

Subregional RTEP Committee – Western AMPT Supplemental Projects

January 3, 2023

AMPT Projects in ATSI Transmission Zone M3 Process Brewster, OH

Need Number: AMPT-2021-006

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan

Previously Presented: Solution Meeting – 8/19/2022, Need Meeting – 12/17/2021

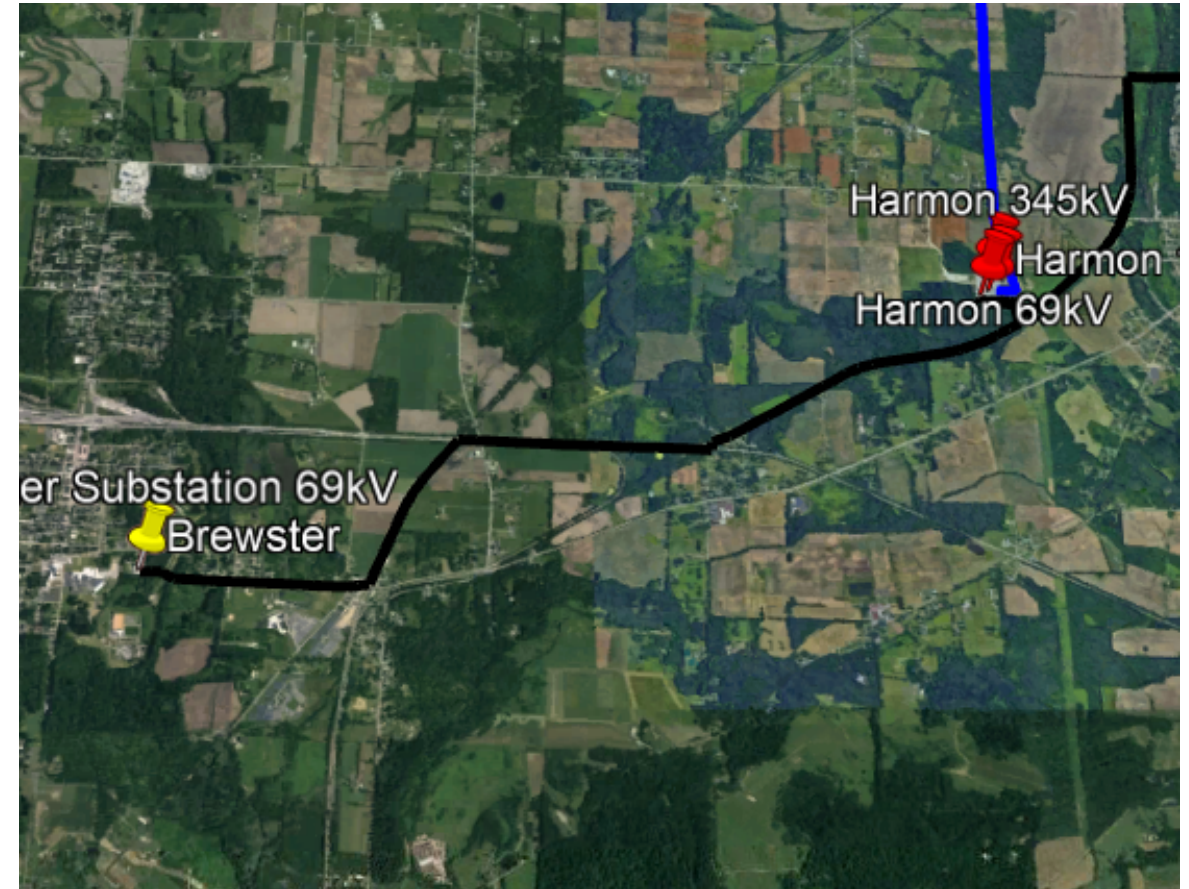
Supplemental Project Driver(s): Customer Service

Specific Assumption Reference(s): AMPT's "Transmission Facilities Interconnection Requirements" document.

Problem Statement:

The existing interconnection is an approximately 3.5 mile radial 69 kV line from ATSI's Harmon substation. Current peak load at Brewster is 9 MW.

The village of Brewster has requested a 2nd supply to support the load. The radial supply presents a single point of failure that could jeopardize reliability for the village. AMPT Interconnection requirements specify a need for a second source for loads 5 MW and above.



AMPT Projects in ATSI Transmission Zone M3 Process Brewster, OH

Need Number: AMPT-2021-006

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan

Previously Presented: Solution Meeting – 8/19/2022

Supplemental Project Driver(s): Customer Service

Proposed Solution:

AMPT Identified Scope (\$18.0 M)

- Construct a greenfield 69 kV single circuit transmission line for approximately 5.5 miles using 795 26/7 ACSR conductor from AMPT's Brewster 69 kV substation to a structure outside of AEP's Alpine 69 kV ring bus station. **(\$9.8 M)**
- Build a four (4) CB 69kV ring station at the existing Brewster Substation location. The new ring bus will be used to re-terminate the existing 69 kV Brewster-Harmon (FE) line, terminate the new 69 kV Alpine-Brewster (AEP) line, and tie with two (2) existing terminals feeding the existing Brewster 69/12 kV transformation. **(\$8.2 M)**

AEP Identified Scope (\$1.81 M)

- Modify AEP's proposed Alpine 69 kV ring bus station (s2534.8) by adding an additional 69 kV circuit position to Brewster. Install one (1) 69 kV circuit breaker, protective relaying, and tie-line metering. **(\$1.03 M)**
- Construct a 0.1 mile segment of 69 kV transmission line using 795 ACSR 26/7 conductor leaving Alpine station to connect to AMPT's transmission line toward Brewster. **(\$0.78 M)**

FE Identified Scope (\$0.63 M)

- At FE's Harmon substation provide fiber termination. AMPT is responsible for the fiber path on the Brewster-Harmon 69 kV line.
- At FE's Harmon 69 kV substation replace two (2) SEL-421s primary and backup relay with two (2) SEL-411Ls and connect to the fiber, retain existing SEL-501 breaker failure relay.
- Adjust relay settings at Cloverdale

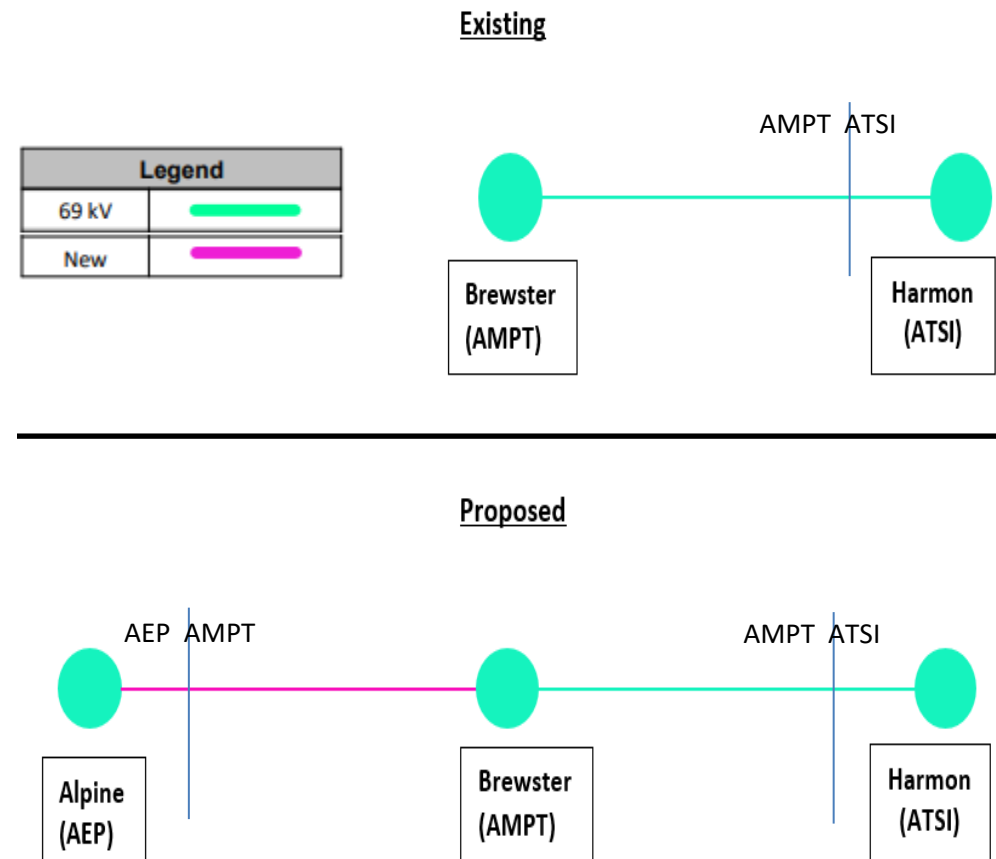
Total Estimated Transmission Cost: \$20.45 M

Projected In-Service: 6/1/2025

Supplemental Project ID: s2807.1 (AMPT); s2807.2 (AEP); s2807.3 (ATSI)

Project Status:

- Conceptual (AMPT), Conceptual (AEP), Conceptual (ATSI)



AMPT Projects in ATSI Transmission Zone M3 Process

Brewster, OH

Alternatives Considered:

- Build a greenfield 69 kV switchyard to tap the existing West Wilmot-Beartown 69 kV line. The new 69 kV switchyard will involve a three-breaker ring configuration. Build a 6 mile-long greenfield 69 kV line from the existing Brewster 69 kV substation to the new switchyard. Expand Brewster 69 kV yard into a four-breaker ring arrangement to accommodate the new line. **(\$22.2 M)**
Similar in scope to the proposed solution however is less cost effective than the proposed solution with the installation of a new 3-CB ring bus.
- Expand the 69 kV yard at the existing Harmon substation to accommodate a new 69 kV line terminal. Build a 4 mile-long greenfield 69 kV line from the existing Brewster 69 kV substation to the existing Harmon substation. Expand Brewster 69 kV yard into a four-breaker ring arrangement to accommodate the new line. **(\$14.8 M)**
This alternative does not comport with AMPT's criteria for a geographically diverse path for a 2nd source, when possible.
- Build a greenfield 138/69 kV substation to tap the existing Cloverdale-Yager 138 kV line. The new 138/69 kV substation will involve a 138 kV three-breaker ring configuration, a 138-69 kV transformer (130 MVA) and a breaker on the low side of the transformer. Build a 5 mile-long 69 kV transmission line from the existing Brewster 69 kV substation to the new substation. Expand Brewster 69 kV yard into a four-breaker ring arrangement to accommodate the new line. **(\$33.6 M)**
Less cost effective than the proposed solution for the reasons noted above.
- Build a greenfield 138/69 kV substation to tap the existing Cloverdale – E. Wooster 138 kV line. The new 138/69 kV substation will involve a 138 kV three-breaker ring configuration, a 138-69 kV transformer (130 MVA) and a breaker on the low side of the transformer. Build a 5 mile-long 69 kV transmission line from the existing Brewster 69 kV substation to the new substation. Expand Brewster 69 kV yard into a four-breaker ring arrangement to accommodate the new line. **(\$33.6 M)**
Less cost effective than the proposed solution for the reasons noted above.
- Build a greenfield 138/69 kV substation to tap the South Canton – Apple Creek 138 kV line. The new 138/69 kV substation will involve a 138 kV four-breaker ring configuration, a 138-69 kV transformer (130 MVA) and a breaker on the low side of the transformer. Build a 4.2 mile-long greenfield 69 kV line from Brewster station to the new substation. Expand Brewster 69 kV yard into a four-breaker ring arrangement to accommodate the new line. **(\$33.2 M)**
Less cost effective than the proposed solution for the reasons noted above.
- Build a greenfield 345/69 kV substation to tap the Harmon – Star 345 kV line. The new 345/69 kV substation will involve a 345 kV four-breaker ring configuration, a 345-69 kV transformer (130 MVA) and a breaker on the low side of the transformer. Build a 3 mile-long greenfield 69 kV line from the existing Brewster 69 kV substation to the new substation. Expand Brewster 69 kV yard into a four-breaker ring arrangement to accommodate the new line. **(\$37.7 M)**
Less cost effective than the proposed solution for the reasons noted above.

AMPT Projects in AEP Transmission Zone M3 Process Deshler, OH

Need Number: AMPT-2021-004

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan

Previously Presented: Solution Meeting – 9/16/2022, Need Meeting – 11/19/2021

Supplemental Project Driver(s): Customer Service

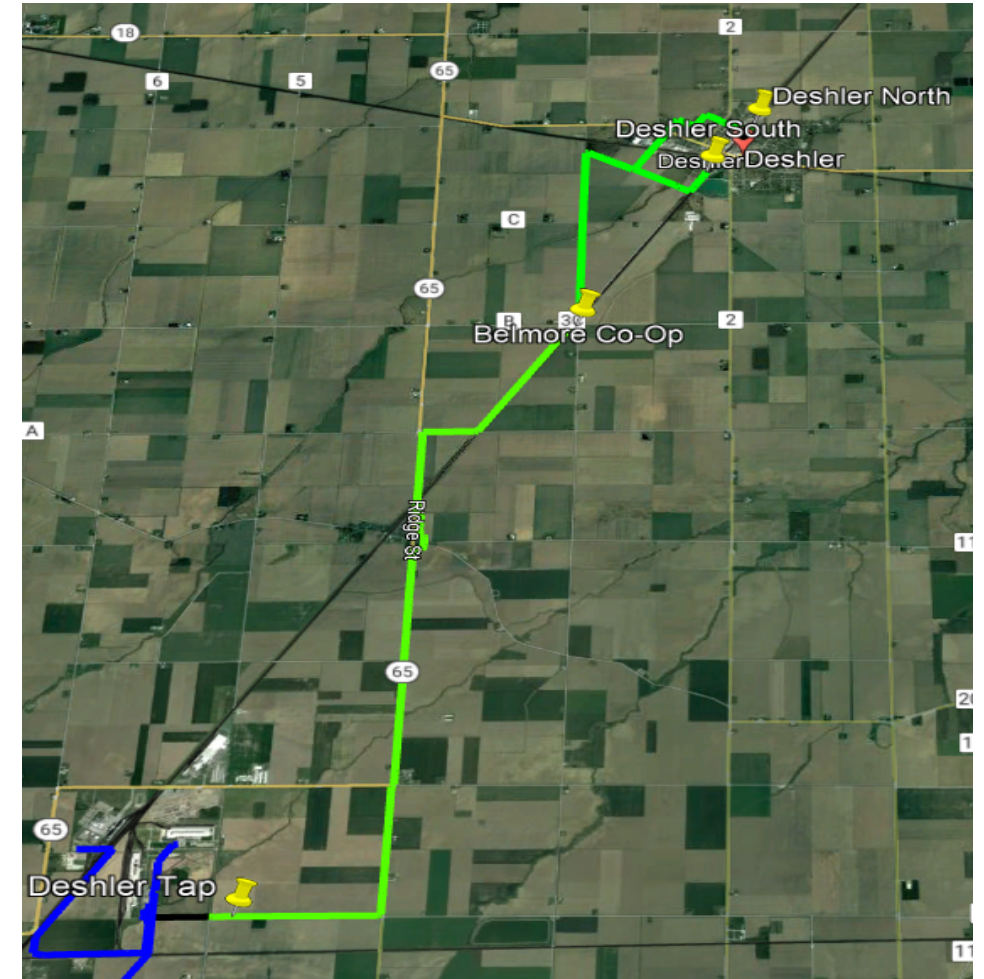
Specific Assumption Reference(s): AMPT Transmission Facilities Interconnection Requirements Document

Problem Statement:

AMPT's Deshler Tap is an approximately 10.7 mile radial 69 kV tap supplied from AEP's East Leipsic-East Ottawa 69 kV line. Three stations are served off the Tap – Belmore Co-op, Deshler South, and Deshler North.

The village of Deshler has requested a 2nd supply to support the load (approximately 4.2 MVA). The radial supply presents a single point of failure that could jeopardize reliability for the village.

AMPT's Transmission Facilities Interconnection Requirements specify looped facilities for loads exceeding 5 MVA or 35 MW-mile thresholds.



AMPT Projects in AEP Transmission Zone M3 Process Deshler, OH

Need Number: AMPT-2021-004

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan

Previously Presented: Solution Meeting – 9/16/2022

Supplemental Project Driver(s): Customer Service

Proposed Solution:

AMPT Identified Scope (Estimated Transmission Cost: \$27.5 M)

- Construct a greenfield 69 kV single circuit transmission line for approximately 11.8 miles using 795 26/7 ACSR conductor from AMPT’s Bremer 69 kV substation to a structure outside of ATSI’s Weston 69 kV ring bus station. Install four (4) 69 kV load break air switches in total on the existing Bremer Tap. Install the switches on either side of the Keyser and Belmore Co-op stations for sectionalizing. Install one (1) load break air switch outside of ATSI’s Weston 69 kV station on the new line between Bremer and Weston. **(\$23.7 M)**
- Expand the existing Bremer 69 kV station to a new 3-CB ring bus configuration to accommodate a second 69 kV circuit. Install a total of four (4) new CBs - including one (1) 69 kV CB for the 69/12 kV transformer high side protection. **(\$3.8 M)**

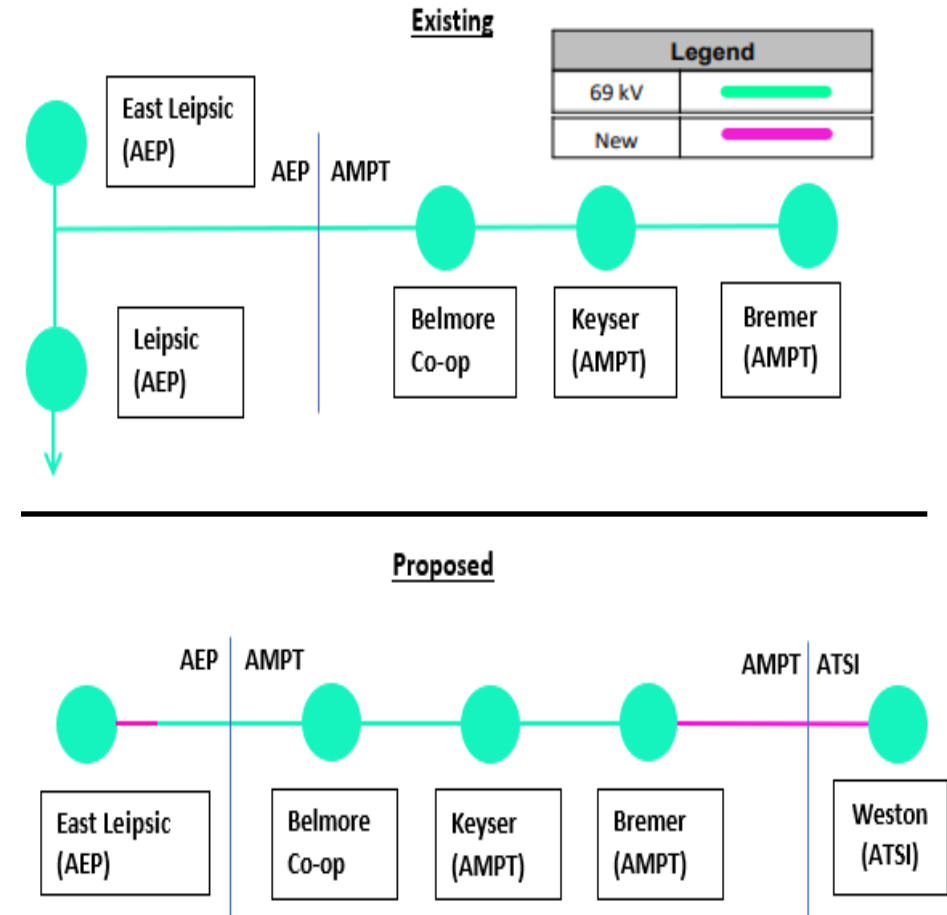
AEP Identified Scope (Estimated Transmission Cost: \$8.01 M)

- At AEP’s East Leipsic station extend the 69kV bus and install a new 69kV breaker. Install 69kV To/To Metering. The station will need expanded to accommodate the work. **(\$1.5 M)**
- Construct a new greenfield 0.55 miles long 69kV single circuit line using 556 ACSR Dove from the new East Leipsic 69kV breaker to the AEP / AMPT POI. **(\$3.15 M)**
- Modify the East Leipsic Extension line **(\$1.68 M)**
- Modify the Yellow Creek - East Leipsic 69kV line. **(\$1.68 M)**

FE Identified Scope (Estimated Transmission Cost: \$1.9 M)

- Install one 69 kV circuit breaker and associated equipment at FE’s Weston 69 kV substation.
- Install one span of conductor to a structure outside the FE Weston 69 kV substation.
- Install tie line interchange revenue metering at FE’s Weston 69 kV substation.

Total Estimated Transmission Cost: \$37.41 M



AMPT Projects in AEP Transmission Zone M3 Process Deshler, OH

Projected In-Service: 8/1/2025

Supplemental Project ID: s2827.1 (AMPT); s2827.2 (AEP); s2827.3 (ATSI)

Project Status:

- Scoping (AMPT), Conceptual (FE), Conceptual (AEP)

Alternative Considered:

- Build a greenfield 69 kV 3-CB ring bus station between ATSI's Maroe and Malinta stations to accommodate three 69 kV circuits. Expand the existing Bremer 69 kV station to a new 3-CB ring bus station. Construct a greenfield 69 kV single circuit transmission line for approximately 11 miles using 795 26/7 ACSR conductor from AMPT's Bremer 69 kV substation to the new ring bus station. Reterminate the Deshler Tap into a new 69 kV bay position at AEP's East Leipsic substation.

Similar in scope to the preferred reinforcement option however is less cost effective than the selected option with the installation of a new ring bus station.

- Build a greenfield 69 kV 3-CB ring bus yard at AEP and AMPT's Deshler Tap demarcation point to break the existing East Leipsic-East Ottawa 69 kV line and Deshler Tap into three (3) 69 kV circuits. Expand the existing Bremer 69 kV station to a new 3-CB ring bus station. Construct a greenfield 69 kV single circuit transmission line for approximately 12 miles using 795 26/7 ACSR conductor from AMPT's Bremer 69 kV substation to ATSI's Weston 69 kV ring bus station.

Similar in scope to the preferred reinforcement option however is less cost effective than the selected option with the installation of a new ring bus station.

AMPT Projects in ATSI Transmission Zone M3 Process Huron, OH

Need Number: AMPT-2021-003

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan

Previously Presented: Solution Meeting – 8/19/2022, Need Meeting – 11/19/2021

Supplemental Project Driver(s): Customer Service

Specific Assumption Reference(s): AMPT Transmission Facilities Interconnection Requirements Document

Problem Statement:

Huron 69 kV Substation (AMP Transmission)

Customer request (Huron Public Power) to install a third 69/12 kV transformer at the existing Huron substation to accommodate the 14 MW of increased load by 10/2022.

Requested In-Service Date for 10/1/2022.



AMPT Projects in ATSI Transmission Zone M3 Process Huron, OH

Need Number: AMPT-2021-003

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan

Previously Presented: Solution Meeting – 8/19/2022, Need Meeting – 11/19/2021

Supplemental Project Driver(s): Customer Service

Proposed Solution:

- Install a 3rd 69/12 kV 25 MVA transformer at Rye Beach Road. Expand the distribution buses as necessary to accommodate the new transformer.
- The 69/12 kV transformer and associated 12 kV equipment costs are distribution costs.
- Related AMPT transmission work scope at Rye Beach Road will be completed under the **AMPT-2021-001** project which has already been presented.

Alternatives Considered:

No alternatives considered for this project.

Total Estimated Transmission Cost: \$0.0 M

Projected In-Service: 6/1/2025

Supplemental Project ID: s2828 (AMPT);

Project Status: Conceptual



(AMPT Portion) ATSI Transmission Zone M-3 Process Cuyahoga Falls 138 kV Planning Area- Solution

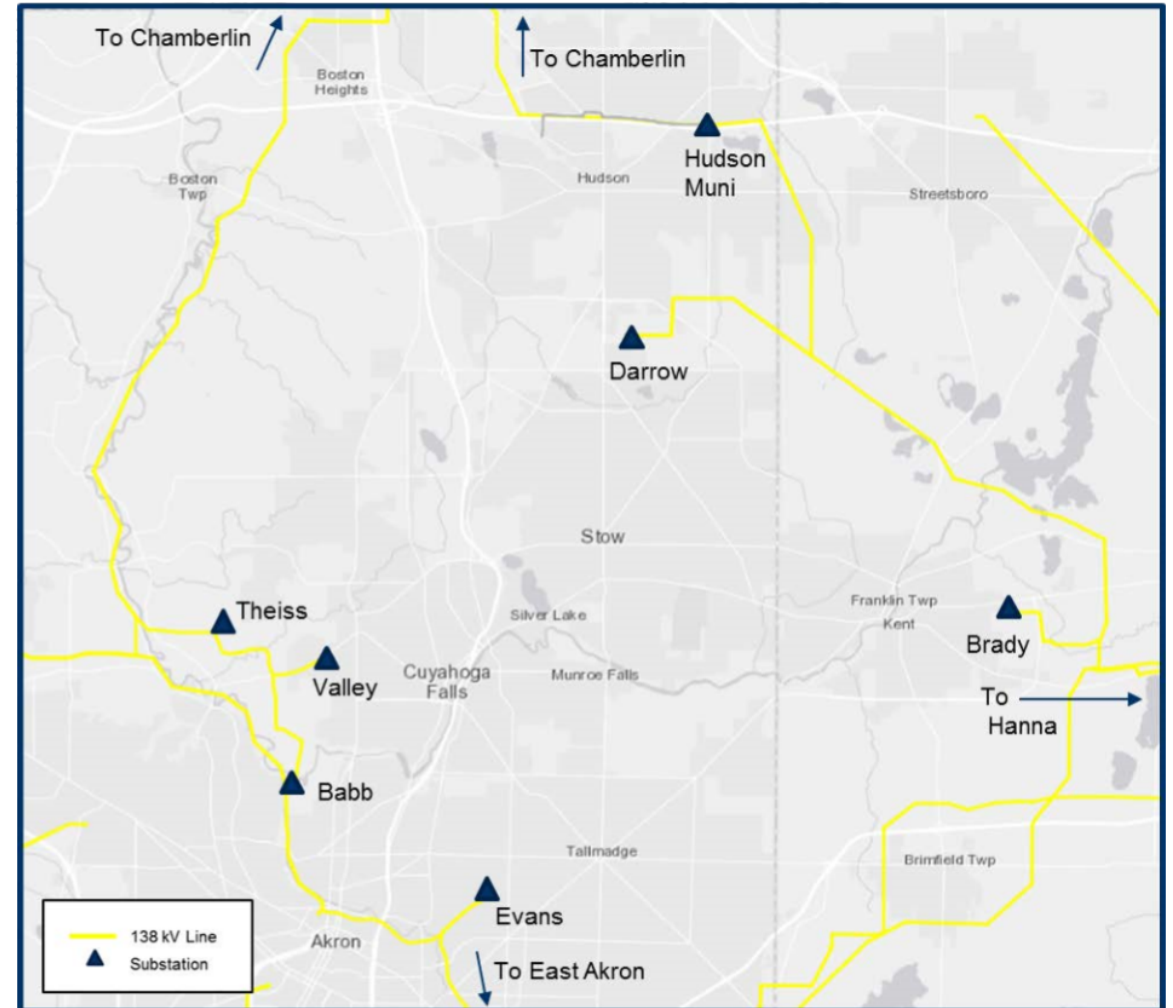
Need Number: ATSI-2019-010 (s2387)
Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan
Previously Presented: Re-Present Meeting – 10/14/2022
 Solutions Meeting – 11/22/2019 (FE Only)
 Need Meeting – 01/11/2019 (FE Only)

Supplemental Project Driver(s):
Operational Flexibility and Efficiency
Infrastructure Resilience

Specific Assumption Reference(s)

Global Considerations

- System reliability and performance
- Substation / Line equipment limits
- Reliability of Non-Bulk Electric System (Non-BES) facilities
- Load and risk in planning and operational scenarios
- Load and/or customers at risk on single transmission line



Need Number: ATSI-2019-010 (s2387)
Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan
Previously Presented: Re-present Meeting – 10/14/2022, Solutions Meeting – 11/22/2019, Need Meeting – 01/11/2019,

Problem Statement

Valley & Thiess 138 kV Substation Area

The Valley and Thiess 138 kV substations are presently co-owned by FE and Cuyahoga Falls Municipality with transmission service from the ATSI Babb-Chamberlin 138 kV line.

- A transmission line outage of the double circuit networked 138 kV tap (approximately 1 mile) to Valley substation could result in approximately 86 MW and 25,000 Customers interrupted for an extended period of time.
- The loss of the Chamberlin-Thiess 138 kV line, followed by the loss of the Babb-Valley 138 kV line (N-1-1) could result in approximately 106 MW and 25,000 customers interrupted for an extended period of time.

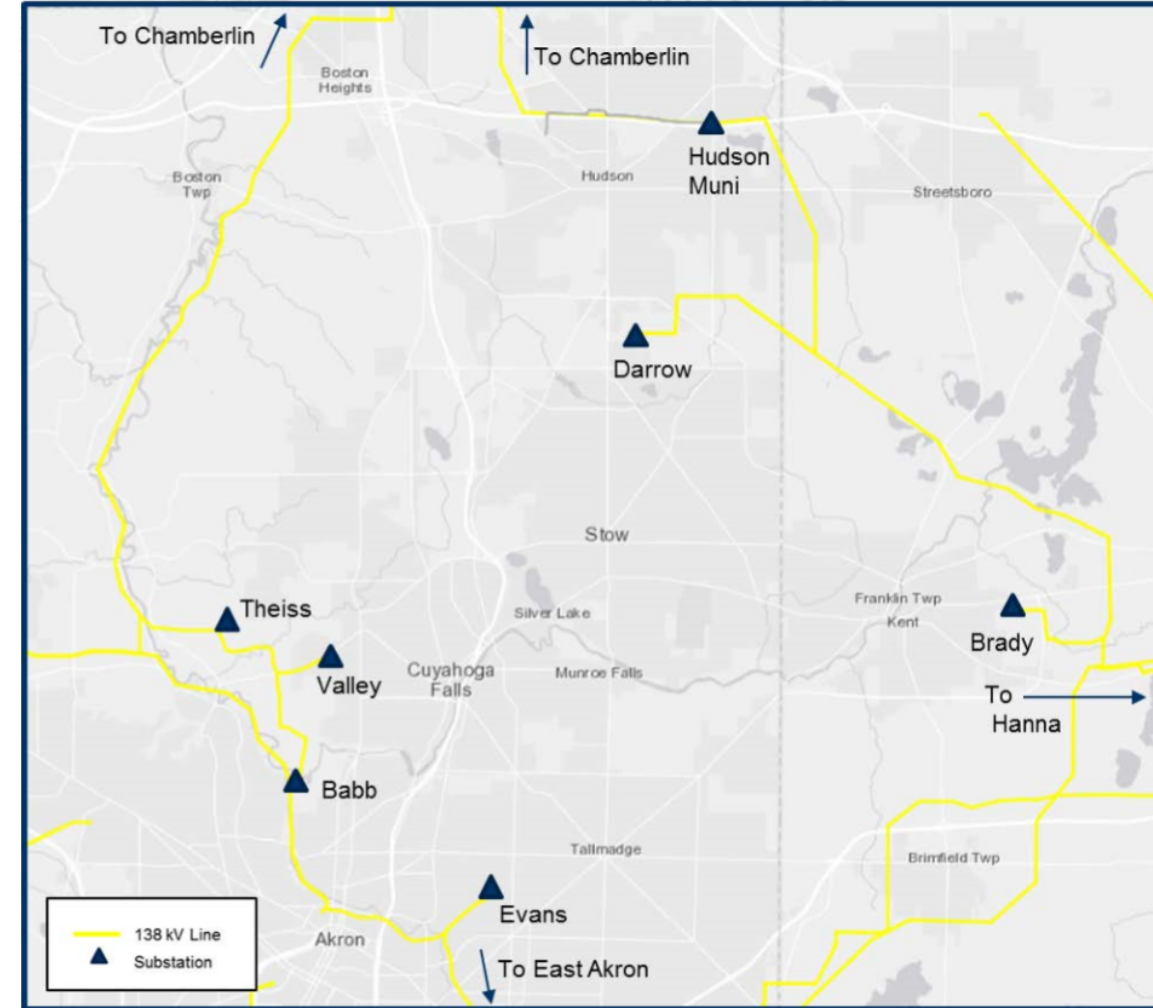
Evans & Darrow 138 kV Substation Area

- The loss of the Babb-Evans 138 kV line, followed by the loss of the East Akron-Evans 138 kV line (N-1-1) results in approximately 25 MW and 4,834 customers interrupted.
- The loss of the Chamberlin-Hudson Muni 138 kV line, followed by the loss of the Brady-Hanna 138 kV line (N-1-1), results in approximately 61 MW and 18,800 customers interrupted. Post-contingency voltage drops below 0.92 p.u. in the Darrow substation area.

System Performance

- Over the past five years:
- The Chamberlin-Thiess 138 kV line has experienced ~~five~~ **one (5 1)** outage (~~3~~ **1** sustained, ~~2~~ **0** momentary)
 - The Thiess-Valley 138 kV line has experienced ~~one~~ **two (1 2)** outages (~~1~~ **2** sustained, 0 momentary)
 - The Chamberlin-Hudson Muni 138 kV line has experienced ~~four~~ **three (4 3)** outages (2 sustained, ~~2~~ **1** momentary)
 - The Babb-Evans 138 kV line has experienced one (1) outage (~~1~~ **0** sustained, ~~0~~ **1** momentary)
 - **The Babb-Valley 138 kV line has experienced one (1) outage (1 sustained, 0 momentary)**

(AMPT Portion) ATSI Transmission Zone M-3 Process
 Cuyahoga Falls 138 kV Planning Area- Solution





(AMPT Portion) ATSI Transmission Zone M-3 Process Cuyahoga Falls 138 kV Planning Area- Solution

Need Number: ATSI-2019-010 (s2387)
Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan
Previously Presented: Re-present Meeting – 10/14/2022, Solutions Meeting – 11/22/2019, Need Meeting – 01/11/2019,
Proposed Solution:

FE Identified Scope (\$36.3M):

New 138 kV Line & Sub 5 Expansion

- Build FE Sub 5 (Riverway) 138 kV four (4) breaker ring bus adjacent to the ~~CF Sub 5~~ AMPT Gaylord Grove substation
- ~~Cuyahoga Falls Muni to expand CF Sub 5 substation to a 138/23 kV substation~~
- Convert Evans 138 kV substation into five (future 6) breaker ring bus
- Convert the proposed Darrow five (future 6) breaker ring bus (s1708) into six breaker ring bus
- Build a new 138 kV line from Evans to new FE Sub5 (Approximately 4.4 miles)
- Build a new 138 kV line from Darrow to new FE Sub5 (Approximately 6.6 miles)
- Add a 28 MVAR 138 kV capacitor bank at Theiss substation.

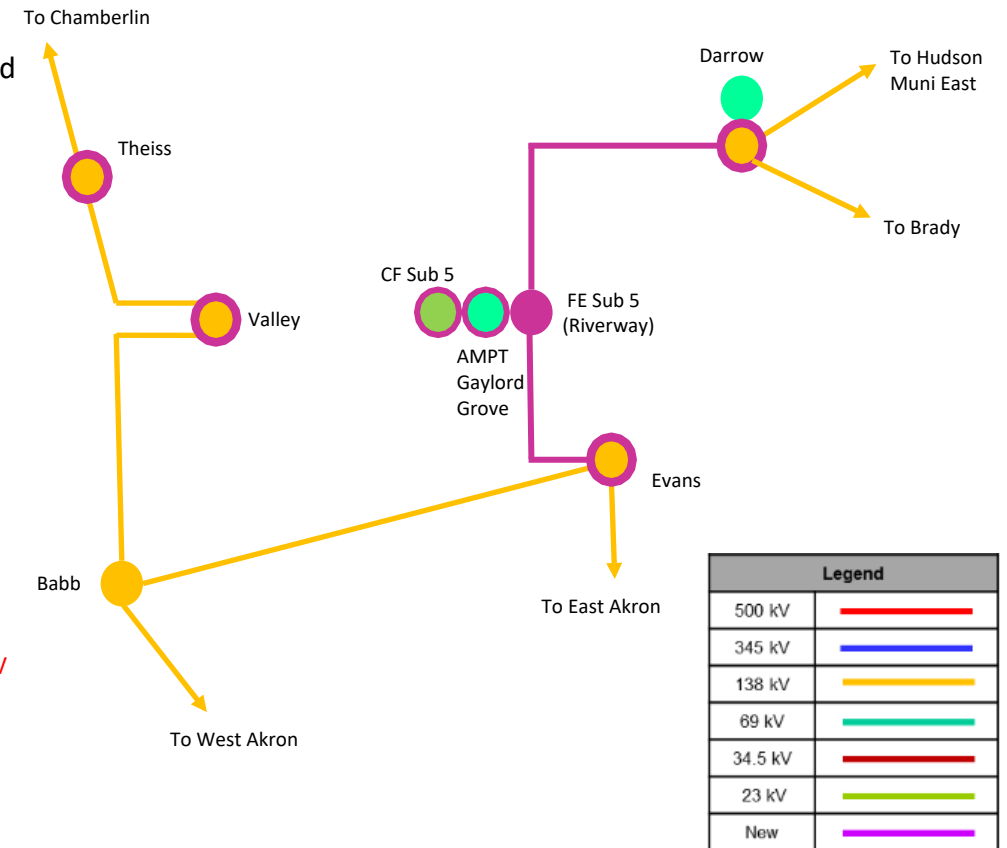
AMPT Identified Scope (\$29.0M):

- At Valley 138/23.8 kV Substation - Install two (2) 138 kV CBs and associated equipment to separate AMPT's 138 kV facilities from FE's 138 kV ring bus. Relocate two (2) existing 138/23.8 kV transformers to accommodate the new 138 kV CBs. Install new panels in a new AMPT control house. **(\$6.3 M)**
- Construct a greenfield 138/69/23 kV station called "Gaylord Grove", located next to FE's proposed Riverway 138 kV station and Cuyahoga Falls existing Substation 5. Install two (2) 138/69 kV 170 MVA transformers, two (2) 138 kV CBs, five (5) 69 kV CBs using 69 kV bus rated to 2000A. **(\$22.7 M)**

Cuyahoga Falls Scope (\$0.0 M)

- Install two (2) 69/23 kV transformers, two (2) 23 kV low side transformer CBs and other associated equipment to connect from Gaylord Grove 69 kV yard to Cuyahoga Falls' Substation 5 23 kV station. *These facilities are distribution and not included in the overall project costs.*

Total Estimated Project Cost: ~~\$44 M~~ 65.3M





(AMPT Portion) ATSI Transmission Zone M-3 Process Cuyahoga Falls 138 kV Planning Area- Solution

Need Number: ATSI-2019-010 (s2387)
Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan
Previously Presented: Re-present Meeting – 10/14/2022, Solutions Meeting – 11/22/2019, Need Meeting – 01/11/2019

Transmission Line Ratings:

- Darrow-FE Sub 5 138 kV Line
 - After Proposed Solution: 278 MVA SN / 339 MVA SE
- Evans-FE Sub 5 138 kV Line
 - After Proposed Solution: 278 MVA SN / 339 MVA SE

Alternatives Considered:

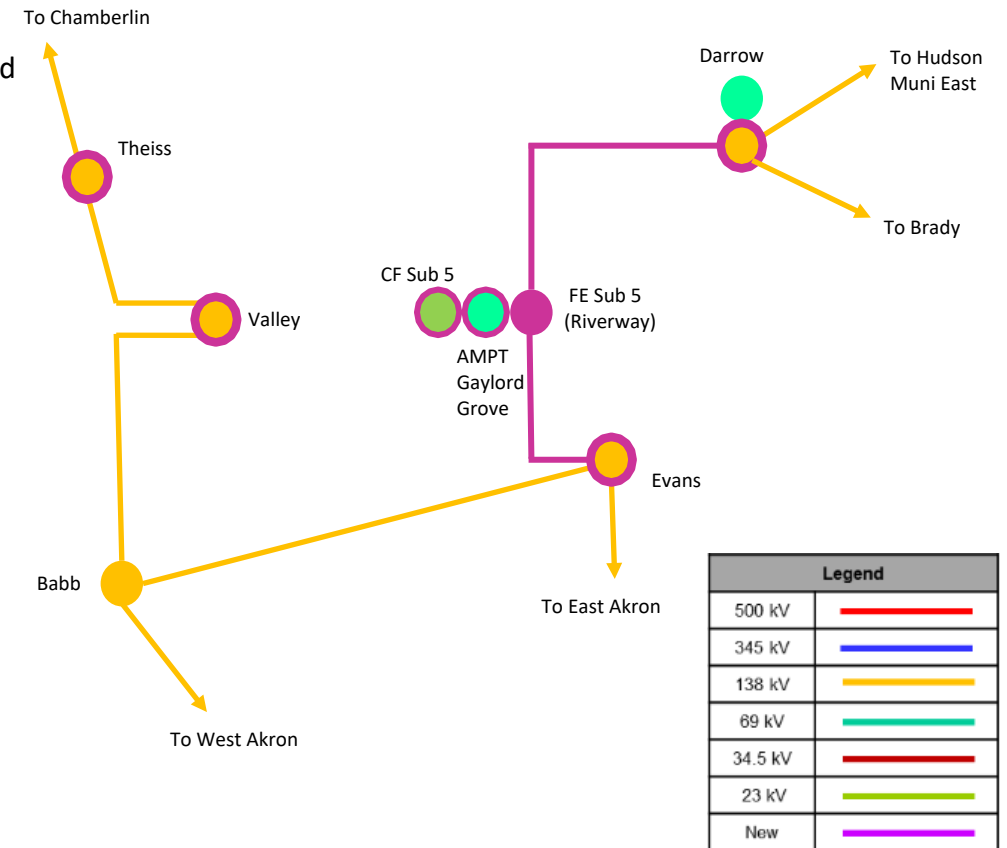
- Bring a third 138 kV transmission line into Valley substation. This alternative was not selected due to lack of route diversity, limited substation expansion, limited easement rights, and siting concerns.
- **Build Gaylord Grove as a 138/23 kV substation. This alternative was not selected due to siting concerns, and ability to address City’s requirement for 69 kV service.**

Projected In-Service: 06/01/2025

Supplemental Project ID: s2387 (FE), s2387.2 (AMPT);

Project Status: Pre-Engineering (FE), Pre-Engineering (AMPT)

Model: 2018 Series 2023 Summer RTEP 50/50



Revision History

1/3/2023 – V1 – Original version posted to pjm.com (s2807.1)

2/6/2023 – V2 – Added S2827 and S2828

4/4/2023 – v3 – Added s2387.3