

Western Sub Regional RTEP: AEP Supplemental Projects

February 16, 2024

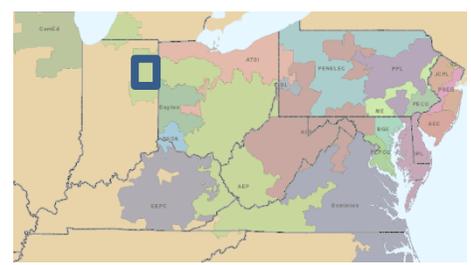
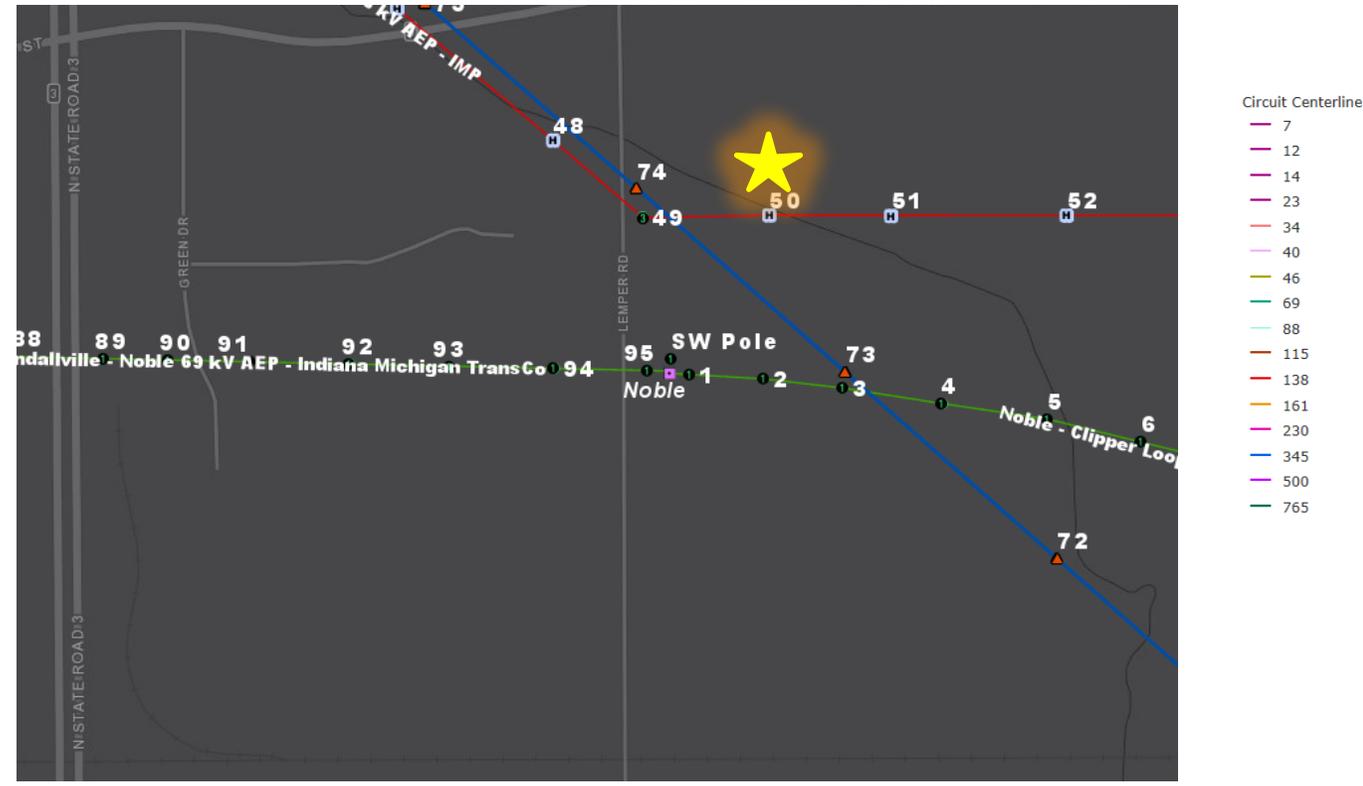
Changes to Existing Projects

S2831: Posted in 2023 Local plan. Need Number: AEP-2022-IM011
Supplemental Project Driver: Customer Need
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.

Reasoning for change:
 At the time of submittal, a land option was not yet selected, and the scope had anticipated a land option close to the existing Noble station. The land option that has been chosen for this station rebuild is neighboring the 138kV line. Due to the proximity of the 138kV line, this project is moving forward with the alternate option of rebuilding the station at 138kV. This scope will avoid complicated line crossings under an existing 345kV, to re-terminate the new station onto the 69kV line.



S2831 Original Scope:

Noble 69kV Station:

Rebuild Noble 69/12kV distribution station on neighboring property with a bus tie breaker and line Moab. (S2831.1)

Cost: \$1.5M

Transmission Cost: \$0M

Reconnect the Auburn—Kendallville 69kV line to the new station (S2831.2)

Cost: \$0.5M

Total Transmission Cost: \$2M

S2831 New Scope:

Noble Station:

Retire 69kV Noble station. Re-terminate 69kV Auburn-Kendallville 69kV line outside of Noble station. (S2831.1)

Estimated Cost: \$0.4M

Virtue 138kV/12kV Station:

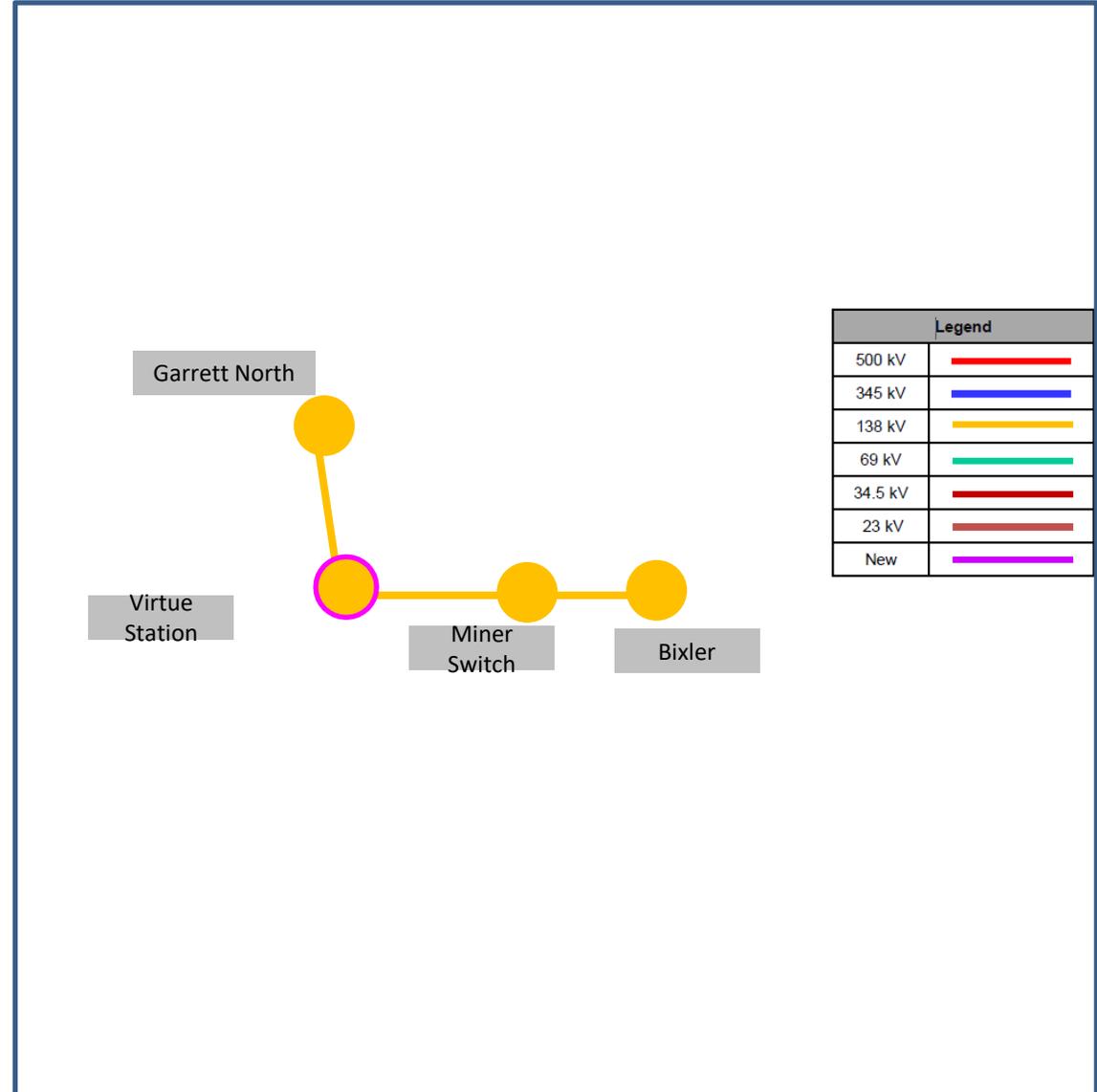
Install 138kV bus, 15.4MVAR Capacitor with 138kV circuit breaker, 2x 138kV MOAB to serve new distribution station. Install Telecom at Virtue station and remote ends. (S2831.2)

Estimated Cost: \$2.9M

Total Estimated Transmission Cost: \$3.3M

Projected In-Service: 03/01/2026

Project Status: Scoping

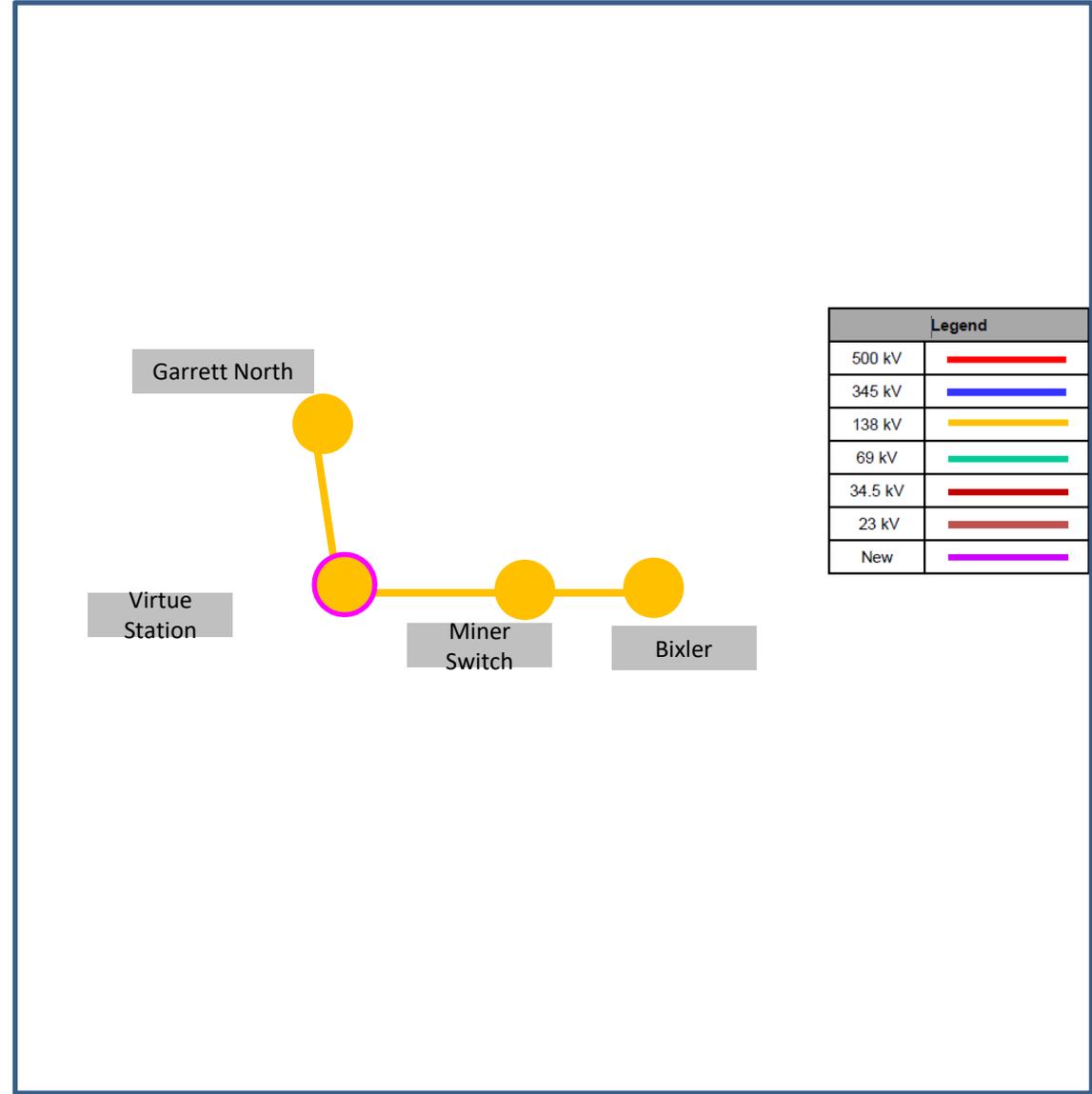


Alternatives Considered:

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~~

The alternate was re-evaluated and selected for this project based on the available land to build the station on. The original proposal, by crossing the 345 kV line and connecting back to the 69 kV line, would result in higher costs to complete. **Estimated cost: \$4.7M**



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 Pike County, KY

Need Number: AEP-2024-AP001

Process Stage: Need Meeting 02/16/2024

Project Driver:

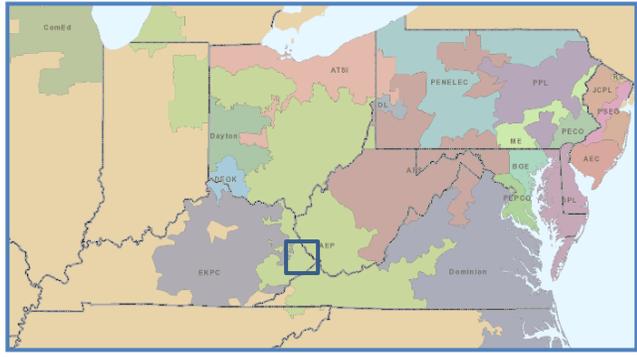
Customer Service Criteria

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 12)

Problem Statement:

- A customer has requested service for 7 MW peak load out of the Bevins switching station location in Pike County, KY, with proposed in service in 12/2024. The customer has plans to increase the load in the future at this delivery point.



Legend	
Station	★
Circuit	—
	12 kV
	14 kV
	23 kV
	34 kV
	40 kV
	46 kV
	69 kV
	88 kV
	115 kV
	138 kV
	161 kV
	230 kV
	345 kV
	500 kV
	765 kV

AEP Transmission Zone M-3 Process Roanoke, VA

Need Number: AEP-2024-AP002

Process Stage: Need Meeting 2/16/2024

Project Driver:

Equipment Condition/Performance/Risk, Operational Flexibility

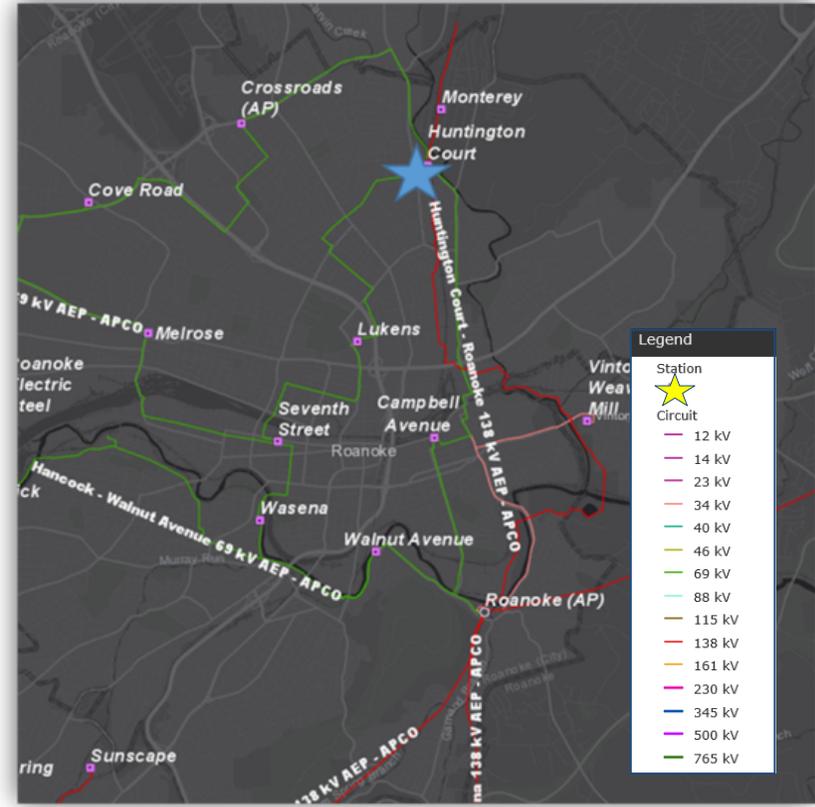
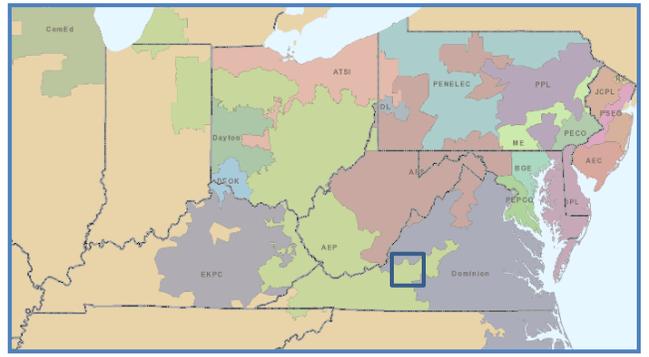
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 13, 14)

Problem Statement:

Huntington Court Station:

- 69 kV Circuit Breakers
 - E, H and M are all 1994 vintage, 72PM31-20 type, SF6 circuit breakers. Circuit breakers of this type across the AEP system have had reports of moisture ingress into the breaker tank. This moisture ingress leads to increased maintenance and a higher risk of failure. These breakers have documented issues with failures to close due to burned up coils. There have been five catastrophic failures involving this model type across the AEP system. As the components of these units age and become brittle like the O-rings and gaskets, SF6 leaks become more prevalent.
 - Two of these circuit breakers, E and M, have exceeded the manufacturer’s designed number of full fault operations (13 and 9 respectively, with 6 being the manufacturer’s recommended maximum).
 - CB-M has a documented malfunction for an SF6 leak.
- Relaying
 - Huntington Court currently deploys 82 relays, implemented to ensure the adequate protection and operation of the substation. Currently, 45 of the 82 relays (55% of all station relays) are in need of replacement. Of these, 40 of these are of the electromechanical and static type which have significant limitations with regards to spare part availability and fault data collection and retention. These relays lack vendor support. In addition, there are 5 legacy microprocessor based relays that need replaced.
- Operational Flexibility and Efficiency
 - 69/12 kV Transformer #2 does not have a high side circuit switcher or high side breaker. Faults on this bank temporarily outage the 69 kV Bus #2 and there is no low-side load breaking device.
 - 69/34.5 kV Transformer #4 utilizes low-side hookstick vacuum bottle switches. Circuit breakers or vacuum bottle MOABs are recommended to allow for proper sectionalizing.



AEP Transmission Zone M-3 Process Ridgeway, VA

Need Number: AEP-2024-AP003

Process Stage: Need Meeting 2/16/2024

Project Driver:

Customer Service

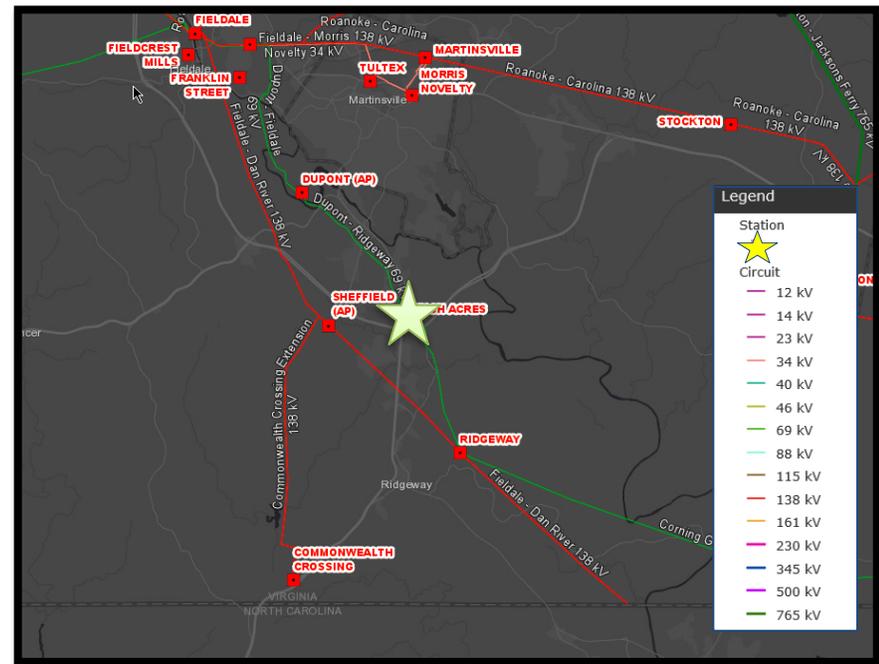
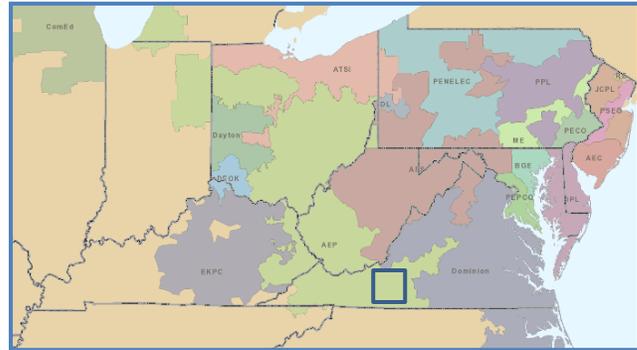
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Customer Service Slide 12)

Problem Statement:

Rich Acres Station:

There are 4 industrial/manufacturing customers, totaling approximately 12.9 MW of load, served out of Rich Acres Station. These customers have experienced 7 Transmission outages in 2023. The customers have asked AEP to investigate. Due to the nature of the load served at Rich Acres, any outage is costly and time consuming to recover from, resulting in lost product for these facilities. Today, there is no fault interrupting devices at the station to help protect customers from outages.



AEP Transmission Zone M-3 Process Mount Vernon, Ohio

Need Number: AEP-2024-OH028

Process Stage: Needs Meeting 2/16/2024

Supplemental Project Driver: Customer Service

Specific Assumption Reference:

AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 7)

Problem Statement:

- Buckeye Co-op, on behalf of The Energy Cooperative (Licking REC), has requested a new service delivery point off the Commerce Extension (Sharp Rd – Commerce 69kV circuit) in Mount Vernon Ohio.
- The anticipated peak load is 12.031 MW by 2033
- This delivery is necessary to support industrial loads in the Mount Vernon area. Also, the new delivery point will be able to offset loading near the Brandon delivery point in anticipation of future growth.

Model: 2027 RTEP



Need Number: AEP-2024-OH029

Process Stage: Need Meeting 02/16/2024

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

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

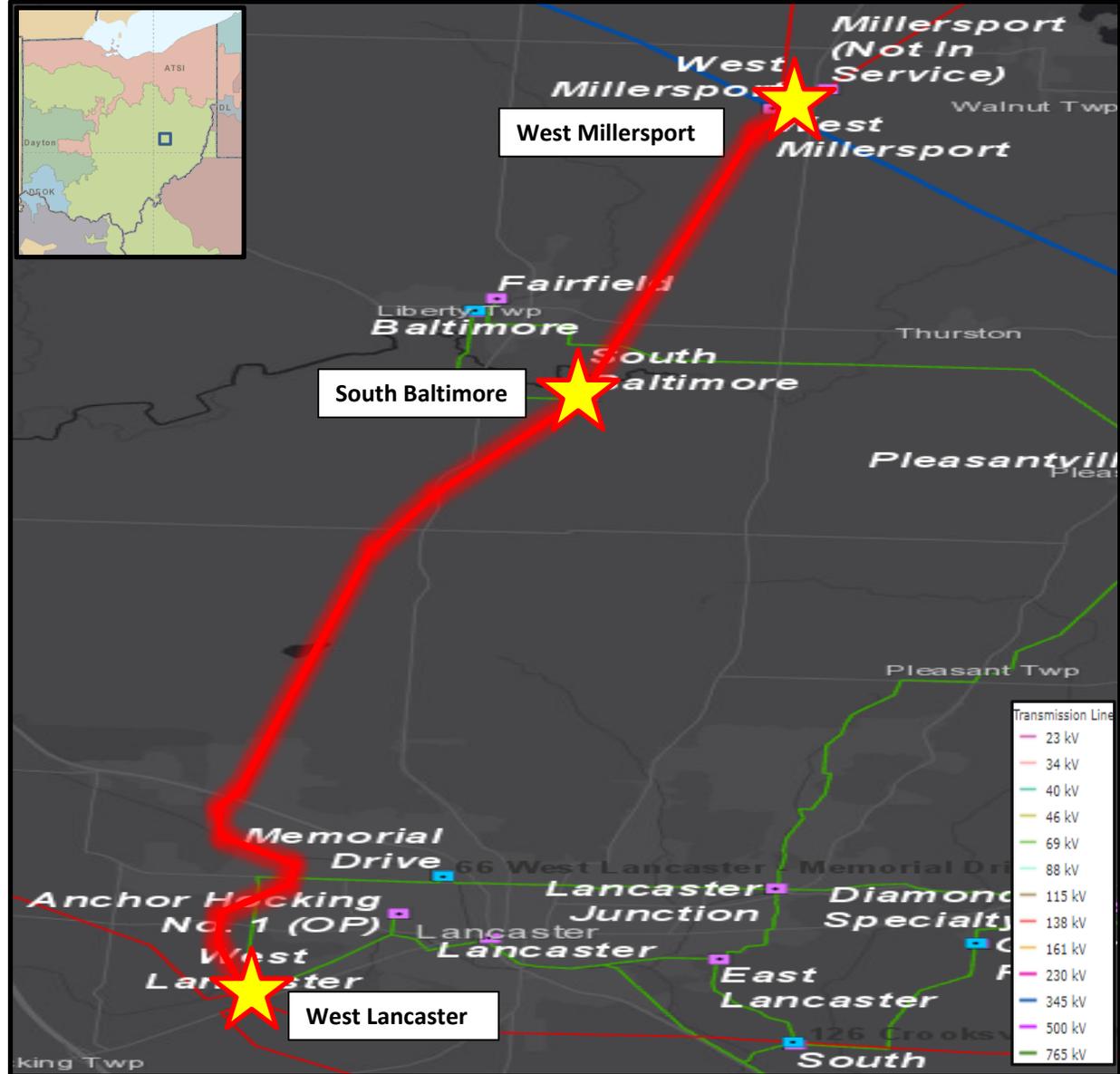
Problem Statement:

Line Name: West Lancaster - South Baltimore - West Millersport 138 kV Line

- Original Install Date (Age): 1954
- Length of Line: 14.4 miles
- Total structure count: 104 of Pole Wood & Pole Steel
 - Wood: 50 from 1950s, 7 from 1960s, 5 from 1970s, 10 from 1980s, and 3 from 1990s.
 - Steel: 29 from 2010s
- Conductor Type: 14.4 miles of 397,500 CM ACSR 30/7 (Lark) from 1954.

Open Conditions:

Currently, there are 90 unique structures with at least one open condition, which relates to 86.5% of the structures on the line. There are currently 102 structures related open conditions including rot, woodpecker, damaged, cracked, loose, vines, split, disconnected, and insect damaged conditions. There are 2 conductors related open condition related to broken strands. There are currently 8 open conditions related to broken ground lead wires. There are also 17 hardware related open conditions including broken and missing molding, damaged guy wires, missing guy guards, and burnt and broken insulators.



Need Number: AEP-2024-OH031

Process Stage: Need Meeting 02/16/2024

Project Driver: Equipment Material/Condition/Performance/Risk

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

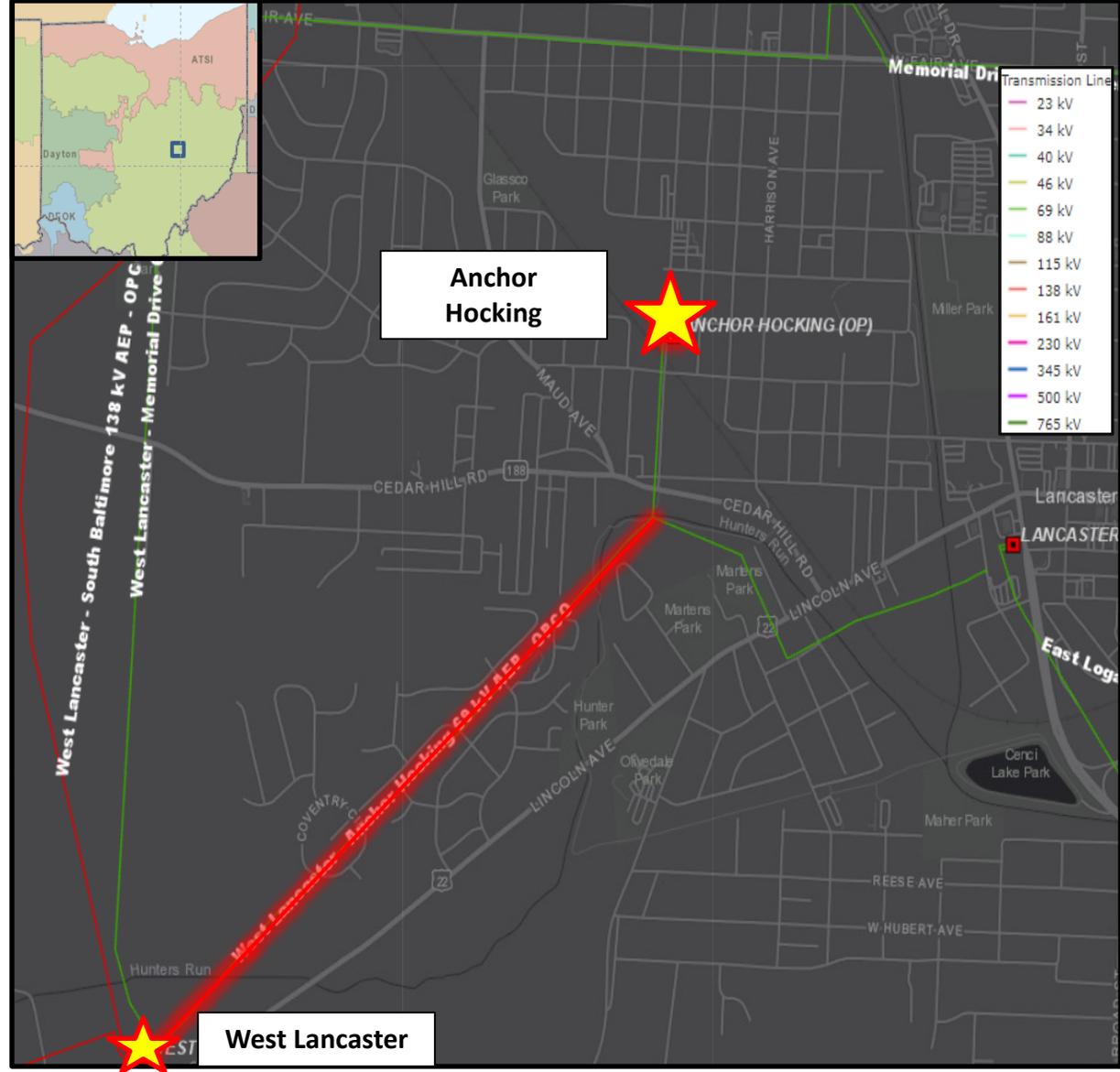
Problem Statement:

Line Name: West Lancaster - Anchor Hocking 69 kV Line

- Original Install Date (Age): 1941
- Length of Line: 1.29 miles
- Total structure count: 39 of Pole Wood
 - Wood: 28 from 1940s, 1 from 1950s, 2 from 1960s, 1 from 1974, 2 from 1980s, 2 from 1994, and 3 from 2015.
- Conductor Type: 1.62 miles of 3/0 copper from 1941.
- **Outage History**
 - Anchor Hocking - West Lancaster 69 kV circuit
 - From 2017, there has been 1 permanent outage on the Anchor Hocking – West Lancaster 69kV Circuit. The permanent outage was due to a station insulator, resulting in 3.92 hours of circuit outage time.

Open Conditions:

- Currently, there are 18 structures with at least one open structural condition, which relates to 46% of the structures on the line. There are currently 32 structural open conditions, specifically affecting the crossarms, poles, knee braces, and a push pole including burnt, insect damaged, loose, rot heart, rot pocket, rot top, split, and woodpecker damaged conditions. There are currently 9 open hardware conditions related to broken or missing guys, molding, and an insulator. There is currently 1 open grounding condition related to a broken ground lead wire.



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 Price 69 kV Capacitor Bank Install

Need Number: AEP-2023-IM025

Process Stage: Solution Meeting 2/16/2024

Previously Presented: 11/17/2023

Project Driver: Customer Need

Specific Assumption Reference:

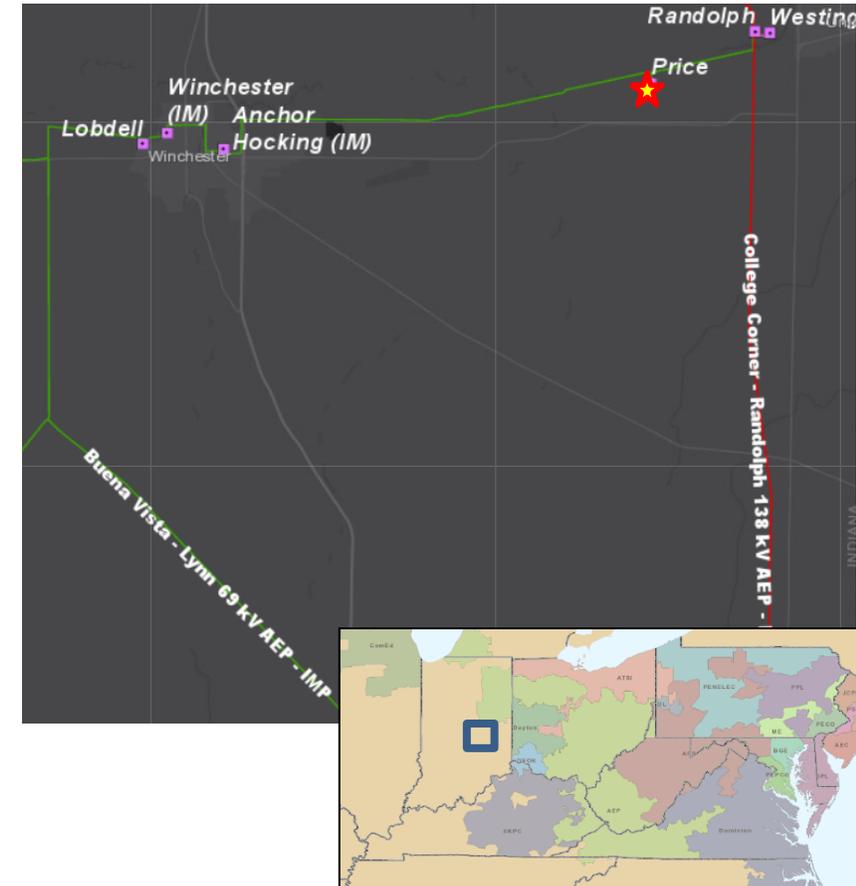
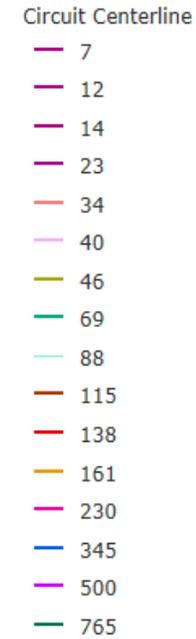
AEP Interconnection Guidelines (AEP Assumptions slide 12)

Problem Statement:

Indiana Michigan Power has requested a load increase of 14 MW at Price station. Total anticipated load to be served at the site is 28MW.

With this load addition, the following transmission criteria violations are observed and will be verified by PJM:

- The N-1 69 kV bus outage at Randolph station causes low voltage violations at Price 69 kV of 0.915 pu.
- The N-1-1 outage of the Selma Parker 138/69 kV transformer and the Randolph 138/69 kV transformer in conjunction with the Price load increase prior to project s2273 (Winchester Area Improvements – Randolph upgrades) going in service, will create low voltage violations for the area. This will be a temporary violation until project s2273 implements Randolph station upgrades to include a 69 kV transformer low side circuit breaker for which the Randolph 138/69 kV transformer outage would not also remove the Randolph 69 kV capacitor bank providing voltage support for the area.



AEP Transmission Zone M-3 Process Price 69 kV Capacitor Bank Install

Need Number: AEP-2023-IM025

Process Stage: Solution Meeting 2/16/2024

Previously Presented: 11/17/2023

Proposed Solution:

- Install a 69 kV 23 MVAR capacitor bank at Price station and a 69 kV circuit breaker.

Cost: \$ 1.5M

- Install a temporary, mobile 69 kV 14.4 MVAR capacitor bank at Winchester station to mitigate low voltage violations in the Winchester area. The mobile capacitor bank at Winchester will be removed when project s2273 Randolph upgrades are completed.

Cost: \$ 0.02M

- Install a 69/4 kV 12.5 MVA transformer and a 69 kV high side circuit switcher.

Cost: \$0 (Distribution cost)

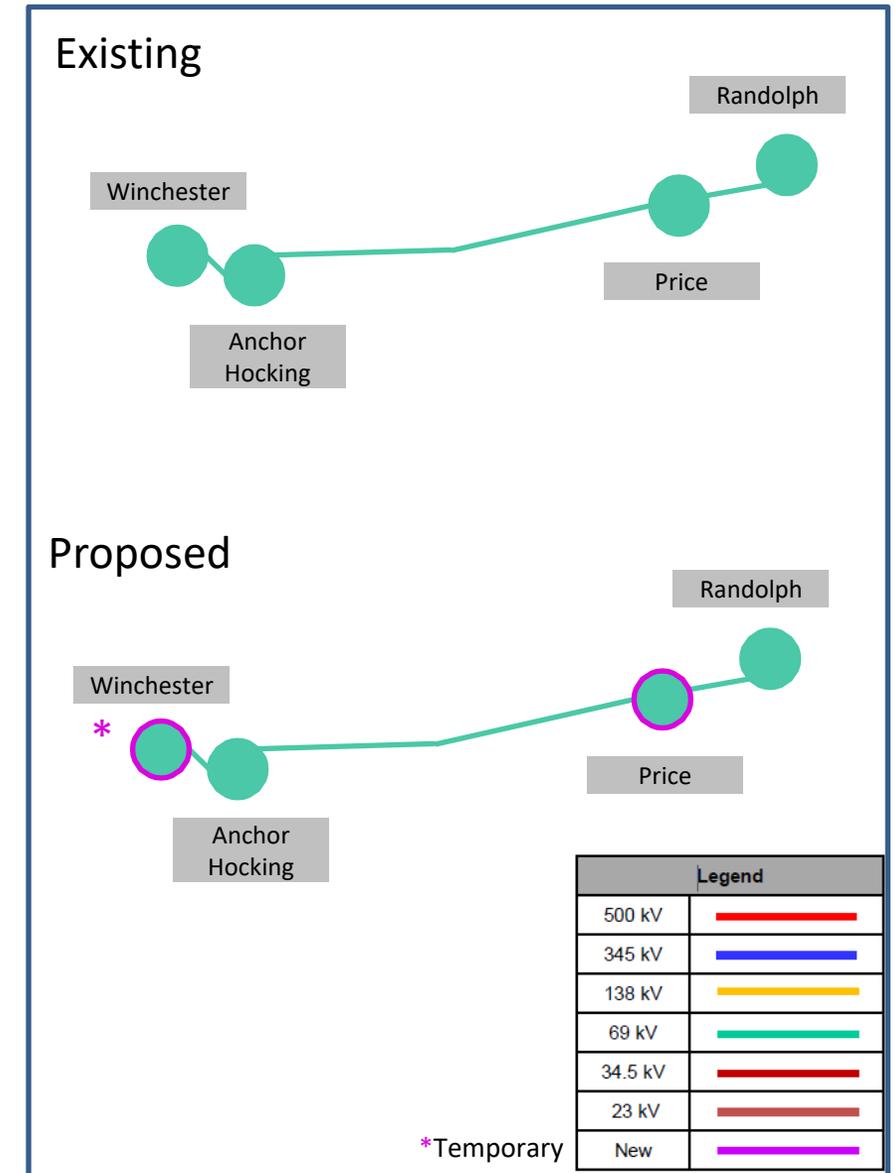
Total Estimated Transmisson Cost: \$ 1.52M

Alternative considered:

Installing a 69 kV capacitor bank at Anchor Hocking was not feasible as there is no space in the station.

Projected In-Service: 11/25/2024

Project Status: Scoping



AEP Transmission Zone M-3 Process Franklin County, Ohio

Need Number: AEP-2023-OH048

Process Stage: Solutions Meeting 2/16/2024

Previously Presented: Needs Meeting 3/17/2023

Supplemental Project Driver:

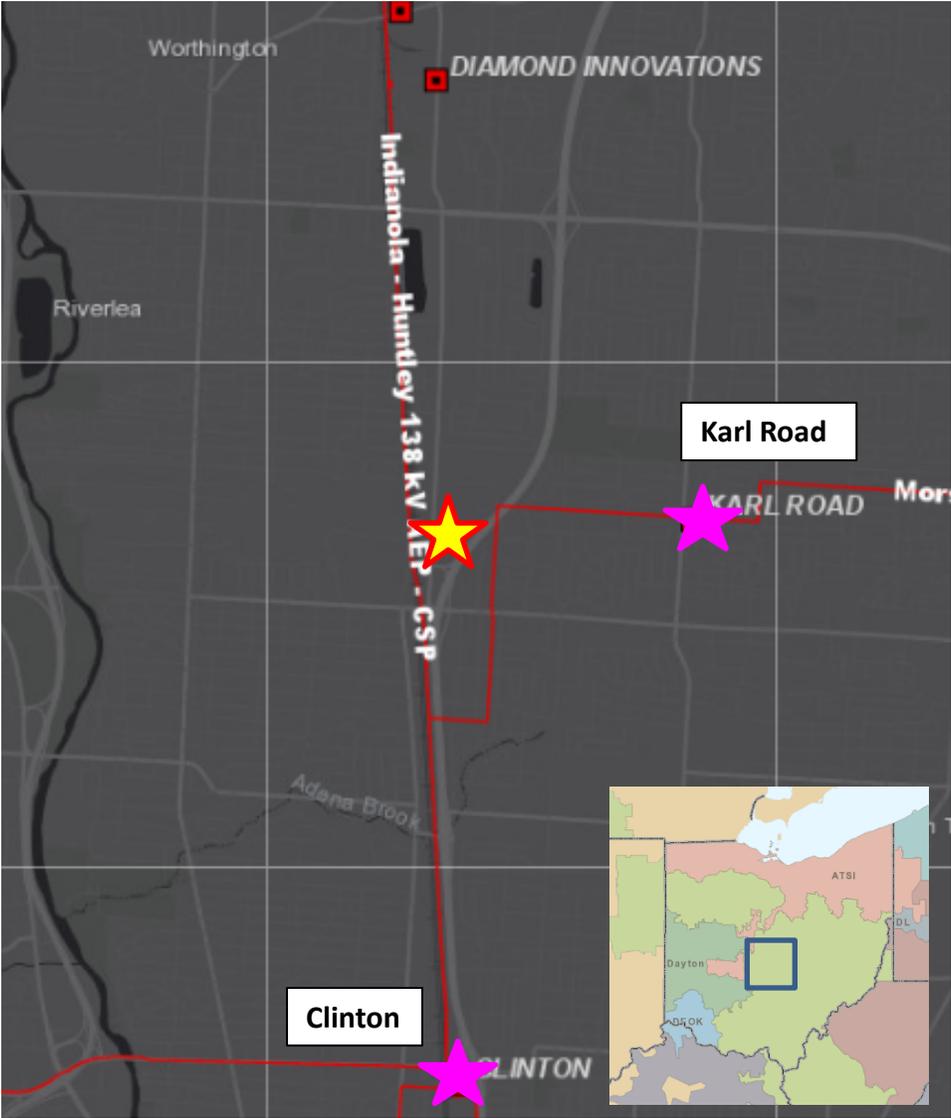
Customer Service

Specific Assumption Reference:

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

Problem Statement:

- Due to increasing load demand in the Clintonville, Ohio area, AEP Ohio has exhausted capacity at Clinton and Karl stations. AEP Ohio has requested a new 138kV delivery point on the Clinton - Huntley - Karl 138kV Circuit by October 2025 in order to transfer approximately 25 MVA of load from Clinton and 15 MVA of load from Karl station and relieve expected transformer capacity issues at those stations.



AEP Transmission Zone M-3 Process Franklin County, Ohio

Need Number: AEP-2023-OH048

Process Stage: Solutions Meeting 2/16/2024

Proposed Solution:

- Giles station 138kV:
Establish a new three breaker ring bus station named Giles using 3000A 40kA circuit breakers. **Estimated Cost: \$3.88 M**
- Clinton- Huntley- Karl 138kV Circuit:
Cut into the existing Clinton - Huntley - Karl 138kV for the Giles Extension line to tap into. **Estimated Cost: \$0.79 M**
- Giles 138kV Extension:
Construct a new 0.1 mile double circuit in and out line from the Clinton- Huntley- Karl 138kV Circuit to the new Giles station. **Estimated Cost: \$0.56 M**
- Remote end relay upgrades at Scherers Switch, Huntley and Blendon stations.
Estimated Cost: \$0.07M

Total Estimated Transmission Cost: \$5.3 M

Alternatives Considered:

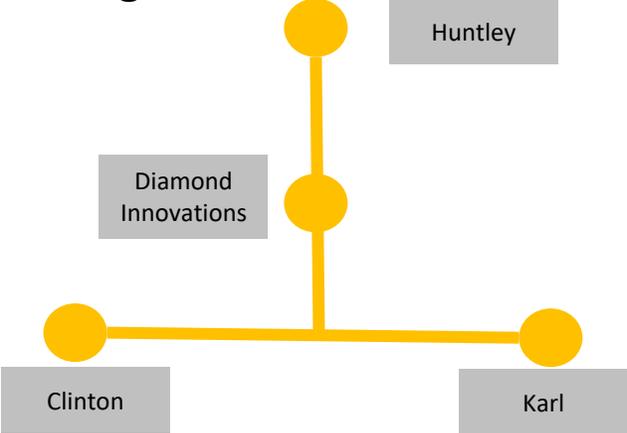
- Consideration was given to locating the new distribution facilities inside existing stations in the area, but was deemed not to be feasible due to space limitations within existing stations in the urban area.

Projected In-Service: 10/01/2025

Project Status: Scoping

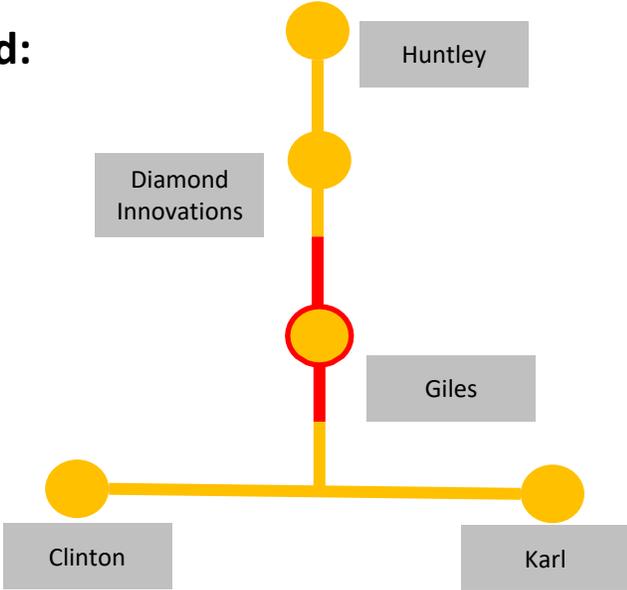
Model: 2027 RTEP

Existing:



Legend	
500 kV	—
345 kV	—
138 kV	—
69 kV	—
40 kV	—
23 kV	—
New	—

Proposed:



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

2/6/2024– V1 – Original version posted to pjm.com