Sub Regional RTEP Committee
Mid-Atlantic - PSEG
Solution Meeting

November 28, 2018

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PSEG Transmission Zone

Need Number: PSEG-2018-0004

Need Presented: 10/292018

Meeting Date: 11/28/2018

Process Stage: Solution Meeting

Project Drivers:

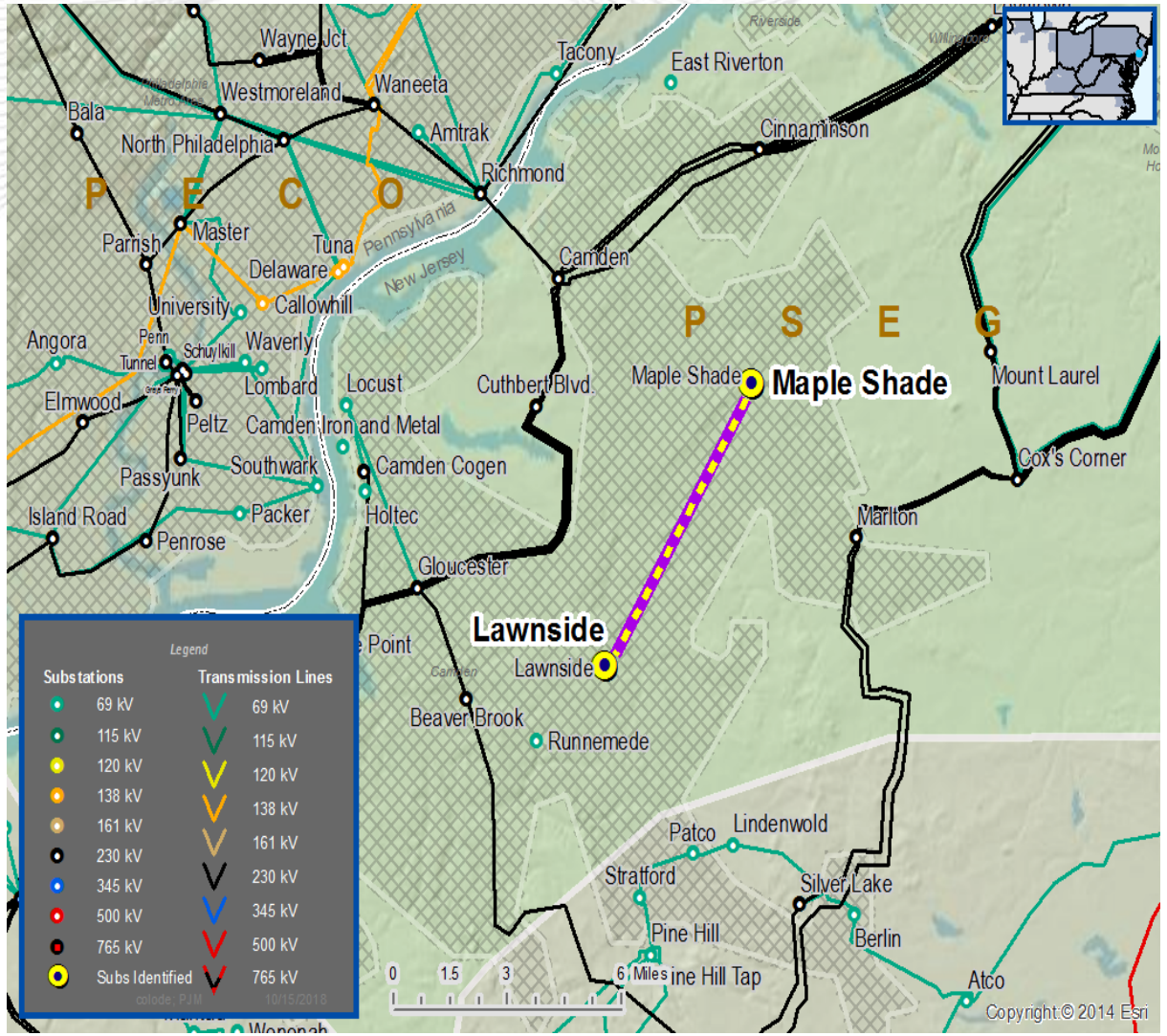
- Operational Flexibility and Efficiency
- Equipment Material Condition, Performance and Risk

Problem Statement:

- Lawnside is a straight bus fed by four 69kV lines that serves roughly 24,000 customers and 113 MVA of load.
  - A stuck breaker condition on any of the 69kV bus section breakers causes the loss of three 69kV lines and two transformers, leaving the station with only a single 69kV supply. This results in an unacceptable voltage drop of roughly 7%.
- Poor circuit performance on the Lawnside-Maple Shade 69kV circuit.
  - Over the past five years, the Lawnside-Maple Shade 69kV circuit has experienced 11 extended outages and 13 momentary outages, with total duration of over 113 hours.

Specific Assumption References:

- [PSE&G 2018 Annual Assumptions]



PSEG Transmission Zone

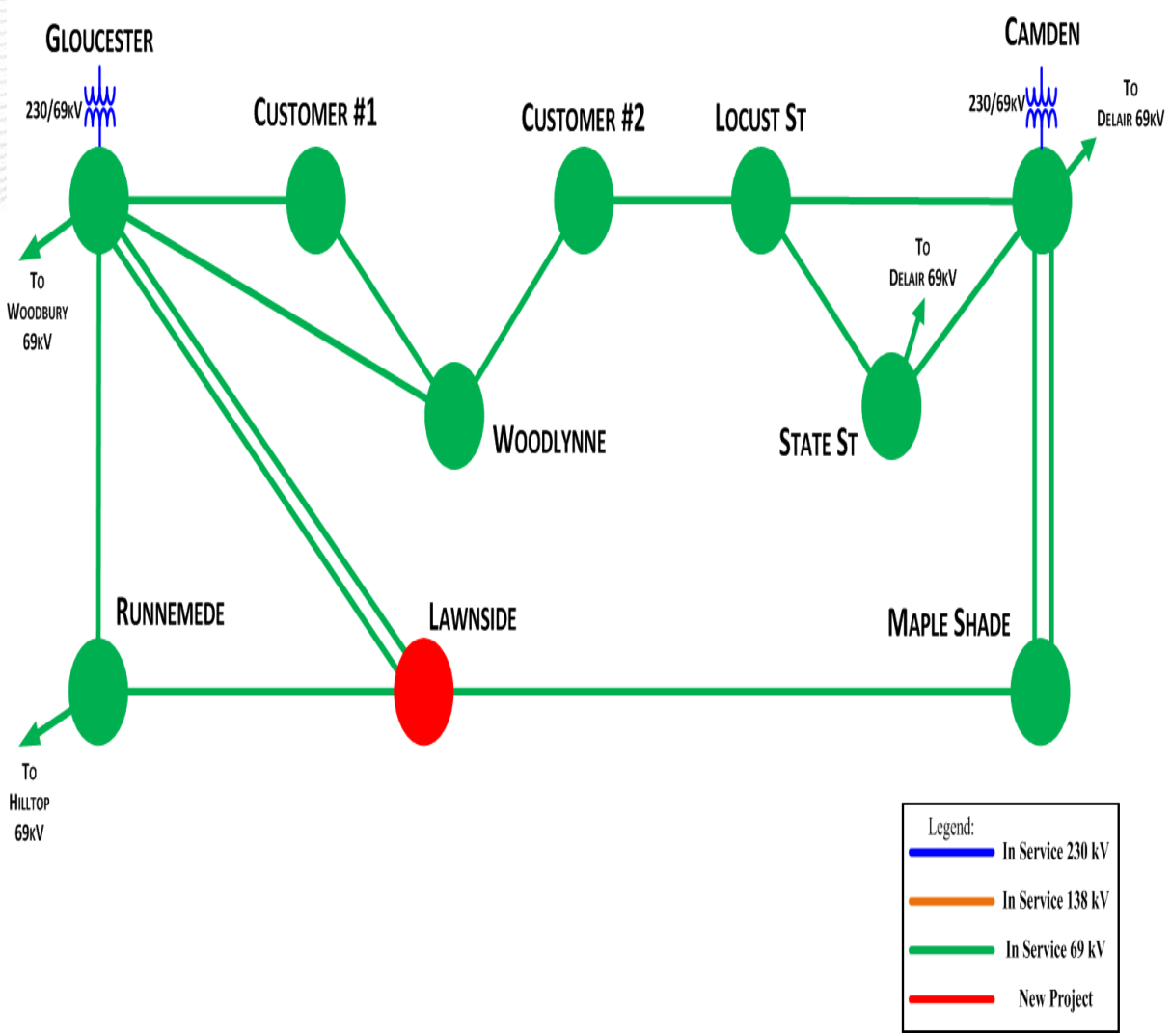
Need Number: PSEG-2018-0004

Proposed Solution:

- Lawnside 69kV Reconfiguration
  - Purchase neighboring property to accommodate construction
  - Reconfigure bus to a 69kV breaker-and-a-half bus.
    - Estimated Cost: $46M
    - Projected In-Service Date: 12/2022
- Poor circuit performance on the Lawnside-Maple Shade 69kV circuit has been referred for further evaluation prior to moving forward with this portion of the recommended solution.

TO Alternatives Considered:

- Alternative 1
  - Install one 30 MVAR SVC or STATCOM.
  - Not feasible. SVC alone would not address the stuck breaker condition need. Would require full bus reconfiguration in addition to the two capacitor banks



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PSEG Transmission Zone

Need Number: PSEG-2018-0005

Need Presented: 10/29/2018

Meeting Date: 11/28/2018

Process Stage: Solution Meeting

Project Drivers:

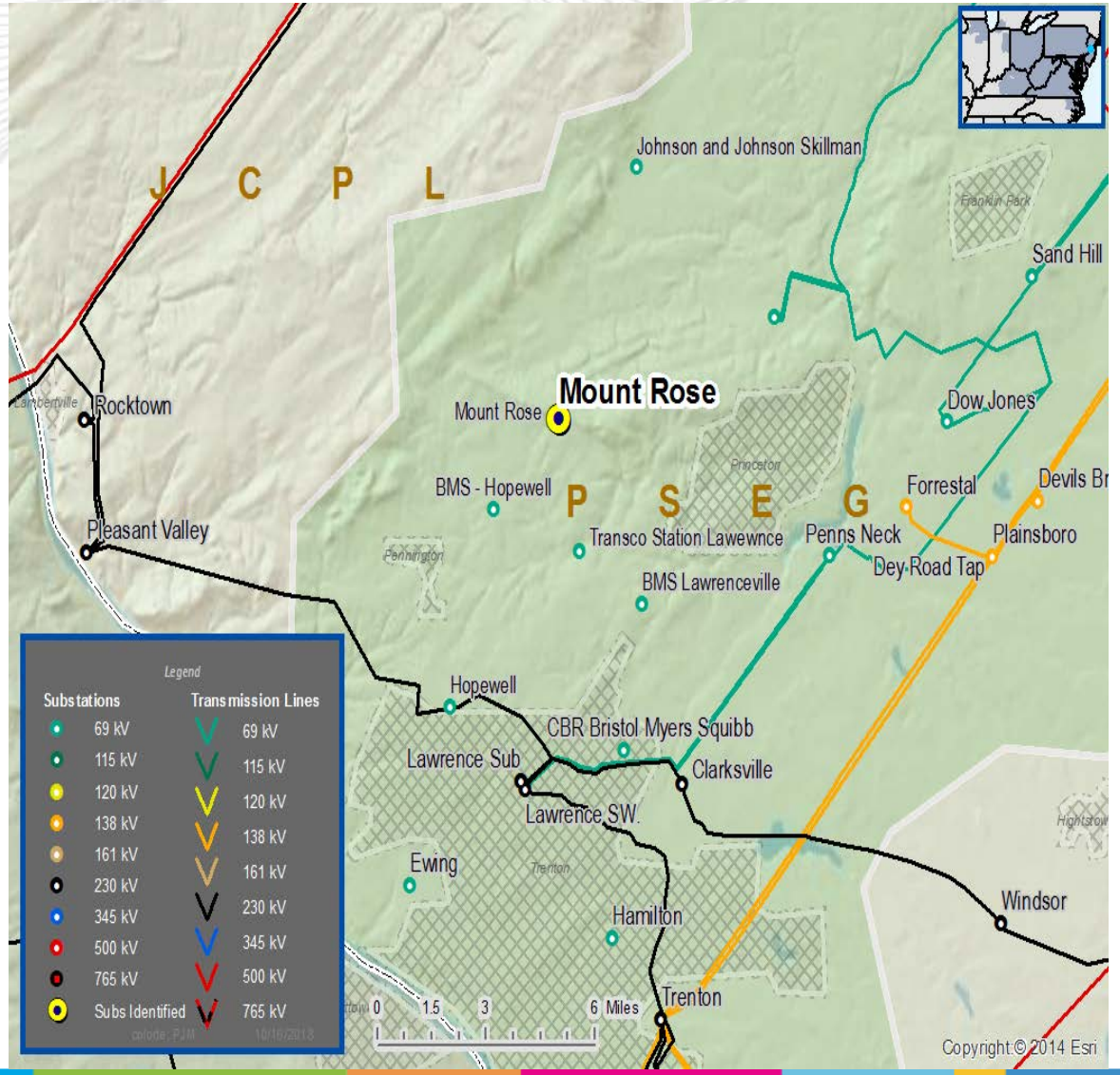
- Operational Flexibility and Efficiency
- Equipment Material Condition, Performance and Risk

Problem Statement:

- Poor station reliability at Mount Rose.
  - Mount Rose experienced station shutdowns due to loss of all 69kV supply in 2016 and 2018.
  - Over the past decade, the three 69kV supply circuits at Mount Rose have experienced 21 extended outages and 9 momentary outages, with total duration of over 207 hours.
- Mount Rose serves roughly 11,000 customers and 60 MVA of load.
- Mount Rose is a straight bus fed by three 69kV lines.
- Several contingencies that would result in unacceptable voltage drops:
  - An N-1-1 condition on 69kV supplies in the network leaves Mount Rose and several customer substations in the area with only long distance, daisy-chained paths to 230kV sources. The voltage drops by roughly 7%.
  - A stuck breaker condition on the capacitor bank breaker causes the loss of two 69kV lines and the capacitor bank, leaving the station with only a single 69kV supply. The voltage drops by roughly 6%.
  - A stuck breaker condition on the bus section breaker results in the loss of the entire station.

Specific Assumption References:

- PSE&G 2018 Annual Assumptions



PSEG Transmission Zone

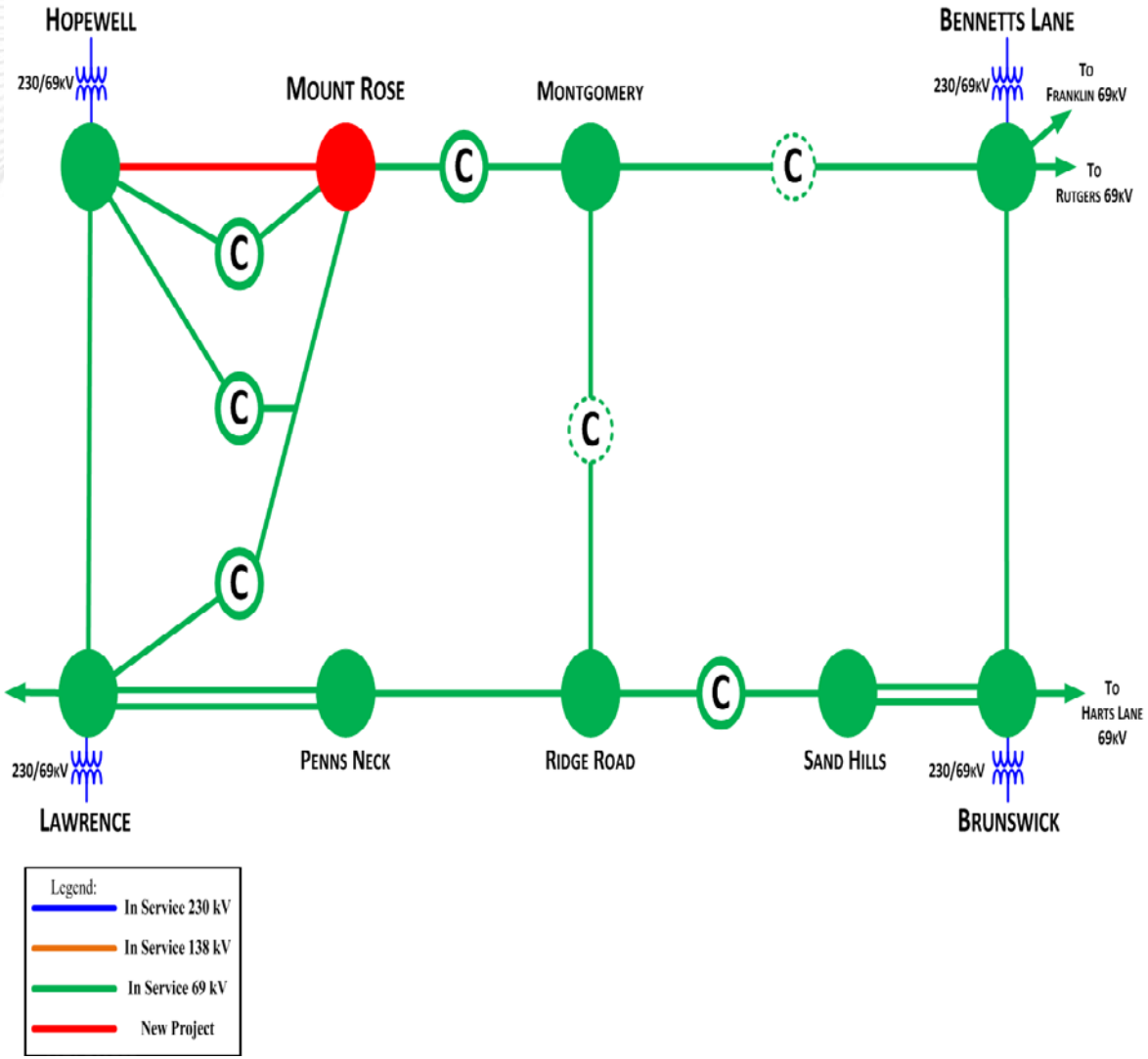
Need Number: PSEG-2018-0005

Proposed Solution:

- Mount Rose 69kV Reconfiguration
  - Purchase neighboring property to accommodate construction
  - Reconfigure bus to a 69kV ring bus.
  - Construct a new 69kV circuit to Hopewell Switching Station.
    - Estimated Cost: $66M
    - Projected In-Service Date: 06/2022

TO Alternatives Considered:

- Alternative 1
  - Purchase property at a nearby alternate location to accommodate construction of a new station.
  - At alternate location, construct a new 69kV station.
  - Install 69kV ring bus with two (2) 69/13kV transformers.
  - Reconfigure existing 69kV circuits at Mount Rose to new station.
  - Construct a new 69kV circuit to Hopewell Switching Station
  - Eliminate existing Mount Rose station.
    - Estimated Cost: $81M



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Sub Regional RTEP Committee
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Need Meeting

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PSEG Transmission Zone

Need Number: PSEG-2018-0006

Meeting Date: 11/28/2018

Process Stage: Needs Meeting

Project Drivers:

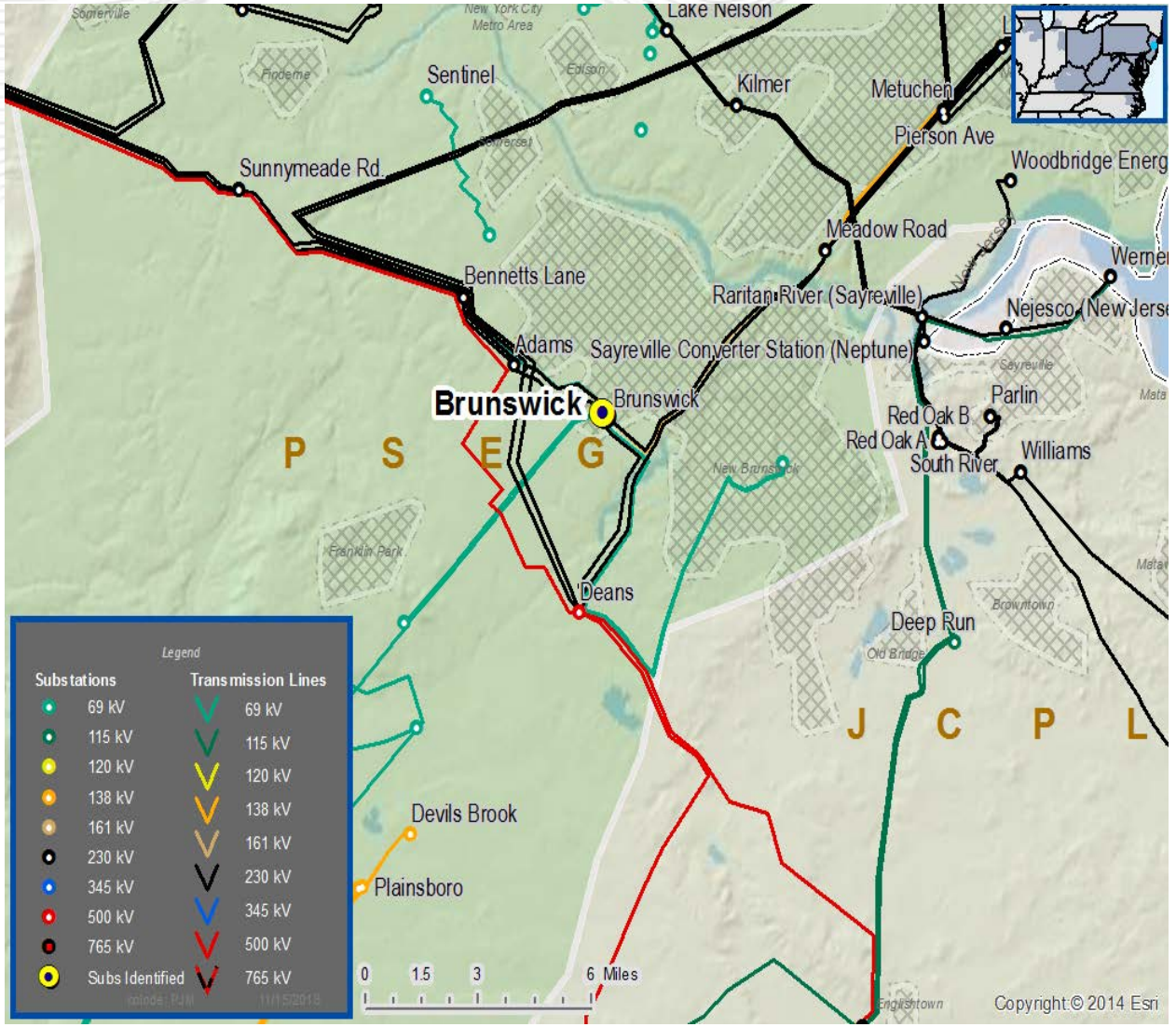
- Customer Service

Problem Statement:

- Stations in the New Brunswick area are at or near capacity. There is a need for additional capacity in the area.
  - Adams serves roughly 22,000 customers and 83 MVA of load.
  - Bennetts Lane serves roughly 21,000 customers and 83 MVA of load.
  - Brunswick serves roughly 10,000 customers and 46 MVA of load.
  - Station capacity for each station is 60 MVA, excluding the value of inter-station ties.

Specific Assumption References:

- [PSE&G 2018 Annual Assumptions]



PSEG Transmission Zone

Need Number: PSEG-2018-0007

Meeting Date: 11/28/2018

Process Stage: Needs Meeting

Project Drivers:

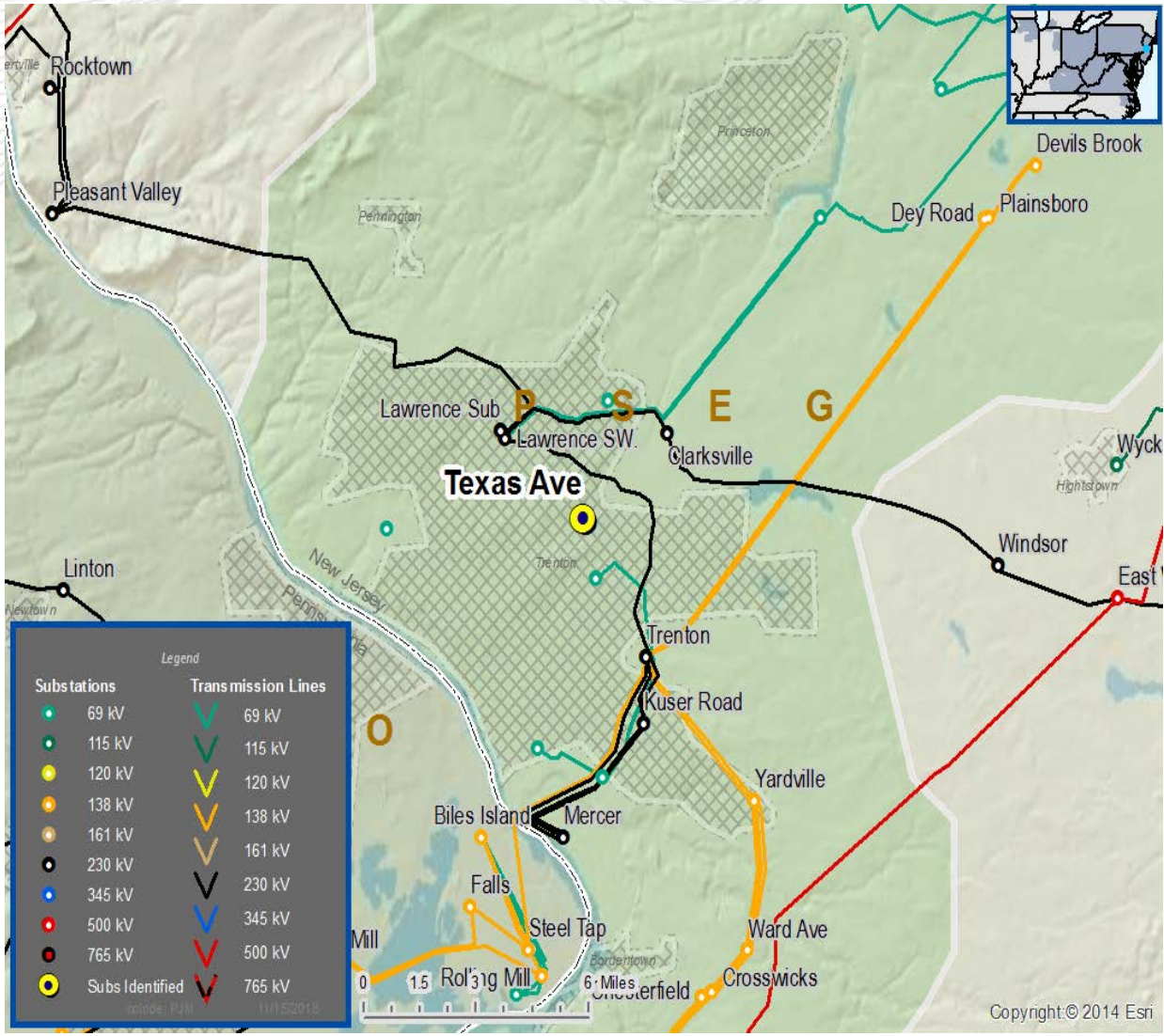
- Customer Service
- Equipment Material Condition, Performance and Risk

Problem Statement:

- Stations around Texas Ave are at or near capacity. There is a need for additional capacity in the area.
  - Lawrence serves roughly 26,000 customers and 121 MVA of load.
- Texas Ave is a unit substation supplied by two 26kV circuits with increasing performance problems.
  - Over the past decade, the two 26kV supply circuits at Texas have experienced 10 extended outages and 32 momentary outages, with total duration of over 82 hours.
- Station equipment at Texas Ave has been in service for over 60 years. This equipment has been identified as being in poor condition and needs to be addressed.
  - Texas Ave serves roughly 1,000 customers and 5 MVA of load.

Specific Assumption References:

- [PSE&G 2018 Annual Assumptions]



Revision History

11/16/2018 – V1 – Original version posted to pjm.com

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