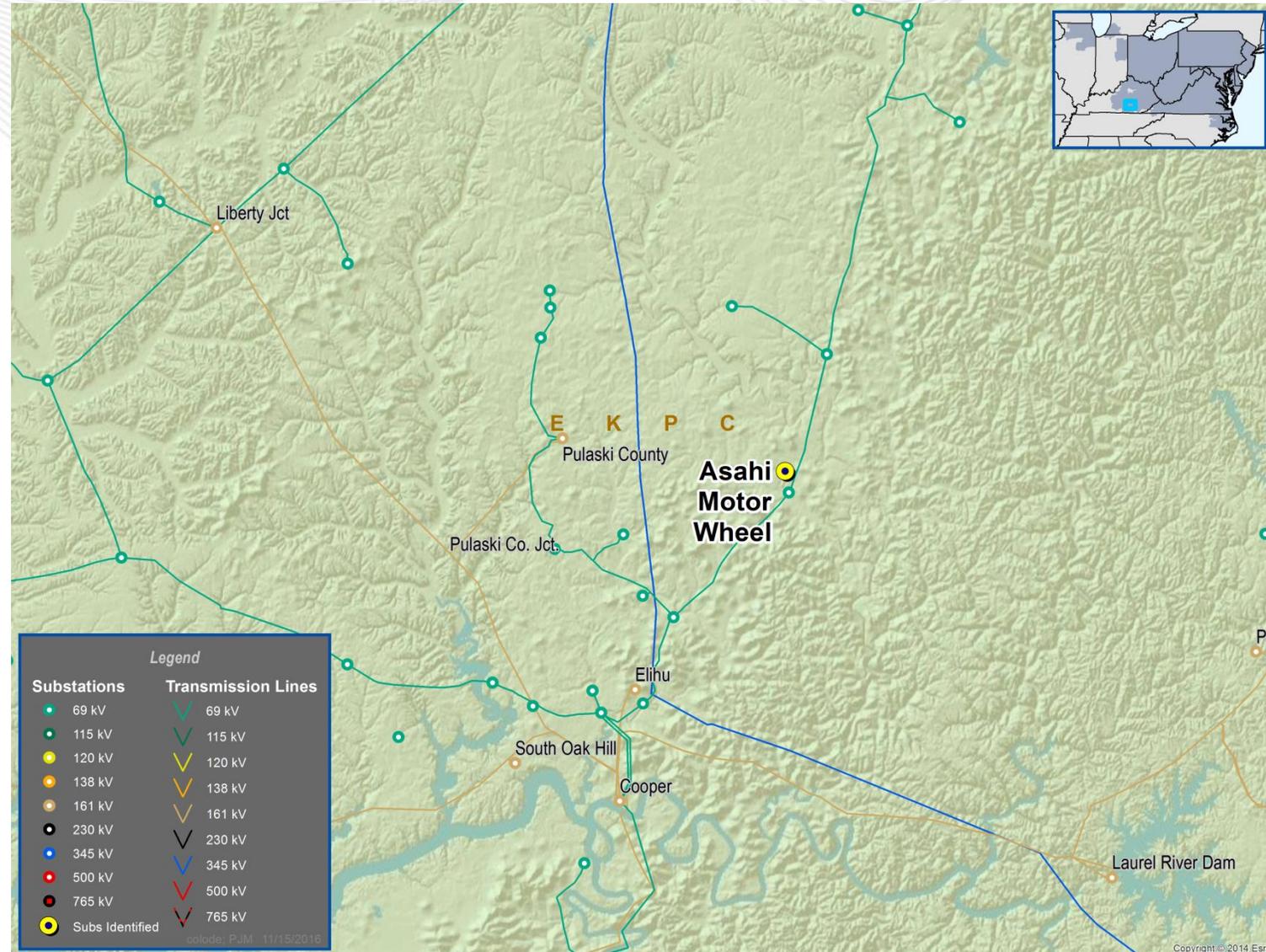
This voltage violation was identified during the 2016 screening after a capacitor bank on the system was retired.

Recommended Solution:

Install Three Links 13.776 MVAR 69kv cap bank (B2785)

Estimated Project Cost: \$0.35M

Required IS Date: 12/1/2017



Supplemental Projects

Supplemental Project

Problem Statement:

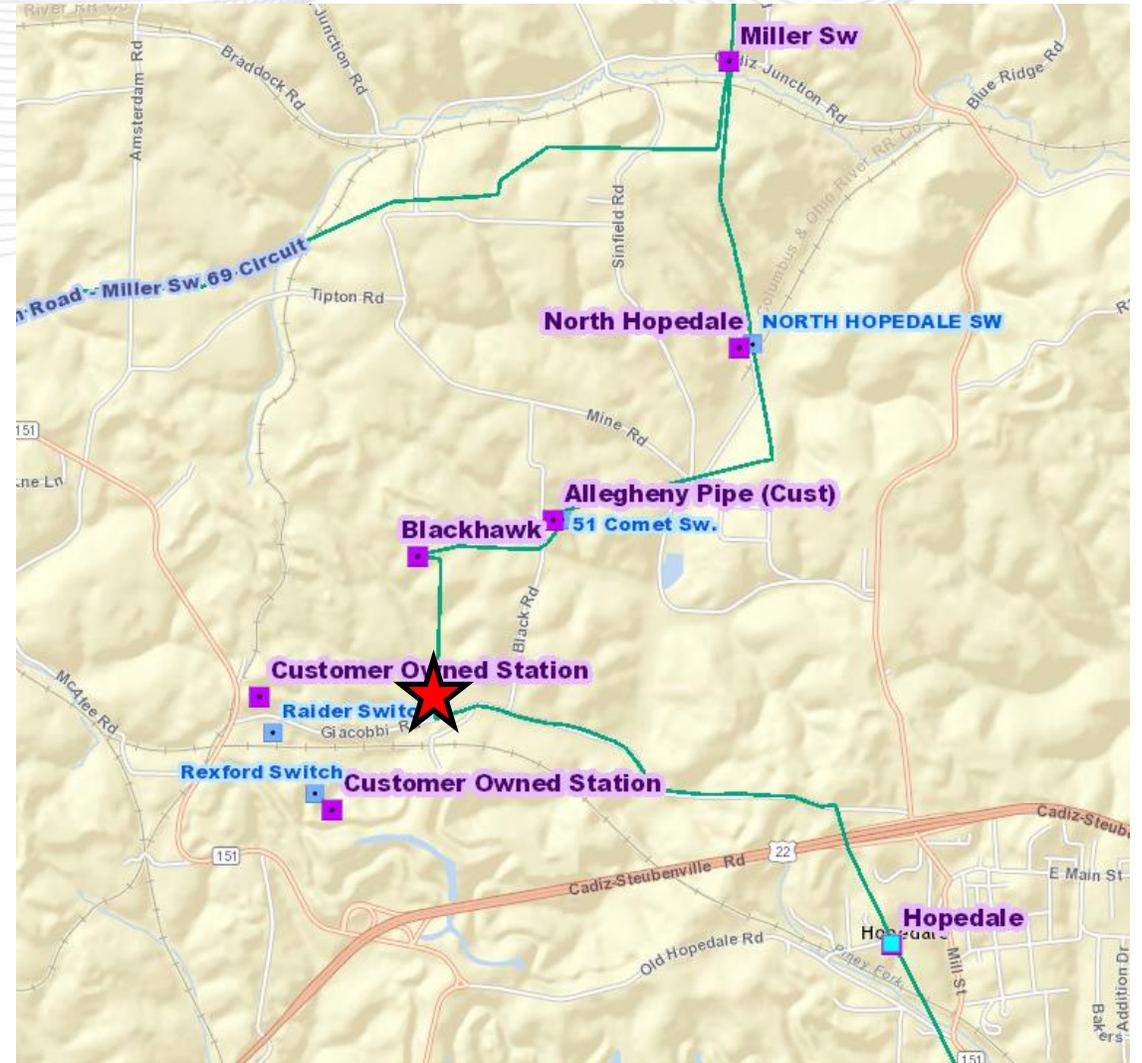
Provide service to a new load.

Potential Solution:

Install a new a phase-over-phase switch and metering structure for the new 3MW load close to the existing Markwest-Hopedale plant near Blackhawk Station.

Estimated Project Cost: \$1.85M

IS Date: 10/14/2016



Supplemental Project

Problem Statement:

Provide service to a new load.

Potential Solution:

Construct 138 kV Britton Station, tapping the existing Davidson – Dublin underground circuit to serve new customer owned station and load.

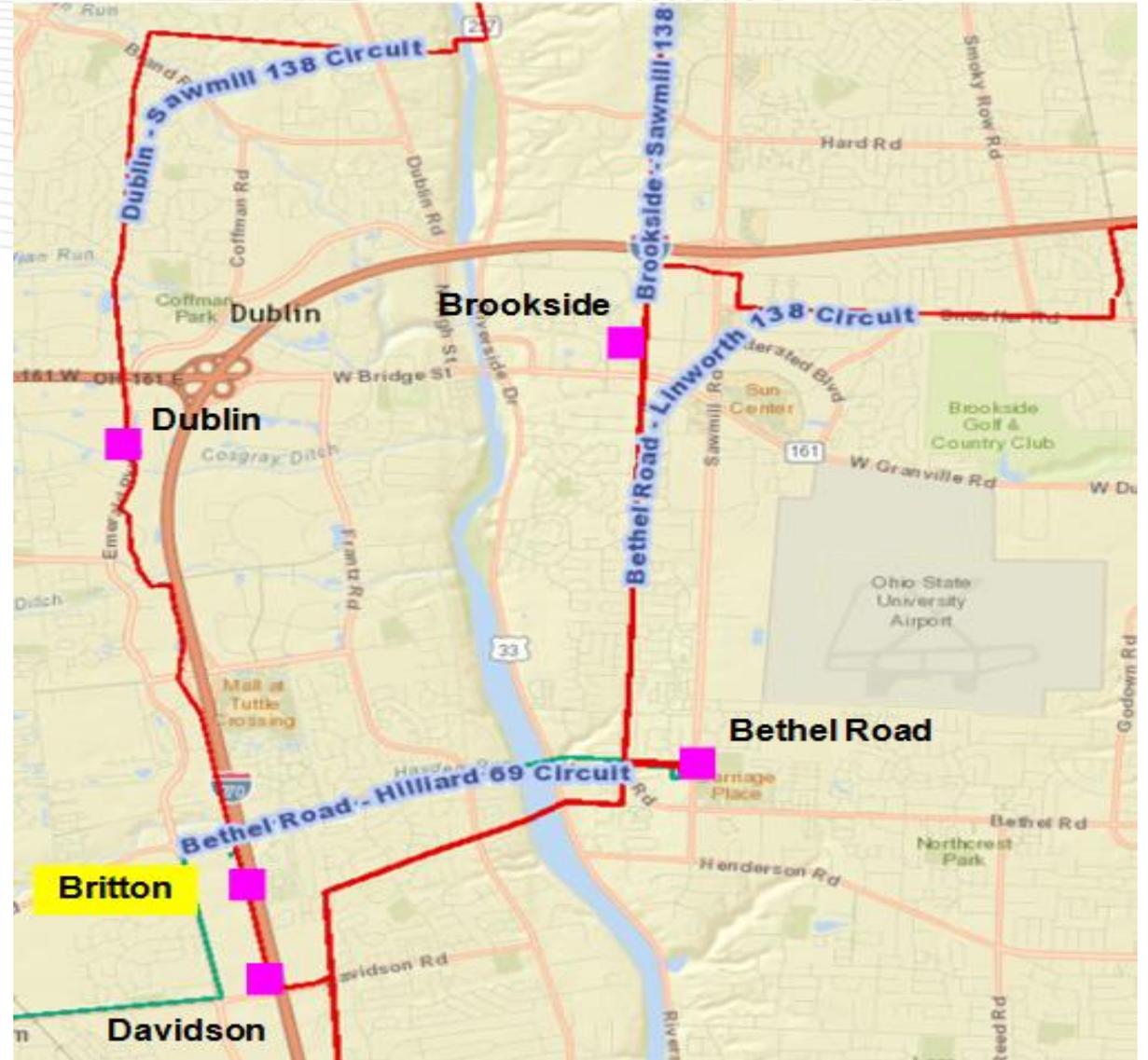
Build a new 138 kV overhead circuit from Britton to Davidson.

Reconfigure Davidson Station to improve reliability.

Remote end work at Dublin, Bethel Road, and Roberts Stations.

Estimated Project Cost: \$17.7M

Possible IS Date: 6/30/2017



Supplemental Project

Problem Statement:

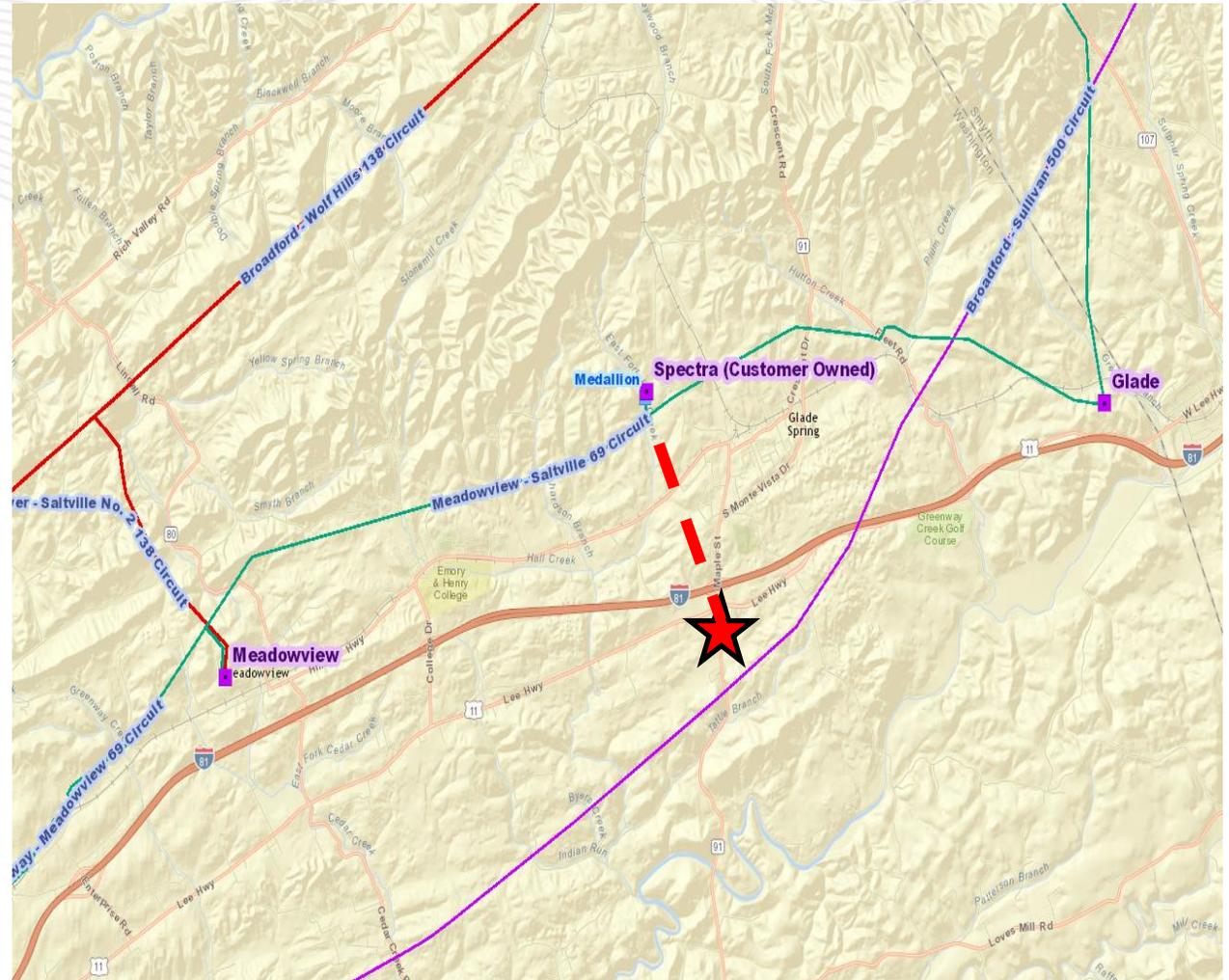
Residential and commercial growth in and around Glade Spring, VA has already and will continue to cause distribution overloads at Glade and Meadowview Substations (winter). Glade Substation serves 1,900 customers and Meadowview Substation serves 2,900 customers. Both Glade and Meadowview Substations serve residential, commercial and industrial load along the Interstate 81 and Route 11 corridors in the Glade Spring area that continues to see significant growth.

Potential Solution:

Construct a new 69/12kV substation with a 2.0 mile 69kV transmission line extension tapped into the Medallion – Glade 69kV circuit.

Estimated Project Cost: \$14.8M

Possible IS Date: 12/1/2016



Supplemental Project

Problem Statement:

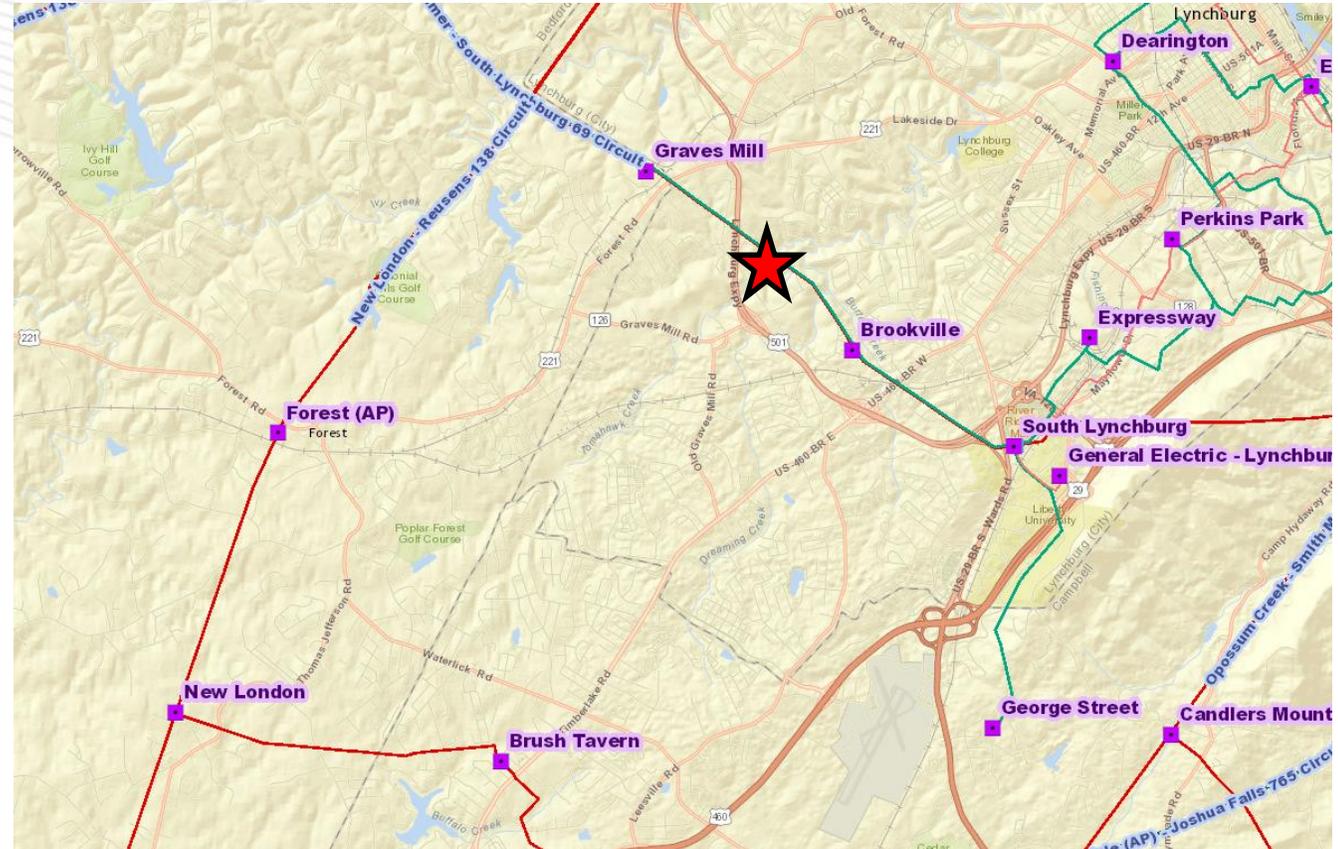
Significant high density residential and commercial growth and new load in the Enterprise Drive and Lynchpin Industrial Parks causes overloads on Forest, Brooksville, Graves Mill substations, and two distribution circuits around Lynchburg, VA in winter 2017/18 analysis.

Potential Solution:

Construct McConville station to serve distribution load on the Brookville-Graves Mill 138 kV line.

Estimated Project Cost: \$7.4M

Possible IS Date: 4/1/2017



Supplemental Project

Problem Statement:

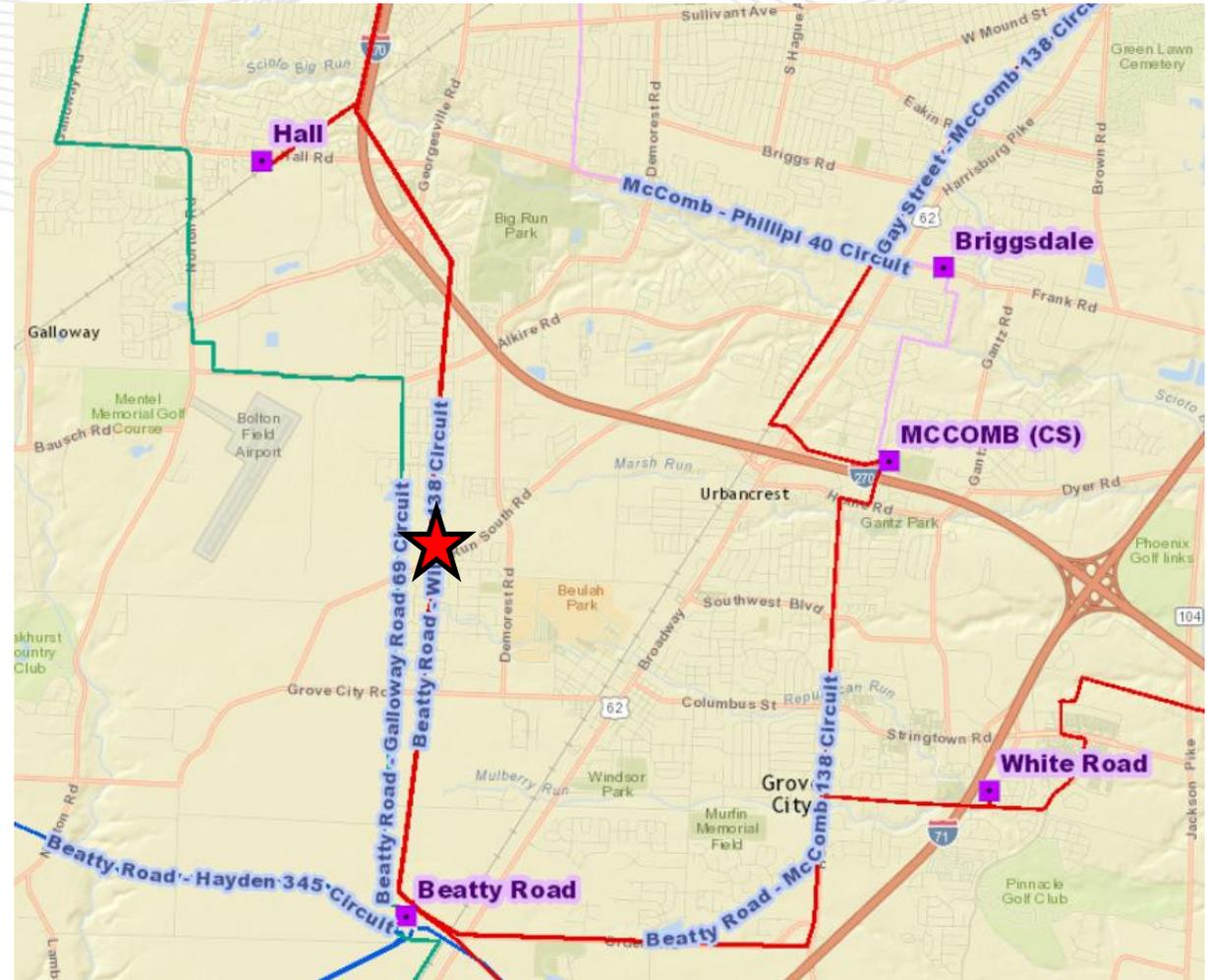
The summer 2015 distribution loading of the area south and west of the Columbus Casino exceeds 90% on several feeders preventing first level contingency switching during abnormal conditions. Area reliability suffers and will continue to worsen as load grows. Load growth in the area is expected to be 4% per year. Installing Bolton Station capacity will allow distribution engineering the flexibility to move load to feeders that reduce the exposure between distribution stations and the load, increasing reliability and reducing system losses.

Potential Solution:

Construct new 138kV Bolton station to serve expected load growth in the southwestern portion of Columbus, OH at the request of AEP Distribution for a new delivery point. Perform sag study mitigation on the Beatty – Wilson 138 kV line to allow for future load growth.

Estimated Project Cost: \$10.2M

Possible IS Date: 5/31/2018



Supplemental Project

Problem Statement:

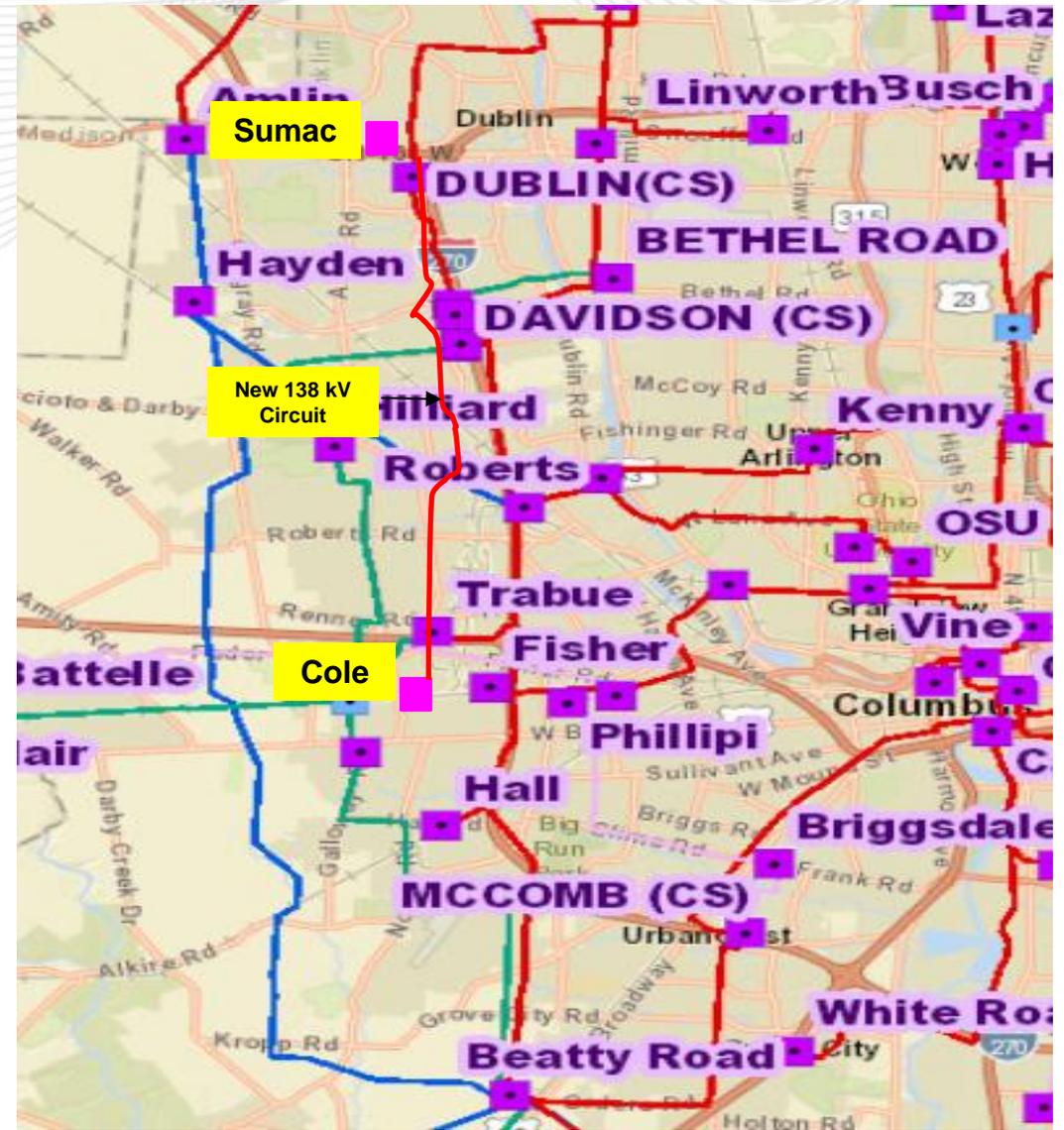
Provide 138 kV facilities to serve a new customer.

Potential Solution:

Construct 138 kV Sumac Station to serve the new customer station and load. Sumac is served from the existing Amlin 138 kV (currently radial) station. Construct Cole 345/138 kV station by tapping the Beatty – Hayden 345 kV circuit. Build a 138 kV circuit from Cole to Amlin on existing towers, providing a second source to Amlin. Remote end work at Beatty and Hayden Stations.

Estimated Project Cost: \$44.5M

Possible IS Date: 6/30/2018



Supplemental Project

Problem Statement:

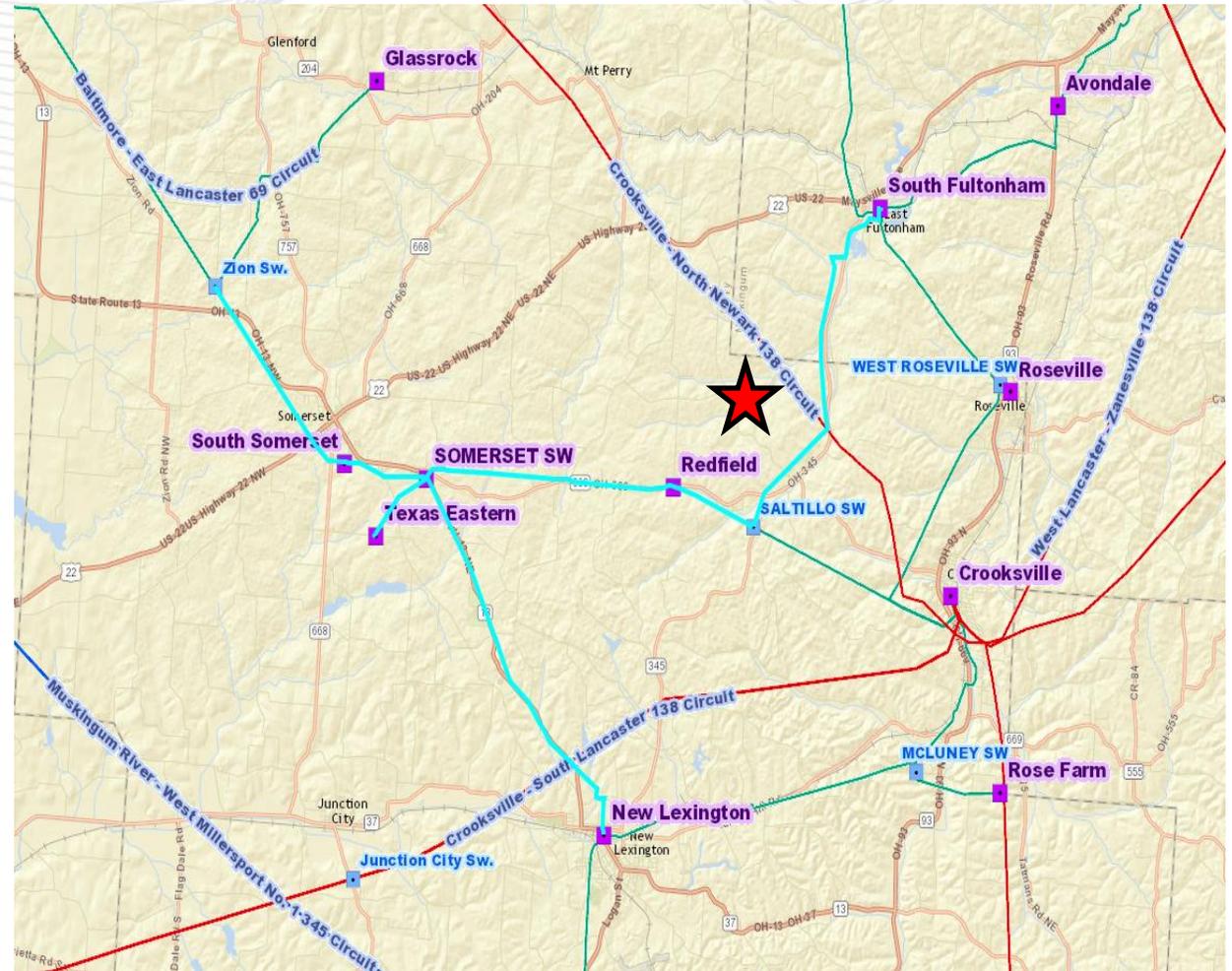
Improve reliability of the Somerset area. The New Lexington – South Fultonham 69 kV circuit is ranked #6 of Ohio’s worst performing circuits. Also the South Central Power Coop Somerset 69 kV delivery point is connected to this circuit and is ranked #27 of Buckeye Powers top 50 worst performer. South Central Power has expressed their concern of the reliability of their Somerset 69 kV delivery point. Clouse station will provide an additional source to customers connected to the New Lexington – South Fultonham 69 kV circuit if New Lexington or South Fultonham were not available.

Potential Solution:

Install a new Clouse 138/69 kV station at the intersection of the West Lancaster – Zanesville 138 kV line and the South Fultonham – New Lexington 69 kV line.

Estimated Project Cost: \$18.2M

Possible IS Date: 12/15/2017



Supplemental Project

Problem Statement:

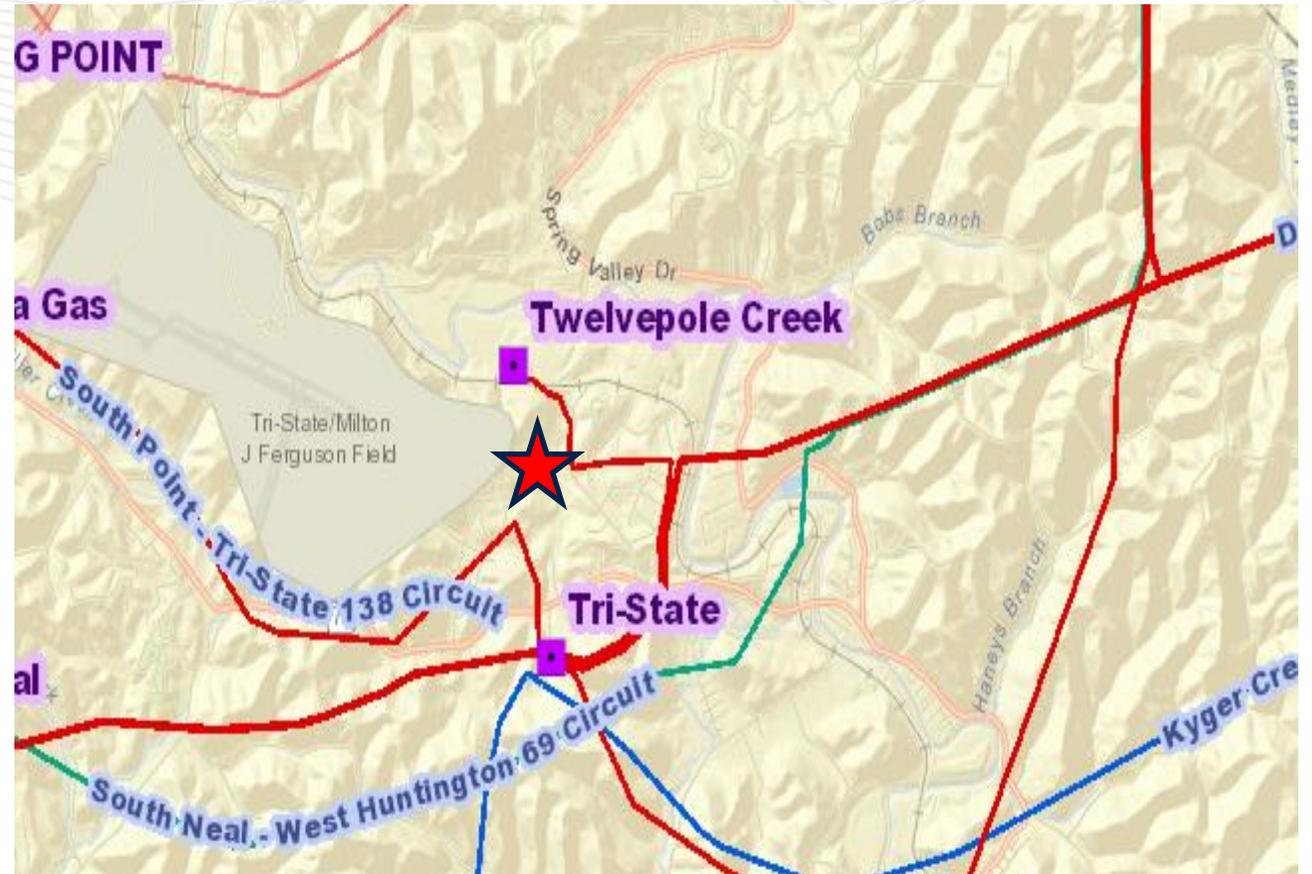
Provide new service to Columbia Gas.

Potential Solution:

Construct new Mariett 138/12kV Station, which is tapped into the Twelve Pole Creek – Tri-State 138 kV line.

Estimated Project Cost: \$8.6M

Possible IS Date: 12/1/2016



Supplemental Project

Problem Statement:

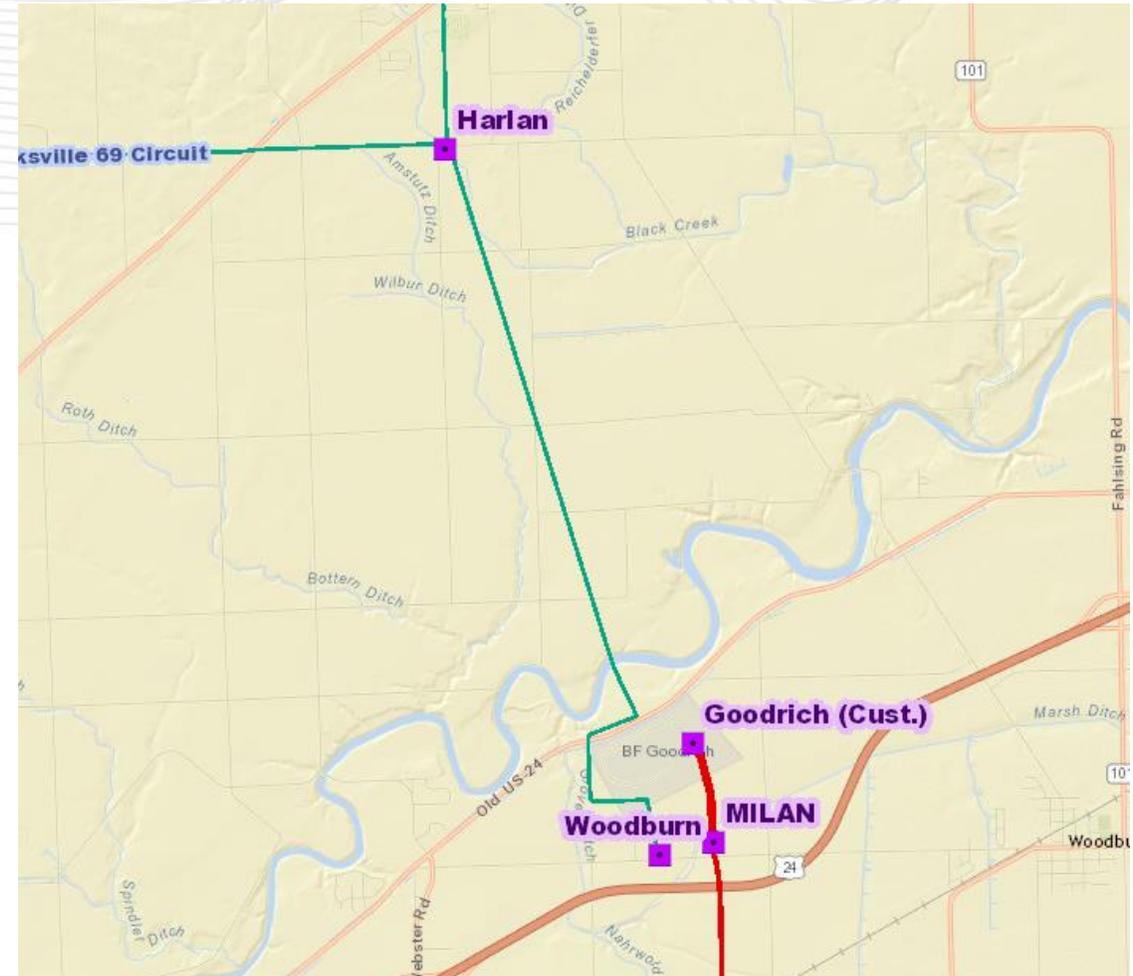
The Woodburn Station is a distribution station served from a 4.75 mile radial 69 kV feed out of Harlan station. Due to the age and poor performance of Woodburn station, the load will be transferred to the nearby Milan station. Woodburn will then be retired along with the radial line from Harlan. Serving the load from the Milan 138 kV will provide better reliability from a newly built station.

Potential Solution:

Construct a new 138/12 kV distribution bay at Milan station to transfer the existing distribution load at Woodburn Station. This new distribution bay at Milan will be tapped off of the 138 kV bus #2 and the 138 kV yard will operate as a ring bus.

Estimated Project Cost: \$2.5M

Possible IS Date: 6/1/2018



Supplemental Project

Problem Statement:

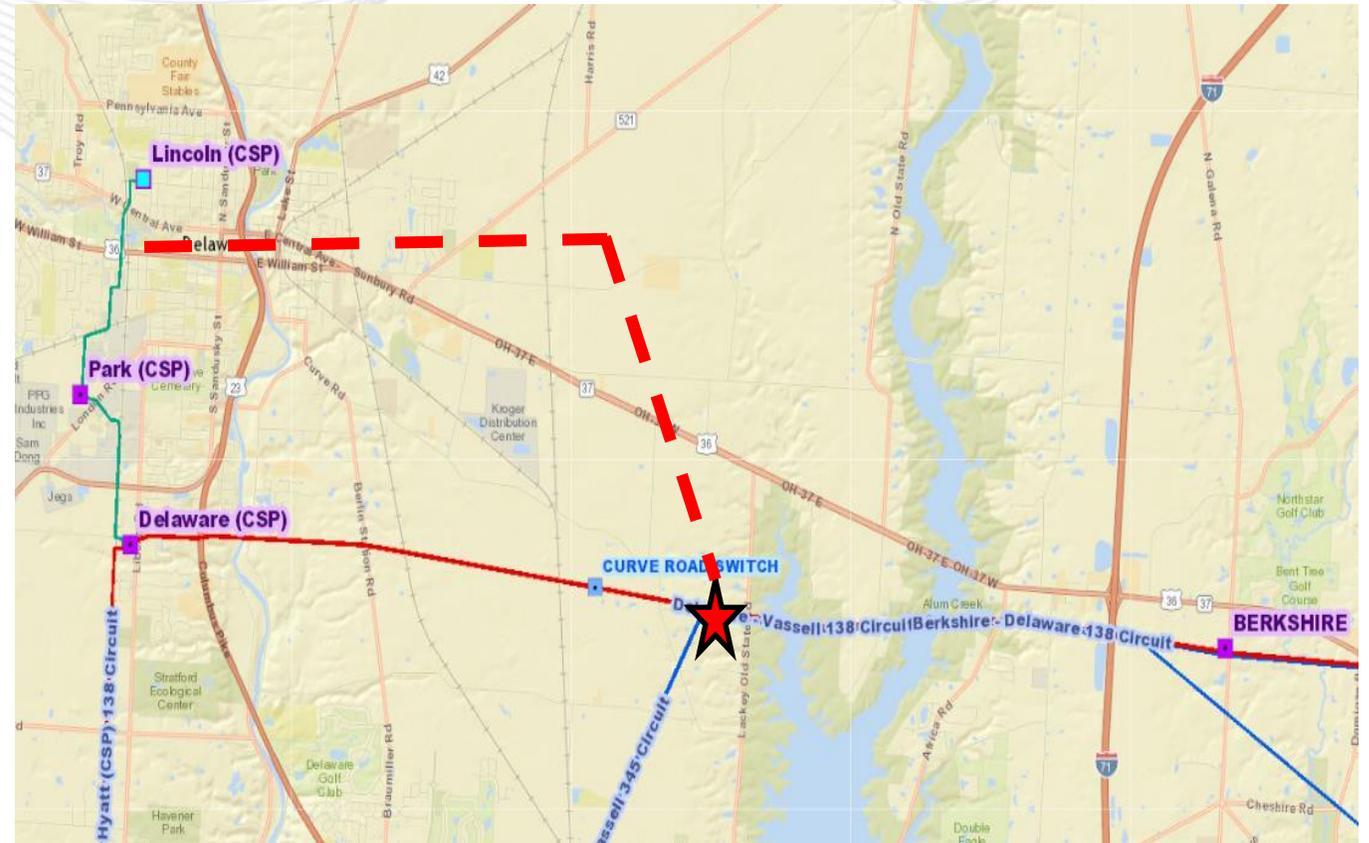
Improve area reliability to approx. 35 MVA of load by looping 69kV radial line serving two existing distribution stations. Facilitate future construction of two planned distribution stations by routing new line to AEP-Ohio owned sites.

Potential Solution:

Build 69 kV line between Lincoln and a new 138/69 kV Berrywood station to close radial line.

Estimated Project Cost: \$39.2M

Possible IS Date: 12/01/2018



Supplemental Project

Problem Statement:

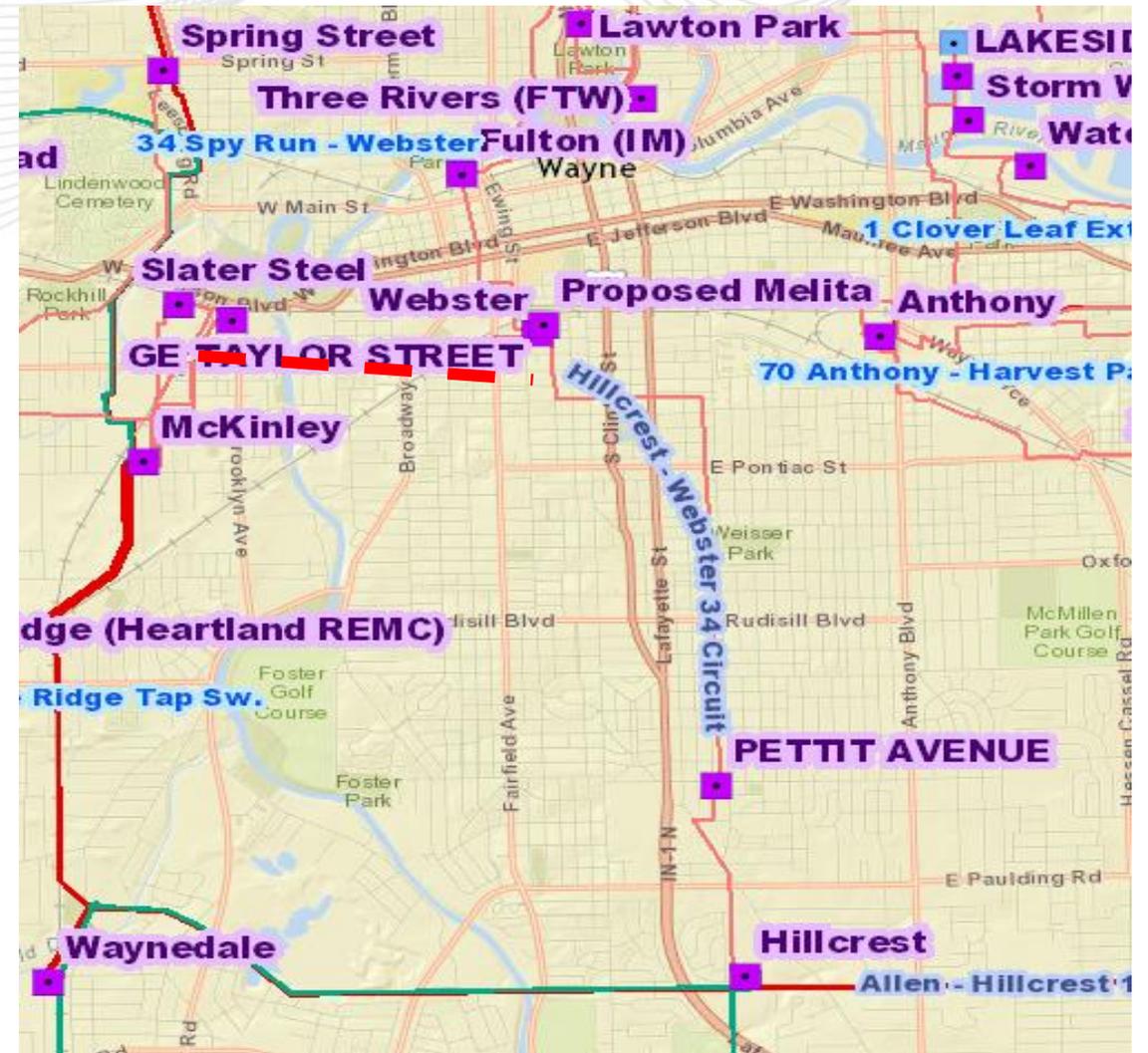
There is a need for network capacity surrounding the loss of distribution source at Three Rivers station resulting in thermal capacity issues at Webster station. Also during this scenario, potential undesirable transformer back-feed situations could occur at Webster station attempting to source the 34.5 kV network.

Potential Solution:

Tap the existing Hadley-McKinley 69 kV circuit and construct a new 69 kV double circuit extension to a new Melita 69 kV station, retiring Webster station and converting existing 34.5 kV transmission lines from Hillcrest to Melita (formerly Webster).

Estimated Project Cost: \$52M

Possible IS Date: 12/13/2017



Supplemental Project

Problem Statement:

The Almena – Schoolcraft 69kV line is currently one of the top 10 worst performing circuits in I&M. AEP has identified potential low voltage violations in this 19 mile corridor which currently serves 3 wholesale customer stations. Additionally, there are no sectionalizing Motor Operated Air-Break Switches (MOABs) or Circuit Breakers between Almena and Schoolcraft stations. This 19-mile outage exposure has been a major issue for AEP’s customers.

Potential Solution:

Improve the voltage profile and sectionalizing capabilities of this line by constructing a new 69kV in line switching station named Frosty, located adjacent to Prairie Ronde station. Frosty station will include a 7.2 MVAR cap bank, two (2) 69kV circuit breakers going towards the Almena – Schoolcraft 69kV lines and a GOAB switch going towards Prairie Ronde customer station.

Estimated Project Cost: \$4.75M

Possible IS Date: 4/1/2018



Supplemental Project

Problem Statement:

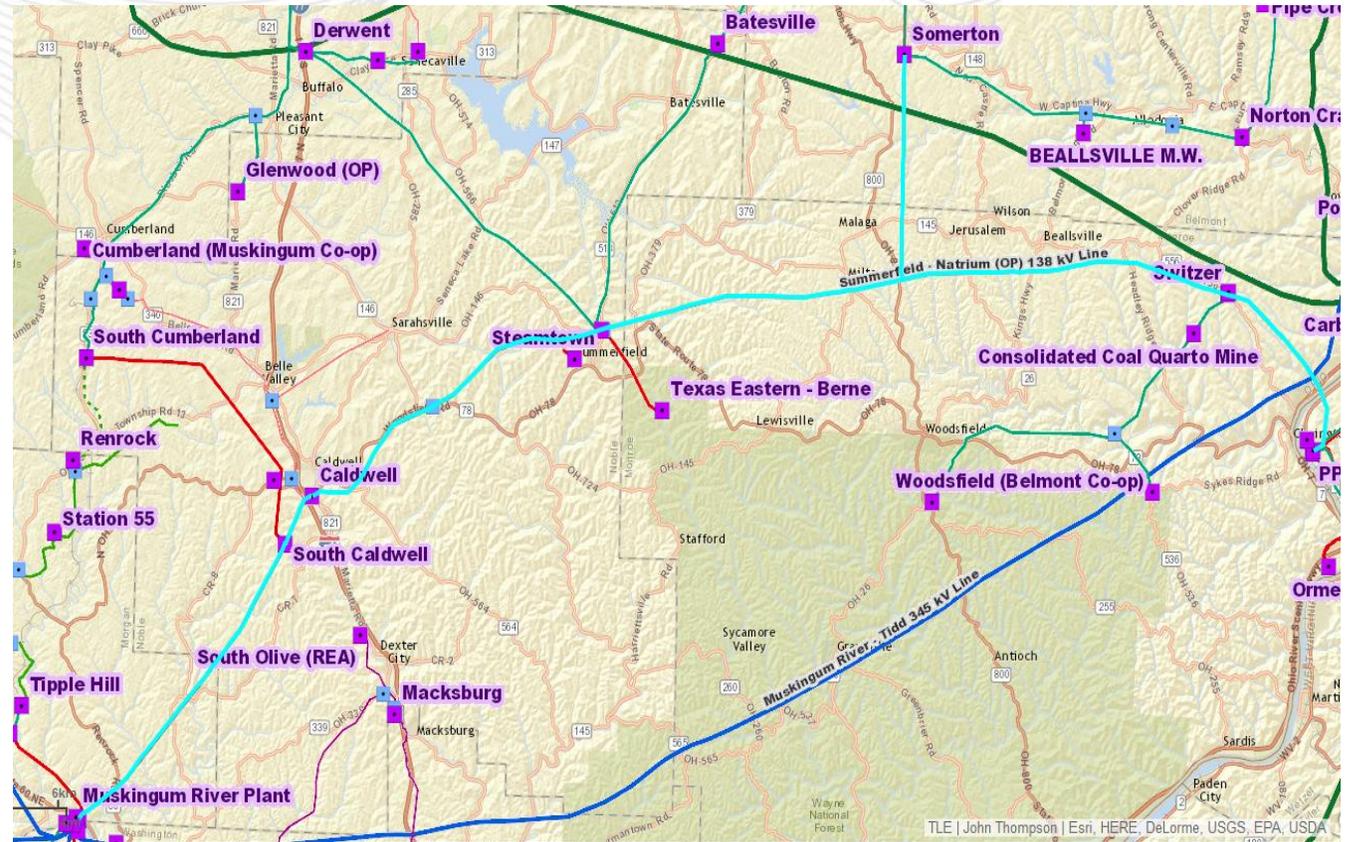
Allow full use of the existing 138 kV corridor to help serve growing and future shale load in the area.

Potential Solution:

Complete sag study mitigation on the Muskingum – Natrium 138 kV line.

Estimated Project Cost: \$2.8M

Possible IS Date: 06/01/2017



Supplemental Project

Problem Statement:

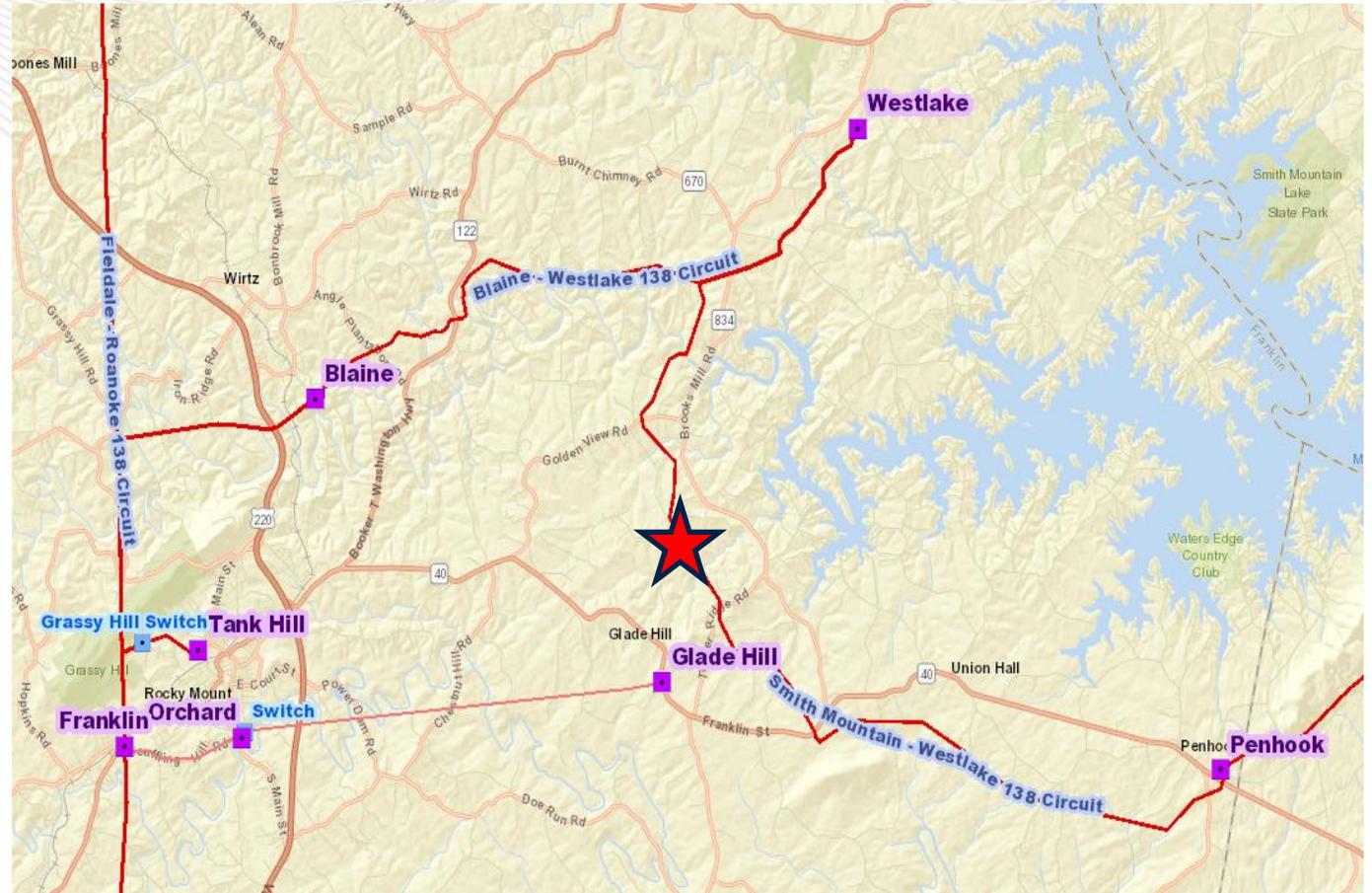
Residential and commercial growth in Rocky Mount, VA and Franklin County near Smith Mountain Lake has caused existing and projected overloads on Franklin and Glade Hill Stations.

Potential Solution:

Construct Redwood station to serve distribution load and allow retirement of the Glade Hill 34.5 kV station.

Estimated Project Cost: \$9.0M

Possible IS Date: 10/01/2017



Supplemental Project

Problem Statement:

A project is needed to serve the 8 MVA load addition from BAE Systems' new facility, improve area reliability, and provide needed capacity for Ft. Wayne Airport area economic development, maintain system reliability and ensure sufficient thermal capacity is available.

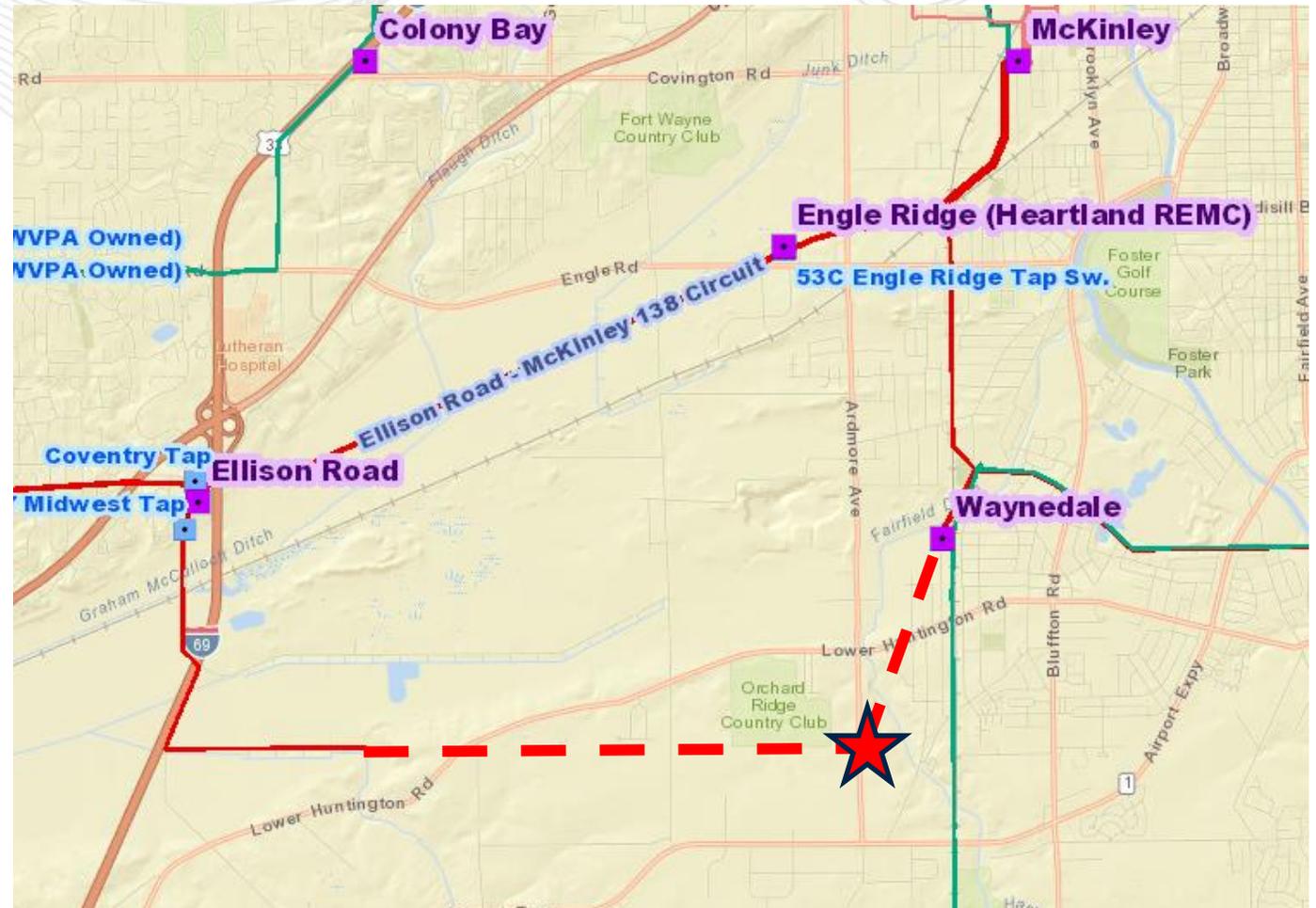
Potential Solution:

Construct a new 138/12 kV Aviation station and approximately 4.7 miles of new 138 kV line from Waynedale Station and a newly established Dalman Road switching station.

Waynedale Station will be upgraded with modifications to the 138 kV and 12 kV systems.

Estimated Project Cost: \$19.4M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

Improve area reliability by reducing the number of forced line outages that are caused by deteriorated facilities. Many of the causes of customer outages have been attributed to line defects such as crossarm failures and insect damage to knee braces and poles, prompting further study leading to a complete line rebuild.

Potential Solution:

Rebuild West Mount Vernon-South Kenton 138kV Line between West Mount Vernon and North Waldo.

Estimated Project Cost: \$70.32M

Possible IS Date: 12/1/2020



Supplemental Project

Problem Statement:

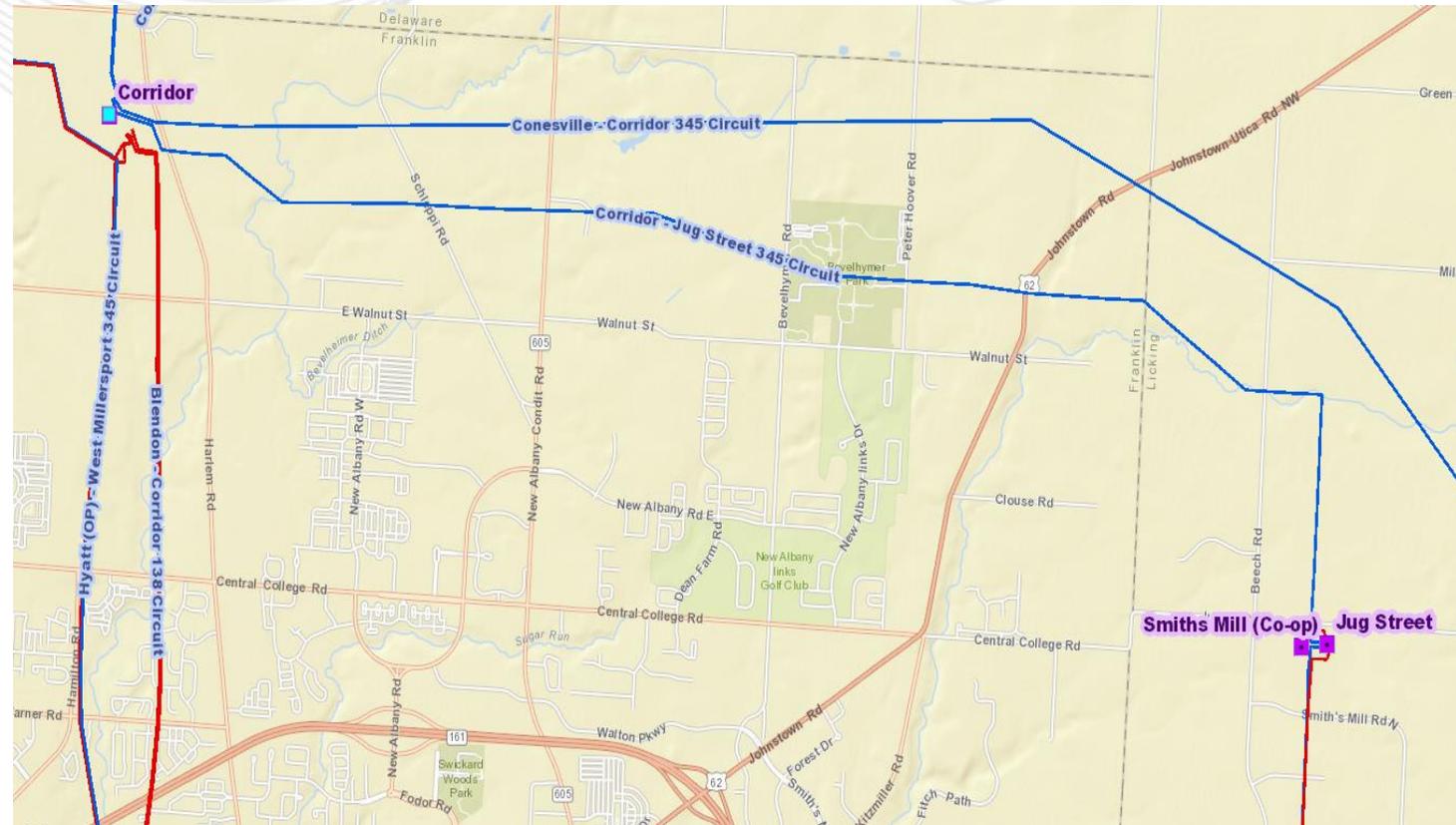
Jug Street is the location for large future load growth, including a single 190 MVA customer. The current arrangement at Jug Street allows for N-1-1 situations where all load would be dropped. This project will introduce a third source at Jug Street to eliminate N-1-1 concerns for the customer load.

Potential Solution:

Rebuild the Corridor – Jug Street 345 kV line as a BOLD double circuit line with one side served at 345 kV and the other at 138 kV to provide a third source to Jug Street station.

Estimated Project Cost: \$15.1M

Possible IS Date: 12/1/2019



Supplemental Project

Problem Statement:

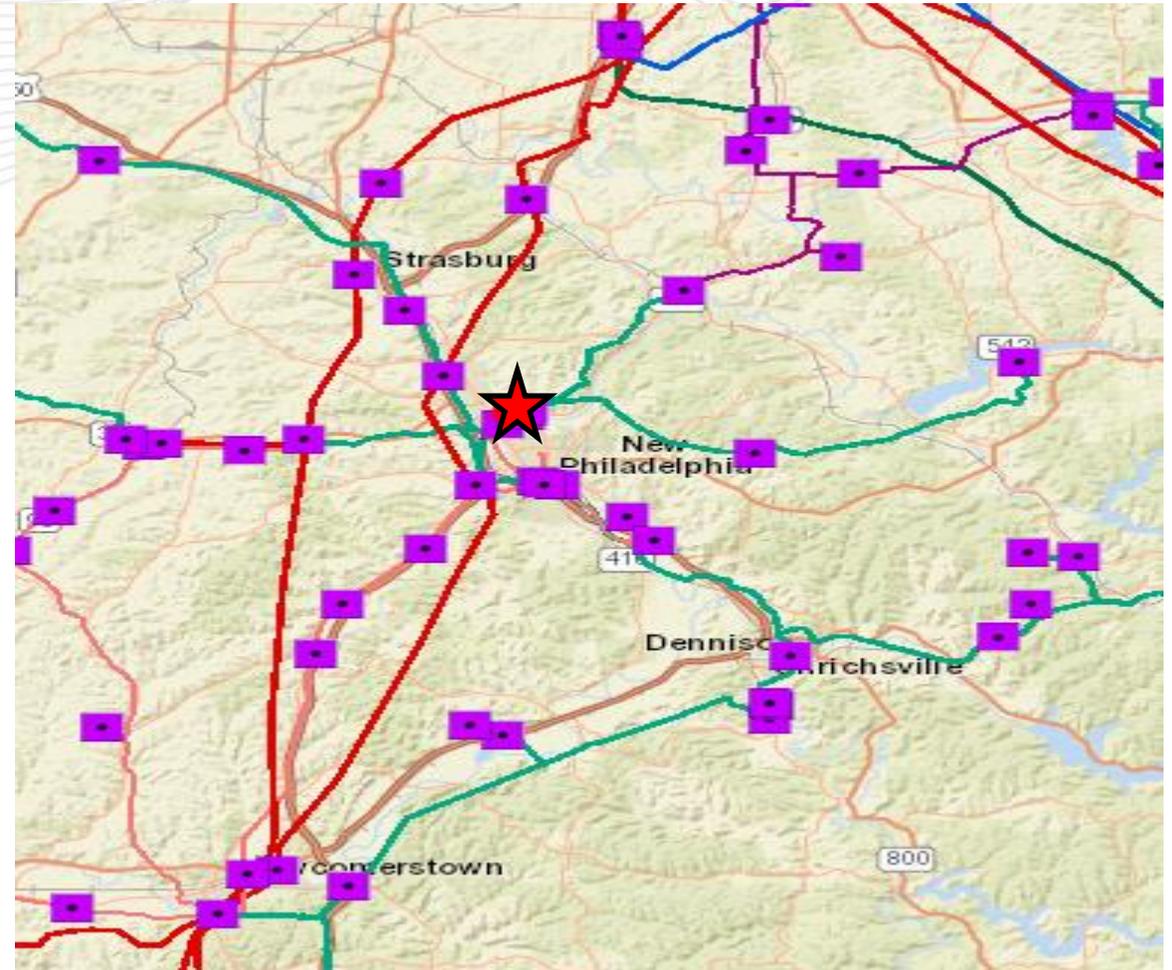
The City of Dover has requested a back-up delivery point from AEP (normally-open). AEP studied the load request and found the East Dover-West Dover 69kV circuit to be the optimal choice, with some terminal upgrades needed at AEP's station, plus the installation of a new switch ("South Intertie Switch"), 69kV revenue metering, and SCADA functionality

Potential Solution:

Construct a new 69kV 3-way switch to provide a back-up service to the City of Dover (an AMP wholesale customer). The connection to Dover will be normally-open. Tap the East Dover-West Dover 69kV circuit. Upgrade the relaying at East Dover & West Dover terminals with fiber-based relaying, due to Dover's behind-the-meter generation. Install revenue metering and SCADA functionality.

Estimated Project Cost: \$1.0M

Possible IS Date: 3/31/2017



Supplemental Project

Problem Statement:

PJM originally identified overloads on Sterling station terminal equipment in the 2012 RTEP analysis (b1881). After analysis with AEP's Asset Renewal group it was decided to rebuild the entire station in the clear to help alleviate aging infrastructure concerns with the existing station equipment and the inability to secure long-term outages at the station to replace the required equipment. Sterling is AEP's #3 ranked worst-performing station in Ohio.

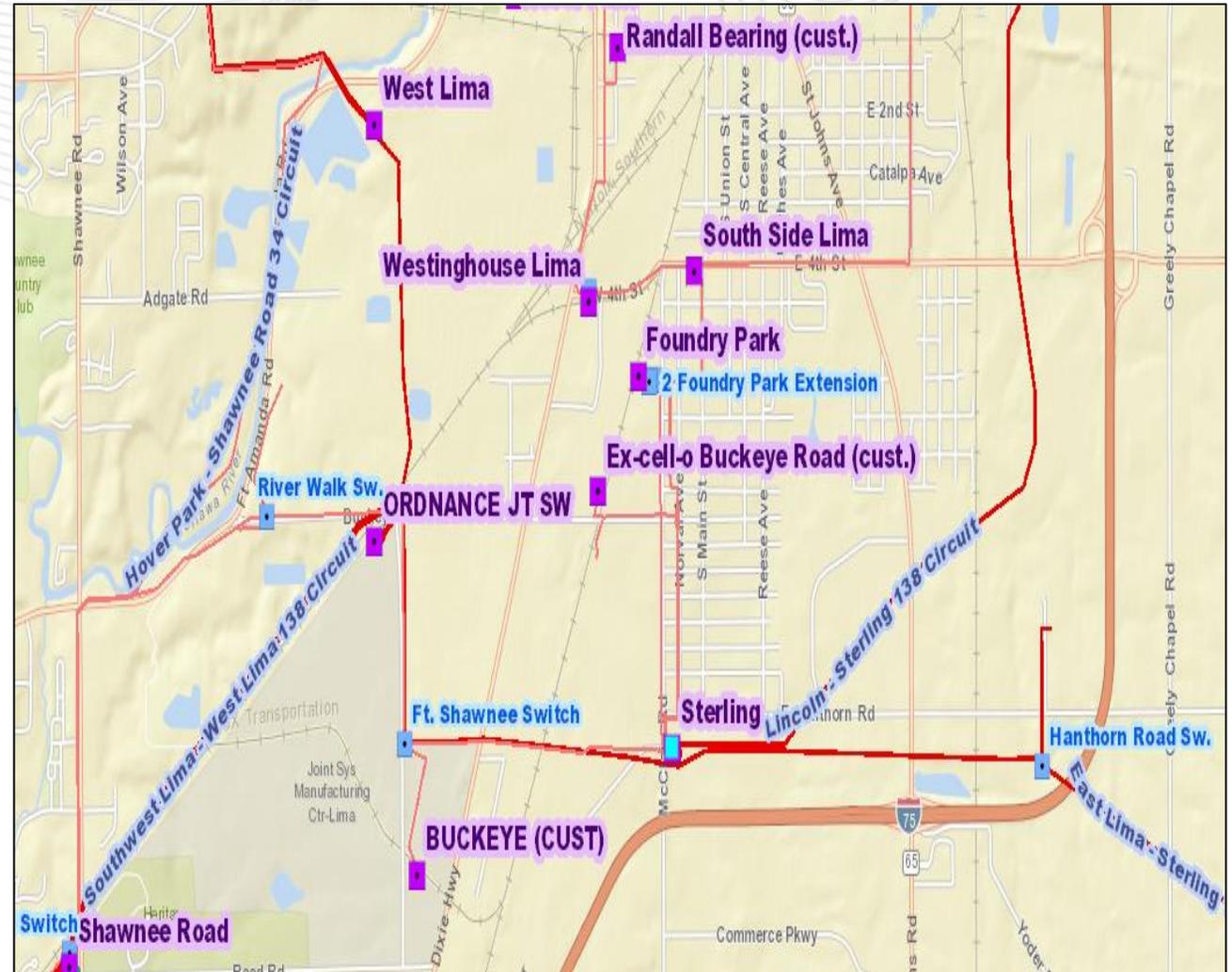
B1881: Replace existing 600 Amp switches, station risers and increase the CT ratios associated with breaker 'G' at Sterling 138 kV Station. It will increase the rating to 296 MVA S/N and 384 MVA S/E

Potential Solution:

Rebuild Sterling station in the clear.

Estimated Project Cost: \$6.5 M

Possible IS Date: 11/1/2018



Supplemental Project

Problem Statement:

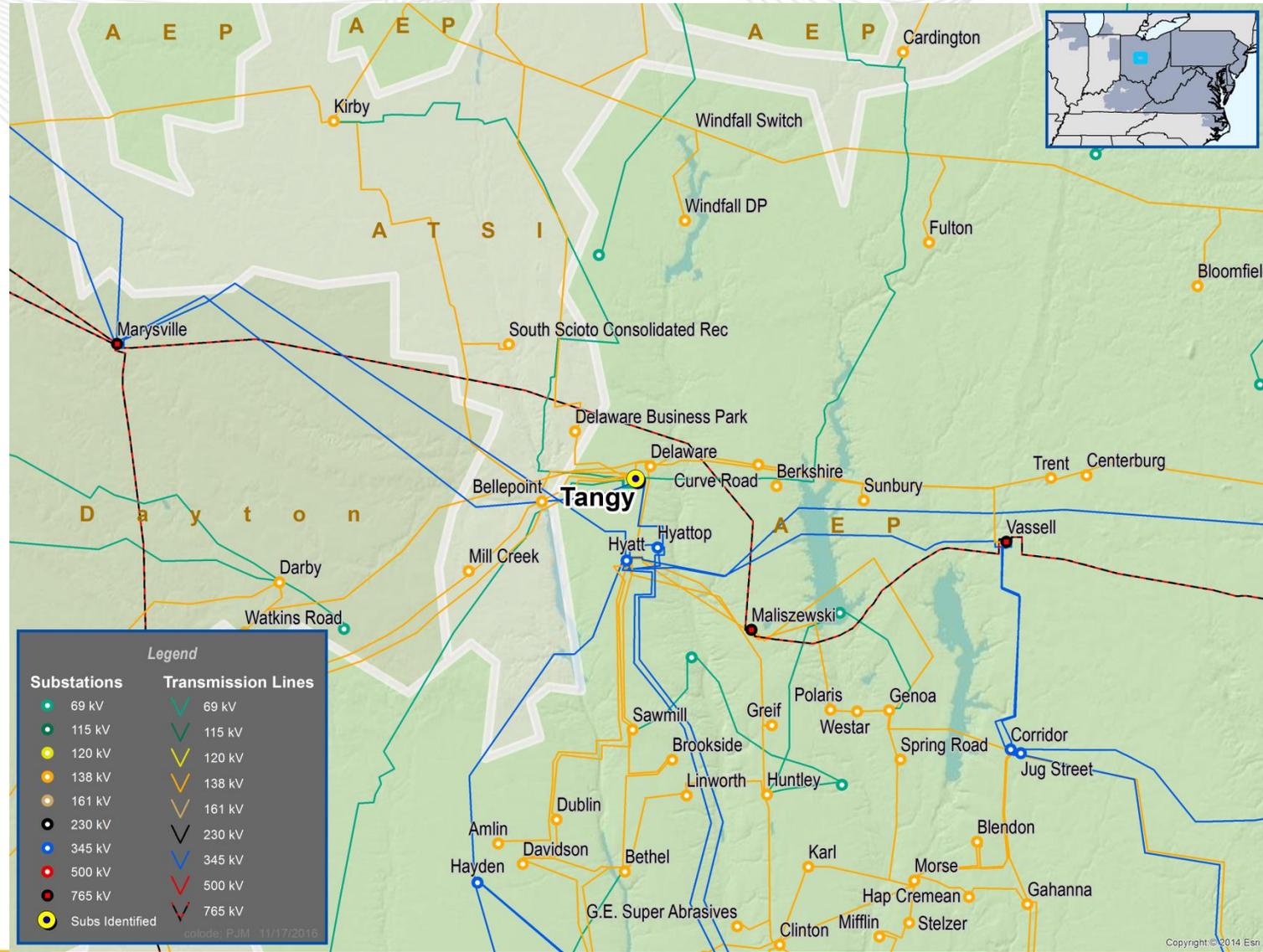
- Reliability: Reduce customer exposure and load loss due to outages; Provide continuity of supply by eliminating simultaneous outages to two or more network elements. Improve overall system protection coordination; including the elimination of a three terminal line.
- Operational Performance: Improve operational switching capabilities and flexibility for system maintenance and restoration

Potential Solution:

Convert Tangy 69kV bus from a main / transfer bus to a five (5) breaker ring bus; Create two (2) lines Tangy-Kirby 69kV Line and Tangy-Cardington 69kV Line.

Estimated Cost: \$4.0 M

Possible IS Date: 12/31/2018



Supplemental Project

Problem Statement:

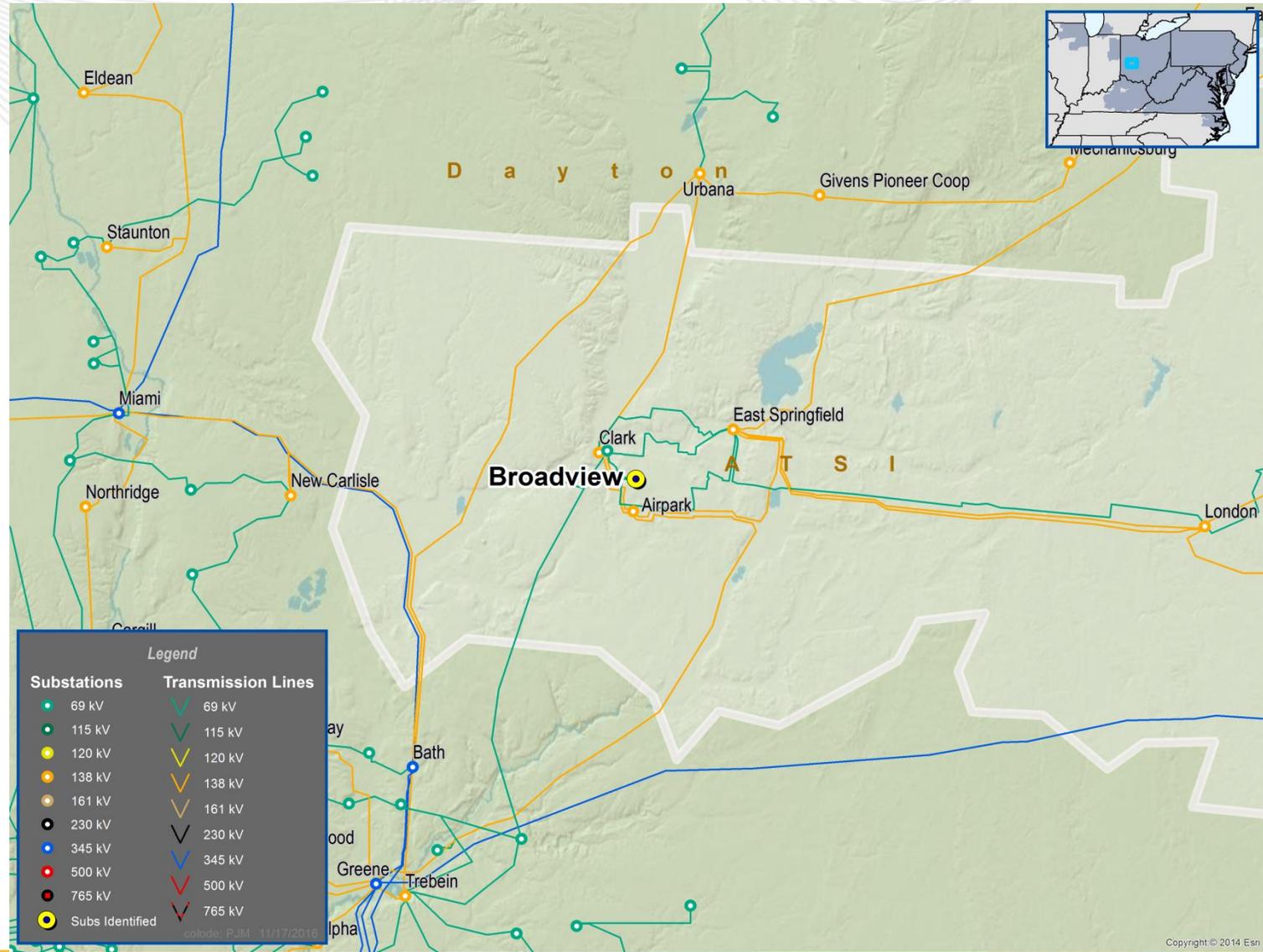
- Reliability: Improve system performance and voltage of a large urban area for loss of any two 138kV lines in the area.
- Operational Flexibility: Improve operational switching capabilities and flexibility for system maintenance and restoration

Potential Solution:

Loop the Clark-Urbana 138kV line (~5 miles) and East Springfield-Tangy 138kV line (~3,5 miles) into the existing 69kV Broadview Substation and add two (2) 138/69kV transformers at Broadview substation to Provide another 138/69kV source near Springfield, Ohio

Estimated Cost: \$32 M

Possible IS Date: 12/31/2019



Supplemental Project

Problem Statement:

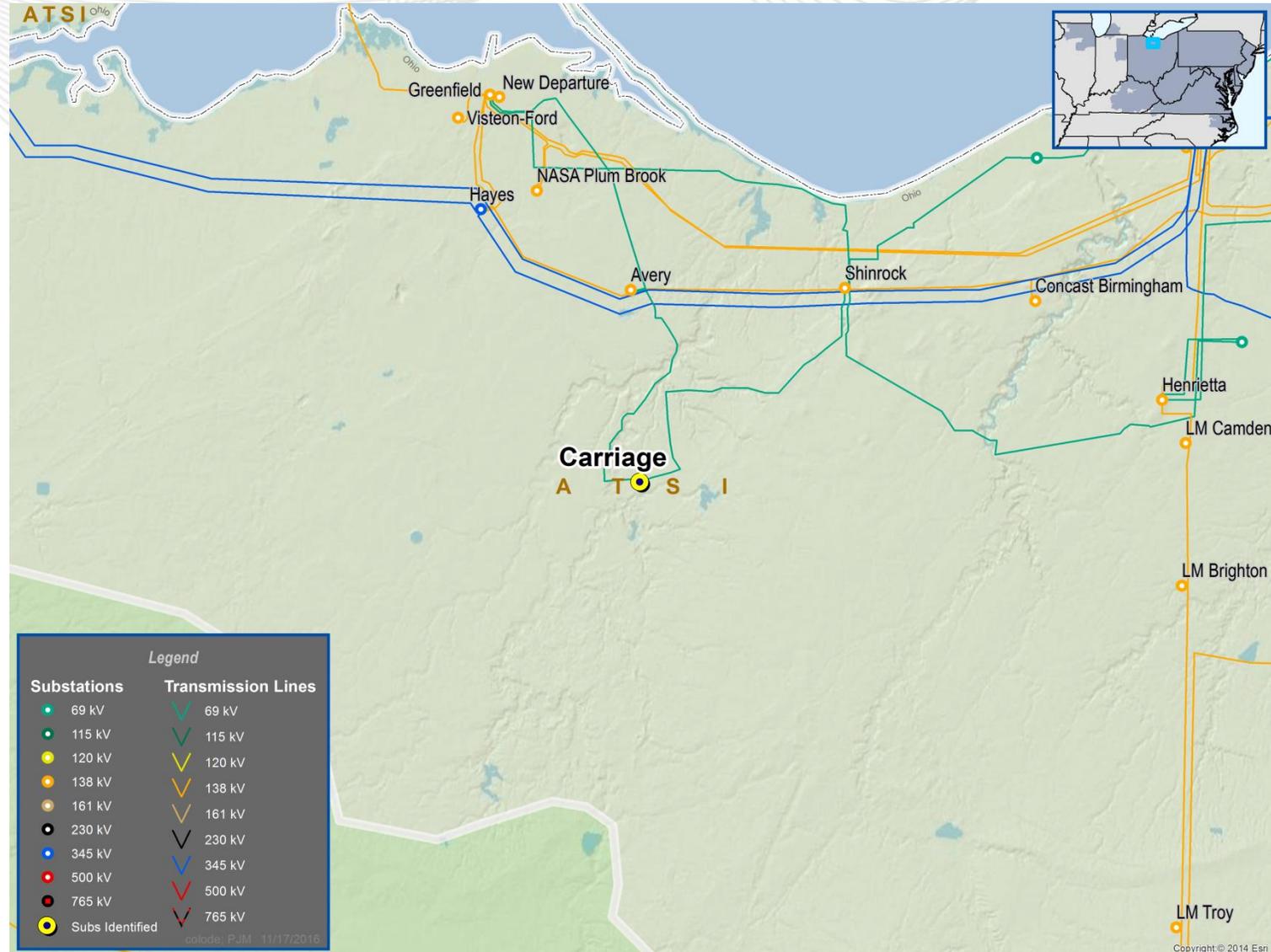
- Reliability: Reduce customer exposure and load loss due to outages on a radial line with multiple customer service points.
- Operational Flexibility: Improve operational flexibility for system maintenance and restoration by providing the ability to transfer load to other sources.

Potential Solution:

Build a new 69kV line from Hanville to Carriage substation (477 ACSR overhead conductor) and Rebuild Hanville into a four (4) breaker ring substation and Carriage into a five (5) breaker ring bus substation

Estimated Cost: \$27 M

Possible IS Date: 05/31/2017



Supplemental Project

Problem Statement:

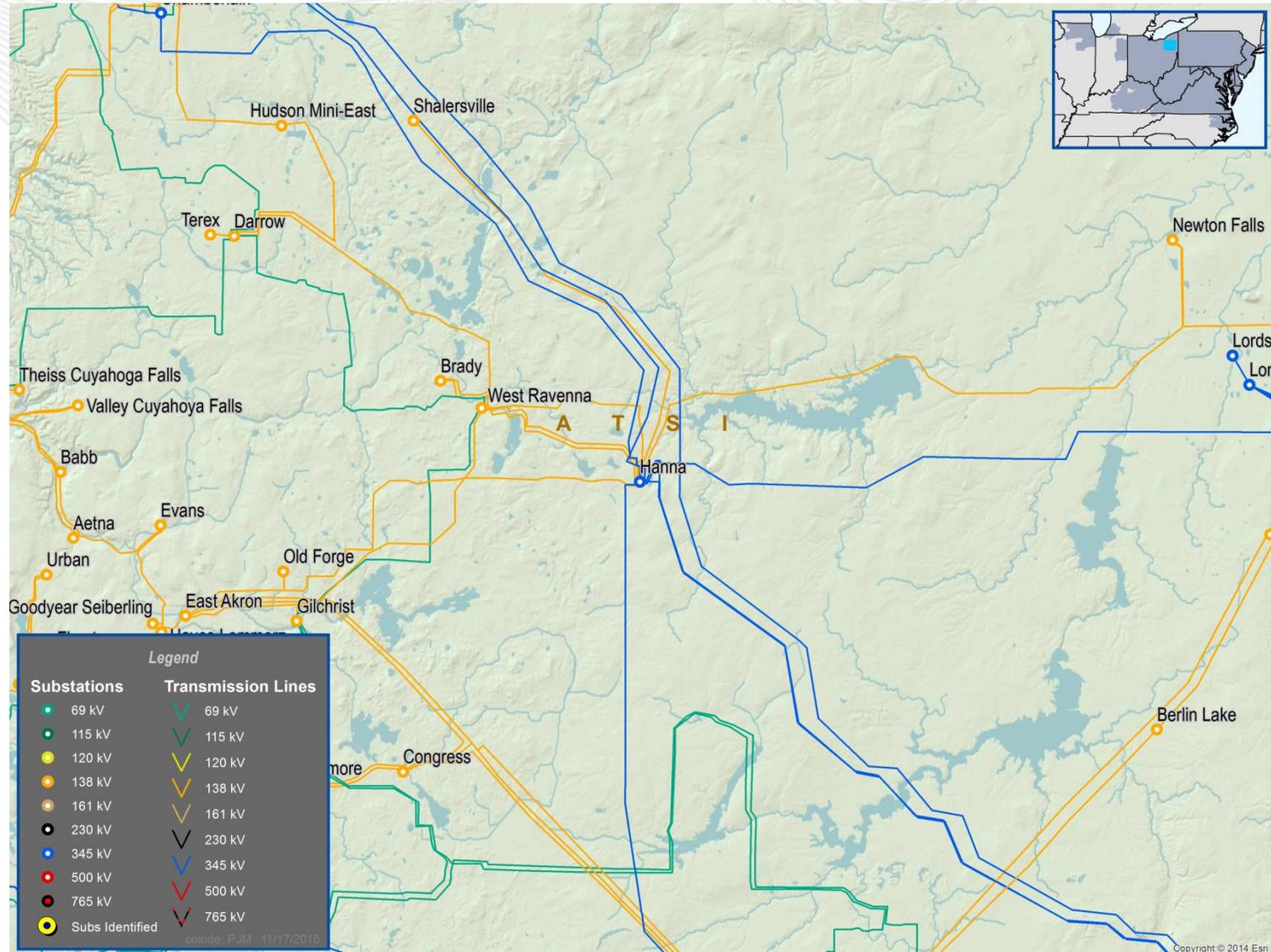
- Reliability: Reduce customer exposure and load loss due to outages on two (2) radial lines with multiple customer service points. Improve overall system protection coordination; including the elimination of a three terminal line.
- Operational Flexibility: Improve operational flexibility for system maintenance and restoration by providing the ability to transfer load to other sources

Potential Solution:

- Rebuild 69kV Line from Ravenna to Sumner tap as double circuit.
- Build a new single circuit 69kV Line from Sumner radial tap to Campbellsport substation.
- Rebuild 2.5 miles of 69kV as double circuit to loop the Ravenna – West Ravenna 69kV Line into Campbellsport.
- Expand Campbellsport to a six breaker ring bus.

Estimated Cost: \$17 M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

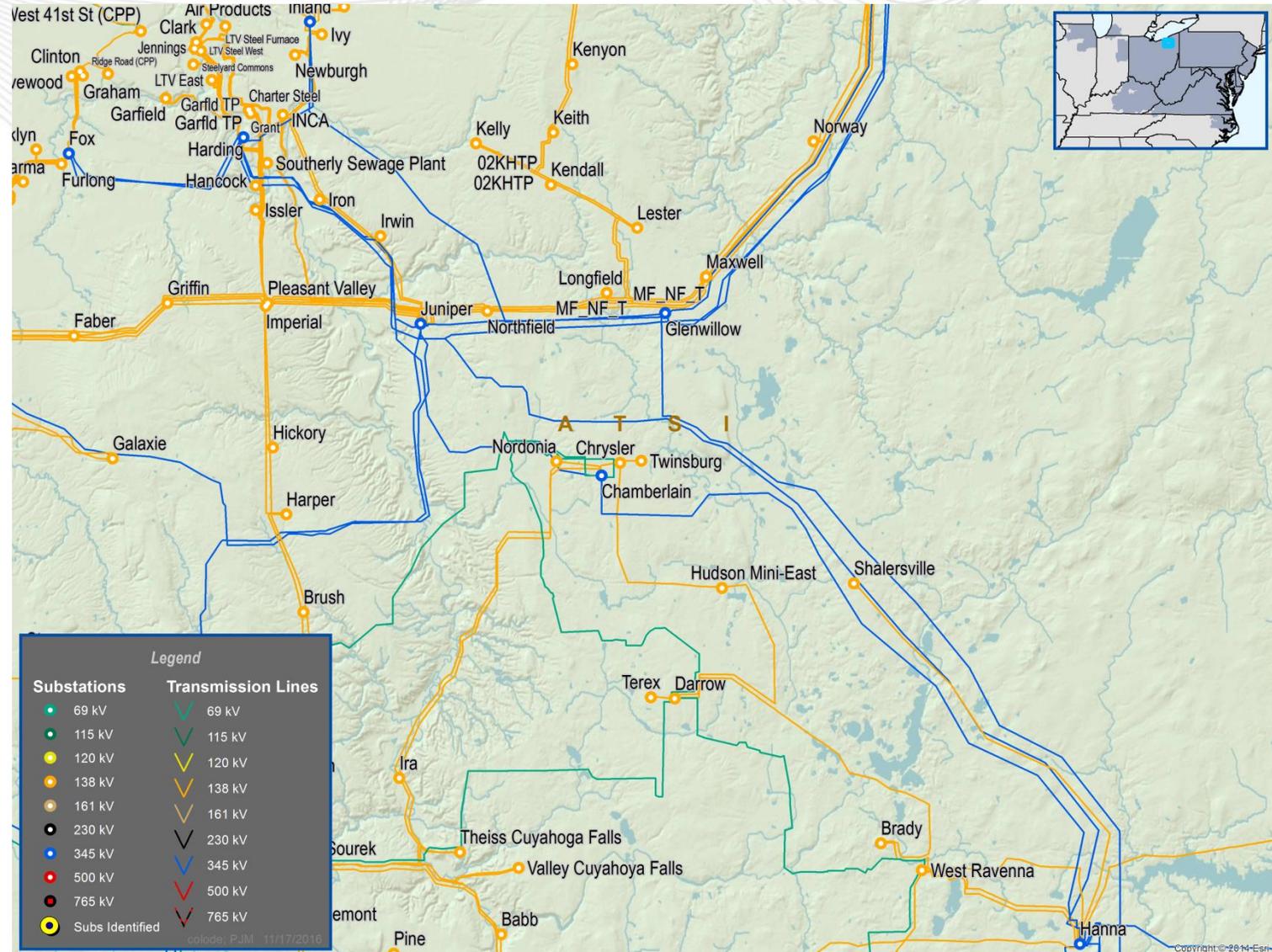
- Reliability: To provide continuity of supply by eliminating simultaneous outages to two or more network elements. Improve overall system protection coordination by networking a three terminal point.
- Operational Performance: Improve operational flexibility for system maintenance and restoration by providing the ability to transfer load to other sources.

Potential Solution:

Convert Aurora into six (6) breaker 69kV Ring Bus

Estimated Cost: \$6.0 M

Possible IS Date: 07/31/2017



Supplemental Project

Problem Statement:

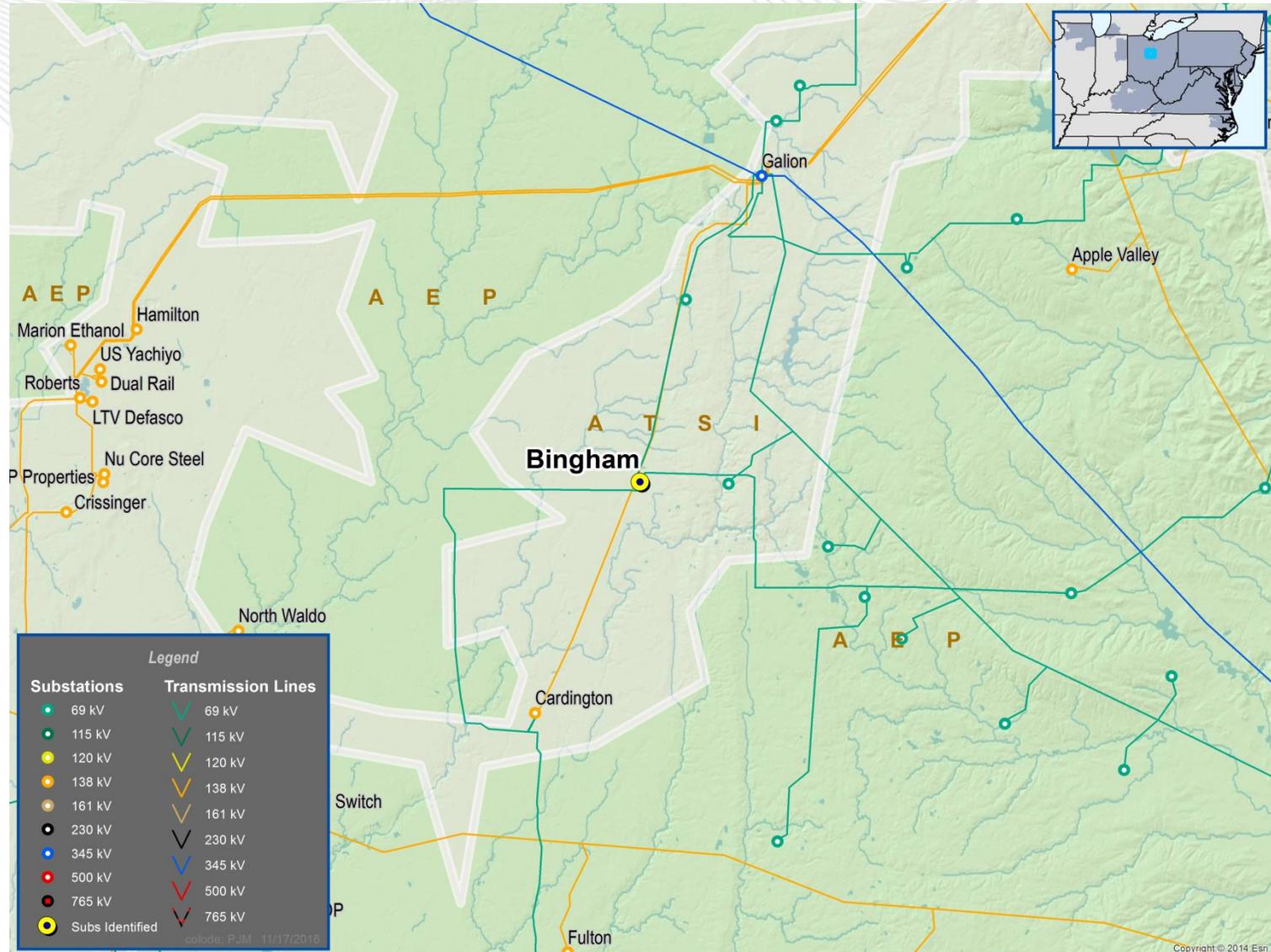
- Reliability: Reduce customer exposure and load loss due to outages; Provide continuity of supply by eliminating simultaneous outages to two or more network elements. Improve overall system voltage and protection coordination; including the elimination of a three terminal line.
- Operational Performance: Improve operational switching capabilities and flexibility for system maintenance and restoration

Potential Solution:

Expand Bingham 69kV substation for a five (5) breaker ring configuration; Add 2-14.4 MVAR Capacitor Bank.

Estimated Cost: \$7.0 M

Possible IS Date: 12/31/2017





ATSI Transmission Zone

Supplemental Project

Problem Statement:

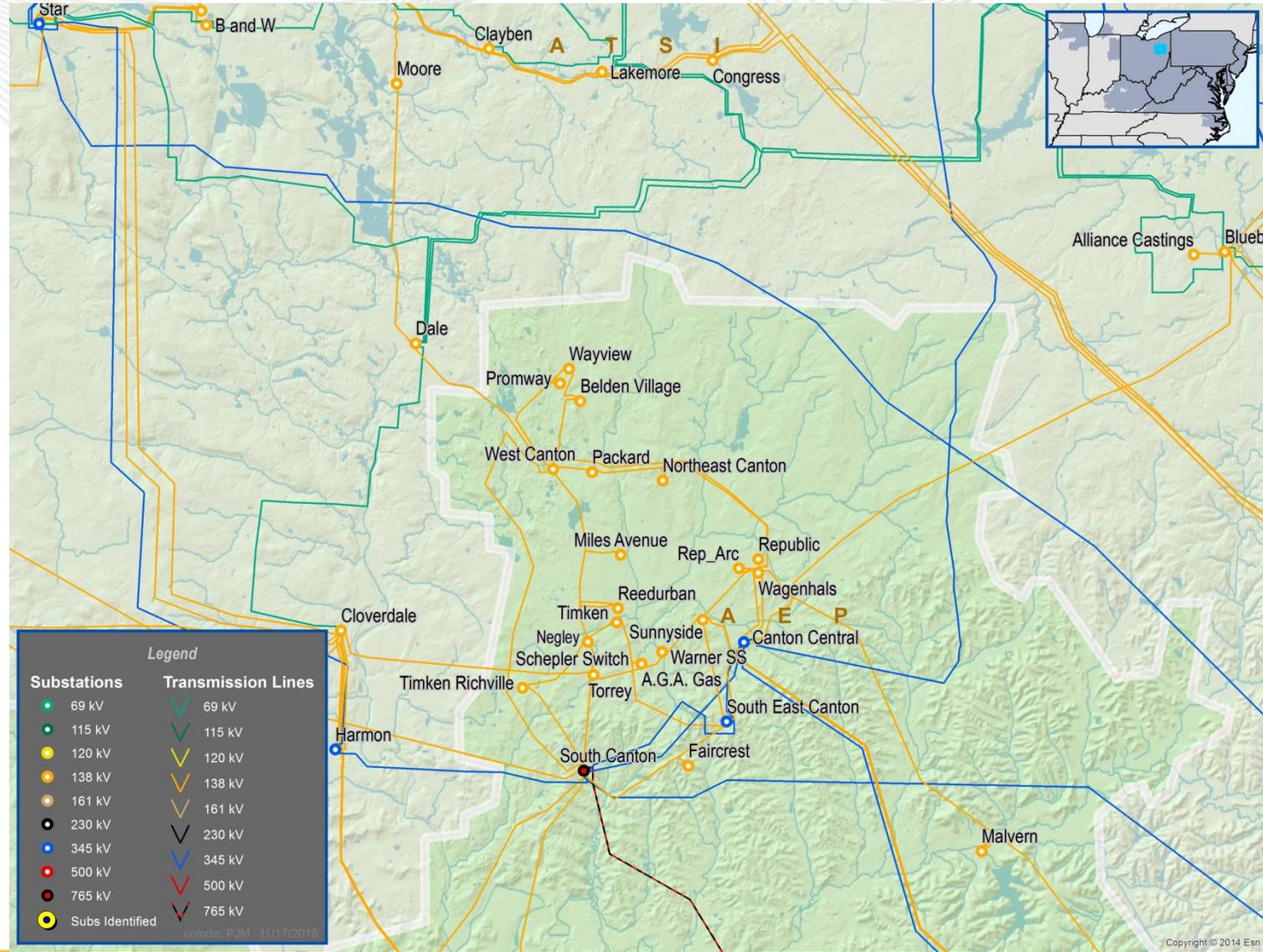
- Reliability: Reduce customer exposure and load loss due to outages; Provide continuity of supply by eliminating simultaneous outages to two or more network elements. Improve overall system protection coordination; including the elimination of a three terminal line.
- Operational Flexibility: Improve operational switching capabilities and flexibility for system maintenance and restoration.

Potential Solution:

Expand Dublin substation for a four (4) breaker ring configuration and reconfigure for a line-load-line-load lay-out; Relay upgrades required at terminal ends.

Estimated Cost: \$6.0 M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

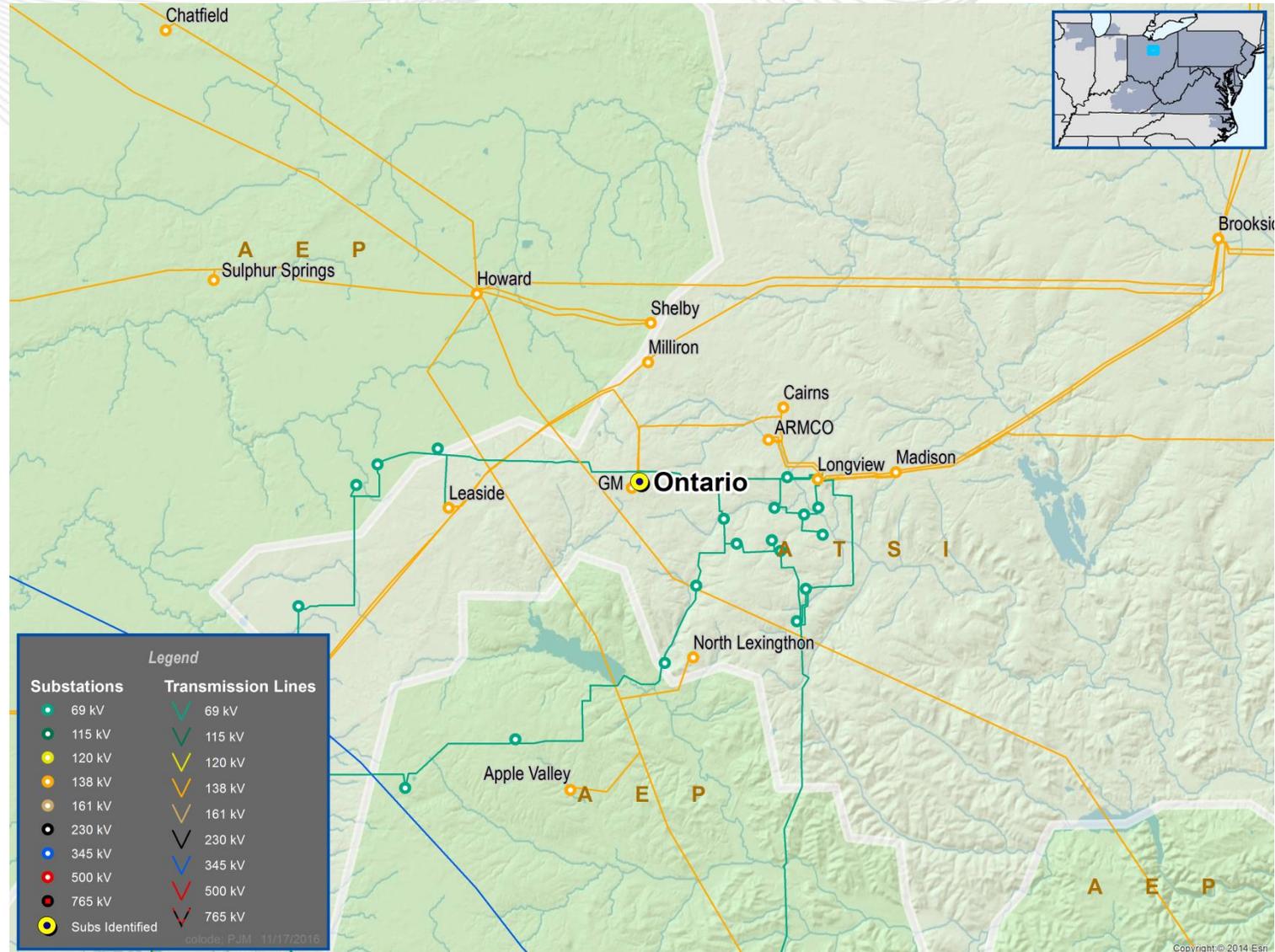
- Reliability: Reduce customer exposure and load loss due to outages; Improve overall system protection coordination.
- Operational Flexibility: Improve operational switching capabilities and flexibility for system maintenance and restoration.

Potential Solution:

Expand Ontario 138kV substation for a four (4) breaker ring configuration and reconfigure for a line-load-line-load lay-out; Relay terminal end upgrades are also required.

Estimated Cost: \$5.0 M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

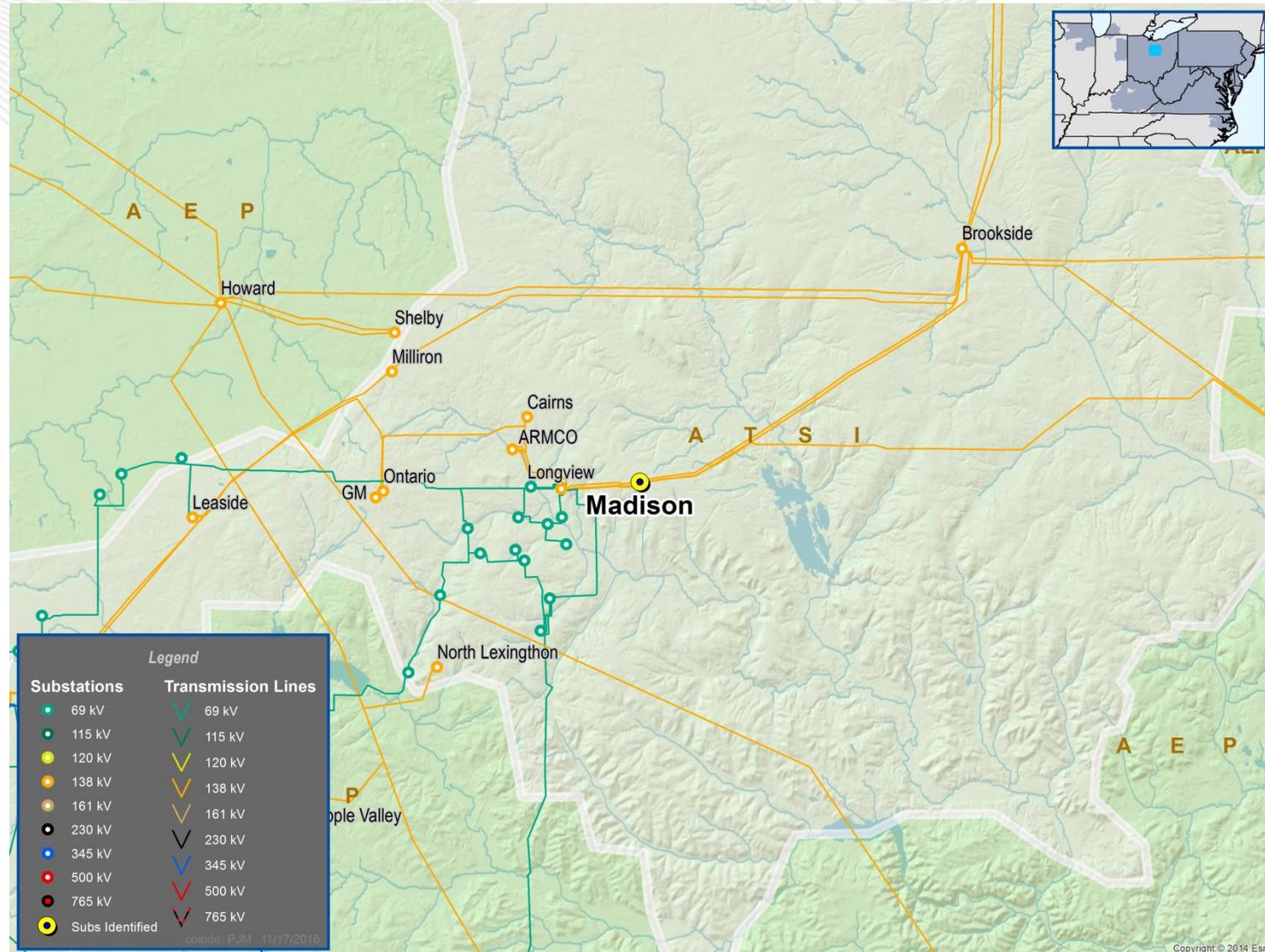
- Reliability: Reduce customer exposure and load loss due to outages; Improve overall system protection coordination.
- Operational Flexibility: Improve operational switching capabilities and flexibility for system maintenance and restoration.

Potential Solution:

Add three (3) breakers at Madison 138kV substation to complete a three breaker ring bus configuration. Relay terminal end upgrades required.

Estimated Cost: \$4.0 M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

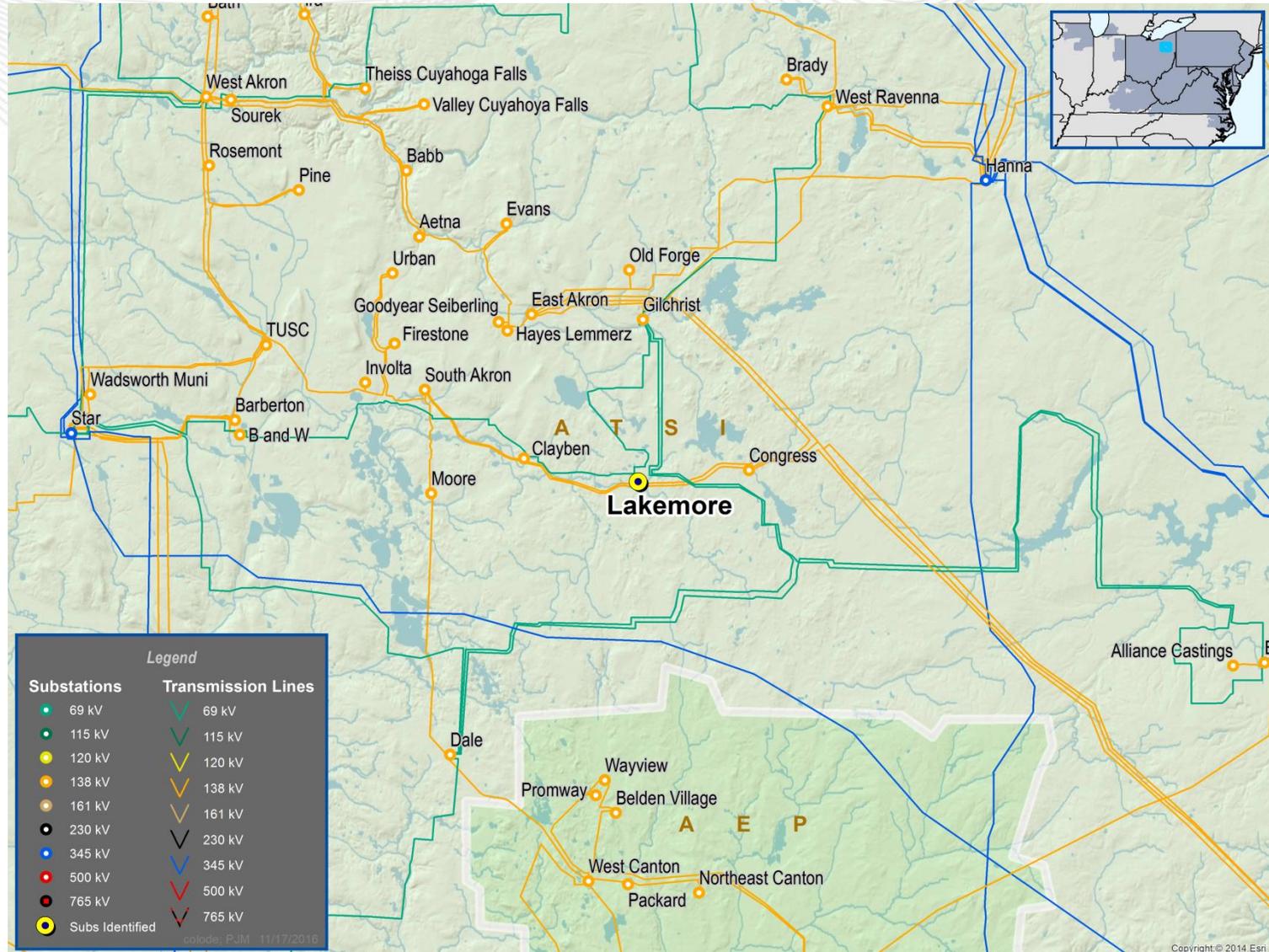
- Reliability: Reduce customer exposure and load loss due to outages; Improve overall system protection coordination.
- Operational Flexibility: Improve operational switching capabilities and flexibility for system maintenance and restoration.

Potential Solution:

Add two (2) breakers at Lakemore 138kV substation to complete a three breaker ring bus configuration. Relay and communication upgrades required at terminal ends.

Estimated Cost: \$4.0 M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

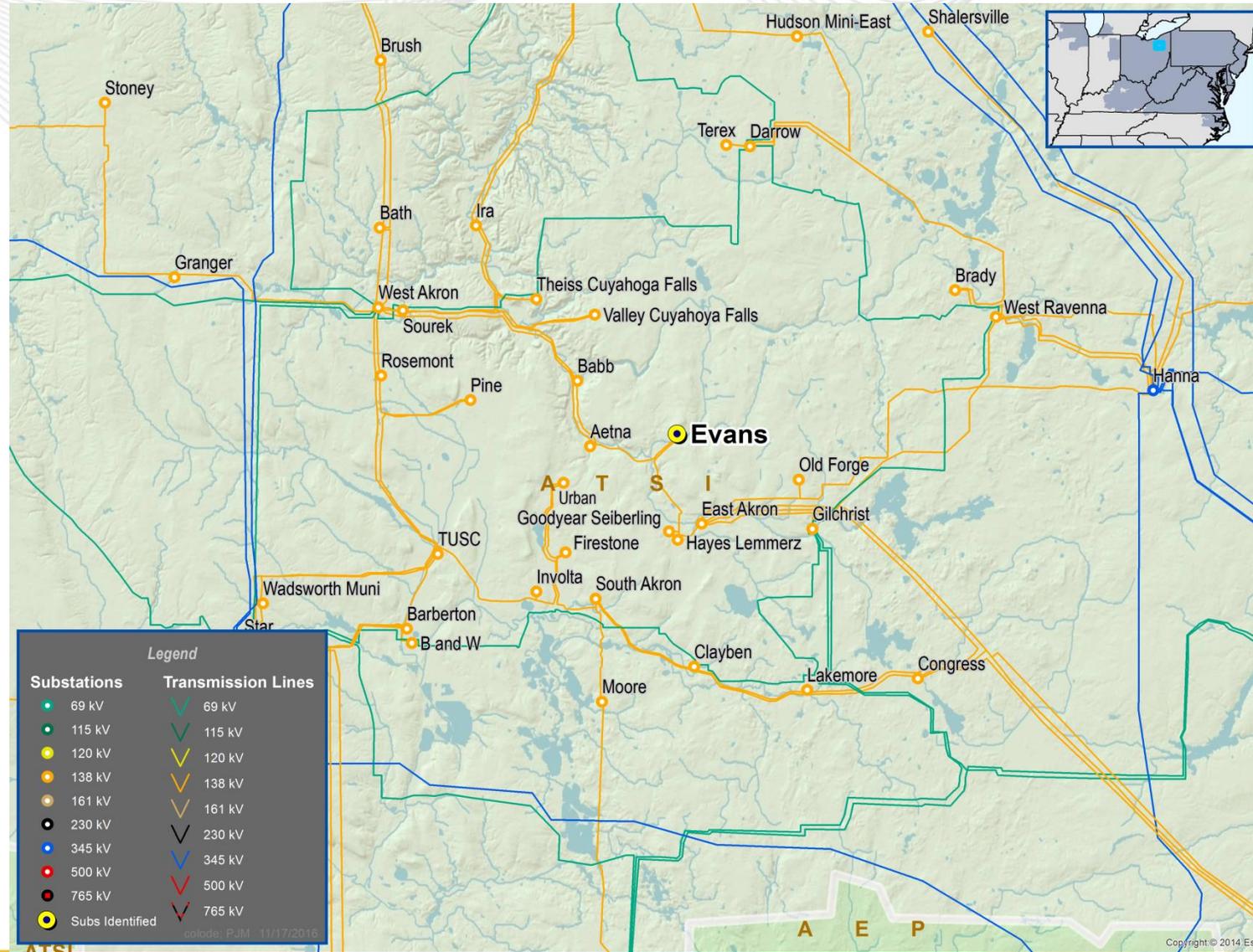
- Reliability: Reduce customer exposure and load loss due to outages; Improve overall system protection coordination.
- Operational Flexibility: Improve operational switching capabilities and flexibility for system maintenance and restoration

Potential Solution:

Add 2 new 138kV breakers for ring bus; Rearrange bus configuration for Line-Load-Line-Load layout.

Estimated Cost: \$3.0 M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

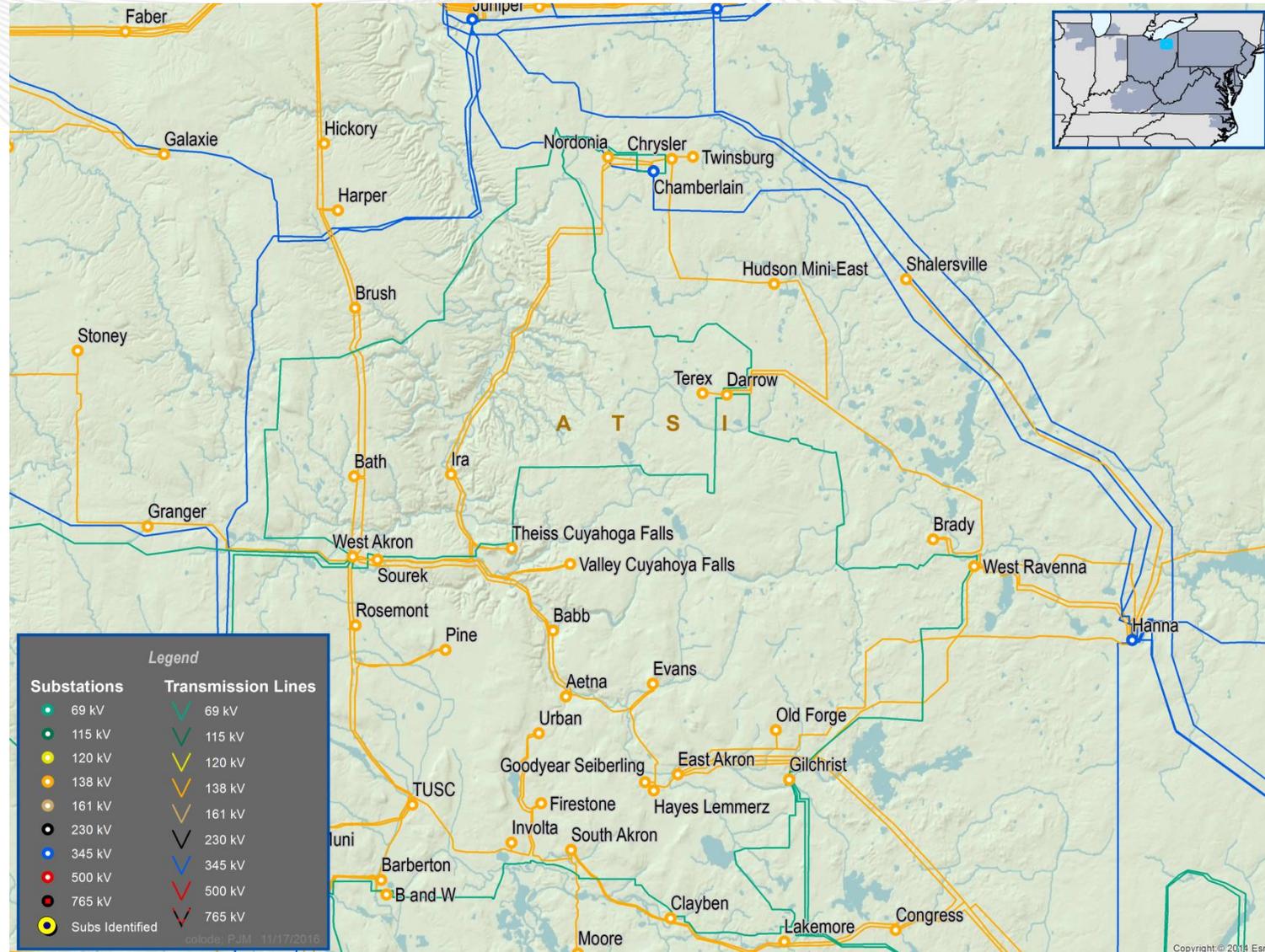
- Reliability: Reduce customer exposure and load loss due to outages; Provide continuity of supply by eliminating simultaneous outages to two or more network elements. Improve overall system protection coordination; including the elimination of a three terminal line.
- Operational Performance: Improve operational switching capabilities and flexibility for system maintenance and restoration.

Potential Solution:

Rebuild 3.9 miles of 69kV line to a double circuit on existing ROW. Expand Chittenden substation to a five (5) CB ring bus and create the Chittenden-Darrow 69kV, Darrow-West Akron 69kV, Chittenden-Hudson Municipal 69kV and Chittenden-Macedonia 69kV lines

Estimated Cost: \$10 M

Possible IS Date: 12/31/2018



Supplemental Project

Problem Statement:

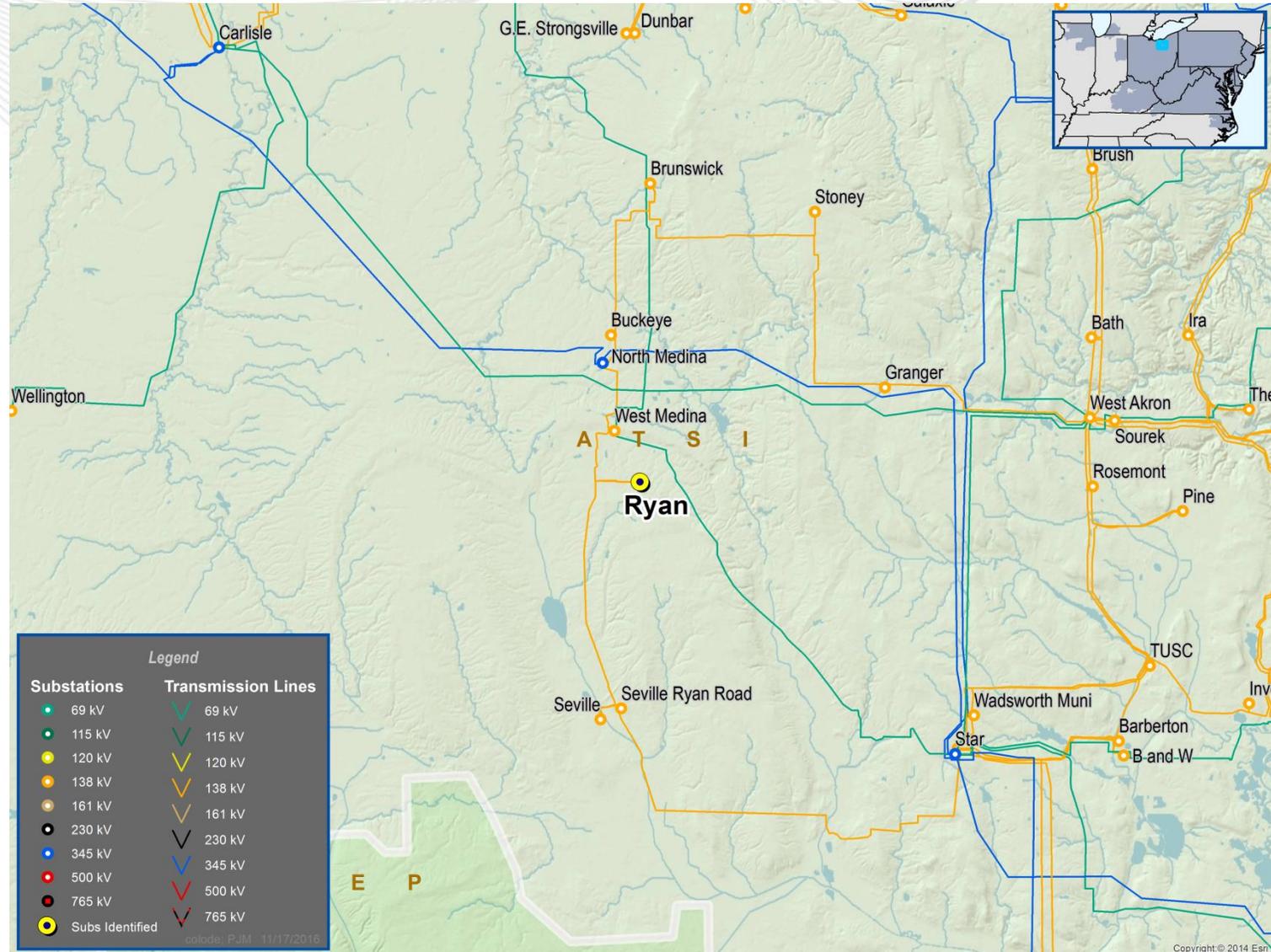
- Reliability: Reduce customer exposure and load loss due to outages; Improve overall system protection coordination.
- Operational Flexibility: Improve operational switching capabilities and flexibility for system maintenance and restoration

Potential Solution:

Add two (2) breakers at Ryan substation to complete a three breaker ring bus configuration. Relay terminal end upgrades required.

Estimated Cost: \$3 M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

- **Reliability:** Eliminates the outage of three or more elements under certain contingencies; Reduces line exposure and impact to multiple customer service points under outage conditions.
- **Operational Flexibility:** Improve operational switching capabilities and flexibility for system maintenance and restoration.

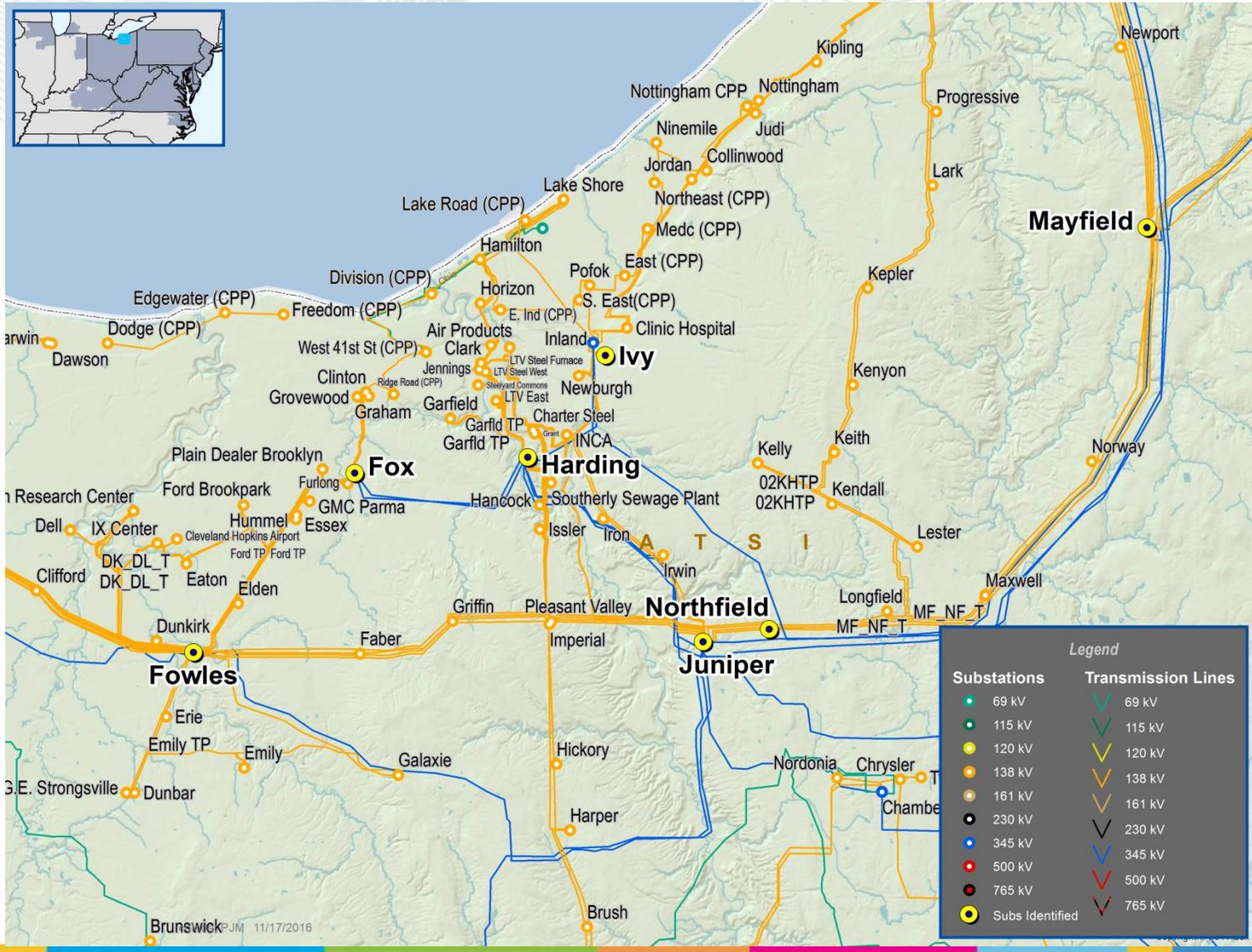
Potential Solution:

Add 138kV breakers to open positions at existing 138kV substation locations.

- **Mayfield 138kV:** Install four (4) 138 kV breakers in open bay positions on the Q1, Q2, Q3 and Q4 138 kV lines
- **Harding 138kV:** Install four (4) 138 kV breakers in open bay positions on the Q11, Q12, Q13 and Q14 138kV lines.
- **Juniper 138kV:** Install two (2) 138 kV breakers in open bay positions on the Q2 and Q4 138 kV lines.
- **Jennings 138kV:** Install one (1) 138 kV breaker in open bay position on the Q13 138 kV line.
- **Fox 138kV:** Install four (4) 138kV breakers in open bay positions on the Q11, Q12, Q13 and Q14 138kV lines.
- **Northfield 138kV:** Install two (2) 138 kV breakers in open bay positions on the Q1 and Q3 138 kV lines.
- **Fowles 138kV:** Install two (2) 138 kV breakers in open bay positions on the Q2 and Q4 138 kV lines
- **Ivy 138kV:** Install one (1) 138 kV breaker in the open bay position on the Q14 138kV line.

Estimated Cost: \$29 M

Possible IS Date: 12/31/2018



Supplemental Project

Problem Statement:

- Transmission line at or beyond existing service life.
- Age of the transmission line is greater than 40 years.
- Field inspections results in greater than 50% of poles failing criteria.
- Increasing maintenance repairs.
- Negative impact on reliability and customer outages
- A few or more outages resulting from failing equipment.

Potential Solution:

Rehab Cedar Street-Frisco East & West 69kV Circuits for improved reliability and to extend life.

Includes inspect and treat grillage foundations, replace select poles, insulators and conductor.

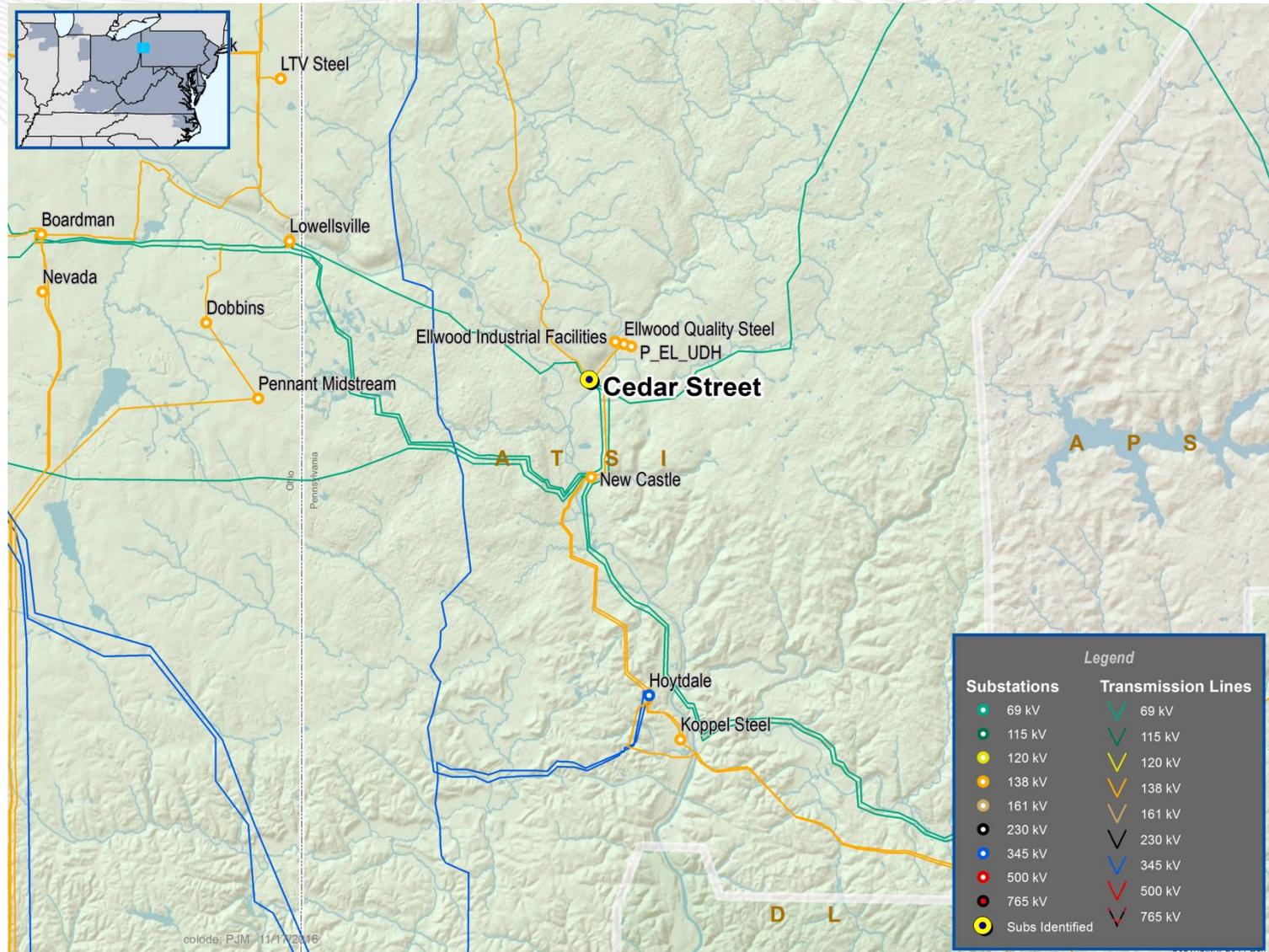
Remove mixed conductor types & sizes, replace all with 336 ACSR

Potential Alternative Solutions Considered :

- Complete rebuild of line: Steel towers have remaining life if grillage repaired and treated.

Estimated Cost: \$15 M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

- Transmission line at or beyond existing service life.
- Age of the transmission line is greater than 40 years.
- Field inspections results in greater than 50% of poles failing criteria.
- Deteriorating reliability due to hardware failures.
- Negative impact on reliability and customer outages
- A few or more outages resulting from failing equipment.

Potential Solution:

Galion-Leaside 69 kV Line: Rebuild the Galion-Leaside 69 kV circuit and replace 7 line switches; reconductor with 477 ACSR.

Crestline Substation: Replace 69kV disconnect switches A8, A10 & A29 and upgrade main bus conductor.

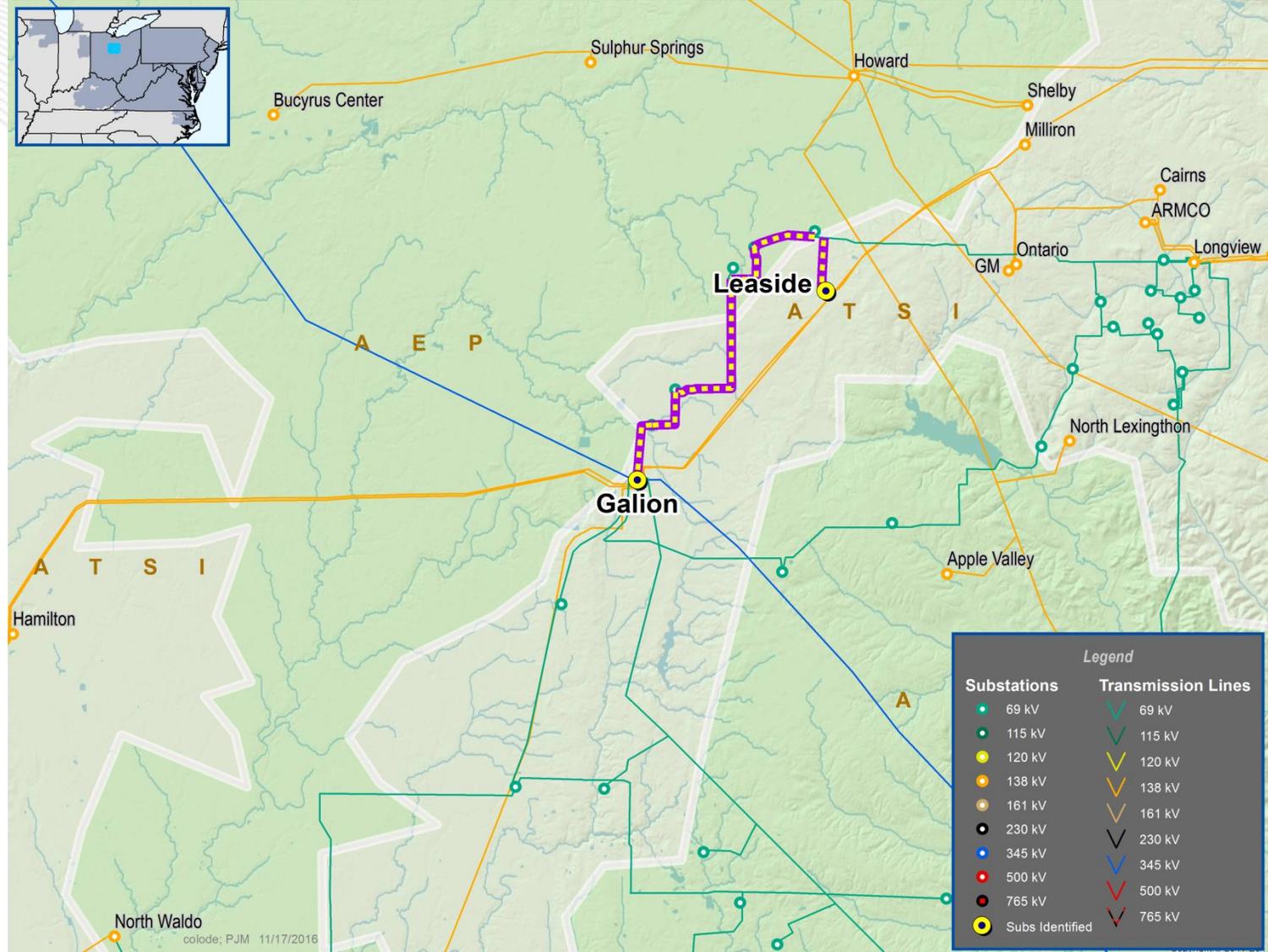
Leaside Substation: Replace 69kV line relaying on B20 to Galion.

Potential Alternative Solutions Considered :

- Rehab line rather than rebuild: Remaining life of remaining poles and hardware not sufficient to justify

Estimated Cost: \$15 M

Possible IS Date: 07/31/2017



Supplemental Project

Problem Statement:

L15625 reroute is being driven by 14.2 mile NERC Facility Ratings Alert project on radial distribution line 17105 (Wempletown – Roscoe Bert – Harlem – Sand Park – Argyle – Belvidere), which was built in 1948. 2.6 miles of line 17105 run through a state park.

Presently Transmission line 15625 runs in parallel with 17105, but bypasses the state park by utilizing an unused position on a 345 kV tower line that goes around the north edge of the park. Ultimate plans call for a 345 kV line to occupy that position, which will require 15625 to be moved to the state park ROW.

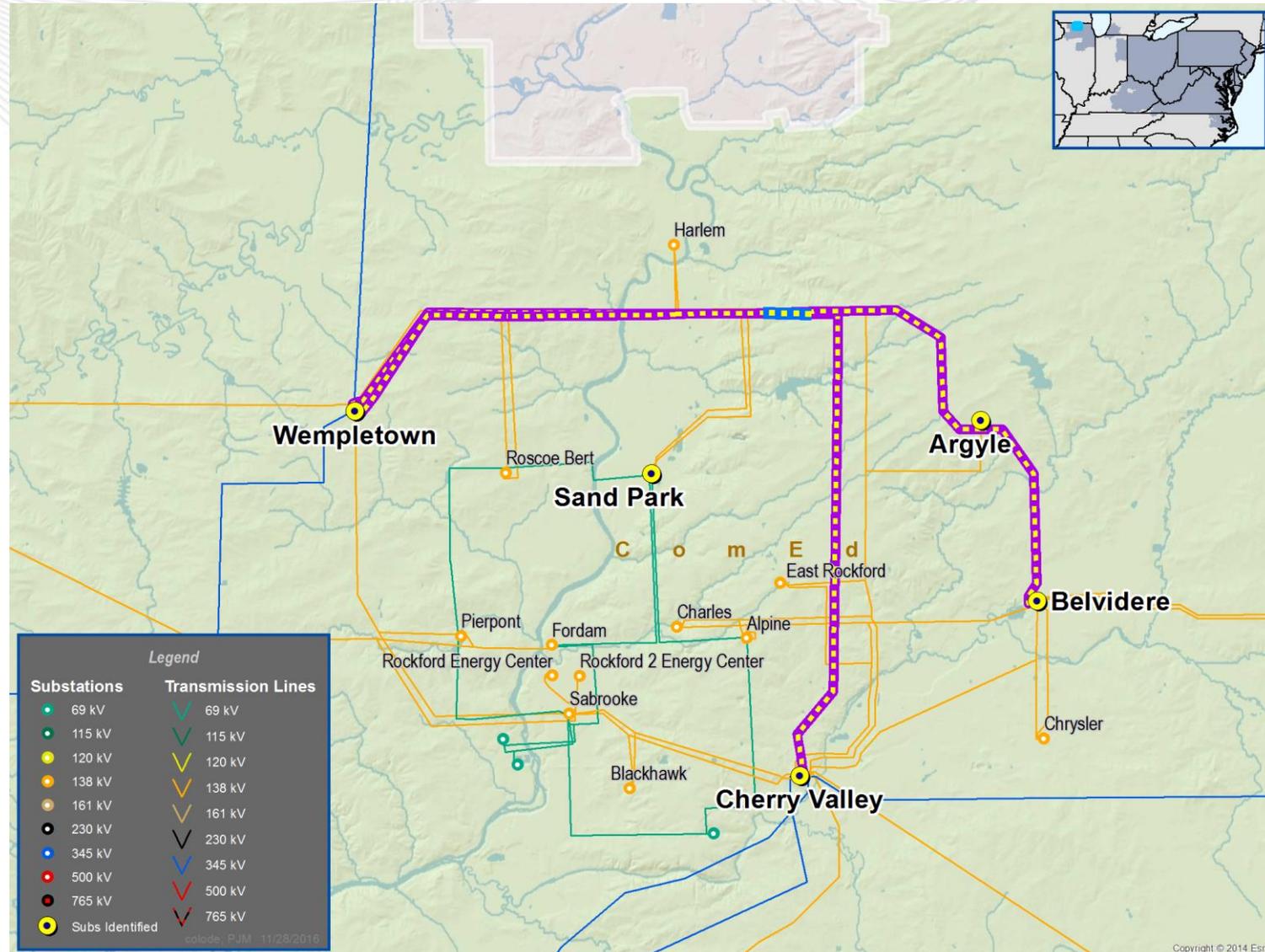
This project will install double circuit 138 kV through the state park and move 15625 to these new towers. This will shorten 15625 by 2.3 miles and prevent having to disturb the state park a second time in the future.

Potential Solution:

Reroute 138 kV line 15625 (Sand Park - Argyle 138kV line) with a new sectionalizing switch on line 15625 to allow for restoration of load at Sand Park in the event of a ROW contingency.

Estimated Project Cost: \$1.0M

Projected IS Date: 12/31/2017





Supplemental Project

Problem Statement:

Blue Island line 7611 Circuit breaker was installed in 1968 (48 years old) and is a 10,000 MVA symmetrically rated oil CB. Blue Island has four 345/138 kV autotransformers and experiences high fault duties.

In the early 1980's a temporary sectionalizing scheme was installed to prevent overduty on several circuit breakers. The sectionalizing scheme trips a bus tie CB following the initial line breaker operation to limit the fault current seen by the line breaker for subsequent reclose attempts.

Failure of the sectionalizing scheme would result in 109% fault duty on 7611 CB

This is the last CB on the ComEd system with this type of sectionalizing scheme. Replacement of this CB will allow removal of the sectionalizing scheme.

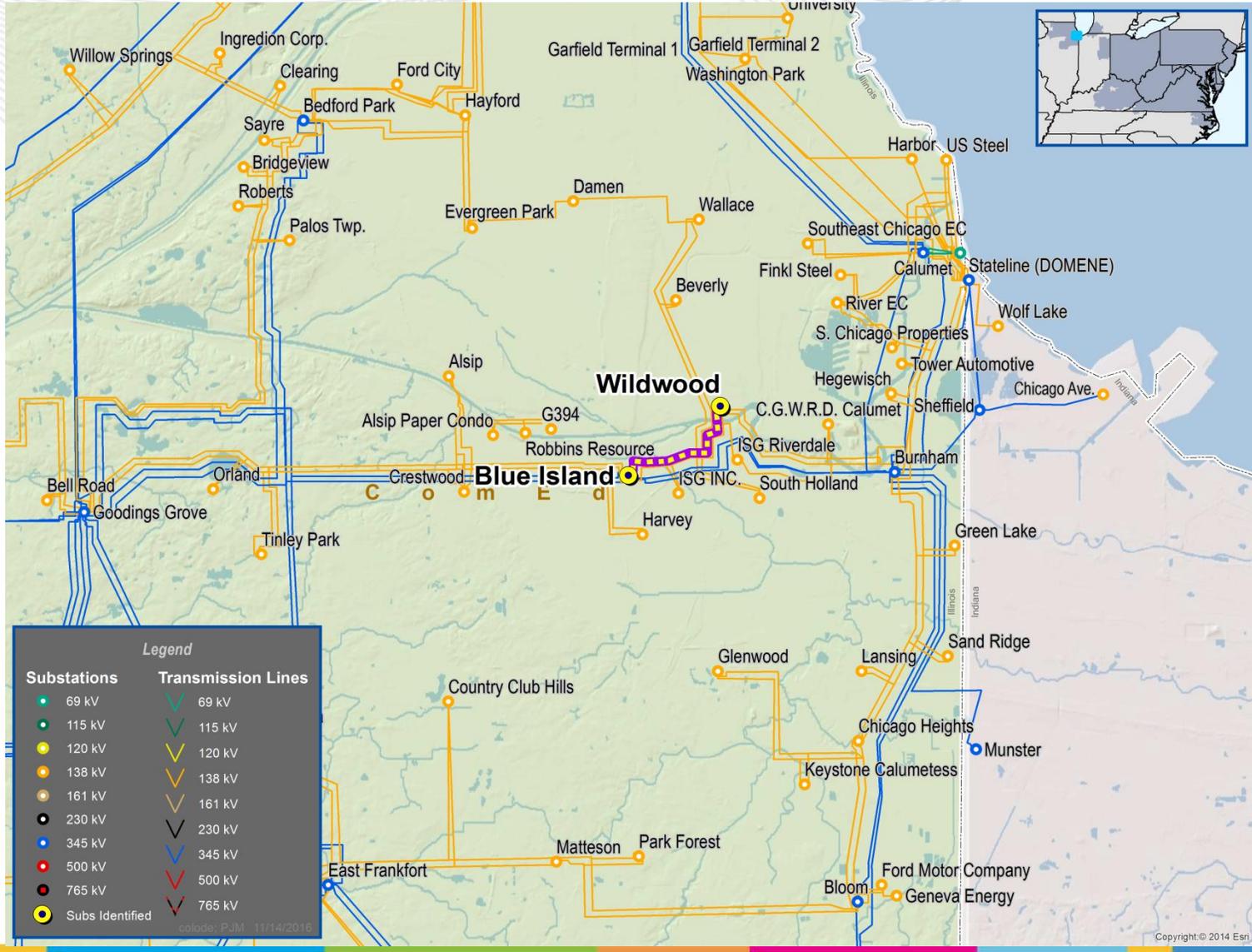
Potential Solution:

Replace line 7611 (Blue Island – Wildwood 138kV line) CB at Blue Island.

Estimated Project Cost: \$1.75M

Projected IS Date: 12/31/2017

ComEd Transmission Area



Supplemental Project

Problem Statement:

Aging Infrastructure at Brunot Island.

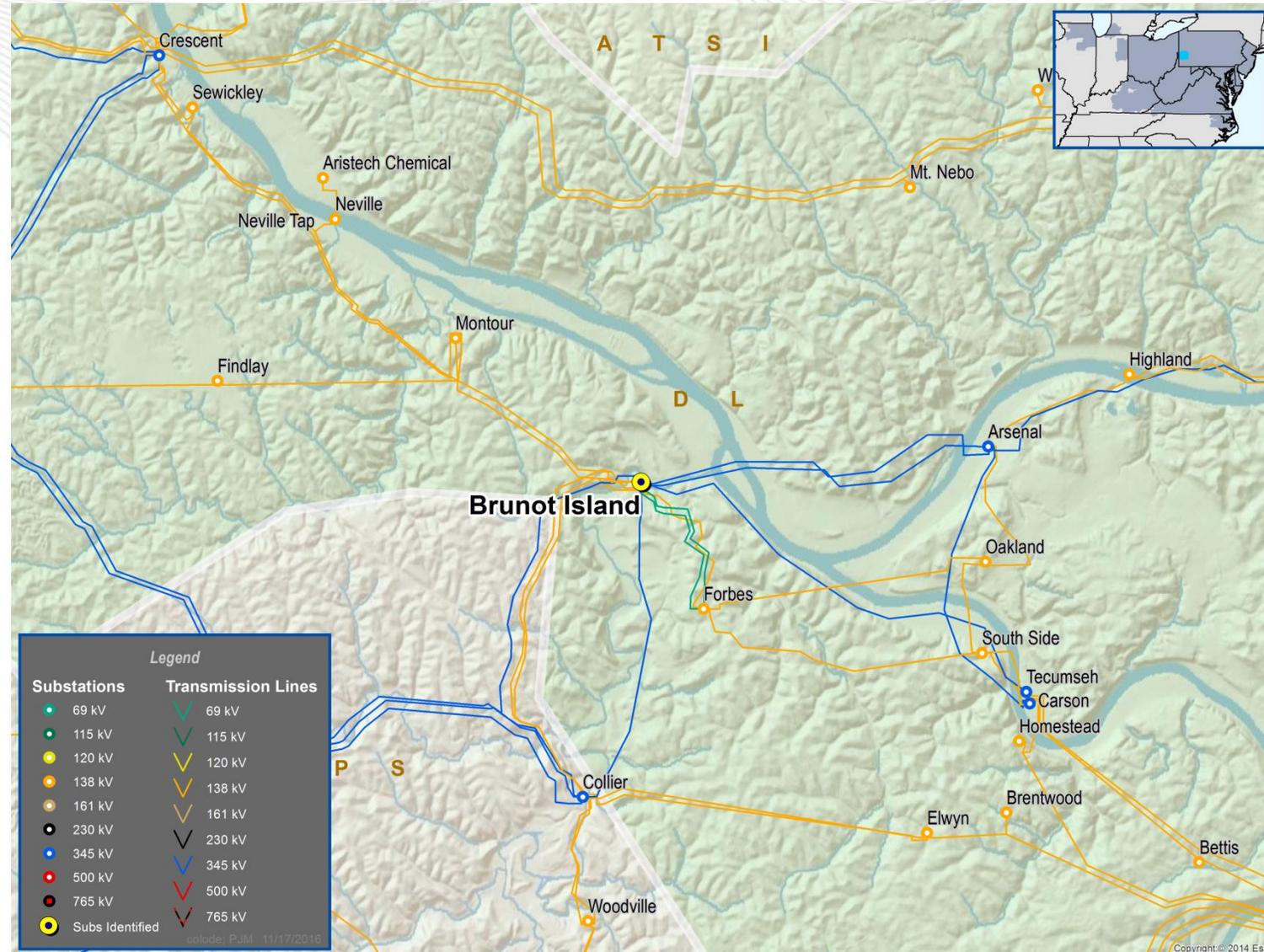
Potential Solution:

Replace Brunnot - #3/9 138kV bus tie breaker (Present rating: 63kA, Future Rating: 63kA).

Replace Brunnot - Sewickley Z43 138kV breaker (Present rating: 63kA, Future Rating: 63kA).

Estimated Project Cost: \$0.33M each

Possible IS Date: 6/1/2017





DLCO Transmission Area

Supplemental Project

Problem Statement:

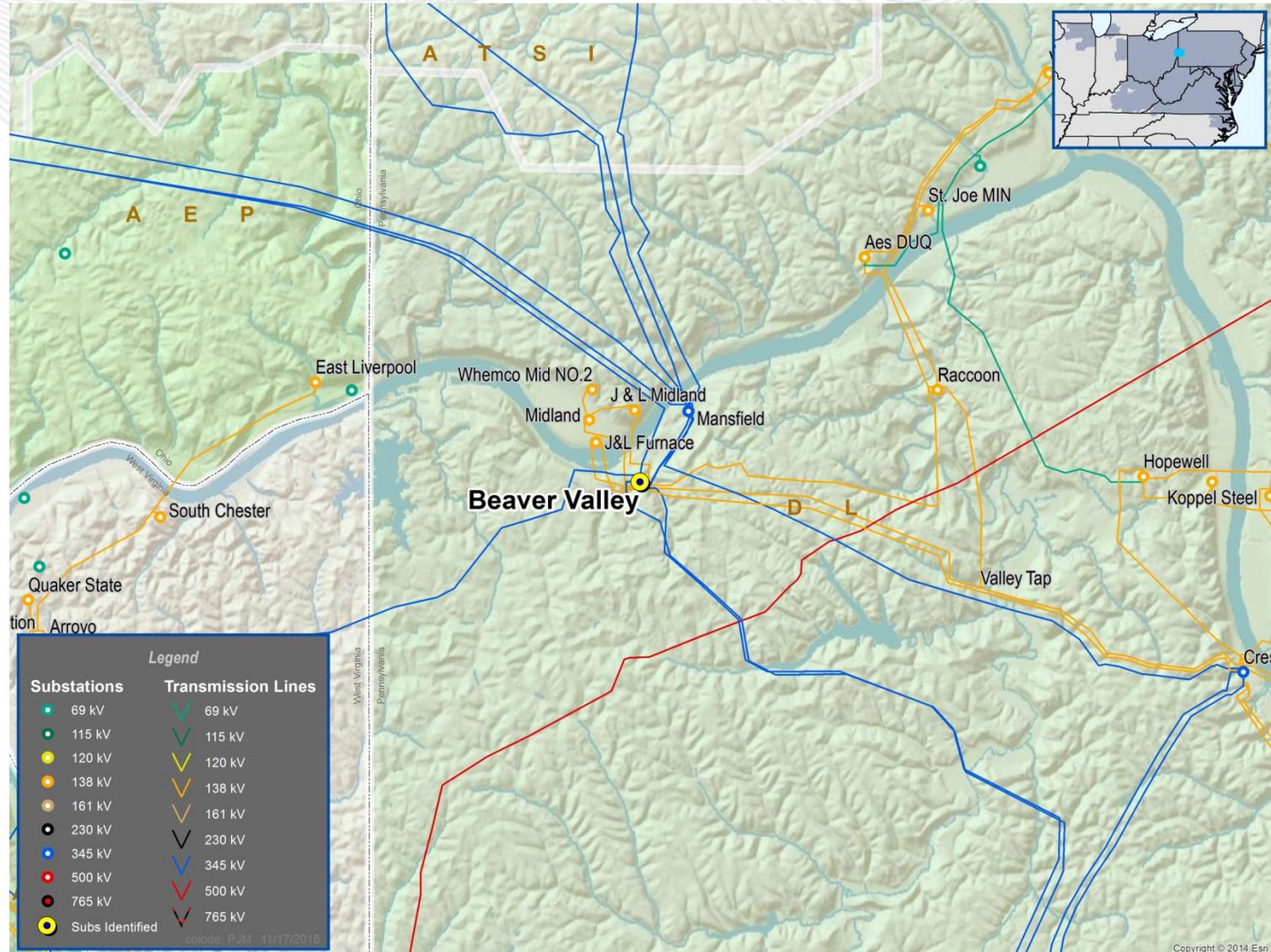
Aging Infrastructure at Beaver Valley.

Potential Solution:

Replace Beaver Valley - 2B SSST breaker 138kV (Present rating: 63kA, Future Rating: 63kA).

Estimated Project Cost: \$0.4M

Possible IS Date: 6/1/2017



Supplemental Project

Problem Statement:

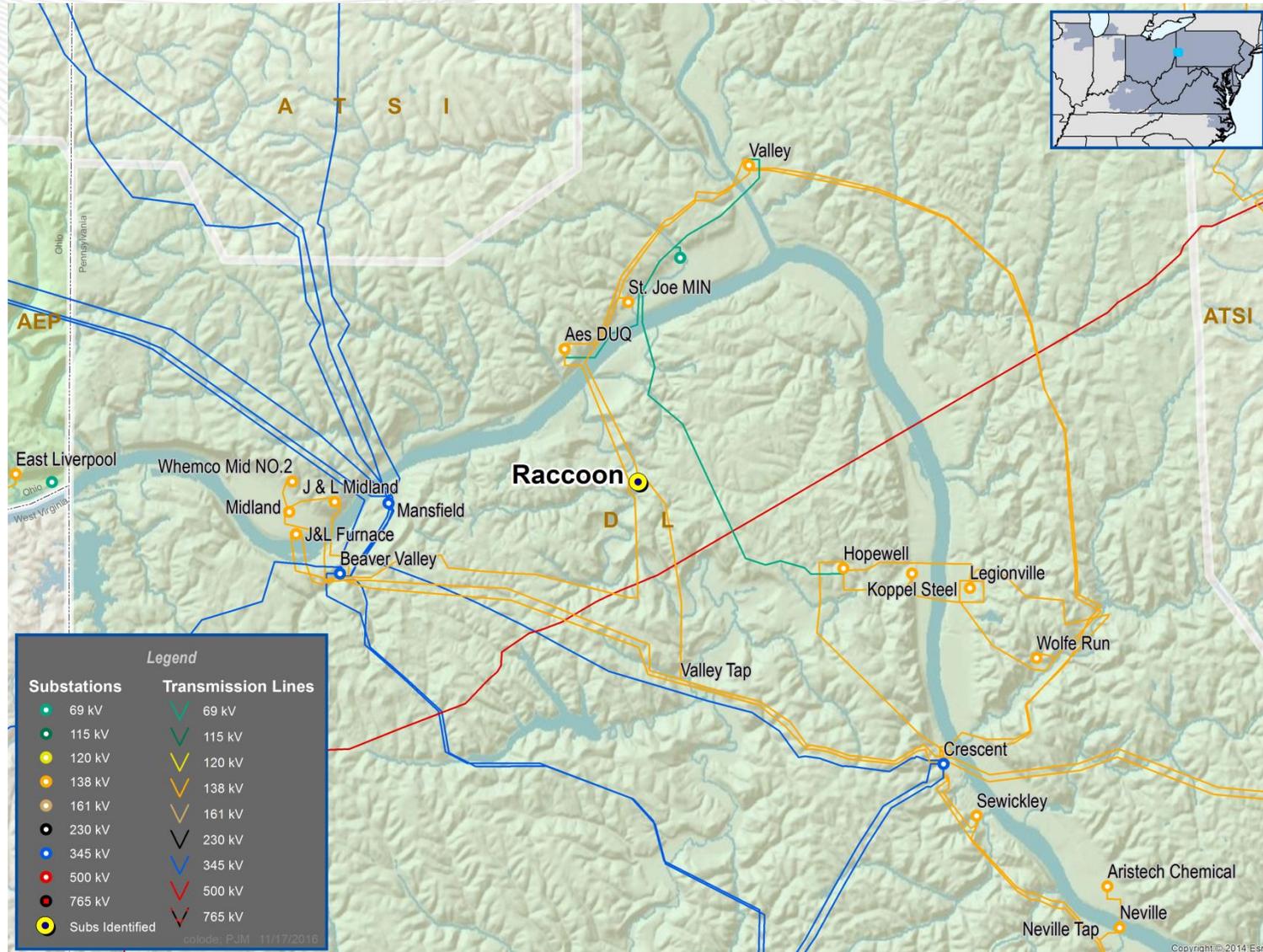
Aging Infrastructure at Raccoon.

Potential Solution:

Replace Raccoon Sub – Valley Z83 138kV breaker (Present rating: 63kA, Future Rating: 50kA).

Estimated Project Cost: \$0.33M

Possible IS Date: 9/1/2017



Supplemental Project

Problem Statement:

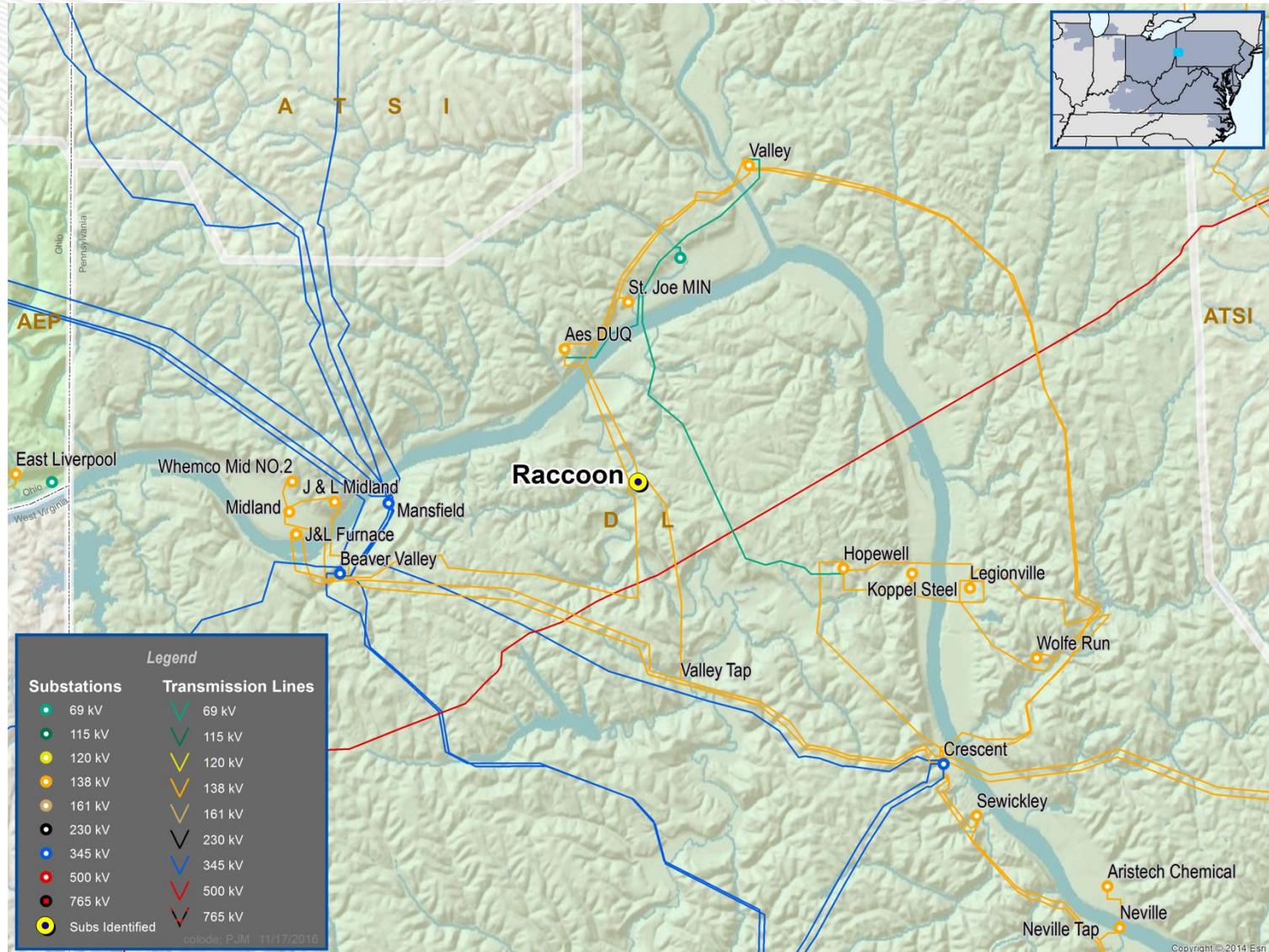
Aging Infrastructure at Raccoon.

Potential Solution:

Replace Raccoon Sub – #1/2 138kV bus tie breaker (Present rating: 63kA, Future Rating: 50kA).

Estimated Project Cost: \$0.33M

Possible IS Date: 12/31/2017





DLCO Transmission Area

Supplemental Project

Problem Statement:

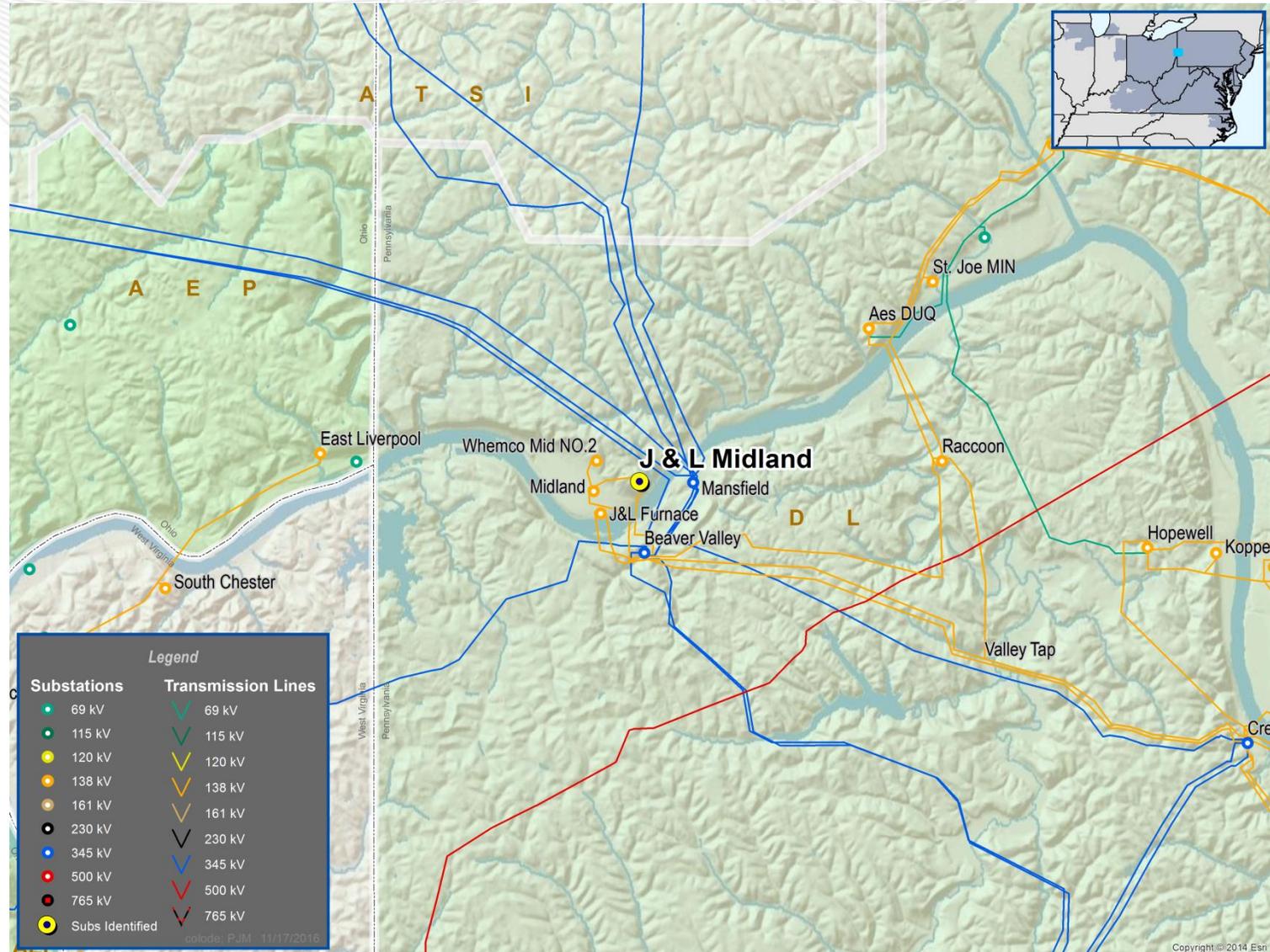
Aging Infrastructure at J&M Midland.

Potential Solution:

Replace J&M Midland SS– BV Z33 138kV breaker (Present rating: 39.8kA, Future Rating: 63kA).

Estimated Project Cost: \$0.33M

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

Aging Infrastructure at Cheswick

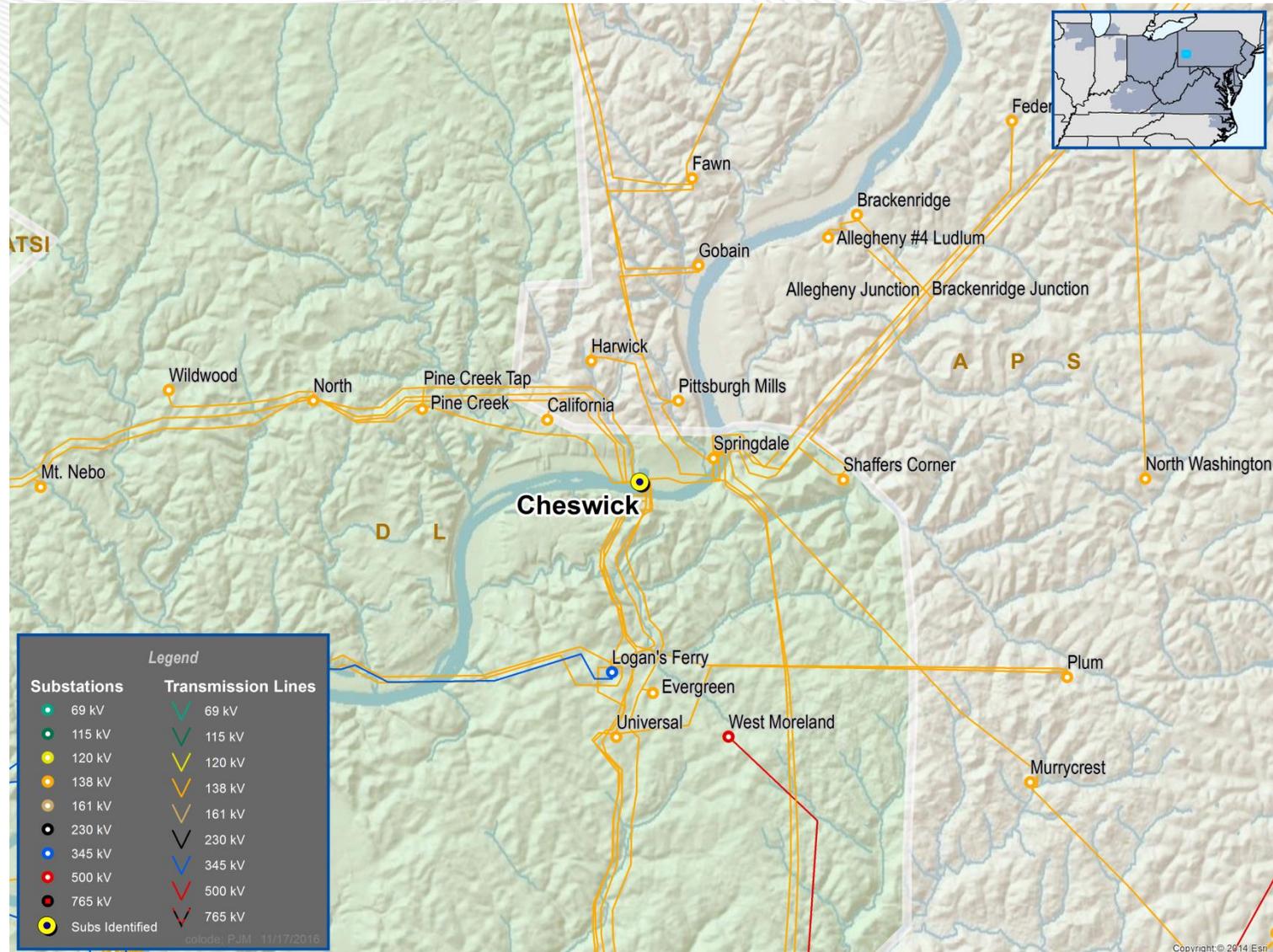
Potential Solution:

Replace Cheswick SS - #86 138kV breaker (Present rating: 63kA, Future Rating: 63kA).

Replace Cheswick SS - #88 138kV breaker (Present rating: 63kA, Future Rating: 63kA).

Estimated Project Cost: \$0.33M each

Possible IS Date: 12/31/2017





DLCO Transmission Area

Supplemental Project

Problem Statement:

Aging Infrastructure at Collier

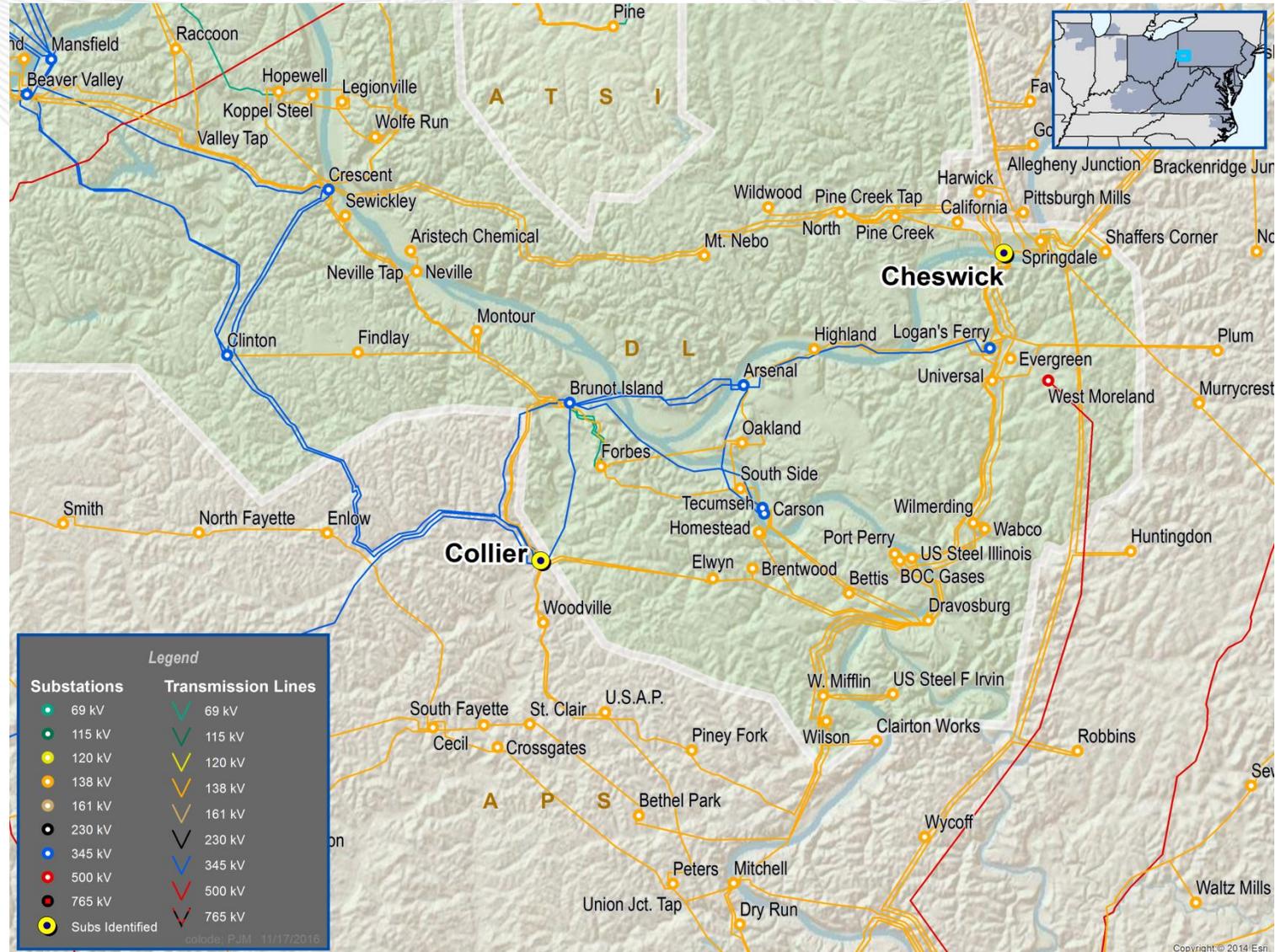
Potential Solution:

Replace Collier SS – 1A transformer 138kV breaker (Present rating: 50kA, Future Rating: 63kA).

Replace Cheswick SS – 2A transformer 138kV breaker (Present rating: 50kA, Future Rating: 63kA).

Estimated Project Cost: \$0.33M each

Possible IS Date: 12/31/2017



Supplemental Project

Problem Statement:

New load off the 34.5kV portion of the substation

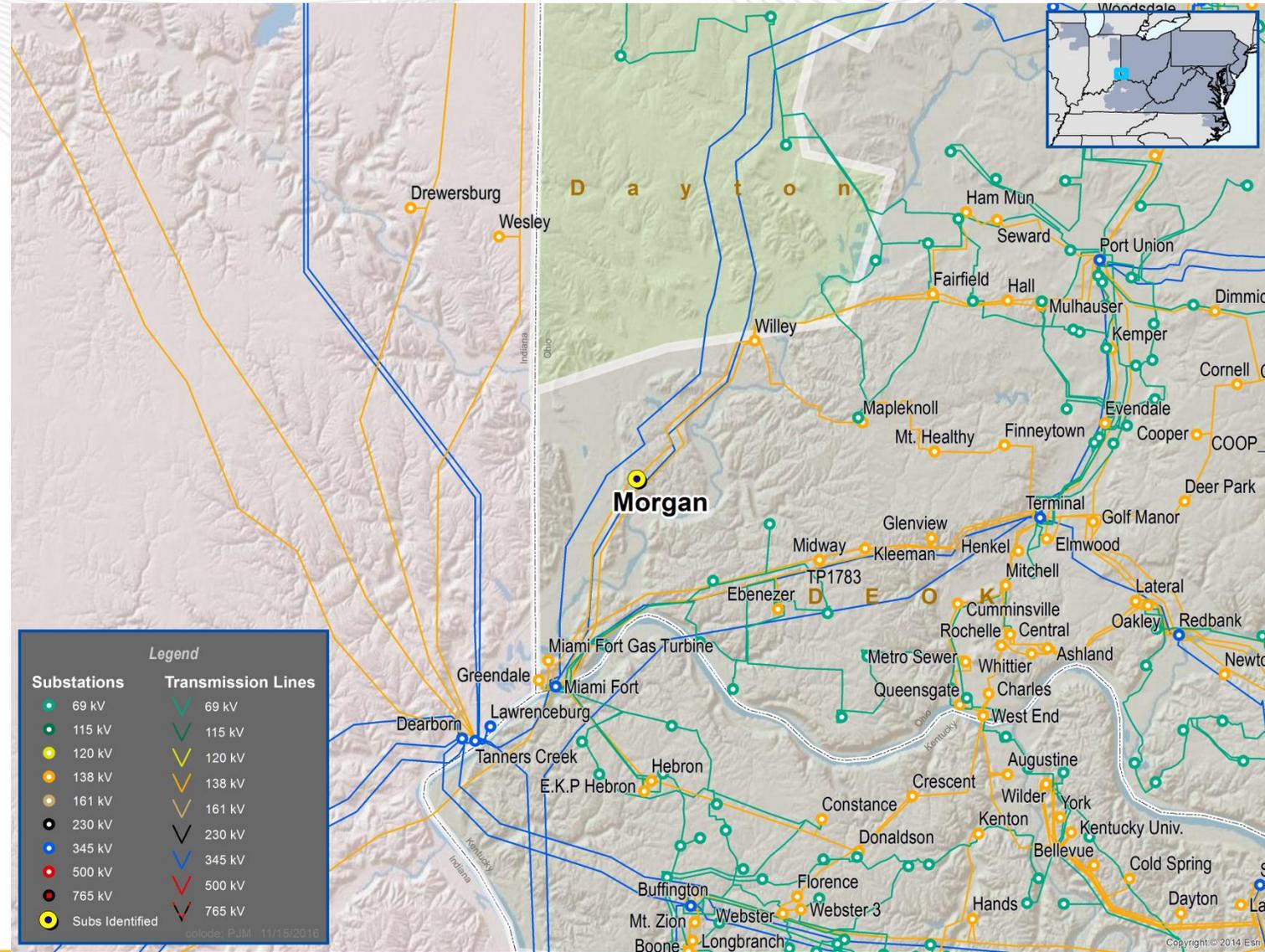
Potential Solution:

Install three 138kV circuit breakers at Morgan 138kV substation. Replace one 138kV circuit breaker. Reconfigure 138kV bus to form a ring.

No potential alternatives

Estimated Project Cost: \$8.277M

Possible IS Date: 12/31/2017



Questions?

Email: RTEP@pjm.com

Revision History

11/23/2016 – Original version posted to PJM.com

11/28/2016 – Deleted the original slide # 41, which is a duplicated with the original slide #43
– Updated the map in current slide #41

11/29/2016 – Deleted the original slides #23, which is on hold and will be presented in later SRTEAC

11/30/2016 – Deleted the original slides #24, which is on hold and will be presented in later SRTEAC

12/01/2016 – Add estimated project costs to Slide #39 and #40

– Add B1881 project description in Slide #22

– Change the Possible IS date in Slide #17

– Change possible IS date to IS date in Slide #4 since this project is already in service