Sub Regional RTEP Committee: Western
Dayton Supplemental Projects

August 16, 2021

Changes to the Existing Supplemental Projects

Dayton Transmission Zone M-3 Process
S2255.3 Scope change

Project S2255.1-.3 Revision (Original project was posted in Dayton 2020 local plan with the Need number Dayton-2020-002)

Project Scope: (Changes are marked in Red)

Construct a new four breaker ring bus substation called "Jasper" and build a new 1.5 mile transmission line extension from the existing 63611 switch to the new Jasper Substation for separate 69kV feeds from Xenia Substation and Glady Run Substation. **(S2255.1)**

Reduces exposure on the existing line from ~32 miles down to ~5 miles for the sections to Glady Run, Xenia, and Jamestown.

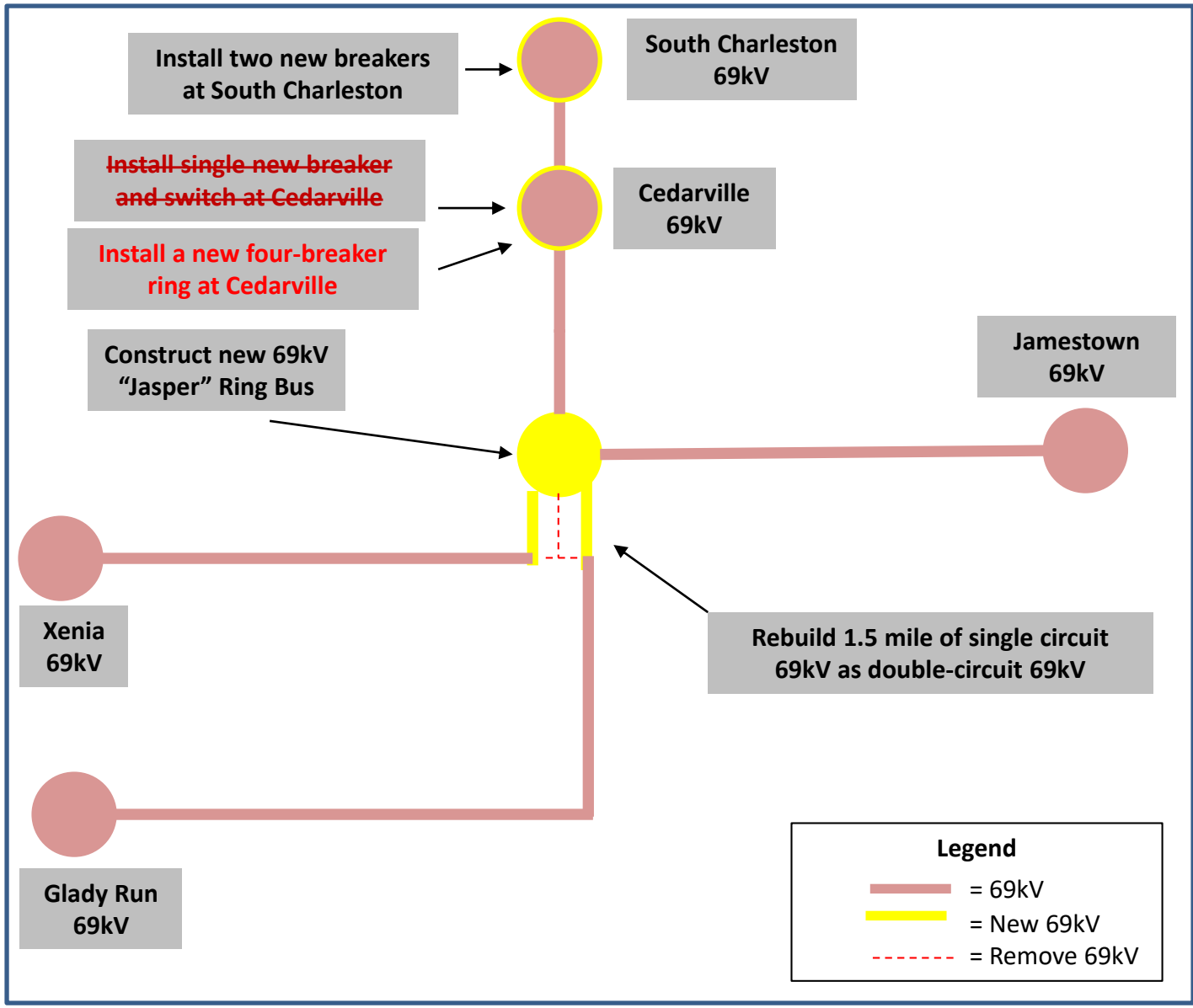
In order to decrease the line exposure on the feeds to Cedarville and South Charleston, two new 69kV breakers will need to be installed at the South Charleston Substation **(S2255.2)** and a ~~single 69kV breaker and switch~~ four breaker 69kV ring will need installed at the Cedarville Substation. **(S2255.3)**

The project is estimated to cost ~~$10.2M~~ $12.2M

Reason for Revision: It was determined during the engineering phase that Cedarville substation has space for a four-breaker ring and hence this modification was submitted for better reliability.

Projected In-Service: 12/31/2023

Project Status: Conceptual



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

Dayton Transmission Zone M-3 Process

Need Number: Dayton-2021-010

Process Stage: Need Meeting 08/16/2021

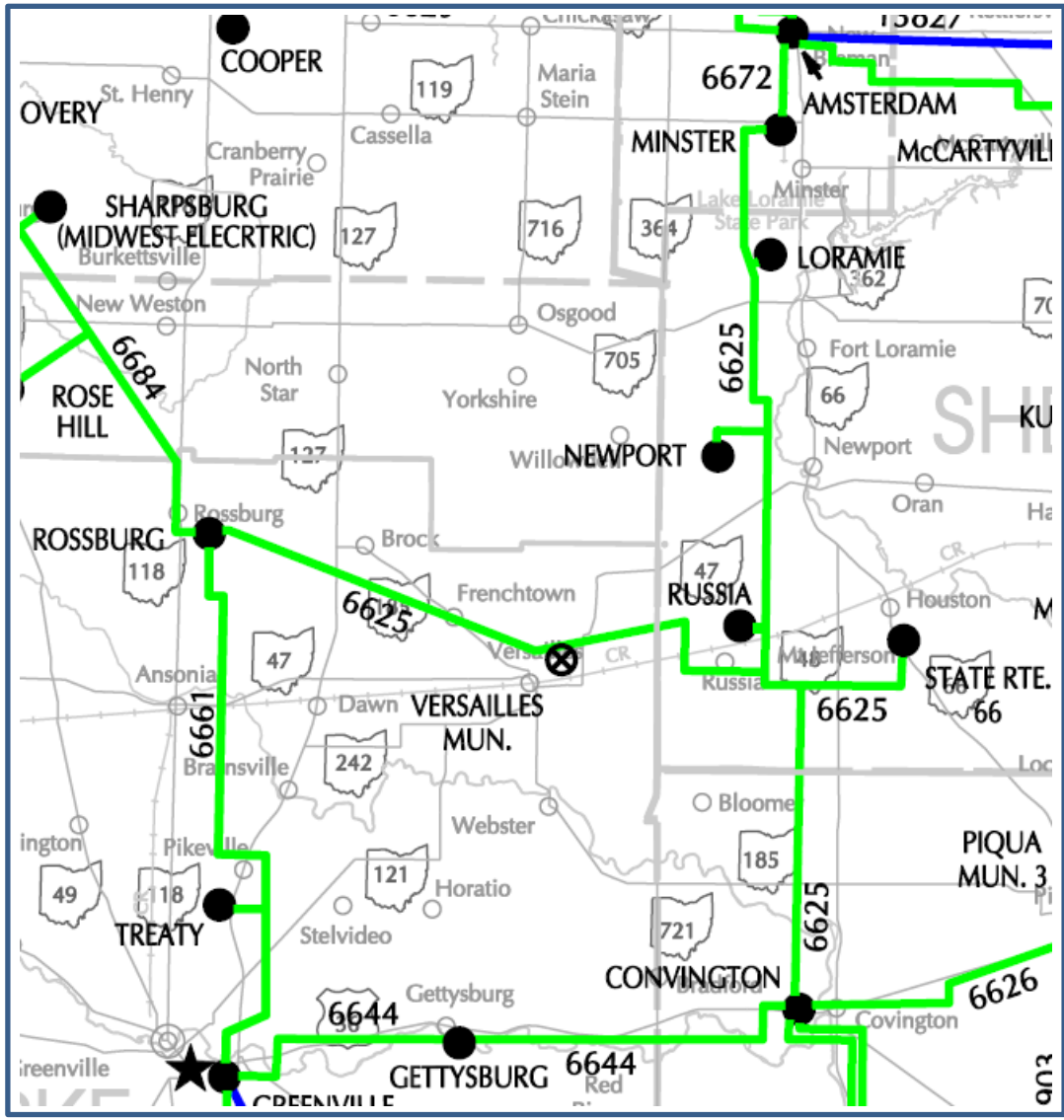
Project Driver: Requested Customer Upgrade, Operational Performance

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

- The Village of Versailles has requested additional sectionalizing improvements to improve local delivery point reliability. Currently Versailles' peak load totals to 16.5MWs and is served via two-way 69kV MOABs switch arrangement.
- Presently, Versailles is the largest served via the 42-mile 69kV transmission circuit and are projected to increase to 17.6 MWs by 2025.
- Also, Buckeye Electric cooperatives served at Newport (peak load of 6.3MWs) and St. Rt. 66 (peak load of 6.2MWs) have delivery points on along this line.
- AES Ohio serves distribution via the Loramie (peak load of 8.5MWs) and Russia (peak load of 3.2MWs) Substations.
- The existing 42 mile 69kV transmission line (6625) from Covington-Minster-Rossburg was constructed using wood pole, cross-arm and brace design in 1971. This line provides transmission and distribution level service to 6 different substations serving nearly 7,000 customers in Darke, Mercer, Miami, and Shelby Counties in Ohio and totaling approximately 40MWs of load.
- Since 2016, the line has experienced 41 outages (11 permanent and 30 momentary), with a total outage duration of ~6,400 minutes. A vast majority of the permanent outages related equipment related issues while most of the momentary outages have been the result of weather.
- Additionally, in 2020 AES Ohio committed to a local area upgrade (Russia 4-breaker ring: S2254). This project also targets to minimize impacts associated with 6625 circuit outages by splitting the 42 miles 69kV circuit into three 69kV circuits:
    - Rossburg – Versailles - Russia: 12.0 miles
    - Minster – Russia: 13.0 miles
    - Covington – Russia: 17 miles
- There is a need here to further evaluate the condition and sectionalizing improvements along 6625 after the Russia 4-breaker ring is complete in 2023 for more localized sections of this line where cross-arm and tap design is prevalent.

Model: 2021 RTEP Series, 2026 Summer Case



= 138kV

= 69kV

- **Need Number:** Dayton-2021-009
- **Process Stage:** Submission of Supplemental Need
- **Project Driver:** Source for underlying distribution
- **Specific Assumption Reference:** Dayton Local Plan Assumptions (Slide 5)

- **Problem Statement:**

➢ A major customer served from Xenia substation is planning to add approximately 4MW of load by 2023. This potential growth paired with the development of two nearby industrial parks will trigger the need for potential system reinforcements east of Xenia.

➢ AES Ohio is planning to build a new 69kV ring bus substation called Jasper in 2023 (s2255.1) to eliminate a three terminal line and to improve reliability on the 6636 Jamestown-Cedarville-Xenia-Glady Run circuit. The 6636 transmission line is a 31-mile circuit constructed primarily with wood poles. The yellow star shown on the map is an approximate location of Jasper Substation and is centrally located to serve future load growth.

  ➢ There have been a total of 17 outages on this circuit for a total of 1245 minutes over the last 5 years.

  ➢ The performance of this line will improve with the addition of Jasper Substation but Xenia Substation will still have exposure to transmission outages with the distribution transformers tapped from a line position between Xenia and Jasper.

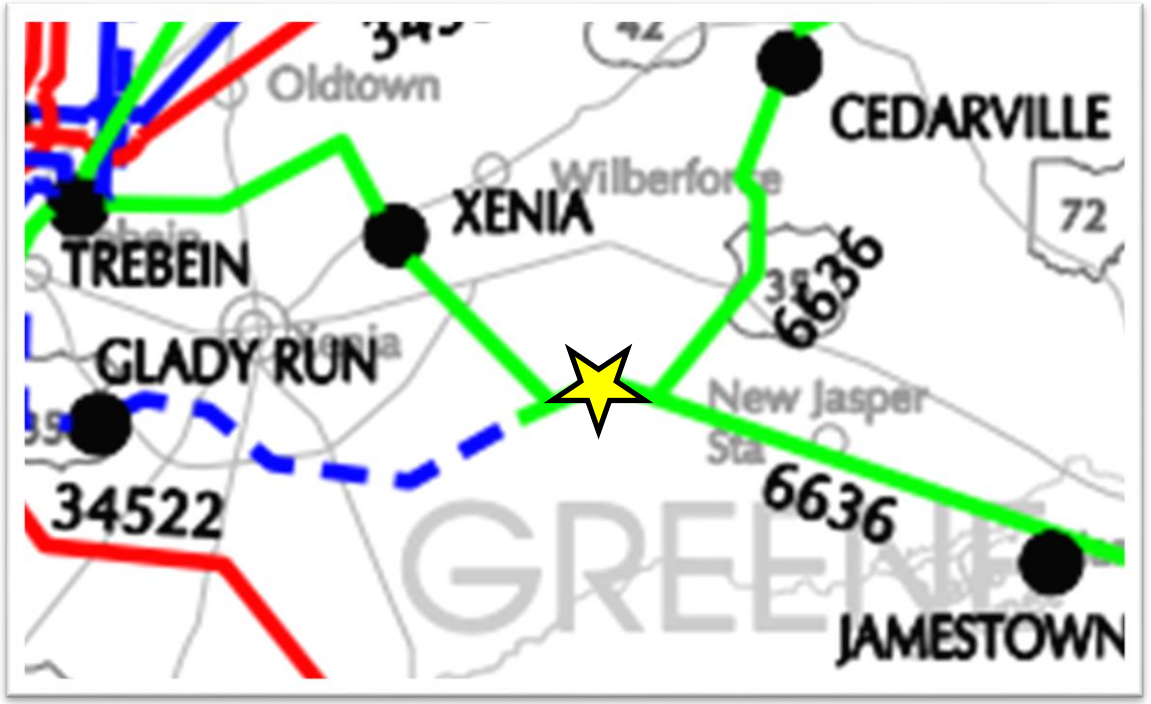
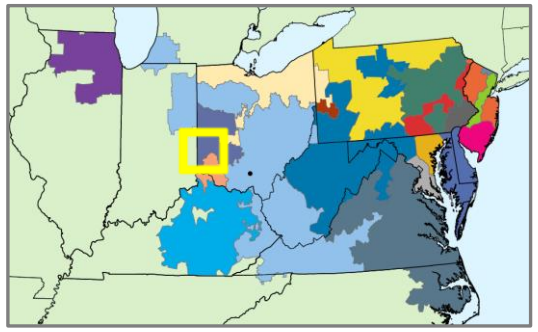


Figure 1 : Area Map

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: Dayton-2020-011, Dayton-2021-001, Dayton-2021-008
Process Stage: Solutions Meeting 8/16/2021
Previously Presented: Need Meetings 12/18/2020, 2/17/2021, 5/21/2021

Supplemental Project Driver(s):
Requested Customer Upgrade, Operational Performance

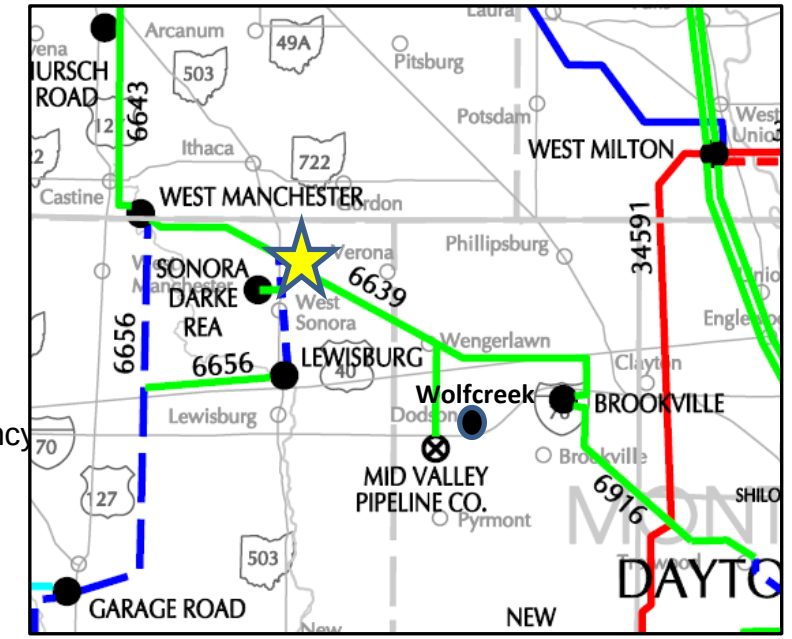
Specific Assumption Reference(s):
DP&L 2020 RTEP Assumptions, Slide 5

Dayton-2020-011 Problem Statement:

- Buckeye Power, on behalf of Darke Rural Electric Cooperative, has requested reliability upgrades on the West Manchester–Brookville 69kV 6639 and the West Manchester–Garage Road 69kV 6656 lines located in Preble and Montgomery Counties.

Area Transmission Configuration:

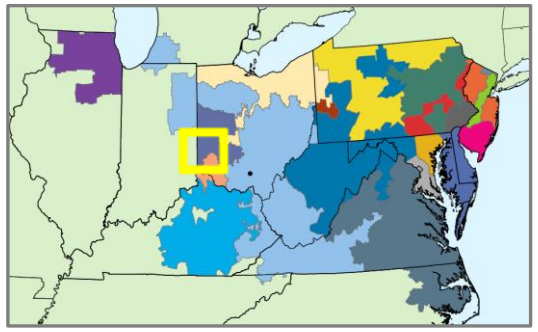
- The 6639 line is a 20-mile 69kV wood pole line serving three Dayton substations (Brookville, Lewisburg, West Manchester), one Darke REA Delivery Point at West Sonora, and one 69kV industrial customer.
  - Lewisburg & West Senora Stations are both served via a 3.2-mile tap from the 6639 line.
  - The 6656 line is a 16-mile 69kV wood pole line built to 138kV standards connecting Dayton substations at Garage Road and West Manchester .
  - Lewisburg & West Senora utilize a 4.61-mile 69kV tap from the 6656 line as a normally open tie for emergency situations. Due to protection limitations, this normally open tie cannot be closed in during normal operations.



Historical Performance

- West Manchester – Brookville 69kV 6639
  - Constructed primarily in 1953
  - Wood pole, crossarm design, 477 ACSR 18/1 conductor
  - 10 permanent outages over last five years
    - The primary causes are equipment failures with broken crossarms being the leading outage cause.
  - 18 momentary outages over last five years
    - The primary causes are lightning, static wire issues, and wind related events.

Dayton Transmission Zone M-3 Process
Preble County, Ohio



Need Number: Dayton-2020-011, Dayton-2021-001, Dayton-2021-008
Process Stage: Solutions Meeting 8/16/2021
Previously Presented: Need Meetings 12/18/2020, 2/17/2021, 5/21/2021

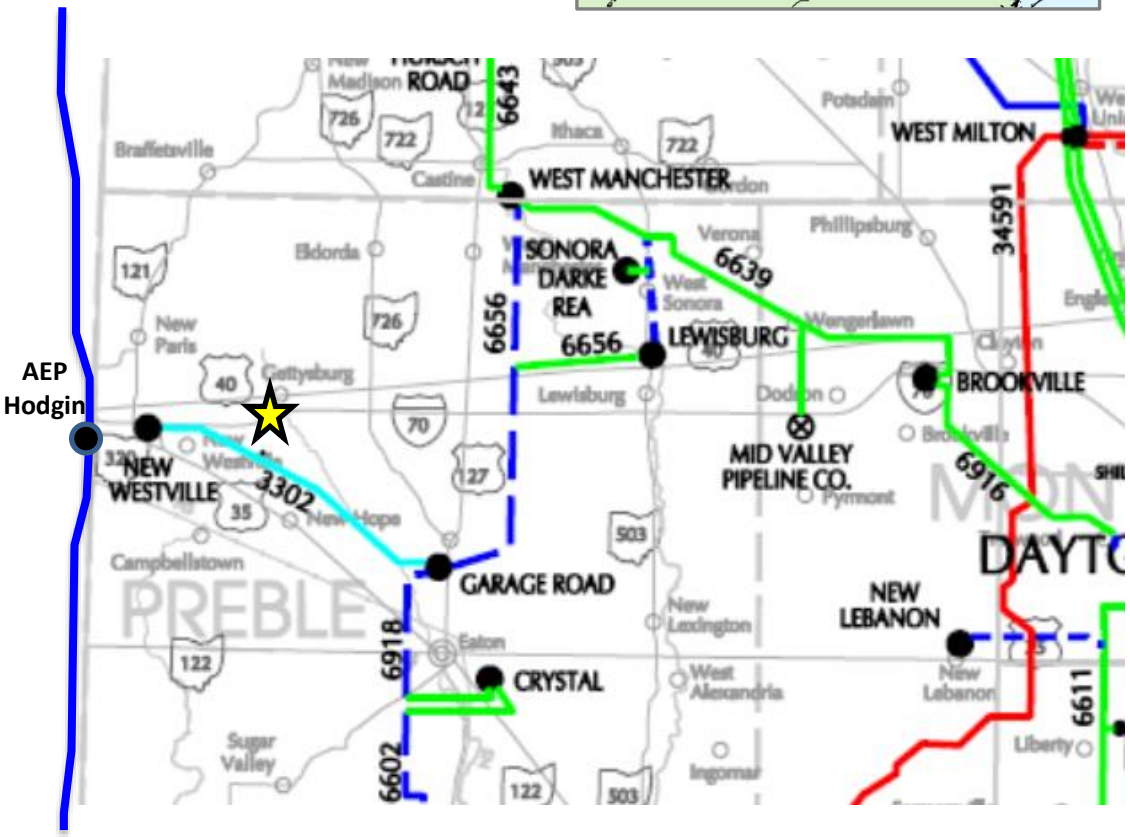
Supplemental Project Driver(s):
Requested Customer Upgrade, System Configuration Improvements, Operational Performance

Specific Assumption Reference(s):
DP&L 2021 RTEP Assumptions, Slide 5

Dayton-2021-001 Problem Statement:

- DP&L Distribution has requested a new 69kV or 138kV delivery point to replace the existing New Westville 33kV Substation due to poor performance and lack of standard equipment which could lead to prolonged system outages.
  - Presently, New Westville Substation is radially fed via a 9.6-mile 33kV line that was constructed in the 1930's.
  - New Westville Substation has three single phase 33/4kV transformers that provide service to 1,428 customers. There are limited transformer spares of this vintage and size so both a near term and long-term solution may be required.
  - In the last five years, the 3302 line has experienced 12 permanent outages and 18 momentary outages.
    - Permanent Outages: six insulator failures, five pole failures, and one crossarm
    - Momentary Outages: one animal, five auto accidents, three insulator flashovers, seven lightning, one high side transformer fuse, one unknown.
    - Due to the remote location of the substation, there are little to no distribution circuit ties to transfer or pick-up loads if there are extended outages.

- In addition, Buckeye Power, on behalf of Darke Electrical Cooperative has indicated they are considering a new transmission delivery located east of New Westville and west of the Garage Rd – West Manchester 6656 circuit.
- Solution development will need to take into consideration recently reviewed need: DPL-2020-011 presented on 12/18/2020.



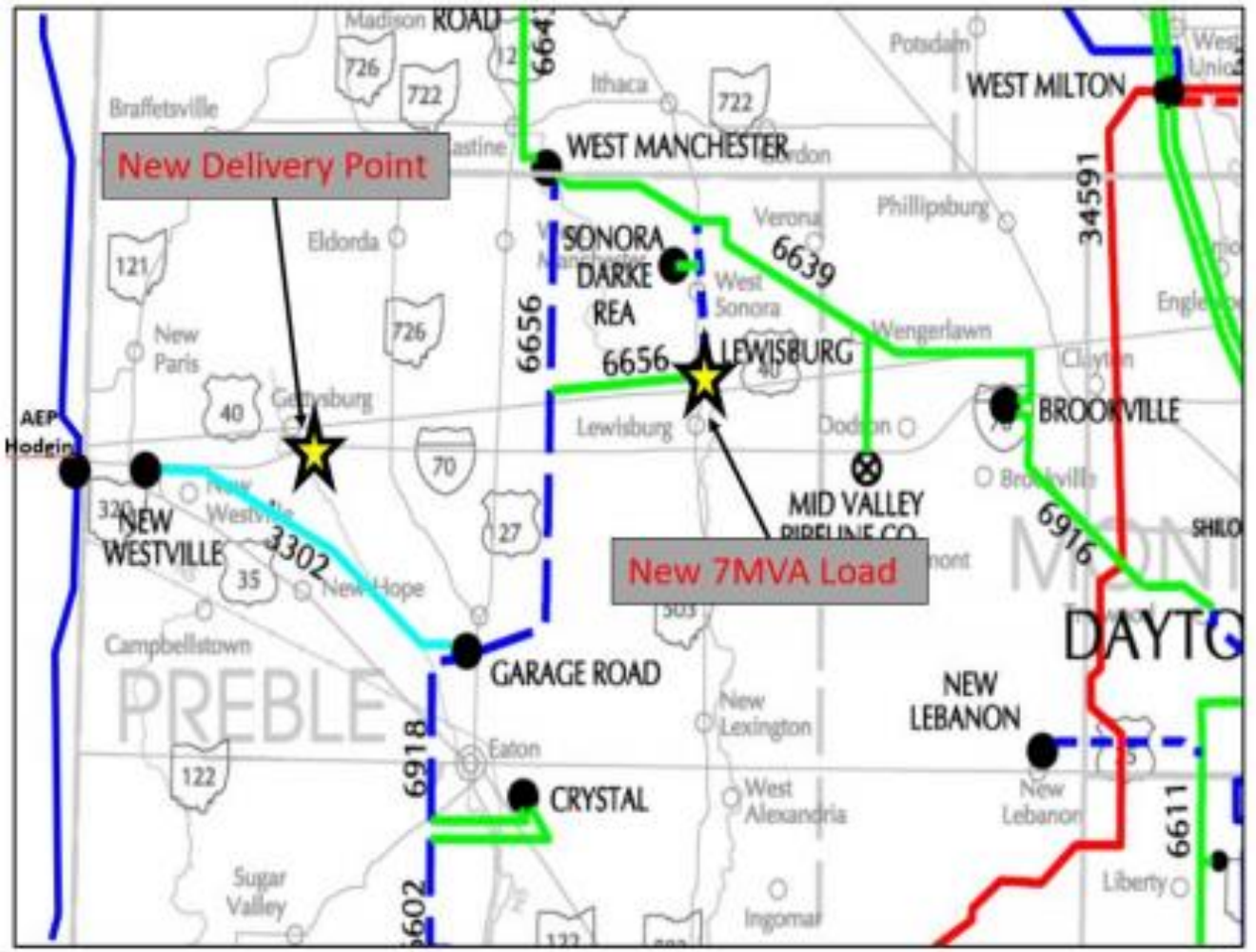
Need Number: Dayton-2020-011, Dayton-2021-001, Dayton-2021-008
Process Stage: Solutions Meeting
Date: 6/17/2020

Supplemental Project Driver(s):
Requested Customer Upgrade

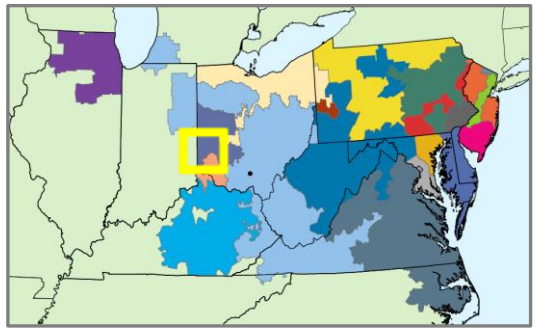
Specific Assumption Reference(s):
DP&L 2021 RTEP Assumptions, Slide 5

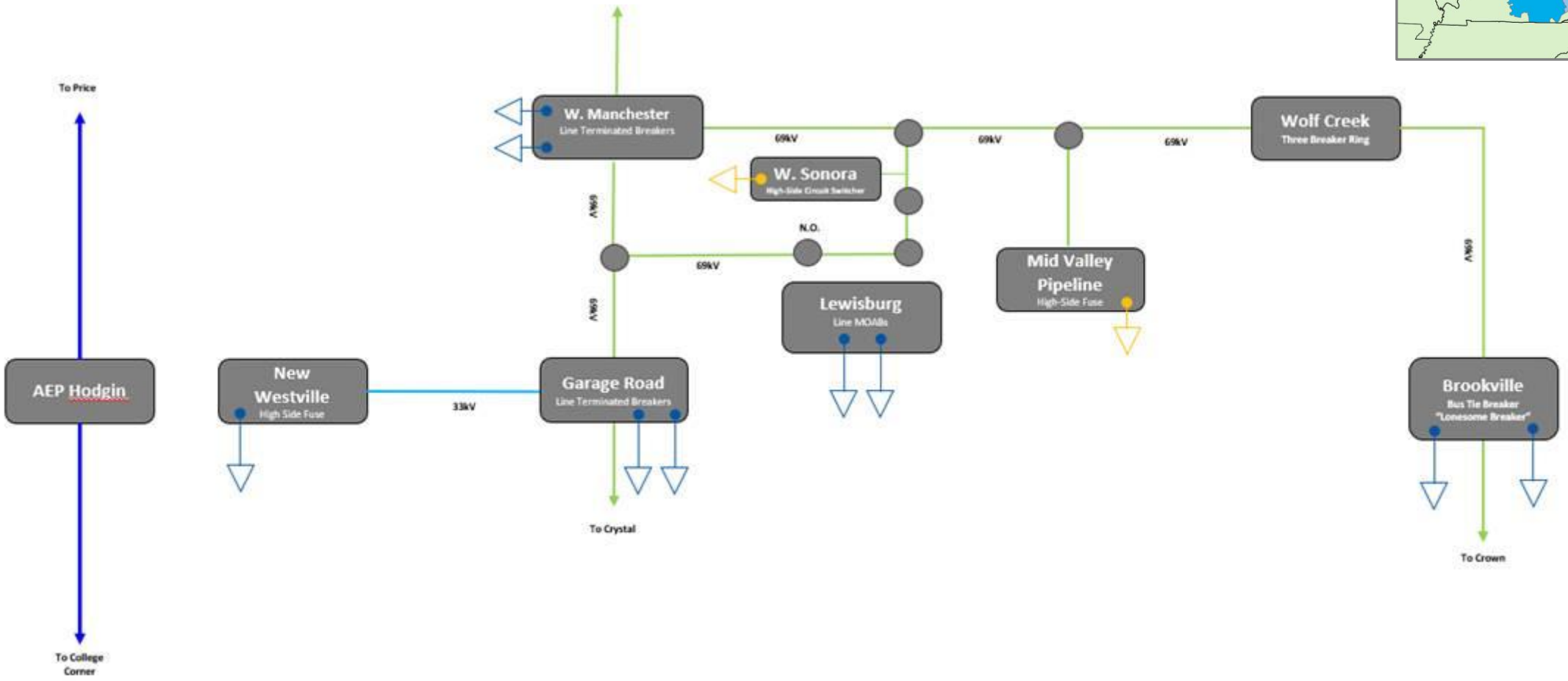
Dayton-2021-008 Problem Statement:

- Ohio Electric Cooperatives on behalf of Darke Rural Electric has requested a new 138kV delivery point located north of the Rockford 69kV substation.
  - New delivery point is expected to serve 1.86 MVA of load with a ten-year projected load exceeding 1.92 MVA.
  - New POI will be referred to as Orphan Rd
- AES Ohio distribution has received a request to serve a new 7MVA load in the vicinity of the AES Ohio Lewisburg substation.
- The following needs previously presented will be taken into consideration during the development of solutions to meeting the submitted request:
  - DP-2020-011: Need presented on 12/18/2020
    - 20201218-dayton-supplemental-projects.ashx (pjm.com)
  - DP-2021-001L Need presented on 2/17/2021
    - 20210217-dayton-supplemental-projects.ashx (pjm.com)



Dayton Transmission Zone M-3 Process
Preble County, Ohio





Need Number: Dayton-2020-011, Dayton-2021-001, Dayton-2021-008
Process Stage: Solutions Meeting 8/16/2021
Previously Presented: Need Meetings 12/18/2020, 2/17/2021, 5/21/2021
Proposed Solution:

Part #1: Project Description:

- **New Westville Substation Replacement:**
  - Establish a new 138kV three breaker ring bus substation that will tie into AEP's Hodgin, connect back to AES Ohio's West Manchester Substation, and serve AES Ohio distribution in the New Westville area. Once the new substation is online, the existing New Westville 33kV Substation will be retired. This will help improve reliability to customers served via New Westville and eliminate vintage 33kV system. The new substation will upgrade the obsolete and non-standard equipment at New Westville
  - **Estimated Cost: $6.0M, In-service Date: 12/31/2025**

- **New Westville – AEP Hodgin 138kV Line:**
  - Construct a 138kV 1.86-mile single circuit transmission line. This transmission line will help loop the radial load served at New Westville as part of the overall effort to improve reliability in this area. Also, it provides a source to feed New Westville load while the 138kV tie built back into the AES Ohio system.
  - **Estimated Cost: $3.7M , In-service Date: 12/31/2025**

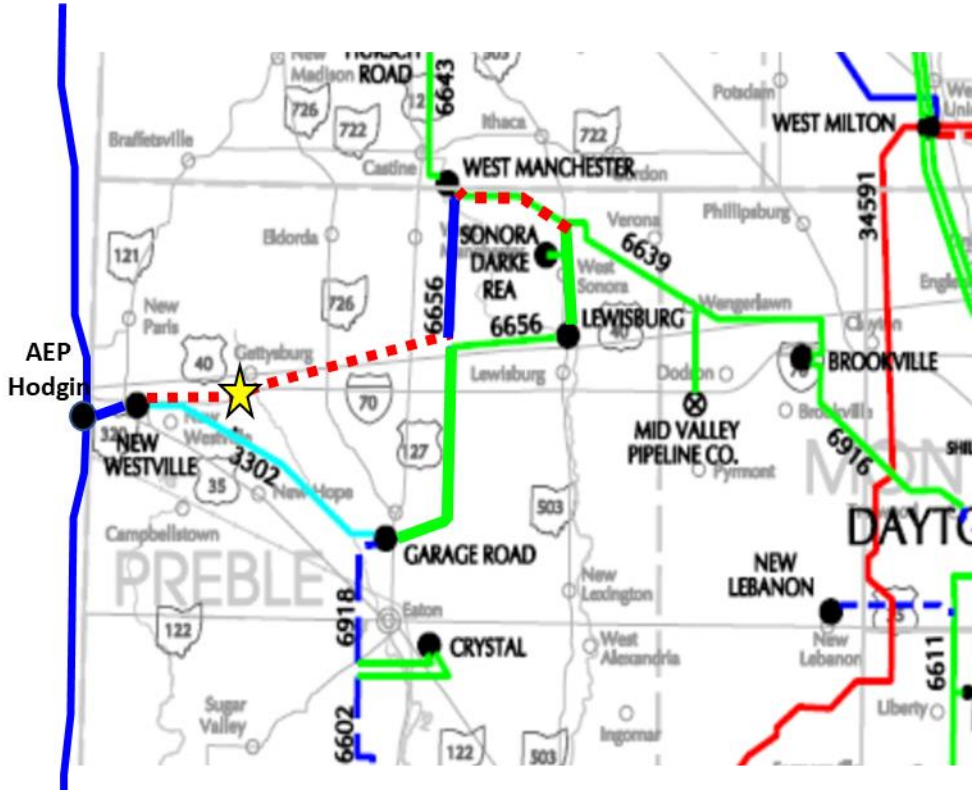
- **New Westville – West Manchester 138kV Line:**
  - Construct a new approximate 11-mile single circuit 138kV line from New Westville to the Lewisburg tap off 6656. Convert a portion of 6656 West Manchester – Garage Rd 69kV line between West Manchester - Lewisburg to 138kV operation (circuit is built to 138kV). This will utilize part of the line already built to 138kV and will take place of the 3302 that currently feeds New Westville. The 3302 line will be retired as part of this project.
  - **Estimated Cost: $16.0M, In-service Date: 12/31/2026**

- **West Manchester Substation:**
  - The West Manchester Substation will be expanded to a double bus double breaker design where AES Ohio will install one 138kV circuit breaker, a 138/69kV transformer, and eight new 69kV circuit breakers. These improvements will improve help improve a non-standard bus arrangement where there is only one bus tie today and will improve the switching arrangement for the West Sonora Delivery Point.
  - **Estimated Cost: $9.9M , In-service Date: 12/31/2026**

- **New Orphan Rd POI (Darke REA):**
  - Install a new three-way phase over phase MOAB to serve a new 138kV delivery point for the Darke REA Electric Co-operative.
  - **Estimated Cost: $0.5M , In-service Date: 12/31/2026**

Total Part 1 Cost: $36.1M

Alternative Part 1: Construct a double circuit from New Westville to Orphans road and install a additional 138kV breaker at New Westville. Cost delta is $3.55M more than proposed MOAB configuration for Ophans Rd. **Total Cost: $39.95M**



Need Number: Dayton-2020-011, Dayton-2021-001, Dayton-2021-008
Process Stage: Solutions Meeting 8/16/2021
Previously Presented: Need Meetings 12/18/2020, 2/17/2021, 5/21/2021

Proposed Solution:

Part #2: Project Description:

- **West Manchester – West Senora Tap Double Circuit Rebuild**
  - Retire the existing single circuit section of the 6639 line tap to Sonora up to West Manchester and rebuild as a 4-mile double circuit 69kV line. One circuit will connect West Manchester to Lewisburg and the other circuit will connect back to West Manchester to Wolfcreek.
  - **Estimated Cost: $8.0M, In-service Date: 12/1/2026**

- **Lewisburg Substation**
  - The Lewisburg 69kV Substation will be converted to a new four breaker 69kV ring station and will serve the 7MVA additional customer load that is being added in Lewisburg. Also, this conversion will allow AES Ohio to close in the normally open feed at Lewisburg when complete.
  - **Estimated Cost: $4.5M, In-service Date: 12/1/2025**

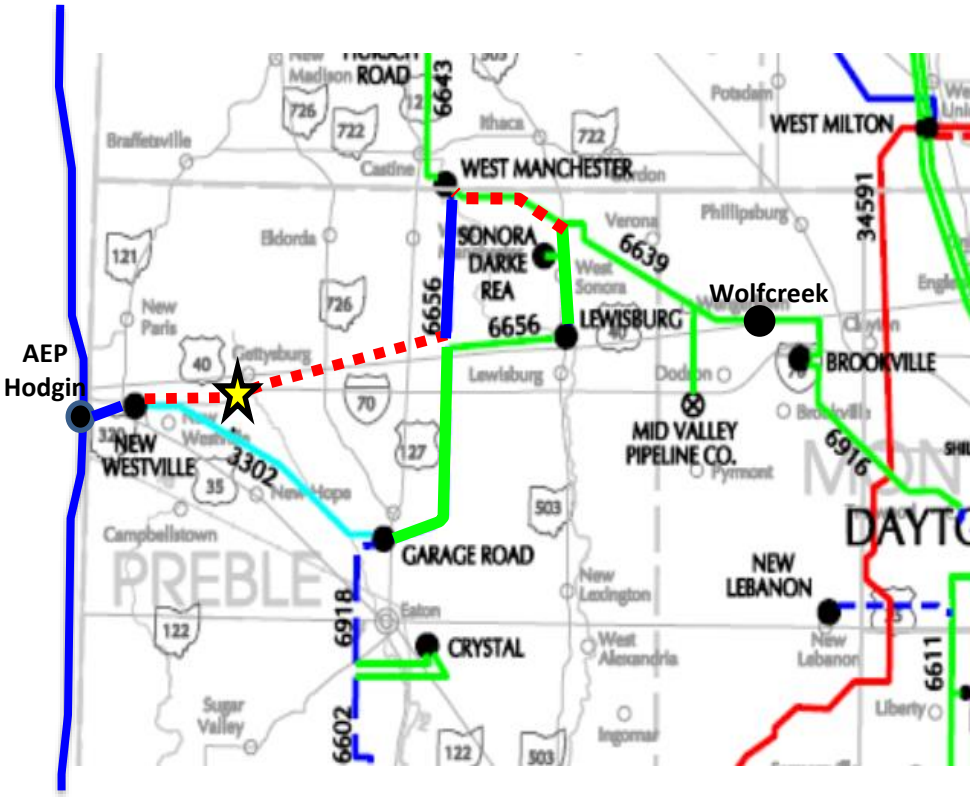
- **West Sonora (Darke REA)**
  - Install a new three-way phase over phase MOAB to serve the Sonora Darke REA delivery point that is currently served via a one-way switch. Retire the existing switch.
  - **Estimated Cost: $0.5M, In-service Date: 12/1/2025**

- **Mid-Valley Pipeline Tap**
  - Replace the existing two-way switch with a new three-way phase over phase MOAB switch. This will provide greater flexibility to switch during outages on the portion of the tap down to the customer.
  - **Estimated Cost: $0.5M, In-service Date: 12/1/2026**

- **Brookville Substation:**
  - Modify the bus arrangement at Brookville Substation to install two new 69kV line circuit breakers. This will improve reliability at Brookville Substation by removing tapped transformers from the transmission lines.
  - **Estimated Cost: $2.9M, In-service Date: 12/1/2026**

Total Part 2 Cost: $16.4M

Alternative Part 2: Rebuild from West Manchester - West Sonora Tap using single circuit configuration and install a new four position 69kV ring switching station expandable to a total of six positions in place of West Sonora Tap. **Total Cost: $12.7M.** It does not address the operational performance and condition identified in the needs statement.



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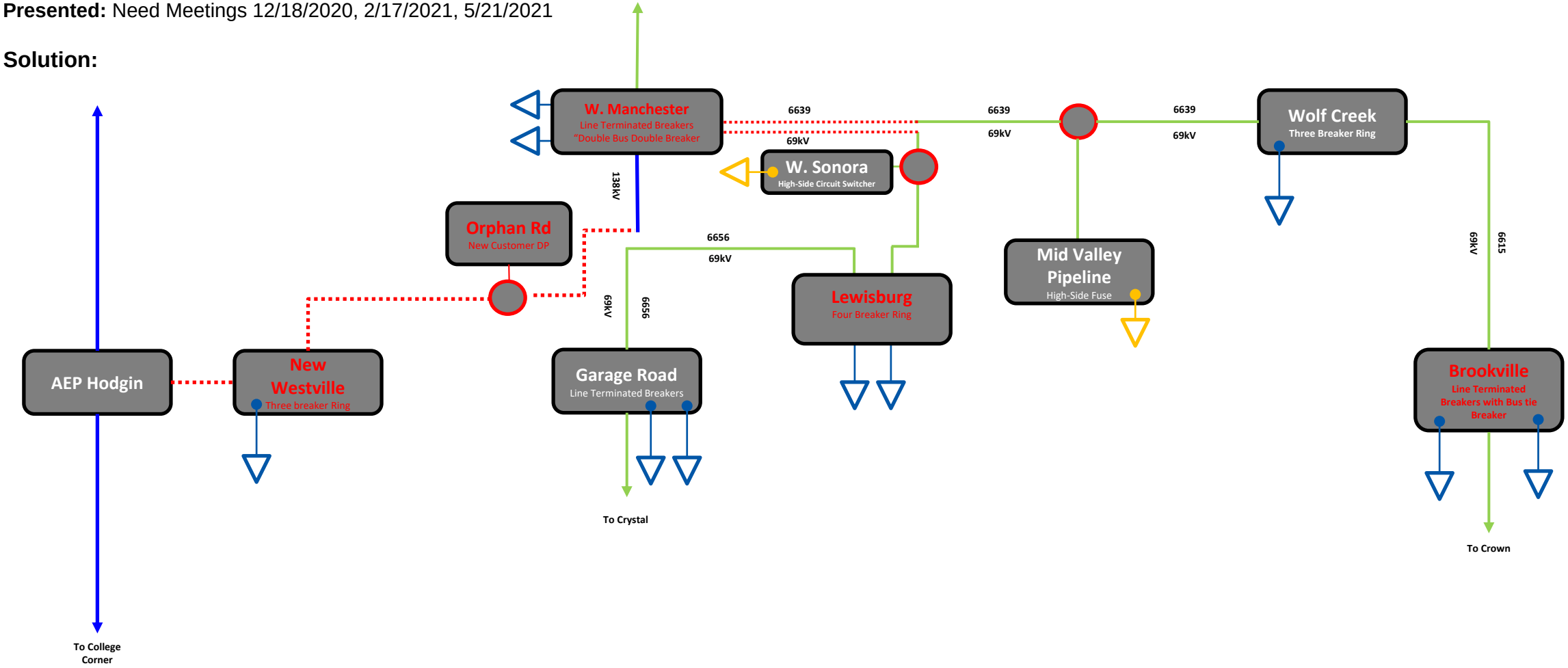

Appendix

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

8/3/2021 – V1 – Original version posted to pjm.com

8/16/2021 – V2 – Slides #12 and 13, Added alternative

10/19/2021 – V3 – Slides #12 and 13, Corrected total estimated costs