

Subregional RTEP Committee – Western FirstEnergy Supplemental Projects

March 15, 2024

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

ATSI Transmission Zone M-3 Process Cloverdale – Dale No. 2 69 kV Line Customer Connection

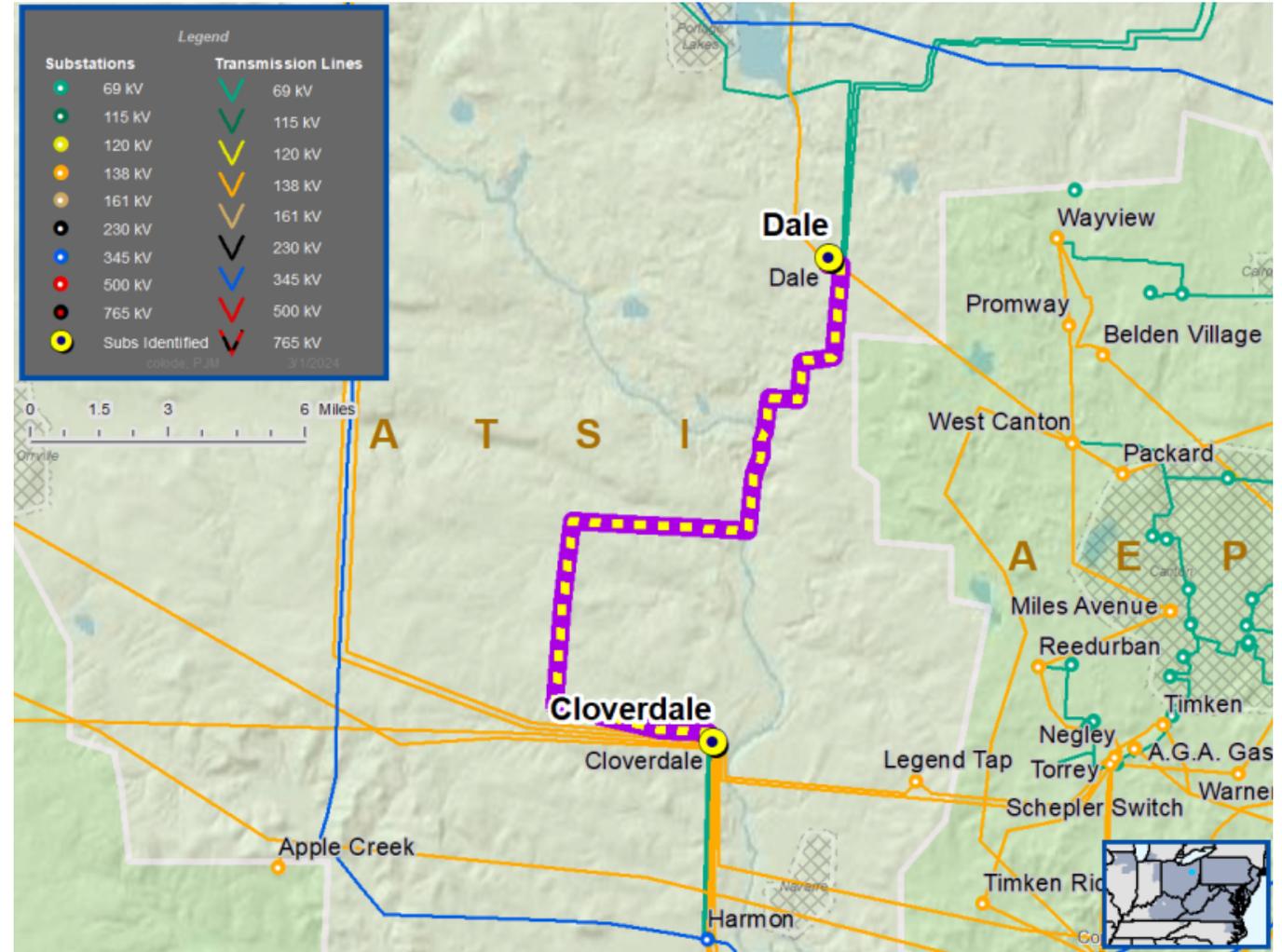
Need Number: ATSI-2024-023
Process Stage: Need Meeting – 03/15/2024

Supplemental Project Driver(s):
Customer Service

Specific Assumption Reference(s):
 New customer connection request will be evaluated per FirstEnergy’s “Requirements for Transmission Connected Facilities” document and “Transmission Planning Criteria” document.

Problem Statement
 New Customer Connection – A customer requested 69 kV service for approximately 21 MVA of load near the Cloverdale – Dale No. 2 69 kV Line. The customer location is approximately 1.2 miles from Cloverdale Substation.

Requested in-service date is April 2, 2022.





ATSI Transmission Zone M-3 Process

Galion – Roberts North 138 kV Line and Galion – Roberts South 138 kV Line

Need Number: ATSI-2024-024

Process Stage: Need Meeting – 03/15/2024

Supplemental Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s):

System Performance Global Factors

- Past system reliability/performance
- Substation/line equipment limits

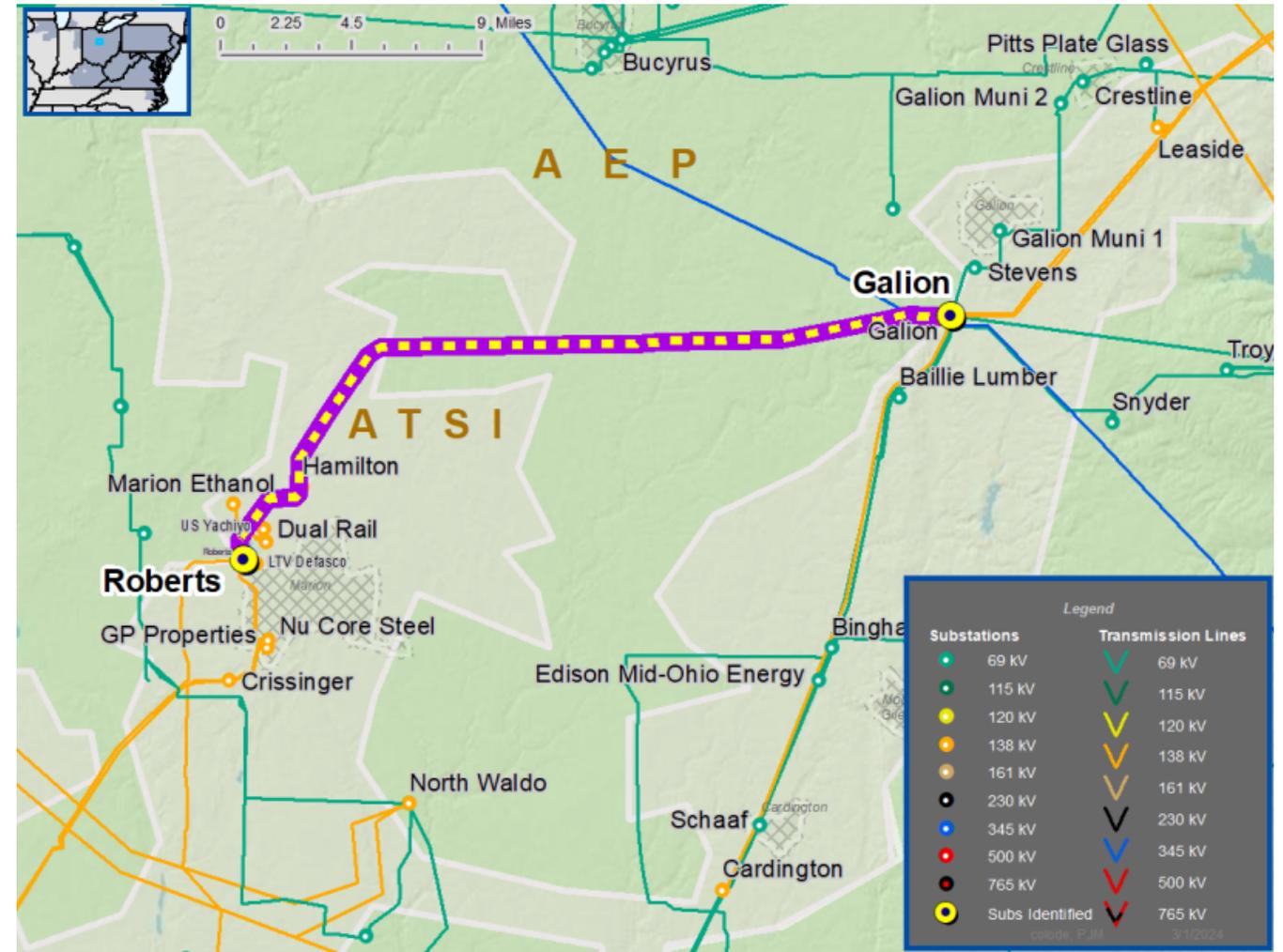
Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures

Problem Statement

- The double circuit Galion – Roberts North 138 kV Line and Galion – Roberts South 138 kV Line were constructed in 1948. The lines are approximately 22.2 miles in length with 129 shared wooden structures.
- Recent inspections have indicated that the conductor and armor rod on the line have experienced aeolian vibrations, resulting in concentrated stress on the conductor and armor rod in various locations. As the temperature of the conductor material is increased, the overall tensile strength decreases and causes tensile overload and the failure of the conductor.
- Since 2019, the Galion – Roberts North 138 kV Line had six unscheduled sustained outages.
- Since 2019, the Galion – Roberts South 138 kV Line had two unscheduled sustained outages.

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ATSI Transmission Zone M-3 Process

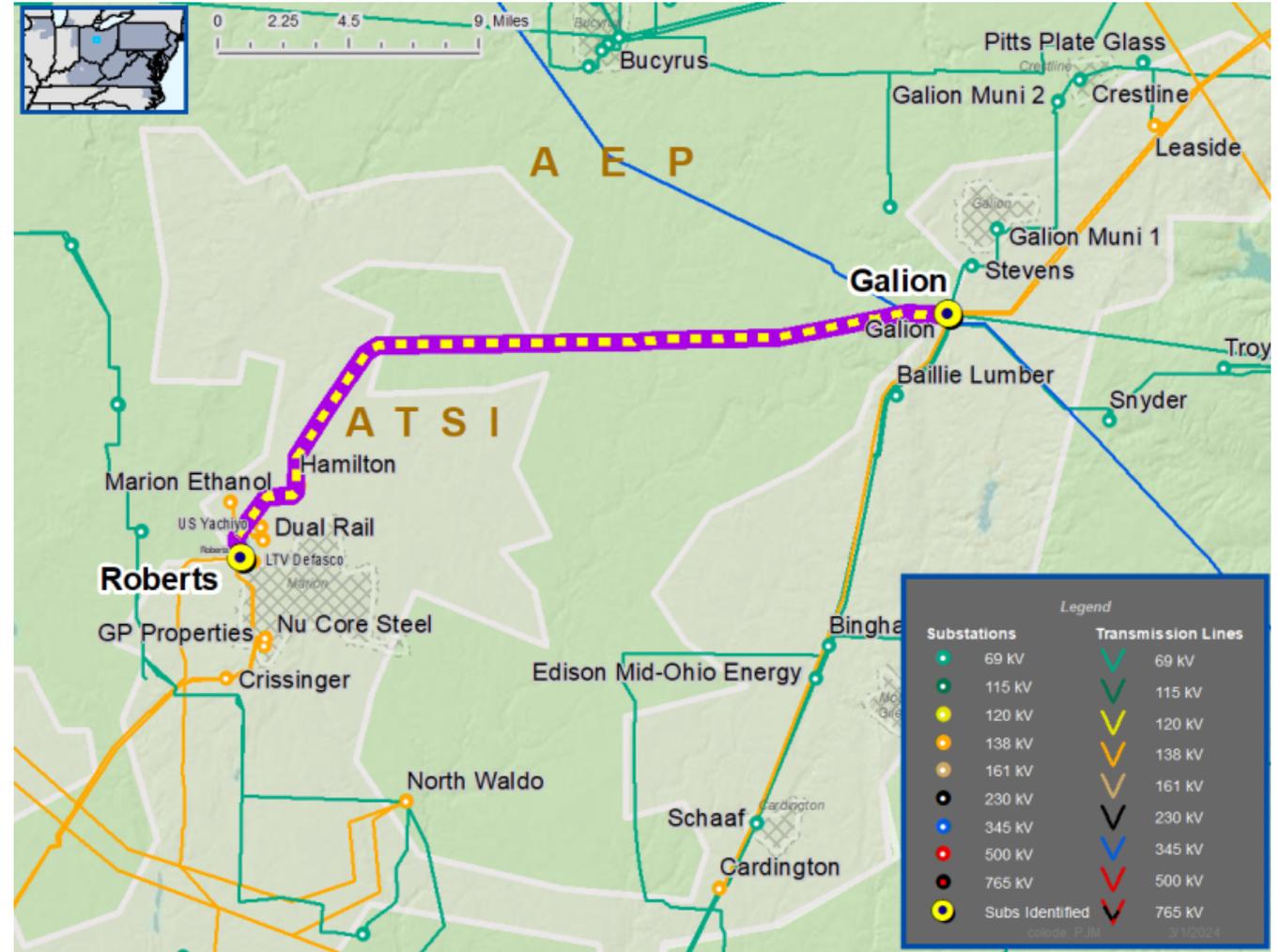
Galion – Roberts North 138 kV Line and Galion – Roberts South 138 kV Line

Need Number: ATSI-2024-024

Process Stage: Need Meeting – 03/15/2024

Transmission Line Ratings:

- Existing Galion –Marion Ethanol 138 kV Line Rating:
 - 160 / 192 / 180 / 228 MVA (SN/SE/WN/WE)
- Existing Marion Ethanol – Roberts North 138 kV Line Rating:
 - 160 / 192 / 180 / 228 MVA (SN/SE/WN/WE)
- Existing Galion – Hamilton Tap 138 kV Line Rating:
 - 195 / 209 / 217 / 229 MVA (SN/SE/WN/WE)
- Existing Hamilton Tap – Dual Rail Tap 138 kV Line Rating:
 - 200 / 242 / 226 / 286 MVA (SN/SE/WN/WE)
- Existing Dual Rail Tap – Roberts South 138 kV Line Rating:
 - 195 / 209 / 217 / 229 MVA (SN/SE/WN/WE)



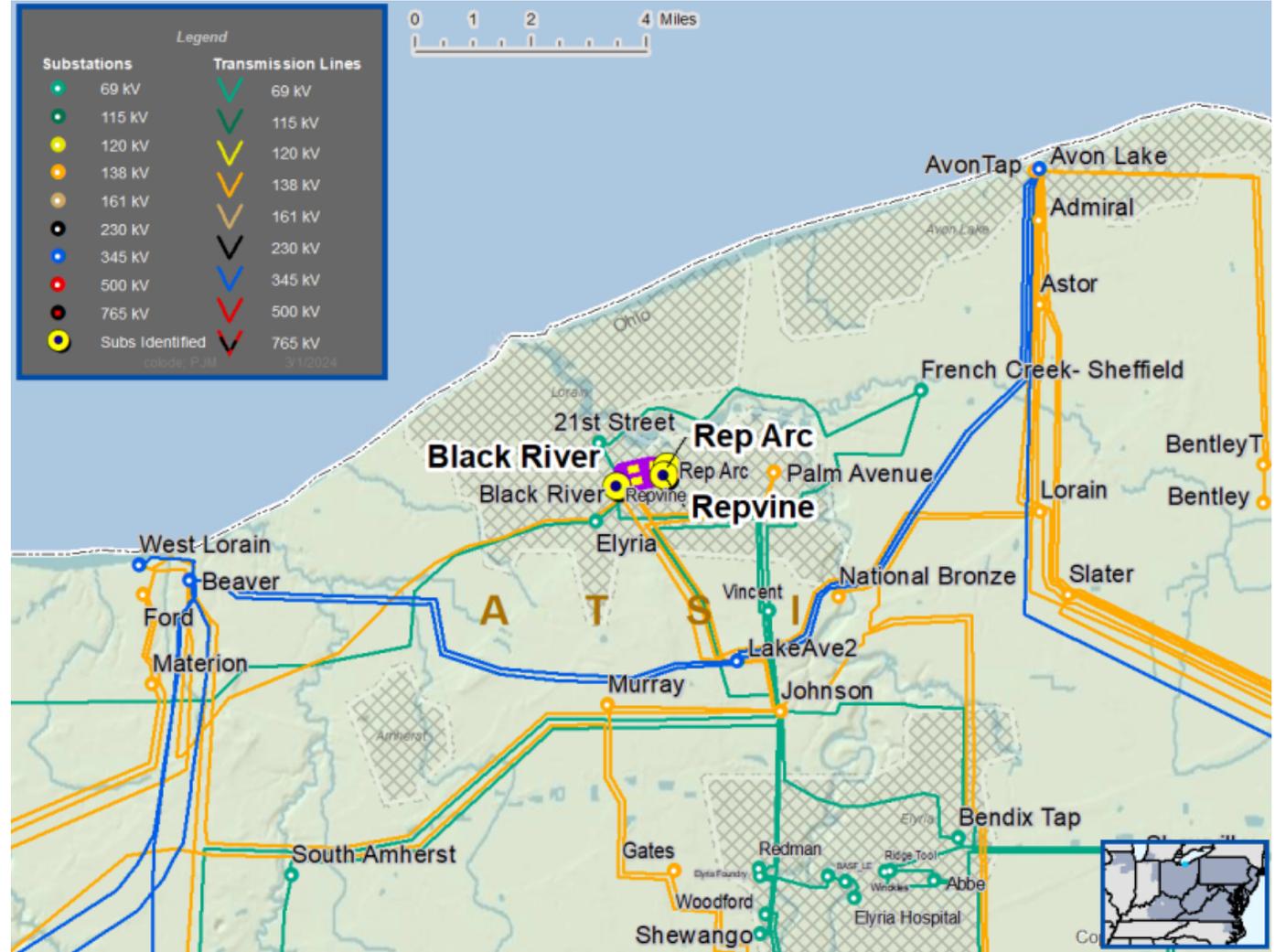
Need Number: ATSI-2024-029
Process Stage: Need Meeting – 03/15/2024

Supplemental Project Driver(s):
Operational Flexibility and Efficiency

Specific Assumption Reference(s):
 System Performance Global Factors
 ▪ System reliability and performance

Problem Statement:

- The existing Black River - Republic Arc 138 kV Line and Black River - Republic Vine 138 kV Line are networked through customer owned substations.
- Since the customer substations are in the transmission network path, transmission flow through customer owned equipment is possible.
- The existing customer substation, Republic Arc, has minimal load.
- The existing customer substation, Republic Vine, is operational but loads are lower than historical levels.





ATSI Transmission Zone M-3 Process Evergreen – Highland No. 3 138 kV Line Customer Connection

Need Number: ATSI-2024-030
Process Stage: Need Meeting – 03/15/2024

Supplemental Project Driver(s):
Customer Service

Specific Assumption Reference(s):
New customer connection request will be evaluated per FirstEnergy’s “Requirements for Transmission Connected Facilities” document and “Transmission Planning Criteria” document.

Problem Statement
New Customer Connection – A customer requested 138 kV service for approximately 17 MVA of initial load near the Evergreen – Highland No. 3 138 kV Line. The customer location is approximately 1.1 miles from Evergreen Substation.

Requested in-service date is June 20, 2025.



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

Need Number: ATSI-2020-028

Process Stage: Solutions Meeting – 03/15/2024

Previously Presented: Need Meeting – 08/14/2020

Supplemental Project Driver(s):
Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

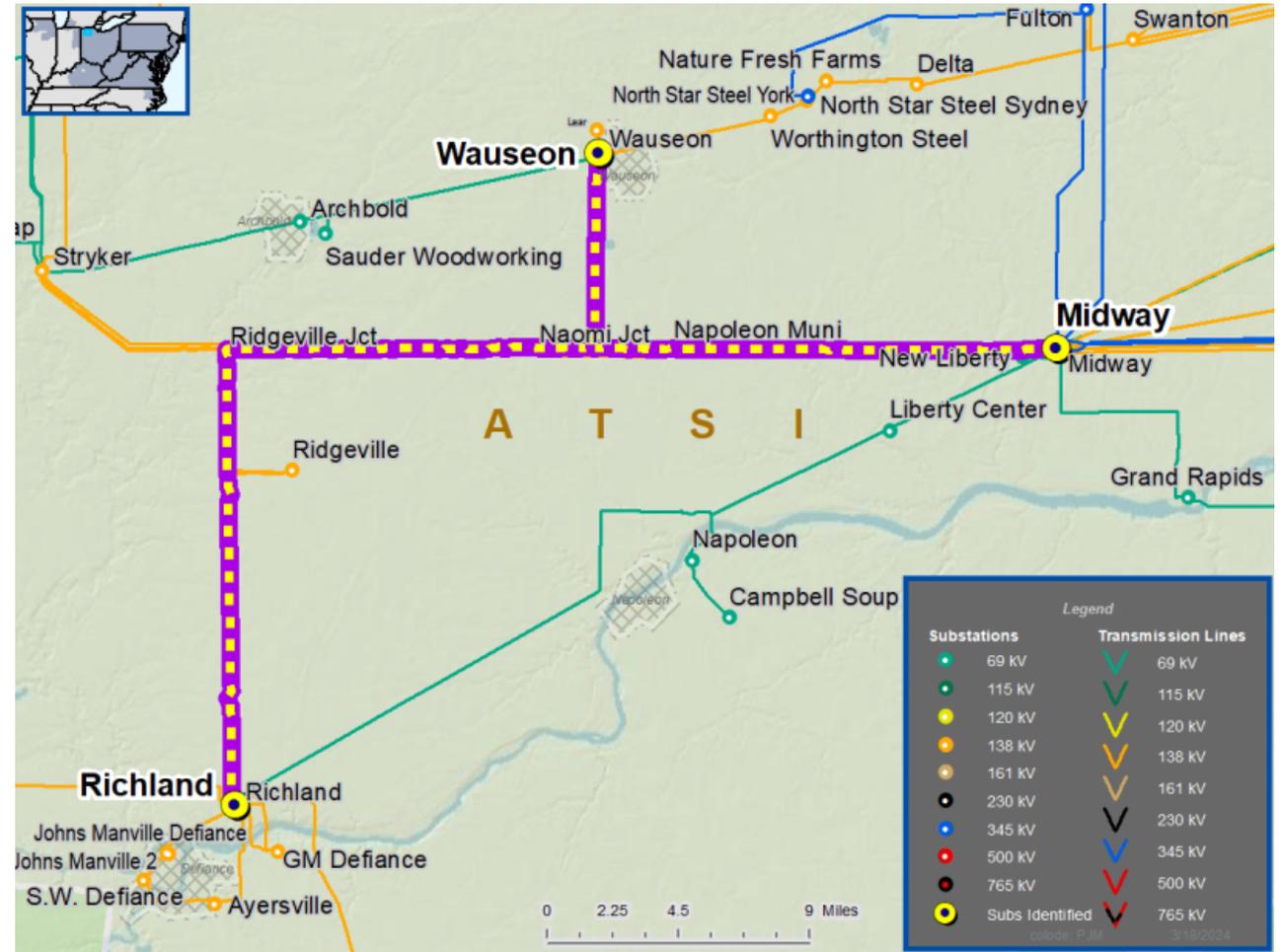
Line Condition Rebuild / Replacement

- Aged or deteriorated transmission line structures
- Negatively impact customer outage frequency and/or durations
- Demonstrate an increasing trend in maintenance findings and/or costs
- Transmission line ratings are limited by terminal equipment.

Problem Statement:

Midway – Richland – Wauseon 138 kV (~33.5 miles) Transmission Line:

- Existing conductor has a history of failure due to conductor vibration resulting in thermal overload and corrosion of steel core.
- Original porcelain insulators from 1948 construction are aged and exhibiting wear.
- Comprehensive aerial inspection was completed in 2020 and shows a rising negative trend in required maintenance with 160 structures that presently require repair for structure damage, static wire damage, broken insulators, and broken or overheated conductor.
- Growing trend in unscheduled interruptions on this line with five equipment caused outages in the past ten years.
- Condition of static wire is deteriorating which may be contributing to rise in lightning caused outages.





Need Number: ATSI-2020-028

Process Stage: Solutions Meeting – 03/15/2024

Proposed Solution:

Midway – Richland – Wauseon 138 kV Line Reconductor

- Project scope assumes completion of Midway – Richland – Wauseon 138 kV Line – Eliminate three-terminal line project is complete (s1698) (projected ISD: 4/12/2023).
- Reconductor the Richland – Wauseon 138 kV Line from Richland Substation to structure 215, approximately 21.2 miles.
- Reconductor the Midway – Richland – Wauseon 138 kV Line from the Midway Substation to structure 215, approximately 12.2 miles.
- Install OPGW from the Midway Substation to the Richland Substation, approximately 21.2 miles.
- Upgrade substation conductor at Midway Substation and Wauseon Substation.

Transmission Line Ratings:

Midway – Wauseon 138 kV Line

- Before Proposed Solution: 160 / 192 / 180 / 228 MVA (SN/SE/WN/WE)
- After Proposed Solution: 161 / 194 / 182 / 230 MVA (SN/SE/WN/WE)

Richland – Wauseon 138 kV Line

- Before Proposed Solution: 160 / 192 / 180 / 228 MVA (SN/SE/WN/WE)
- After Proposed Solution: 161 / 194 / 182 / 230 MVA (SN/SE/WN/WE)

Alternatives Considered:

- Maintain existing condition and elevated risk of failure.

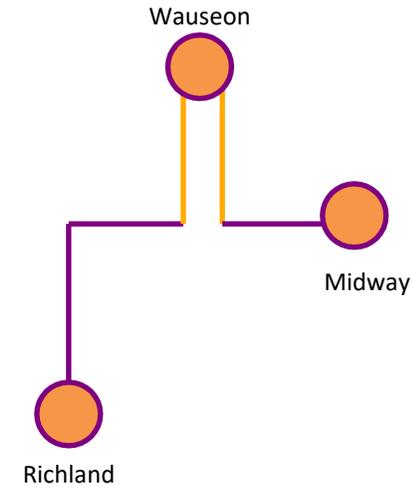
Estimated Project Cost: \$44 M

Projected In-Service: 12/31/2026

Status: Conceptual

Model: 2023 RTEP model for 2028 Summer (50/50)

ATSI Transmission Zone M-3 Process Midway – Richland – Wauseon 138 kV Line



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

Need Number: ATSI-2020-029

Process Stage: Solutions Meeting – 03/15/2024

Previously Presented: Need Meeting – 08/14/2020

Supplemental Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

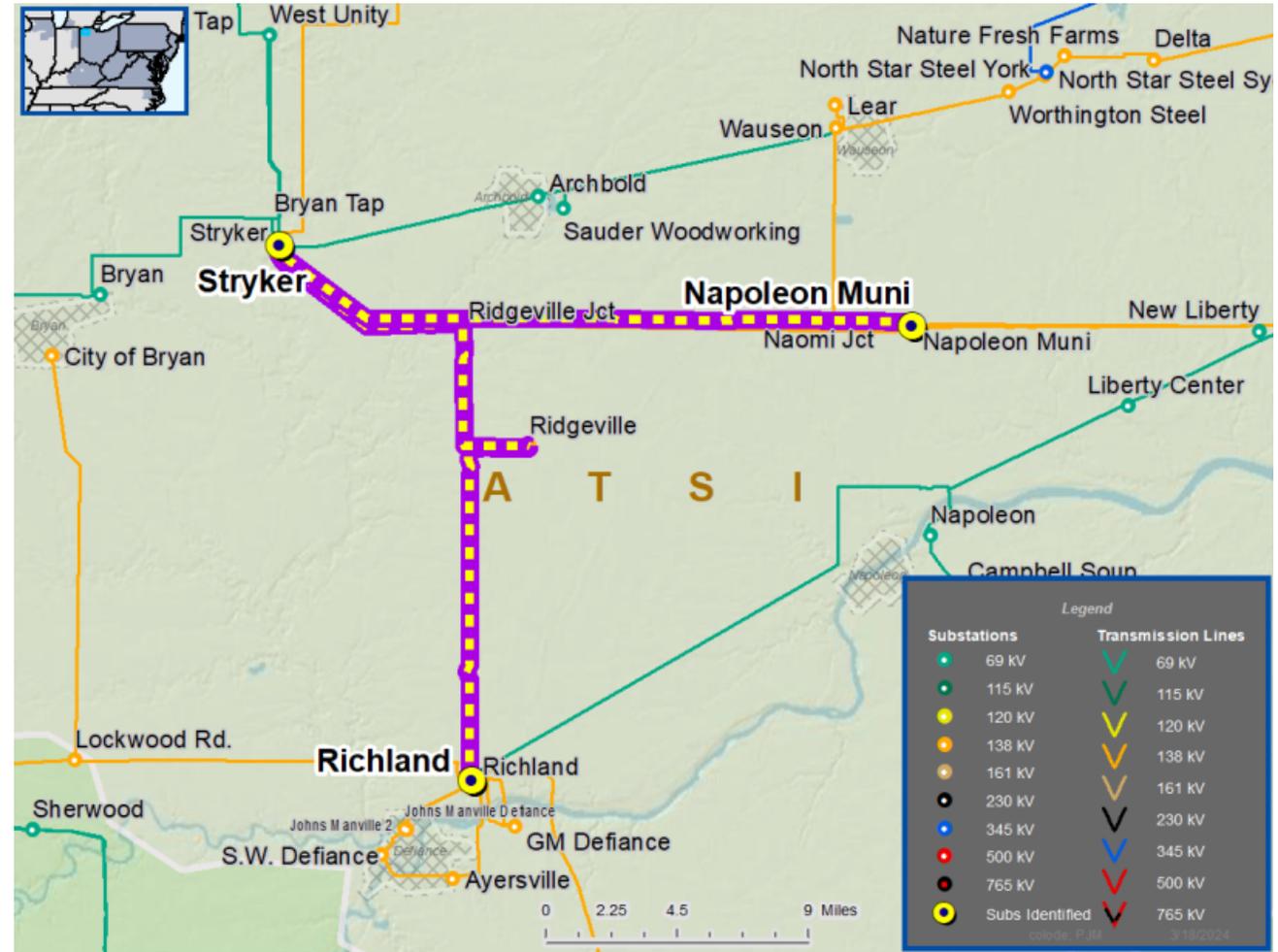
Line Condition Rebuild / Replacement

- Aged or deteriorated transmission line structures
- Negatively impact customer outage frequency and/or durations
- Demonstrate an increasing trend in maintenance findings and/or costs
- Transmission line ratings are limited by terminal equipment.

Problem Statement:

Napoleon – Richland – Stryker 138 kV (~32 miles) Transmission Line:

- Existing conductor has a history of failure due to conductor vibration resulting in thermal overload and corrosion of steel core.
- Existing line is constructed on double circuit lattice towers shared with the Midway – Richland – Wauseon 138 kV Line.
- Comprehensive aerial inspection was completed in 2020 and shows a rising negative trend in required maintenance with 130 structures that presently require repair for worn static wire, damaged attachment hardware, and broken or flashed insulators.
- Growing trend in unscheduled interruptions on this line with six equipment caused outages in the past ten years.





Need Number: ATSI-2020-029

Process Stage: Solutions Meeting – 03/15/2024

Proposed Solution:

Napoleon – Richland – Stryker 138 kV Line Reconductor

- Reconductor the Napoleon Muni Northside – Stryker 138 kV Line from Napoleon Substation to the Stryker Substation, approximately 17.1 miles.
- Reconductor the Richland – Stryker 138 kV Line from Richland Substation to Structure 265, approximately 11.8 miles.
- Replace one 138 kV breaker at Richland Substation.
- At AMPT (Napoleon) Sullivan Station:
 - Revise remote end relay settings to accommodate new conductor

Transmission Line Ratings:

Ridgeville – Stryker 138 kV Line

- Before Proposed Solution: 160 / 192 / 180 / 228 MVA (SN/SE/WN/WE)
- After Proposed Solution: 161 / 194 / 182 / 230 MVA (SN/SE/WN/WE)

Richland – Ridgeville 138 kV Line

- Before Proposed Solution: 161 / 194 / 182 / 230 MVA (SN/SE/WN/WE)
- After Proposed Solution: 161 / 194 / 182 / 230 MVA (SN/SE/WN/WE)

Napoleon Muni – Stryker 138 kV Line

- Before Proposed Solution: 161 / 194 / 182 / 230 MVA (SN/SE/WN/WE)
- After Proposed Solution: 161 / 194 / 182 / 230 MVA (SN/SE/WN/WE)

Alternatives Considered:

- Maintain existing condition and elevated risk of failure.

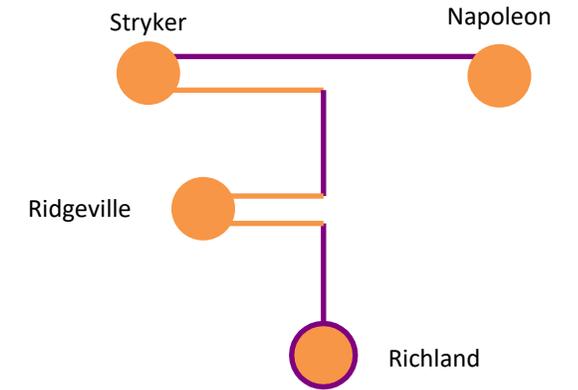
Estimated Project Cost: \$12 M (ATSI=\$11.9M, AMPT=\$0.1M)

Projected In-Service: 12/31/2026

Status: Conceptual

Model: 2023 RTEP model for 2028 Summer (50/50)

ATSI Transmission Zone M-3 Process Napoleon – Richland – Stryker 138 kV Line



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

Need Number: ATSI-2020-032
Process Stage: Solutions Meeting – 03/15/2024
Previously Presented: Need Meeting – 08/14/2020

Supplemental Project Driver(s):
Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

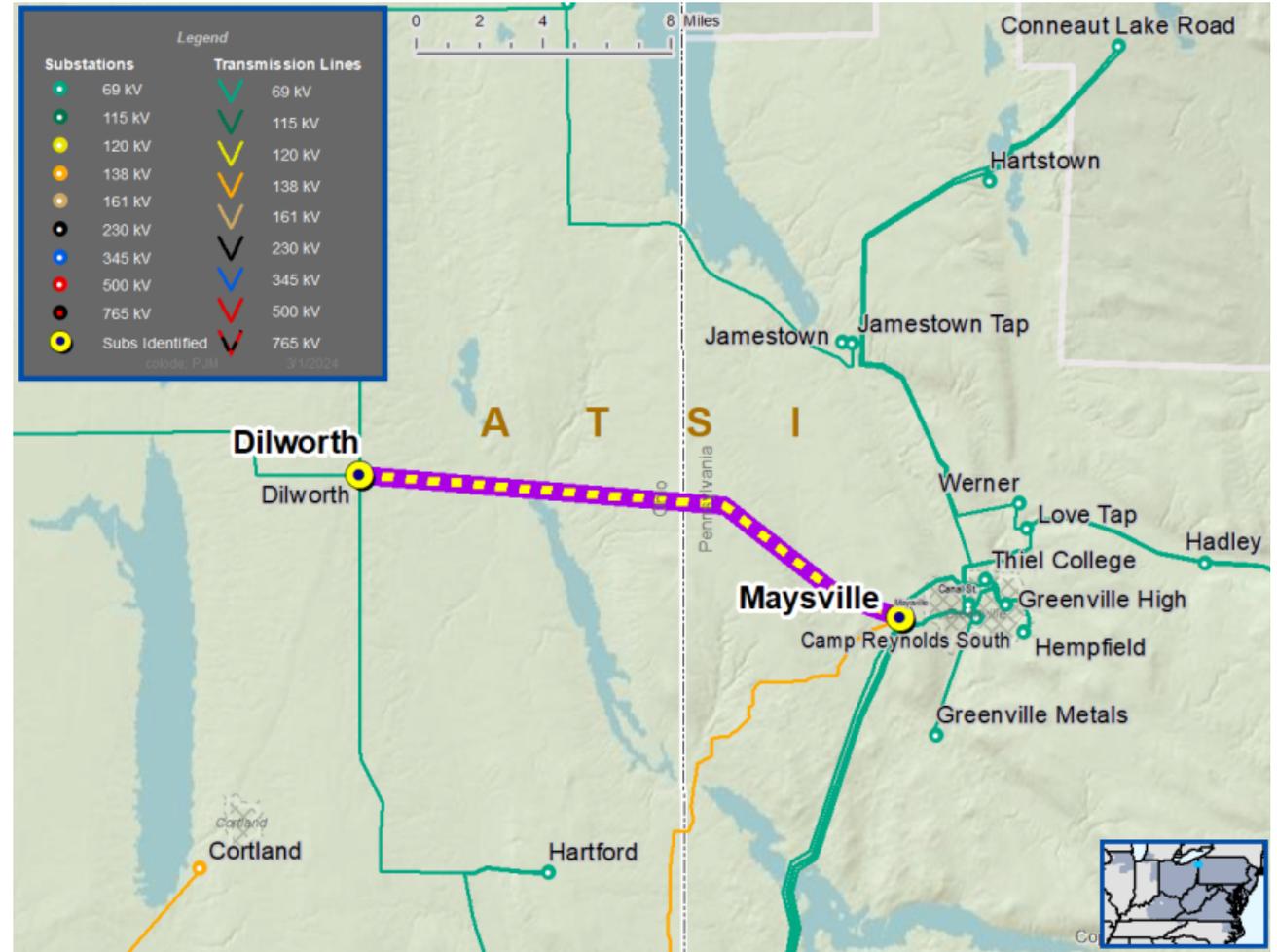
Line Condition Rebuild / Replacement

- Aged or deteriorated transmission line structures
- Negatively impact customer outage frequency and/or durations
- Demonstrate an increasing trend in maintenance findings and/or costs
- Transmission line ratings are limited by terminal equipment.

Problem Statement:

Dilworth – Maysville 69 kV (~11.4 miles) Transmission Line Rehab project is being proposed due to the following:

- Line was originally constructed in 1947. The average age of structures on this line are 58 years old. FirstEnergy has historically experienced an average age of reject for wood poles to be 48.7 years.
- Line survey in 2019 showed a structure reject rate of 57% (166 of 293). The primary reasons for reject were wood pole deterioration, broken static wire, woodpecker holes, broken conductor strands.
- Existing conductor has a history of failure due to conductor vibration resulting in thermal overload and corrosion of steel core.
- Environmental conditions on ROW causes difficulties for routine maintenance, vegetation management, and outage restoration.
- Growing trend in unscheduled interruptions with 10 equipment caused outages in the past 2 years which have historically impacted ~20,000 customers.
- Obsolete line switch (A-212 N.O.) is no longer supported by the manufacturer.





Need Number: ATSI-2020-032
Process Stage: Solutions Meeting – 03/15/2024

Proposed Solution:

Dilworth – Maysville 69 kV Line Rebuild

- Rebuild an approximately 11.4-mile section of the Dilworth – Maysville 69 kV Line from Dilworth Substation to Andover Substation.
- Replace the obsolete normally open line switch.

Transmission Line Ratings:

Dilworth – Andover 69 kV Line

- Before Proposed Solution: 36 / 43 / 40 / 51 MVA (SN/SE/WN/WE)
- After Proposed Solution: 80 / 96 / 90 / 114 MVA (SN/SE/WN/WE)

Alternatives Considered:

- Maintain existing condition and elevated risk of failure.

Estimated Project Cost: \$25.2 M
Projected In-Service: 12/31/2025
Status: Conceptual
Model: 2023 RTEP model for 2028 Summer (50/50)

ATSI Transmission Zone M-3 Process Dilworth – Maysville 69 kV Line



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

Need Numbers: ATSI-2024-004

Previously Presented: Need Meeting 01/19/2024

Process Stage: Solution Meeting 03/15/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

System Condition Projects

- Substation Condition Rebuild/Replacement

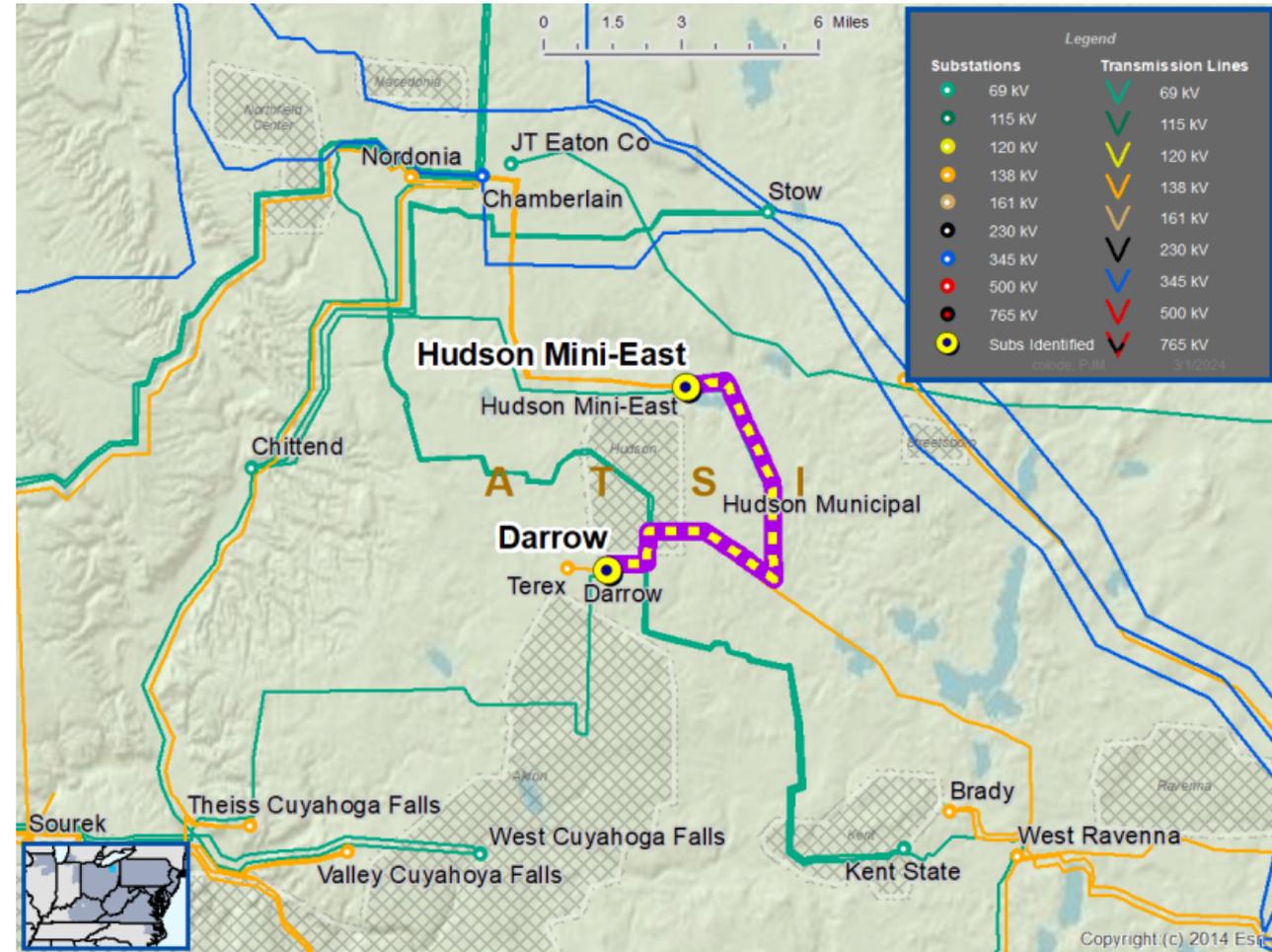
Upgrade Relay Schemes

- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

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Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
ATSI-2024-004	Darrow – Hudson East 138 kV Line	191 / 191 / 191 / 191	200 / 242 / 226 / 286

Need Number: ATSI-2024-004

Process Stage: Solution Meeting 03/15/2024

Proposed Solution:

- Replace limiting substation conductor, line trap, and relaying at Hudson East Substation

Transmission Line Ratings:

Darrow – Hudson East 138 kV Line

- Before Proposed Solution: 191 / 191 / 191 / 191 MVA (SN/SE/WN/WE)
- After Proposed Solution: 200 / 242 / 226 / 286 MVA (SN/SE/WN/WE)

Alternatives Considered:

- Maintain line and vintage relay schemes in existing condition with potential risk of misoperation.

Estimated Project Cost: \$ 1.9 M

Projected In-Service: 5/15/2026

Project Status: Conceptual

Model: 2023 RTEP model for 2028 Summer (50/50)



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

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

3/5/2024– V1 – Original version posted to pjm.com

3/15/2024 – V2- Added AMPT proposed solution and cost to ATSI-2020-029

3/18/2024- V3 – Updated maps for ATSI-2020-028 and ATSI-2020-029