

Submission of Supplemental Projects for Inclusion in the Local Plan

Need Number: DEOK 2019-023

Process Stage: Local Plan Submission 03-02-2020

Previously Presented:

Solutions Meeting 01-17-2020

Needs Meeting 11-22-2019

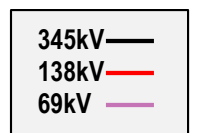
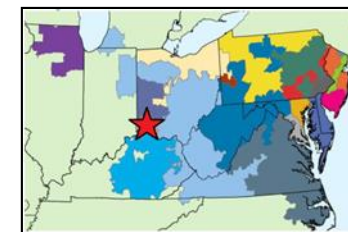
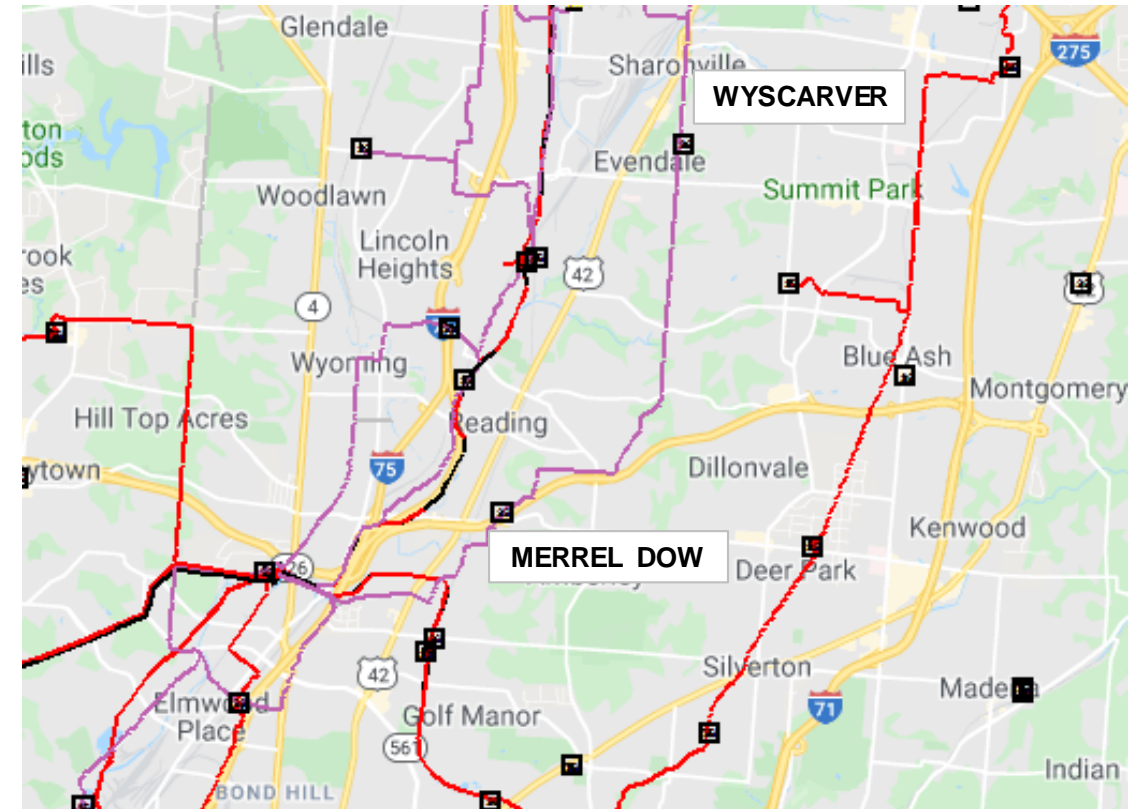
Project Driver: Equipment Condition, Performance and Risk

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slides 6 - 7

Problem Statement:

The 69kV feeder from Wyscarver to Marion Merrell Dow is in deteriorating condition. Constructed in 1940 with wooden mono poles and cross arms, and 300 and 400 kcmil copper conductor, 18% of the 101 structures were rejected and 12 open conditions were reported during a recent inspection. The line has had one momentary and eight sustained outages in the last five years with 5,042 customers experiencing an average outage time of 574 minutes.





DEOK Transmission Zone M-3 Process Wyscarver – Merrell Dow

Need Number: DEOK 2019-023

Process Stage: Solutions Meeting 01-17-2020

Selected Solution:

Rebuild 4.2 miles of feeder between Wyscarver and Marion Merrell Dow with 101 new steel poles, hardware and conductor. The capacity of the line will increase from 73MVA to 100MVA (substation switch limited). **(S2180)**

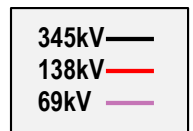
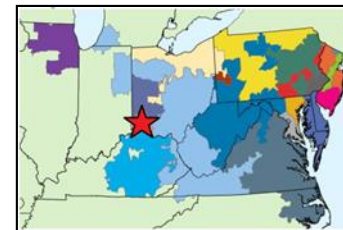
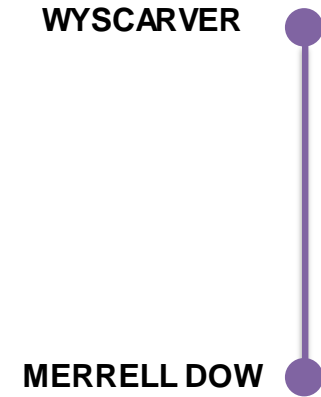
Estimated Cost: \$7.15M

Projected In-service Date: 06-01-2022

Supplemental Project ID: S2180

Project Status: Scoping

Model: 2019 RTEP Summer



Need Number: DEOK 2019-025

Process Stage: Local Plan Submission 03-02-2020

Previously Presented:

Solutions Meeting 01-17-2020

Needs Meeting 11-22-2019

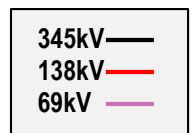
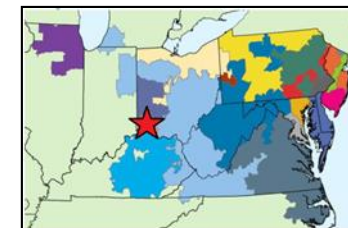
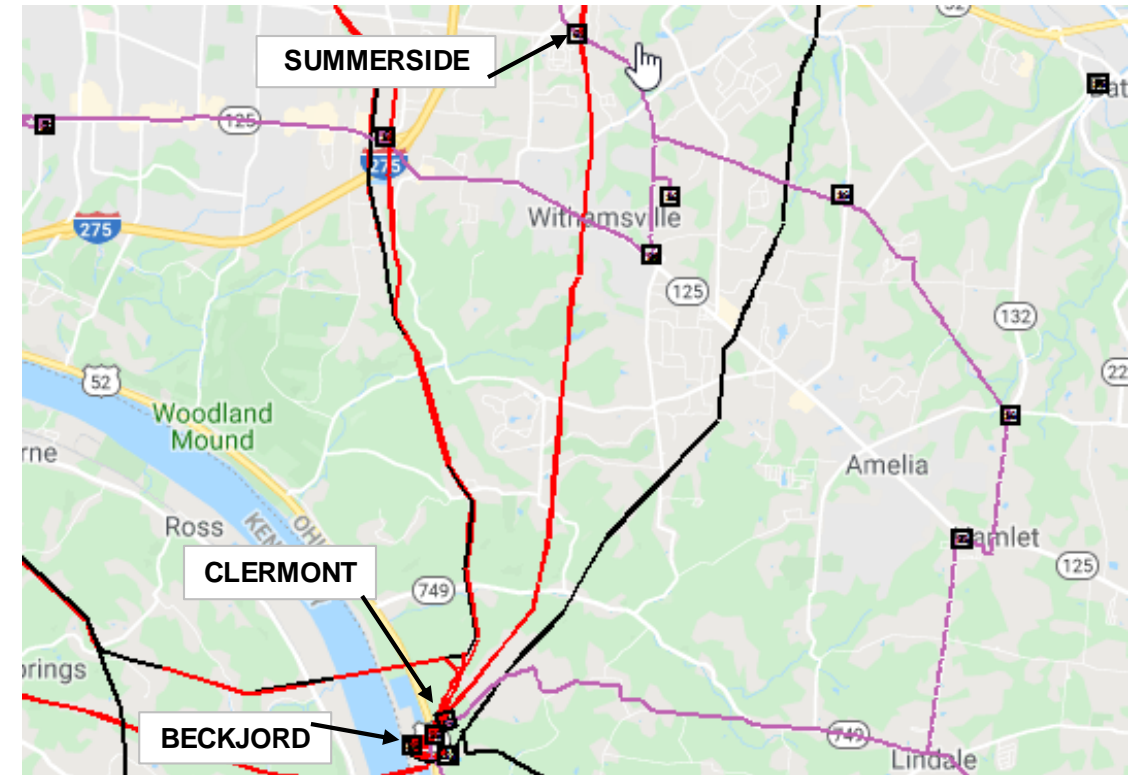
Project Driver: Equipment Condition, Performance and Risk

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slides 6-7

Problem Statement:

Clermont substation is one of three sources of supply to the far eastern 69kV system serving large portions of Clermont and Brown Counties. The vintage 1950's substation is in deteriorating condition. Structural steel is rusting. Concrete footings are starting to crack and spall. There are 138kV & 69kV cap and pin insulators which are prone to failure. Clermont has two 138/69kV 33MVA transformers. TB1 was manufactured in 1953. TB2 was manufactured in 1962. Both transformers continue to show increasing levels of gassing. Elevated levels of acetylene indicate internal problems. Double testing indicates the insulation on the windings is deteriorating. Ground switches are used as high side protective devices. This old design causes a fault on the 138kV system when they operate, interrupting the 138kV circuit from Beckjord to Summerside. If there is a fault on a transformer or bus it could result in a sustained outage to the 138kV circuit, effectively causing all of Clermont substation to be de-energized. It is impossible to install high side circuit switchers as protective devices and 138kV line switches for sectionalizing due to the configuration of the substation. To do this would require a complete substation rebuild. The hillside site is too small to reconfigure or rebuild to current standards.





DEOK Transmission Zone M-3 Process Clermont, Beckjord

Need Number: DEOK 2019-025

Process Stage: Solutions Meeting 01-17-2020

Selected Solution:

At Clermont: Retire the substation. Remove all equipment, foundations, underground cables, cableways, fencing and the control building. Connect the 138kV feeder from Beckjord to the feeder from Summerside. Connect the 69kV feeder from Blairville to the feeder from Amelia. At Beckjord: Replace the 138kV oil filled circuit breaker that connects to the high side of the existing 138/69kV transformer, install a new 138kV breaker connecting to a new 138/69kV 150MVA transformer, expand the substation and install four 69kV circuit breakers to form a ring bus. (**S2181**)

Ancillary Benefits: Resiliency and options for switching due to the ring bus configuration and the new transformer at Beckjord.

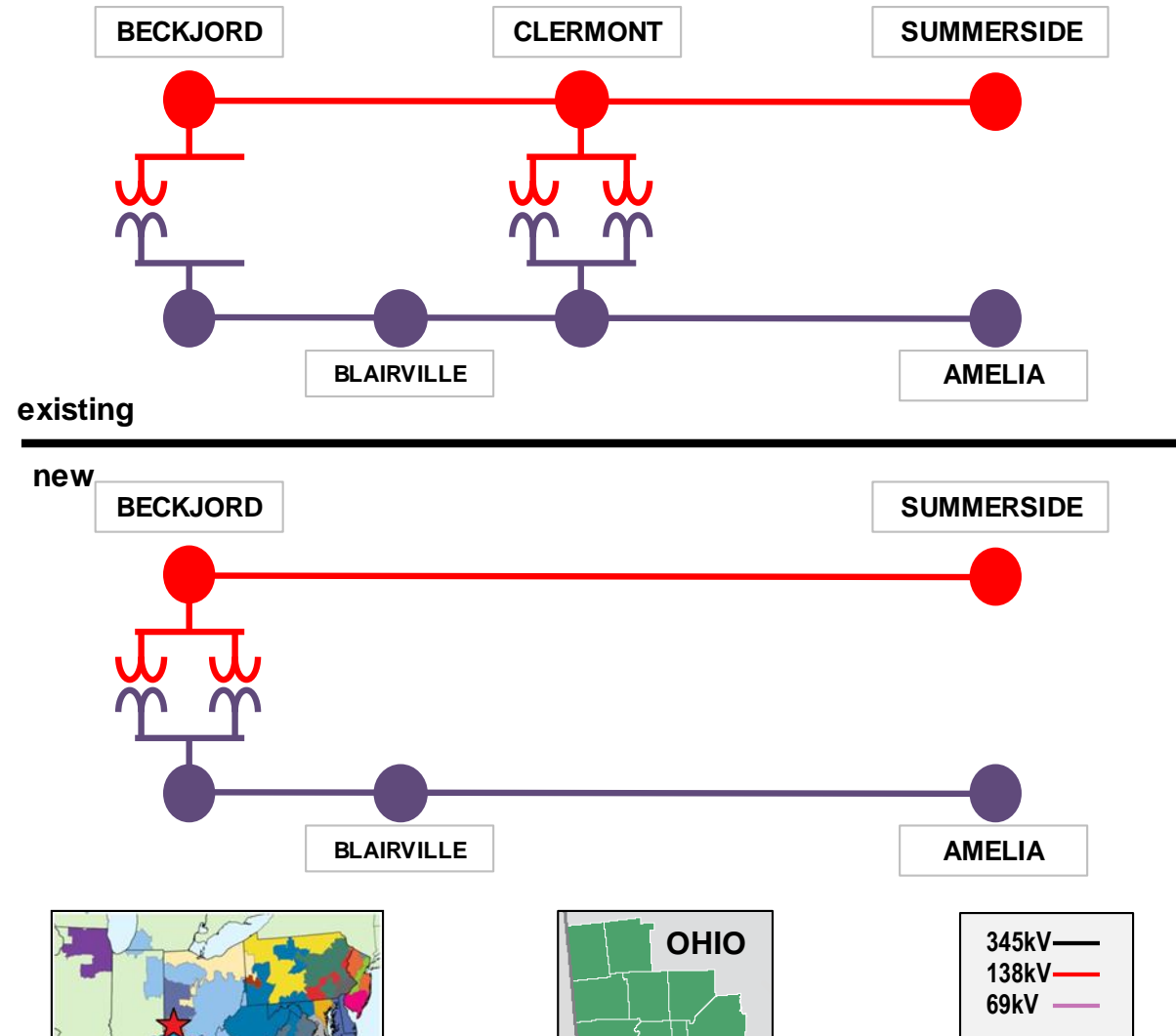
Estimated Cost: \$12.2M

Projected In-service Date: 06-21-2023

Supplemental Project ID: S2181

Project Status: Scoping

Model: 2019 RTEP Summer



Need Number: DEOK 2019-026

Process Stage: Local Plan Submission 03-02-2020

Previously Presented:

Solutions Meeting 01-17-2020

Needs Meeting 11-22-2019

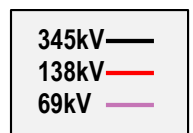
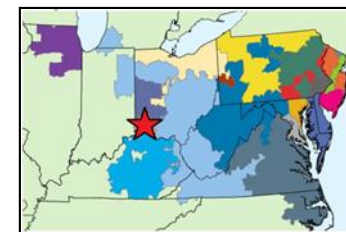
Project Driver: Equipment Condition, Performance and Risk

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slides 6-7

Problem Statement:

At Fairfield substation 138/34kV 56MVA TB1 is showing high levels of dissolved combustible gasses, especially acetylene indicating arcing in this 54 year old transformer. 138/69/34kV TB2's tertiary winding is connected to a grounding transformer and a 34kV distribution bus. This old system design exposes the transmission system to greater risk due to faults on the distribution system.



Need Number: DEOK 2019-026

Process Stage: Solutions Meeting 01-17-2020

Selected Solution:

Replace TB1 with a 138/34kV 60MVA transformer. Disconnect TB2's 34kV tertiary winding. Replace that source with a new 69/34kV 33MVA transformer. **(S2182)**

Estimated Cost: \$4.7M

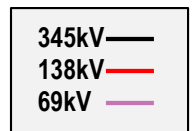
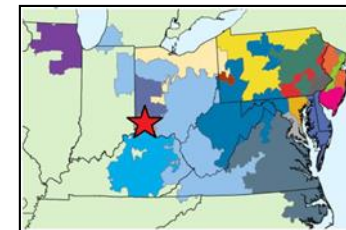
Projected In-service Date: 06-01-2021

Supplemental Project ID: S2182

Project Status: Scoping

Model: 2019 RTEP Summer

**Bubble Diagram Not Applicable
Station Modifications Only**





DEOK Transmission Zone M-3 Process Locust - Fairfield

Need Number: DEOK 2019-020

Process Stage: Local Plan Submission 05/11/2020

Previously Presented:

Needs Meeting 07-24-2019

Solutions Meeting 03-19-2020

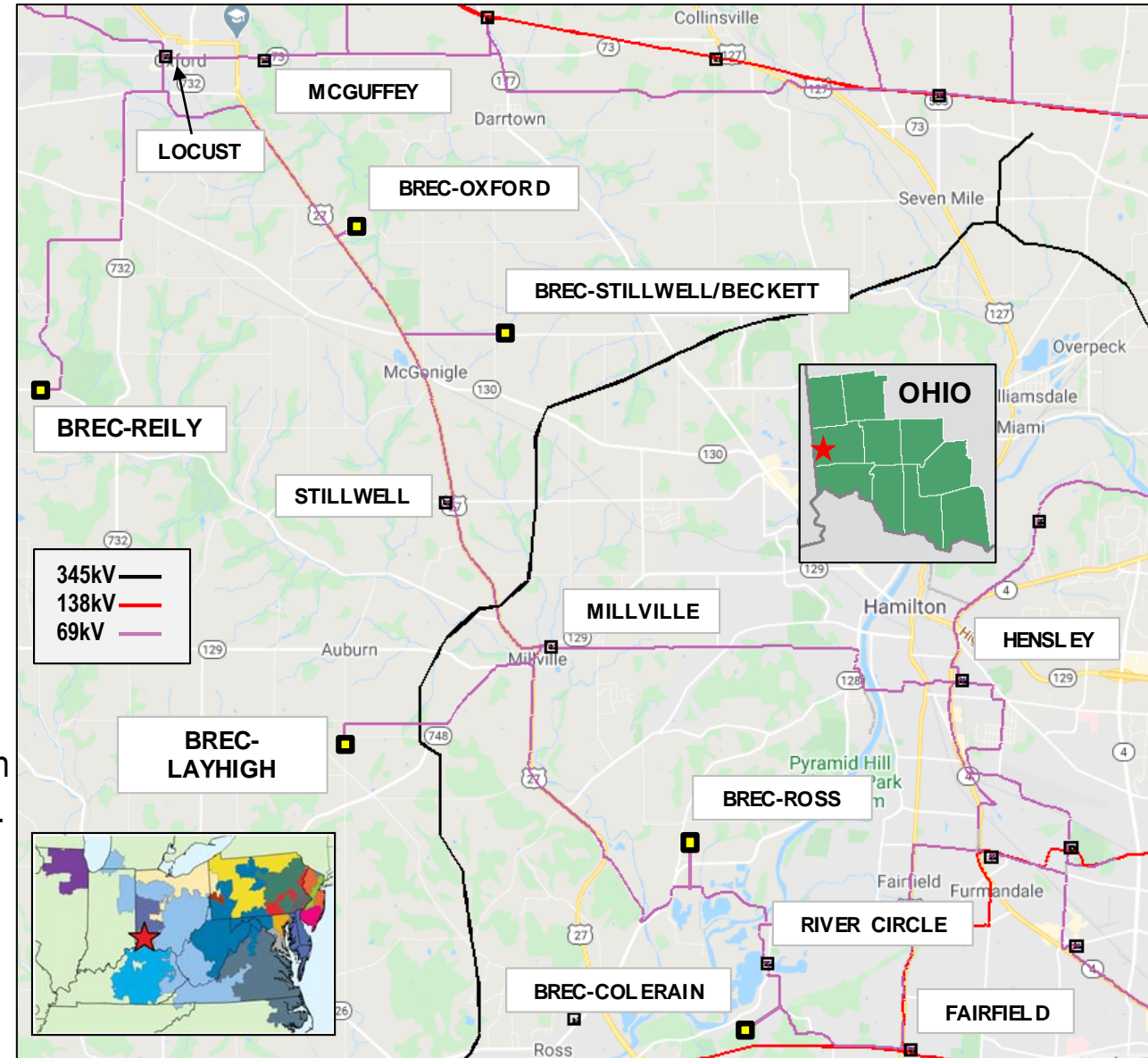
Project Driver: Customer Service

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slide 10.

Problem Statement:

Buckeye Power, on behalf of Butler Rural Electric Cooperative, has requested Duke Energy review options for improving the reliability of the 34 mile long, 69kV circuit from Fairfield to Locust substations. The six BREC delivery points connected to the circuit serve 5,135 customers and experienced 7,015,437 customer minutes of interruption (CMI) in the 2009-2019 YTD period [data provided by Buckeye Power]. Duke Energy's Stillwell and River Circle substations serve 3,130 customers and experienced 4,596,672 CMI in the 2009-2019 YTD period.





DEOK Transmission Zone M-3 Process Locust - Fairfield

Need Number: DEOK 2019-020

Process Stage: Local Plan Submission 05/11/2020

Selected Solution:

The comprehensive solution to improving the reliability of this wide area is the sum of five projects.

Locust Ring Bus - Install four 69kV breakers in a ring bus configuration. Split the main feeder into two circuits. Terminate the two new main feeder circuits and the feeder to McGuffey each into their own position on the ring.

Estimated Costs: \$7,642,394

Projected In-service date: 06-01-2023

Supplemental ID: S2211.1

McGuffey Automatic Throw Over- Install voltage sensing, control and associated equipment to implement an automatic throw over (ATO) scheme in McGuffey Substation

Estimated Costs: \$236,126

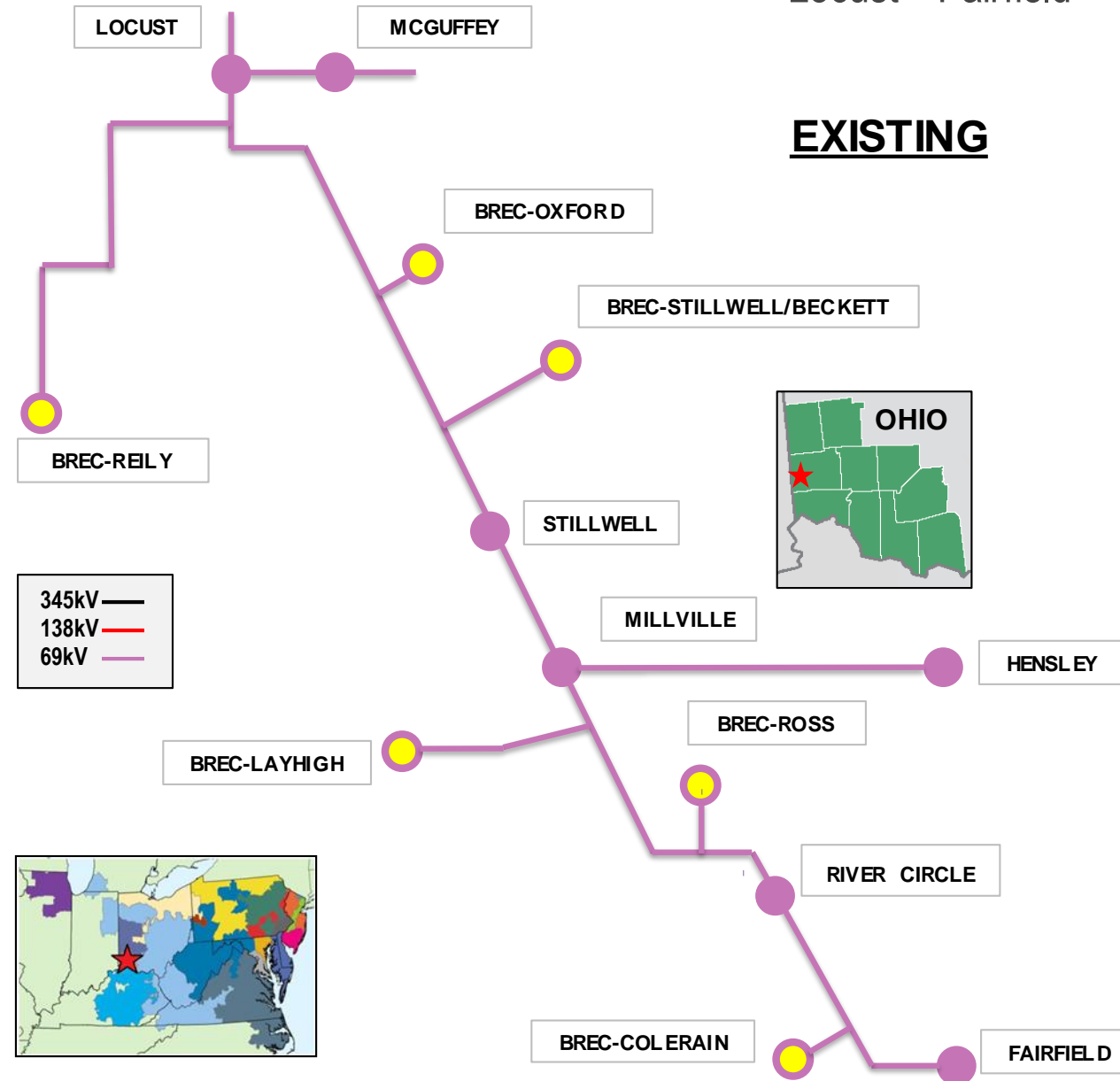
Projected In-service date: 12-31-2023

Supplemental ID: S2211.2

Locust-Millville Sectionalizing - Install switching facilities with energy management system (EMS) control and an ATO scheme in a new station at the BREC Stillwell/Beckett tap. Loop the main feeder through the new facilities. Install switching facilities with EMS control and transmission line sectionalizing (TLS) in or adjacent to BREC Oxford Station. Loop the main feeder through the facilities.

[continued]

EXISTING





DEOK Transmission Zone M-3 Process Locust - Fairfield

Need Number: DEOK 2019-020
Process Stage: Local Plan Submission 05/11/2020

[continued]
Estimated Costs: \$5,969,771
Projected In-service date: 12-31-2023
Supplemental ID: S2211.3

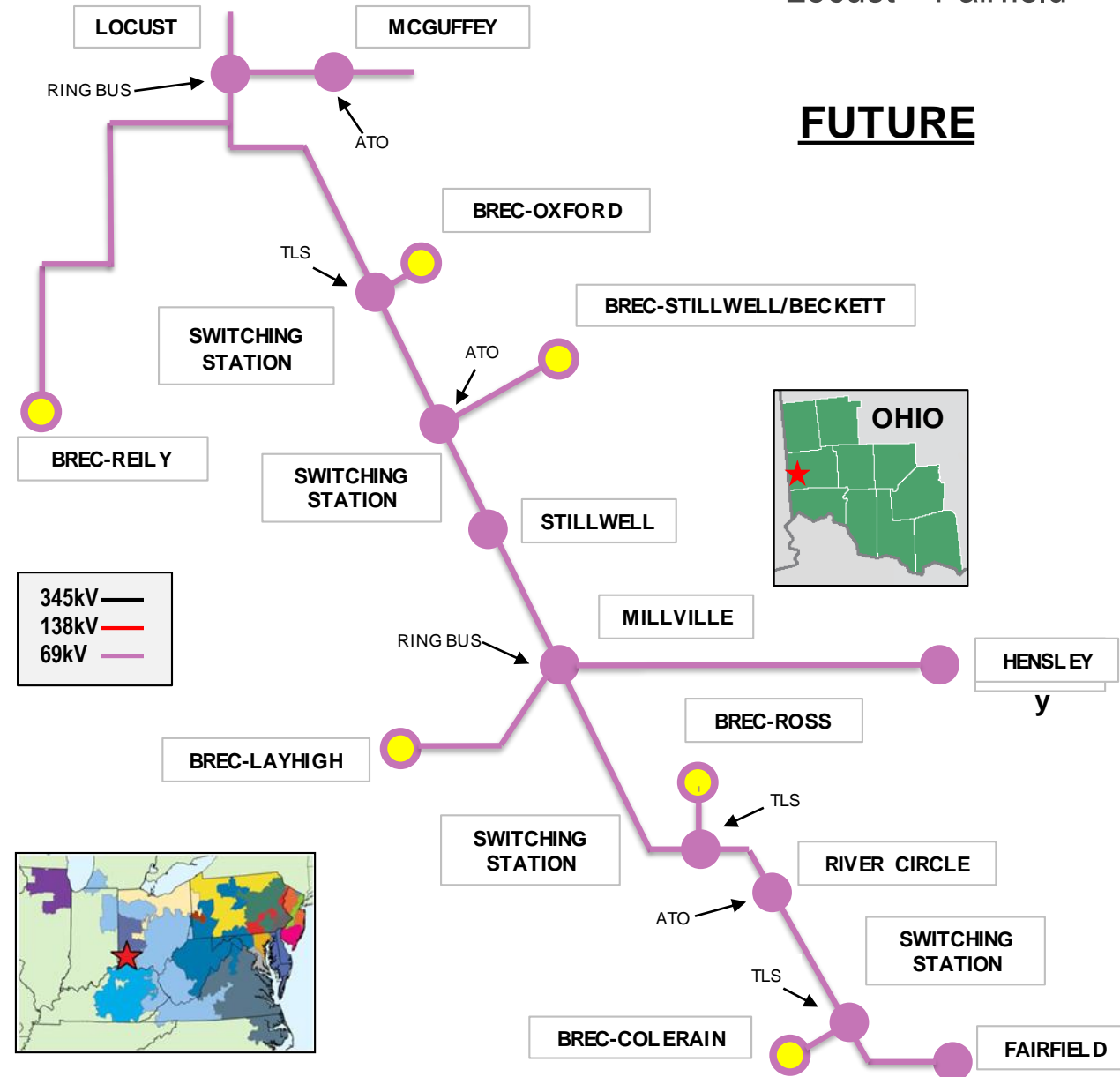
Millville Ring Bus - Install four 69kV breakers in a ring bus configuration. Split the main feeder into two circuits. Extend the feeder that supplies BREC-Layhigh to Millville. Terminate the two new main feeder circuits, the feeder to BREC-Layhigh and the feeder to Hensley each into their own position on the ring.

Estimated Costs: \$7,468,582
Projected In-service date: 6-1-2023
Supplemental ID: S2211.4

Millville-Fairfield Sectionalizing - Install switching facilities with EMS control and TLS in or adjacent to BREC Ross. Loop the main feeder through the new facilities. Install switching facilities with EMS control and TLS at or near the tap to BREC Colerain. Loop the main feeder through the new facilities. Install ATO in River Circle Substation. Loop the main feeder through the facilities.

Estimated Costs: \$5,969,771
Projected In-service date: 12-31-2023
Supplemental ID: S2211.5

Projects Status: Scoping
Model: 2019 RTEP Summer



Revision History

3/2/2020 – V1 – Added S2180 – S2182

5/13/2020 – V2 – Added S2211.1-.5

5/26/2020 – V3 – Slide #2-#10, Adjusted the font size in the map