Submission of Supplemental Projects for Inclusion in the Local Plan

Dayton Transmission Zone M-3 Process
Brookville, Ohio

Need Number: Dayton-2019-009

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 2/3/2020

Previously Presented:
Need Meeting: 10/25/2019
Solution Meeting: 12/18/2019

Project Driver:
New customer delivery point

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

Problem Statement:

- An new industrial customer has requested a new delivery point in Brookville, Ohio. The potential customer site is located north of Upper Lewisburg Salem Rd and west of Arlington Rd in close proximity to the existing 6639 transmission line. The route of the existing 6639 line is shown in the graphic on the right side of the slide.
- Prior to the need for full transmission capacity, the customer will require 500kW of capacity immediately to begin construction activities. By April 1, 2020 the customer will require a minimum of 5MW of total capacity to finalize building construction and the installation of production equipment. By November of 2020, the full substation and capacity for an 11MVA load will be required. There are long-terms plan for the customer to potentially grow to a 26MVA load.
- In order to support the customer's delivery needs, support local economic development, and maintain system reliability for all customers, it is necessary to promptly begin designing and building a comprehensive solution that can supply the customer needs and meet the schedule outlined in this slide.

Dayton Transmission Zone M-3 Process
Brookville, Ohio

Need Number: Dayton-2019-009

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 2/3/2020

Selected Solution:

Dayton has developed a comprehensive distribution and transmission solution to meet both the short-term and long term needs identified in problem statement. Dayton plans to install distribution level service to provide service to the first 500kW and 5MW loads. The transmission project to serve the initial 11MVA of load will entail tapping the existing Brookville-West Manchester 69 kV line (6639). This new transmission tap, constructed with 477 ACSR conductor, will loop in and out of a new three breaker 69kV ring bus substation where one 69/12kV 30MVA transformer will be installed. Fiber will be added from Brookville Substation to the new sub, so remote end relay changes will be needed at Brookville Substation. Remote end relay setting updates will be required at West Manchester Substation.

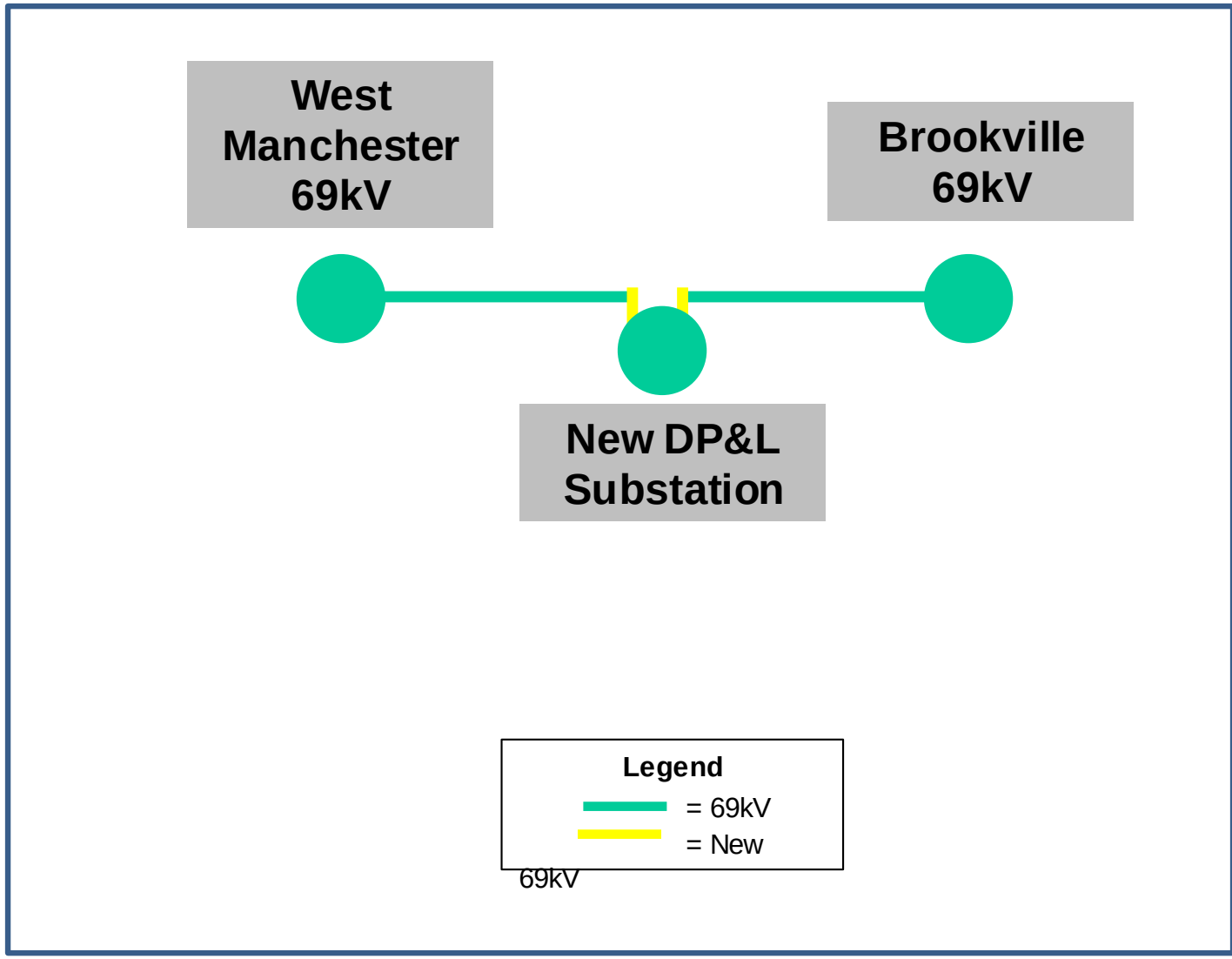
Estimated Cost: $2.5M

Projected In-Service: 10/31/2020

Supplemental Project ID: S2150

Project Status: Conceptual

Model: 2018 MMWG 2020SUM



Dayton Transmission Zone M-3 Process
Sidney, Ohio

Need Number: Dayton-2019-010

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 5/8/2020

Previously Presented: Needs Meeting 12/18/2019

Solutions Meeting 3/19/2020

Project Driver:

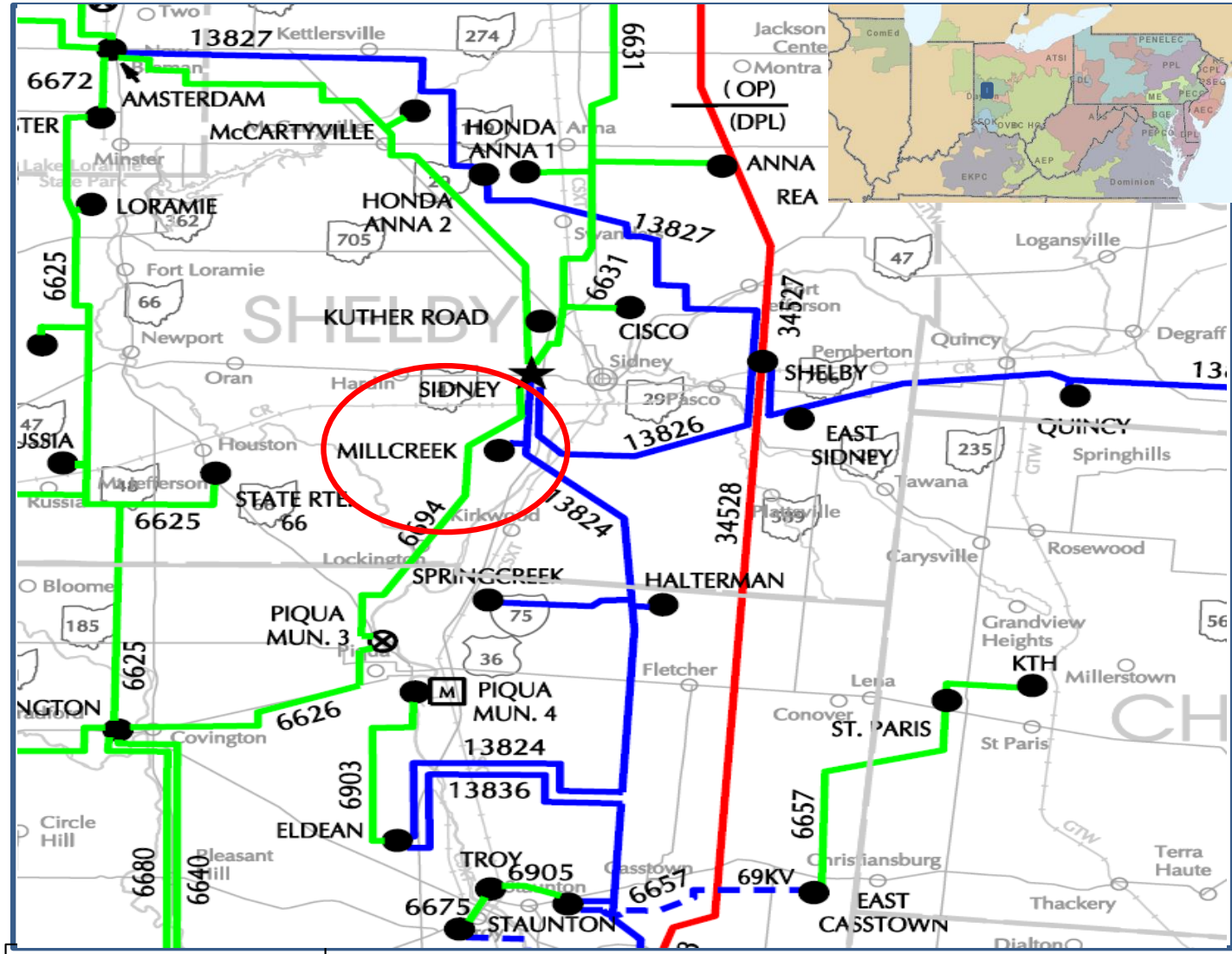
Requested customer upgrade, source for underlying distribution

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: Submission of Supplemental Project for inclusion in the Local Plan 5/8/2020

Selected 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. (**S2210**)

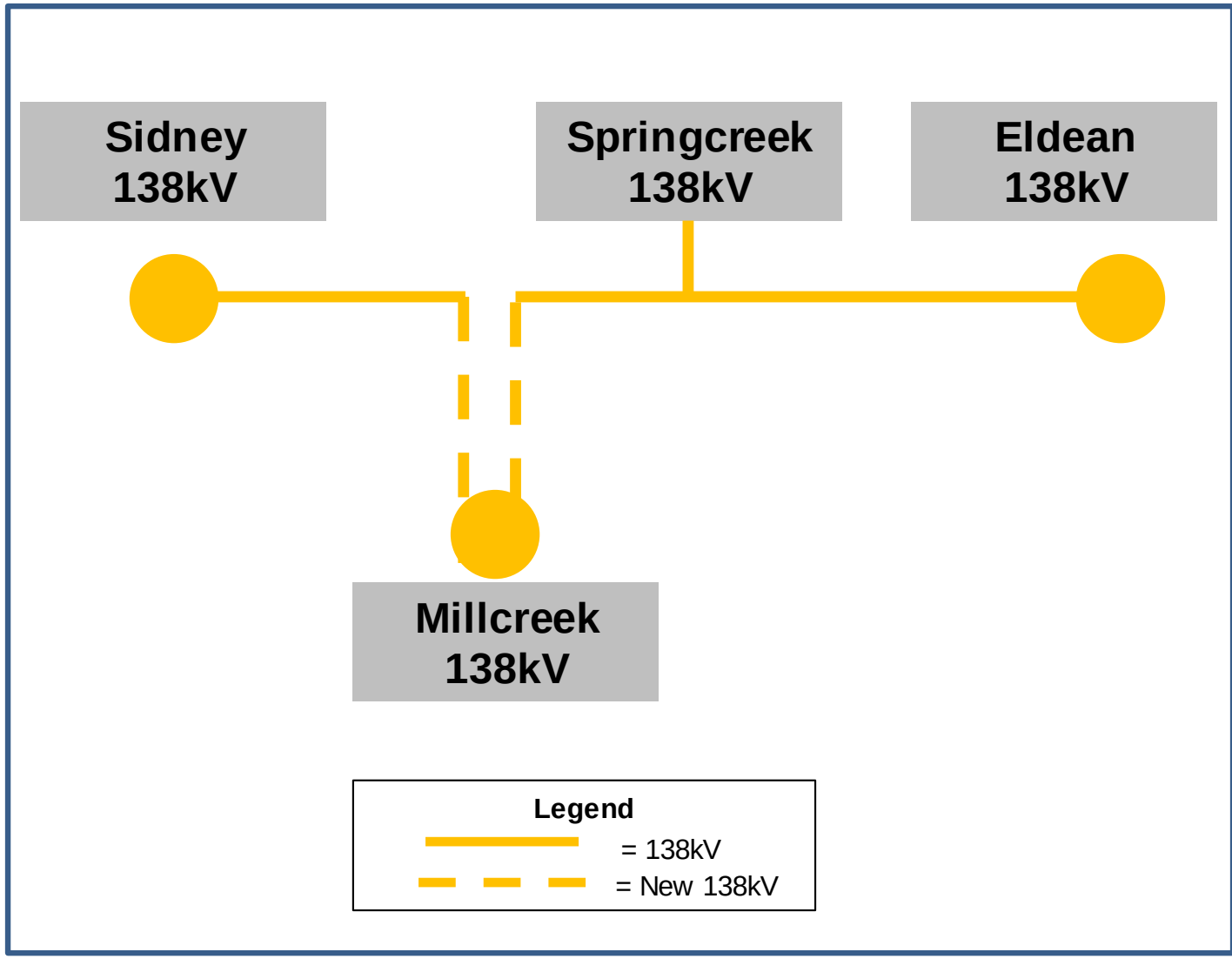
Estimated Cost: $2.5M

Projected In-Service: 12/31/2020

Supplemental Project ID: S2210

Project Status: Conceptual

Model: 2018 MMWG 2020SUM



Dayton Transmission Zone M-3 Process
Russia, Ohio

Need Number: Dayton-2020-001

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 6/19/20

Previously Presented:

Needs Meeting 2/21/2020

Solution Meeting 4/20/2020

Project Driver:

Operational performance

Specific Assumption Reference:

Dayton Local Plan Assumptions (Slide 5)

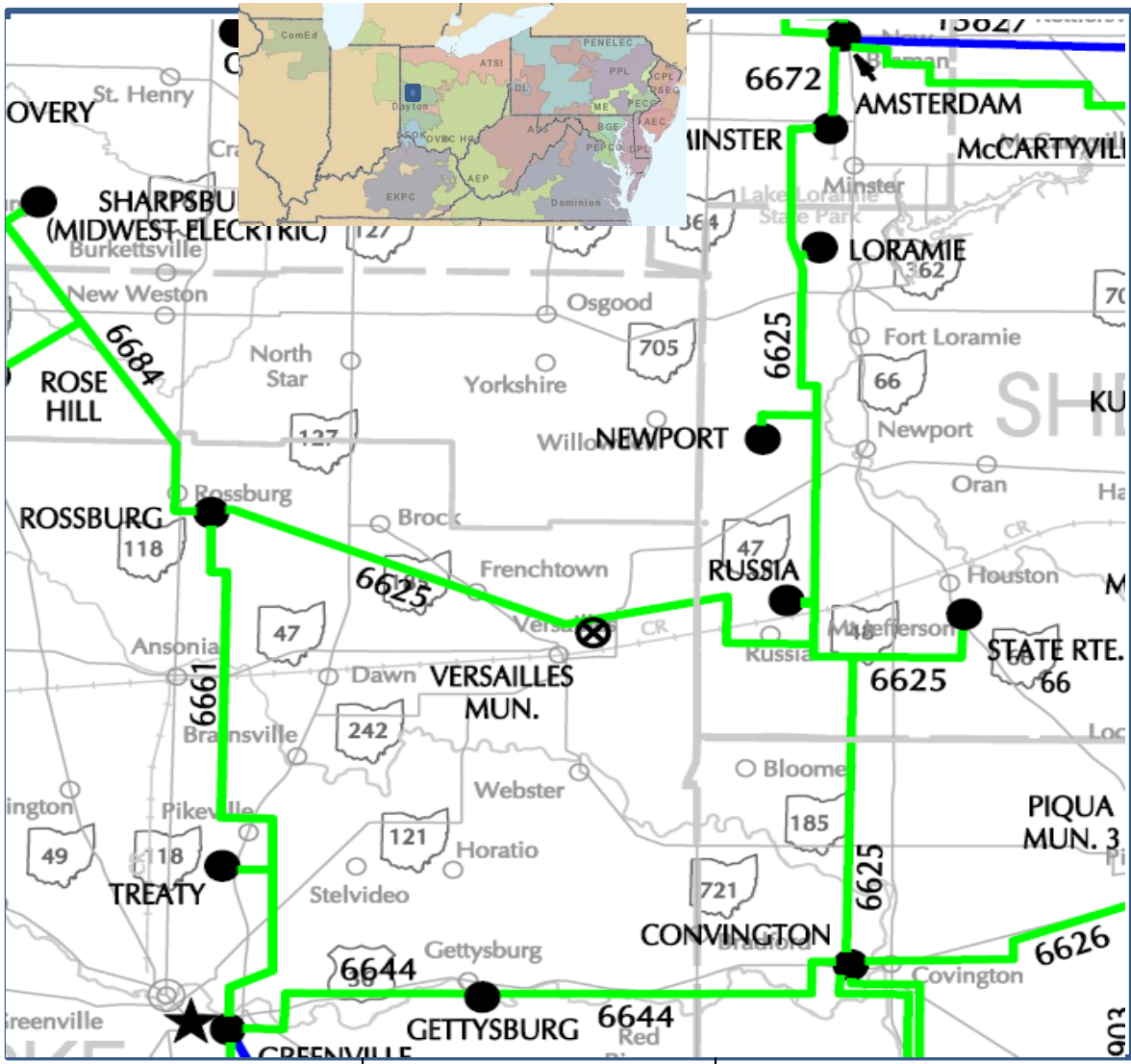
Problem Statement:

- 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 40MW of load.

- A fault occurring anywhere on this 42 mile line will result in at least a temporary outage and potential permanent outage to all 7,000 customers.

-This line is one of the worst performing 69kV transmission lines in the Dayton zone. The line has experienced 30 outages (5 permanent and 25 momentary) since 2016, and the total duration of those outages is ~3700 minutes. Most of the permanent outages have been caused by equipment related issues while most of the momentary outages have been the result of weather.

-This is a three-terminal transmission line which causes protection and control concerns which could lead to possible misoperation. There are existing sectionalizing switches to help reduce outage time but the switches have not operated reliably during outage conditions and will need addressed.



Dayton Transmission Zone M-3 Process
Russia, Ohio

Need Number: Dayton-2020-001

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 6/19/20

Selected Solution:

The solution to address this need will be :

Convert the existing Russia Substation from a tapped substation to a ring bus arrangement and complete 69kV transmission line work to loop lines in and out of the substation. (**S2254.1**) **Estimated Cost: $4.25M**

- This reconfiguration will require the installation of four new 69kV circuit breakers and will involve approximately 1 mile of double circuit 69kV transmission line construction.
- The solution will effectively eliminate the current three-terminal line configuration and will reduce exposure from 42 miles down to approximately 14 miles for each new section of the line.
- This will lead to fewer outages and quicker restoration times for the six substations that currently receive service from the existing line.

Upgrade the existing auto sectionalizers at Loramie (**S2254.2**) **Estimated Cost: $0.35M**

Upgrade the existing auto sectionalizers at Versailles (**S2254.3**) **Estimated Cost: $0.35M**

Replace the existing switches at the SR 66 tap with a new auto sectionalizing switches, (**S2254.4**) **Estimated Cost: $0.35M**

- These will further reduce outage times to improve service to customers.

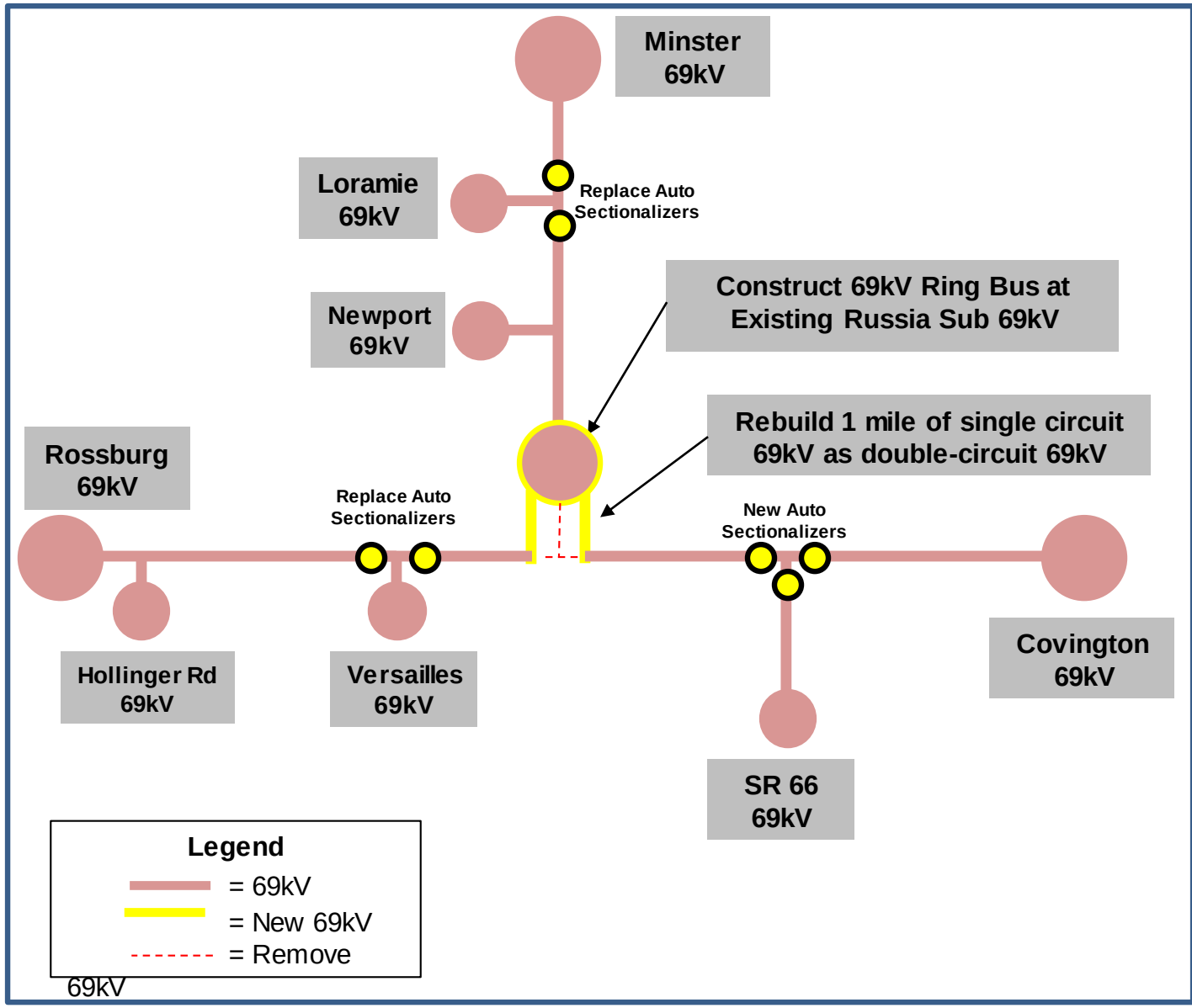
Estimated Cost: $5.3M

Projected In-Service: 12/31/2023

Project Status: Conceptual

Model: 2018 RTEP – 2023 Summer Case

Supplemental Project ID: S2254.1 -.4



Dayton Transmission Zone M-3 Process
Jasper, Ohio

Need Number: Dayton-2020-002

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 6/19/20

Previously Presented:

Needs Meeting 3/19/2020

Solutions Meeting 4/20/2020

Project Driver:

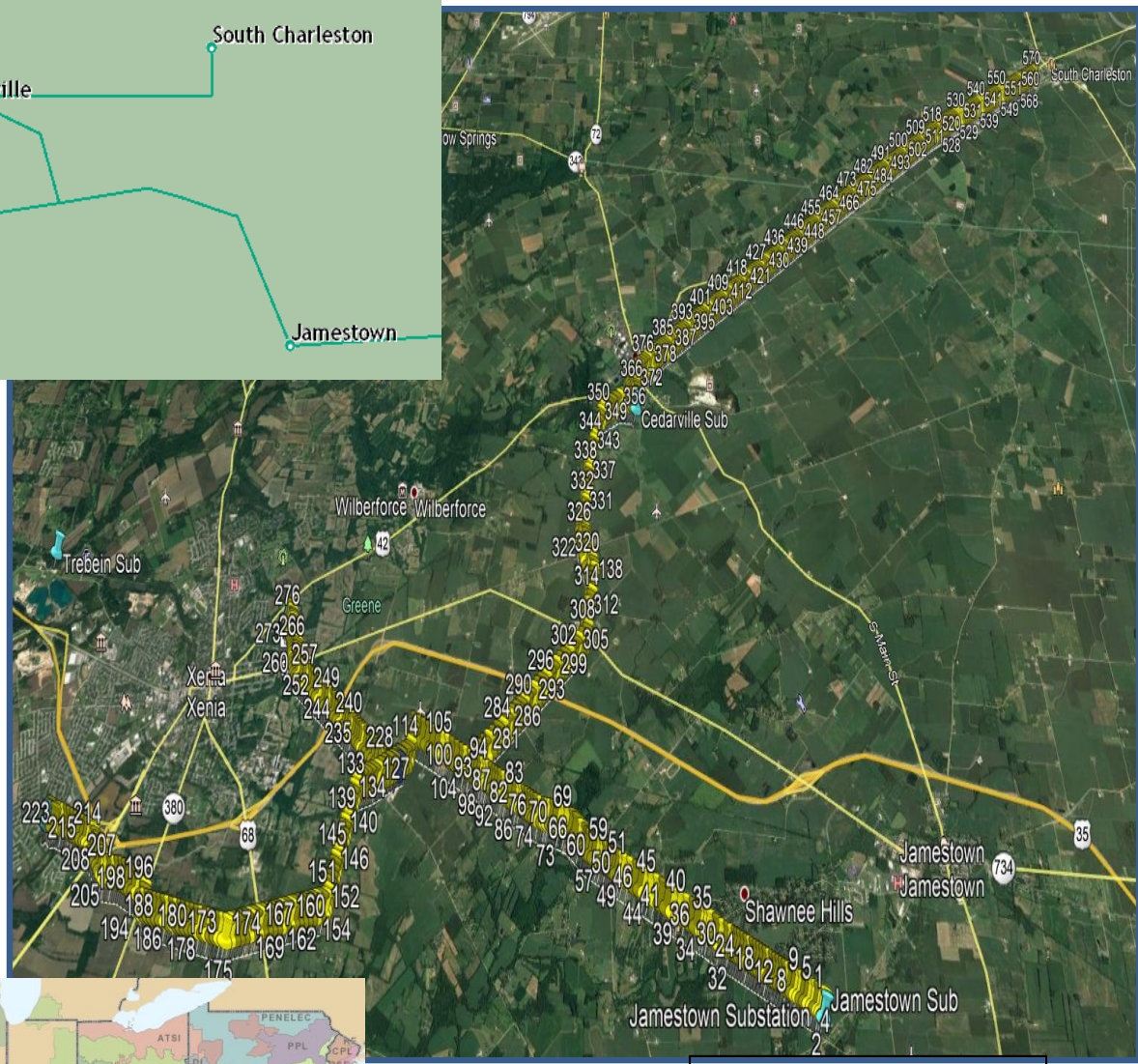
Operational performance

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
Jasper, Ohio

Need Number: Dayton-2020-002

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 6/19/20

Selected Solution:

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**) **Estimated Cost: $5.7M**

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

Install two new 69kV breakers at the South Charleston Substation (**S2255.2**) **Estimated Cost: $1.6M**

Install a single 69kV breaker and switch at the Cedarville Substation(**S2255.3**) **Estimated Cost: $2.9M**

- The line exposure on the feeds to Cedarville and South Charleston exposure will be reduced from ~17 miles to ~6 miles for the section to Cedarville and ~11 miles for the section between Cedarville and South Charleston.
- Circuit breakers will help ensure reliability and enhance performance to customers served at Cedarville and South Charleston by ensuring an outage on the ~17 mile portion of that line does not take out all 3 distribution transformers and ~25MW of load.

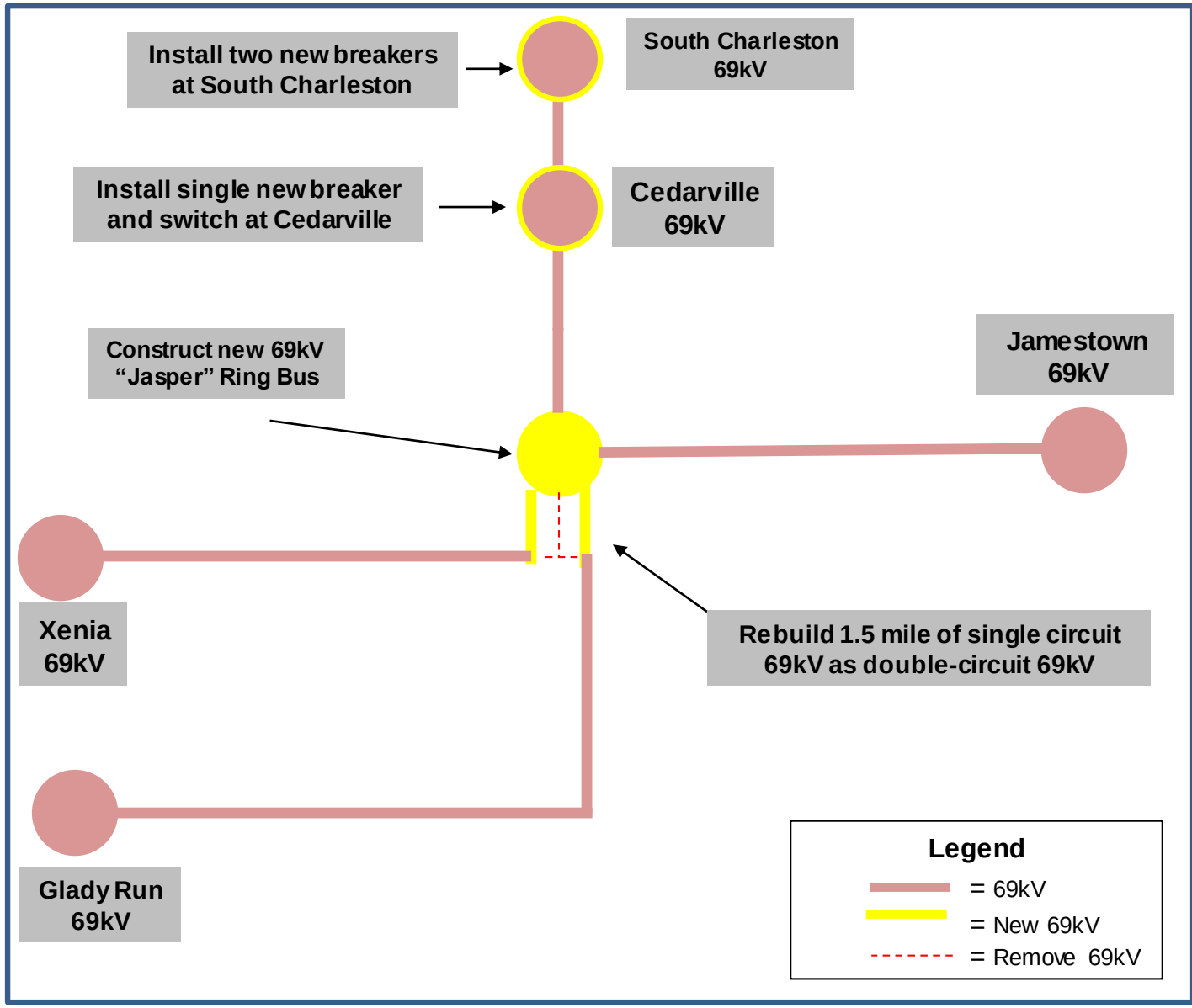
Estimated Cost: $10.2M

Projected In-Service: 12/31/2023

Project Status: Conceptual

Model: 2018 RTEP – 2023 Summer Case

Supplemental Project ID: S2255.1 -.3



Dayton Transmission Zone M-3 Process
Octa, Ohio

Need Number: Dayton-2020-003

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 6/19/20

Previously Presented:

Needs Meeting 3/19/2020

Solutions Meeting 4/20/2020

Project Driver:

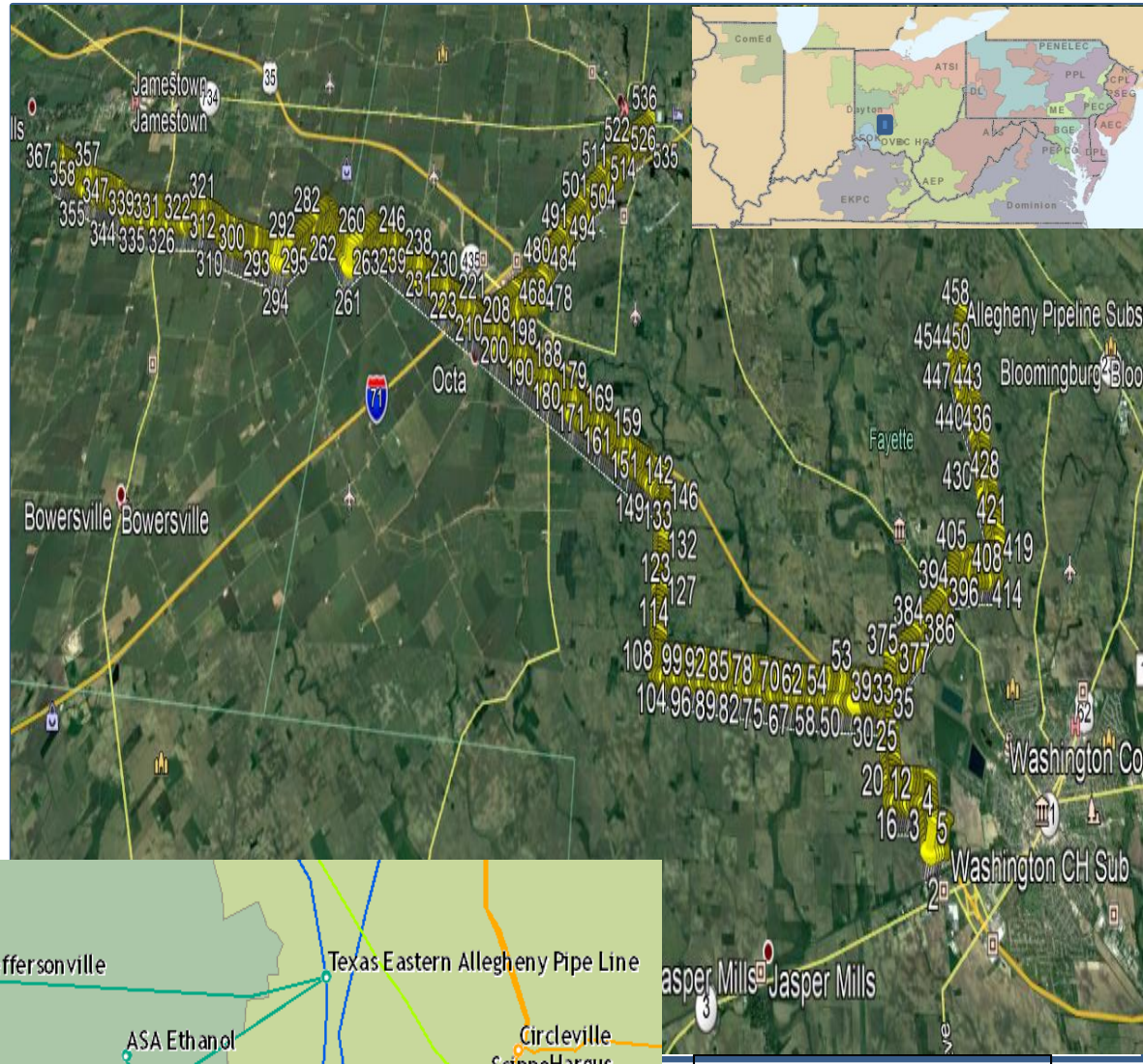
Operational performance

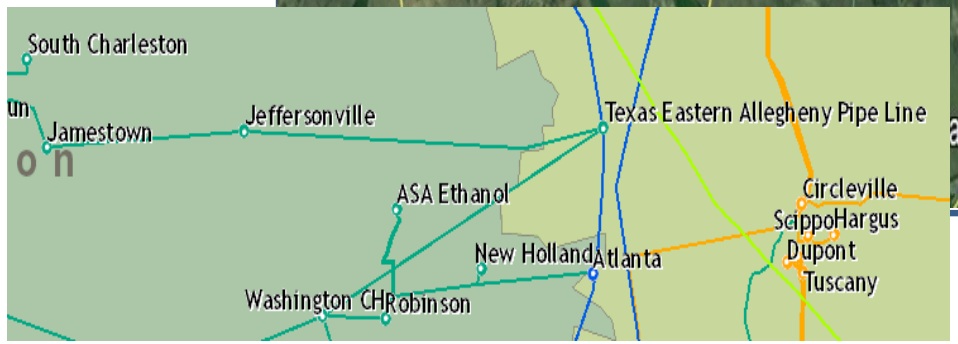
Specific Assumption Reference:

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.





= 345kV
= 138kV
= 69kV

Dayton Transmission Zone M-3 Process
Octa, Ohio

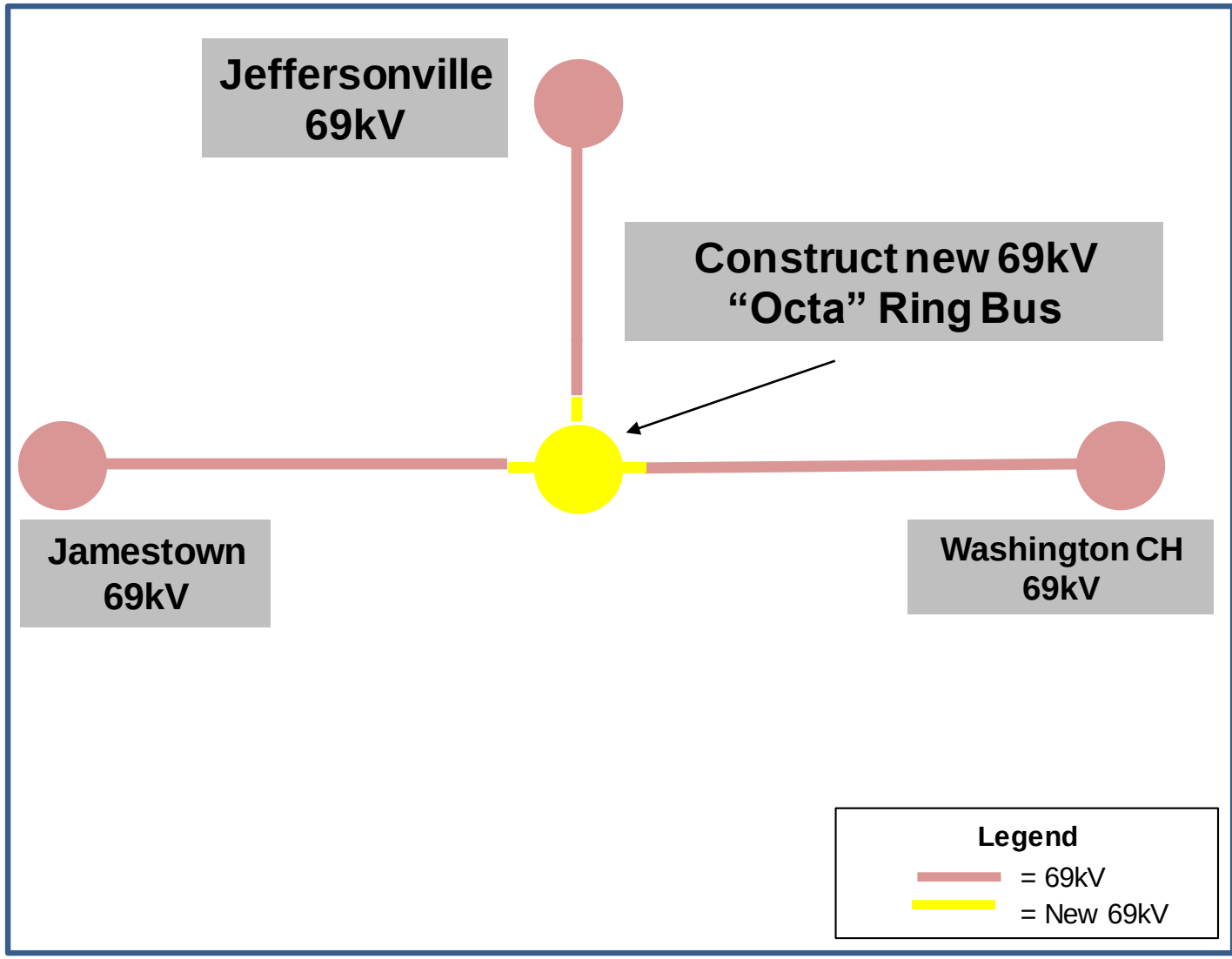
Need Number: Dayton-2020-003

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 6/19/20

Selected Solution:

The solution to address this need will be to construct a new three breaker ring bus substation called "Octa" and complete 69kV transmission line work to loop lines in and out of the substation.

- This reconfiguration will require the installation of three new 69kV circuit breakers and will involve approximately 0.5 miles of 69kV transmission line construction to bring the lines to the substation.
- This project will significantly reduce the exposure on the existing ~31 mile line to ~10 miles to Jamestown, ~5 miles to Jeffersonville, and ~15 miles to Washington CH.
- The location of the Octa Sub also provides an option to serve as a future source for distribution in the area.



Estimated Cost: $4.9M

Projected In-Service: 12/31/2023

Project Status: Conceptual

Model: 2018 RTEP – 2023 Summer Case

Supplemental Project ID: S2256

Dayton Transmission Zone M-3 Process
Jackson Center, Ohio

Need Number: Dayton-2020-004

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 6/19/20

Previously Presented:

Needs Meeting 3/19/2020

Solutions Meeting 4/20/2020

Project Driver:

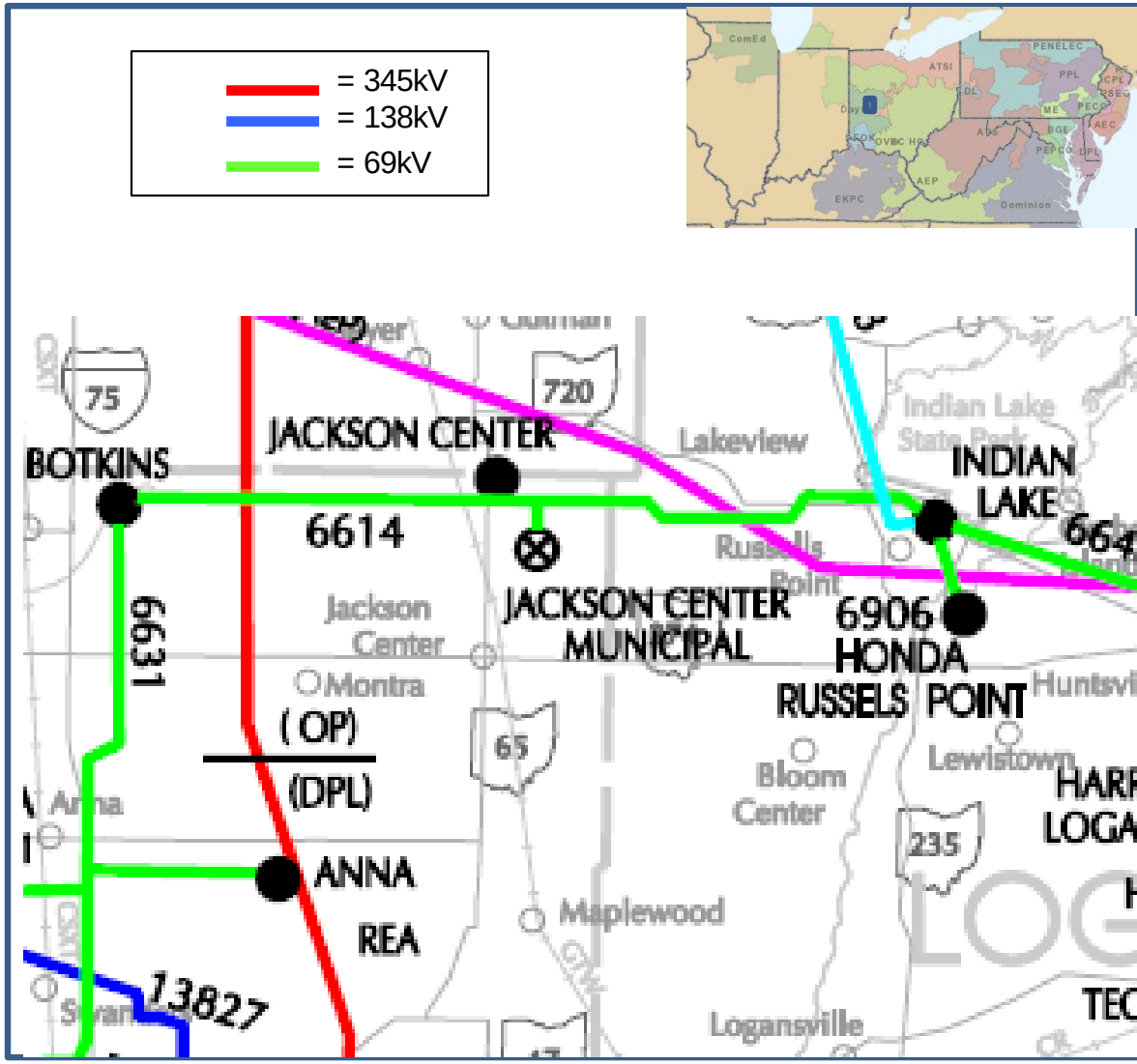
Requested customer upgrades

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
Jackson Center, Ohio

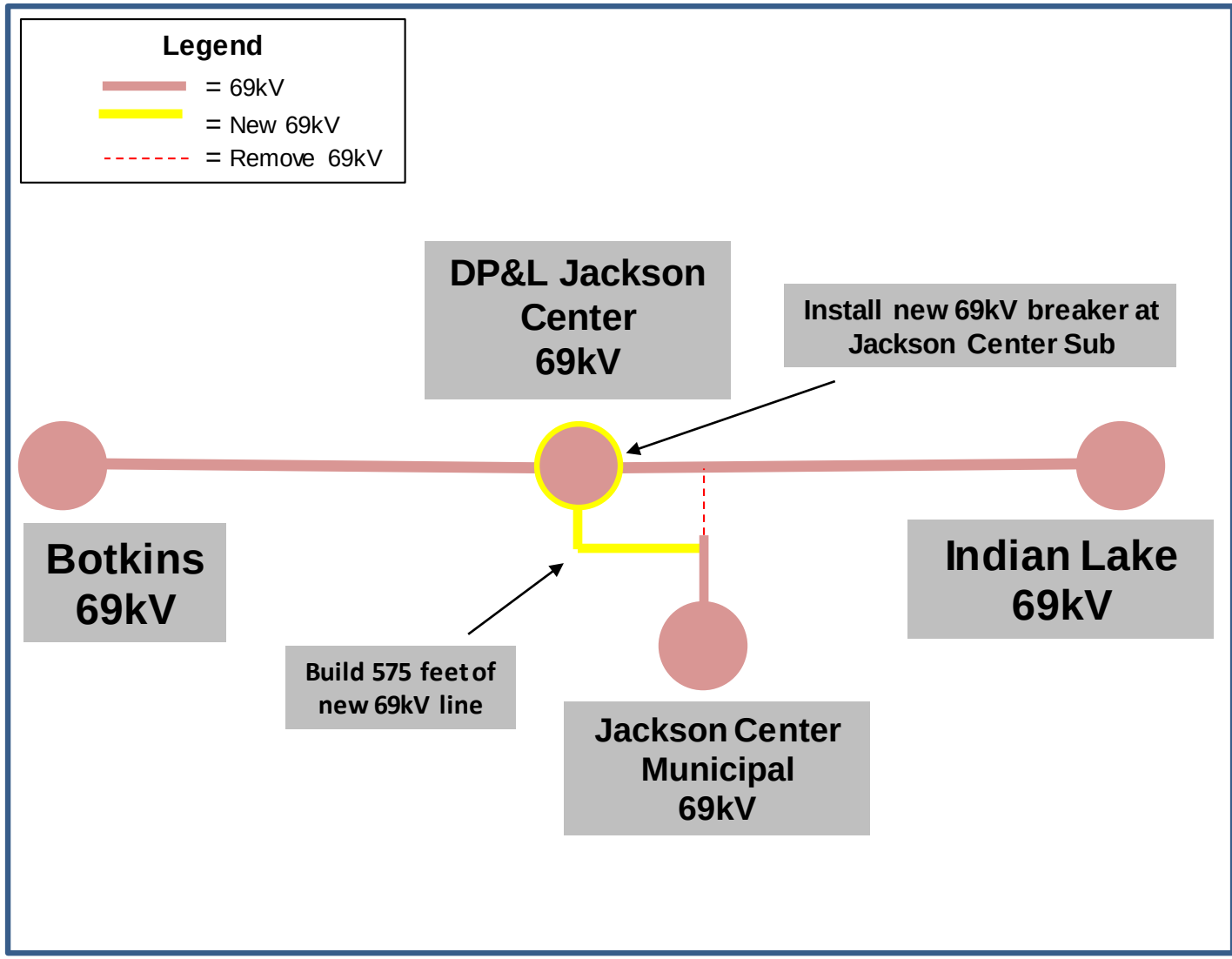
Need Number: Dayton-2020-004

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 6/19/20

Selected Solution:

The solution to address this need will be to install a single 69kV circuit breaker at DP&L's Jackson Center Substation and bring the 69kV transmission line to Jackson Center Municipal into a breaker position at the DP&L Jackson Center Substation.

- This will reduce exposure as the Jackson Center Municipal load moves into a breaker position and the village will no longer experience outages from a fault on DP&L's Jackson Center to Indian Lake 69kV line.
- This configuration change will also help reduce overall system exposure and improve performance since the 69kV line supplying service to Jackson Center Municipal's two substations will add no additional exposure on DP&L's Jackson Center-Indian Lake 69kV line.



Estimated Cost: $900,000

Projected In-Service: 12/31/2023

Project Status: Conceptual

Model: 2018 RTEP – 2023 Summer Case

Supplemental Project ID: S2257

Revision History

2/3/2020 – V1 – Added S2150

5/13/2020 – V2 – Added S2210

6/19/2020 – V3 – Added S2254.1-.4 - S2257, Slides #6 -#13