



Sub Regional RTEP Committee Mid-Atlantic

May 25, 2018

First Review

Baseline Reliability and Supplemental Projects

Problem Statement:

Aging Infrastructure

- The 20.7 mile Five Forks – Windy Edge 110511/110512 115kV Circuit pair (Conductors/Towers/Foundations) was originally constructed during the period between 1910 and 1918
- Construction of the 115kV circuit pair is two single circuit lattice towers contained in a single ROW with a circuit configuration that is conducive to Avian related issues
- Original towers were reconducted between 1965 and 1966 with 1033.5kcm 45/7 ACSR & 634.9kcm 12/7 ACAR conductor
- Foundations are grillage type foundations that have shown signs of rust, particularly at the air/surface line
- Porcelain insulation hardware is deteriorating/losing glaze preventing adequate washing, allowing dirt and dust to accumulate, compounded the tower location through farm fields where dirt is regularly disturbed
- Directly serves two BGE distribution substations and two transmission customers along with providing network transmission to BGE system

Performance - BGE's 4th worst performing circuit pair

- Avian related issues as a result of conductor spacing/configuration
- Farm equipment tower hits
- Normalized outage rate of 6.1 operations/100mi/year (110511), 2.03 operations/100mi/year (110512)

Potential/ Alternative Solution:

Alternative Solution 1:

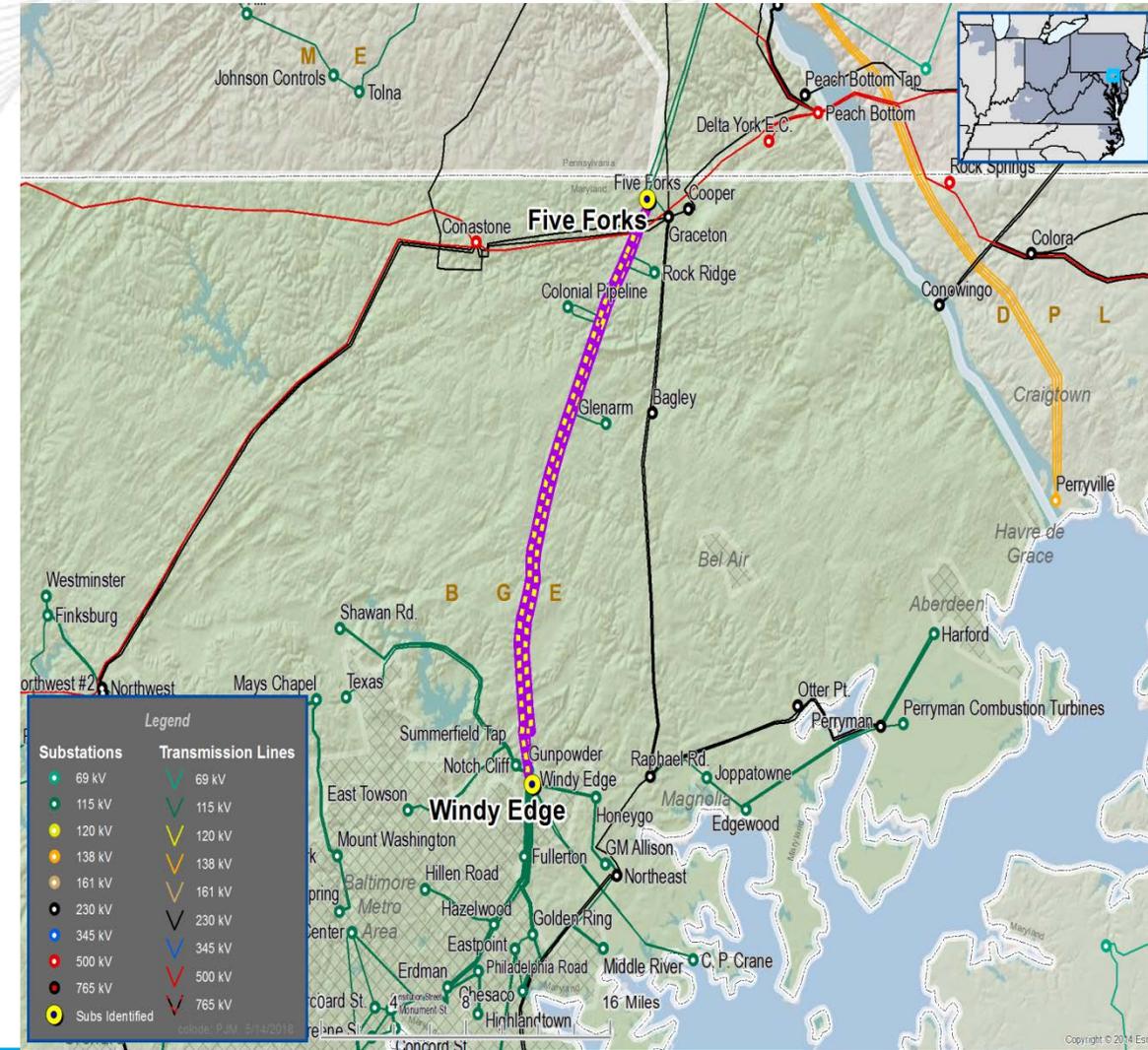
- Continue to monitor condition of asset and maintain material condition through reactionary responses to emergent events and planned maintenance and refurbishment
- Does not address overall line and customer reliability, aging infrastructure, ground-line impact, future capacity requirements
- Requires continual reactionary responses to emergent events that may occur during inopportune times

Alternative Solution 2:

- Rebuild both circuits using steel monopole, double circuit construction with sufficient capacity to support future needs
- Addresses line and customer reliability, aging infrastructure, ground-line impact, future capacity requirements
- Estimated Cost: \$60M

Expected In-Service: 12/31/2019

Status: Conceptual



BGE Transmission Zone: Supplemental Project Transmission Supply to Sparrows Point Redevelopment

Problem Statement:

- Redevelopment of the Sparrows Point peninsula
- Retirement of existing customer owned Finishing Mill and Steel Side substations
- Planned (BGE Distribution) construction of new 34kV&13kV (Fitzell) substation located near existing Steel Side substation to supply ~95 MW of new forecasted distribution customer demand on peninsula

Potential/ Alternative Solution:

- Build new 115kV station to supply 34kV & 13kV distribution station
- Provide diverse overhead transmission supplies from Riverside and Windy Edge substations to new 115kV station
- Retire remainder of unused transmission infrastructure at Finishing Mill and Steel Side Substations.

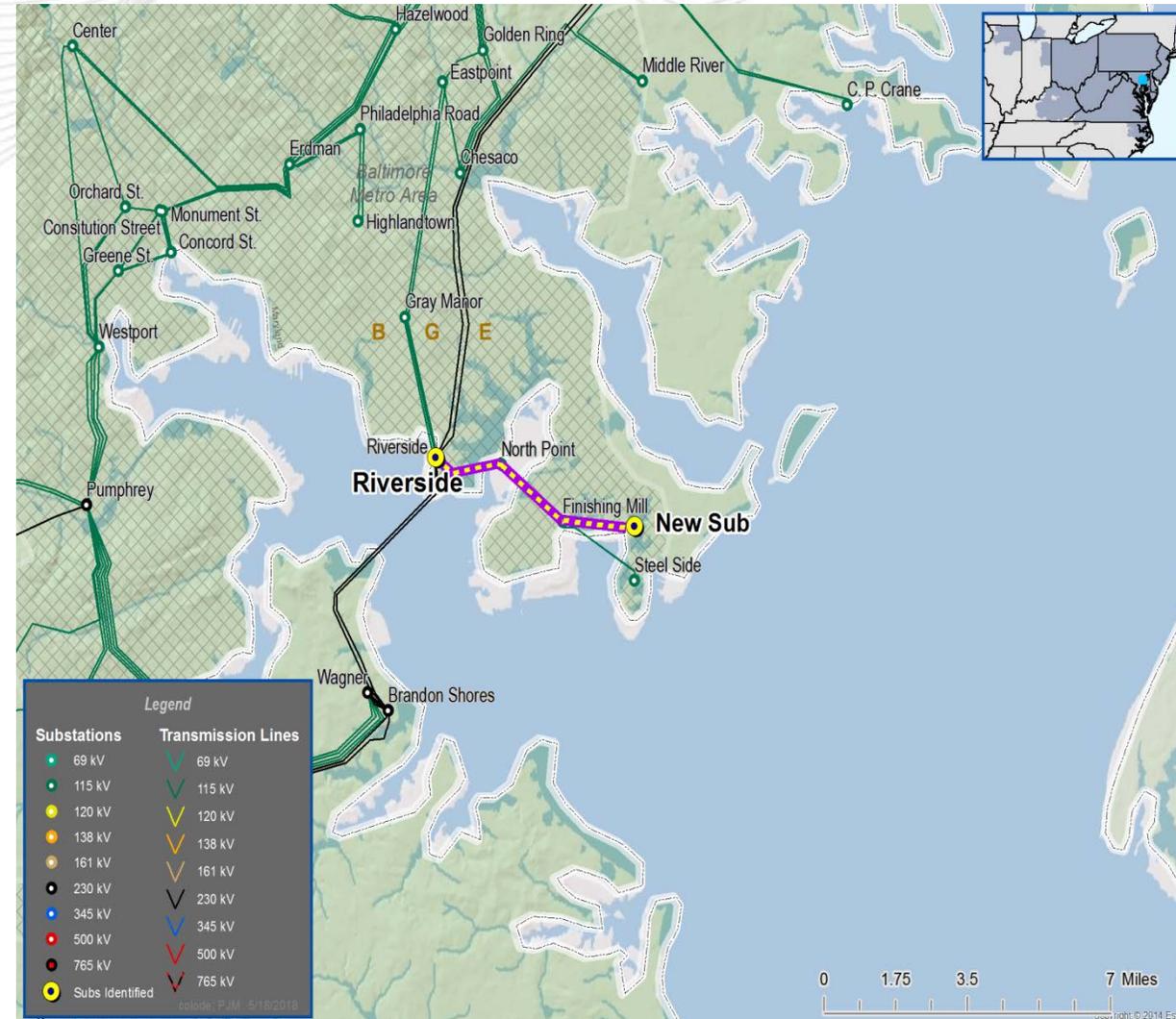
Alternative Solution:

- None

Estimated Cost: \$45M

Expected In Service Date: 12/1/2026

Status: Conceptual



Problem Statement:

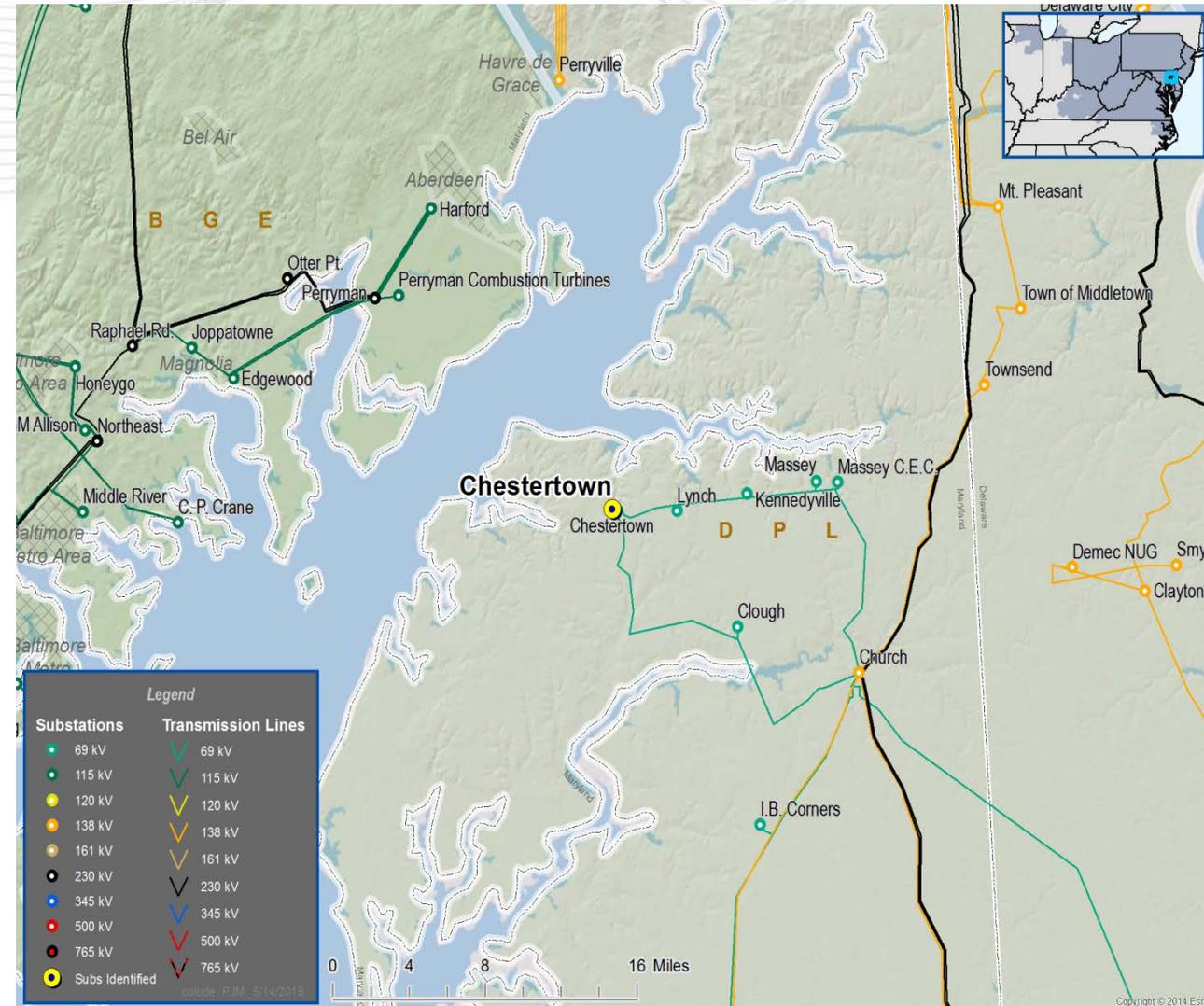
- Chestertown is currently an open ring bus. Closing in this substation will provide operational flexibility and provide high side protection for the existing transformers.

Potential/ Alternative Solution:

- Close ring bus by installing a new circuit breaker and line relaying.
 - Estimated Cost: ~ \$2.0M
- Leave station in current configuration

Preliminary In-Service: 12/31/2019

Status: Conceptual



Problem Statement:

Equipment Material Condition, Performance and Risk

- Enhance system reliability and performance.
- Upgrade equipment due to degraded equipment performance, material condition, and obsolescence.

Operational Flexibility and Efficiency

- Improve long-term overall system reliability and performance of the system.
- Improve operational flexibility during maintenance, outage, and restoration.
- Reduce amount of potential local load loss under contingency conditions

Potential Solution:

Rebuild Seward-Glory-Piney 115 kV line

- Rebuild ~66 miles of 115 kV line using double circuit 230 kV construction.
- Install 1033 ACSR conductor (six-wired) energized at 115 kV.

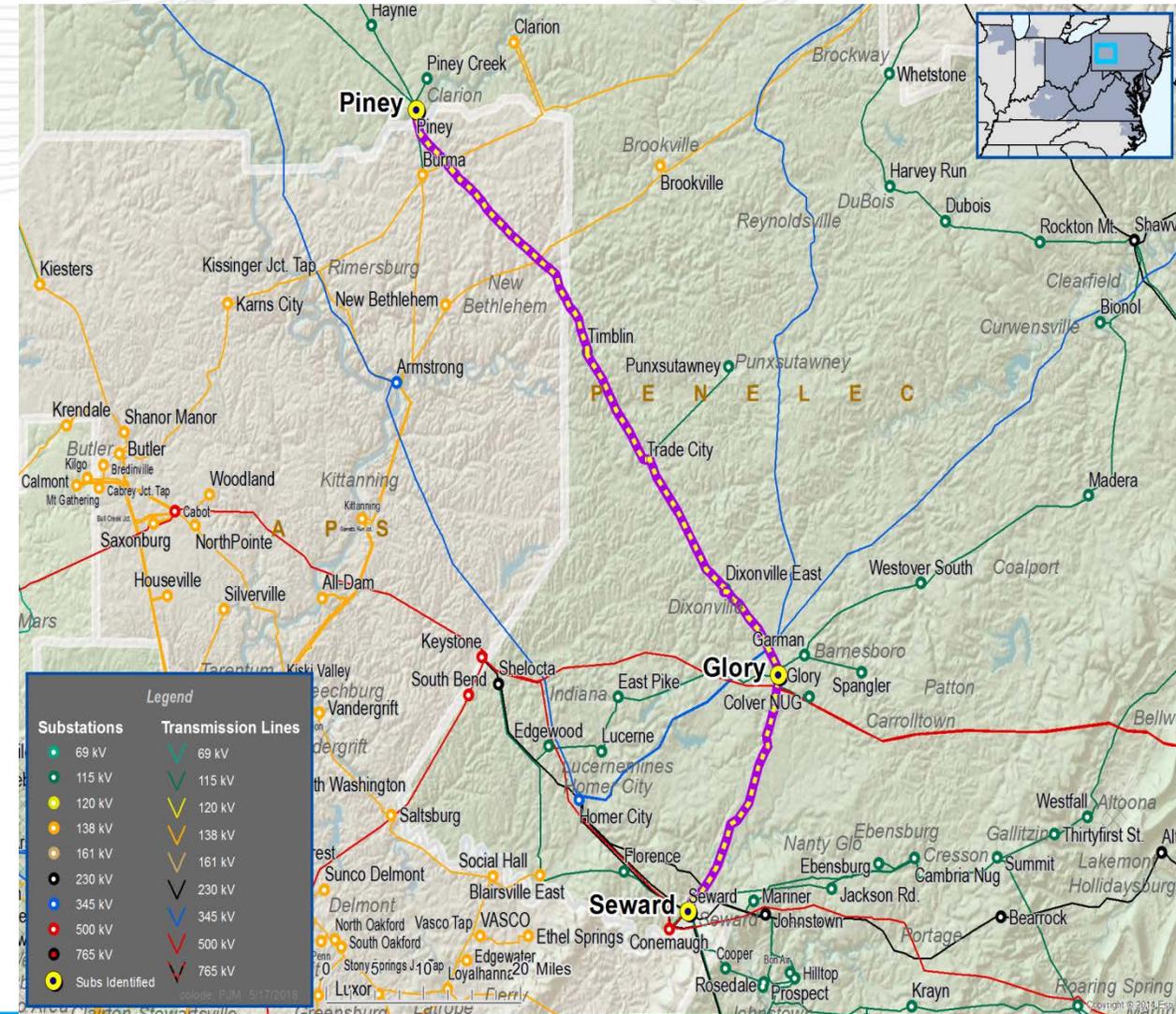
Alternative Solution:

- Rebuild line double circuit 115 kV construction. Existing line from Glory-Piney is double circuit (six-wired)
- Install second circuit at later date.

Estimated Project Cost: \$150M - \$200M (subject to detailed design)

Expected In-Service: 12/31/2019

Status: Conceptual



Problem Statement:

FERC Form 715:

Doremus Place Substation is supplied by two underground 138kV circuits. Doremus Place supplies almost 45,000 customers with load in excess of 120 MVA. An N-1-1 event would result in a complete loss of electric supply to the station for more than 24 hrs.

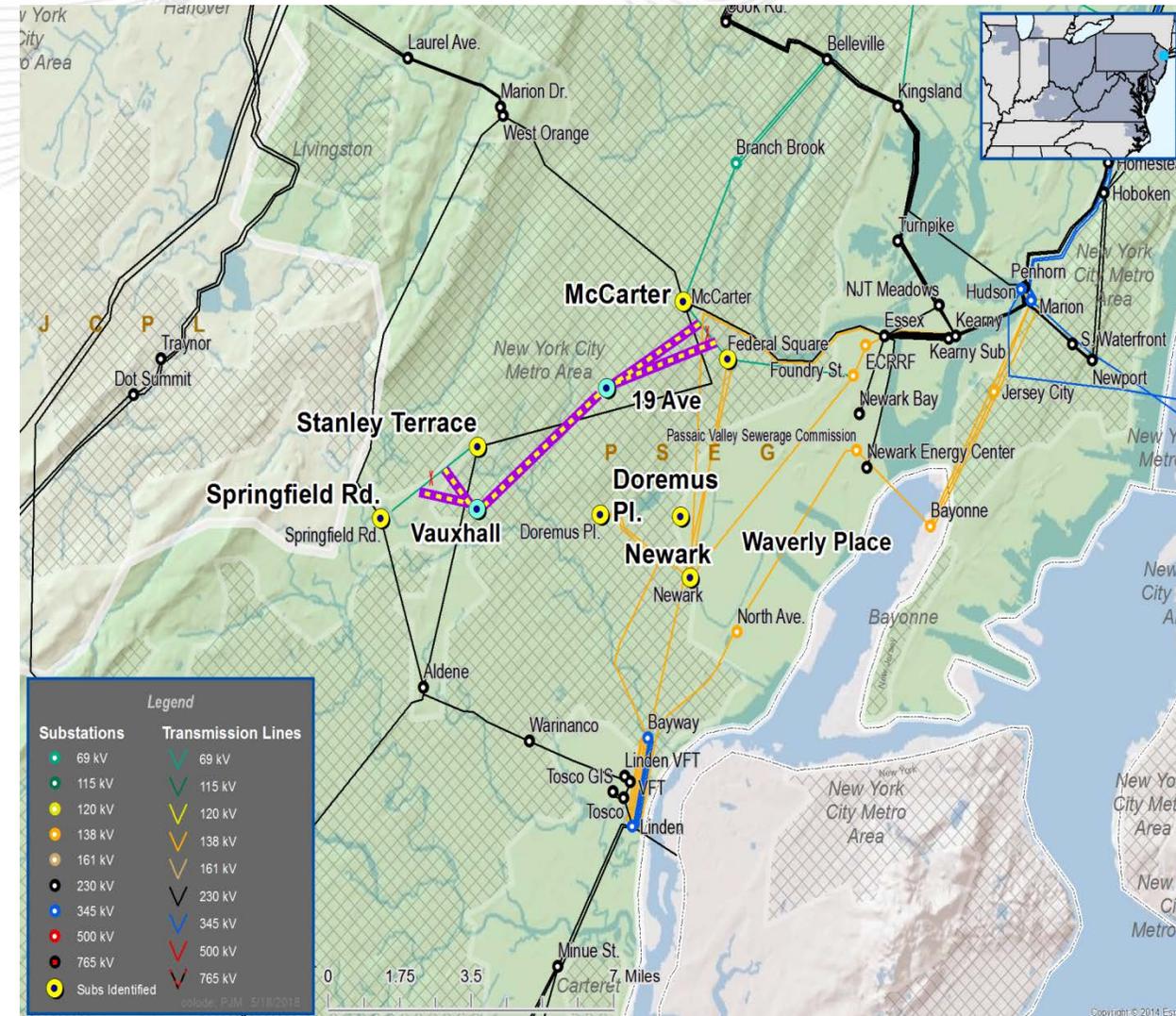
Equipment Material Condition, Performance and Risk:

The majority of the equipment at 19th Ave Substation is over 60 years of age and must be addressed.

Potential/ Alternative Solution:

1. Construct two (2) new 69/13kV stations in the Doremus area and relocate the Doremus load to the new stations.
 - At each of two (2) new locations, install a 69kV ring bus and two (2) 69/13kV transformers.
 - Construct a 69kV network between Stanley Terrace, Springfield Road, McCarter, Federal Square, and the two new stations.
 - This alternative allows for elimination of 19th Ave Substation.
 - Estimated Project Cost: \$155M
2. Convert Doremus Place and Waverly Place to 69/13kV stations.
 - Purchase additional property to accommodate new construction at Doremus.
 - Convert Waverly Place 26kV Substation to 69kV to provide third source to Doremus.
 - Install 69kV ring bus with two (2) 69/13kV transformers at each station.
 - Construct a 69kV network between Stanley Terrace, Springfield Road, McCarter, Federal Square, Waverly Place, and Doremus.
 - This alternative allows for elimination of 19th Ave Substation.
 - Estimated Project Cost: N/A (routing not feasible)
3. Construct new 138kV cable to Doremus Place from Newark Switching Station.
 - Purchase additional property to accommodate new construction at Doremus.
 - Rebuild Doremus Place 138kV to provide additional line positions.
 - Install new 138kV XLPE cable from Newark Switching Station to Doremus Place.
 - This alternative does not allow for elimination of 19th Ave Substation.
 - Estimated Project Cost: \$205M
4. Do Nothing Alternative – Not feasible; potential criteria violation and loss of load created by not acting to address.

Status: Conceptual



Problem Statement:

Infrastructure Resilience:

Academy St is currently below FEMA 100 year flood elevations and is at risk in case of a major storm event.

Equipment Material Condition, Performance and Risk:

The majority of the equipment at Academy St is over 60 years of age and must be addressed.

Potential/ Alternative Solution:

1. Raise and rebuild Academy St above FEMA flood elevation.
 - Install a 69kV ring bus and two (2) 69/13kV transformers at Academy St.
 - Construct a 69kV network between the following stations: Academy St, Greenville, Kearny, and Madison.

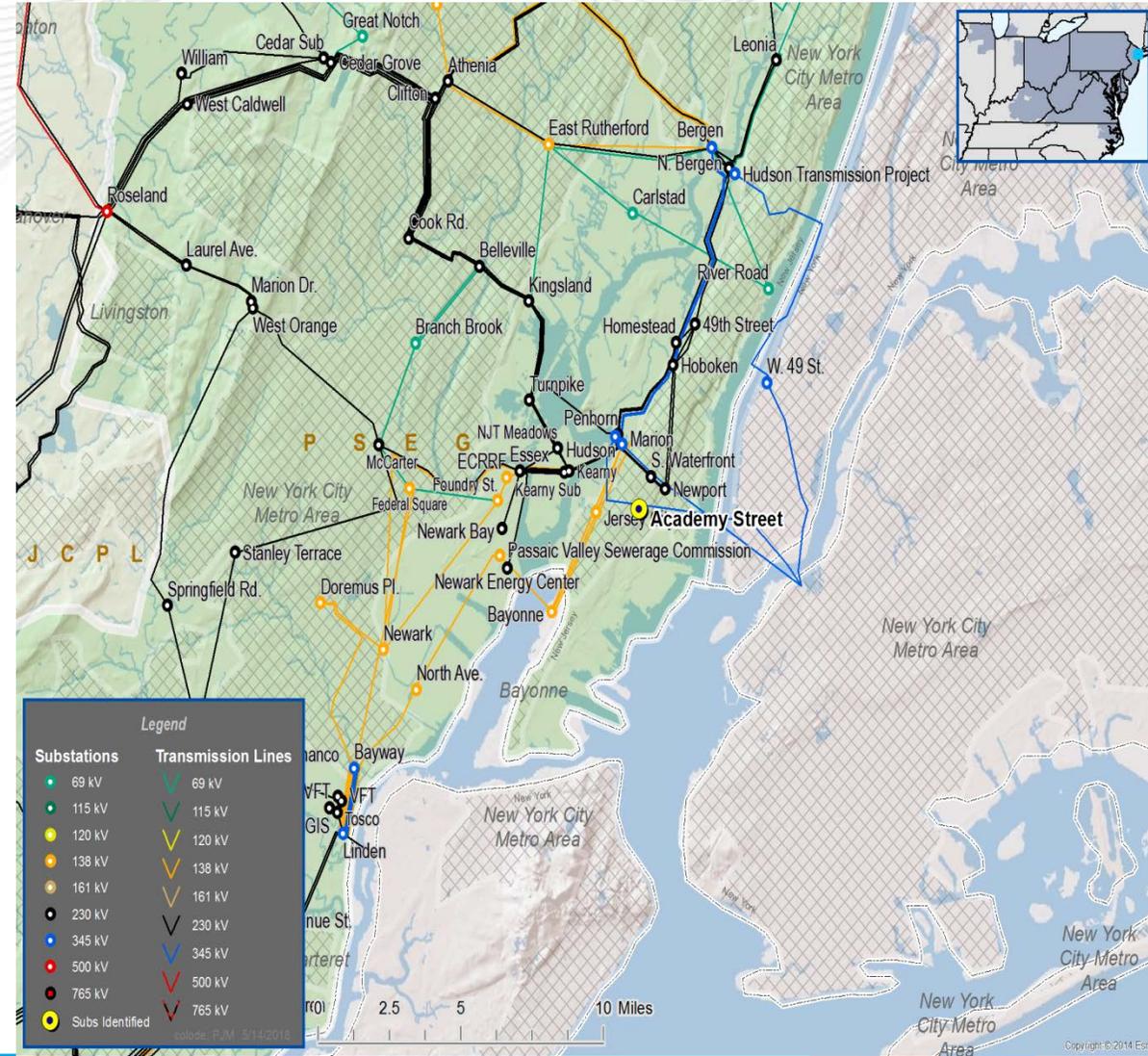
Estimated Project Cost: \$110M

2. Eliminate Academy St and construct a new station at a nearby location.
 - Purchase new property in Jersey City.
 - Install a 69kV ring bus and two (2) 69/13kV transformers at the new property.
 - Construct a 69kV network between the following stations: Greenville, Kearny, Madison, and the new station.
 - Easier constructability and logistics.

Estimated Project Cost: \$90M (based on property availability)

3. Do Nothing Alternative – Not feasible; potential loss of load for extended periods of time created by not acting to address.

Status: Conceptual



Problem Statement:

Infrastructure Resilience: State Street and Woodlynne are currently below FEMA 100-year flood elevations and are at risk in case of a major storm event.

Equipment Material Condition, Performance and Risk: The majority of the equipment at State St and Woodlynne is over 60 years of age and must be addressed.

Potential/ Alternative Solution:

1. Eliminate State Street and Woodlynne and construct two (2) new stations in new locations outside of the FEMA Flood Hazard Area
 - At a new location, install a 69kV ring-bus and three (3) 69/4kV transformers to feed State Street Substation load.
 - At a new location, install a 69kV ring-bus and two (2) 69/13kV transformers to feed Woodlynne Substation load.
 - Construct a 69kV network between the following stations: Camden, Gloucester, Delair, Locust Street, and the two new stations.

Estimated Project Cost: \$153M

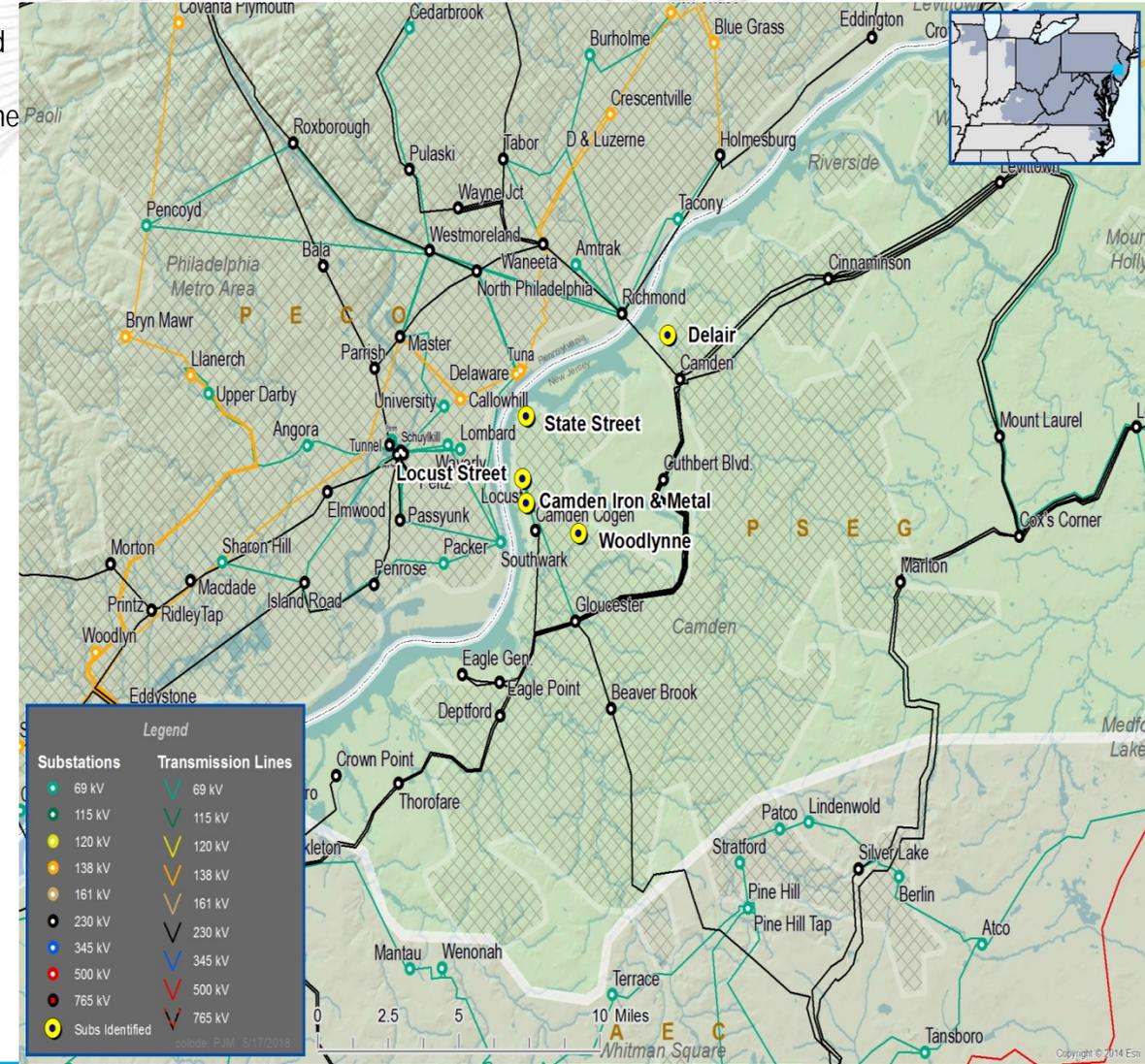
2. Eliminate State Street and construct a new station at a location outside of the FEMA Flood Hazard Area. Raise and rebuild Woodlynne on adjacent property.
 - At a new location, install a 69kV ring-bus and three (3) 69/4kV transformers to feed State Street Substation load.
 - At Woodlynne, purchase adjacent property, install a 69kV ring-bus, and two (2) 69/13kV transformers.
 - Construct a 69kV network between the following stations: Camden, Gloucester, Delair, Locust Street, Camden Iron & Metal, Holtec, Woodlynne, and the new station.

Estimated Project Cost: \$141M

3. Raise and rebuild both State Street and Woodlynne Substations on the existing properties.

Estimated Project Cost: N/A (not feasible due to property constraints)
4. Do Nothing Alternative - Not feasible; potential loss of load for extended periods of time created by not acting to address.

Status: Conceptual



Second Review

Baseline Reliability and Supplemental Projects

Previously Presented: 03/23/2018

Problem Statement:

- Existing transformers at Wenonah, a 69/12kV distribution substation, are deteriorated. There are no existing 69kV breakers at the substation (current configuration is not built to existing standard).

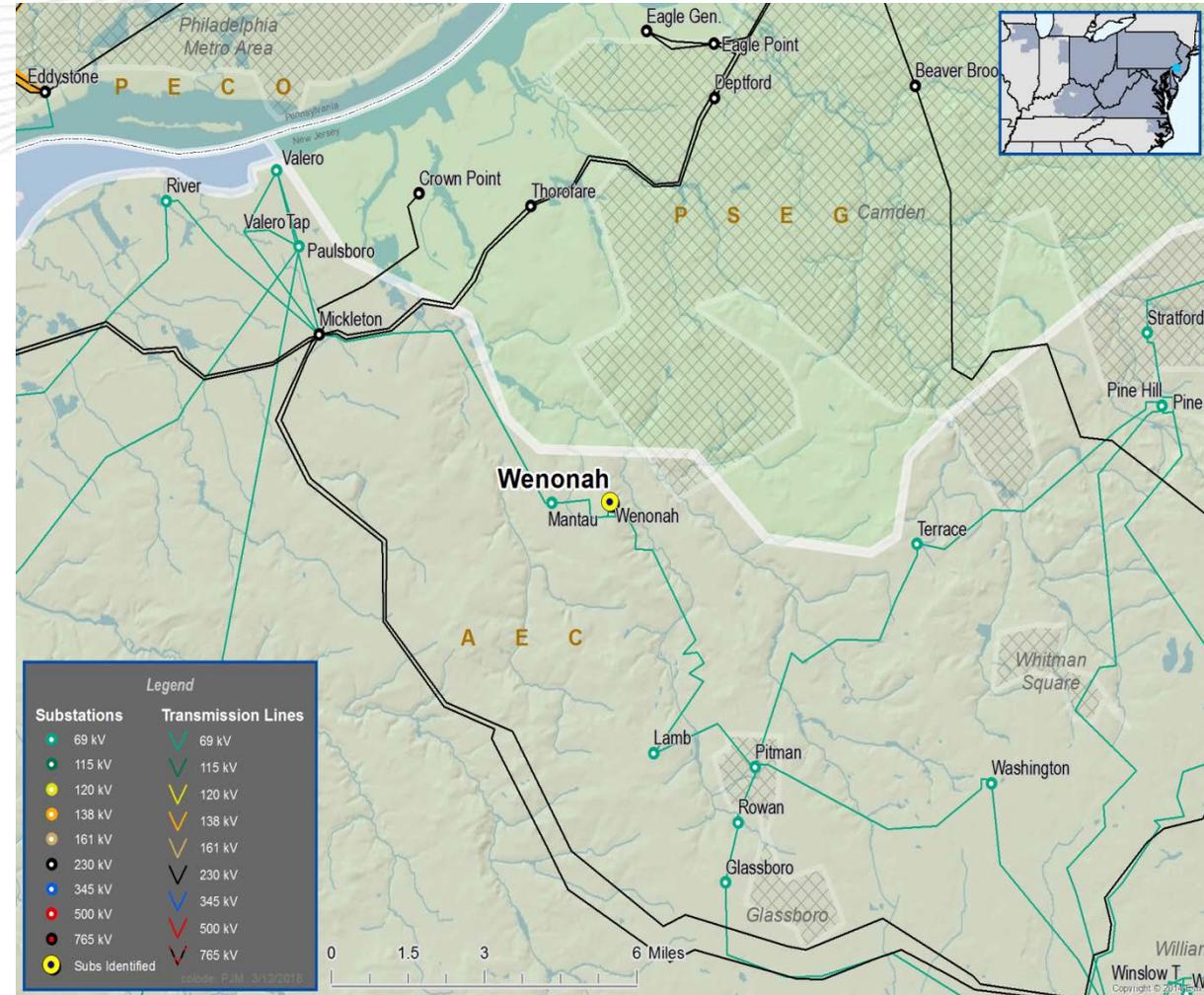
Selected Solution:

- Retire Wenonah substation, shift load to Mantua substation, and have the 69kV 0785 line from Mantua to Lamb bypass the existing Wenonah substation. (S1625)

Estimated Cost: \$0.3 M

Expected In-Service: 12/31/2020

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- At Washington Substation, a 69/12kV distribution substation, the two existing transformers are projected to experience overloads beginning in summer 2020, requiring a third transformer.

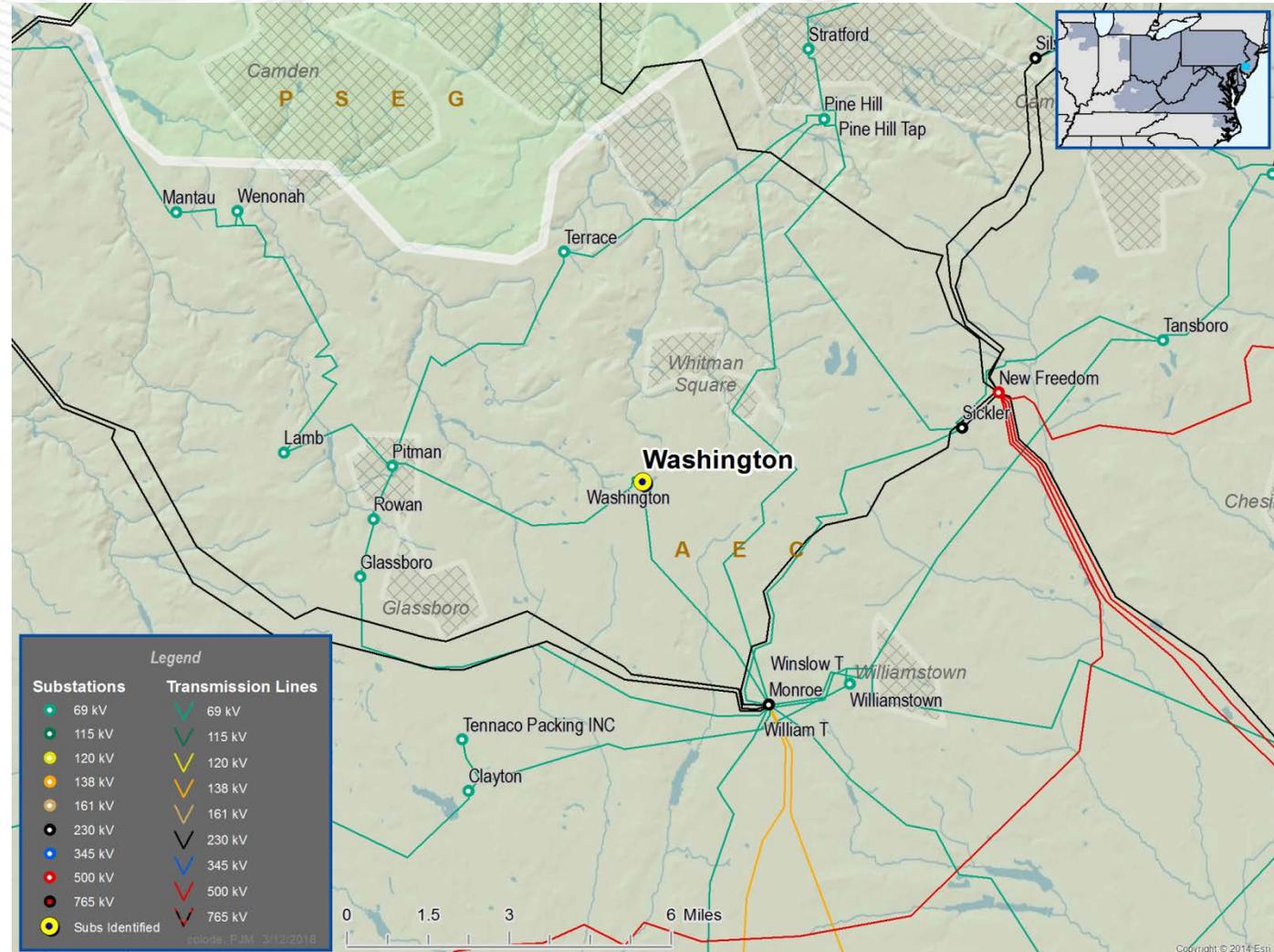
Selected Solution:

- Convert the Washington 69kV line bus to a ring bus to bring station up to AEC's current design standard while accommodating the additional transformer. (S1626)

Estimated Cost: \$5.6 M

Expected In-Service: 12/31/2020

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- This project is needed to mitigate performance risk associated with the current equipment material and condition. Specifically, based on inspection data, deteriorated and cracked poles were identified, which places this line in the top quartile of the ACE age and condition ranking.

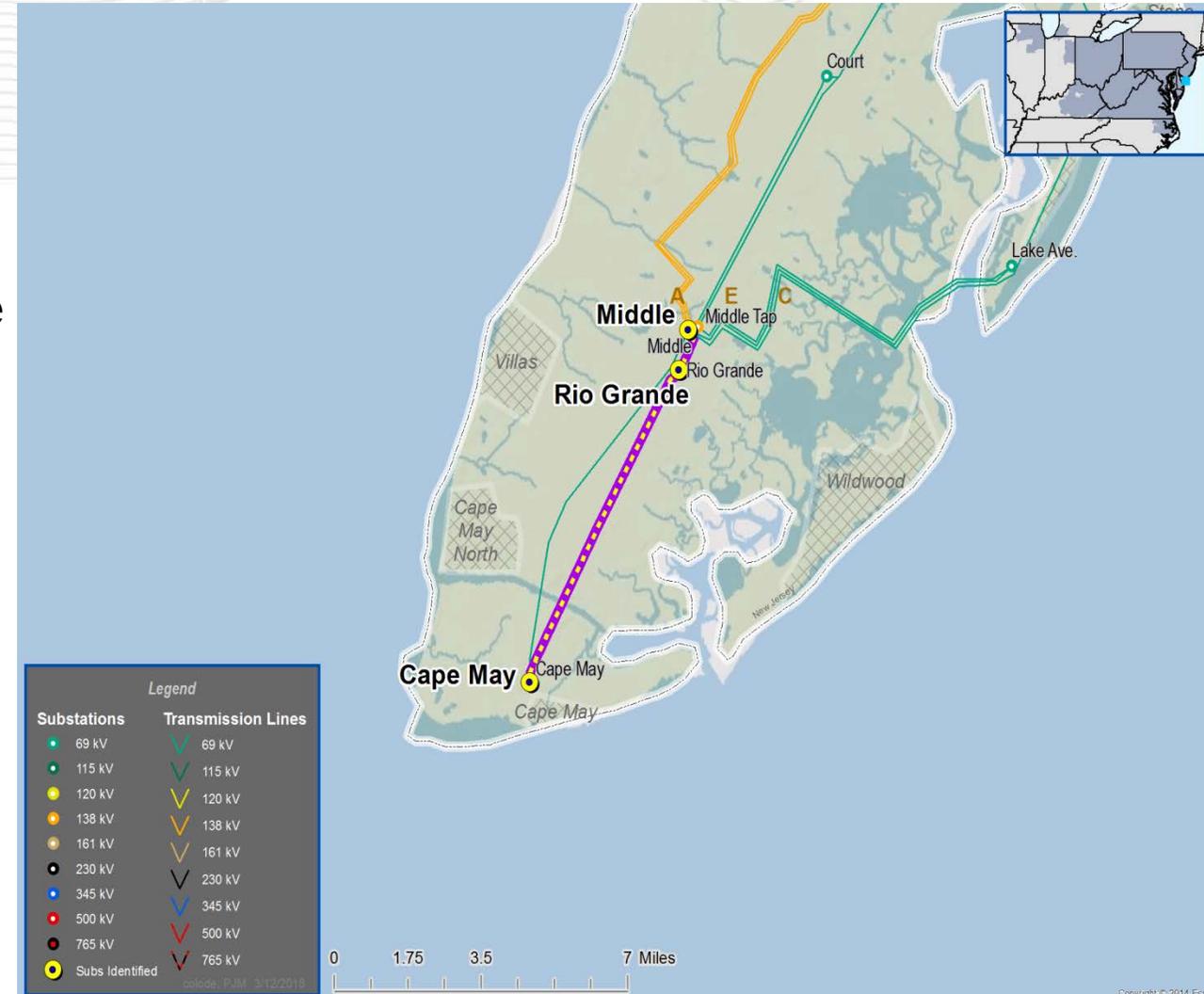
Selected Solution:

- Rebuild line 0735 #2 between Middle, Rio Grande, and Cape May substations. All structures, conductor, and static wire will be replaced with new weathering steel poles, conductor, and OPGW. (S1627)

Estimated Cost: \$9.9 M

Expected In-Service: 12/31/2021

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- This project is needed to mitigate performance risk associated with the current equipment material and condition. Specifically, based on inspection data, deteriorated poles were identified, which places this line in the top quartile of the ACE age and condition ranking.

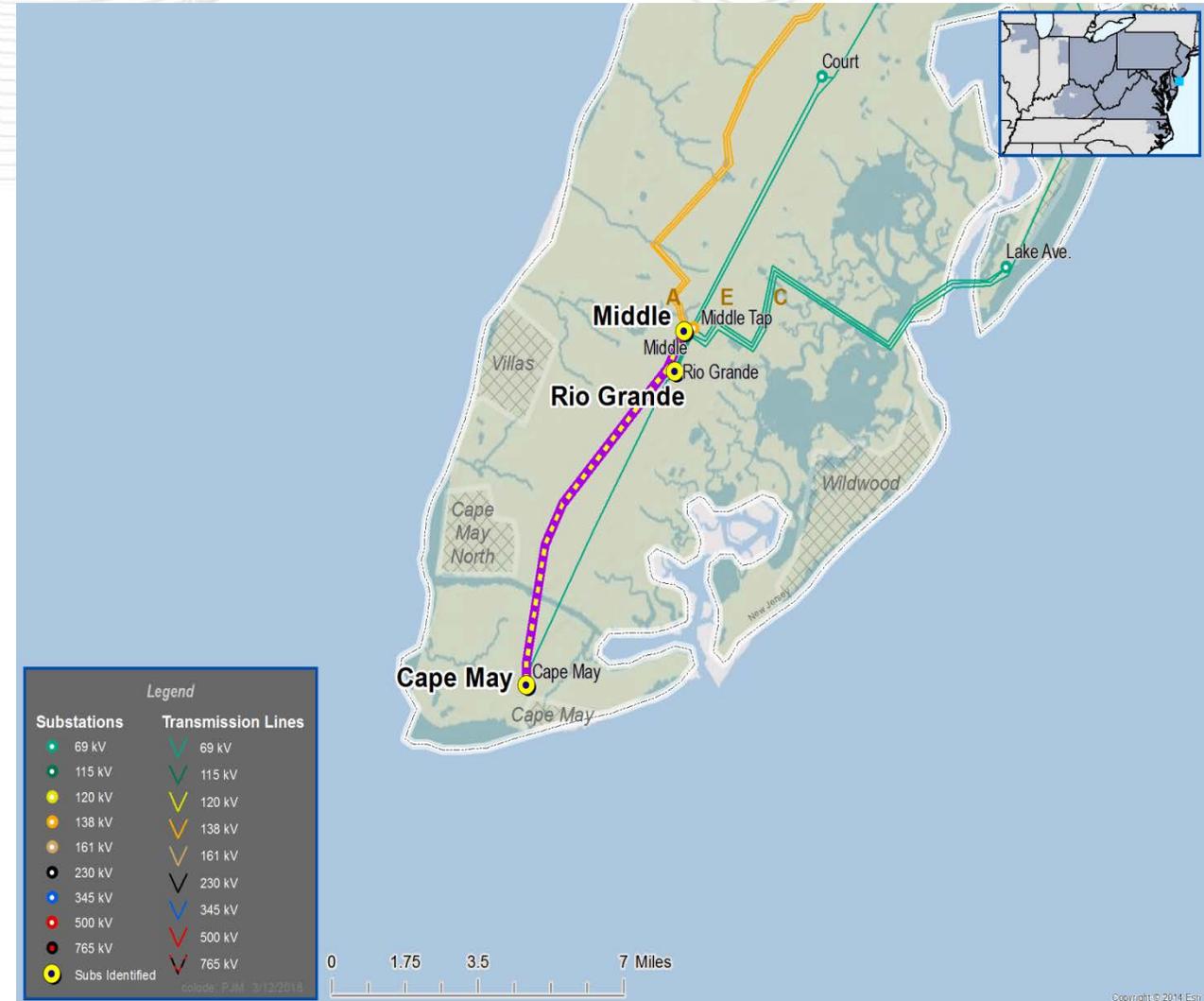
Selected Solution:

- Rebuild line 0735 #1 between Middle, Rio Grande, and Cape May substations. All structures, conductor, and static wire will be replaced with new weathering steel poles, conductor, and OPGW. (S1628)

Estimated Cost: \$11.4 M

Expected In-Service: 12/31/2022

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- Brigantine Island is supplied by the existing Harbor Beach and Brigantine Substations, which are served by two 23kV sources. The N-1 contingency loading is projected to reach the emergency limit of the 23kV lines. Additionally, the existing lines, transformers, and switchgear have been identified as being in deteriorated condition.

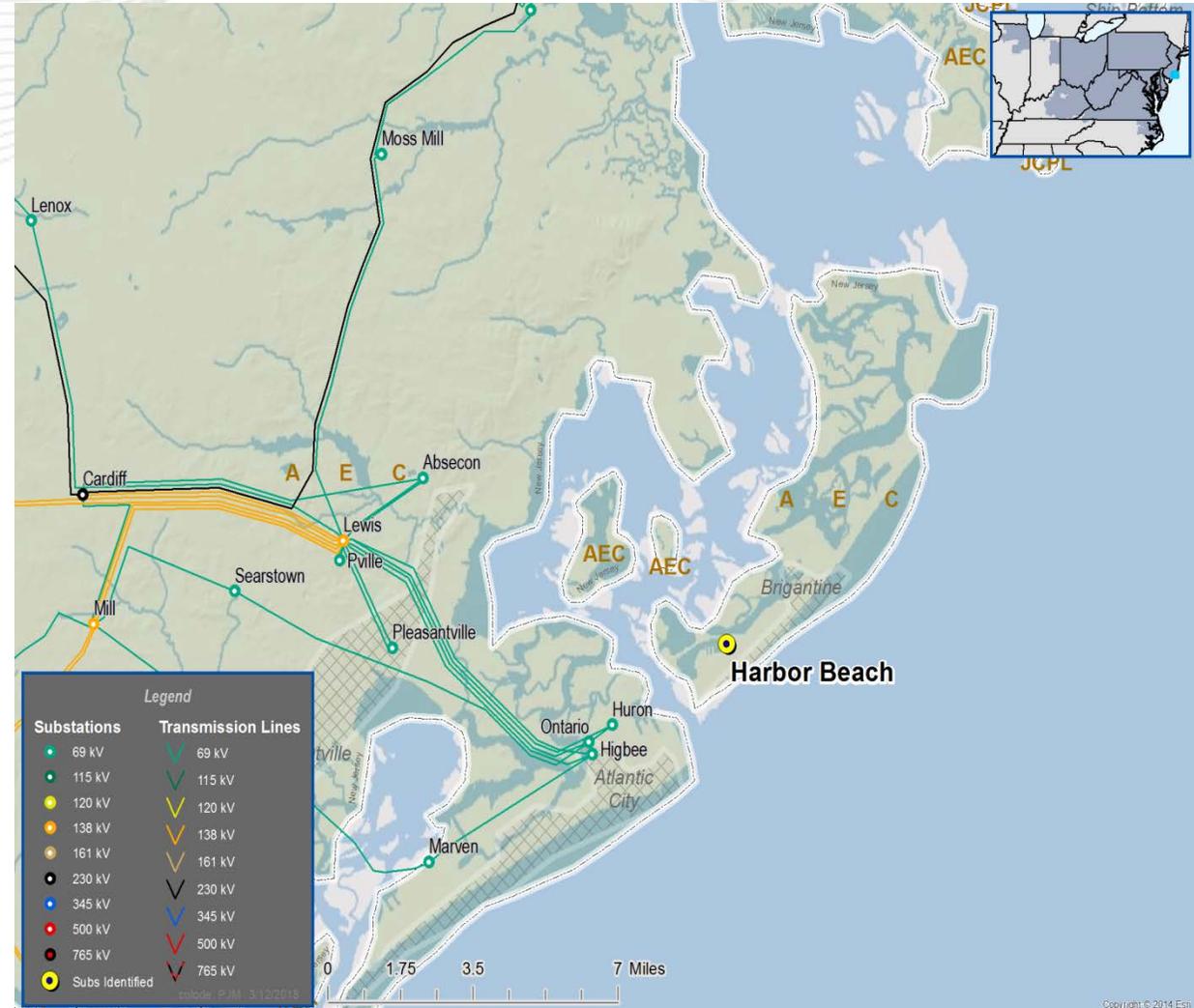
Selected Solution:

- Build a new six breaker 69kV GIS ring bus at Harbor Beach. Install two new 69kV sources from Huron and from Ontario. Retire the two existing Brigantine Island 23kV substations and 23kV lines. (S1629)

Estimated Cost: \$70.3 M

Expected In-Service: 12/31/2022

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- The BGE owned portion of the 110901-1/110901-2 115kV tie-line consists of double lattice towers operating as a six wire circuit
- The BGE-owned portion of the line is approximately two miles long extending from BGE’s Five Forks station to the Maryland/Pennsylvania state line.
- The towers were installed in the 1910’s and are experiencing hardware deterioration and avian-related issues
- The existing 300kcm 19-strand AAC conductor and hardware was installed in the 1930’s and is showing signs of corrosion and annealing along with having past splice failures

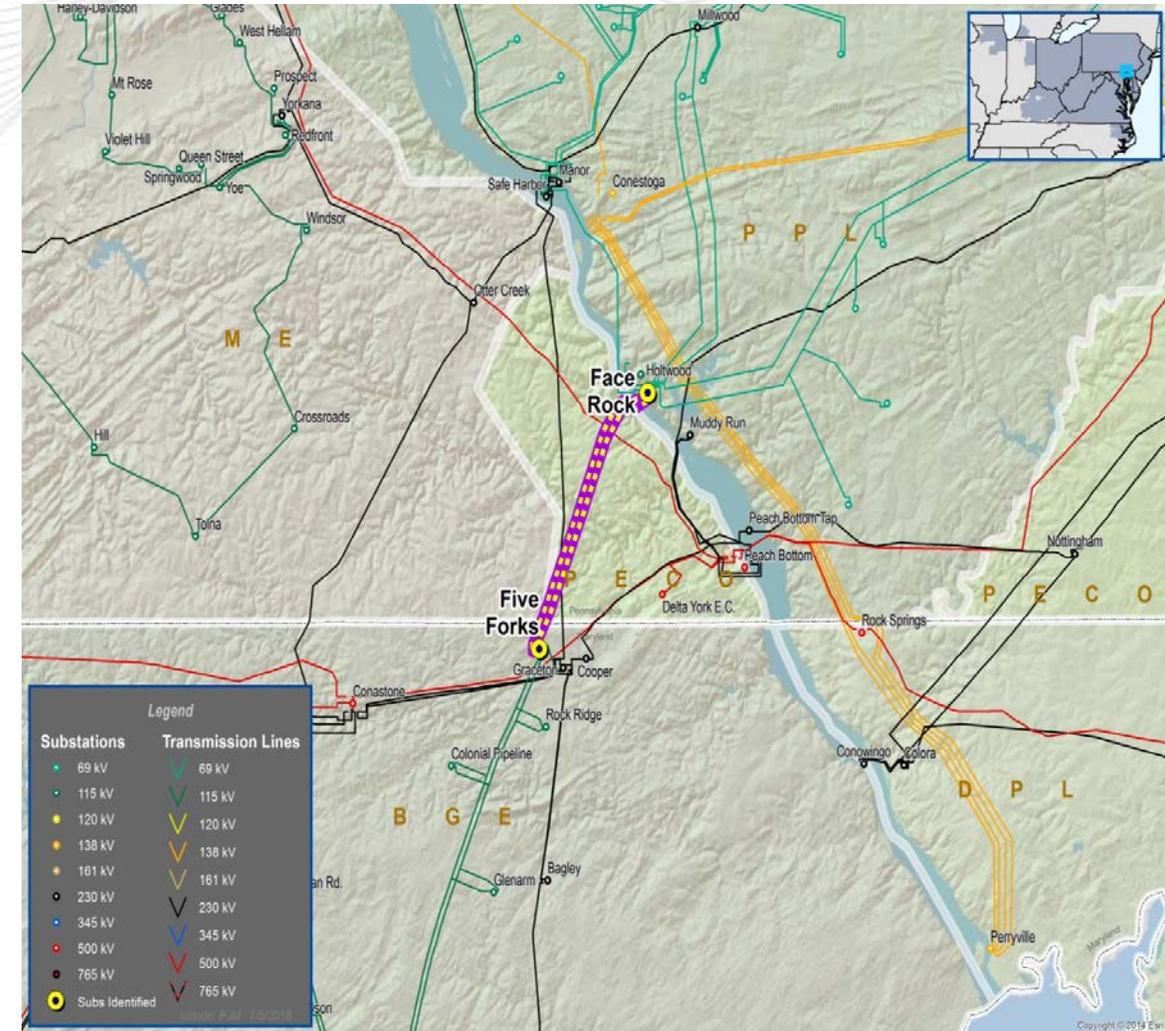
Selected Solution:

- Replace the BGE side of the Five Forks – Face Rock 115 kV double lattice towers with single monopole structures and install single 795kcm 30/19 ACSR conductor, connect into single dead end switch and the existing breaker at Five Forks. (S1630)
 - Coordinates with PPL Supplemental Project S1154 presented -7/26/2016

Estimated Cost: \$2.7 M

Expected In-Service: 12/1/2020

Status: Engineering



BGE Transmission Zone: Supplemental Project Transmission Supply to new Loch Raven Distribution Substation

Previously Presented: 01/26/2018

Problem Statement:

- A 115kV transmission supply is needed for the new Loch Raven distribution substation. The new Loch Raven distribution substation replaces an existing Hillen Road distribution substation that is at end of life due to both aging infrastructure and capacity limitations.
- The existing transmission supply to the area is via 115kV Hazelwood – Hillen Road underground (UG) Self Contained Fluid Filled (SCFF) transmission cables which require replacement and should not to be used to re-supply the new Loch Raven Substation
 - 445kcm CU hollow conductor (2.4" OD) Medium Pressure Fluid Filled (MPFF) cable pair originally built in 1968
 - Cables are the only two transmission cables supplying this area and are connected to Windy Edge – Erdman circuits in a simple tap configuration
 - Cables have experienced 12 leaks over the past 20 years with most recent in November 2017 and January 2018.
 - Outages associated with leak repairs generally last at least 2-3 days and require significant operating steps to secure distribution load during repairs
 - One of the four stop-joints failed in the late 1990s, requiring a 3 month repair time
 - Cable duct manhole end walls are cracking and are not BGE's to be able to consider repairs
 - Spare materials for this cable type are becoming obsolete
 - Specialized contractors to support cable repairs are not widely available and cannot always provide immediate support

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BGE Transmission Zone: Supplemental Project Transmission Supply to new Loch Raven Distribution Substation

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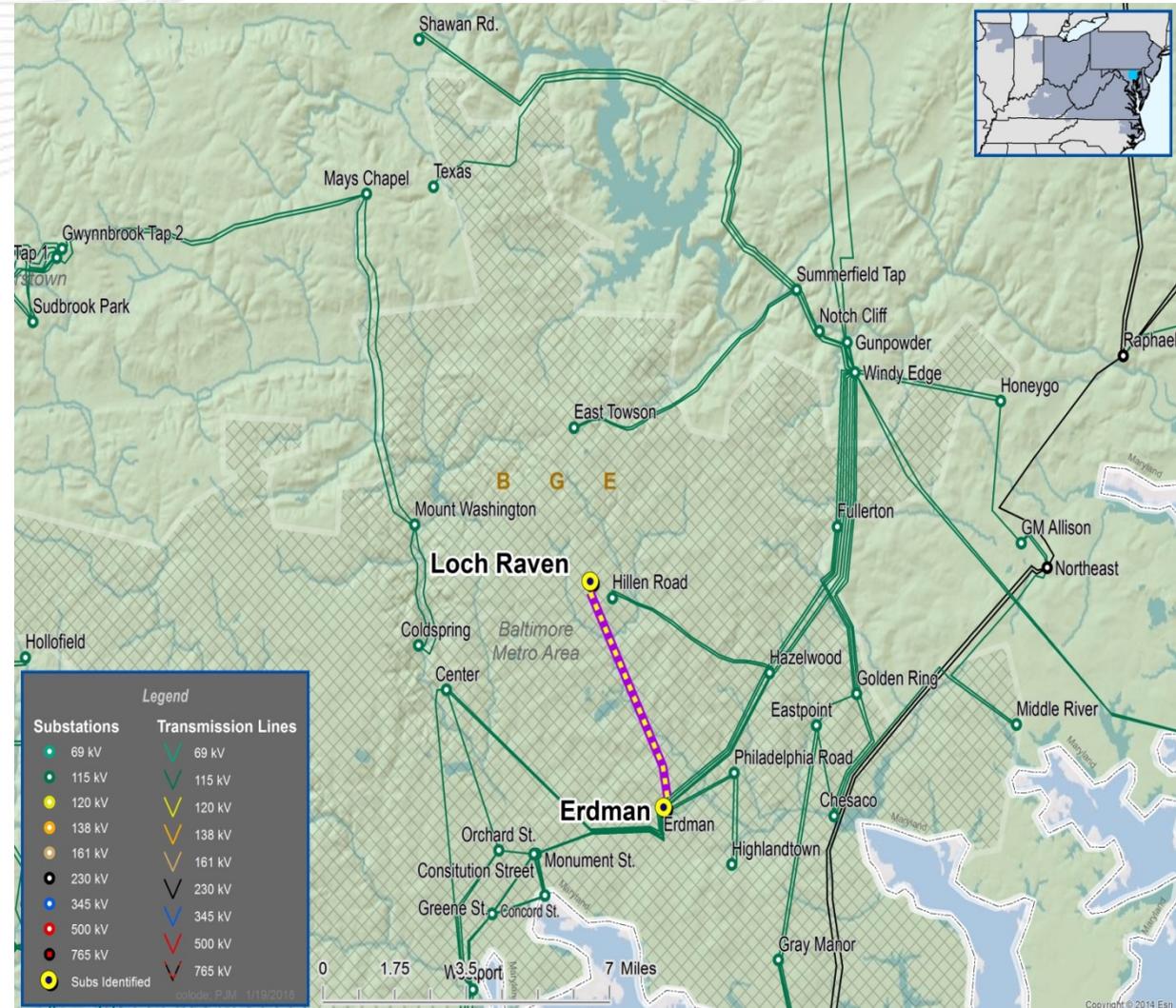
Selected Solution:

- Build new Loch Raven 115/13 kV substation and supply the new Substation with UG XLPE 115kV cables from Erdman Substation
- At new Loch Raven Substation, install 115kV breakers and high side bus work to supply the distribution station
- At Erdman 115kV Substation, expand the 115kV station to a GIS breaker and half configuration to connect new circuits to supply the new Loch Raven substation. (S1631)

Estimated Cost: \$130M

Expected In-Service: 6/1/2024

Status: Conceptual



BGE Transmission Zone: Supplemental Project East Towson-Loch Raven Transmission Network

Previously Presented: 01/26/2018

Problem Statement:

- Current East Towson and Hillen Road distribution stations are each radially fed by 115 kV fluid filled cable pairs
- Single cable outages expose distribution stations to risks requiring significant operational steps to ensure continued customer service
- N-2 contingencies create undesirable conditions which have significant customer impacts to numerous major customers, such as hospitals, universities, government facilities, etc.
 - Operating procedures including distribution load transfers are no longer a feasible option to maintain customer load
 - Time to repair cable problems and associated equipment failures can be significant
 - Distribution recovery plans are difficult to implement, require significant construction and material, and take a long time

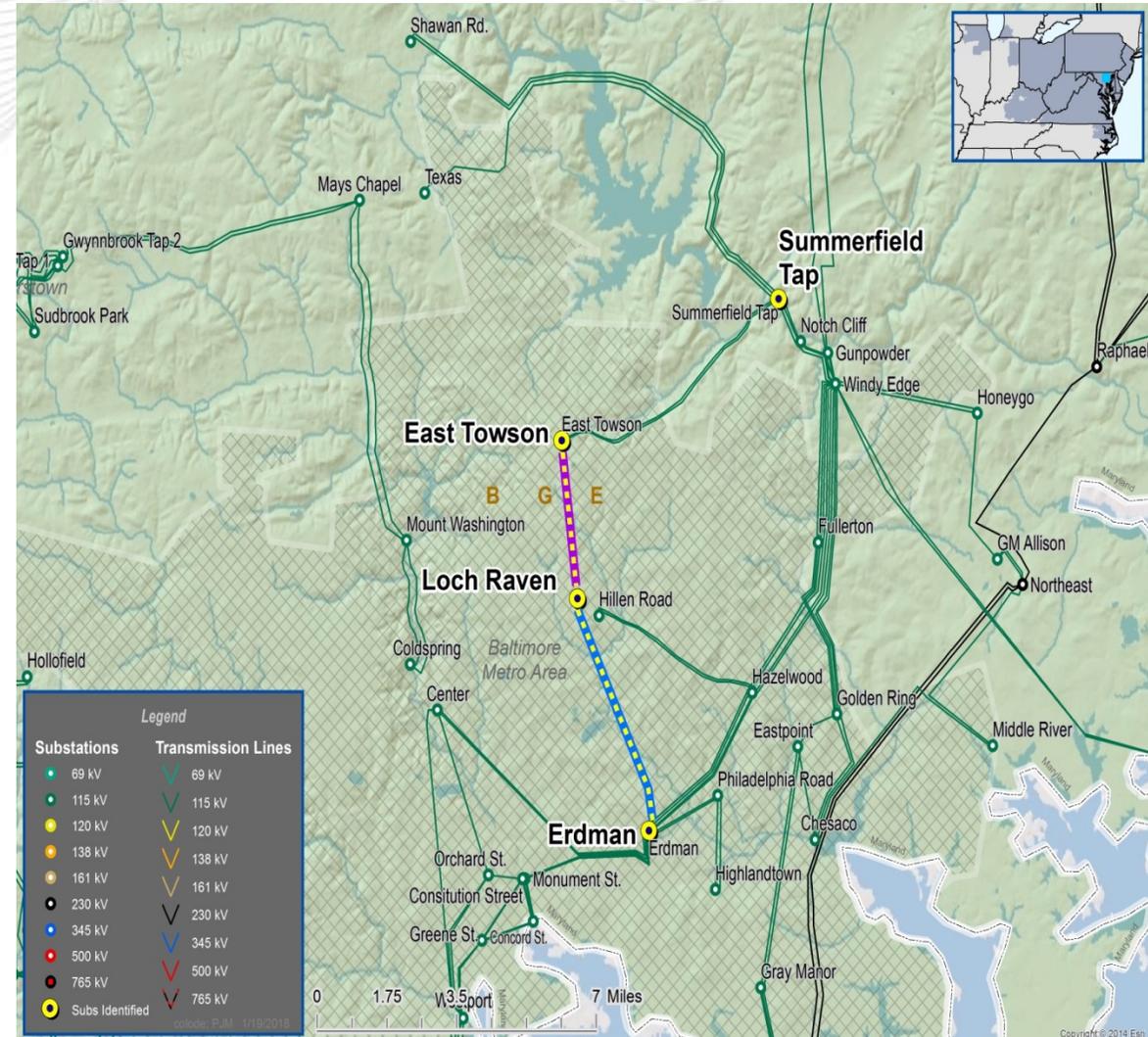
Selected Solution:

- Network East Towson substation to new Loch Raven Distribution Substation with UG 115kV XLPE cables
- Install East Towson and Summerfield substation breakers and equipment to accommodate transmission network. (S1632)

Estimated Cost: \$93 M

Expected In-Service: 6/1/2024

Status: Conceptual



Previously Presented: 03/23/2018

Problem Statement:

- The Stevensville area faces repeated outages due to the existing substation configuration and the remote location at the edge of DPL territory. There are no 69kV breakers at the substation.

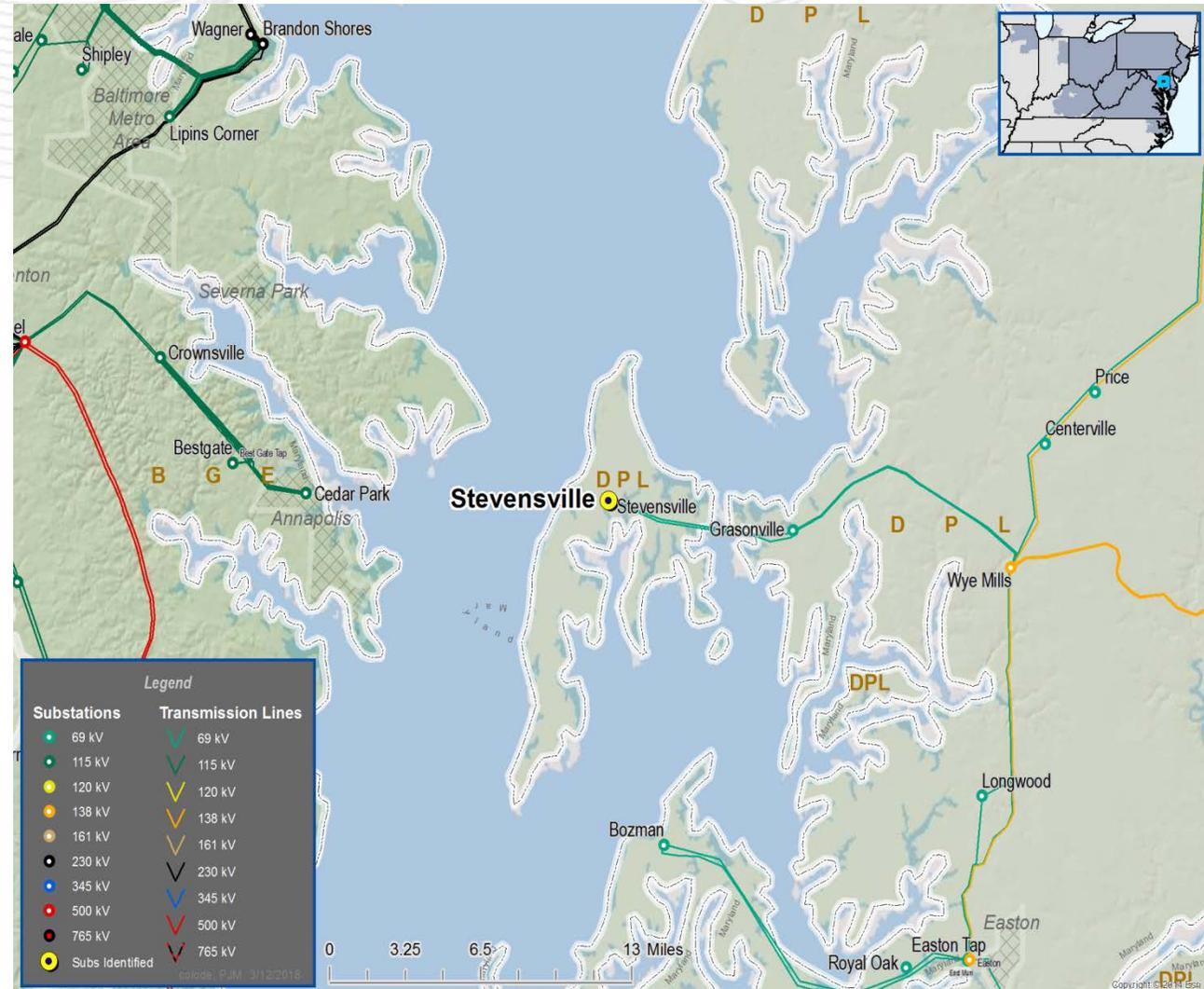
Selected Solution:

- Install a 3 breaker 69kV line bus at Stevensville, isolating faults and limiting customer interruptions. (S1633)

Estimated Cost: \$2.5 M

Expected In-Service: 12/31/2019

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- The Massey faces repeated outages due to the existing substation configuration and the remote location. There is no 69kV bus arrangement at the substation.

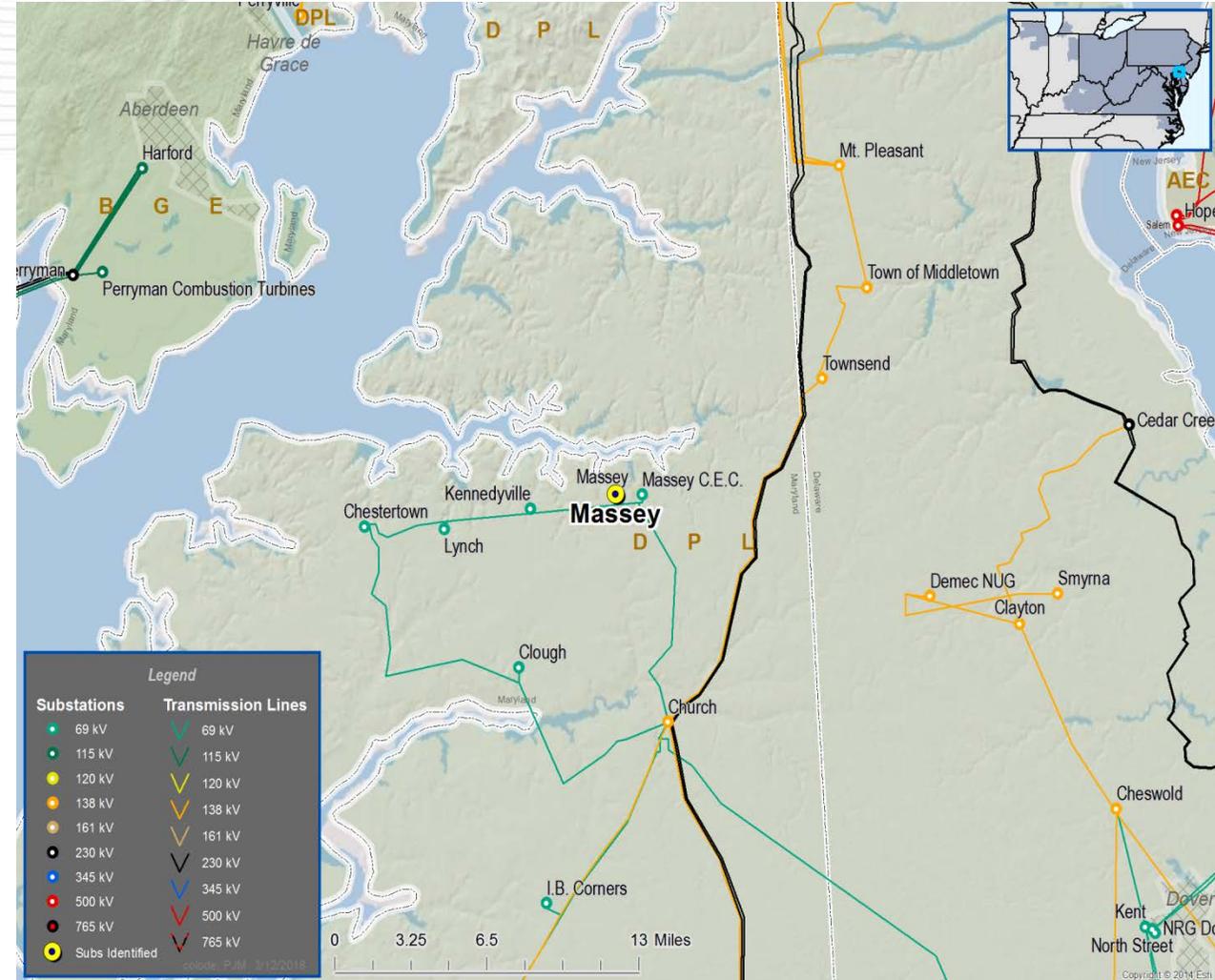
Selected Solution:

- Install a 3 breaker 69kV line bus at Massey, isolating faults and limiting customer interruptions. (S1634)

Estimated Cost: \$2.2 M

Expected In-Service: 12/31/2019

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- The Lynch area faces repeated outages due to the existing substation configuration and the remote location. There is no 69kV bus arrangement at the substation.

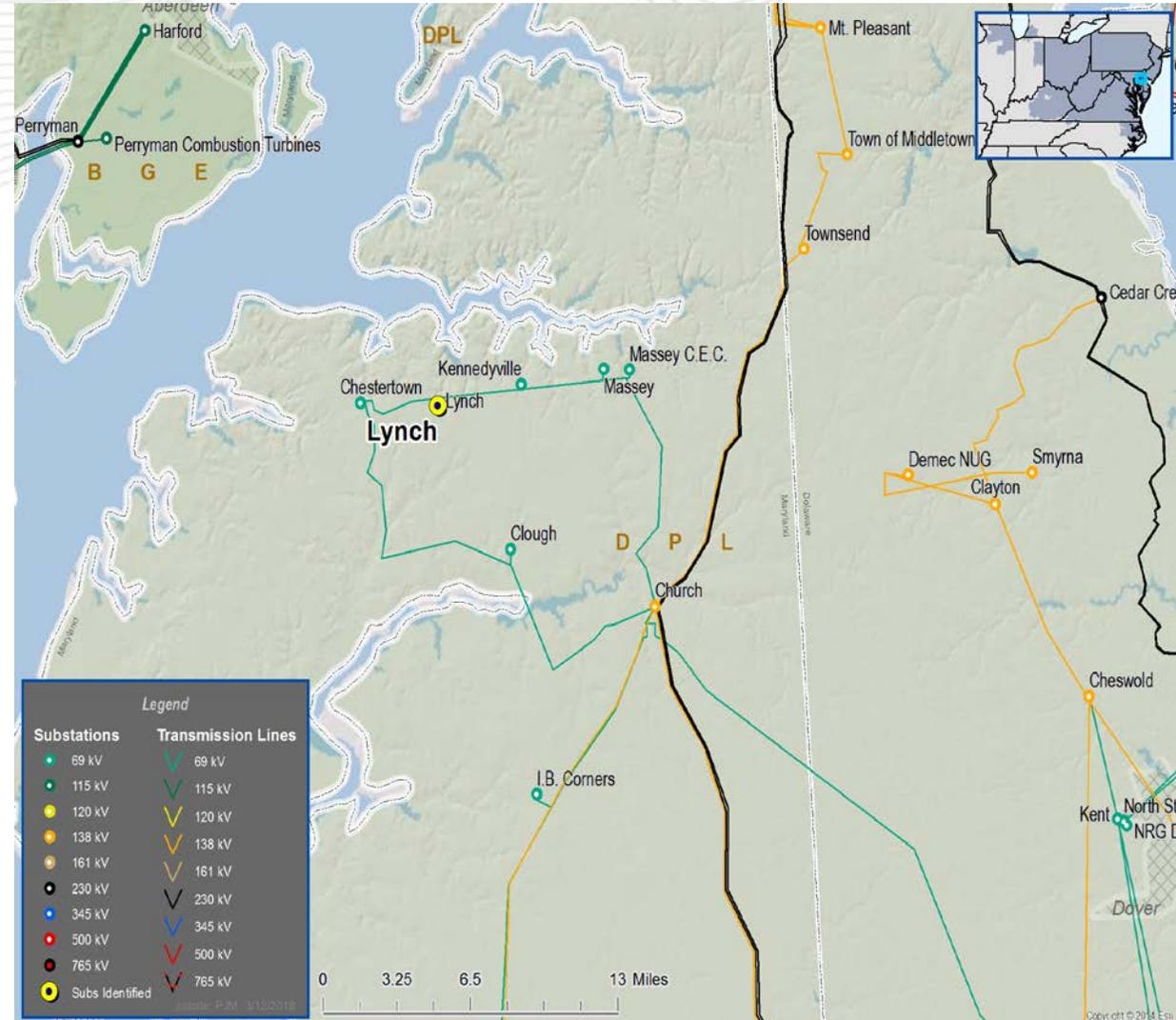
Selected Solution:

- Install a 3 breaker 69kV line bus at Lynch, isolating faults and limiting customer interruptions. (S1635)

Estimated Cost: \$1.9 M

Expected In-Service: 12/31/2019

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- This project is needed to mitigate performance risk associated with the current equipment material and condition. Specifically, based on inspection data, deteriorated, cracked, and weathered crossarms and deteriorated poles were identified, which places this line in the top quartile of the DPL age and condition ranking.

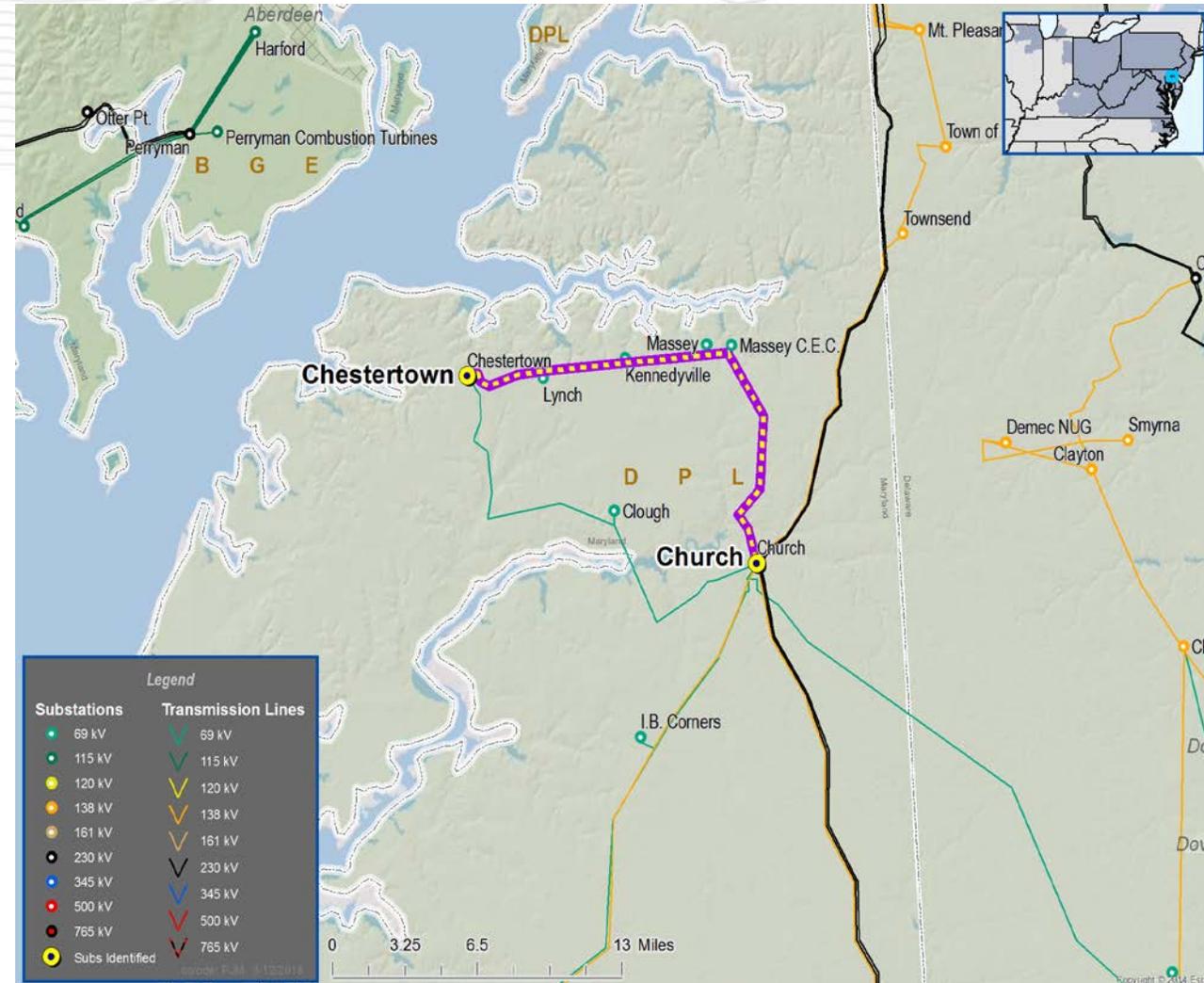
Selected Solution:

- Rebuild line 6727 between Church and Chestertown substations. The work would be split into three construction stages: Church – Massey REA, Massey REA – Lynch, and Lynch – Chestertown. All structures, conductor, and static wire will be replaced with new steel poles and conductor. (S1636)

Estimated Cost: \$35 M

Expected In-Service: 12/31/2022

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- This project is needed to mitigate performance risk associated with the current equipment material and condition. Specifically, based on inspection data, deteriorated, cracked, and weathered crossarms and deteriorated poles were identified, which places this line in the top quartile of the DPL age and condition ranking

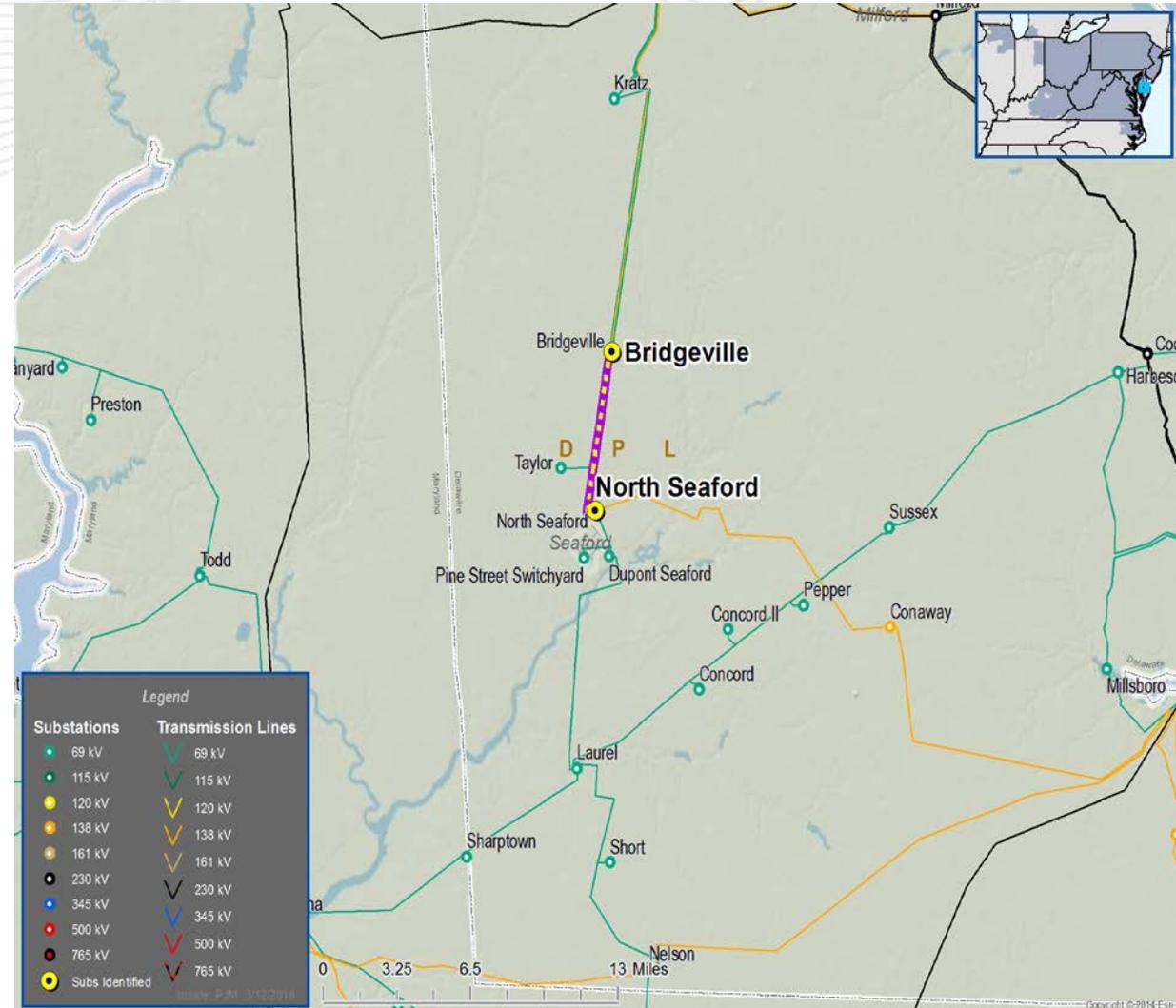
Selected Solution:

- Rebuild line 6737 between North Seaford and Bridgeville substations. All structures, conductor, and static wire will be replaced with new steel poles and conductor. (S1637)

Estimated Cost: \$7.2 M

Expected In-Service: 12/31/2020

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- This project is needed to mitigate performance risk associated with the current equipment material and condition. Specifically, based on inspection data, deteriorated, cracked, and weathered crossarms and deteriorated poles were identified, which places this line in the top quartile of the DPL age and condition ranking.

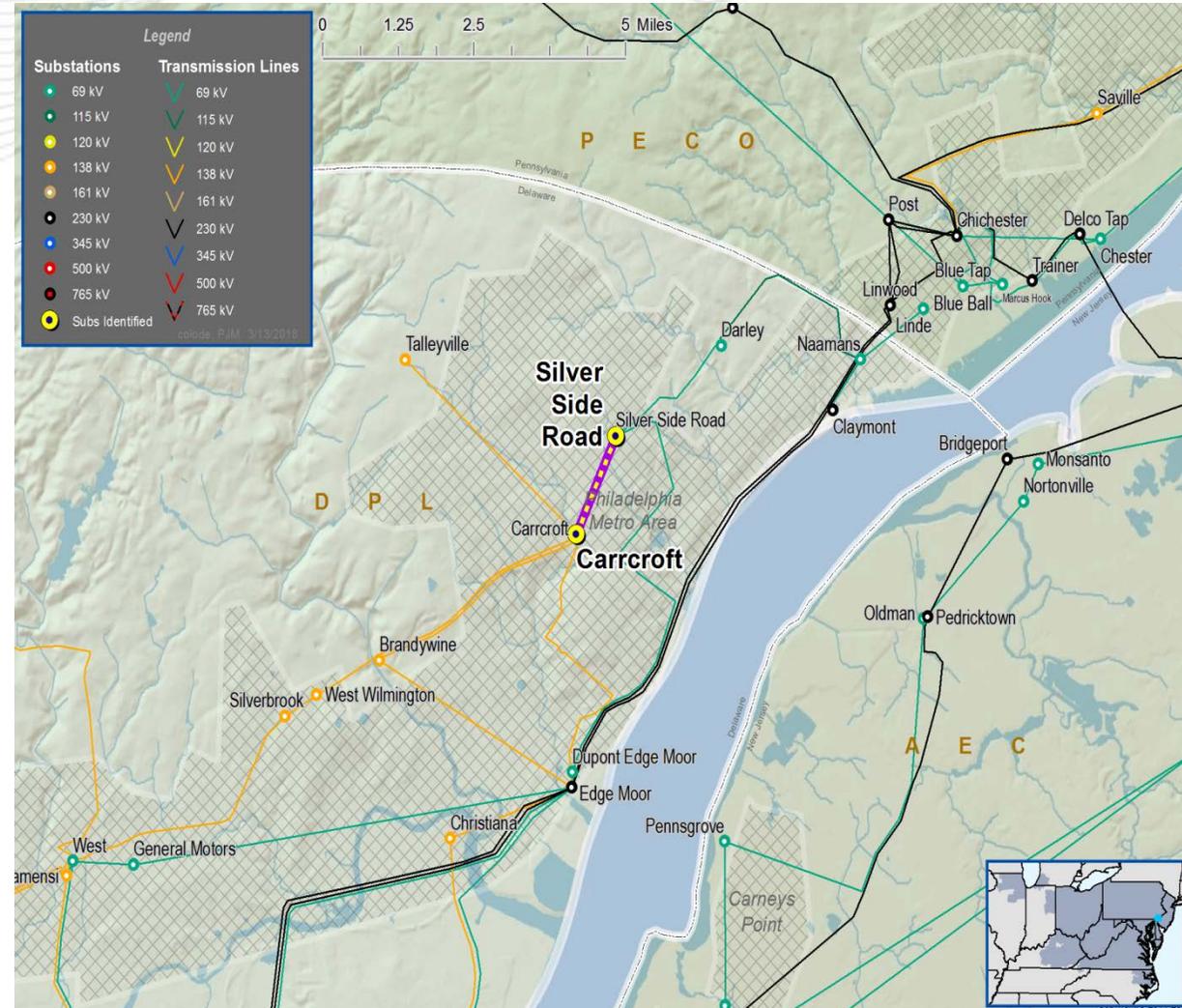
Selected Solution:

- Rebuild line 6831 between Carrcroft and Silverside substations. All structures, conductor, and static wire will be replaced with new poles, conductor, and OPGW. (S1638)

Estimated Cost: \$2.5 M

Expected In-Service: 12/31/2020

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- This project is needed to mitigate performance risk associated with the current equipment material and condition. Specifically, based on inspection data, deteriorated, cracked, and weathered crossarms and deteriorated poles were identified, which places this line in the top quartile of the DPL age and condition ranking.

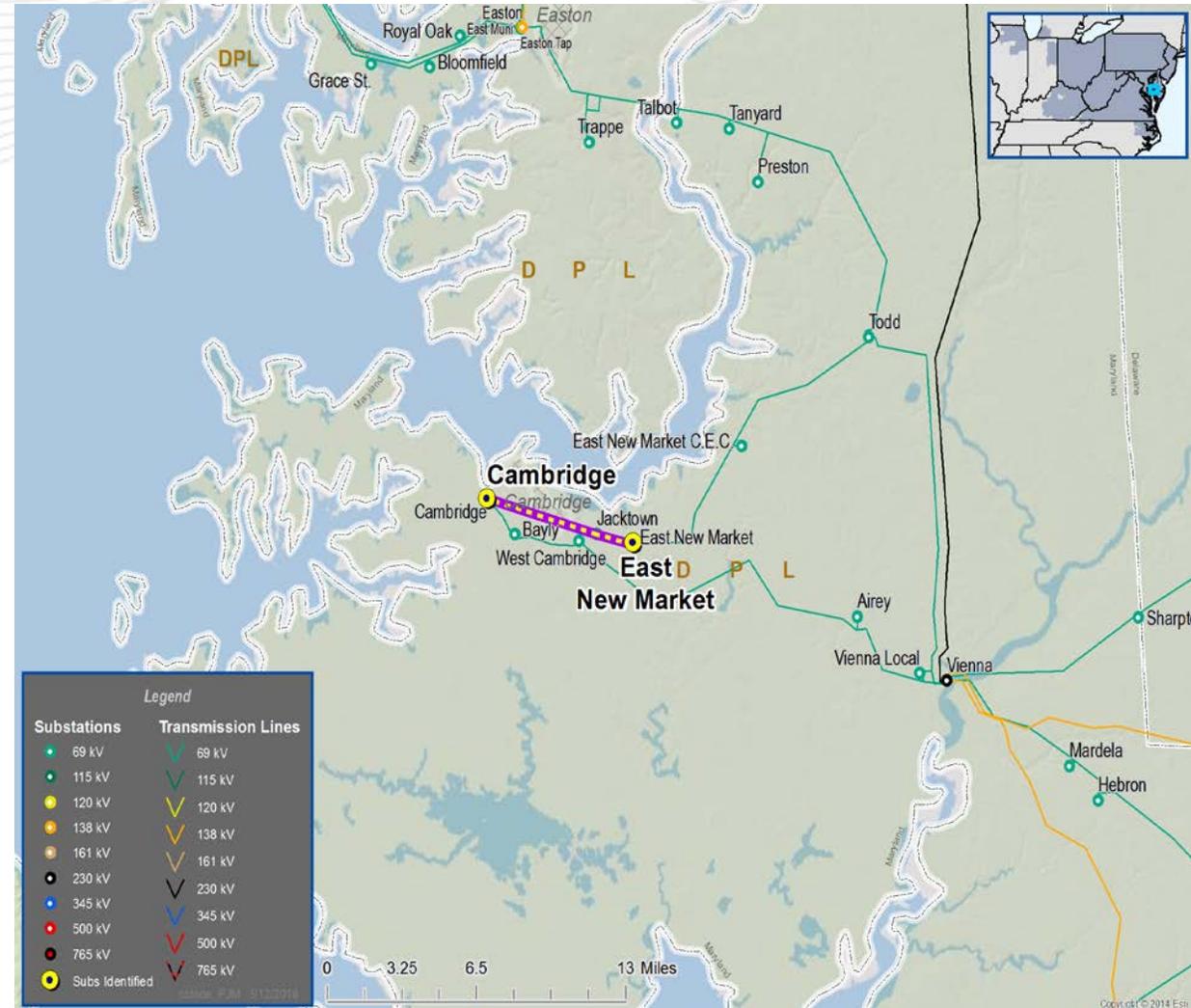
Selected Solution:

- Rebuild line 6719 between East New Market and Cambridge substations. All structures, conductor, and static wire will be replaced with new poles, conductor, and OPGW. (\$1639)

Estimated Cost: \$2.5 M

Expected In-Service: 12/31/2020

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Eliminate the simultaneous outages to three or more system elements.

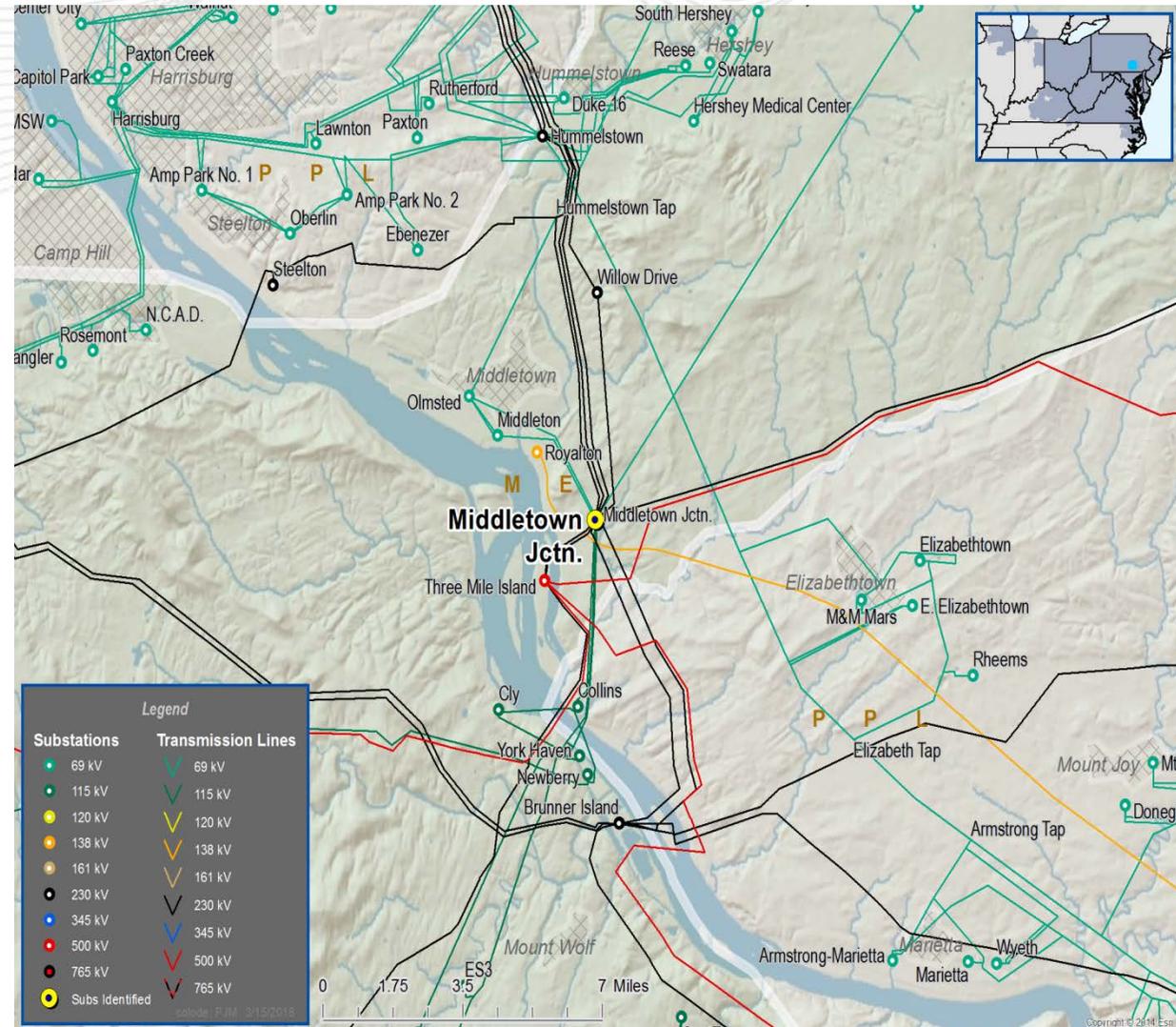
Selected Solution:

- Middletown Junction, Install eleven (11) 230 kV Circuit Breakers to complete the double bus configuration including replacement of the #2 (75 MVA) & #5 (75/84 MVA) 230/115 kV transformers with 180/240/300 MVA units, and removal of the #1 (75 MVA) 230/115 kV transformer. (S1640)

Estimated Project Cost: \$13.5 M

Projected IS date: 6/1/2023

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

Operational Flexibility and Efficiency

- Reduces customer outage exposure.
- Mitigates loss of Tolna substation for a fault on the 115 kV line to the generator.

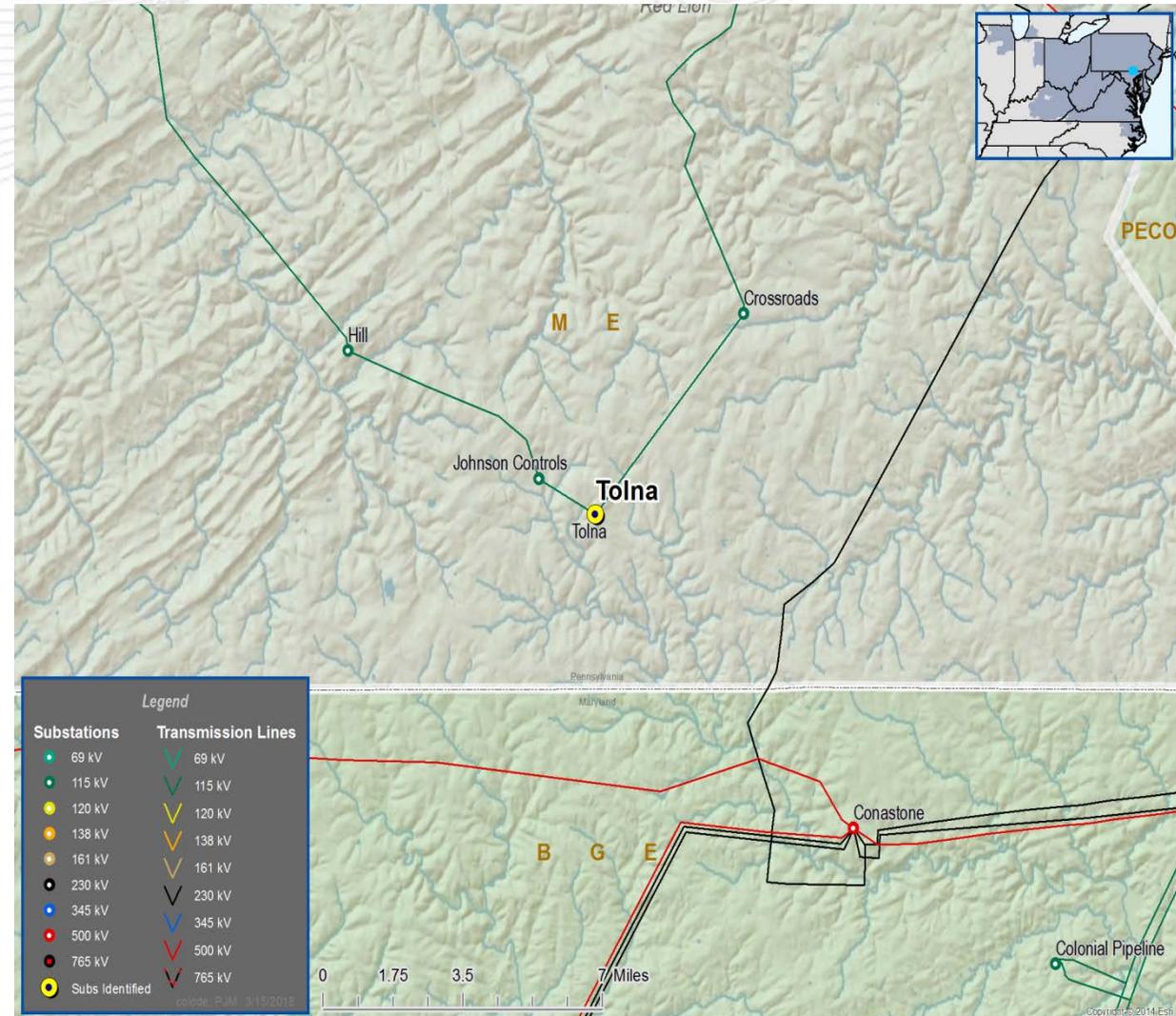
Selected Solution:

- Install new 115 kV circuit breakers at Tolna on the generator terminal and in the bus tie position. (S1641)

Estimated Project Cost: \$2.4M

Projected IS date: 12/31/2018

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

Equipment Material Condition, Performance and Risk

- Improve system reliability and performance
- Remove obsolete & deteriorated equipment.

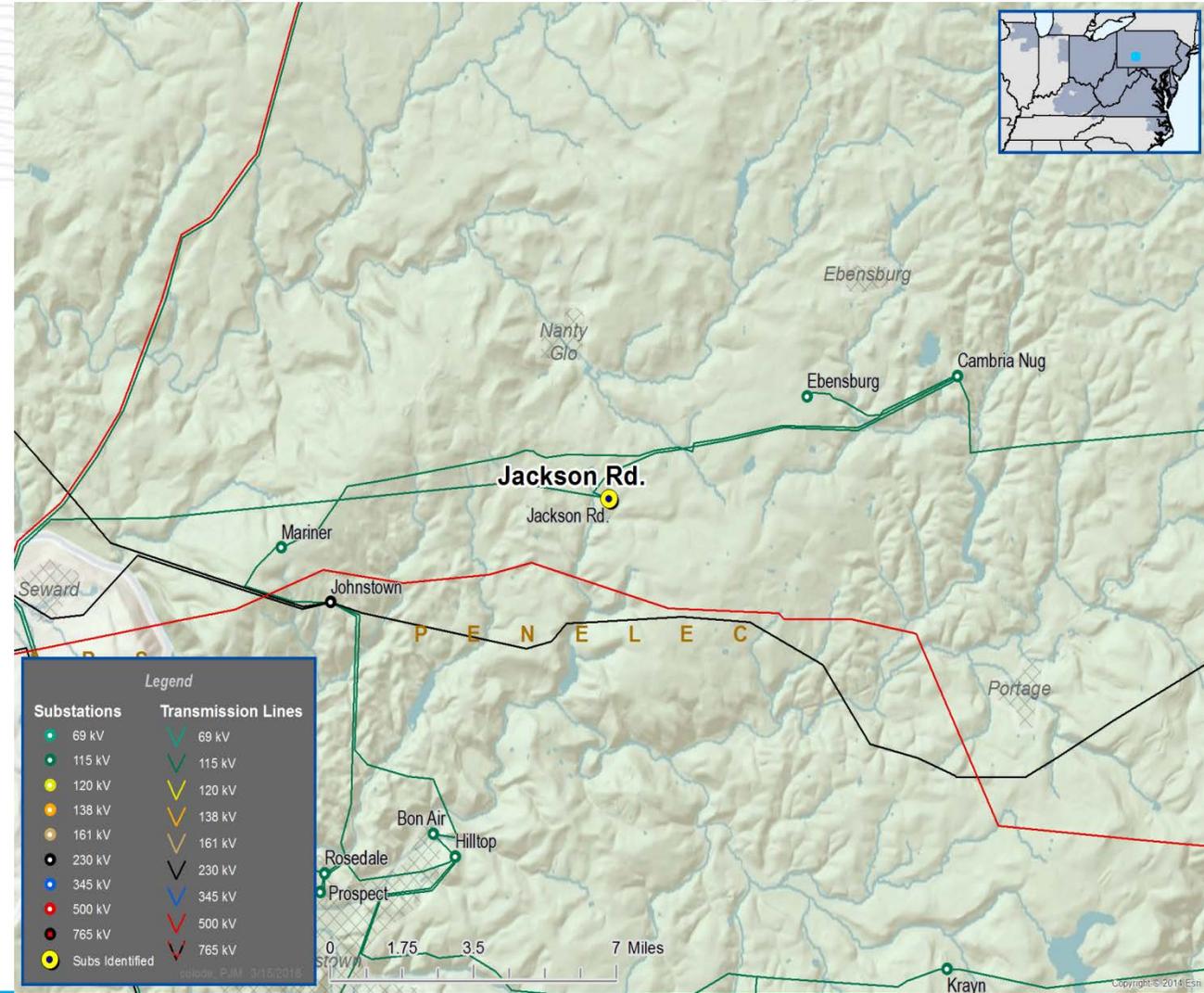
Selected Solution:

- Replace the existing Jackson Road 25 and 28/37.3 MVA 115/46 kV transformers with 45/60/75 MVA units.
- Install a 115 kV breaker on the high side of each Jackson Road transformer. (S1642)

Estimated Project Cost: \$3.7 M

Projected IS date: 11/30/2018

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

Equipment Material Condition, Performance and Risk

- Improve system reliability and performance
- Remove obsolete & deteriorated equipment.
- Upgrade to current FE Standards
- Eliminate the simultaneous outages to three or more system elements

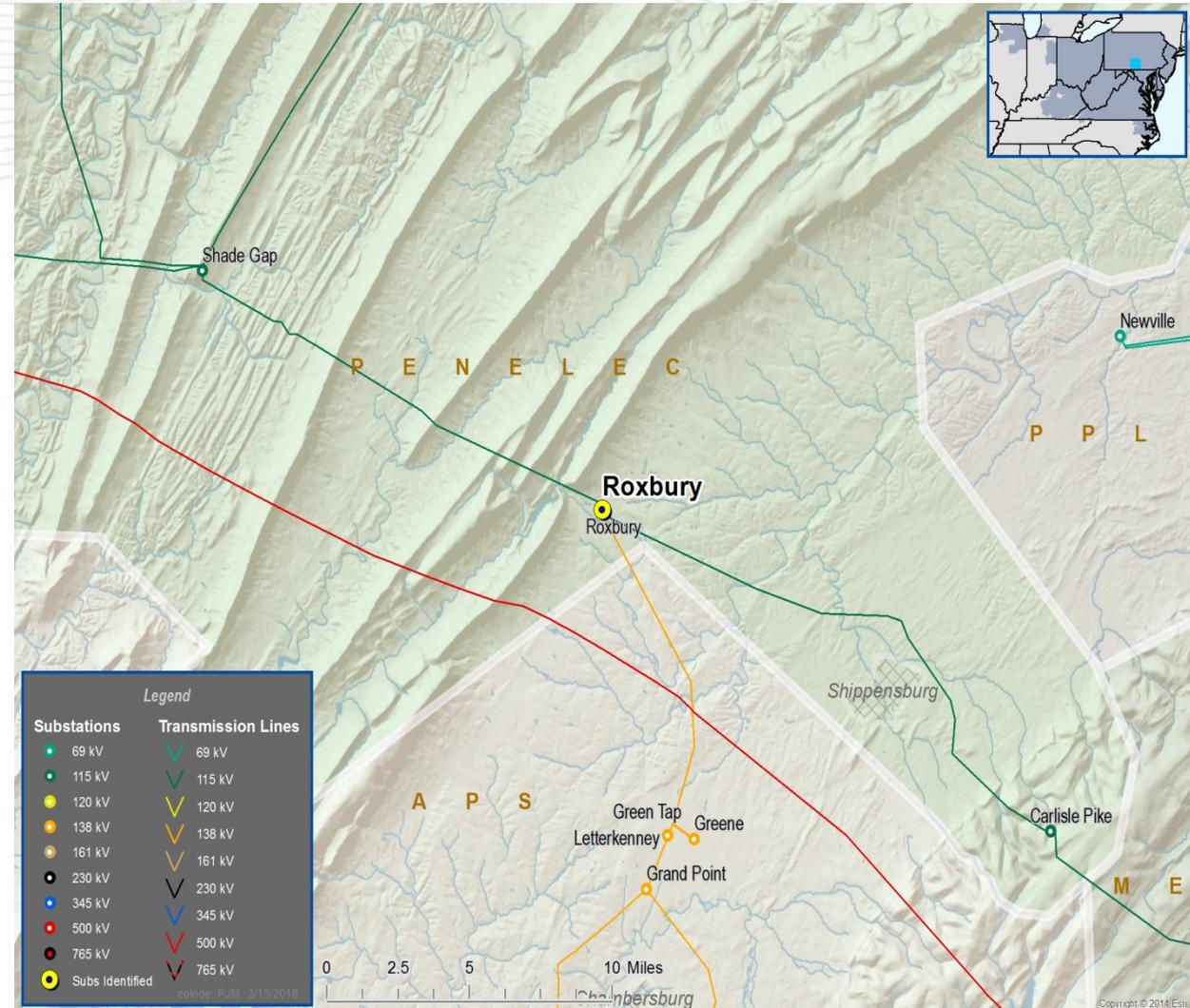
Selected Solution:

- Replace the existing Roxbury 100 MVA 138/115 kV transformer with a 224 MVA unit. (S1643)
- Convert Roxbury 115 kV substation into a four (4) breaker ring bus.

Estimated Project Cost: \$4.2 M

Projected IS date: 12/31/2019

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.
- Eliminate the simultaneous outages to three or more system elements.

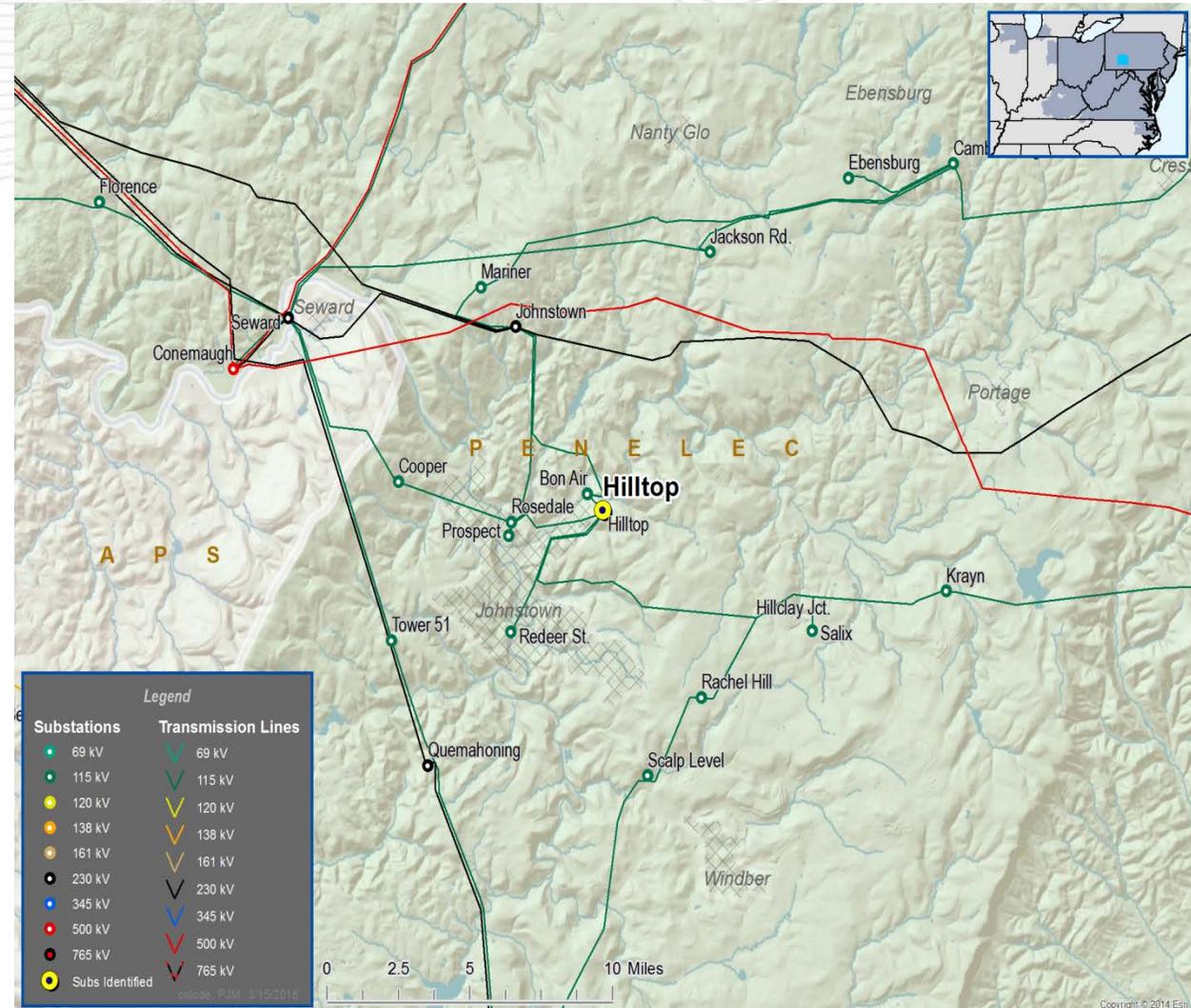
Selected Solution:

- Expand the existing Hilltop 115 kV substation to a six (6) breaker ring bus. (S1644)

Estimated Project Cost: \$9.3 M

Projected IS date: 12/31/2018

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Eliminate the simultaneous outages to three or more system elements.

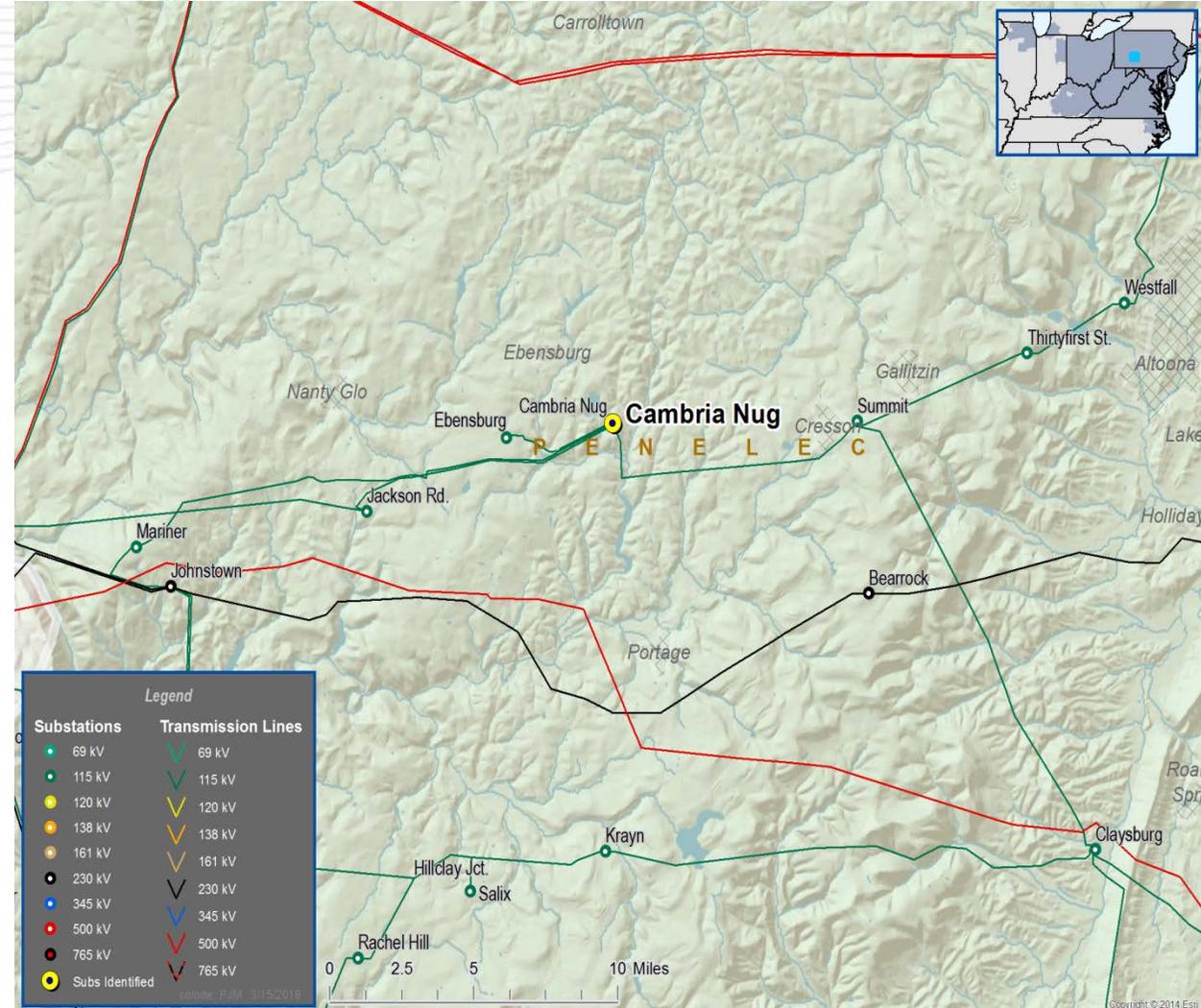
Potential Solution:

- Expand the existing Cambria Slope 115 kV substation to a six (6) breaker ring bus. (S1645)

Estimated Project Cost: \$8.7 M

Projected IS date: 6/1/2019

Status: Engineering





Previously Presented: 03/23/2018

Problem Statement:

Operational Flexibility and Efficiency

- Planning analysis identifies concerns related to loss of an existing transformer at a specific voltage level.
- Loss of substation bus adversely impact transmission system performance
- Improve operational flexibility during maintenance and restoration efforts.
- Eliminate the simultaneous outages to three or more system elements.

Selected Solution:

Wayne Substation

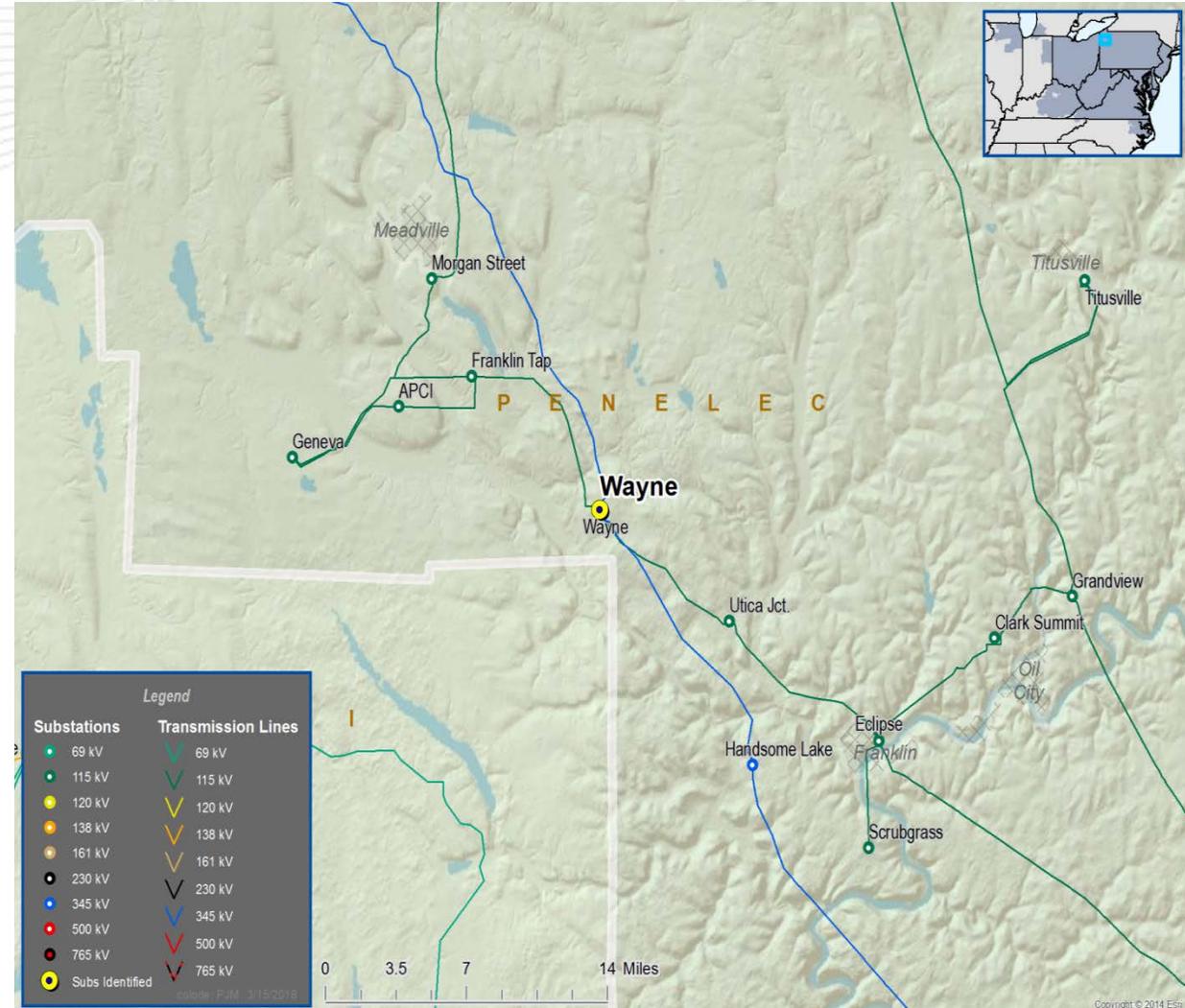
- Install a second 345/115 kV 168/224 MVA transformer. Convert the 115 kV yard to a 4 breaker ring bus. (S1643)

Estimated Project Cost: \$5.8 M

Projected IS date: 6/1/2019

Status: Engineering

Penelec Transmission Zone: Supplemental Project Wayne 345/115 kV Substation



Previously Presented: 03/23/2018

Problem Statement:

FERC Form 715:

Maywood Substation is supplied by two underground 230kV cables. Maywood supplies more than 25,000 customers with load in excess of 130 MVA. An N-1-1 event would result in a complete loss of electric supply to the station for more than 24 hrs.

Recommended Solution:

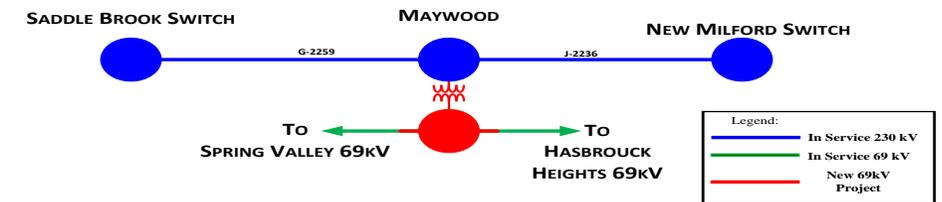
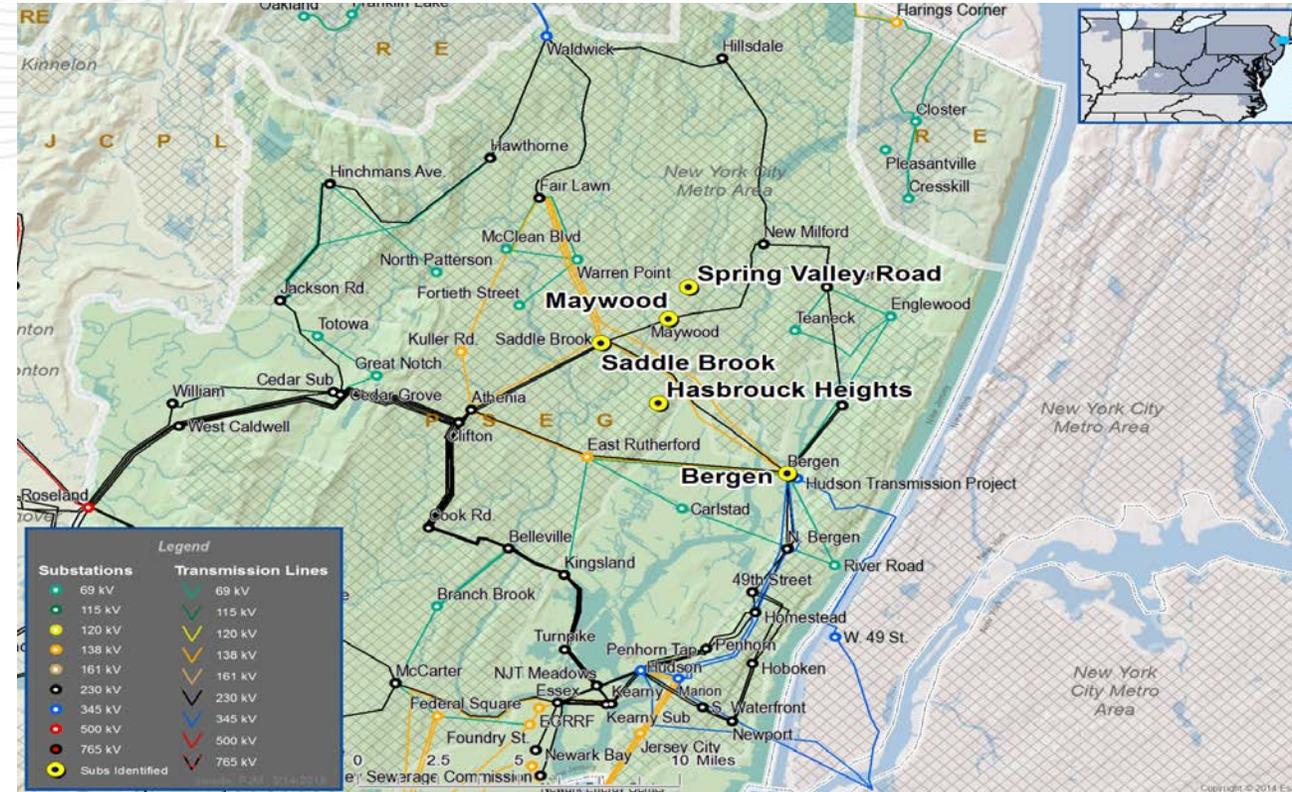
- Construct a 230/69kV station at Maywood. (B3003)
 - Purchase properties at Maywood to accommodate new construction.
 - Extend 230kV bus and install one (1) 230kV breaker.
 - Install one (1) 230/69kV transformer.
 - Install a 69kV ring bus.
 - Construct a 69kV network between Spring Valley Road, Hasbrouck Heights, and Maywood.
 - Estimated Project Cost: \$87M

Estimated Project Cost: \$87 M

Required IS date: 6/1/2018

Projected IS date: 12/31/2021

Status: Engineering



PSEG Transmission Zone: Baseline Project South Trenton Network N-1-1 Reliability, Trenton Area Load Growth

Previously Presented: 03/23/2018

Problem Statement:

FERC Form 715:

The South Trenton 69kV network is supplied by a 230/69kV transformer at Trenton Switching Station and an underground 69kV circuit between Lawrence Switching Station and Ewing. The South Trenton 69kV network, which consists of Clinton Ave, Ewing, Hamilton, and Liberty St, supplies over 15,000 customers with load in excess of 40 MVA. An N-1-1 event would result in a complete loss of electric supply to the network for more than 24 hrs.

Load Growth:

Kuser Road currently supplies over 42,000 customers in the Trenton area. The load supplied exceeded 150 MVA during summer 2017 and is expected to grow in the local area. During the loss of a transformer at Kuser Road, there will be a ~9% overload on the remaining transformers.

Recommended Solution:

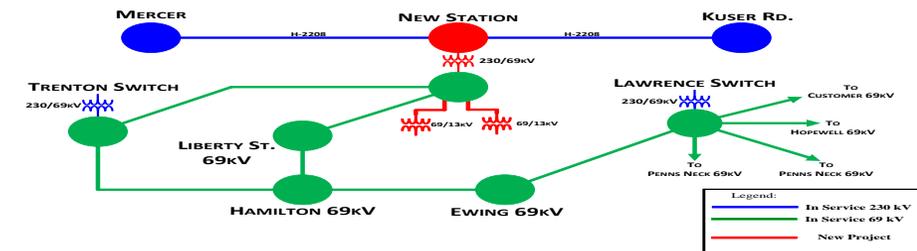
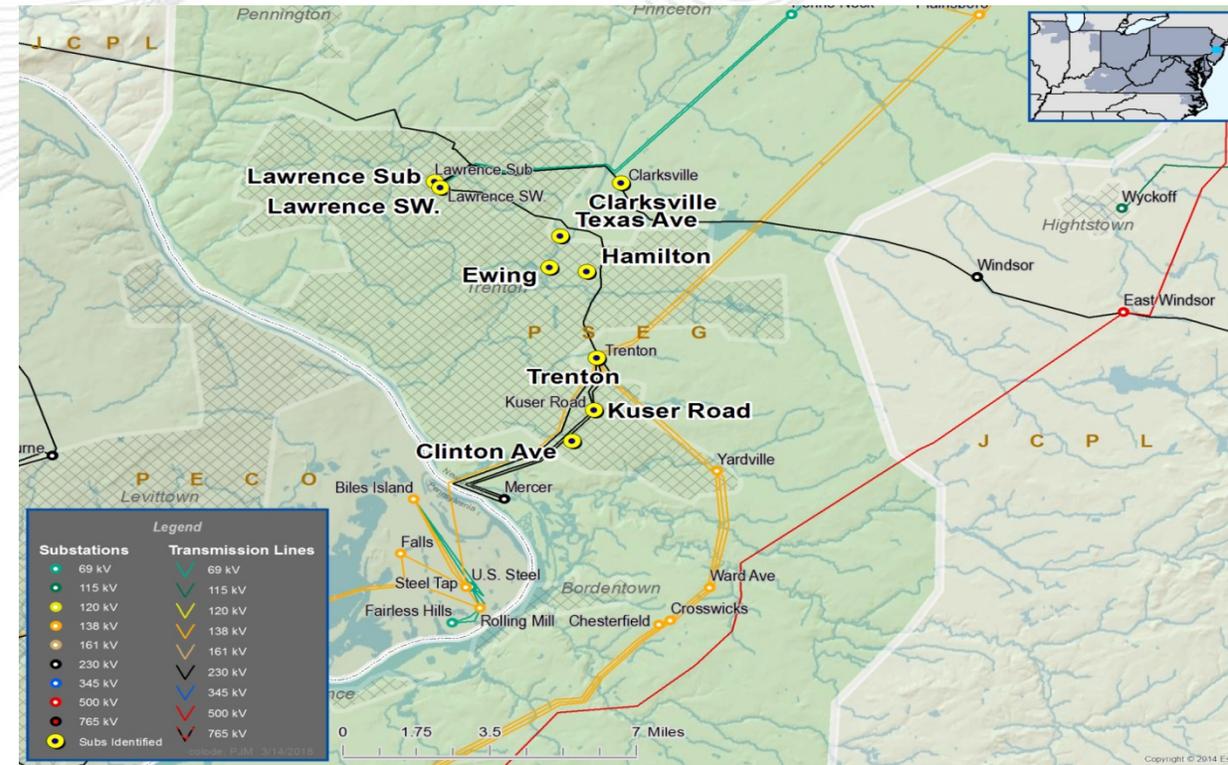
- Construct a 230/69/13kV station on existing 230kV ROW. (B3004)
 - Install 230kV ring bus with one (1) 230/69kV transformer at existing Clinton Ave location.
 - Expand existing 69kV ring bus at Clinton Ave with two (2) additional 69kV breakers.
 - Install two (2) 69/13kV transformers.
 - Install 18 MVAR capacitor bank.

Estimated Project Cost: \$62 M

Required IS date: 6/1/2018

Projected IS date: 12/31/2021

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

Load Growth:

The Cranbury area is currently served by long 13kV circuits from Plainsboro and Devils Brook. Of the eight Plainsboro and Devils Brook 13kV circuits feeding this area, five experienced overloads in 2016, while the remaining three were loaded at over 75%. PSE&G continues to receive new business requests in the area.

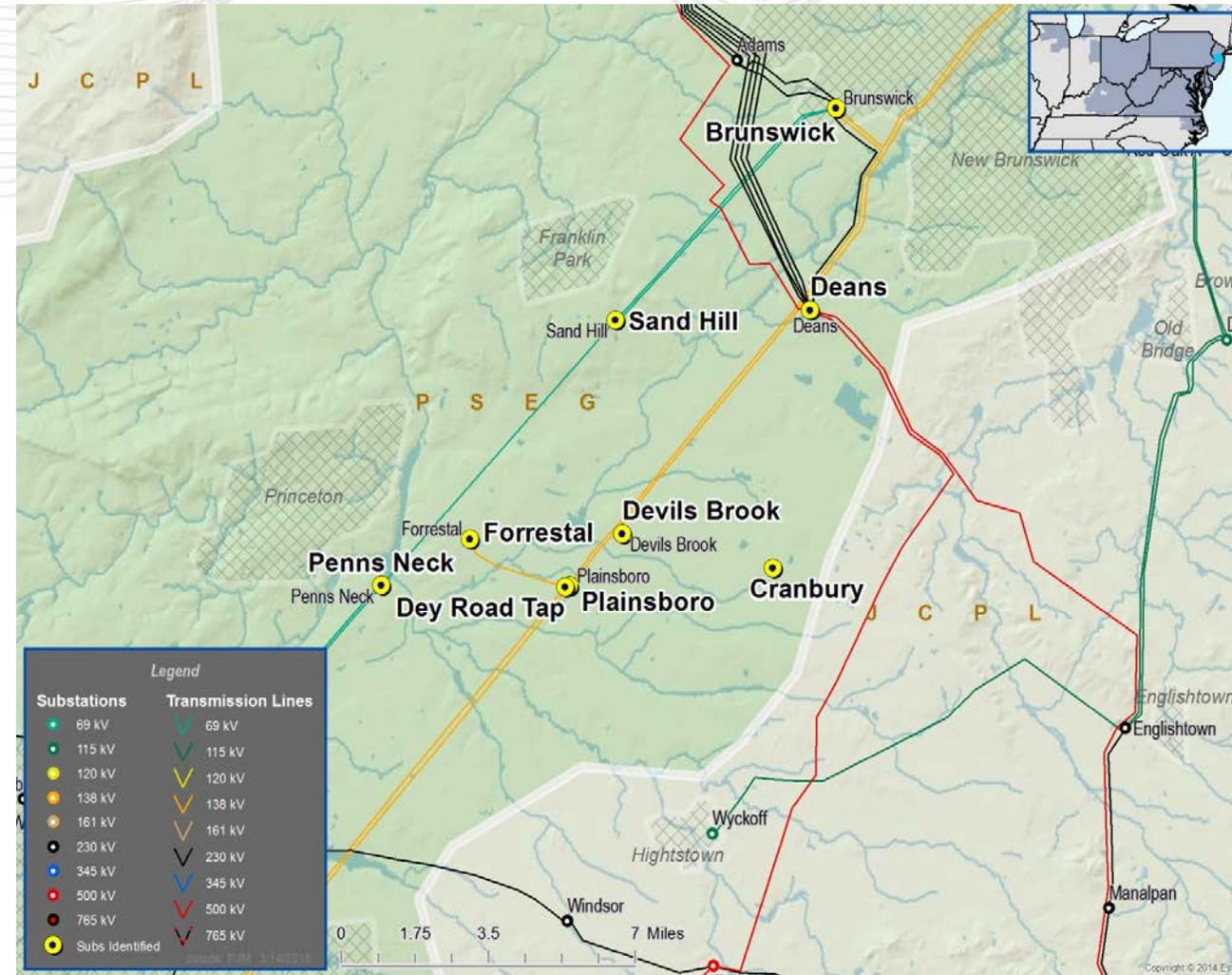
Network Availability:

The Cranbury area is at the edge of PSE&G territory and does not have a transmission supply source to feed a new station.

Operational Flexibility and Efficiency, Customer Service:

Sand Hills is a 69/13kV station that serves around 20,000 customers with load of around 80MVA. A stuck breaker event on the 69kV bus would cause the loss of two lines and a capacitor bank. This would cause the voltage on the 69kV bus to drop by roughly 10%, resulting in a voltage below 0.95 pu.

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Selected Solution:

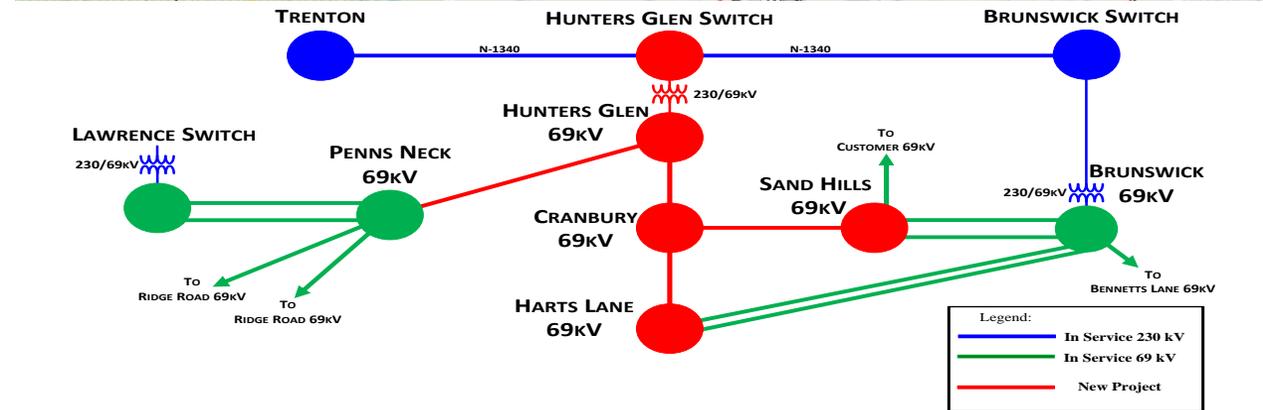
Construct a new 69/13kV station in Cranbury, construct a 230/69kV station at Plainsboro (Hunters Glen), and reconfigure 69kV bus at Harts Lane and Sand Hills. (\$1647)

- Install a 69kV ring bus, two (2) 69/13kV transformers, and 18 MVAR capacitor bank at new Cranbury station.
- Reconfigure 230kV bus, install a 69kV ring bus, and install one (1) 230/69kV transformer at Hunters Glen.
- Convert 69kV straight bus to 69kV ring bus at Harts Lane to provide a new line position.
- Convert 69kV straight bus to 69kV breaker-and-a-half bus at Sand Hills to resolve voltage issues and provide a line position.
- Construct a 69kV network between Cranbury, Harts Lane, Hunters Glen, Penns Neck, and Sand Hills.

Estimated Project Cost: \$307 M

Projected IS date: 11/31/2021

Status: Engineering



Previously Presented: 03/23/2018

Problem Statement:

- Distribution load growth requires the construction of a double circuit 66kV transmission line serving a two-transformer (Type II) substation. The installed and under construction load served by UGI's HIP Substation (Type II) exceeds current substation capacity for loss of a single transformer reducing reliability. In addition, proposed expansion of industrial and commercial load further magnifies the capacity limitation.

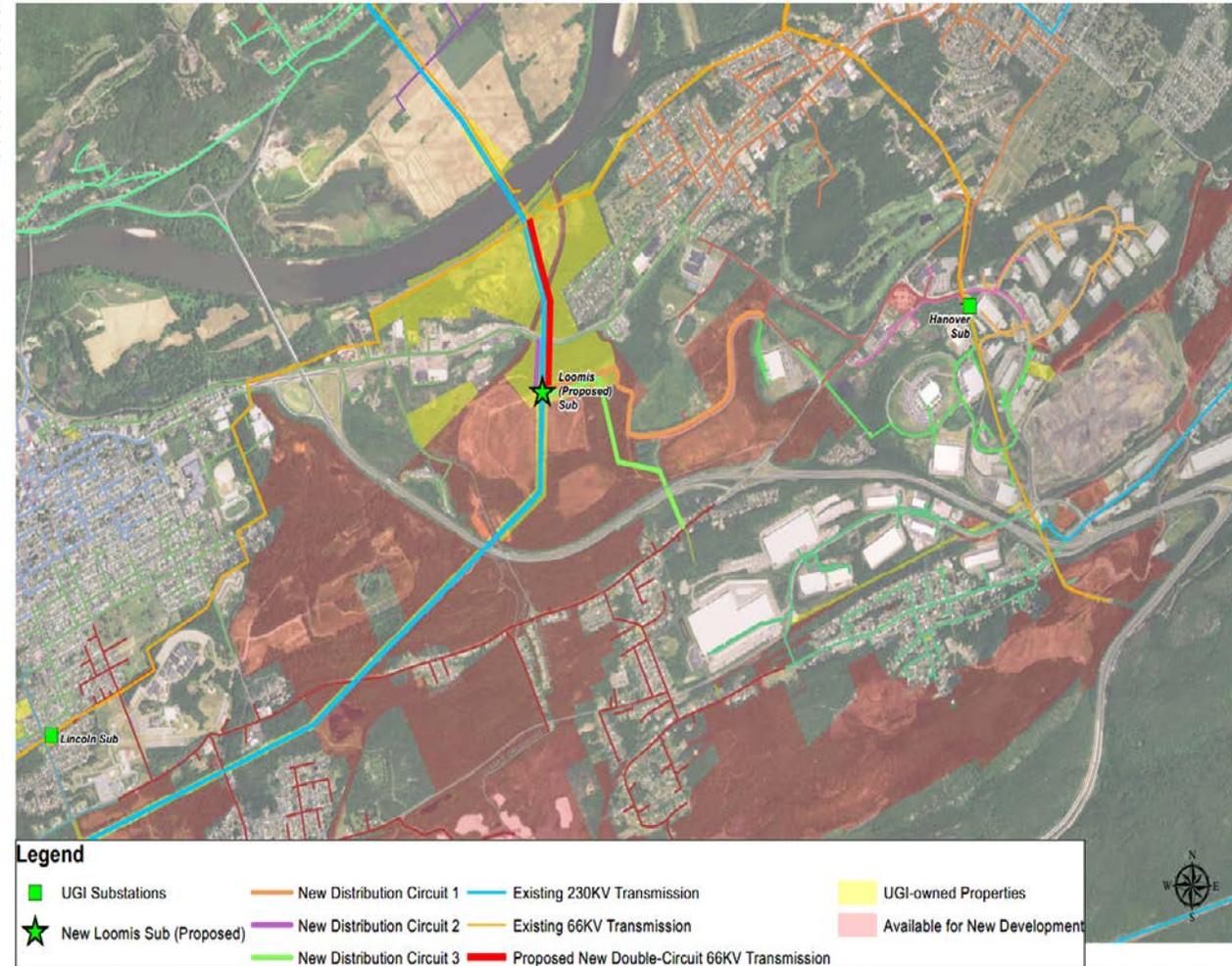
Potential Solution:

- Construct 0.6 mile double circuit 66kV transmission line serving Looms 69/13.8 kV new substation with two-transformer (Type II) and six (6) overhead feeders. (S1648)

Estimated Cost: Transmission → \$1 M, Substation → \$8 M

Expected IS Date: 9/30/2019

Status: Planning and Engineering



Next Steps

Mid-Atlantic	Start	End
7/20/2018	8:30	12:30
9/21/2018	8:30	12:30
11/28/2018	8:30	12:30



- PJM will retire the RTEP@pjm.com email address as of September 1, 2018. Stakeholders with questions about planning updates or planning windows should use the [Planning Community](#).
- PJM is enhancing the way we communicate to follow industry standards and maintain its standing as an industry leader.
- The [Planning Community](#) is a vital avenue for PJM members and staff to collaborate on planning updates, including RTEP windows, and get their questions answered.



Revision History

5/18/2018 – V1 – Original version posted to pjm.com