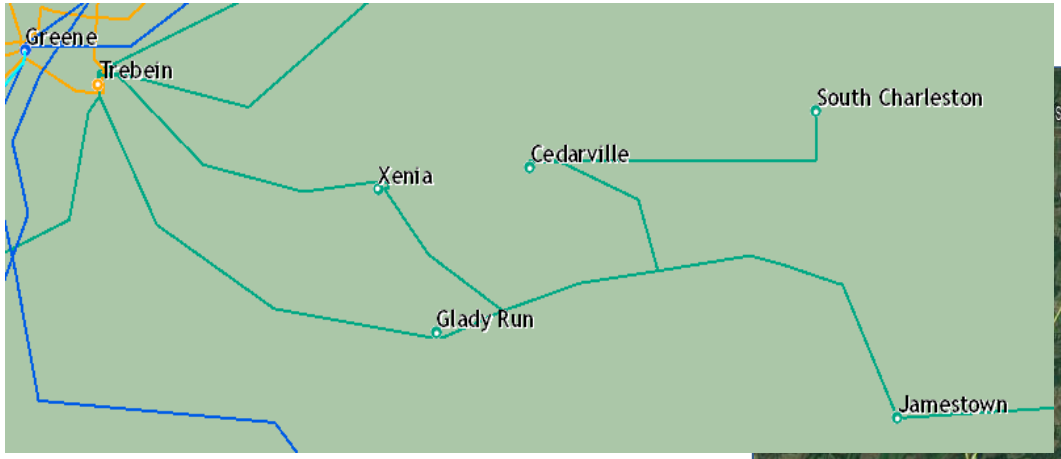
# Sub Regional RTEP Committee: Western
# Dayton Supplemental Projects

March 19, 2020

# 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
## Jasper, Ohio




**Need Number:** Dayton-2020-002

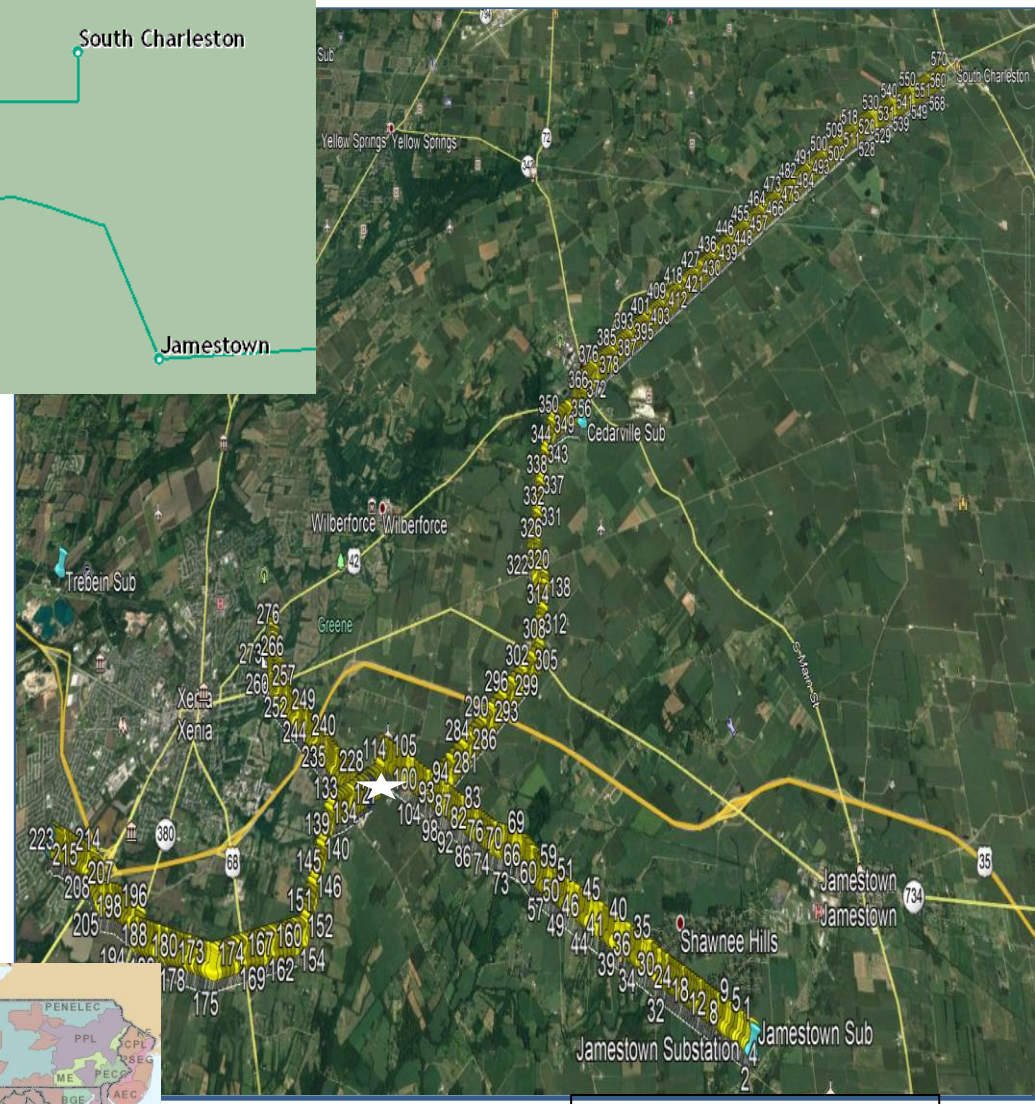
**Process Stage:** Need Meeting 3/19/2020

**Project Driver:**
Operational performance

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

**Problem Statement:**

- The existing 32 mile 69kV transmission line (6636) from Xenia-Glady Run-Jamestown was constructed using wood pole, cross-arm and brace design in 1929, with some replacements made in 1951. This line provides transmission and distribution level service to five different substations serving approximately 8,000 customers in both Greene and Clark Counties in Ohio.
    - A fault occurring anywhere on this 32 mile line will result in at least a temporary outage and possibly a permanent outage to 6 distribution transformers and all 8,000 customers served from the 6636 line.
- This line is one of the worst performing 69kV transmission lines in the Dayton zone. The line has experienced 13 outages (3 permanent and 10 momentary) since 2016, and the total duration of those outages was ~900 minutes. Most of the permanent outages were caused by auto accidents and animals, while most of the momentary outages were the result of weather.
- Large commercial and industrial distribution customers served from the five substations supplied by the 6636 line have experienced loss of supply events emanating predominantly from disturbances on the 6636 line. One particular industrial customer has experienced a total of 18 events (T&D) since 2016 but the majority of events have been related to 6636 transmission line performance.
- This is a three-terminal transmission line which causes protection and control concerns.

# Dayton Transmission Zone M-3 Process
## Octa, Ohio

**Need Number:** Dayton-2020-003

**Process Stage:** Need Meeting 3/19/2020

**Project Driver:**

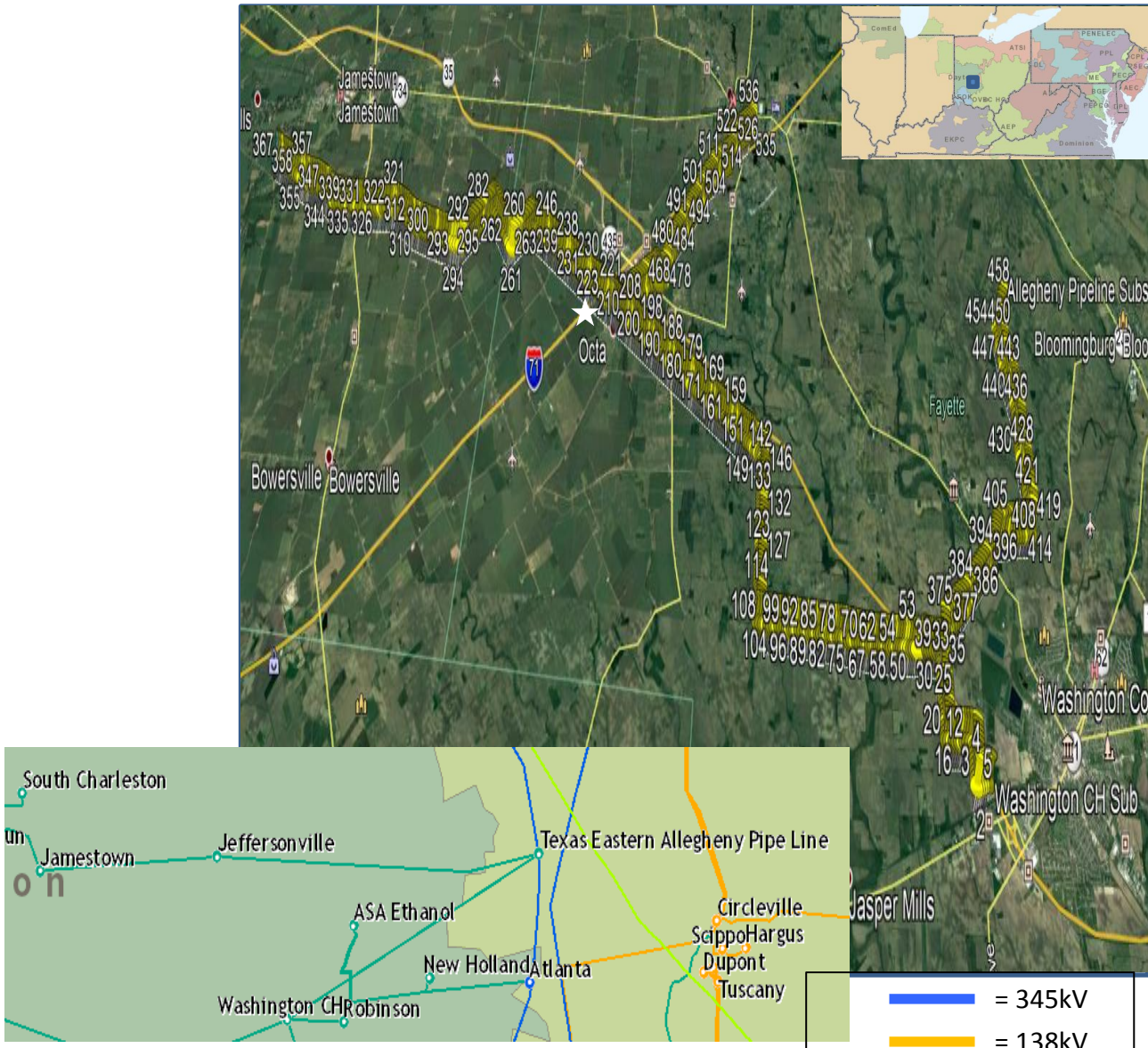
Operational performance

**Specific Assumption Reference:**

Dayton Local Plan Assumptions (Slide 5)

**Problem Statement:**

- The existing 31 mile 69kV transmission line (6902) from Washington CH-Jamestown was constructed using predominantly wood pole, cross-arm and brace design in 1950. This line provides transmission and distribution level service to three different substations serving approximately 3,800 customers in both Greene and Fayette Counties in Ohio.
    - A fault occurring anywhere on this 31 mile line will result in at least a temporary outage and possibly a permanent outage to all 3,800 customers.
- This line is one of the worst performing 69kV transmission lines in the Dayton zone. The line has experienced 25 outages (7 permanent and 18 momentary) since 2016, and the total duration of those outages was ~1,719 minutes. Most of the permanent outages were caused by crossarm issues while most of the momentary outages were the result of weather.
- Large commercial and industrial distribution customers served from the three substations supplied by the 6902 line have experienced loss of supply events emanating predominantly from disturbances on the 6902 line.
- There are limited distribution switching capabilities out of Jeffersonville Sub since there are no nearby distribution substations located close to the load center.



# Dayton Transmission Zone M-3 Process
# Jackson Center, Ohio

**Need Number:** Dayton-2020-004

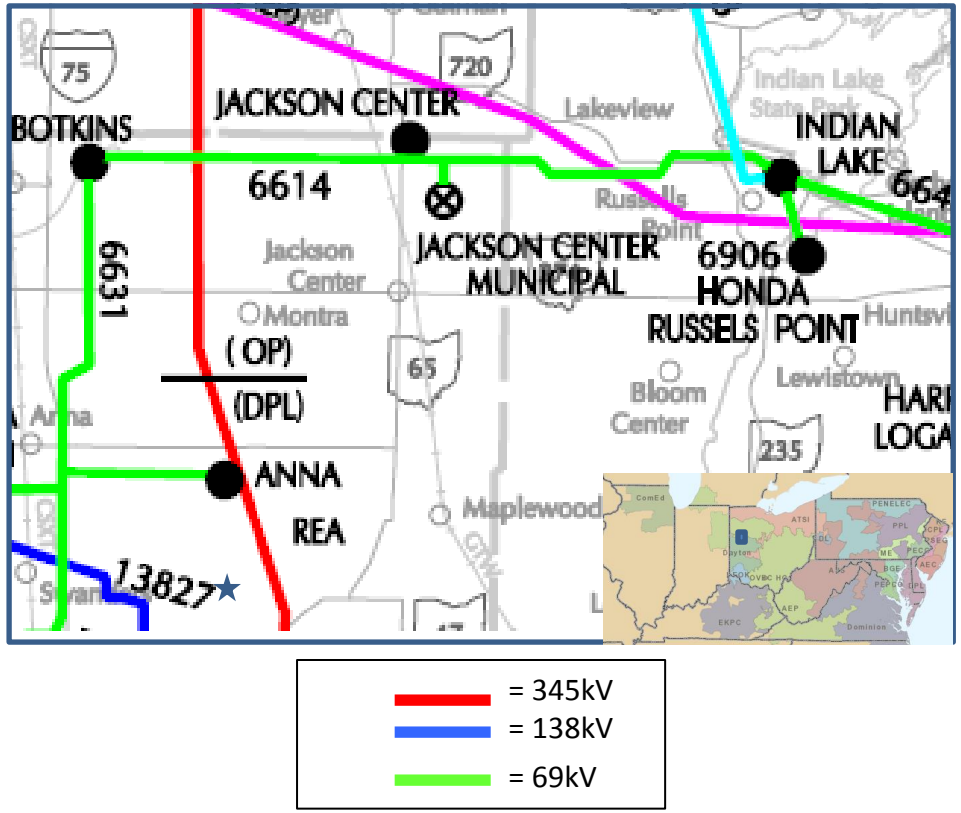
**Process Stage:** Need Meeting 3/19/2020

**Project Driver:**
Requested customer upgrades

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

**Problem Statement:**

- The Village of Jackson Center is planning to add load and has constructed a second substation. The Jackson Center Municipal load is currently tapped off the Jackson Center-Indian Lake 6614 69kV transmission line in the northern part of Dayton's service territory.
- The Jackson Center-Indian Lake 69kV transmission line is approximately 13 miles long and was constructed in 1955 with wood poles and crossarm design, which is prone to weather related outages.
- This line has experienced 3 permanent outages and 3 momentary outages since 2016, with the majority of causes being equipment failure (static wire, breaker, phase down). A line fault results in an outage to the entire Village with no ability to transfer load.
- The point of interconnection for Jackson Center municipal is only 575 feet from Dayton's Jackson Center Substation. There is a switch that can be operated to sectionalize the line towards Indian Lake.



# Dayton Transmission Zone M-3 Process
# Northwest Dayton Zone

**Need Number:** Dayton-2020-005

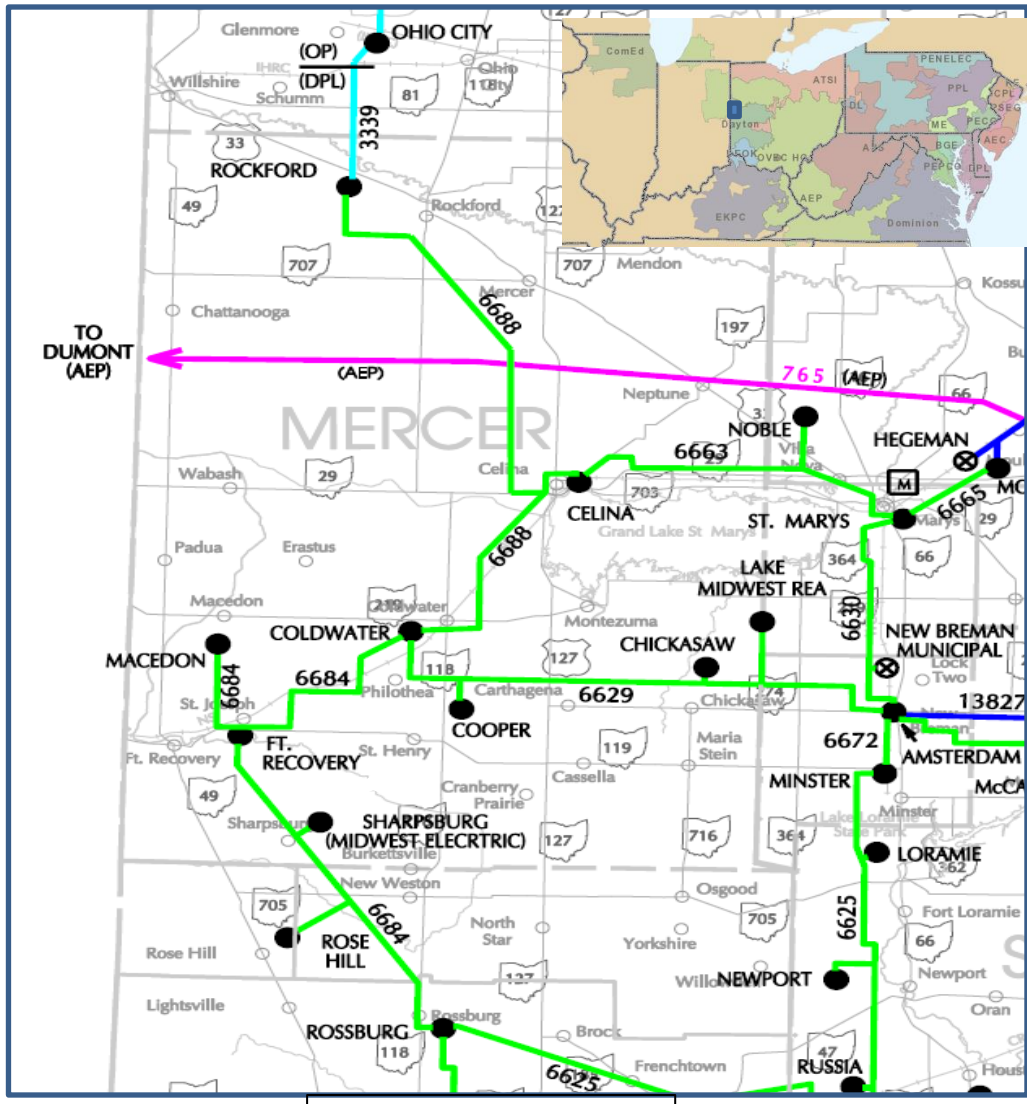
**Process Stage:** Need Meeting 3/19/2020

**Project Driver:**
Requested customer upgrade, Operational performance

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

**Problem Statement:**
The NW portion of the Dayton transmission system has experienced several real-time performance events over the last 5 years as a result of aging infrastructure and legacy system design.

- The Coldwater to Rossburg 69kV line (6684) is ~28 miles long and was built in 1967 with wood poles.
  - The line provides transmission and distribution service to 4 tapped substations including 1 Dayton delivery point and 3 cooperative delivery points. The line serves approximately 3,500 customers representing approximately 30 MW of peak load.
  - This line has experienced 8 permanent outages and 23 momentary outages in the last 3 years. The most common outage cause was equipment failures, particularly on the Macedon tap and between Sharpsburg and Rose Hill.
  - DP&L has a related project in the vicinity, s0327, which would help provide a source into the NW system on the Coldwater-Rossburg 6684 line.
- The Celina-Coldwater-Rockford 69kV line (6688) is ~23 miles long and was constructed in 1990 with wood poles and crossarm design.
  - The 6688 line provides service to 2 delivery points, serving approximately 1,900 customers and 12 MW of peak load.
  - This line has experienced 10 permanent and 12 momentary outages since 2016, with the primary causes being equipment failure and weather.
  - Dayton has a normally open 33kV tie (3339) with Ohio Power at Rockford Sub that is built to 69kV standards. This is an out of phase tie point and can only be closed if the 12kV Rockford bus is de-energized and 3339 line is energized from Ohio Power. Since this is a normally open point, the Rockford load is radial under most operating conditions since a manual process must take place to switch the load to the Ohio Power source if there is an issue with the Celina-Coldwater-Rockford 6688 69kV line.
  - The Rockford Substation is one of the most remote areas on the Dayton system and lacks nearby sources.
- The Amsterdam-Coldwater 69kV line (6629) is ~17 miles long and was constructed in 1991 with wood poles and crossarm design.
  - The line provides transmission and distribution service to 3 tapped substations including 1 Dayton delivery point and 2 cooperative delivery points. The line serves approximately 3,500 customers representing approximately 18 MW of peak load.
  - This line has experienced 6 permanent outages and 8 momentary outages since 2016. The most common outage causes were equipment failures and weather.
- DP&L provides 69kV service to the City of Celina from a very small 69kV switching station. This legacy design has a single point of failure that has become problematic for equipment maintenance and outages.
  - The peak load for the City of Celina is ~43 MW.
  - A bus or line fault on Celina's system interrupts both of the 69kV deliveries to Celina.
  - Due to the size of the switching station, there is very limited ability to expand or improve the configuration.



# Dayton Transmission Zone M-3 Process
# North Dayton Zone

**Need Number:** Dayton-2020-006

**Process Stage:** Need Meeting 3/19/2020

**Project Driver:**

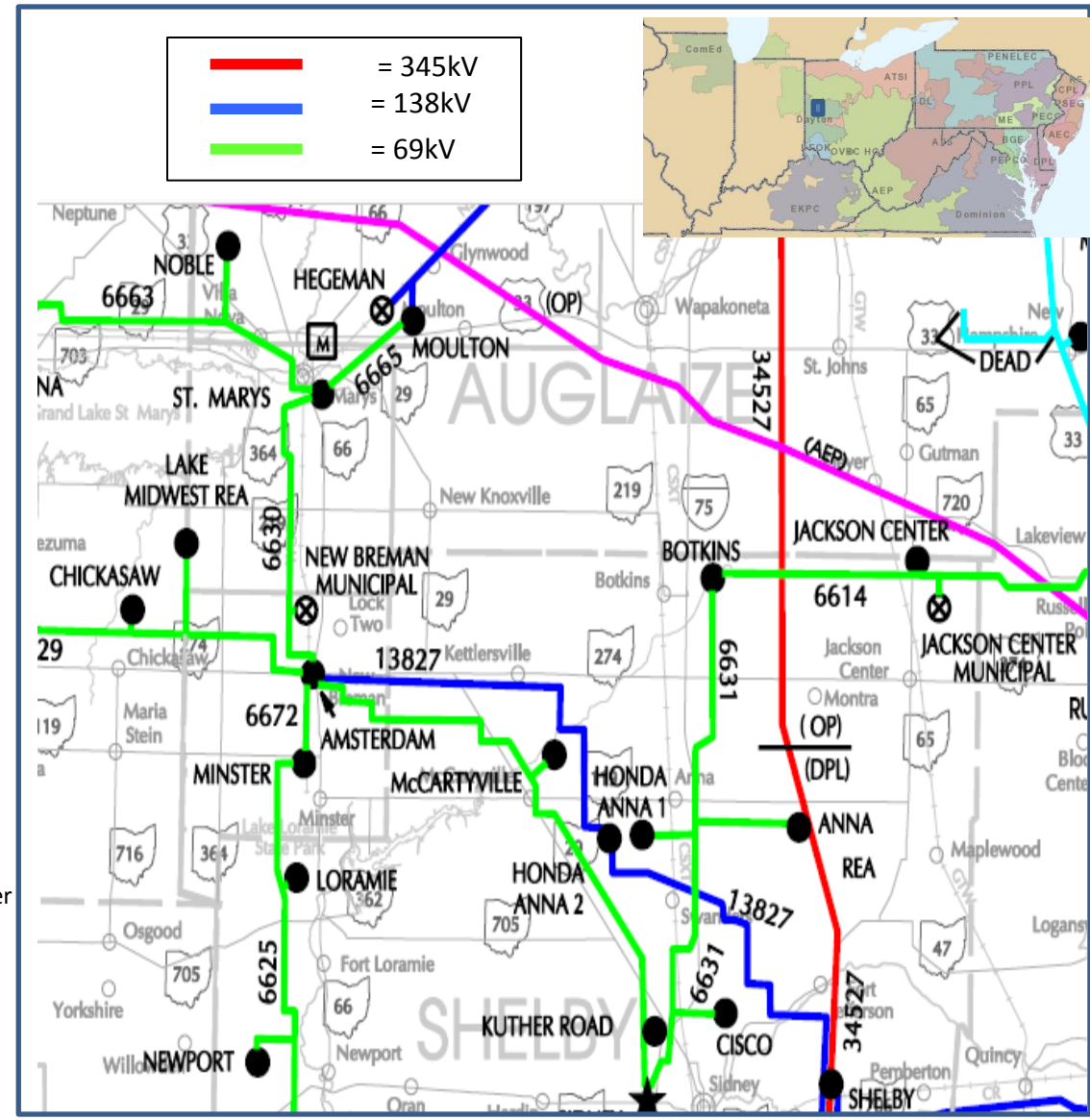
Requested customer upgrade, Operational performance

**Specific Assumption Reference:**

Dayton Local Plan Assumptions (Slide 5)

**Problem Statement:**

- The Amsterdam-Shelby 138kV transmission line (13827) is approximately 26 miles long and was constructed in 1974 with wood poles.
  - A fault on any portion of this circuit will result in an outage to a large 55MW industrial customer. Permanent faults on the Shelby side of the line could lead to reduced capacity to serve load for an extended duration depending on system conditions.
  - The Amsterdam-Shelby 138kV line has experienced 2 permanent and 4 momentary outages since 2016. The permanent outages were caused by galloping conductors and an auto accident, while the momentary outages were caused by lightning and an animal.
  - The Amsterdam-Shelby 138kV line is critical in providing a 138kV source into the NW area of the DP&L transmission system. In this rural area, there are limited sources and an outage to this source combined with other area outages can lead to operational voltage and loading issues. This contingency is regularly trending in real-time operations and has occurred. Galloping conductors have been problematic in this area causing multiple 69kV outages over the past 2 years causing operational issues to surface.
- Transmission line equipment issues have been identified along the Amsterdam-New Bremen-St Marys 69kV line (6630) related to vintage cross-arm design and bracing of transmission poles at the base.
  - The 6630 line was constructed in 1970 and is ~8 miles long.
  - This line has experienced 2 permanent and 2 momentary outages since 2016. The majority of the outages were caused by equipment failure.
  - The Village of New Bremen has a peak load of ~20MW of load
  - This corridor serves as a key tie between the Ohio Power and Dayton systems in this area.
- The Village of Minster is served from two sources, the Covington-Minster-Rossburg 69kV line (6625) and the Amsterdam-Minster 69kV line (6672). During winter storm conditions and with galloping lines in this area, Minster has lost both transmission feeds.
  - The Village of Minster serves ~1,500 customers and has a peak load of ~25MW of load.
  - The 6672 line is ~1.7miles long and is 1970's cross-arm design and ties into the strongest area source at Amsterdam Sub.
  - The 6672 line has experienced 5 outages, 4 momentary and 1 permanent, since 2016. The majority of the outages were caused by weather, including the permanent outage which was the result of galloping conductors.



# 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

# Dayton Transmission Zone M-3 Process
## Sidney, Ohio

**Need Number:** Dayton-2019-010

**Process Stage:** Solutions Meeting 3/19/2020

**Previously Presented:** Needs Meeting 12/18/2019

**Project Driver:**

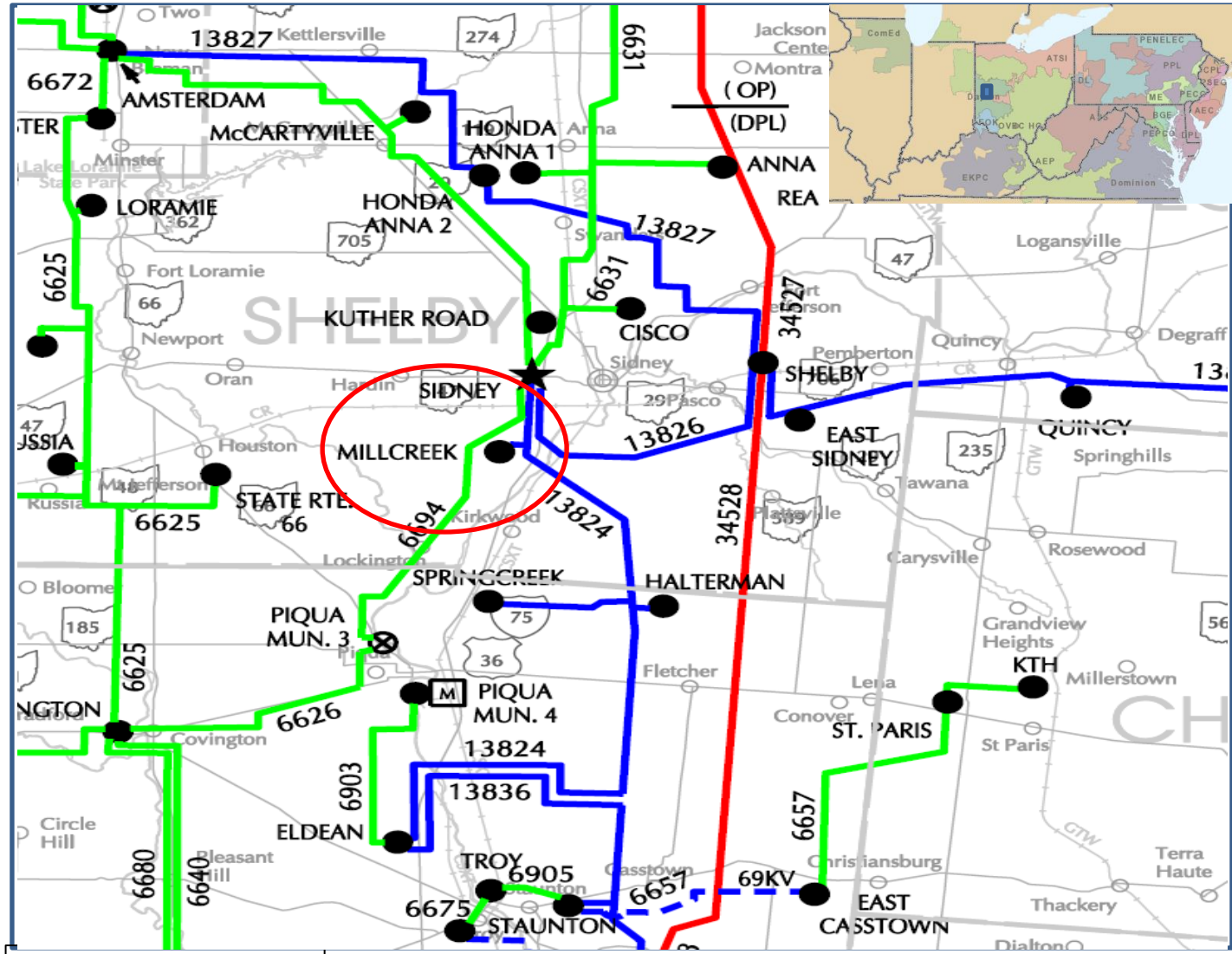
Requested customer upgrade, source for underlying distribution

**Specific Assumption Reference:**

Dayton Local Plan Assumptions (Slide 5)

**Problem Statement:**

- An industrial customer served from the Sidney Substation intends to add 10 MVA of load in 2020 Q3.
- All three of the 69/12kV transformers at Sidney Substation are already loaded to ~90% during peak times.
- The loss of one of the three 69/12kV transformers at Sidney Substation will result in load shed of ~4,000 customers.
- The 138/12kV transformer at the nearest substation, Millcreek, is currently loaded to ~70% during peak times.
- Millcreek is a tapped sub off of the Sidney to Eldean 138kV transmission line



# Dayton Transmission Zone M-3 Process
# Sidney, Ohio

**Need Number:** Dayton-2019-010

**Process Stage:** Solutions Meeting 3/19/2020

**Proposed Solution:**

Millcreek Substation is currently tapped off the existing 138kV line from Sidney Substation to Eldean Substation. With this solution, the 138kV line will be extended approximately 0.2 miles, using the same 636 ACSR conductor as the existing line, to loop in and out of a new four breaker ring bus at Millcreek Substation, where a second 138/12kV 30MVA transformer will also be added. The second transformer will allow load to be transferred from the Sidney Substation to Millcreek Substation and will provide the needed capacity at Millcreek to be able to serve the new 10MVA of load. This solution will also provide switching capability between Sidney and Millcreek substations. The transmission project is estimated to cost $2.5M.

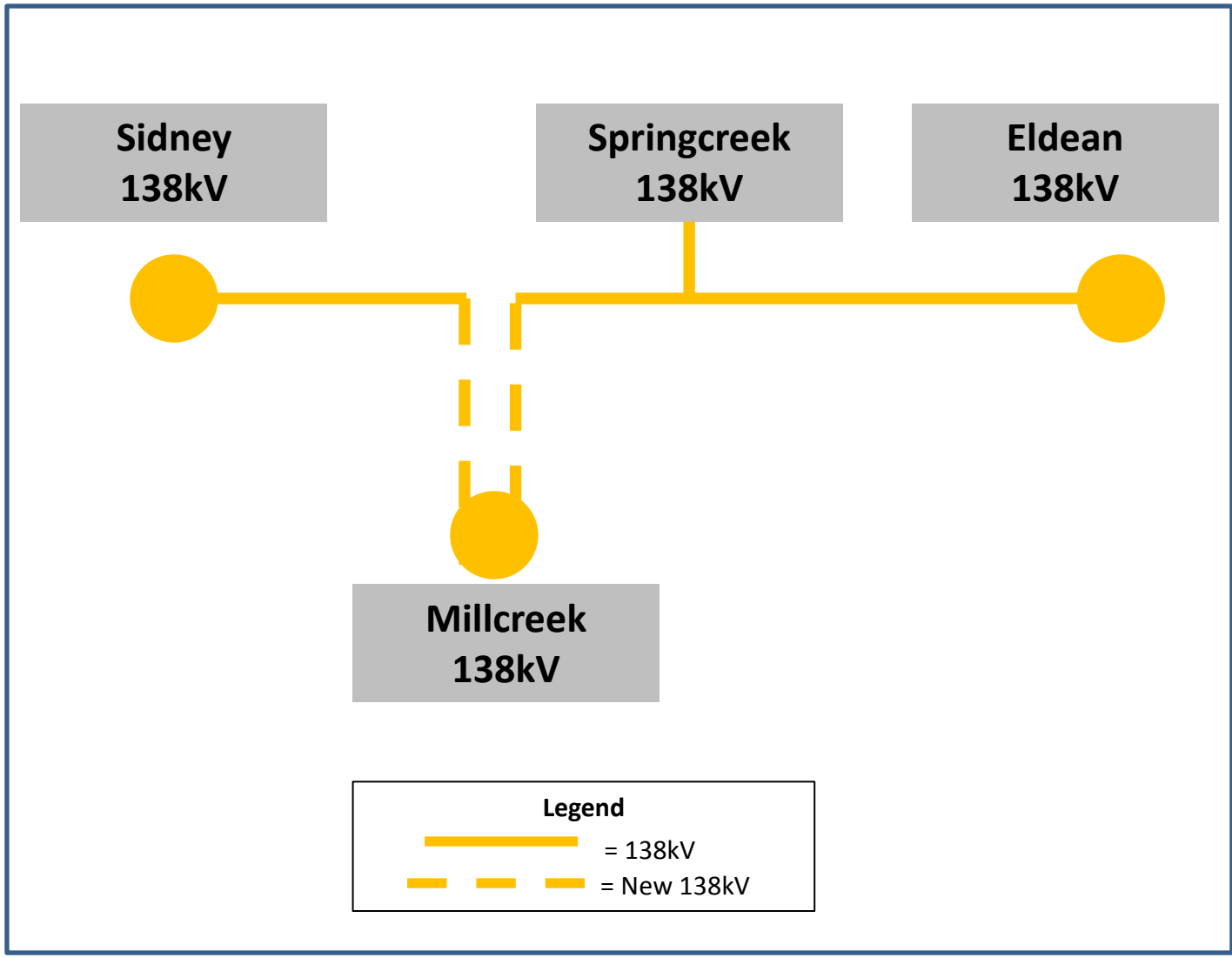
**Alternatives Considered:**

1. Install a new fourth 69/12kV transformer at Sidney Substation. This alternative would be difficult to execute because Sidney Substation is space constrained and it would be very difficult to get any more 12kV circuits out of the sub.

**Projected In-Service:** 12/31/2020

**Project Status:** Conceptual

**Model:** 2018 MMWG 2020SUM



# 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

3/6/2020 – V1 – Original version posted to pjm.com