Sub Regional RTEP Committee: Western
AEP Supplemental Projects

May 19, 2022

Changes for Existing Supplemental Projects

AEP Transmission Zone: Supplemental Sturgis Area Improvements (S2584) Revision

Need Number: AEP-2018-IM019
Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/27/2021
Previously Presented:
Needs Meeting 1/11/19
Solution Meeting 8/16/2021

Supplemental Project Driver: Equipment Condition/Performance
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)
Problem Statement:
Mottville Hydro Station –

- 1975 vintage 34.5kV grounding transformers carbon dioxide is at IEEE level 3
- PCB's and obsolete bushings

Moore Park Station -

- CB C is a 23 year old 69kV SF6 Breaker (ABB – 72PM31-20)
    - 38 fault operations
    - 38 recorded instances of SF6 additions since 2006

Stubey Road Station –

- Transformer high side ground switch

Sturgis Station –

- CB A and B 63 year old oil CBs with 37 and 28 fault operations, respectively
    - Replacement parts are very difficult to find for these legacy units

Moore Park Tap 69 kV –

- 1960s vintage wood structures
    - 20 poles identified with structural integrity concerns
    - Part of a three terminal line (~9 miles)

Sturgis – Howe (NIPSCO tie) –

- Vintage 1950s wood cross arm construction with suspended insulators (~3 mi)
- low capability 4/0 ACSR

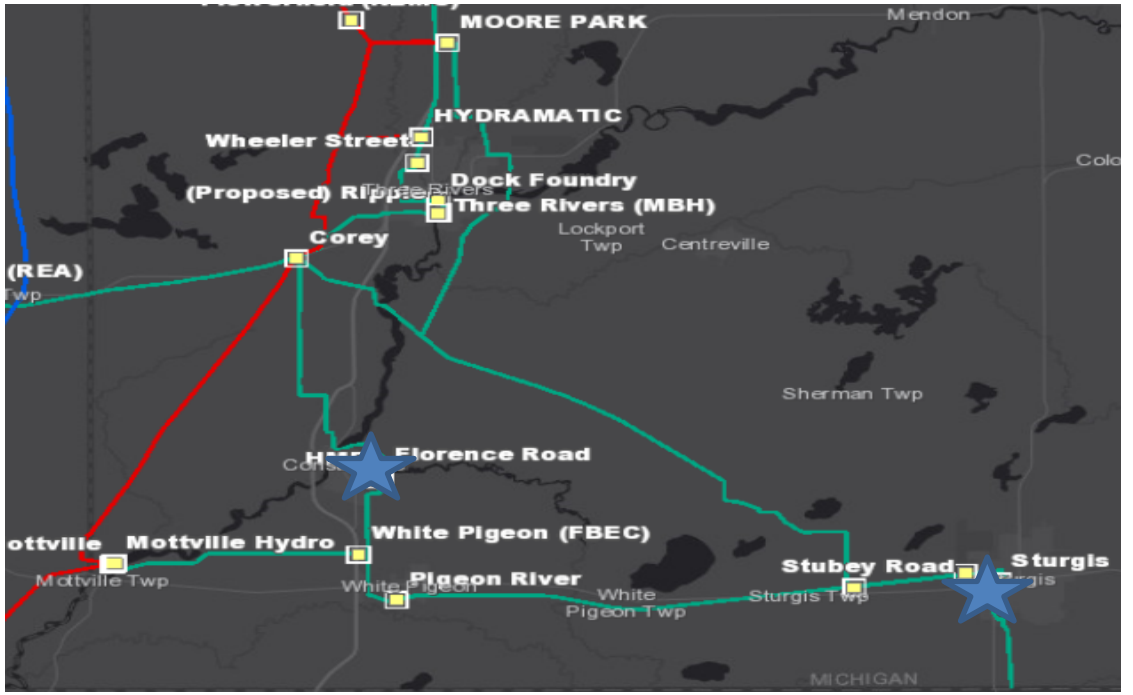
AEP Transmission Zone: Supplemental Sturgis Area Improvements (S2584) Revision

Need Number: AEP-2018-IM019
Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/27/2021
Previously Presented:
Needs Meeting 1/11/19
Solution Meeting 8/16/2021
Supplemental Project Driver: Operational
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)
Problem Statement:
HMD Station –

- Permanently jumpered disconnects on main bus

Sturgis – Howe (NIPSCO tie)

- Outage constrained – difficult to outage due to local dependence



AEP Transmission Zone: Supplemental Sturgis Area Improvements (S2584) Revision

Need Number: AEP-2020-IM007
Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/27/2021

Previously Presented:

Needs Meeting 02/21/2020

Solution Meeting 8/16/2021

Supplemental Project Driver: Equipment Condition/Performance/Risk

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

Model: N/A

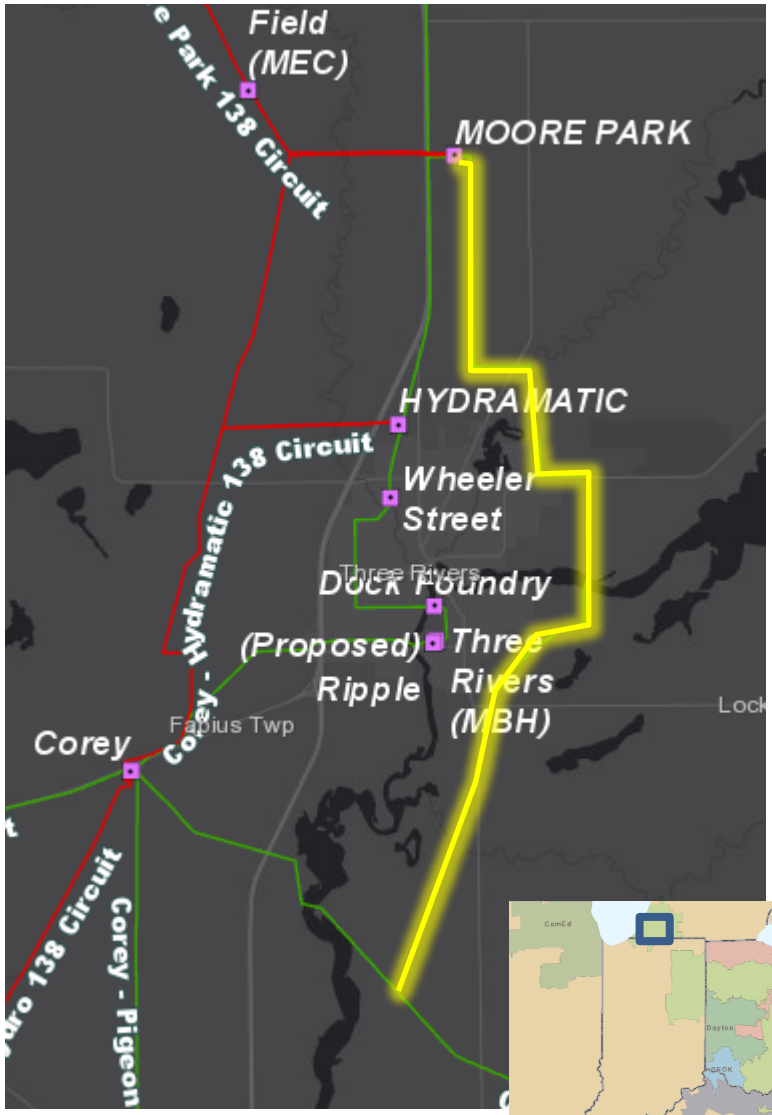
Problem Statement:

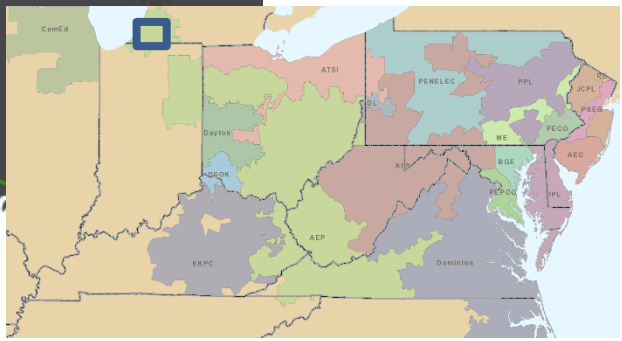
Moorepark 69kV Tap line:

- 9.02 miles of 1967 wood pole structure with horizontal insulators
- 94 structures with at least one open condition (52% of the line)
  - Open conditions include pole damage such as cracked, insect damage, rot heart and woodpecker holes, shielding/grounding conditions related to broken, missing or stolen ground wires, and broken or burnt insulators
- Since 2014 8 momentary and 1 permanent outages
  - 7 due to weather (lightning/thunderstorm) demonstrating poor shielding
- This line is a three terminal line which is hard to coordinate from a relaying perspective and is prone to misoperations

Moorepark (138/69kV) Station:

- 69kV circuit breaker (1) installed in 2006 with 41 documented malfunction records due to low SF6. This breaker has exceeded the designed number of fault operations.
- (1) 2030-69 Cap Switcher with no gas monitor. The AEP system has experienced numerous malfunctions of this type of cap switcher due to gas loss, interrupter failures, operating mechanism failures and trip or reclose failures.





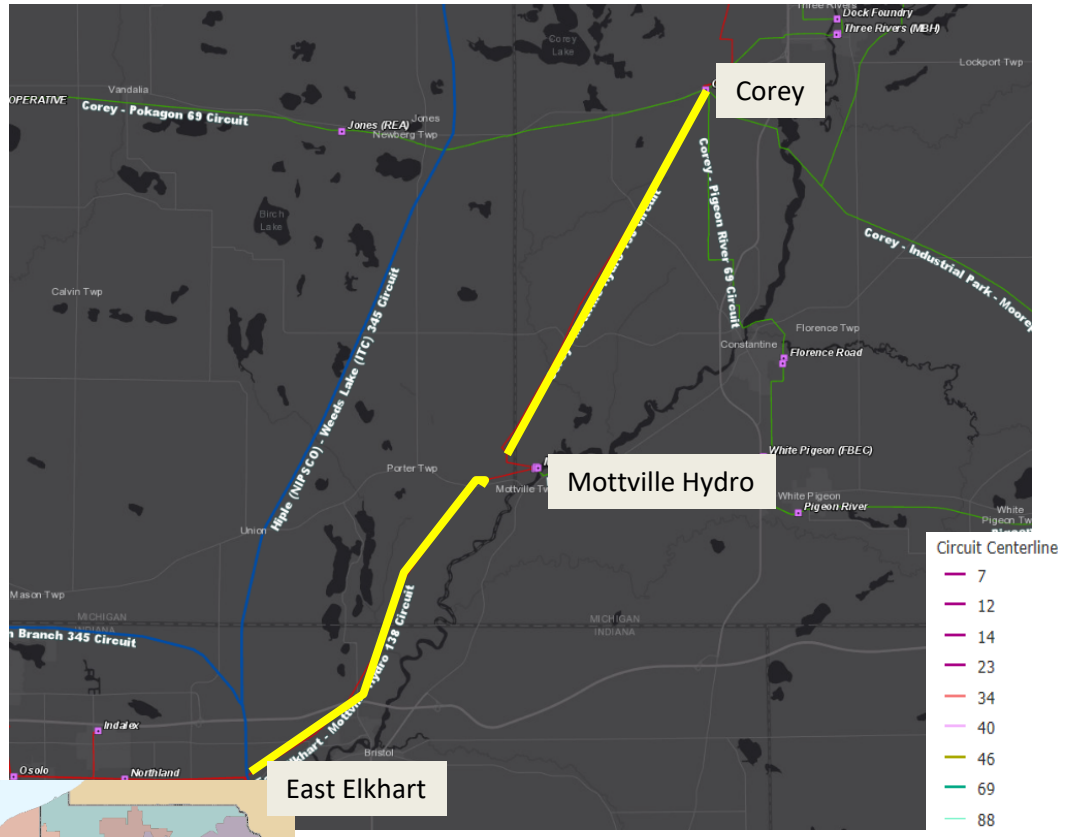
AEP Transmission Zone: Supplemental Sturgis Area Improvements (S2584) Revision

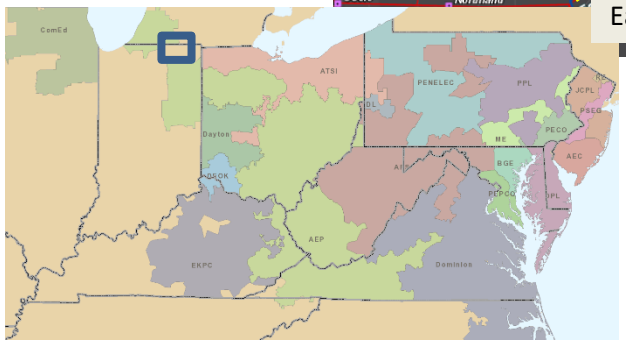
Need Number: AEP-2020-IM021
Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/27/2021
Previously Presented:
Needs Meeting 09/11/2020
Solution Meeting 8/16/2021

Supplemental Project Driver: Equipment Condition/Performance/Risk
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)
Problem Statement:

East Elkhart- Mottville Hydro- Corey 138kV

- 16.3 miles consisting of 1960's wood pole H frame structures with vertical insulators
  - 88% of structures are original
  - 100% of conductor is original
- Since 2014 there have been
  - 3 momentary outages on Corey-Mottville Hydro 138kV
  - 2 momentary outages on East Elkhart-Mottville Hydro 138kV
- The line contains 36 open conditions including burnt or broken insulators and broken or missing ground lead wire
  - Leads to poor lightning performance (3 outages caused by lightening)
  - Shielding angle does not meet current AEP shielding requirements
  - The grounding utilizes butt wraps which are not current AEP standards
- Field assessment found 45% of the structures assessed with at least one condition. Conditions included cracked and split cross arms, upper pole and knee brace decay, woodpecker damage and flashed insulators
- Insulators don't meet CIFO and minimum leakage requirements





AEP Transmission Zone: Supplemental Sturgis Area Improvements (S2584) Revision

Need Number: AEP-2018-IM019 & AEP-2020-IM007 & AEP-2020-IM021

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/27/2021

Proposed Solution:

East Elkhart – Mottville Hydro 138kV: Rebuild the ~10 miles of 1950's wood on the East Elkhart – Mottville Hydro 138kV line using 795 Drake ACSR re-routing through RV Capital. **Estimated Cost: ~~$31M~~ $31.5M (s2584.1)**

Mottville Hydro – Corey 138kV: Retire the ~9 mile 138kV line. **Estimated Cost: $4.25M (s2584.2)**

Moore Park 69kV Tap: Retire the ~9 mile 69kV line. **Estimated Cost: $2.8M (s2584.3)**

Moore Park 69kV SW: Retire the 69kV POP Sw. **Estimated Cost: $0.2M (s2584.4)**

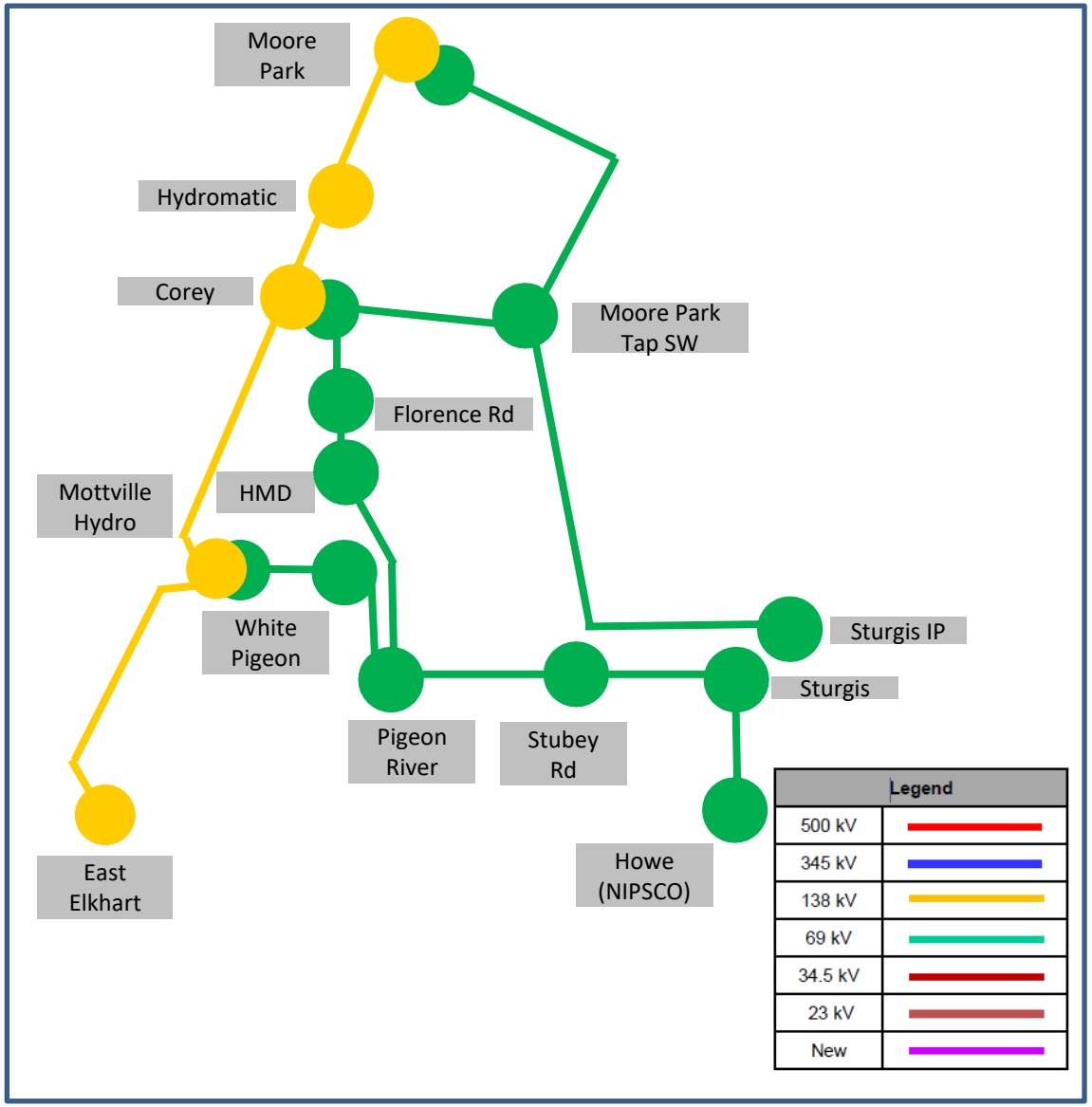
Moore Park 69kV Station: Install a 90MVA 138/69kV XFR with a high side switcher and low side CB. 69kV CB "C" will be replaced with the 69kV CB "B". Replace 69kV cap switcher "BB" **Estimated Cost: $4.6M (s2584.5)**

Sturgis 69kV Station: Retire Sturgis 69kV station. **Estimated Cost: $.9M (s2584.6)**

Stubey Rd 138/69kV Station: Expand station to include (6) 69kV CB's in a ring , (4) 138kV CB's in a ring, (2) 138/69kV 130MVA XFR's and (2) 17.6Mvar 69kV Cap Banks. Reterminate the Sturgis IP line into Stubey Road. Reterminate the Corey line into Stubey Road to energize the line at 138 kV. **Estimated Cost: $18.9M (S2584.7)**

Howe (Nipsco) – Sturgis 69kV: Retire the ~2.9 mile 69kV line. **Estimated Cost: $1.9M (S2584.8)**

Mottville Hydro – Stubey Rd 138kV: Re-energize the existing line from Mottville – Pigeon River to 138kV and construct a new ~8.9 mile 138kV line between Pigeon River and Stubey Road to re-establish the 138 kV through path to Corey station. **Estimated Cost: $23.7M (s2584.9)**



AEP Transmission Zone: Supplemental Sturgis Area Improvements (S2584) Revision

Need Number: AEP-2018-IM019 & AEP-2020-IM007 & AEP-2020-IM021

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/27/2021

Proposed Solution (Cont):

Pigeon River 69kV Station: Remove 69kV CB "K" from Pigeon River to re-use at Stubey Rd. **Estimated Cost: $0.4M (s2584.10)**

Mottville Hydro 138/69kV Station: Remove 69kV CB "D" from Mottville Hydro to re-use at Stubey Rd. **Estimated Cost: $0.4M (S2584.11)**

Corey 138/69kV Station: Remove 69kV CB "C" from Corey to re-use at Stubey Rd. **Estimated Cost: $0.4M (s2584.12)**

White Pigeon 69kV Ext: Build new 69kV .2 mile extension from Corey – Pigeon River to the existing White Pigeon Station. **Estimated Cost: $1.7M (s2584.13)**

Florence Rd 69kV Station: Replace the line switches at Florence Rd. **Estimated Cost: $0M (Distribution Cost) (s2584.14)**

Total Estimated Transmission Cost: ~~**$87.2M**~~ **$87.7M**

Ancillary Benefits:

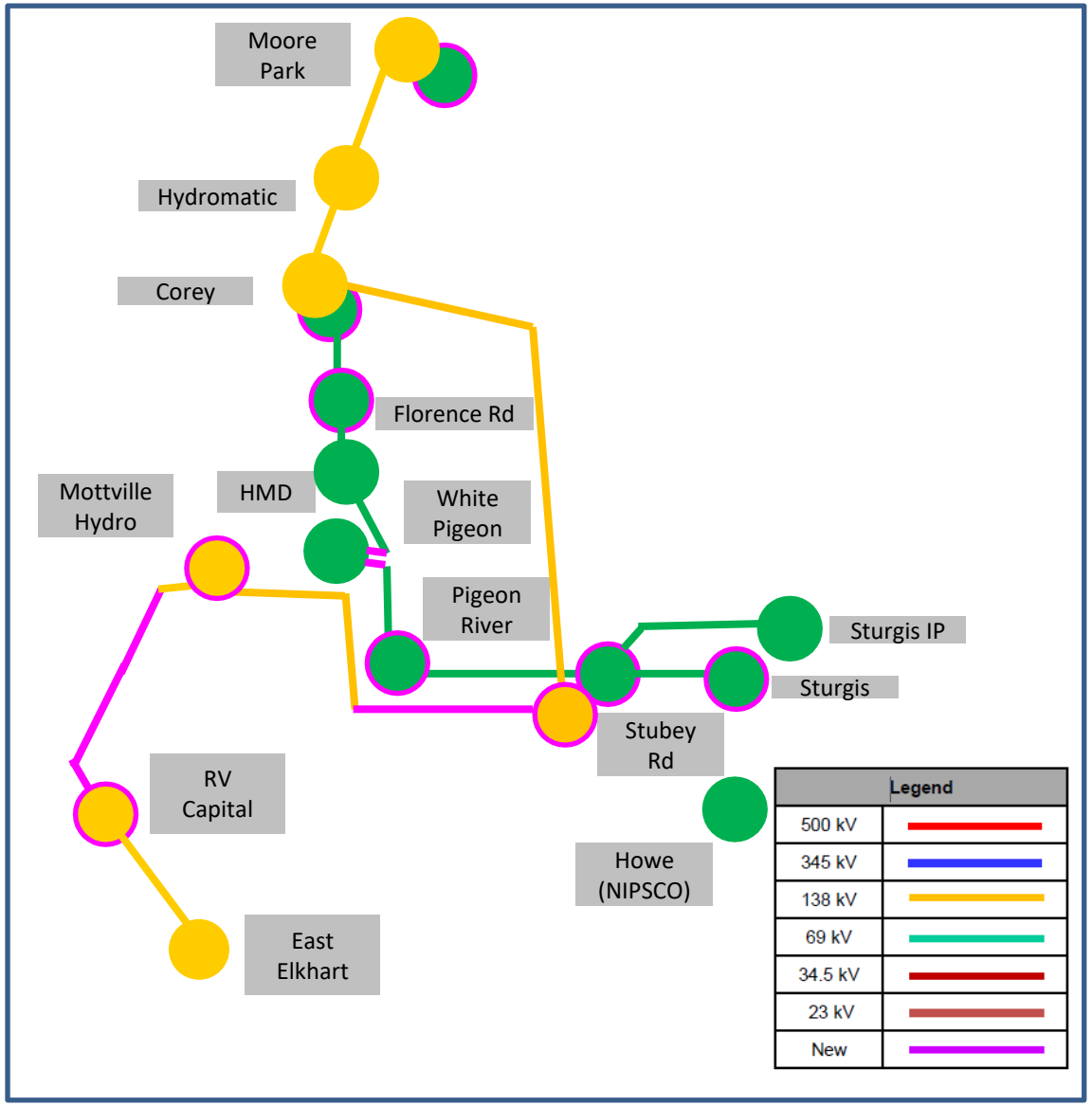
Moves the 138 kV source into the long 69 kV network and utilizes the lines already built to 138 kV to their capability and allows for the retirement of 9 miles of 138 kV line and 9 miles of 69 kV line. Under various outages on the AEP system, the tie to NIPSCO is opened to prevent overloading on the NIPSCO system. From the 7/1/2020-7/1/2021 time period, this line was open on 119 separate days. Because of this NIPSCO operational procedure, under N-1-1 this area drops 71MW of load. By introducing the 138 kV source at Stubey Road, the proposed solution allows for the retirement of 18 total miles of line that would otherwise need to be rebuilt and eliminates the three terminal line out of Moore Park.

Reason for the scope change: A customer request has moved forward to connect to our system via new RV Capital station. This station will be hard tapped and radially fed off the East Elkhart – Mottville Hydro 138kV circuit. The proposed re-route through RV Capital station will allow us to loop in a customer feed and eliminate a hard tap while addressing asset renewal concerns on this line.

Projected In-Service: 3/25/2025

Supplemental Project ID: s2584.1 -.14

Project Status: Scoping



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 M-3 Process
Mason/Putnam County, WV

Need Number: AEP-2022-AP030

Process Stage: Need Meeting 5/19/2022

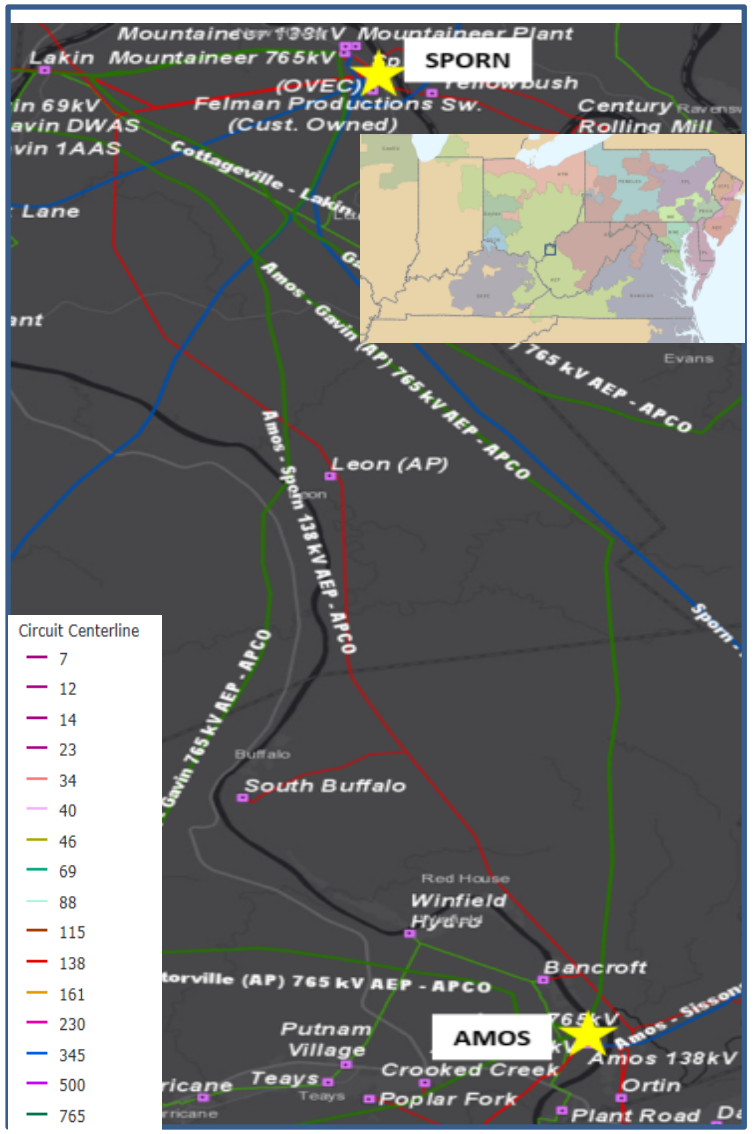
Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8), AEP Presentation on Pre-1930s Lines

Problem Statement:

Amos – Sporn 138 kV Line (~36 miles)

- Circuit primarily consists of original vintage (1926) lattice steel structure, porcelain insulators and 397 ACSR conductor
  - Circuit fails to meet 2017 NESC Grade B loading criteria, AEP structural strength requirements and fails to meet the current ASCE structural strength requirements.
  - Some spans are 1200-2000' along this line resulting in some fairly high conductor tensions and are not up to current AEP standards.
  - This pre-1930s lattice line displays the following conditions:
    - Moderate to Severe degradation of galvanizing coating, moderate
    - Moderate to heavy rusting & corrosion of the steel lattice, arms, braces, hangers & conductor dampers
    - Heavy rusting on conductor dampers, insulator end fittings & hardware
    - Wear of the conductor & static attachment points
    - Visible conductor corrosion
    - Ferrous clamps
    - Below grade surface rusting
- Since 2017 there have been 13 momentary outages and 1 permanent outage on the Amos – Sporn 138 kV line
  - Momentary outages were due to lightning, weather, vegetation fall in from outside AEP ROW and line conductor
  - Permanent outage was due to vegetation fall in from outside AEP ROW
- Stations served from the line:
  - Bancroft (~50 MVA)
  - Leon (~8 MVA)
  - South Buffalo (~60 MVA)



AEP Transmission Zone M-3 Process
Mason/Putnam County, WV

Need Number: AEP-2022-AP030

Process Stage: Need Meeting 5/19/2022

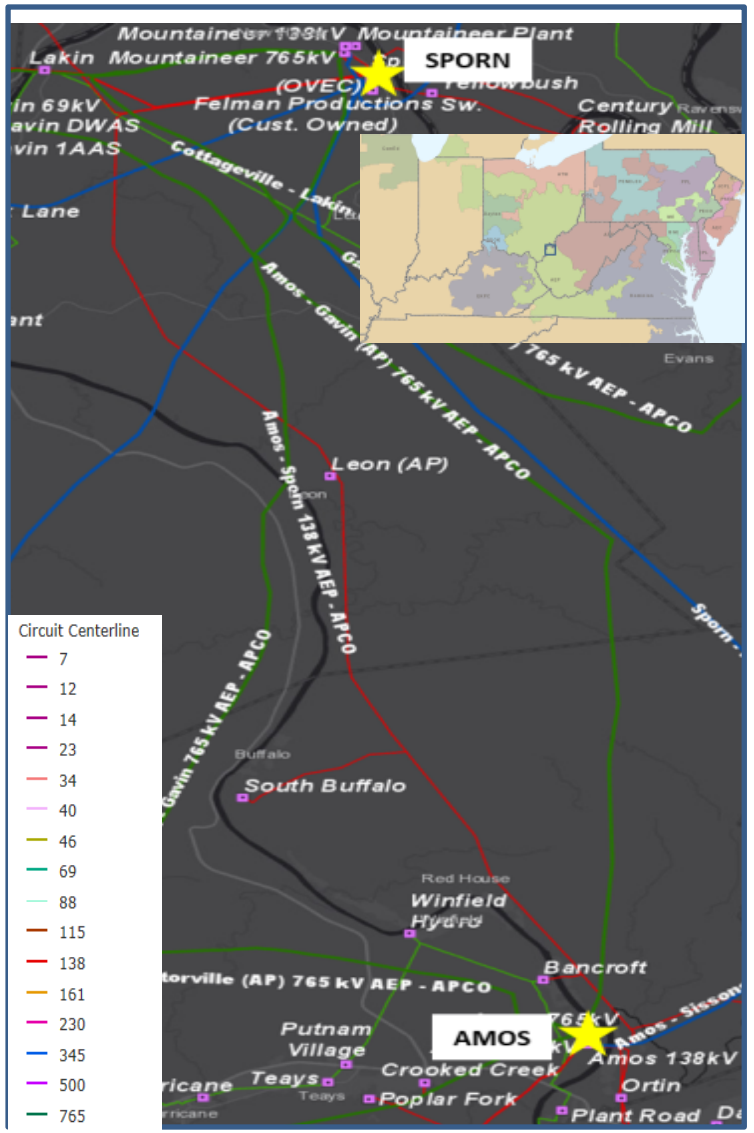
Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8), AEP Presentation on Pre-1930s Lines

Problem Statement:

Amos – Sporn 138 kV Line (~36 miles) Continued:

- Condition & Impacts of the Degraded pre-1930s Era System
  - These transmission line assets are clearly in the accelerated deterioration phase of their life.
  - Significant deterioration results in loss of strength and performance posing a significant risk of failure under conditions the assets should be able to withstand.
    - May cause frequent and extended outages
    - May create significant economic losses
    - May endanger public safety
- Conditions of System
  - Towers: Typical life of galvanizing is 70 years. The towers are all supported by steel grillage foundations buried in the ground. The tower leg is subject to significant risk of corrosion where it enters the ground. Lattice tower structures have little structural redundancy. A failure of one member of the structure will impact the integrity of the structure and may cause the entire tower to collapse.
  - Insulator & Hardware Corrosion: The connecting elements including the tower attachment hole and the insulator hook have experienced serious section loss due to corrosion and wear. This loss of metal cross-section significantly reduces the capacity of the connection. The insulator caps and connecting hardware have experienced heavy to complete loss of galvanizing. When the protective galvanized coating is gone or is significantly compromised, the bare steel corrodes at an accelerated rate.
  - Broken Insulators: Broken, cracked and otherwise damaged insulators lead to premature flashover causing permanent outages. When the insulator assembly breaks, the wire falls to the ground potentially damaging other conductors, and presents an increased public safety concern.
  - Conductor: Aluminum Conductor Steel Reinforced (ACSR) conductor consists of aluminum strands wrapped around a core of galvanized steel strands. The steel provides the structural strength. Like other steel elements, the strands of the core have also lost the galvanized coating and steel section. The degraded state results in significant loss of tensile strength and potential risk to the public if the conductor was to fail and fall to the ground. Conductor damage is usually not visible in a field inspection. Specific conductor samples, from the belly of the sag (lowest point) and/or inside the clamps at the insulators, have confirmed significant corrosion. During the restoration or construction activities, conductors often break at adjacent locations due to handling, introducing a potential safety risk and increase public safety concern.



AEP Transmission Zone M-3 Process
Wayne County, WV

Need Number: AEP-2022-AP032

Process Stage: Need Meeting 5/19/2022

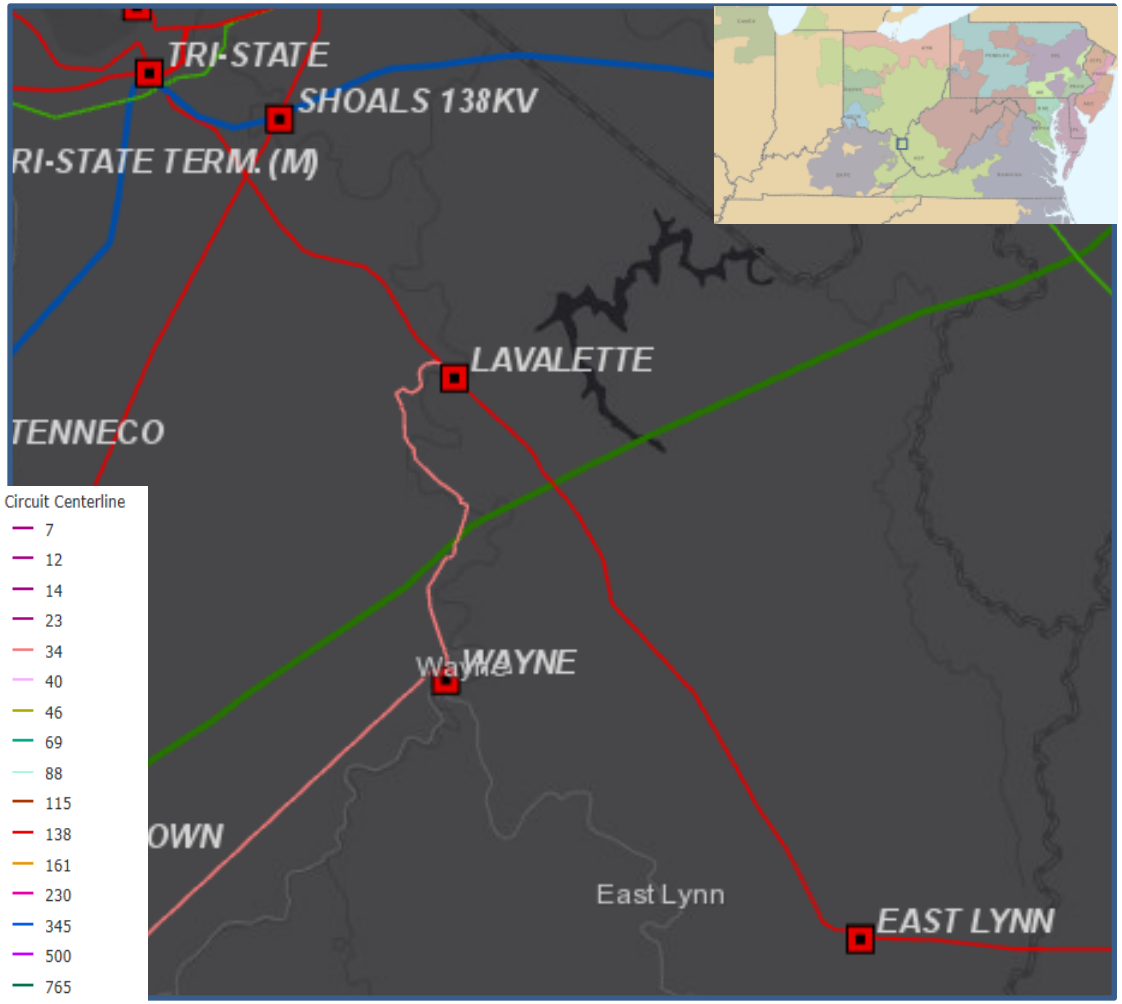
Project Driver: Equipment Condition/Performance/Risk

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

Problem Statement:

Tri-State – East Lynne 138 kV Line (~18 miles)

- Circuit primarily consists of original vintage (1979) wood pole structures and 795 ACSR conductor
    - Circuit fails to meet 2017 NESC Grade B loading criteria, AEP structural strength requirements and fails to meet the current ASCE structural strength requirements.
    - Legacy butt wrap grounding method is used throughout the line and is inadequate for current AEP standards
- Since 2017 there have been 6 momentary outages and 5 permanent outage on Tri-State – East Lynn 138 kV
    - Momentary outages were due to lightning and ice/snow
    - Permanent outages were due to crossarm failure, vegetation fall-in from outside AEP ROW, lightning and win.
        - The permanent outages resulted in a total of 24.4M minutes of customer interruption
- 86 structures with at least one open structural condition which relates to 83% of the structures on this line asset.
    - Currently there are 196 open structural conditions related to woodpecker damaged poles, rot top poles, crossarms, a filler block, cracked poles, bowed crossarms, split poles and crossarms, corroded crossarms, broken cross arm and x-brace, a pole leaning transverse, rot heart crossarm
    - There are currently 15 open grounding conditions related to broken and stolen ground wire leads which has likely contributed to the number of lightning related outages



AEP Transmission Zone M-3 Process
Kanawha County, WV

Need Number: AEP-2022-AP031

Process Stage: Need Meeting 5/19/2022

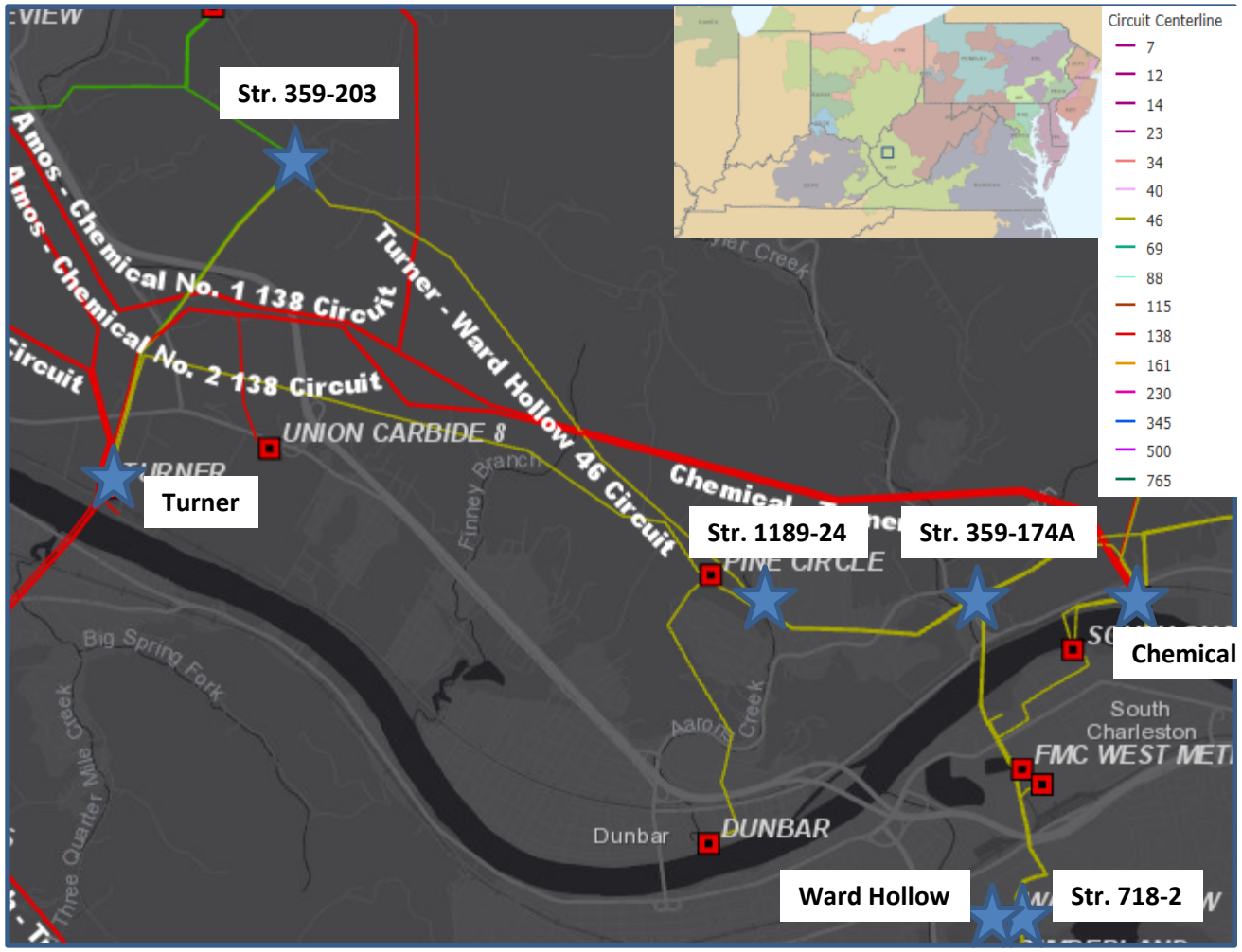
Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8), AEP Presentation on Pre-1930s Lines

Problem Statement:

Turner – Ward Hollow 46 kV Line (~5 miles). Line segments included in the need are from Str. 359-203 to Str. 1189-24 and from Str. 359-174A to Str. 718-2.

- The sections described above were constructed in 1920 and consist of lattice type structures and wood pole structures, 4/0 CU conductor and 336 ACSR conductor
  - Specific to this pre 1930s line lattice structures on the line are displaying the following:
    - Galvanized coating mostly worn off
    - Lattice steel rusting
    - Visible corrosion of shield wire
    - Ovalization at wire attachment points
    - Hardware & Insulator end fittings moderate deterioration
    - Significant below grade section loss & corrosion
  - Wood poles display the following:
    - Woodpecker holes
    - Pole top weathering
    - Moderate deterioration & rusting of hardware
    - Crossarm & Crossarm block splitting
    - Pole cracking and weathering
  - Circuit fails to meet 2017 NESC Grade B loading criteria, AEP structural strength requirements and fails to meet the current ASCE structural strength requirements.
  - Legacy butt wrap grounding on the wood poles is inadequate for current AEP standards
- Since 2017 there have been 5 momentary outages and 8 permanent outage on the Turner/Chemical – Ward Hollow 46 kV line
  - Momentary outages were due to wind, and lightning
  - Permanent outages were due to vegetation fall-in outside AEP ROW, lightning, and wind



AEP Transmission Zone M-3 Process
Kanawha County, WV

Need Number: AEP-2022-AP031

Process Stage: Need Meeting 5/19/2022

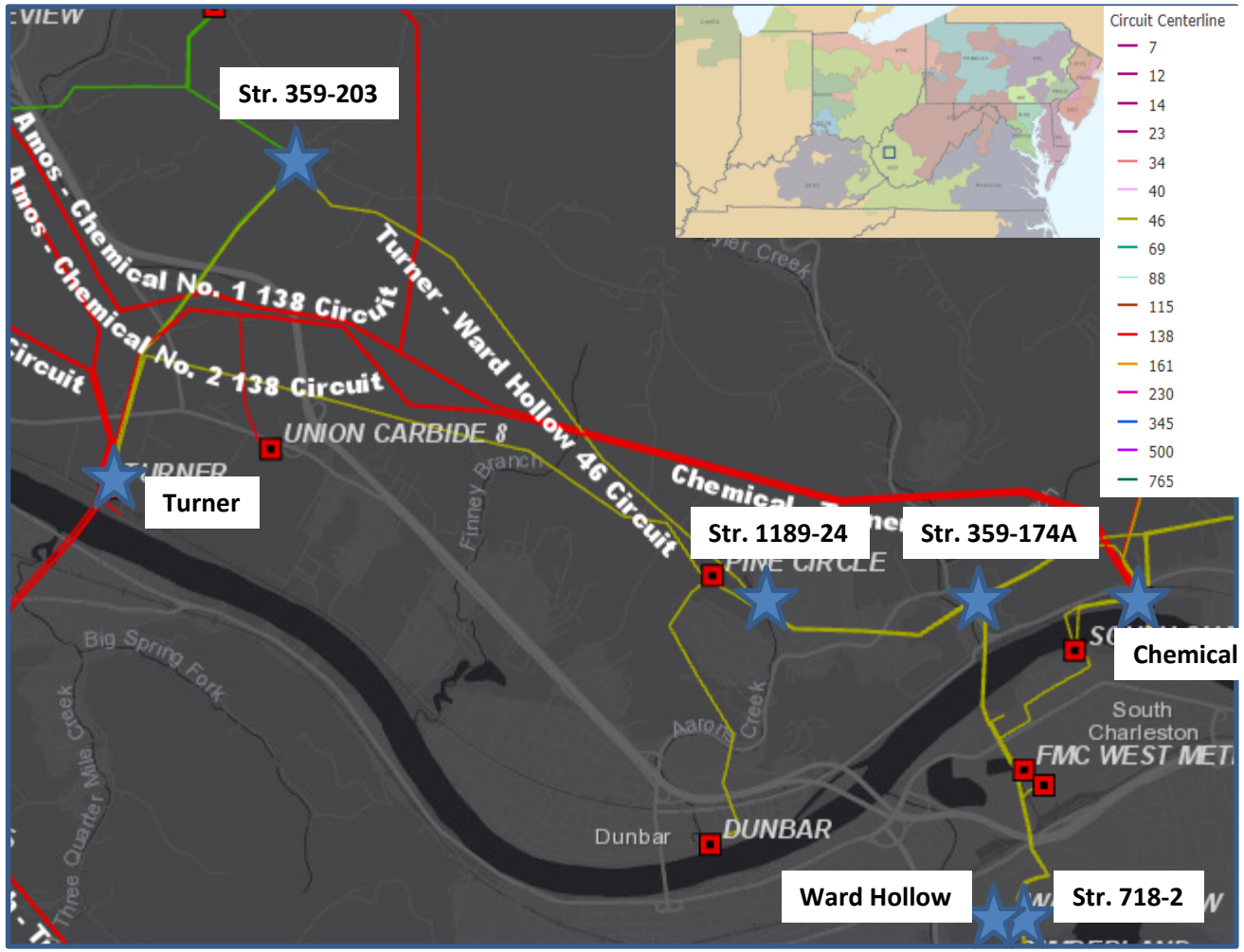
Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8), AEP Presentation on Pre-1930s Lines

Problem Statement:

Turner – Ward Hollow 46 kV Line (~5 miles). Line segments included in the need are from Str. 359-203 to Str. 1189-24 and from Str. 359-174A to Str. 718-2.

- Condition & Impacts of the Degraded pre-1930s Era System
  - These transmission line assets are clearly in the accelerated deterioration phase of their life.
  - Significant deterioration results in loss of strength and performance posing a significant risk of failure under conditions the assets should be able to withstand.
    - May cause frequent and extended outages
    - May create significant economic losses
    - May endanger public safety
- Conditions of System
  - Towers: Typical life of galvanizing is 70 years. The towers are all supported by steel grillage foundations buried in the ground. The tower leg is subject to significant risk of corrosion where it enters the ground. Lattice tower structures have little structural redundancy. A failure of one member of the structure will impact the integrity of the structure and may cause the entire tower to collapse.
  - Insulator & Hardware Corrosion: The connecting elements including the tower attachment hole and the insulator hook have experienced serious section loss due to corrosion and wear. This loss of metal cross-section significantly reduces the capacity of the connection. The insulator caps and connecting hardware have experienced heavy to complete loss of galvanizing. When the protective galvanized coating is gone or is significantly compromised, the bare steel corrodes at an accelerated rate.
  - Broken Insulators: Broken, cracked and otherwise damaged insulators lead to premature flashover causing permanent outages. When the insulator assembly breaks, the wire falls to the ground potentially damaging other conductors, and presents an increased public safety concern.
  - Conductor: Aluminum Conductor Steel Reinforced (ACSR) conductor consists of aluminum strands wrapped around a core of galvanized steel strands. The steel provides the structural strength. Like other steel elements, the strands of the core have also lost the galvanized coating and steel section. The degraded state results in significant loss of tensile strength and potential risk to the public if the conductor was to fail and fall to the ground. Conductor damage is usually not visible in a field inspection. Specific conductor samples, from the belly of the sag (lowest point) and/or inside the clamps at the insulators, have confirmed significant corrosion. During the restoration or construction activities, conductors often break at adjacent locations due to handling, introducing a potential safety risk and increase public safety concern.



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: Supplemental
Danville, VA

Need Number: AEP-2021-AP032

Process Stage: Solutions Meeting 5/19/2022

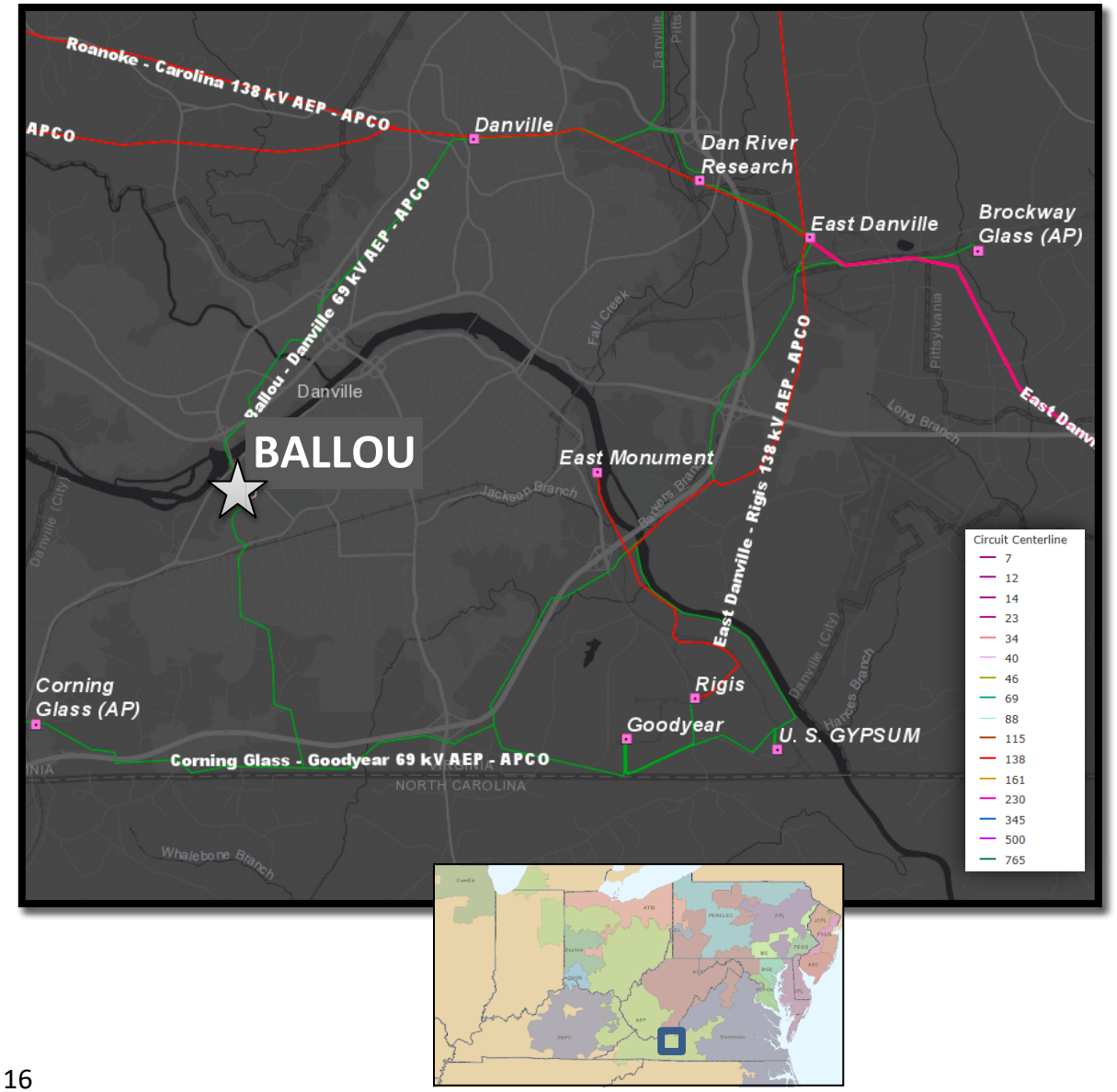
Previously Presented: Needs Meeting 11/19/2021

Supplemental Project Driver: Customer Service

Specific Assumptions Reference: AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 12)

Problem Statement:

- The City of Danville requested a new 69 kV delivery point located at Ballou Station in Danville, VA to provide up to 25 MW of peak load (with an average load of 7-10 MW).



Need Number(s): AEP-2021-AP032

Process Stage: Solutions Meeting 5/19/2022

Proposed Solution:

- Ballou Station
  - This station was recently abandoned due to a previous customer no longer being served there. This project will remove all steel and cut all foundations down to 6" below grade. The only existing equipment that will be reused are two H-frames and the control house (AEP will not have any relaying equipment inside this building).
  - Two 138 kV Motor Operated Air-Break Switches (MOABs) and high-side 69 kV, 3-element metering and associated CT's and PT's will be installed
  - **Estimated Cost: $0 (Distribution)**

- Ballou-State Line 69 kV Line Asset
  - Remove the temporary span between structure 290-58 and 289-1C, replace structure 289-1C, and then reinstall the span into Ballou Station using 795 kcmil 26/7 Drake ACSR with a 7#10 Alumoweld Shield Wire
  - **Estimated Cost: $0.46 M**

- Ballou-Danville 69 kV Line Asset
  - Remove the temporary span between structure 290-58 and 289-1C, replace structure 290-58, and then reinstall the span into Ballou Station using 795 kcmil 26/7 Drake ACSR with a 7#10 Alumoweld Shield Wire
  - **Estimated Cost: $0.42 M**

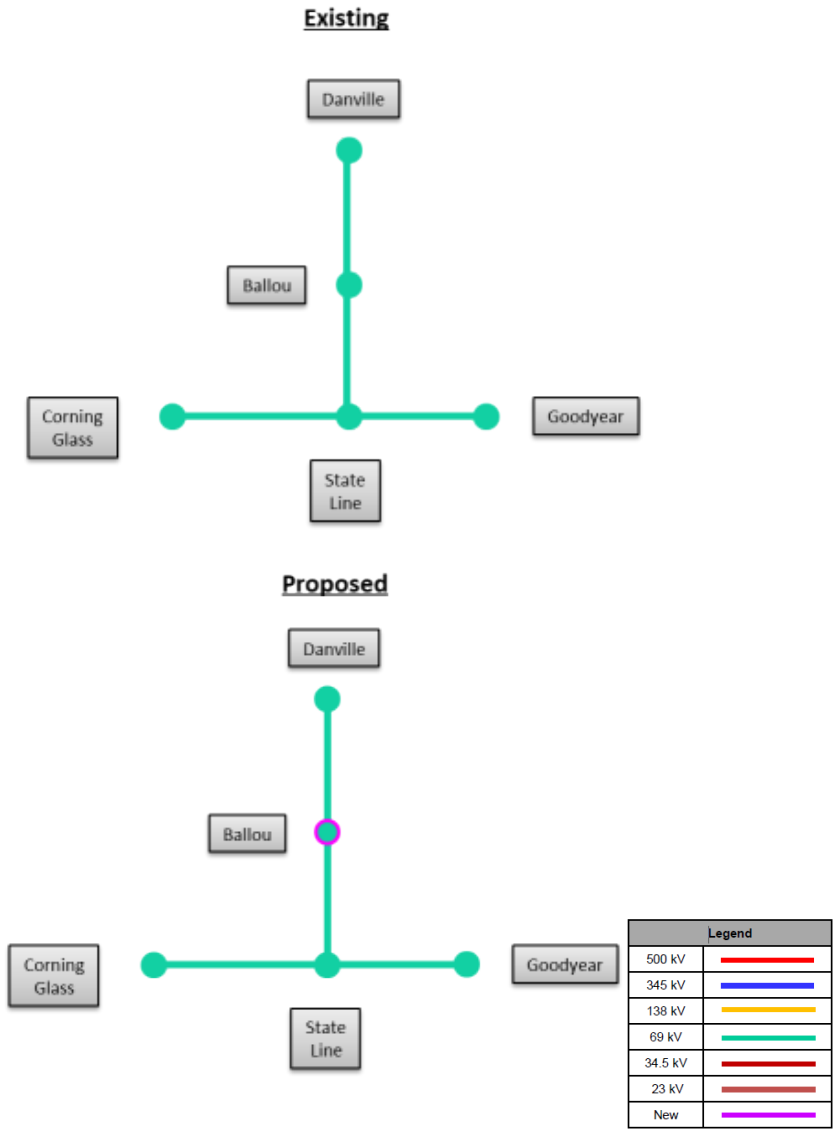
Total Estimated Transmission Cost: $0.88 M

Ancillary Benefits:
Establishing a new delivery point for the City of Danville will provide additional automatic sectionalizing on the existing Corning Glass-Danville-Goodyear 69 kV Circuit, decreasing the amount of exposure to permanent faults.

Alternatives Considered:
Circuit breakers were considered for in-line sectionalizing

Projected In-Service: 11/1/2023

Project Status: Scoping



AEP Transmission Zone M-3 Process
East Dover – Atwood Upgrade

Need Number: AEP-2020-OH029

Process Stage: Solution Meeting 05/19/2022

Previously Presented: Need Meeting 06/19/2020

Project Driver: Equipment Condition/Performance/Risk

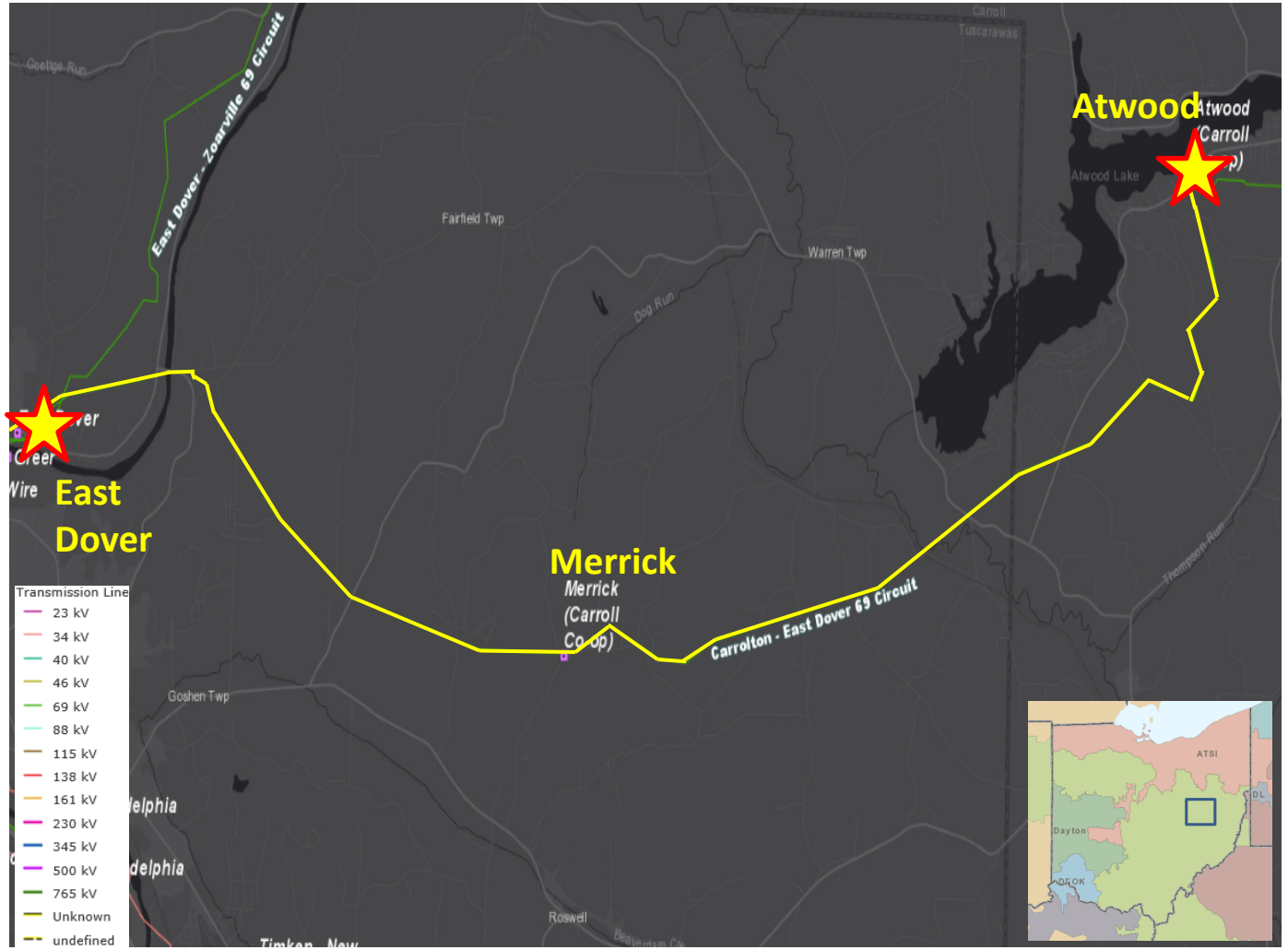
Specific Assumption Reference:

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

Problem Statement:

East Dover Carroll Co-op 69kV (15.30 miles)

- The line consists of wooden monopoles, H-frames and 3 pole structures.
- The line was originally built in 1958 with 4/0 ACSR conductor.
- There are currently 95 structures (55.5% of the line) with at least one open condition.
    - 69 structures with open conditions consisting of insect damage, rot top, rot heart, split crossarms, broken knee braces, rot shell, split poles and woodpecker holes.
    - 7 conductor-based open conditions consisting of damaged conductors and malfunctioning splices.
    - 28 hardware-based open conditions consisting of loose/broken insulators, burnt insulators, insulators missing bolts and broken/damaged/missing molding.
- For the 2015-2020 time period there have been 13 outage events on the Carrolton – East Dover Circuit. The permanent outages resulted in 2,344,426 minutes of interruption to the 2,643 customers served from the circuit (all Carroll Electric Co-op).



AEP Transmission Zone M-3 Process
East Dover – Atwood Upgrade

Need Number: AEP-2020-OH029

Process Stage: Solution Meeting 05/19/2022

Proposed Solution:

Merrick Switch – Atwood Switch: Rebuild the existing 8.8 mile 69kV line section between Merrick Switch and Atwood Switch, using 477 ACSR conductor. $19.92 Million

Zoarville – Merrick Switch: Build 7.0 mile greenfield 69kV line between Merrick Switch and Zoarville, using 477 ACSR conductor. $16.47 Million

Merrick Switch – East Dover: Retire 6.5 miles of 69 kV line between Merrick Switch and East Dover. $1.84 Million

East Dover: Remove 69kV breaker K and associated equipment. Connect the modified Carrollton 69kV circuit to breaker H; upgrade a small amount of risers at East Dover. $0.34 Million.

Zoarville: Install 69kV switch and conductor to connect to new T-line entrance. Relay settings updates at Carrollton. $0.14 Million.

Total Transmission Cost: $38.71 Million

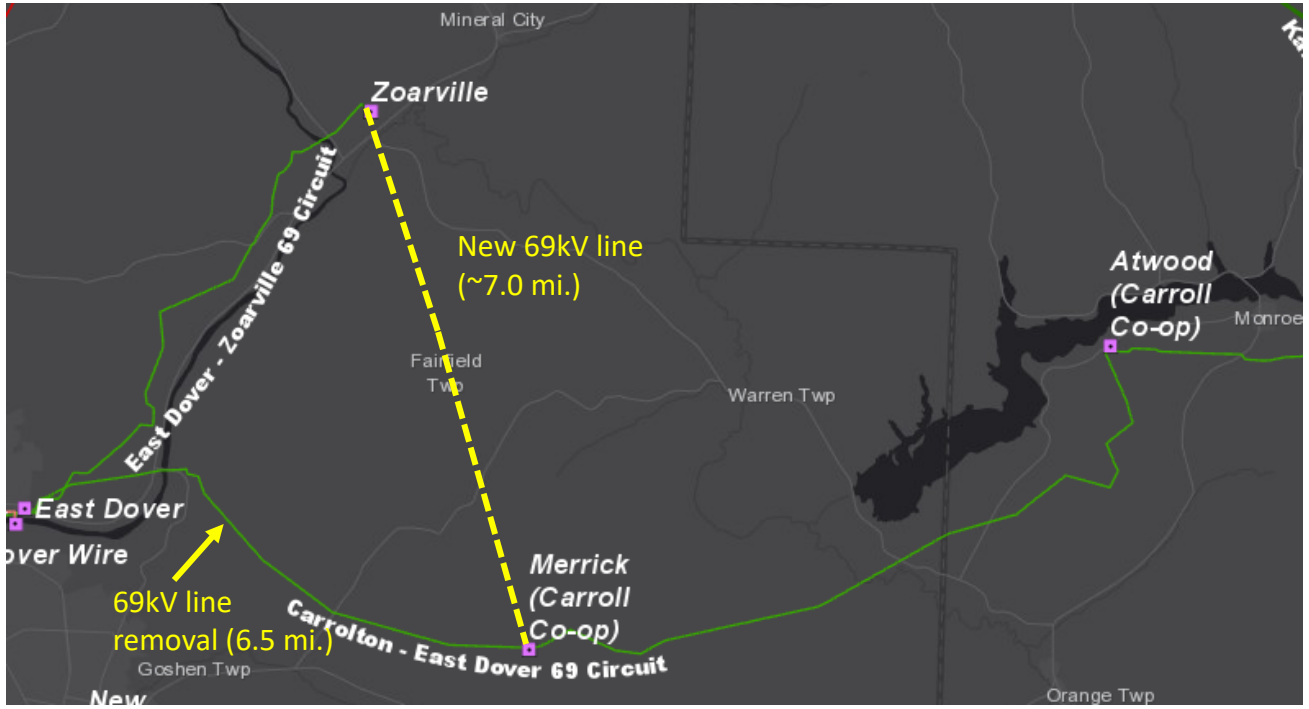
Ancillary Benefits: Addresses the 6.8-mile radial 69kV line to Zoarville station, by looping it into the Carrollton circuit. The existing radial system puts Zoarville area customers at risk of outages, due to the inability to take station or transmission line facilities out of service for maintenance or repairs.

Alternatives Considered: Consideration was given to a rebuild of the East Dover-Merrick-Atwood 69kV line on the existing route. This would have resulted in slightly less line miles being constructed (~0.5 mi), but still would of required additional ROW acquisitions to bring the existing 1950's line easement up to current standards. It also would have left the customer's at Zoarville radially fed from East Dover. Given the nominal difference in overall line mileage, the decision was made to move forward with the proposed solution as it would not only improve operational flexibility for customers served from Zoarville today, but it would also provide the benefit of allowing the existing line to Zoarville to be maintained in a manner that should extend it's life.

Projected In-Service: 05/01/2025

Project Status: Scoping

Model: 2026 PJM RTEP Load-Flow and Short Circuit Models

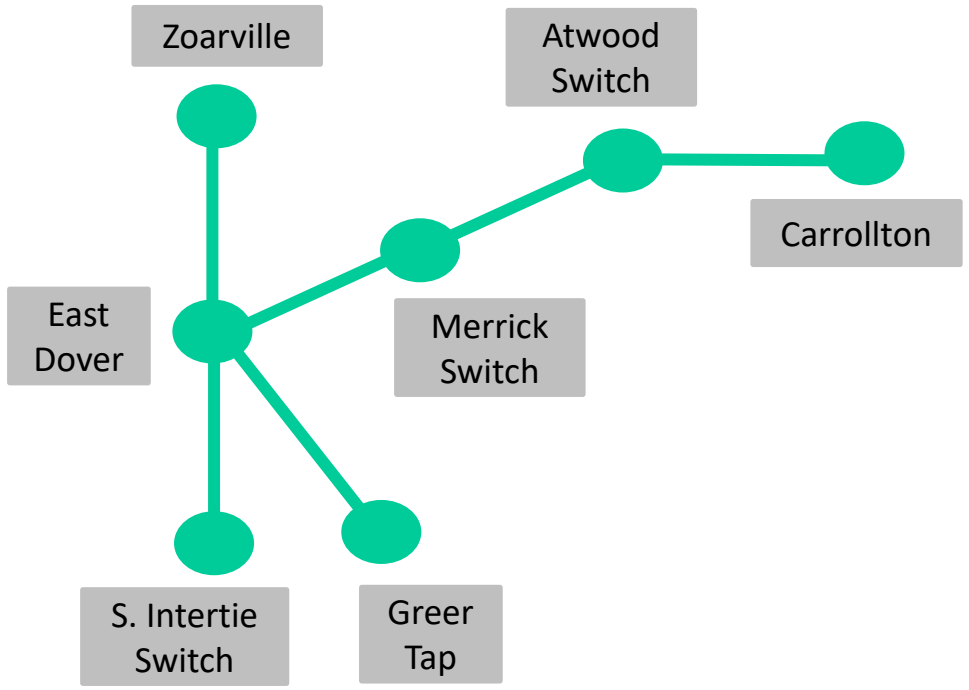


AEP Transmission Zone M-3 Process
East Dover – Atwood Upgrade

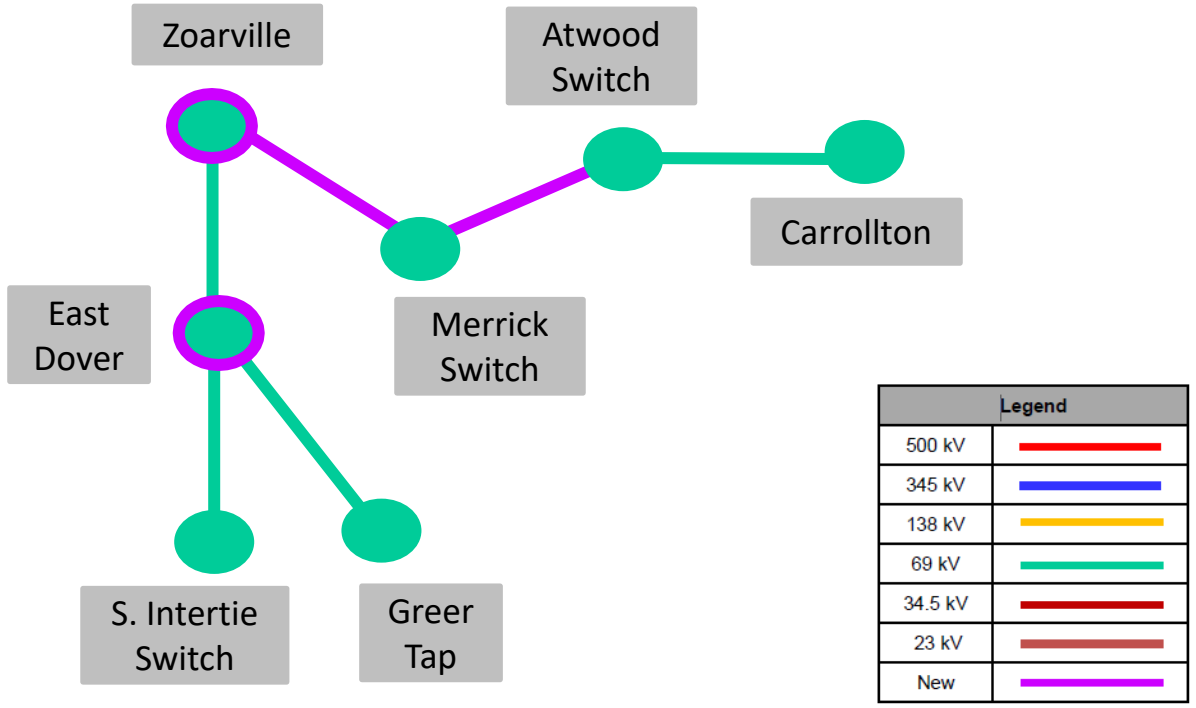
Need Number: AEP-2020-OH029

Process Stage: Solution Meeting 05/19/2022

Existing:



Proposed:



AEP Transmission Zone M-3 Process
Hancock, Ohio

Need Number: AEP-2021-OH003

Process Stage: Solutions Meeting 05/19/2022

Previously Presented: Need Meeting 02/17/2021

Supplemental Project Driver:

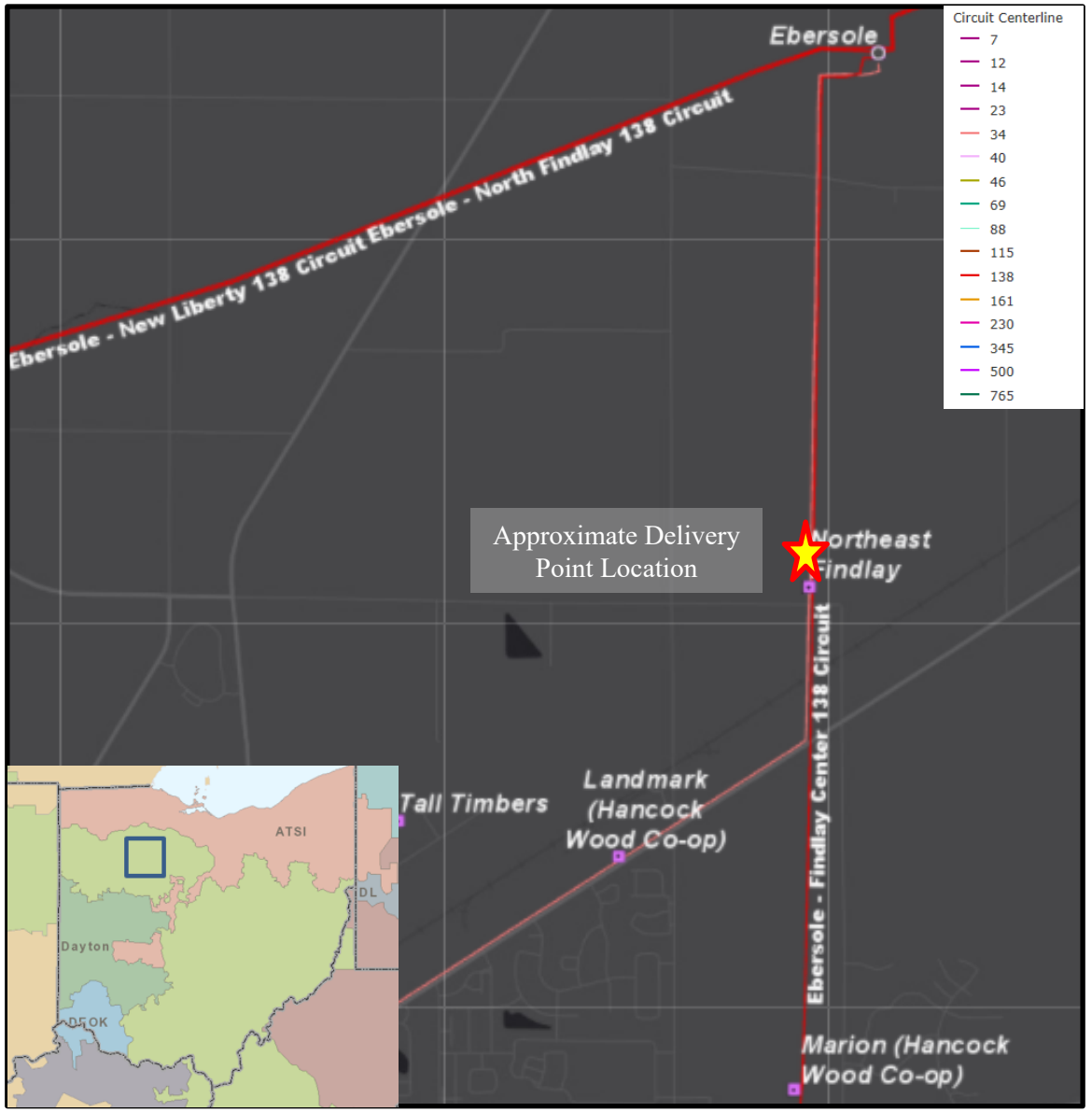
Customer Service

Specific Assumption Reference:

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

Problem Statement:

- Buckeye is requesting on behalf of Hancock-Wood Electric co-op for a new 138kV delivery point on the Ebersole – Findlay Center 138kV Circuit by August 2023. Anticipated load is about 3 MVA.



Need Number: AEP-2021-OH003

Process Stage: Solutions Meeting Solutions Meeting 05/19/2022

Proposed Solution:

- Invision Switch: Install a new switch on the Ebersole – Findlay center 138 kV line to serve the new Buckeye Co-Op Cass Substation. Estimated Cost: $1.49 M
- Invision – Cass: Install approximately 0.1 miles of new 138 kV line from Invision Switch to the Buckeye Co-op Cass Substation. Estimated cost: $595 k

Total Estimated Transmission Cost: $2.085 M

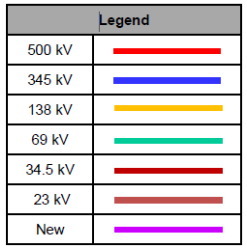
Alternatives Considered:

- Considering the location and timing of the customer request, no other viable alternatives were considered.

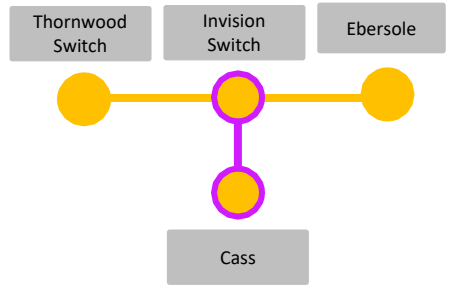
Projected In-Service: 8/15/2023

Project Status: Engineering

Existing:



Proposed:



AEP Transmission Zone M-3 Process
George Washington-Kammer (Marshall County, WV)

Need Number: AEP-2021-OH013

Process Stage: Solution Meeting 05/19/2022

Previously Presented: Need Meeting 03/19/2021

Project Driver: Equipment Condition/Performance/Risk

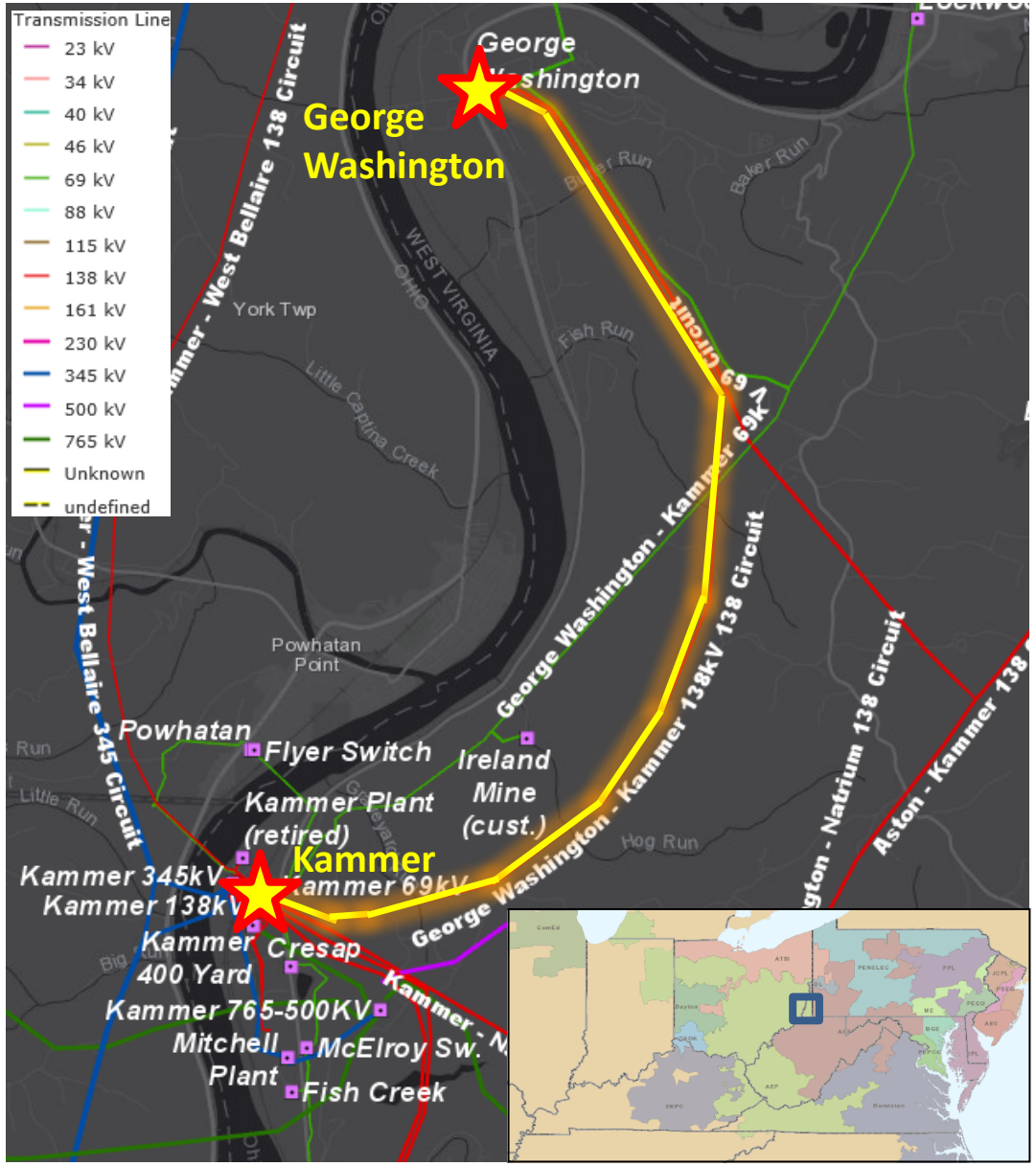
Specific Assumption Reference:

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

Problem Statement:

<u>George Washington-Kammer 138kV circuit (6.9 miles)</u>

- The line consist of 6.7 miles of original (1956) lattice towers and conductor (6-wired 636 ACSR). There is 0.2 miles of newer construction that is in adequate condition (outside the substation at each end).
- The shield wire design does not meet current shielding angle requirements.
- There are currently 14 hardware-based open conditions on the line (primarily insulator damage), 1 conductor condition (broken strands), and 1 structure condition.
- Some of the steel lattice towers show heavy rusting and corrosion. The original insulator strings show significant residue/contamination, leading to risk of flashovers and circuit outages.
    - Hook attachments freely move and wear through the hangers. This wear results in the loss of steel section over time. That section loss reduces the strength of the connection which can result in premature failure. There is evidence of hole elongation and the amount of steel left in the hanger holding up the suspension insulators is thin.



AEP Transmission Zone M-3 Process
George Washington-Kammer 138kV Line Rebuild

Need Number: AEP-2021-OH013

Process Stage: Solution Meeting 05/19/2022

Proposed Solution: Rebuild the George Washington – Kammer 138kV circuit, except for 0.1-mile of previously-upgraded T-line outside each terminal station (6.7 miles of total upgrade scope). Remove the existing 6-wired steel lattice towers and supplement the right-of-way as needed.

Total Cost = $18.3 Million

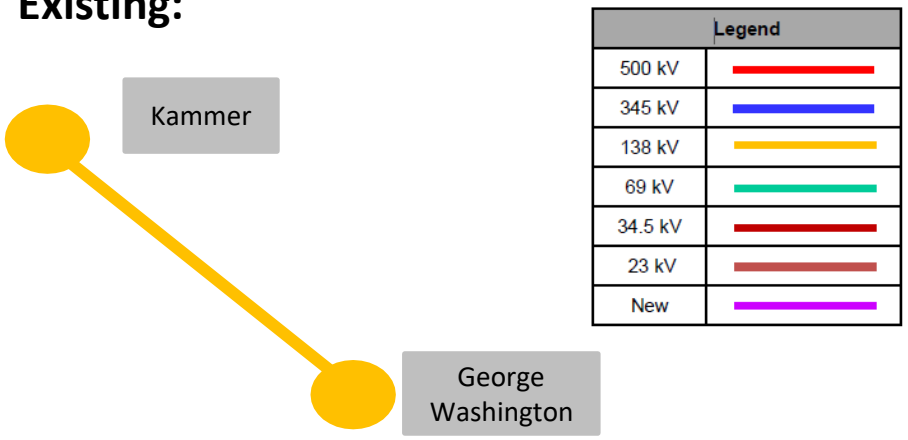
Alternatives Considered: No viable alternatives identified for this equipment condition issue. Retirement or re-routing of the 138kV circuit was not an option, as this is a heavily-loaded circuit in an area with much generation, large industrial customers, and tie-lines from West Virginia to Ohio. Rebuilding this 66-year-old transmission facility ensures a high level of system reliability for decades to come.

Projected In-Service: 06/01/2024

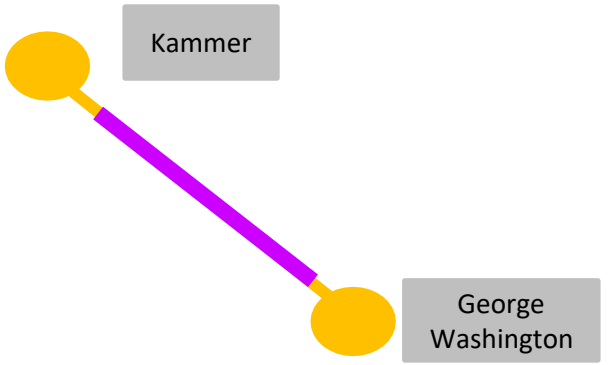
Project Status: Scoping

Model: 2026 PJM RTEP Load-Flow and Short Circuit Models

Existing:



Proposed:



AEP Transmission Zone M-3 Process
RV Capital Customer Request

Need Number: AEP-2021-IM035

Process Stage: Solution Meeting 05/19/2022

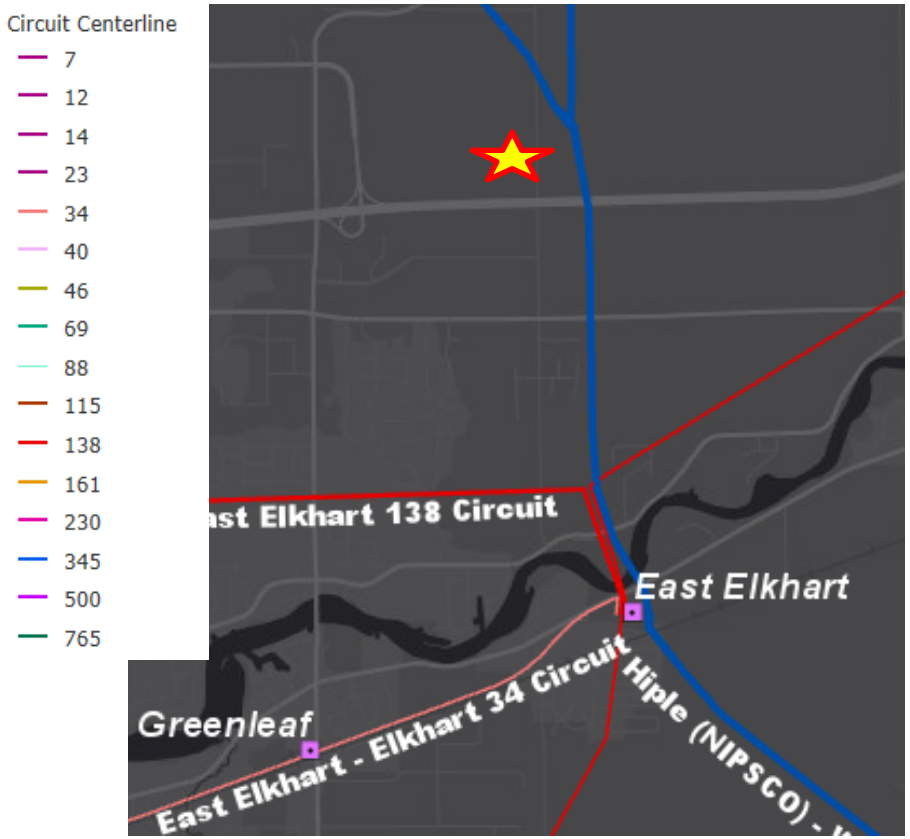
Previously Presented: Needs Meeting 11/19/2021

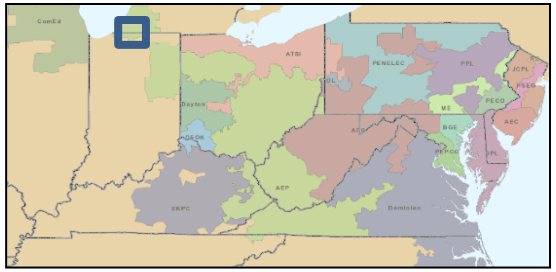
Project Driver: Customer Service

Specific Assumption Reference: AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 12)

Problem Statement:

AMZ Propco, LLC has requested new transmission service in Elkhart, Indiana by January 2023. Anticipated load is approximately 8.5 MW.





AEP Transmission Zone M-3 Process
RV Capital Customer Request

Need Number: AEP-2021-IM035

Process Stage: Solution Meeting 05/19/2022

Proposed Solution:

RV Capital 138 kV - Install a new 138kV straight bus with a (2) 138kV MOAB switches, fiber and relaying.

Estimated Cost: $1.96M

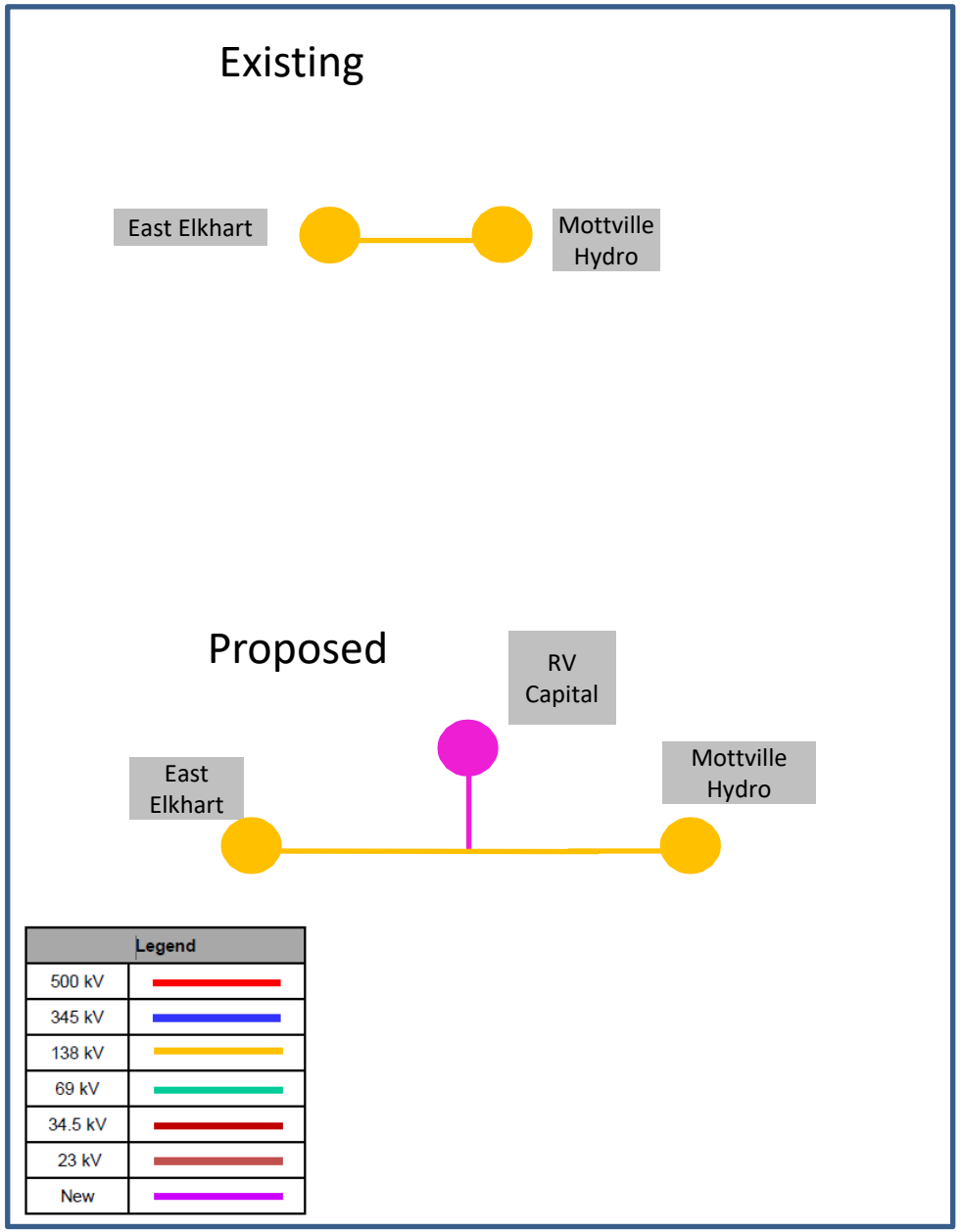
East Elkhart – RV Capital 138kV - Install ~1.44 mi of 138 kV single circuit from structure 1 to RV Capital on the East Elkhart – Mottville Hydro 138kV circuit with the conductor size 795 ACSR 26/7 Drake.

Estimated Cost: $3.34M

East Elkhart Stateline Metering - Relocate to Mottville Hydro.

Estimated Cost: $0.47M

Total Estimated Transmission Cost: $5.77M



AEP Transmission Zone M-3 Process
RV Capital Customer Request

Need Number: AEP-2021-IM035

Process Stage: Solution Meeting 05/19/2022

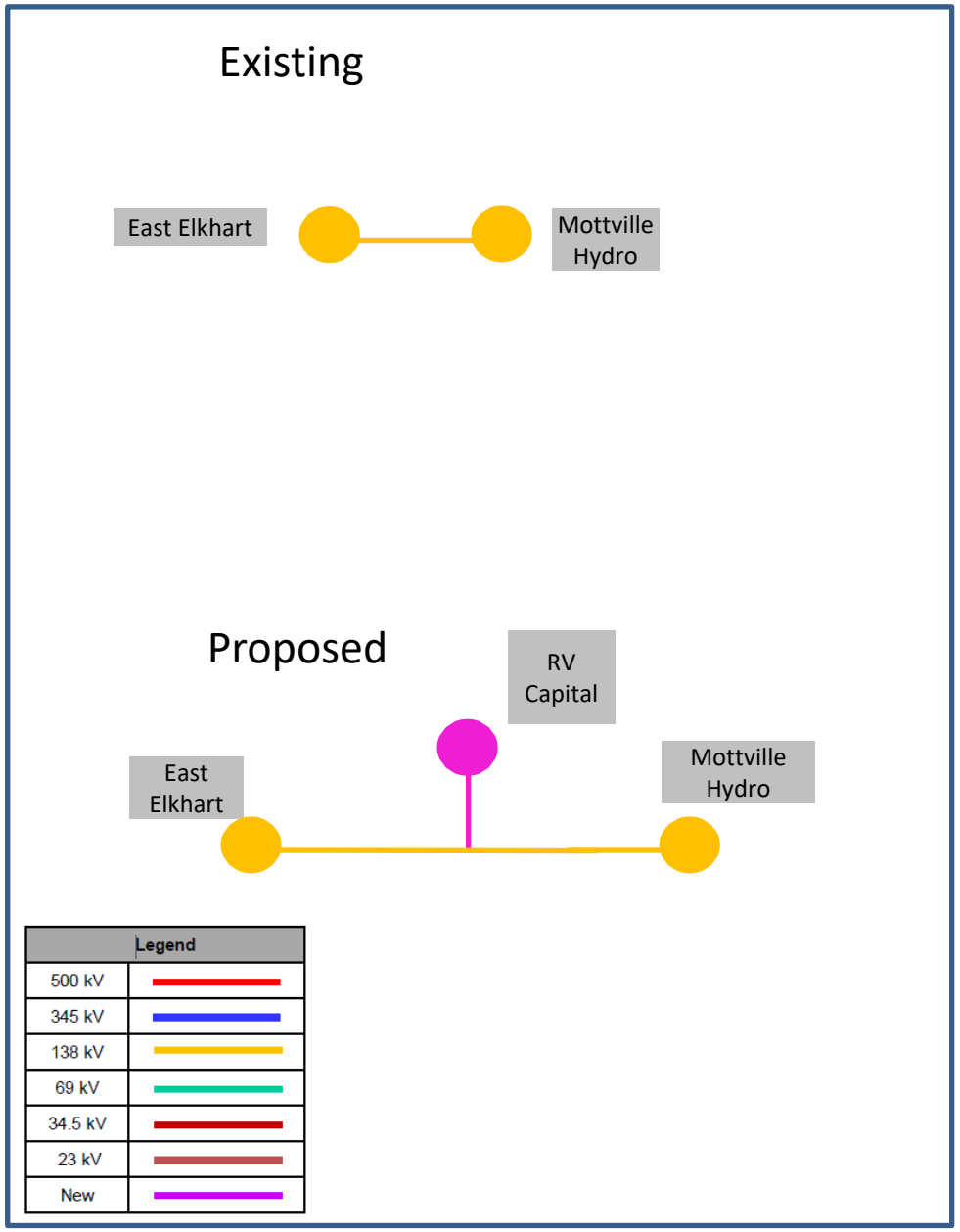
Alternates Considered:

Construct ~1.44 miles of double circuit 138kV line from structure 1 to the new RV Capital station to provide increased reliability. This alternative was not chosen as we can take advantage of the opportunity to re-route the existing rebuild of East Elkhart to Mottville Hydro 138kV (s2584) through RV Capital station to loop in the radial and provide increased reliability.

Estimated Cost: $6.27M

Projected In-Service: 3/28/2023

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

5/9/2022 – V1 – Original version posted to pjm.com

5/17/2022 – V2 – Slide #17, Corrected bubble diagram

5/18/2022 – V3 – Slide #19, Added the missing component “Merrick Switch – East Dover”

1/11/2023 – V4 – Slide #16, Corrected the Need# from AEP-2021-AP033 to AEP-2021-AP032 and the solution date