# PJM Western Sub-Regional RTEP Committee
# Dayton Supplemental Upgrades

April 23, 2019

# 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
## Gebhardt Distribution Sub

**Need Number:** Dayton-2019-002

**Process Stage:** Solutions Meeting 4/23/2019

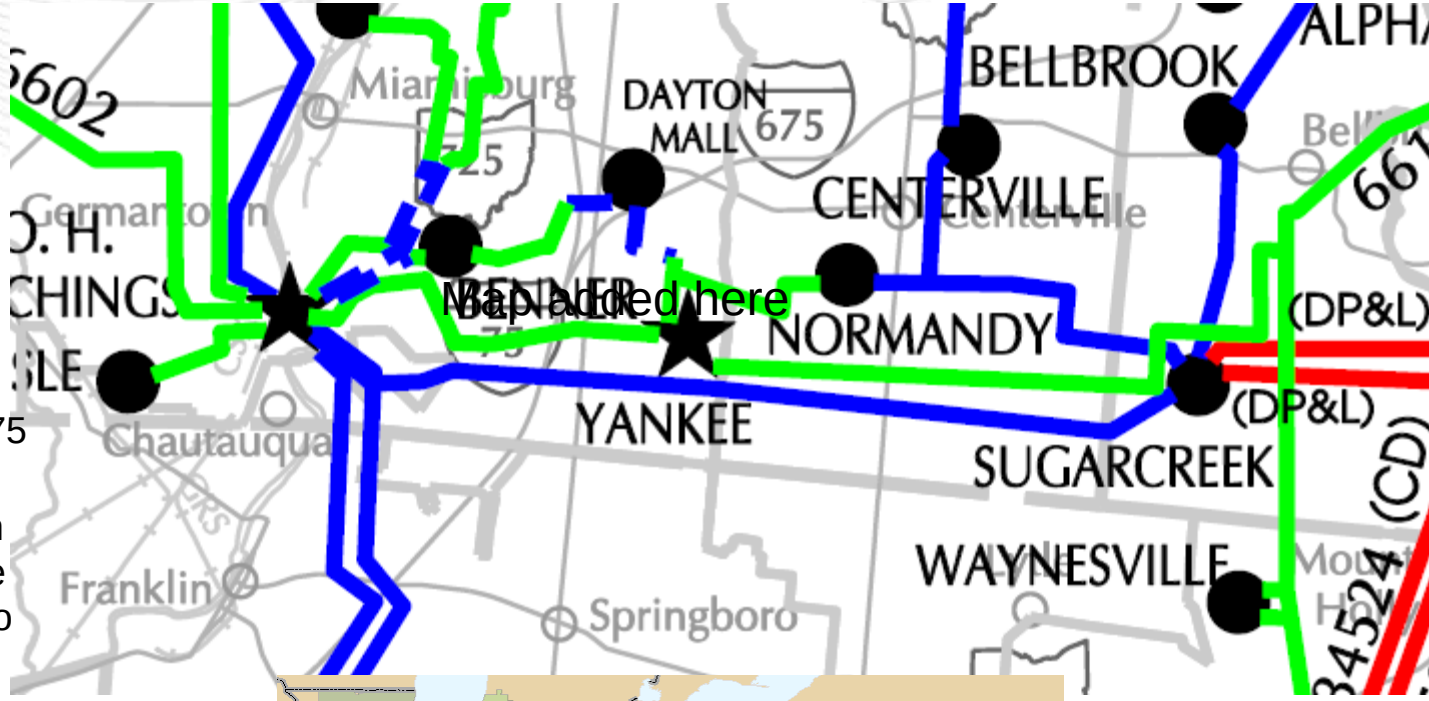
**Previously Presented:**
Needs Meeting 2/20/2019

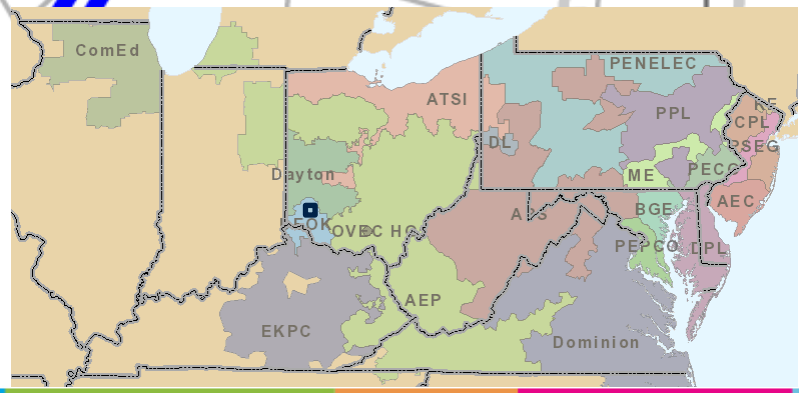
**Supplemental Project Driver:**
Source for Underlying Distribution

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

**Problem Statement:**

- Significant load growth in the area east of I-75 and south of I-675
- Distribution Circuit RH1211 served from Yankee Substation exceeded its thermal rating this past summer and RH1204 from Yankee Substation is approaching its rated capacity. There are no ties in the vicinity of the load center with sufficient capacity to serve growing loads.
- DP&L must develop a solution immediately to have capacity to serve distribution load in this load center or risk overloading existing equipment and not having sufficient distribution capacity to serve growing load. There is a need for a new distribution source closer to the load center.
- DP&L must offload the Yankee and Normandy circuits to ensure sufficient capacity to serve growing load centers in Centerville and Waynesville.



# Dayton Transmission Zone M-3 Process
## Gebhardt Distribution Sub

**Need Number:** Dayton-2019-002

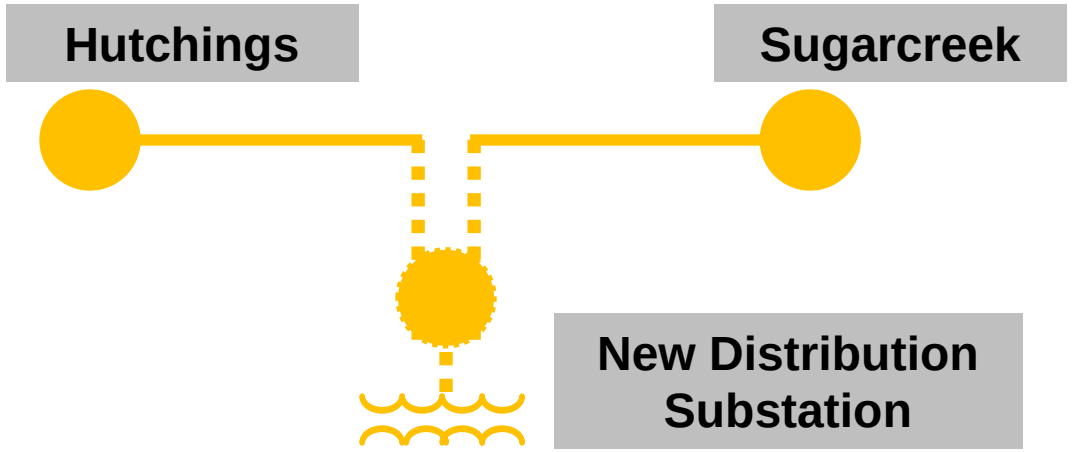
**Process Stage:** Solutions Meeting 4/23/2019

**Potential Solution:**
The project will tap the existing Hutchings-Sugarcreek 138 kV line and loop the 138 kV in and out of the substation which is close proximity to the existing 138 kV line. There will be a single 138/12kV 30MVA distribution transformer installed at the new substation and three new 138 kV breakers arranged in a ring bus configuration. The location of this substation will allow Dayton to offload distribution circuits served from Yankee and Normandy while also serve as a centrally located source for growth in the Centerville and Waynesville areas.

**Estimated Transmission Cost:** $2.5 M

**Alternatives Considered:**
1. Build new 69 kV substation in Washington Township with single 30MVA transformer. This project was estimated to cost $1.5 M. This project was not selected because there is very limited space at the substation for additional distribution transformers.
2. Build new 138 kV substation on Clearcreek. This project was estimated to cost $3.75 M This project was rejected due to the location of the substation and limited ability for transmission and distribution line exits.

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



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

**Need Number:** Dayton-2019-003

**Process Stage:** Solution Meeting 4/23/2019

**Previously Presented:**

Needs Meeting 2/20/2019

**Supplemental Project Driver:**

Source for Underlying Distribution

**Specific Assumption Reference:**

DP&L Local Plan Assumptions (Slide 5)

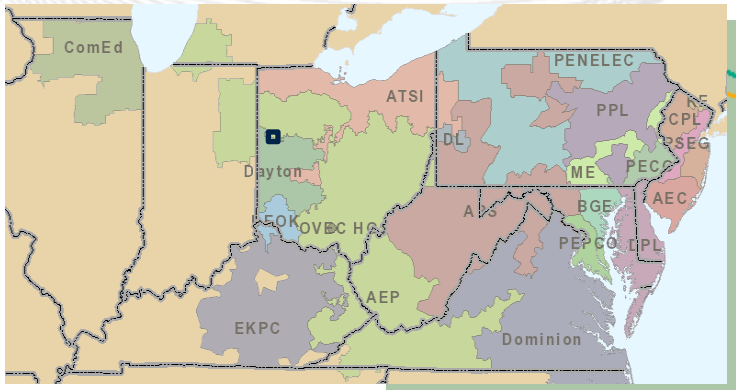
**Problem Statement:**

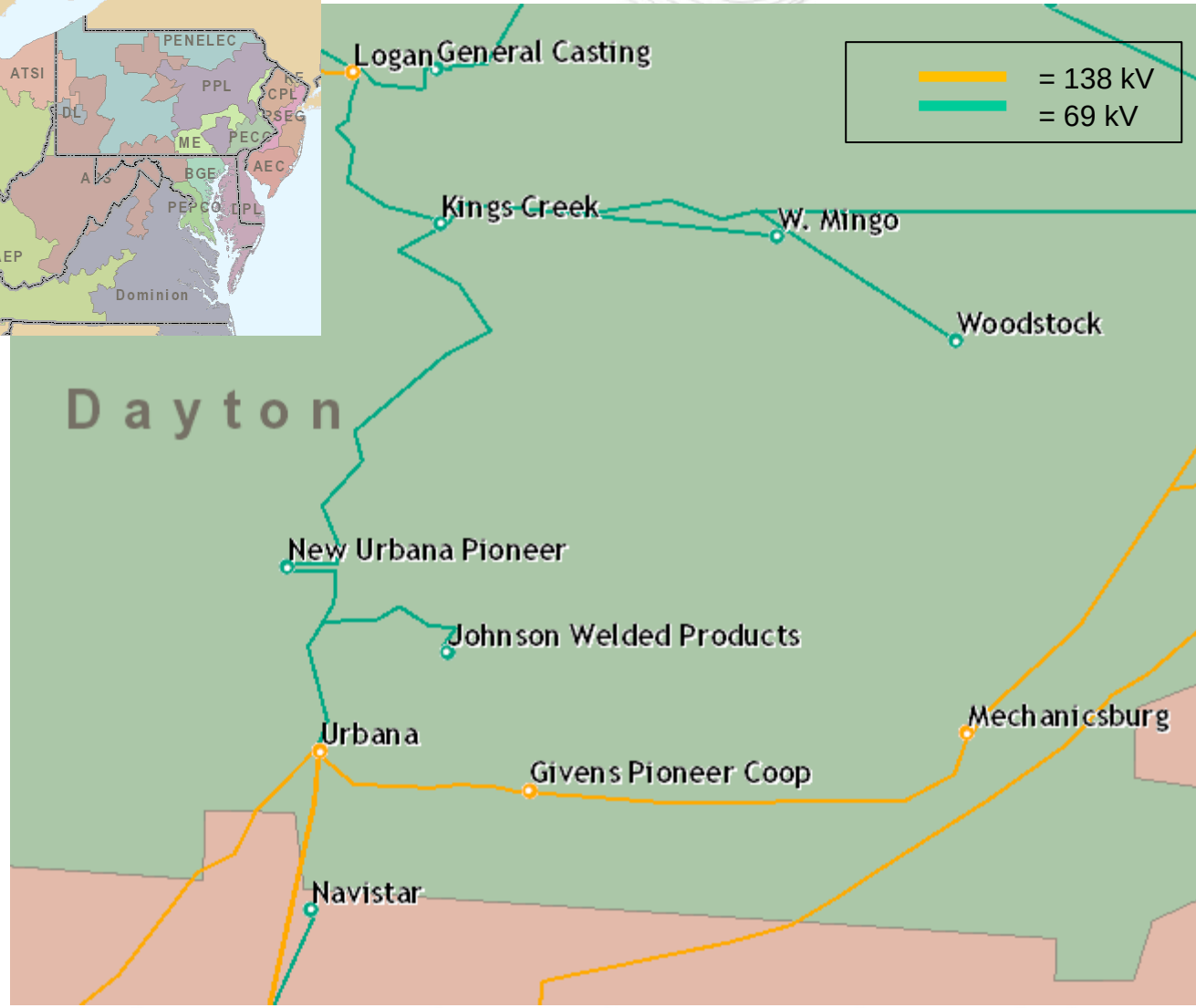
- The loads at the existing Urbana Substation have grown beyond the capacity of the existing distribution transformers and DP&L has utilized a mobile transformer at the Urbana substation to take load off of the distribution banks that would otherwise be pushed beyond their thermal limits.

- The existing Urbana and Kingscreek substations are not centrally located to the growing load center which makes load transfers to and from either sub nearly impossible.

- Distribution circuits DB1205 and DB1206 from Urbana Substation both reached their peak circuit capacities this past summer.

- There is a need for a new distribution source closer to the load center to provide loading relief on the Urbana Substation transformers and circuits.



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

**Need Number:** Dayton-2019-003

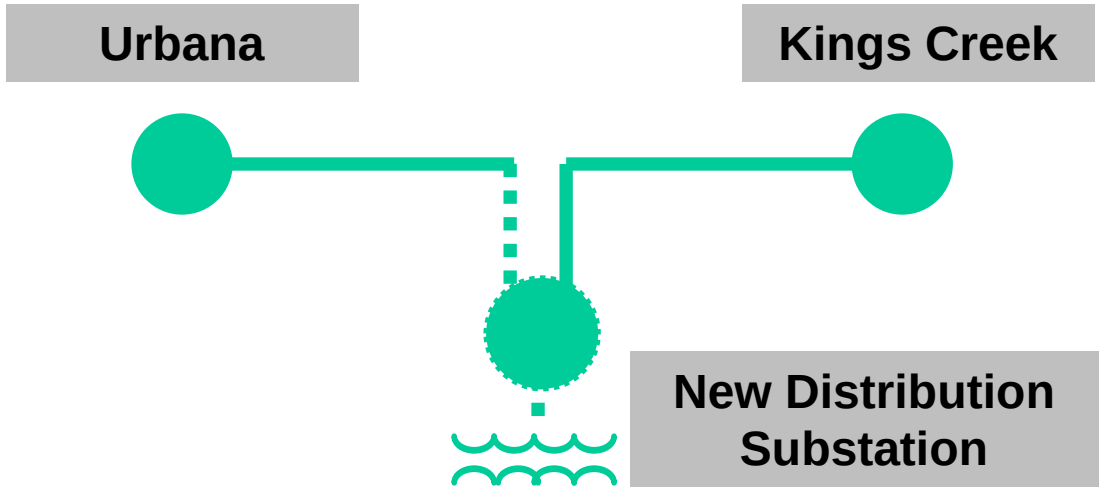
**Process Stage:** Solution Meeting 4/23/2019

**Potential Solution:**
The project will tap the existing Urbana-Kings Creek 69 kV line and build a new 1 mile 69 kV extension to the new substation. There will be a single 69/12 kV 30 MVA distribution transformer installed at the new substation and two new 69 kV breakers. This substation will be located in close proximity to the load center on the southwest side of Urbana where many of the large commercial and industrial loads are located. This location will ensure that DP&L has sufficient capacity to serve the load center and offload the transformers at Urbana Substation. The solution will also enhance the ability to switch distribution circuits and facilitate load transfers between the new substation, Urbana, and Kings Creek Substations.

**Estimated Transmission Cost:** $2.5 M

**Alternatives Considered:**
1. Add an additional distribution transformer at Urbana Substation and reconductor the distribution circuits leaving Urbana Substation. This project was estimated to cost $3 M. This project was not selected because it would only provide marginal benefit due to the distance between Urbana Substation and the load center. Significant distribution circuit upgrades would be required and there would still be a lack of circuit ties available for outage or maintenance related switching in the area.

**Projected In-Service:** 06/01/2020



# Dayton Transmission Zone M-3 Process
## South Dayton Metro

**Need Number:** DAYTON-2019-004

**Process Stage:** Solutions Meeting 4/23/2019

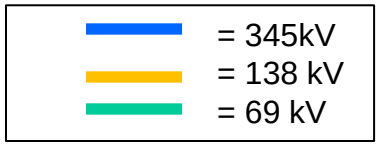
**Previously Presented:**
Needs Meeting 2/20/2019

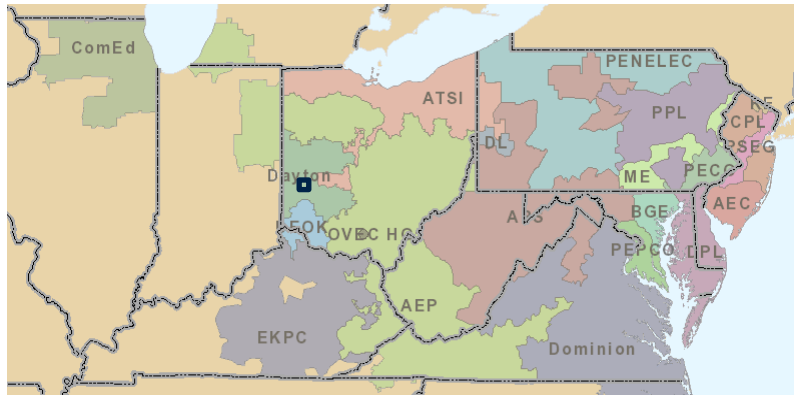
**Supplemental Project Driver:** Operational Performance

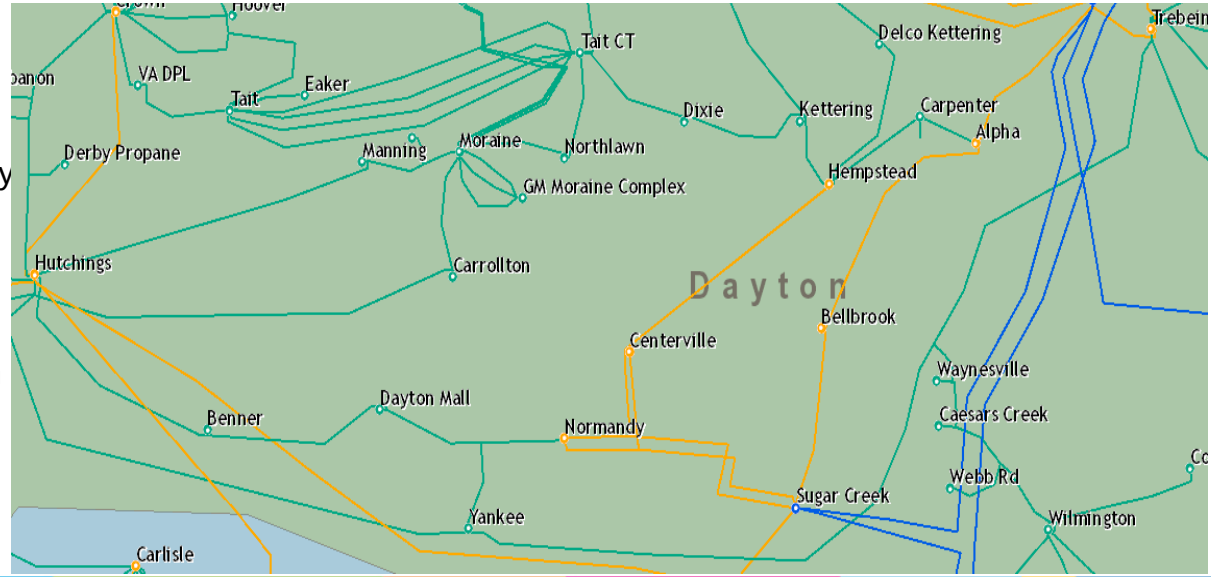
**Specific Assumption Reference:**
DPL Local Plan Assumptions (Slide 5)

**Problem Statement:**
The Dayton 138 kV system regularly experiences real-time loading issues on the Hutching-Sugarcreek 138 kV 13805 line during peak and shoulder peak times. Dayton System Operations works with PJM and frequently switches the Crown 138/69 kV transformer out of service to avoid a PCLLRW but in some instances, this is not a possibility. Also, this switching and segmentation of the system is not a good practice for the equipment and reliability of the system. Dayton has a plan to help solve this issue by installing a 138/69 kV transformer at Normandy Substation but we have concerns this could shift the operational loading issues from the Sugarcreek-Hutchings 138 kV line to the Sugarcreek to Normandy 138 kV line with the growth in this area. Also, Normandy Substation has space limitations for a 138 kV transformer. If this issue is not addressed immediately, it could lead to more real-time issues and further degradation to the equipment that is switched out in this quickly growing load center.

In addition to the 138 kV loading issues in this area, this growing load center is served by three 69 kV sources with limited capacity and a performance issue. These factors make performing regular maintenance more difficult and puts the reliability of the system at risk. In the event of a single outage (planned for maintenance or unplanned due to system events) to one of the three sources, a subsequent 69 kV outage would lead to severe reliability implications including loadings in excess of the emergency line ratings. The 6610 Yankee-Caesars-Trebein 69 kV line is one of the three 69 kV lines supplying the load center and it is a 31 mile line, three terminal line constructed in 1950 with wood poles that has experienced 7 permanent and 16 momentary outages the past 5 years.



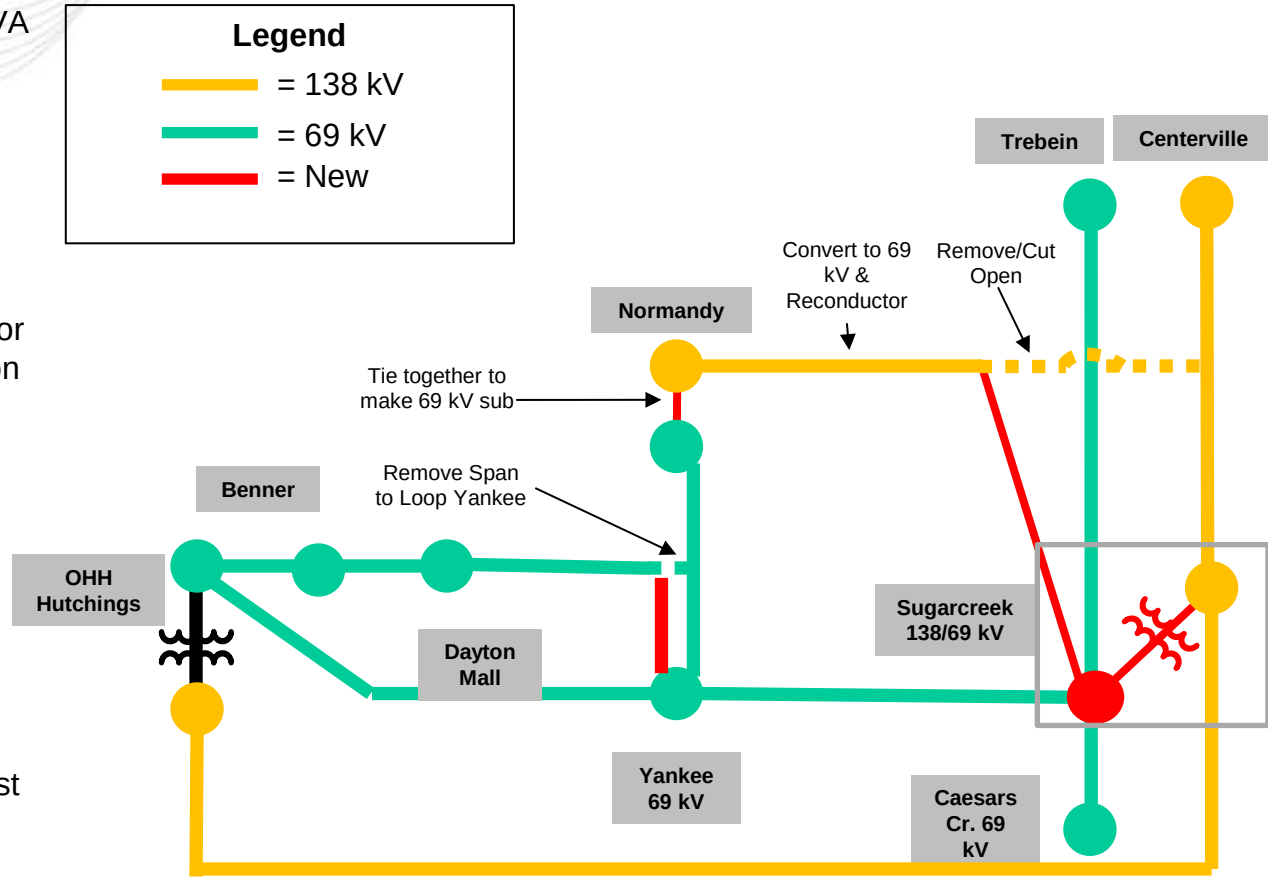
# Dayton Transmission Zone M-3 Process
## South Dayton Metro

**Need Number:** Dayton-2019-004

**Process Stage:** Solution Meeting 4/23/2019

**Potential Solution:**

- This project will expand the Sugarcreek Substation by installing a 138/69 kV 200 MVA transformer, forming a new 69 kV ring bus, and building a new 69 kV line from Sugarcreek to Normandy Substation that will connect directly into the load center. These upgrades will provide a critical fourth source into the load center which will address shoulder peak loading concerns and will improve reliability of the three terminal 6610 Yankee-Caesars-Trebein 69 kV line that has historically been a poor performing circuit;
- Normandy Substation has an existing distribution transformer that will need to be changed from 138/12 kV to 69/12 kV. This will provide operations greater flexibility for switching loads through parallel distribution bank operation at Normandy. The Dayton Mall-Yankee-Normandy 6671 line will be looped in and out of Yankee Substation to eliminate a three terminal arrangement. A single 69 kV breaker will be needed at Normandy Substation to separate the 69 kV bus and a single 69 kV breaker will be installed at Yankee to eliminate the three terminal line configuration.




**Estimated Transmission Cost:** $15.9 M

**Alternatives Considered:**

1. Install 138/69 kV transformers at both Sugarcreek and Normandy. This project was estimated to cost $17 M. This solution was not selected due to cost, protection concerns, and physical constrains at Normandy Sub.
2. Install 138/69 kV transformer at Sugarcreek Sub. This project was estimated to cost $8.5 M. Although this project addresses the 6610 performance issue, it would not provide an additional source to load center that helps relieve operational loading scenarios on the Hutchings-Sugarcreek 138 kV line and the underlying 69 kV system.

**Projected In-Service:** 12/31/2021

# 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

4/12/2019 – V1 – Original version posted to pjm.com