

Sub Regional RTEP Committee: Western DAYTON Supplemental Projects

April 20, 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

Need Number: Dayton-2020-005

Process Stage: Need Meeting 4/20/2020 (update), Originally presented 3/19/2020

Project Driver:

Requested customer upgrade, Operational performance

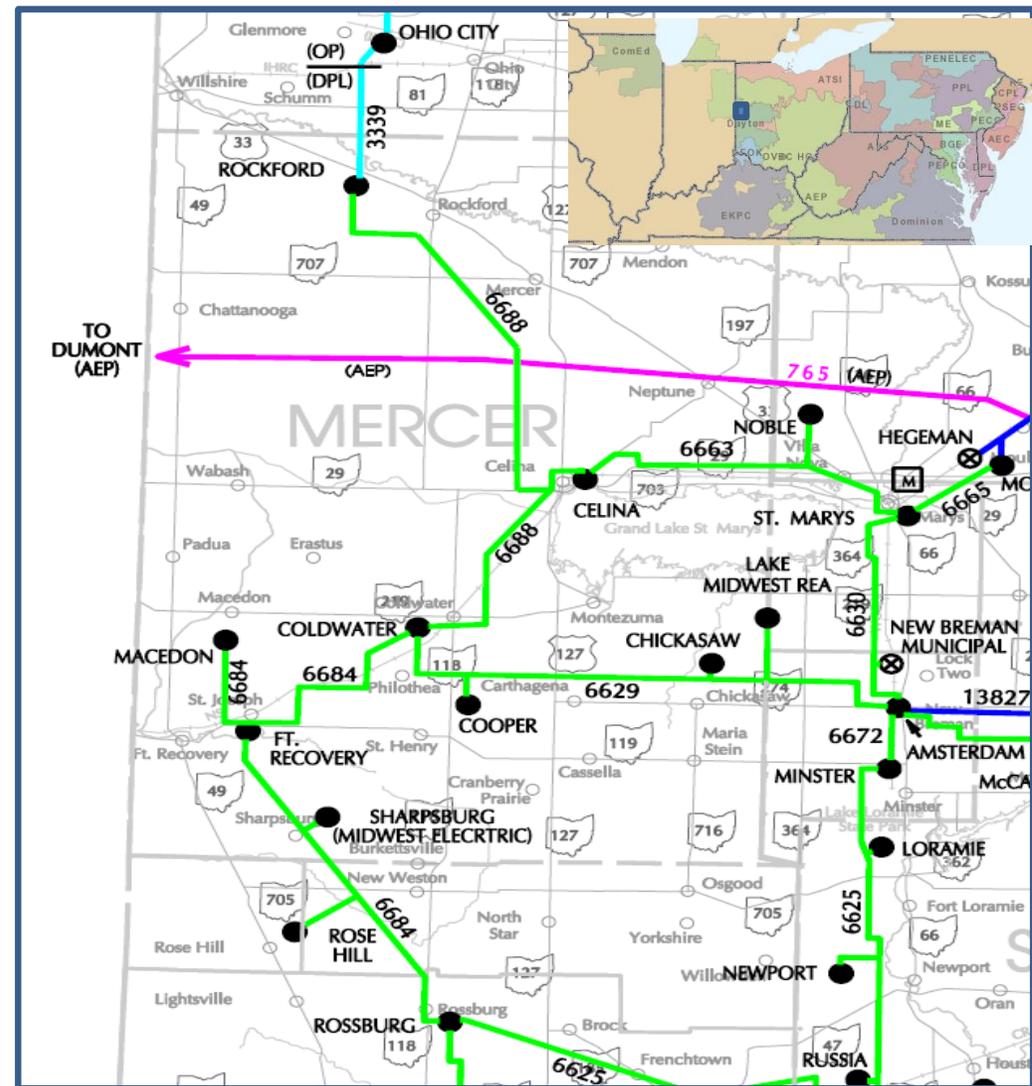
Specific Assumption Reference:

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 related projects in the vicinity, (s0326, s0327, and s0328), 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.



—	= 345kV
—	= 138kV
—	= 69kV

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-2020-004

Process Stage: Solutions Meeting 4/20/2020

Previously Presented: Needs Meeting 3/19/2020

Project Driver:

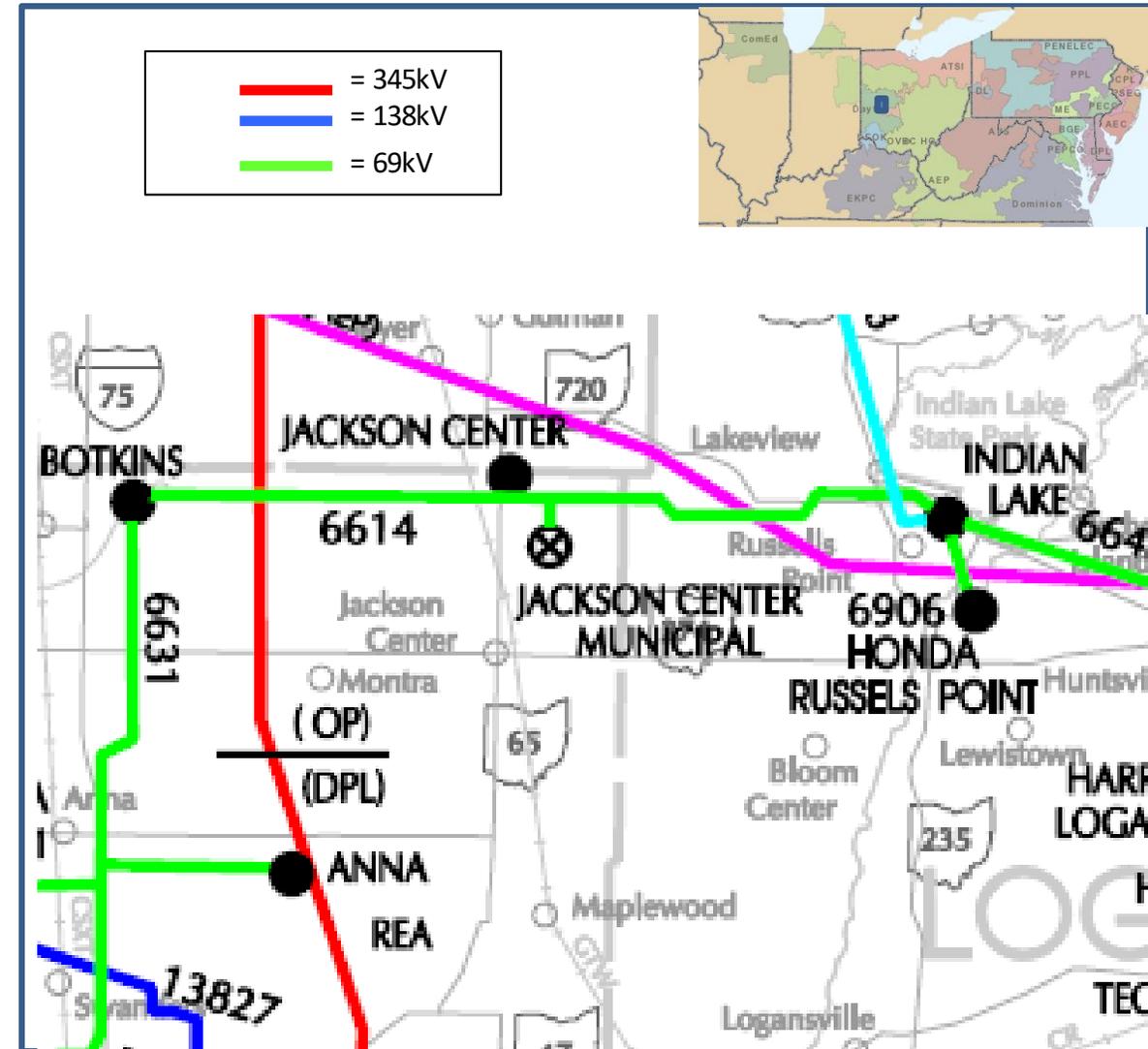
Requested customer upgrades

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.



Need Number: Dayton-2020-004

Process Stage: Solutions Meeting 4/20/2020

Proposed 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.

The project is estimated to cost \$900,000.

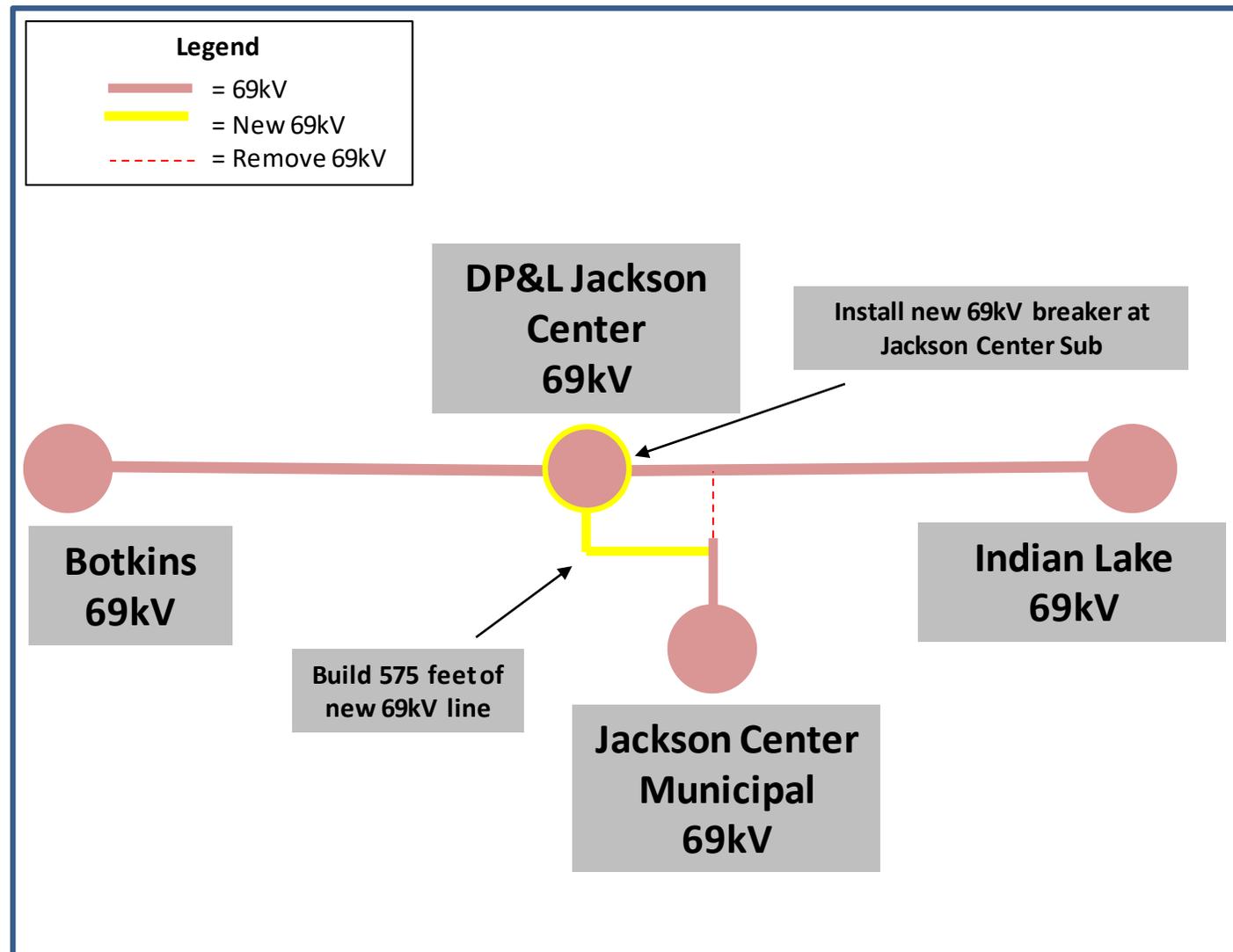
Alternatives Considered:

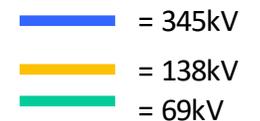
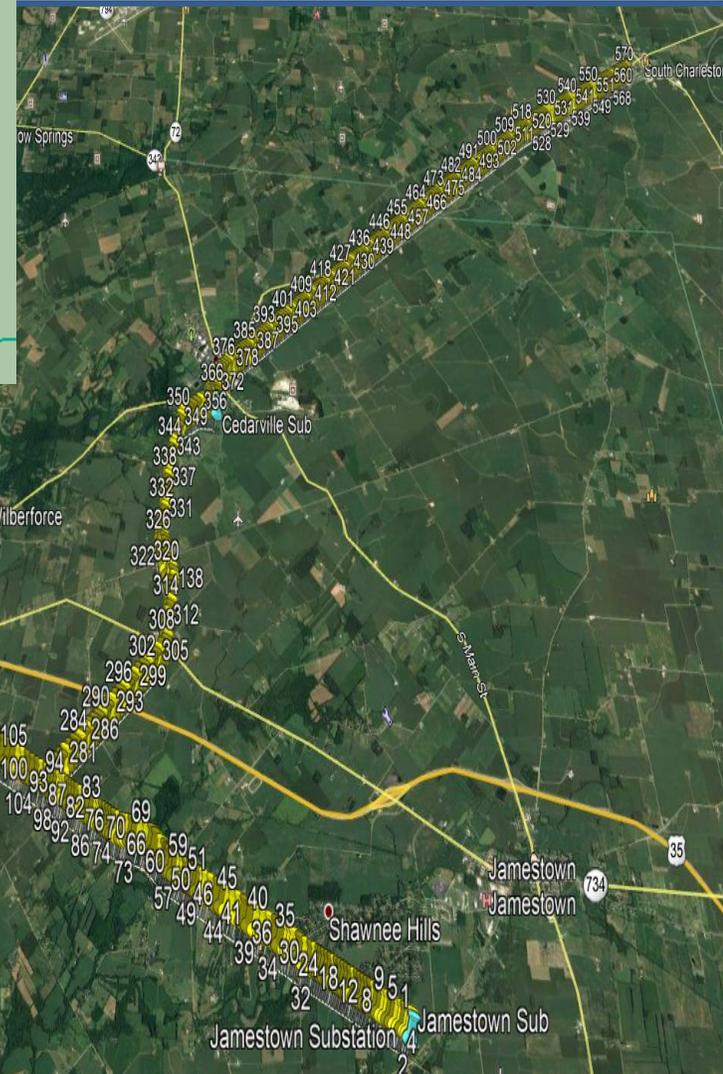
1. Install automatic line sectionalizing switches on DP&L's Jackson Center-Indian Lake 69kV line where the line goes to Jackson Center Municipal. Estimated cost \$400k

Projected In-Service: 12/31/2023

Project Status: Conceptual

Model: 2018 RTEP – 2023 Summer Case





Need Number: Dayton-2020-002

Process Stage: Solutions Meeting 4/20/2020

Previously Presented: Needs 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

Need Number: Dayton-2020-002

Process Stage: Solutions Meeting 4/20/2020

Proposed 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.

- 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 and a single 69kV breaker and switch will need installed at the Cedarville Substation.

- 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.

The project is estimated to cost \$10.2M

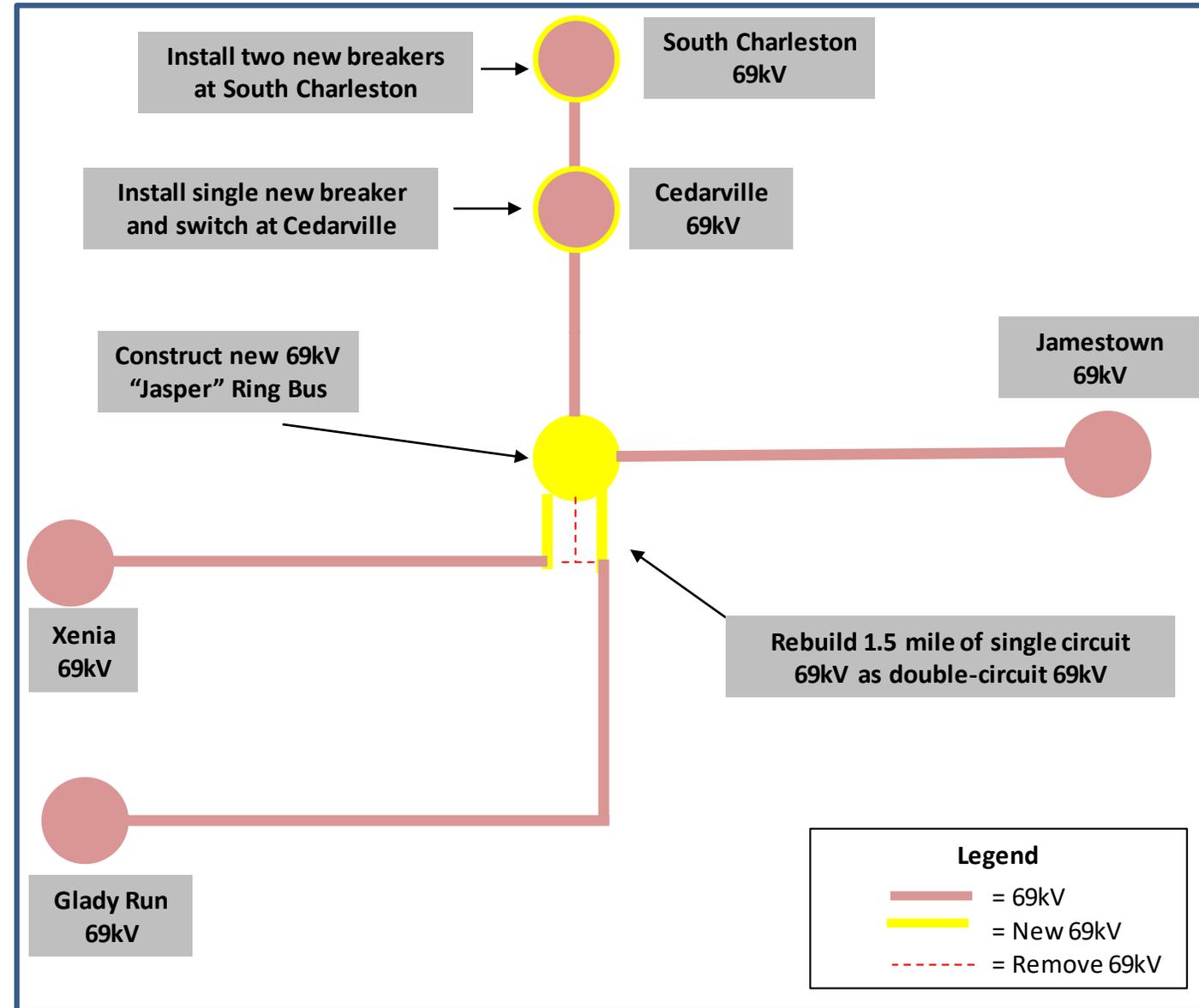
Alternatives Considered:

1. Rebuild the existing 69kV transmission line from Xenia-Glady Run-Jamestown. This alternative was not selected due to the higher cost. Estimated cost \$32M

Projected In-Service: 12/31/2023

Project Status: Conceptual

Model: 2018 RTEP – 2023 Summer Case



Need Number: Dayton-2020-003

Process Stage: Solutions Meeting 4/20/2020

Previously Presented: Needs Meeting 3/19/2020

Project Driver:

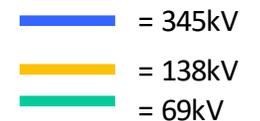
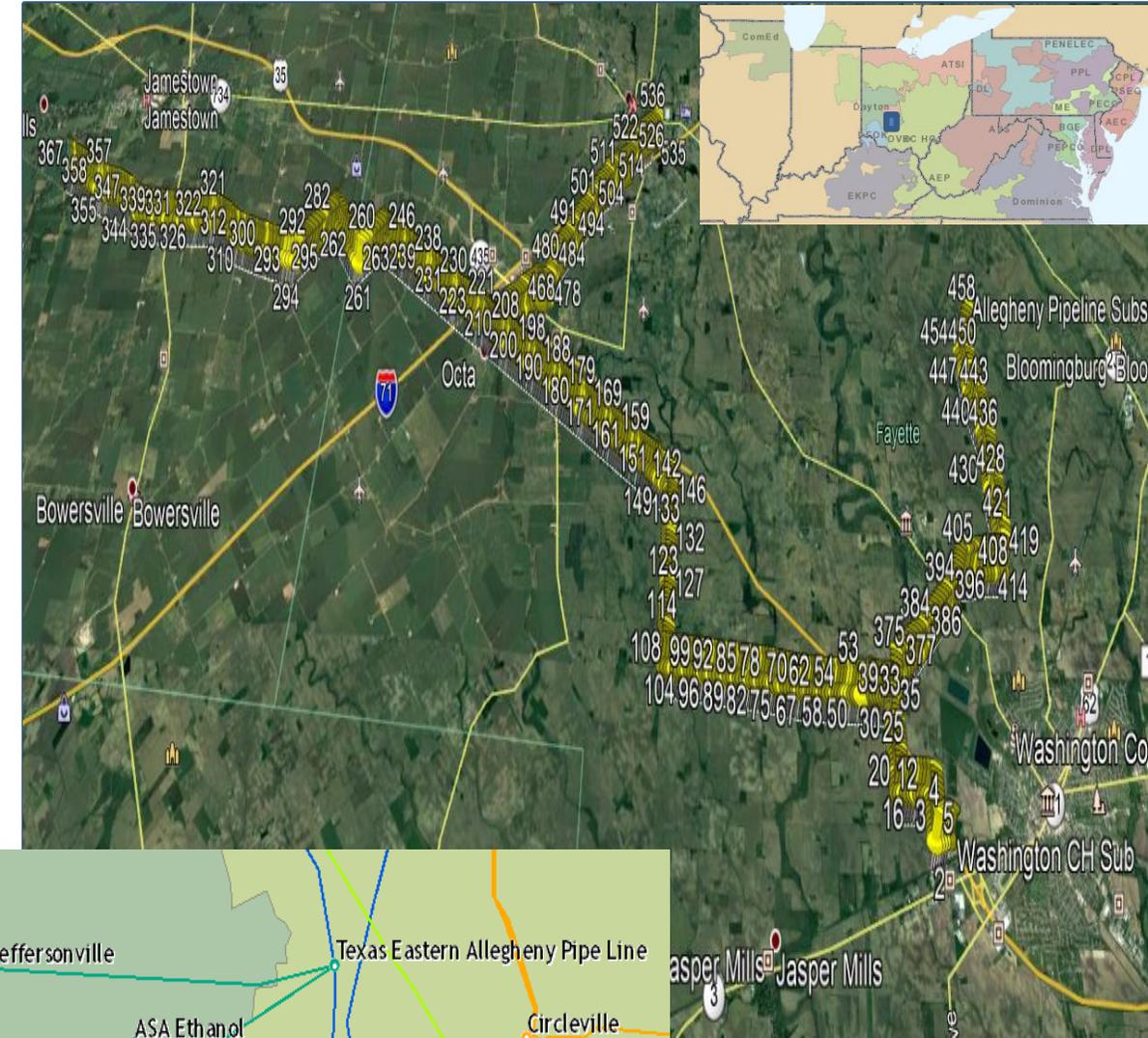
Operational performance

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.



Need Number: Dayton-2020-003

Process Stage: Solutions Meeting 4/20/2020

Proposed 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.

The project is estimated to cost \$4.9M

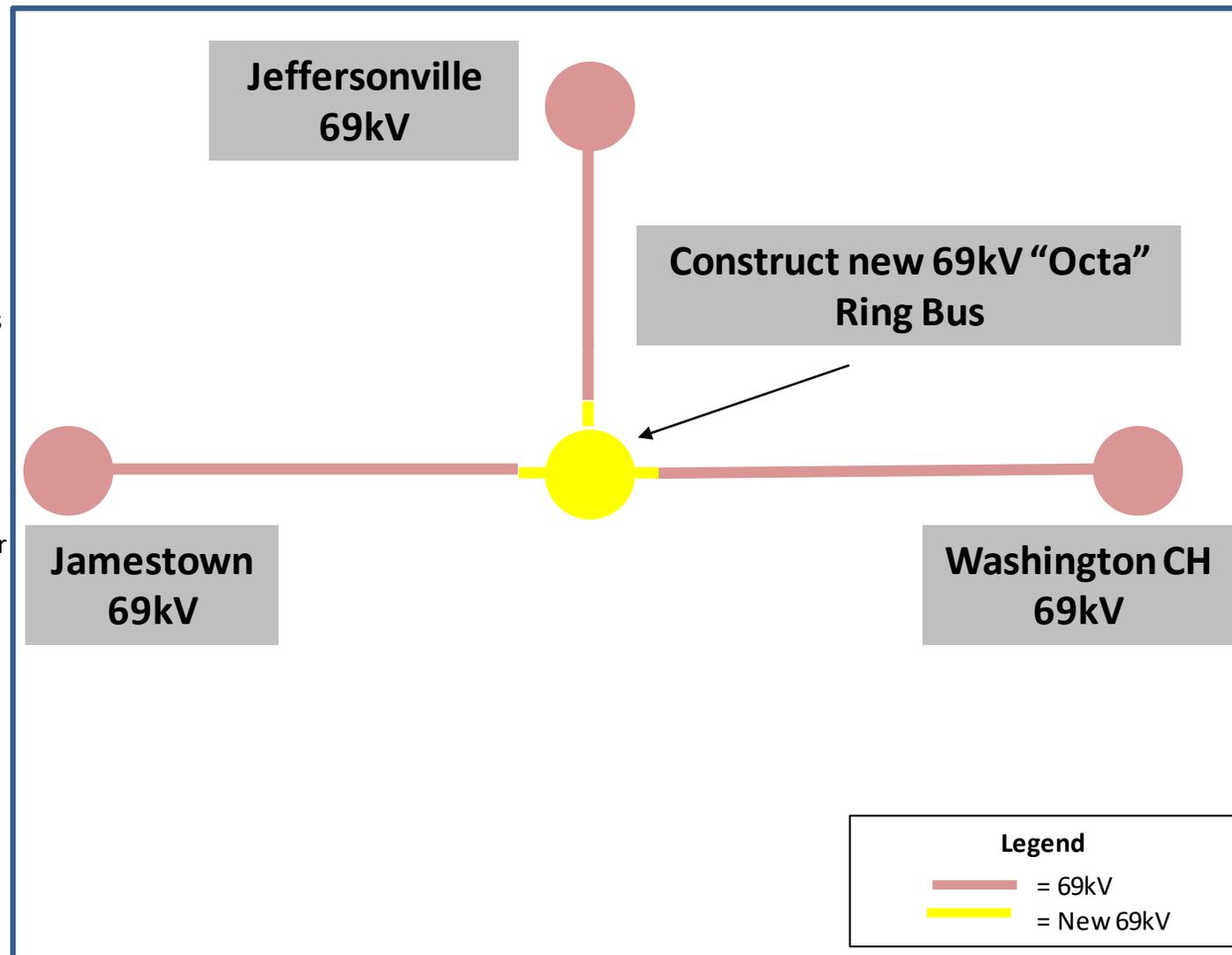
Alternatives Considered:

1. Rebuild the existing 31 mile 69kV line from Washington CH-Jamestown. This alternative was not selected due to the higher cost. Estimated cost \$31M

Projected In-Service: 12/31/2023

Project Status: Conceptual

Model: 2018 RTEP – 2023 Summer Case



Need Number: Dayton-2020-001

Process Stage: Solutions Meeting 4/20/2020

Previously Presented: Needs Meeting 2/21/2020

Project Driver:

Operational performance

Specific Assumption Reference:

Dayton Local Plan Assumptions (Slide 5)

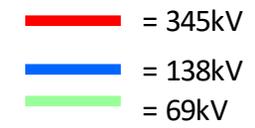
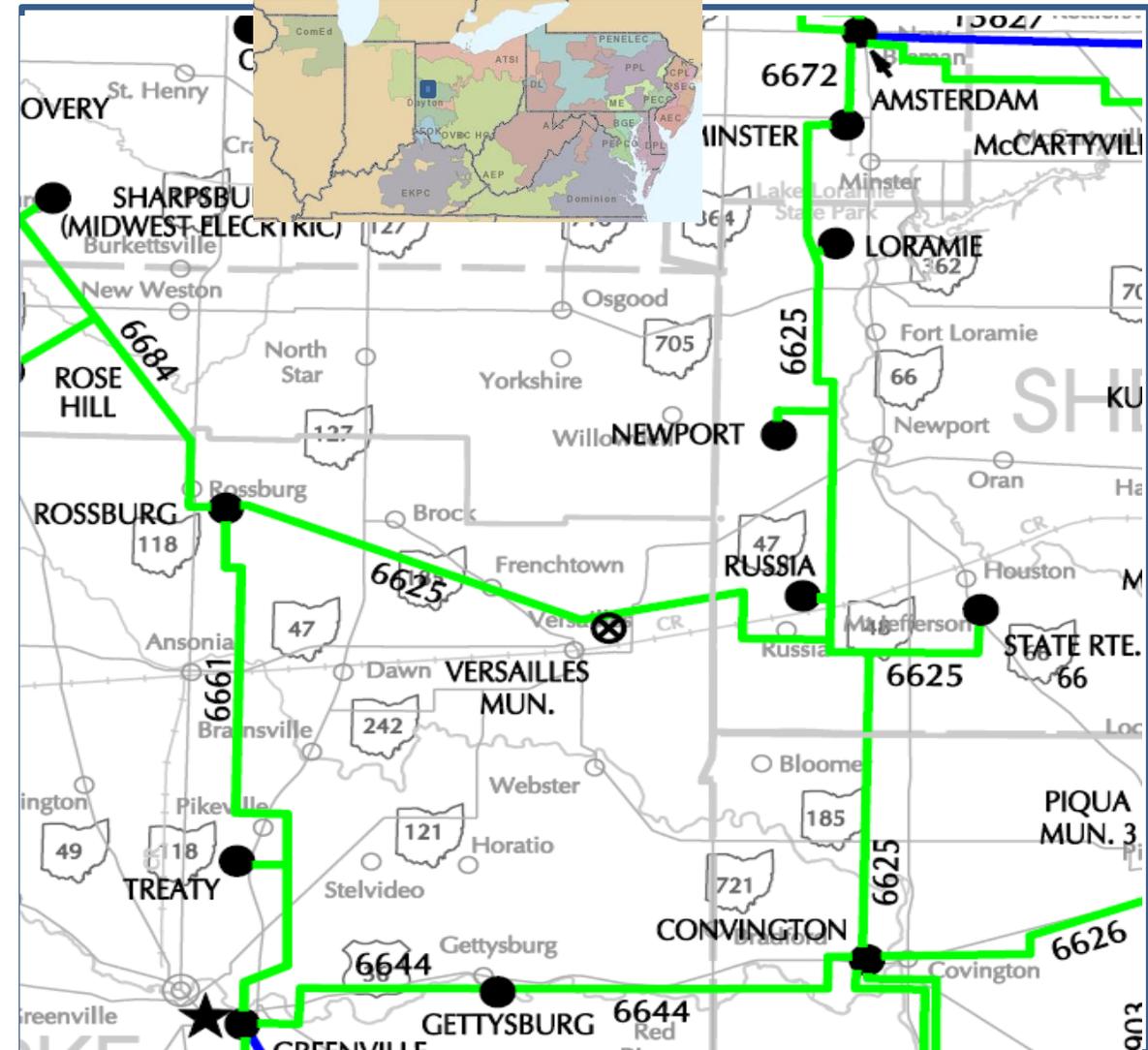
Problem Statement:

- 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.



Need Number: Dayton-2020-001

Process Stage: Solutions Meeting 4/20/2020

Proposed Solution:

The solution to address this need will be to 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.

- 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.
- In addition, the existing auto sectionalizers at Loramie and Versailles will be upgraded and we will replace the existing switches at the SR 66 tap with a new auto sectionalizing switches, which will further reduce outage times to improve service to customers.

The project is estimated to cost \$5.3M

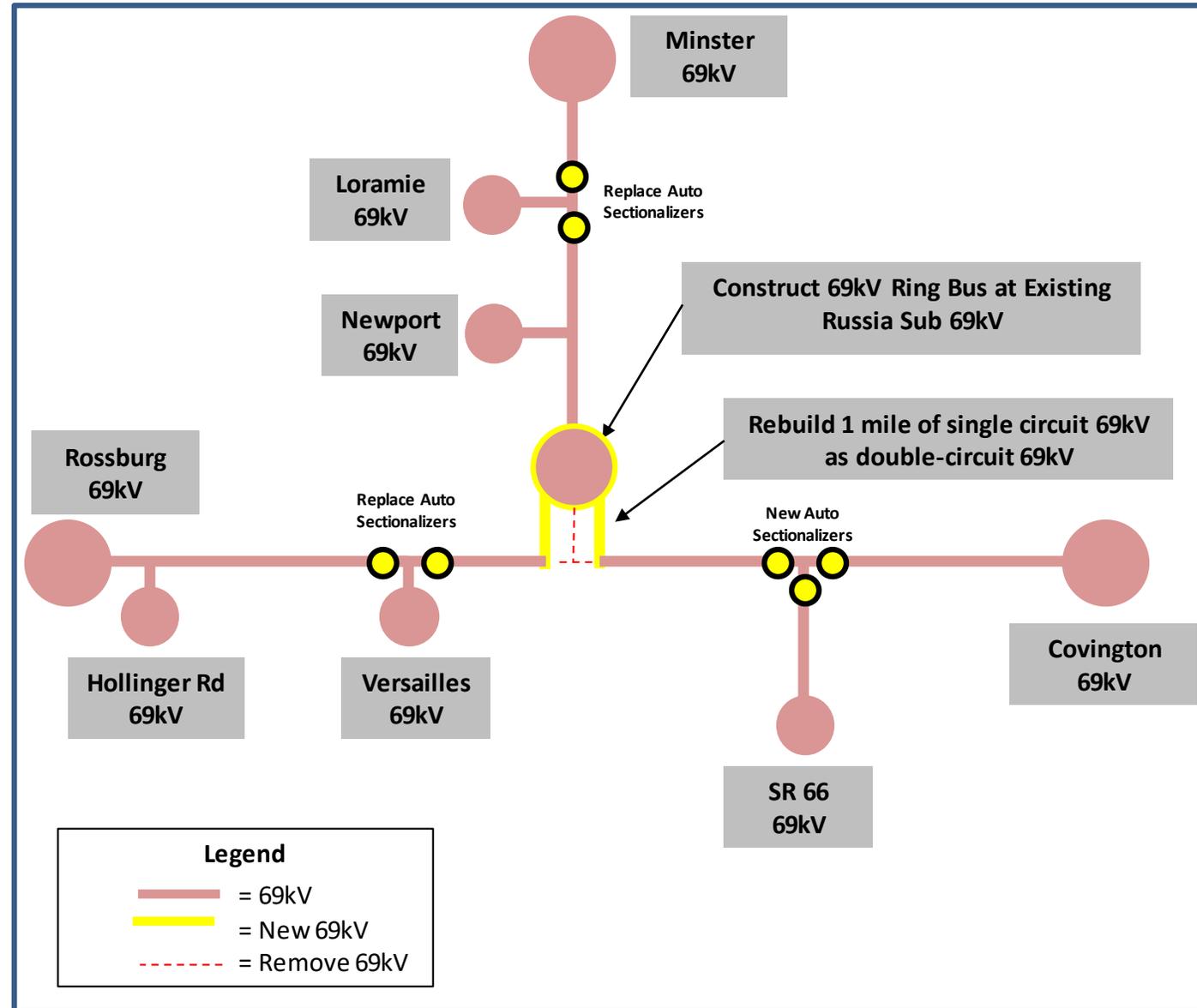
Alternatives Considered:

1. Construct a 69kV ring bus at the existing Russia Substation and build a 1.25 mile single circuit extension from the 69kV line out of Versailles directly to Russia Sub. Replace the existing auto sectionalizers at Loramie and Versailles, and replace the existing switches at the SR 66 tap with auto sectionalizers. This alternative was not selected since it would lead to new ROW, longer lead times, and higher costs. Estimated cost \$5.6M
2. Rebuild the existing 69kV transmission line from Covington-Rossburg-Minster. This alternative was not selected due to the higher cost. Estimated cost \$42M

Projected In-Service: 12/31/2023

Project Status: Conceptual

Model: 2018 RTEP – 2023 Summer Case



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

4/8/2020 – V1 – Original version posted to pjm.com