Subregional RTEP Committee - Mid-Atlantic
FirstEnergy Supplemental Projects

Submission of Supplemental Projects for Inclusion in the Local Plan

JCPL Transmission Zone M-3 Process
Gillette – Green Village 34.5 kV Lines

Need Number: JCPL-2019-026

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting – 03/25/2019
Solution Meeting – 11/16/2023

Project Driver(s):
Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

Line Condition Rebuild/Replacement

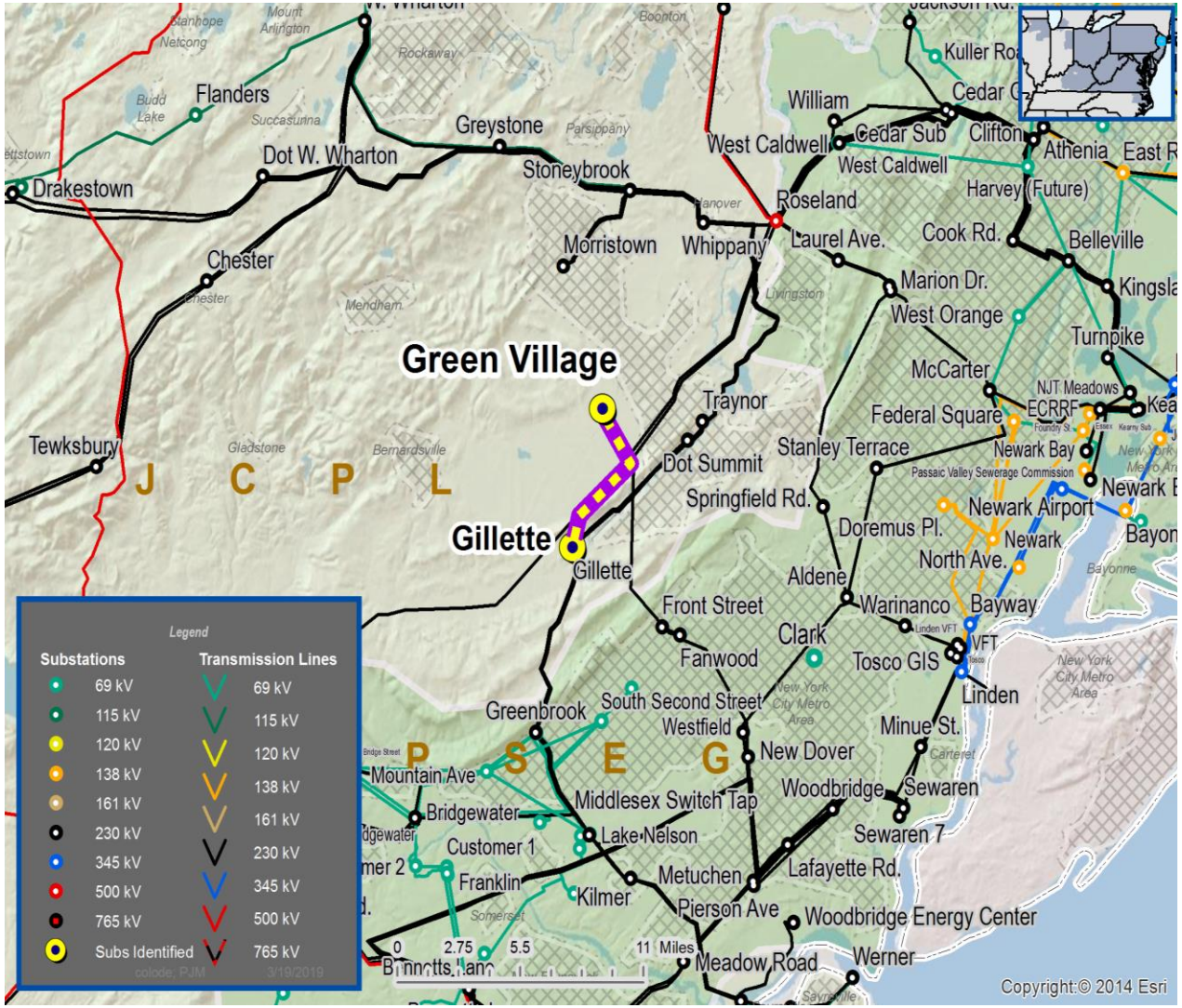
- Age/condition of wood pole transmission line structures
- Age/condition of steel tower or steel pole transmission line structures
- Age/condition of transmission line conductors

System Performance Projects

- Substation/line equipment limits

Problem Statement

- Line sections are exhibiting deterioration, increasing maintenance needs. Transmission line is approaching end of life
- Transmission line ratings are limited by terminal equipment.



JCPL Transmission Zone M-3 Process
Gillette – Green Village 34.5 kV Lines

…Continued from previous page

Need Number	Transmission Line / Substation Locations	Existing Circuit Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Length of Line (miles)	Identified Structures (end of life / total)	Failure reasons
JCPL-2019-026	Gillette – Green Village 34.5 kV E5 Line Gillette – Green Village 34.5 kV J114 Line	41 / 50 44 / 53	41 / 50 44 / 53	5.7	132 / 134 (99% Failure Rate)	Age, bad/cut/missing grounds, rot/decay, woodpecker holes, etc.

JCPL Transmission Zone M-3 Process
Gillette – Green Village 34.5 kV lines

Need Numbers: JCPL-2019-026

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Rebuild the Gillette-Green Village 34.5kV E5 and J114 circuit (shared structures). Replace approximately 134 damaged poles. Install 5.7 miles of new conductor.
  - Gillette Substation: Replace line relaying, limiting substation conductor
  - Green Village Substation: Replace line relaying, line side disconnect switch

Transmission Line Ratings:

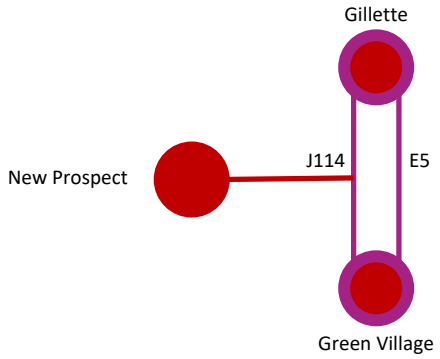
- Gillette-Green Village E5 34.5 kV Line
  - Before Proposed Solution: 41 / 50 MVA (SN / SE)
  - After Proposed Solution: 55 / 67 MVA (SN / SE)

- Gillette-Green Village J114 34.5 kV Line
  - Before Proposed Solution: 44 / 53 MVA (SN / SE)
  - After Proposed Solution: 55 / 67 MVA (SN / SE)

Estimated Project Cost: $ 24.2 M

Projected In-Service: 02/23/2024

Supplemental Project ID: s3232.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
New Customer Connection

Need Number: JCPL-2023-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 06/15/2023
Solution Meeting 12/13/2023

Project Driver:

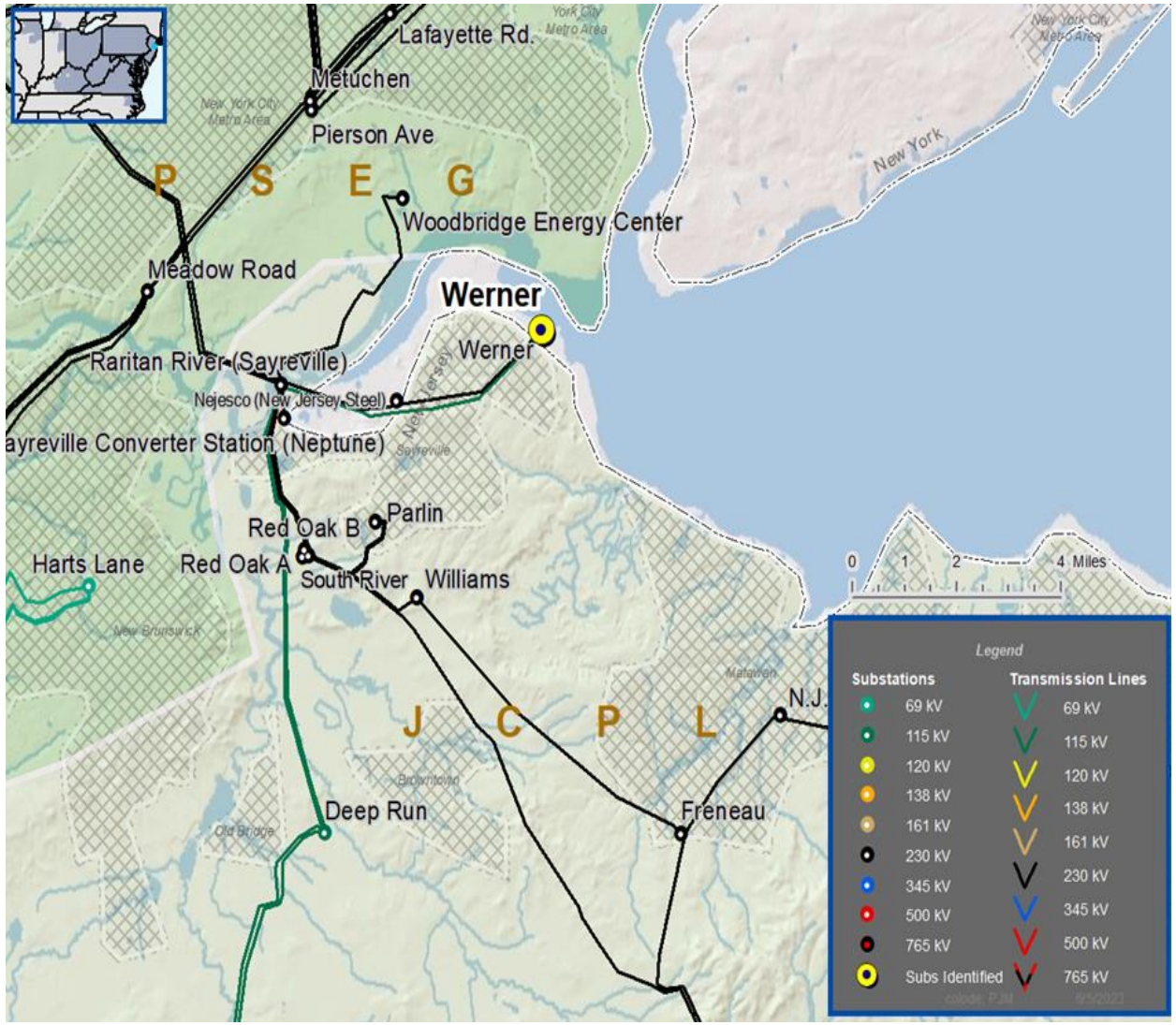
Customer Service

Specific Assumption Reference:

New customer connection requests will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

New Customer Connection - A customer requested 34.5 kV service for load of approximately 29.9 MVA of capacity; location is near the Werner 115 kV Substation.



JCPL Transmission Zone M-3 Process
New Customer Connection

Need Number: JCPL-2023-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

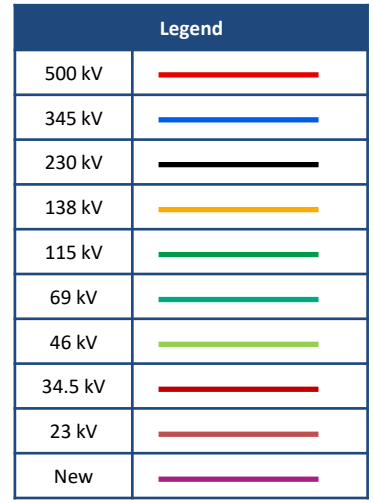
115 kV Breaker Addition

- Install one 115 kV breaker to create a 115 kV five breaker ring bus and create a terminal for customer connection
- Modify relay settings/scheme to accommodate breaker addition

Estimated Project Cost: $1.5M

Projected In-Service: 12/31/2025

Supplemental Project ID: s3233.1



JCPL Transmission Zone M-3 Process
Automatic Restoration Projects

Need Numbers: JCPL-2023-008, -009, -013, -014, -016-021, -024, -026, -028-030, -040, -041

Process State: Submission of Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 6/15/2023, 10/19/2023
Solution Meeting 11/16/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance

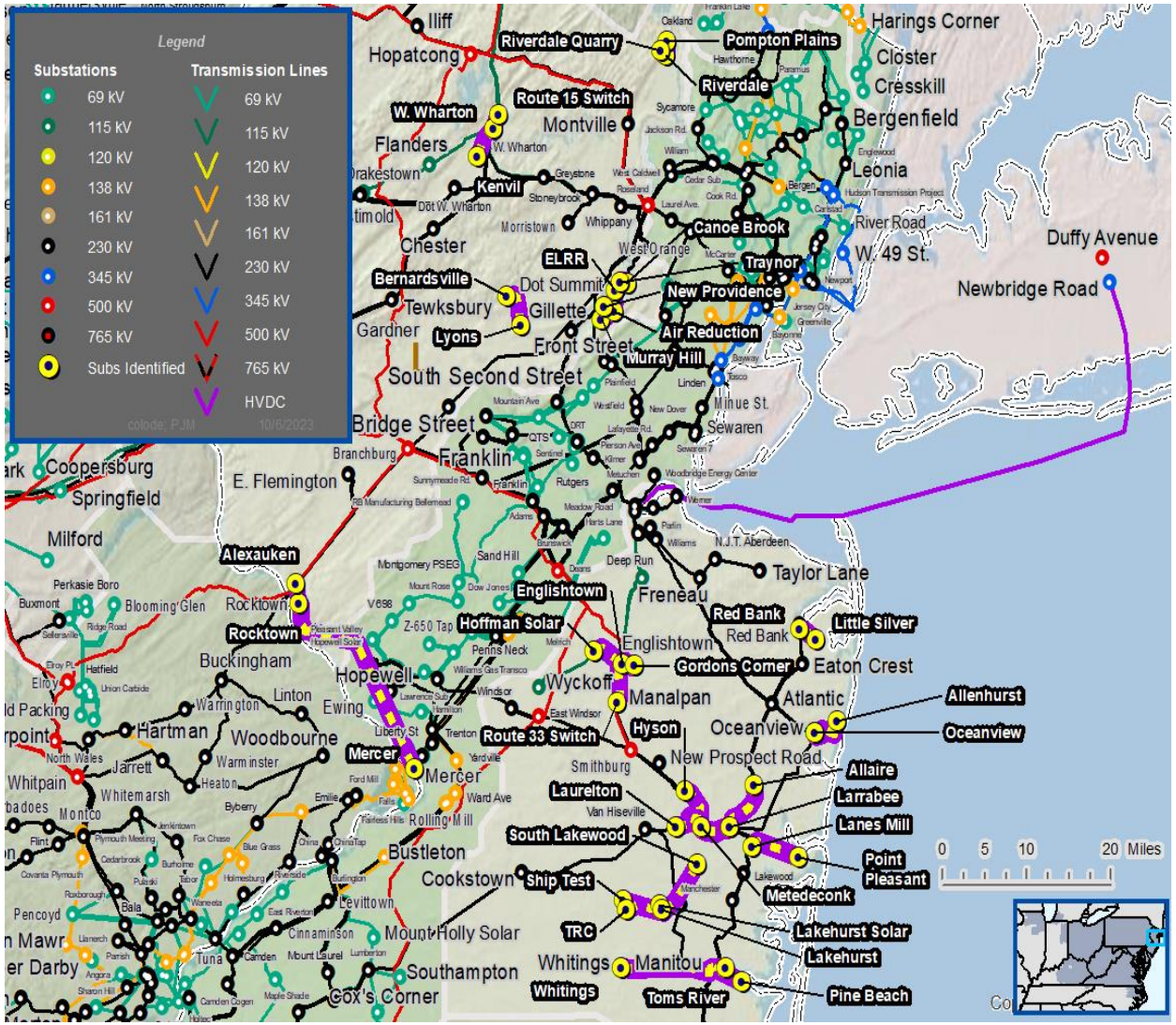
Upgrade Relay Schemes

- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- There is a lack of automatic restoration of 34.5 kV lines following tripping events without the intervention of Transmission Operators.
- Manual restoration increases the risk of system constraints on adjacent facilities, especially for critical lines as identified by Transmission Operations.
- Obsolete electromechanical relay schemes. In many cases, the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- Transmission line ratings are limited by terminal equipment.

Continued on next slide…



JCPL Transmission Zone M-3 Process
Automatic Restoration Projects

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
JCPL-2023-008	Citgo D Tap – Monroe 34.5 kV	70/84	70/85
	Hoffman Solar Tap – Monroe 34.5 kV	44/57	70/85

JCPL Transmission Zone M-3 Process
Automatic Restoration Projects

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
JCPL-2023-009	Freneau – Hillsdale Tap 34.5 kV	44/48	44/53
	Freneau – Pennwalt Tap 34.5 kV	44/48	44/53
	Freneau – Hazlet 34.5 kV	55/67	55/67
	Freneau – Ernston Tap 34.5 kV	40/48	40/48

JCPL Transmission Zone M-3 Process
Automatic Restoration Projects

Need #	Transmission Line	Existing Line Rating (SN/SE/WN/WE)	Existing Conductor Rating (SN/SE/WN/WE)
JCPL-2023-013	Manitou – Toms River Tap V126 34.5 kV	66/72/72/72	70/85/79/100
	Manitou - Pine Beach Tap X50 34.5 kV	55/63/63/63	55/67/63/79
JCPL-2023-014	Bernardsville – ELRR Tap C757 34.5 kV	44/53/50/57	44/53/50/63
	Bernardsville - Lyons B730 34.5 kV	44/47/47/47	44/53/50/63
JCPL-2023-016	Allenhurst - Oceanview H216 34.5 kV	44/48/48/48	55/67/63/79
JCPL-2023-017	Air Reduction – Murray Hill D108 34.5 kV	44/53/50/61	44/53/50/63
JCPL-2023-018	Rocktown Road - Mercer Tap N716 34.5 kV	39/48/45/48	39/48/45/56
	Alexauken Tap - Rocktown Road Y727 34.5 kV	38/38/38/38	40/48/45/57
JCPL-2023-019	Air Reduction Tap – New Providence D108 34.5 kV	35/46/48/48	41/50/48/60
JCPL-2023-020	West Wharton - Route 15 Switch Point T254 34.5 kV	55/67/63/72	55/67/63/79
	West Wharton - Kenvil Tap Z728 34.5 kV	55/67/63/77	55/67/63/79
JCPL-2023-021	Lanes Mill Tap - Point Pleasant T146 34.5 kV	41/48/48/48	44/53/50/63
	Brielle - Point Pleasant B106 34.5 kV	39/48/40/48	39/48/40/50
JCPL-2023-024	Englishtown - Hoffman Solar Tap H34 34.5 kV	70/72/72/72	70/85/79/100
	Englishtown - Route 33 Switch Point I87 34.5 kV	41/50/48/56	41/50/48/60
	Englishtown - Gordons Corner A209 34.5 kV	44/53/50/61	44/53/50/63

JCPL Transmission Zone M-3 Process
Automatic Restoration Projects

Need #	Transmission Line	Existing Line Rating (SN/SE/WN/WE)	Existing Conductor Rating (SN/SE/WN/WE)
JCPL-2023-026	Lakehurst - Ship Test E109 34.5 kV	25/25/25/25	44/53/50/63
	Lakehurst - Lakehurst Solar Tap N140 34.5 kV	18/18/19/19	18/18/20/20
	Lakehurst - South Lakewood W777 34.5 kV	41/50/48/57	41/50/48/60
	Lakehurst - TRC O Tap O41 34.5 kV	41/50/48/51	41/50/48/60
JCPL-2023-028	Pompton Plains Tap – Riverdale M117 34.5 kV	41/48/48/48	41/50/48/60
	Riverdale Quarry Tap - Riverdale I9 34.5 kV	44/53/50/57	44/53/50/63
JCPL-2023-029	Traynor - Canoe Brook T72 34.5 kV	41/48/48/48	41/50/48/60
	Traynor - ELRR Summit Q Tap Q17 34.5 kV	42/48/48/48	44/53/50/63
	Canoe Brook Tap - Traynor C81 34.5 kV	44/53/50/53	44/53/50/63
JCPL-2023-030	Larrabee - Laurelton Tap Q43 34.5 kV	55/67/63/72	55/67/63/79
	Hyson - Larrabee K219 34.5 kV	66/76/76/76	70/85/79/100
	Larrabee - Metedeconk Tap E213 34.5 kV	41/50/48/53	41/50/48/60
	Larrabee - Allaire Tap B106 34.5 kV	41/50/48/52	41/50/48/60
JCPL-2023-040	Red Bank - Little Silver Z78 34.5 kV	55/67/63/72	55/67/63/79
JCPL-2023-041	Manitou - Whitings L138 34.5 kV	41/50/48/56	41/50/48/60

JCPL Transmission Zones M-3 Process
Automatic Restoration Projects

Selected Solution(s):

Need #	Transmission Line	New Line Rating (SN/SE/WN/WE)	Scope of Work	Supplemental Project ID	Estimated Cost ($ M)	Target ISD
JCPL-2023-008	Citgo D Tap – Monroe D82 34.5 kV	70/85/79/100	• At Monroe, replace relaying	s3234.1	$1.89	12/31/2024
	Hoffman Solar Tap – Monroe H34 34.5 kV	44/57/63/71				
JCPL-2023-009	Freneau – Hillsdale Tap F32 34.5 kV	44/53/50/63	• At Freneau, replace relaying	s3235.1	$3.78	12/31/2024
	Freneau – Pennwalt Tap V100 34.5 kV	44/53/50/63				
	Freneau – Hazlet S45 34.5 kV	55/67/63/79				
	Freneau – Ernston Tap W101 34.5 kV	40/48/45/57				
JCPL-2023-013	Manitou – Toms River Tap V126 34.5 kV	66/79/79/90	• At Manitou, replace relaying	s3236.1	$1.92	10/15/2024
	Manitou - Pine Beach Tap X50 34.5 kV	55/67/63/79				
JCPL-2023-014	Bernardsville – ELRR Tap C757 34.5 kV	44/53/50/63	• At Bernardsville, replace relaying	s3237.1	$1.28	11/15/2024
	Bernardsville - Lyons B730 34.5 kV	44/53/50/63				
JCPL-2023-016	Allenhurst - Oceanview H216 34.5 kV	44/57/63/71	• At Allenhurst, replace relaying	s3238.1	$1.28	11/16/2024
JCPL-2023-017	Air Reduction – Murray Hill D108 34.5 kV	35/46/48/57	• At Murray Hill, replace relaying	s3239.1	$0.64	12/15/2024
JCPL-2023-018	Rocktown Road - Mercer Tap N716 34.5 kV	39/48/45/56	• At Rocktown Road, replace relaying	s3240.1	$1.28	12/31/2024
	Alexauken Tap - Rocktown Road Y727 34.5 kV	40/48/45/57				

JCPL Transmission Zones M-3 Process
Automatic Restoration Projects

Selected Solution:

Need #	Transmission Line	New Line Rating (SN/SE/WN/WE)	Scope of Work	Supplemental Project ID	Estimated Cost ($ M)	Target ISD
JCPL-2023-019	Air Reduction Tap – New Providence D108 34.5 kV	44/53/50/63	• At New Providence, replace relaying	s3241.1	$0.64	12/10/2027
JCPL-2023-020	West Wharton - Route 15 Switch Point T254 34.5 kV	55/67/63/79	• At West Wharton, replace relaying	s3242.1	$1.92	6/1/2025
	West Wharton - Kenvil Tap Z728 34.5 kV	55/67/63/79				
JCPL-2023-021	Lanes Mill Tap - Point Pleasant T146 34.5 kV	41/52/50/62	• At Point Pleasant, replace relaying	s3243.1	$1.92	5/15/2025
	Brielle - Point Pleasant B106 34.5 kV	39/48/40/50				
JCPL-2023-024	Englishtown - Hoffman Solar Tap H34 34.5 kV	70/85/79/100	• At Englishtown, replace relaying	s3244.1	$2.56	10/15/2025
	Englishtown - Route 33 Switch Point I87 34.5 kV	41/50/48/60				
	Englishtown - Gordons Corner A209 34.5 kV	44/53/50/63				
JCPL-2023-026	Lakehurst - Ship Test E109 34.5 kV	44/53/50/63	• At Lakehurst, replace relaying	s3245.1	$2.56	12/31/2025
	Lakehurst - Lakehurst Solar Tap N140 34.5 kV	18/18/20/20				
	Lakehurst - South Lakewood W777 34.5 kV	41/50/48/60				
	Lakehurst - TRC O Tap O41 34.5 kV	41/50/48/57				
JCPL-2023-028	Pompton Plains Tap – Riverdale M117 34.5 kV	41/50/48/60	• At Riverdale, replace relaying	s3246.1	$1.28	12/31/2025

JCPL Transmission Zones M-3 Process
Automatic Restoration Projects

Selected Solution:

Need #	Transmission Line	New Line Rating (SN/SE/WN/WE)	Scope of Work	Supplemental Project ID	Estimated Cost ($ M)	Target ISD
JCPL-2023-029	Traynor - Canoe Brook T72 34.5 kV	41/50/48/60	• At Traynor, replace relaying	s3247.1	$1.92	12/31/2025
	Traynor - ELRR Summit Q Tap Q17 34.5 kV	42/50/50/57				
	Canoe Brook Tap - Traynor C81 34.5 kV	44/53/50/63				
JCPL-2023-030	Larrabee - Laurelton Tap Q43 34.5 kV	55/67/63/79	• At Larrabee, replace relaying	s3248.1	$2.56	12/20/2024
	Hyson - Larrabee K219 34.5 kV	70/85/79/100				
	Larrabee - Metedeconk Tap E213 34.5 kV	41/50/48/60				
	Larrabee - Allaire Tap B106 34.5 kV	41/50/48/60				
JCPL-2023-040	Red Bank - Little Silver Z78 34.5 kV	55/67/63/79	• At Red Bank, replace relaying	s3250.1	$1.28	12/31/2027
JCPL-2023-041	Manitou - Whitings L138 34.5 kV	41/50/48/60	• At Whitings, replace relaying	s3251.1	$1.28	6/1/2025

JCPL Transmission Zone M-3 Process
Vernon Substation

Need Number: JCPL-2023-038

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/19/2023

Solution Meeting 03/14/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

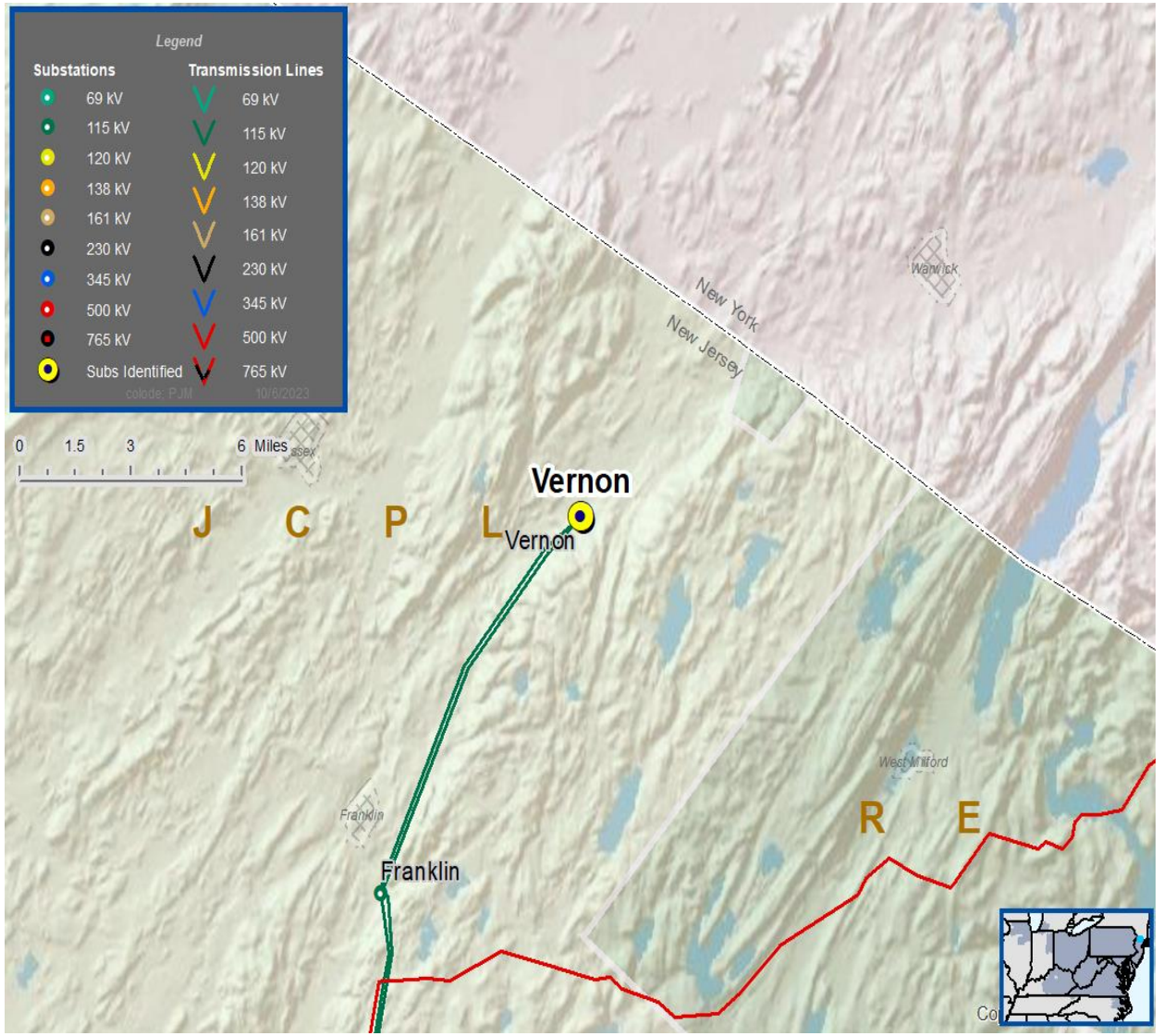
Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities
- Substation/line equipment limits

Problem Statement:

- The 115-34.5 kV No. 1 Transformer at Vernon Substation is approximately 50 years old and is approaching end of life. Most recent DGA results showed elevated methane and ethane gas levels compared with IEEE Standards.
- Existing Transformer Ratings:
  - 65 / 77 MVA (SN / SSTE)



JCPL Transmission Zone M-3 Process
Vernon Substation

Need Number: JCPL-2023-038

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace the 115-34.5 kV No. 1 Transformer at Vernon Substation.
- Replace 115 kV circuit switcher with a circuit breaker.
- Upgrade transformer relaying.

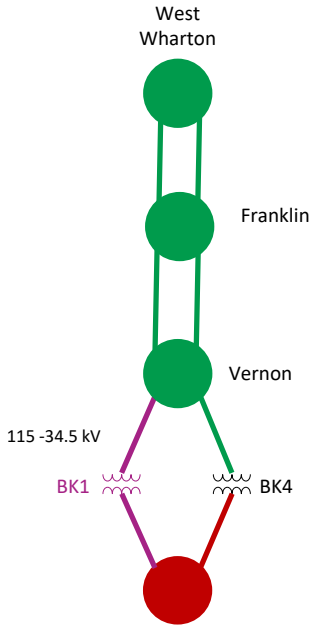
Transformer Ratings:

- Vernon 115-34.5 kV No. 1 Transformer:
  - Before Proposed solution: 65 / 77 / 80 / 88 MVA (SN/SSTE/WN/WSTE)
  - After Proposed Solution: 161 / 161 / 175 / 175 MVA (SN/SSTE/WN/WSTE)

Estimated Project Cost: $4.7 M

Projected In-Service: 12/15/2025

Supplemental Project ID: s3249.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Franklin Substation

Need Number: JCPL-2023-006

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 9/14/2023
Solution Meeting 11/16/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

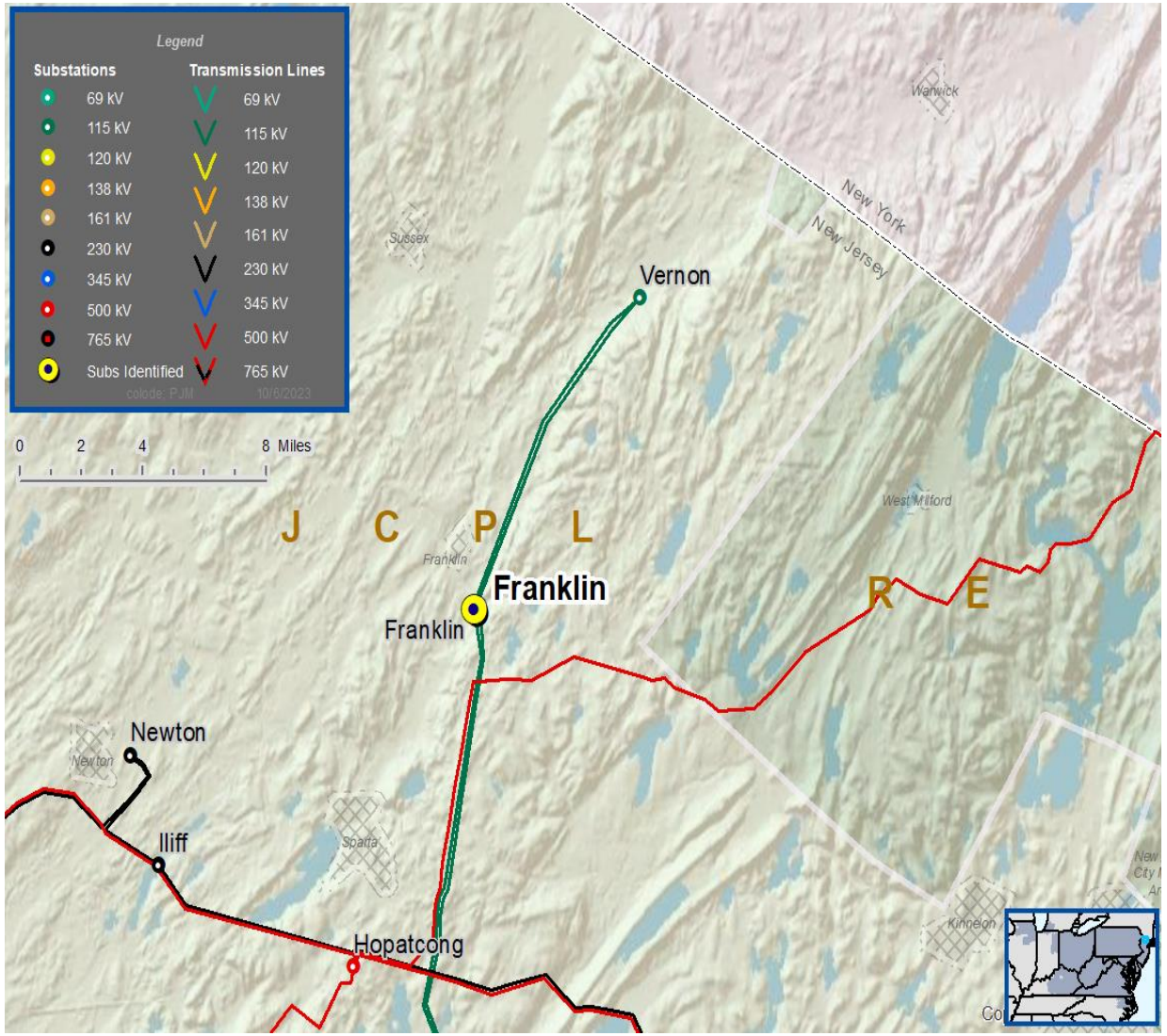
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 115 – 34.5 kV No. 2 Transformer at Franklin Substationwas installed 70 years ago and is approaching end of life.
- Ethane and Hydrogen gases have been exhibited as elevated compared to IEEE standards.
- Existing TR Ratings:
  - 61 / 66 MVA (SN / SLTE)



JCPL Transmission Zone M-3 Process
Franklin Substation

Need Number: JCPL-2023-042

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/19/2023
Solution Meeting 11/16/2023

Project Driver:

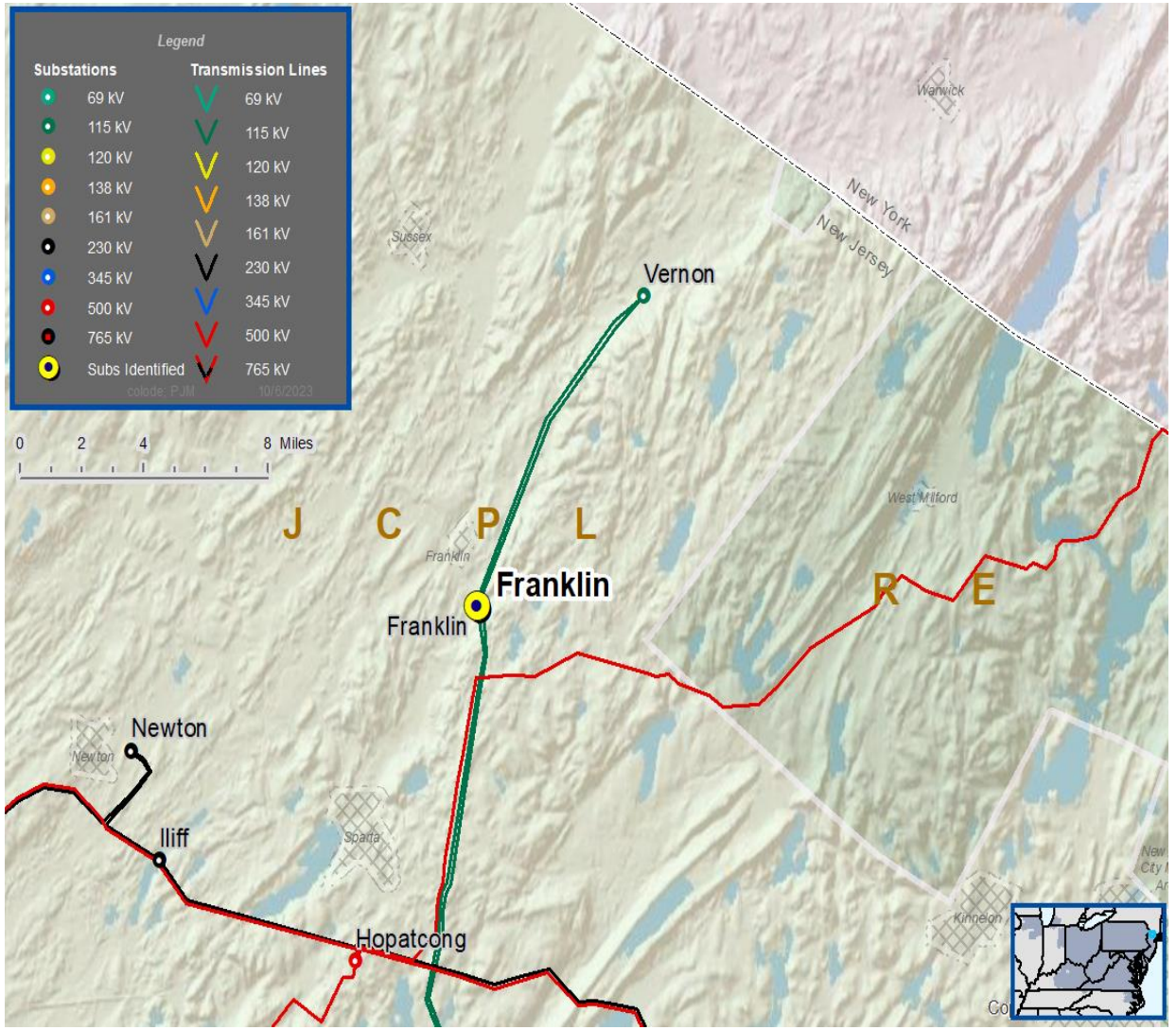
Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:

- Load at risk in planning and operational scenarios
- Add/Expand Bus Configuration

Problem Statement:

- Franklin Substation is configured as a straight bus with two 115 kV sources. Each 115 kV source is a tap connection on the Vernon – West Wharton 115 kV lines
  - Franklin Substation serves approximately 67 MW of load and 4,464 customers.
  - Both existing Vernon – West Wharton 115 kV Lines are 16.7 miles long. A fault anywhere on either line will cause an outage at Franklin and Vernon substations.



JCPL Transmission Zone M-3 Process
Franklin Substation

Need Number: JCPL-2023-006, JCPL-2023-042

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

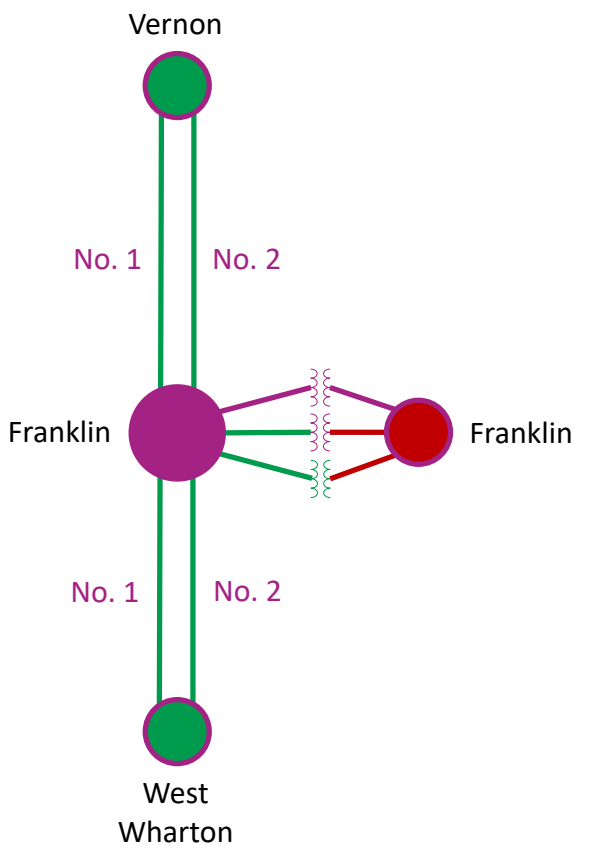
- At Franklin Substation:
  - Construct an 11 breaker 115 kV breaker-and-a-half substation
  - Cut the existing Vernon – West Wharton 115 kV D931 & J932 Lines and terminate them at Franklin Substation. This will create the following 115 kV Lines:
    - Franklin – West Wharton No. 1 115 kV
    - Franklin – West Wharton No. 2 115 kV
    - Franklin – Vernon No. 1 115 kV
    - Franklin – Vernon No. 2 115 kV
  - Install a new 90 MVA 115-34.5 kV transformer
  - Replace the existing 115-34.5 kV No. 2 transformer with a 90 MVA unit.
- Replace relaying at Franklin, Vernon, and West Wharton Substations

Estimated Project Cost: $32.0 M

Projected In-Service: 12/31/2025

Supplemental Project ID: JCPL-2023-006: s3299.1, s3299.2, s3299.3, s3299.4

JCPL-2023-042: s3252.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Misoperation Relay Projects

Need Number: JCPL-2023-044, -045, -048

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/31/2023
Solution Meeting 12/05/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption References:

Global Factors

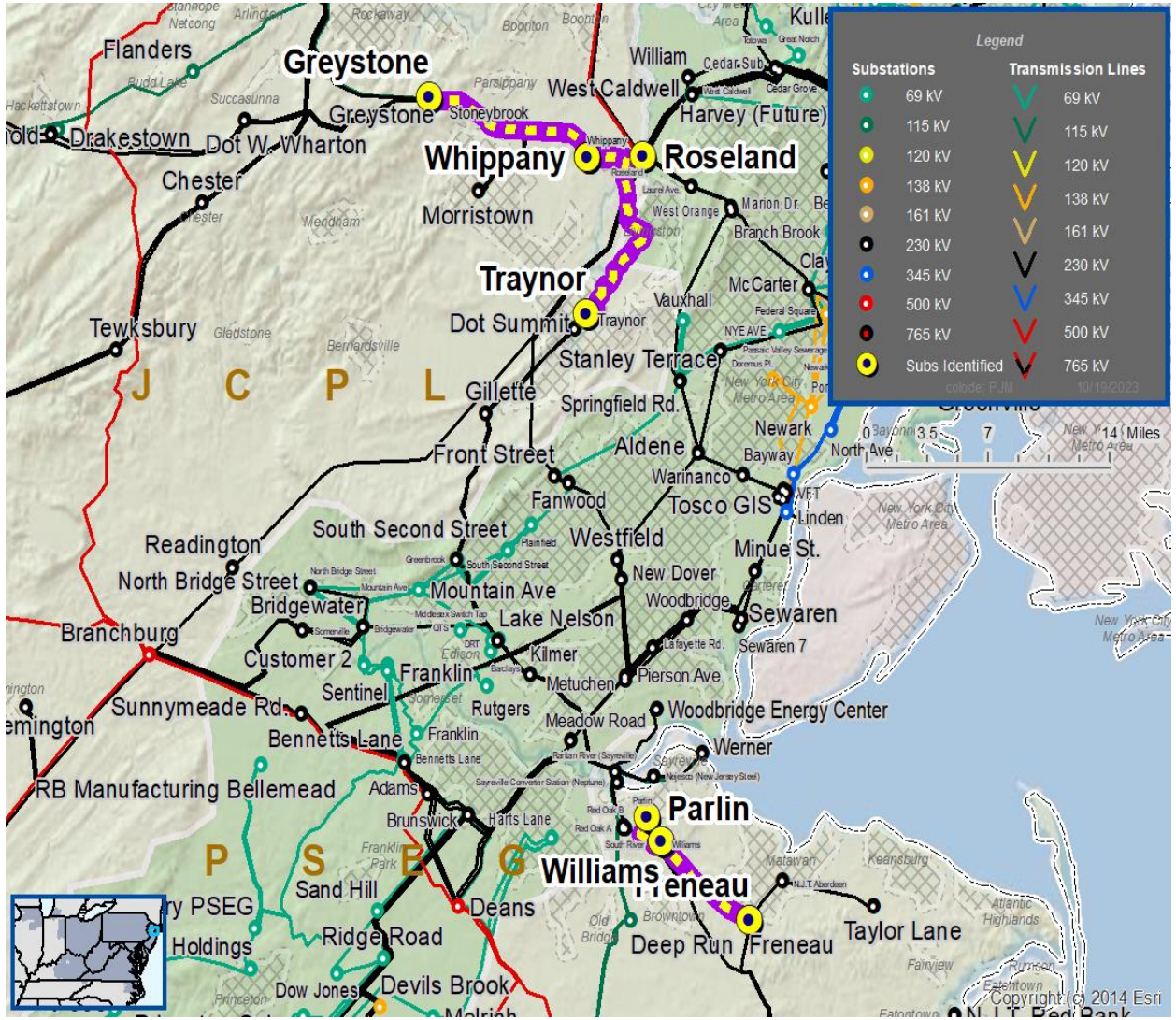
- System reliability and performance
- Substation / line equipment limits

Upgrade Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.



JCPL Transmission Zone M-3 Process Misoperation Relay Projects

…Continued from previous page

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
JCPL-2023-044	Traynor – Whippany 230 kV Z1040 Line	574 / 574 / 574 / 574	709 / 869 / 805 / 1031
JCPL-2023-045	Greystone – Whippany 230 kV J1024 Line	649 / 698 / 723 / 762	709 / 869 / 805 / 1031
JCPL-2023-048	Parlin – Williams Gas 230 kV K1025 Line Williams Gas - Freneau 230 kV K1025 Line	709 / 869 / 805 / 952 709 / 869 / 805 / 1031	709 / 869 / 805 / 1031 709 / 869 / 805 / 1031

JCPL Transmission Zones M-3 Process
Traynor – Whippany 230 kV Misoperation Relays

Need Number: JCPL-2023-044

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace relaying and limiting substation conductor at Traynor and Whippany substations

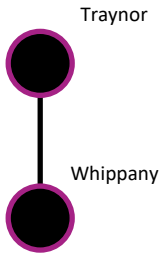
Transmission Line Ratings:

- Traynor – Whippany Z1040 230 kV Line
  - Before Proposed Solution: 574/574/574/574 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 709/869/805/1031 MVA (SN/SE/WN/WE)

Project Cost: $3.25M

Projected In-Service: 11/15/2024

Supplemental Project ID: s3253.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zones M-3 Process
Greystone – Whippany 230 kV Misoperation Relays

Need Number: JCPL-2023-045

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace relaying and line trap at Greystone and Whippany substations.

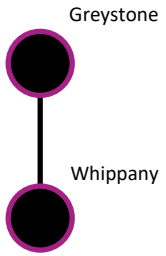
Transmission Line Ratings:

- Greystone – Whippany J1024 230 kV Line
  - Before Proposed Solution: 649/698/723/762 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 709/869/805/1031 MVA (SN/SE/WN/WE)

Project Cost: $2.75M

Projected In-Service: 12/31/2024

Supplemental Project ID: s3254.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zones M-3 Process
Freneau-Williams Gas-Parlin 230 kV Misoperation Relays

Need Number: JCPL-2023-048

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace relaying and limiting substation conductor at Freneau, Williams Gas and Parlin substations

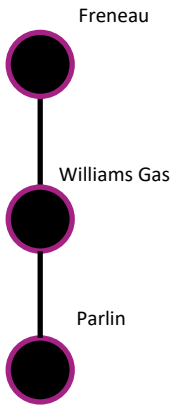
Transmission Line Ratings:

- Freneau-Williams Gas-Parlin K1025 230 kV Line
  - Before Proposed Solution: 709/869/805/952 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 709/869/805/1031 MVA (SN/SE/WN/WE)

Project Cost: $4.1M

Projected In-Service: 05/30/2025

Supplemental Project ID: s3255.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Gilbert Substation

Need Number: JCPL-2023-043

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/31/2023
Solution Meeting 12/05/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

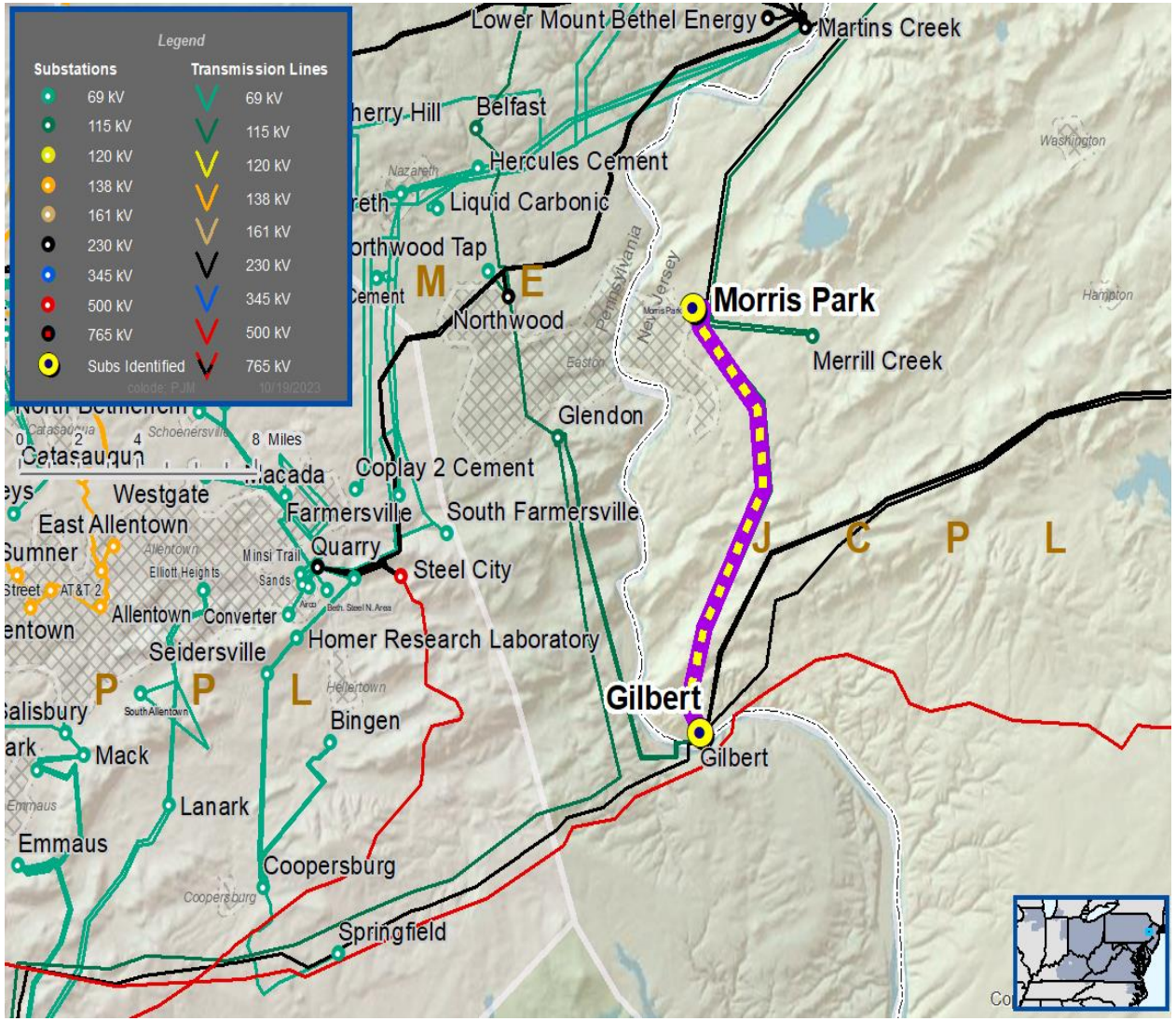
Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

Problem Statement:

- FirstEnergy has identified operational constraints when a single breaker is out of service for maintenance at Gilbert and substation on the Gilbert – Morris Park 230 kV P2016 line.
- The Gilbert – Morris Park 230 kV P2016 line is limited by terminal equipment:
  - Normal Ratings: 1306/1593/1593/1593 MVA (SN/SE/WN/WE)
  - Single Breaker Outage #1: 678/813/833/929 MVA (SN/SE/WN/WE)
  - Single Breaker Outage #2: 830/1000/1040/1171 MVA (SN/SE/WN/WE)



JCPL Transmission Zones M-3 Process
Gilbert Substation

Need Number: JCPL-2023-043

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace limiting substation equipment to meet or exceed the line (P2016) conductor rating at Gilbert substation:
  - Circuit breakers
  - Disconnect switches
  - Substation conductor

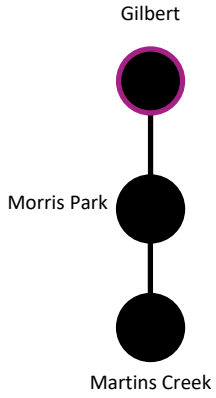
Transmission Line Ratings:

- Gilbert – Morris Park 230 kV Line
  - Before Proposed Solution:
    - Breaker Outage #1: 678/813/833/929 MVA (SN/SE/WN/WE)
    - Breaker Outage #2: 830/1000/1040/1171 MVA (SN/SE/WN/WE)
  - After Proposed Solution:
    - 1418/1739/1610/2062 MVA (SN/SE/WN/WE)

Project Cost: $2.4M

Projected In-Service: 05/30/2024

Supplemental Project ID: s3256.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Gilbert and Glen Gardner Substations

Need Number: JCPL-2023-047

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/31/2023
Solution Meeting 12/05/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

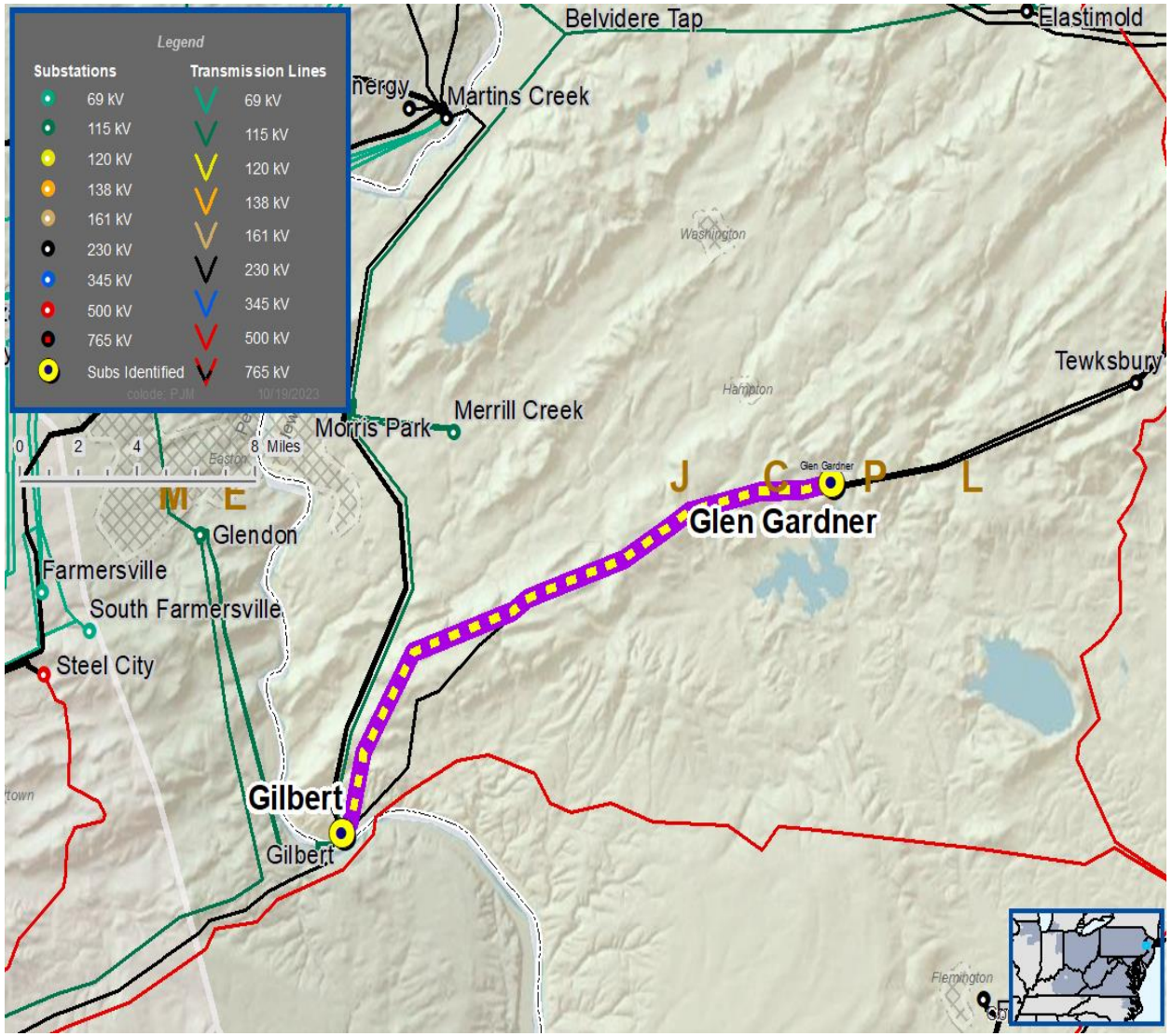
Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

Problem Statement:

- FirstEnergy has identified operational constraints when a single breaker is out of service for maintenance at Gilbert and Glen Gardner substations on the Gilbert - Glen Gardner 230 kV V1036 line.
- The Gilbert – Glen Gardner 230 kV V1036 line is limited by terminal equipment:
  - Normal Ratings: 913/1147/1139/1376 MVA (SN/SE/WN/WE)
  - Single Breaker Outage #1: 678/813/833/929 MVA (SN/SE/WN/WE)
  - Single Breaker Outage #2: 830/1000/1040/1171 MVA (SN/SE/WN/WE)
  - Single Breaker Outage #3 & #4: 909/1084/1119/1241 MVA (SN/SE/WN/WE)



JCPL Transmission Zones M-3 Process
Gilbert and Glen Gardner Substations

Need Number: JCPL-2023-047

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Replace limiting substation equipment at Gilbert and Glen Gardner substations to meet or exceed the line (V1036) conductor rating:
  - Circuit breakers
  - Disconnect switches
  - Substation conductor

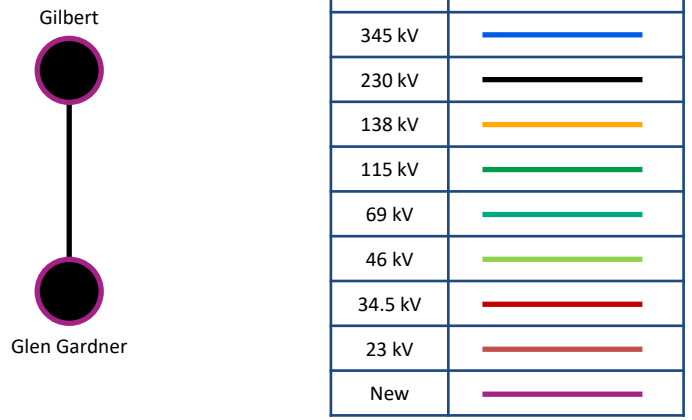
Transmission Line Ratings:

- Gilbert – Glen Gardner V1036 230 kV Line
  - Before Proposed Solution:
    - Breaker Outage #1: 678/813/833/929 MVA (SN/SE/WN/WE)
    - Breaker Outage #2: 830/1000/1040/1171 MVA (SN/SE/WN/WE)
    - Breaker Outage #3 & #4: 909/1084/1119/1241 MVA (SN/SE/WN/WE)
  - After Proposed Solution:
    - 1136/1311/1139/1379 MVA (SN/SE/WN/WE)

Project Cost: $5.2M

Projected In-Service: 04/04/2025

Supplemental Project ID: s3257.1



JCPL Transmission Zone M-3 Process
Montville Substation

Need Number: JCPL-2023-050

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/31/2023
Solution Meeting 02/06/2024

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

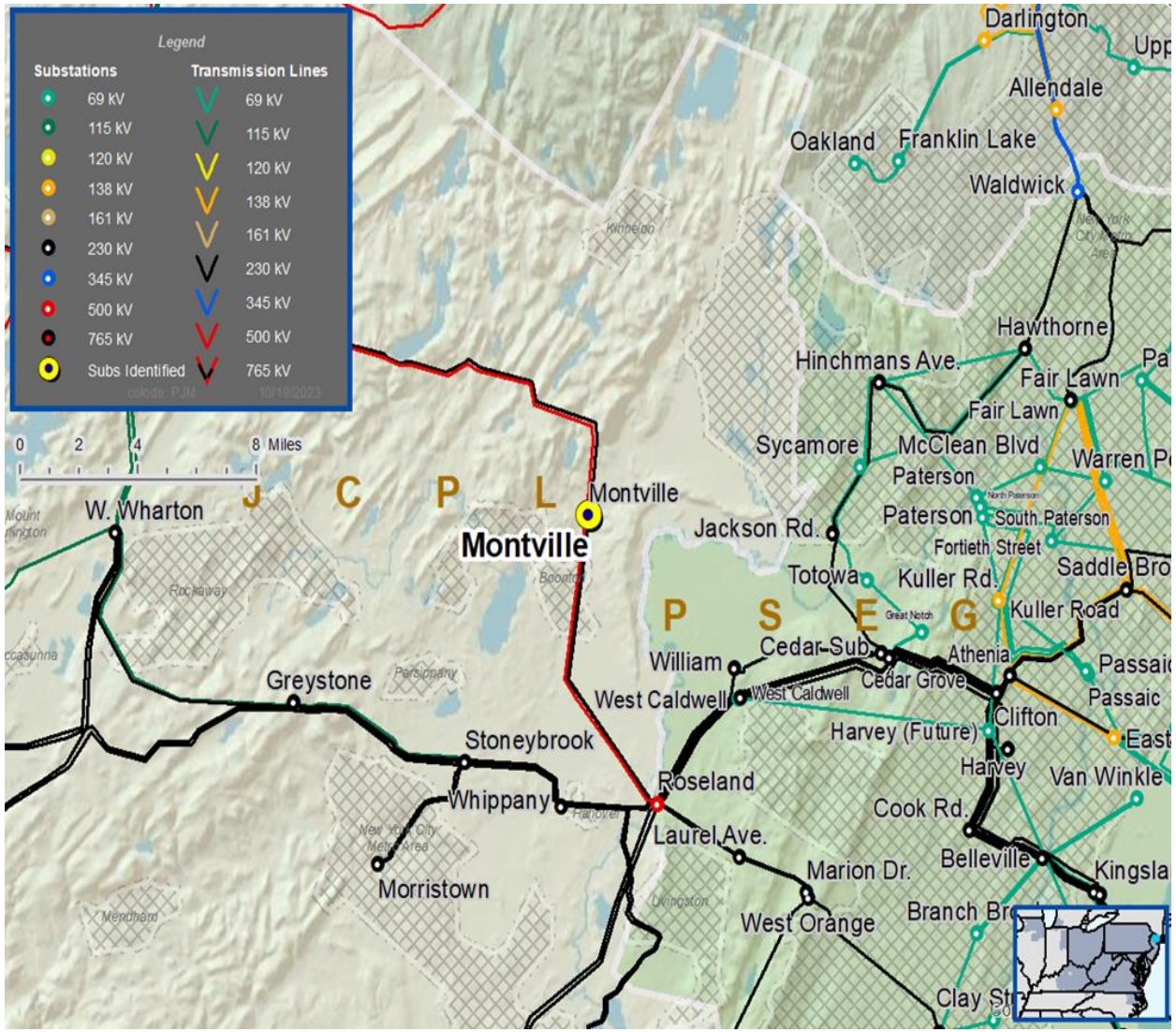
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The parallel 230-34.5 kV No. 3A and 3B Transformers at Montville Substation are approximately 55 and 60 years old, respectively, and are reaching end of life.
- Recent dissolved gas analysis (DGA) showed elevated Ethane gas levels compared to IEEE standards.
- Existing transformer ratings:
  - 175/194/200/220 MVA (SN/SLTE/WN/WLTE)



JCPL Transmission Zone M-3 Process
Montville Substation

Need Number: JCPL-2023-050

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace the 230-34.5 kV No. 3A and 3B transformers at Montville Substation with a single 168 MVA unit.
- Upgrade transformer relaying

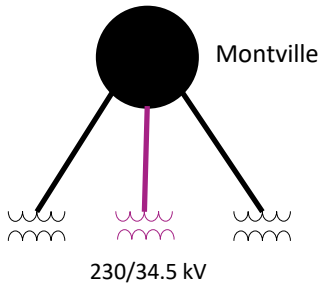
Transformer Ratings:

- Montville 230-34.5 kV No. 3A and 3B Transformer:
  - Before Proposed Solution: 175/194/200/220 MVA (SN/SLTE/WN/WLTE)
  - After Proposed Solution: 216/216/279/282 MVA (SN/SLTE/WN/WLTE)

Estimated Project Cost: $8.55M

Projected In-Service: 04/01/2026

Supplemental Project ID: s3258.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
New Customer Connection

Need Number: JCPL-2023-058

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 11/16/2023
Solution Meeting 01/18/2024

Project Driver:

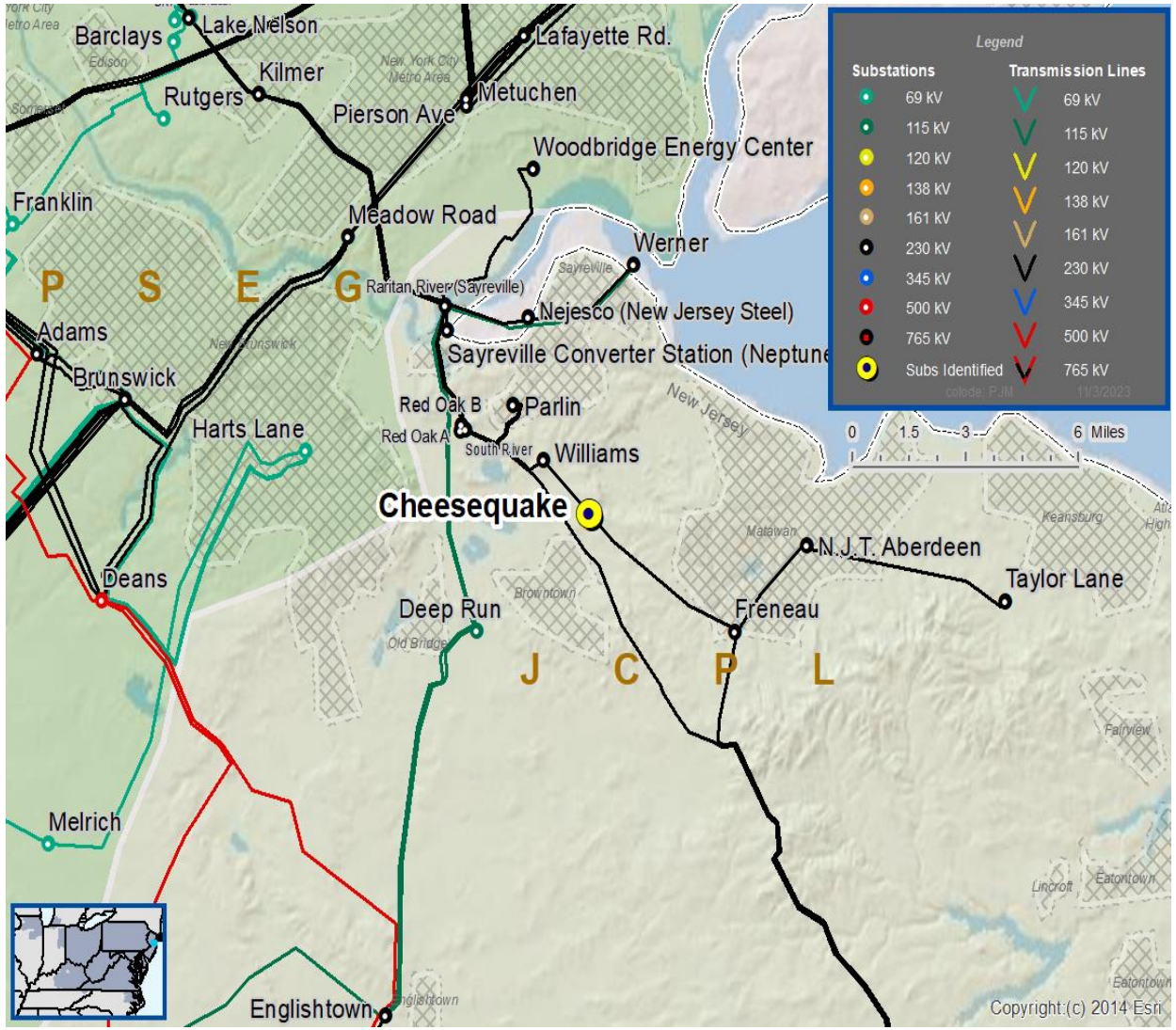
Customer Service

Specific Assumption Reference:

New customer connection requests will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

New Customer Connection - A customer requested 34.5 kV service for load of approximately 14 MVA; location is near Cheesequake Substation.



JCPL Transmission Zone M-3 Process
New Customer Connection

Need Number: JCPL-2023-058

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

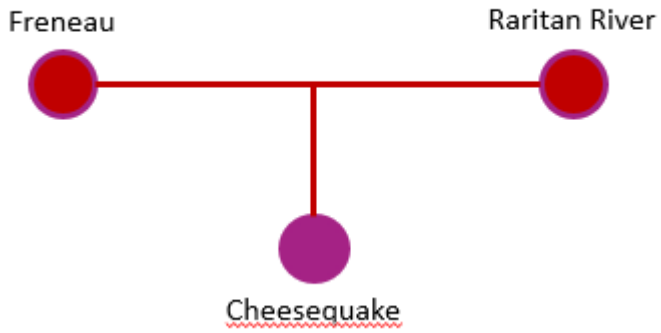
Tap the Freneau – Raritan River 34.5 kV Line at Cheesequake Substation

- Install one SCADA controlled line switch toward Freneau Substation and build approximately one to two spans toward Cheesequake Substation and install one SCADA controlled tap switch
- Install 34.5 kV revenue metering equipment
- Modify relay schemes/settings at terminal stations

Estimated Project Cost: $1.3M

Projected In-Service: 06/01/2024

Supplemental Project ID: s3259.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Raritan River Substation

Need Number: JCPL-2023-060

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 12/05/2023
Solution Meeting 01/09/2024

Project Driver:
Equipment Material Condition, Performance and Risk

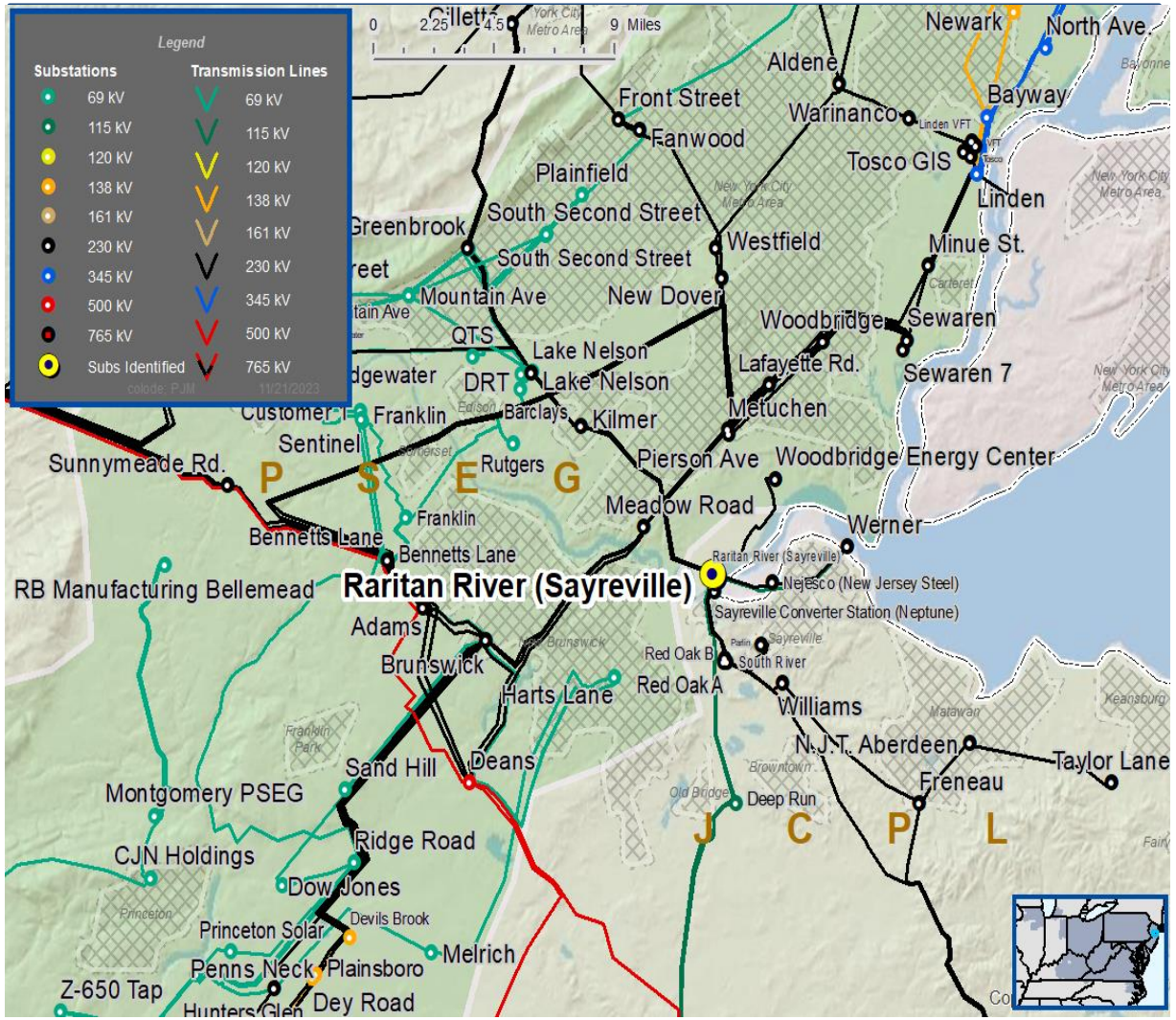
Specific Assumption References:
System Performance Projects Global Factors

- System reliability and performance
- Reliability of Bulk Electric System (BES) Facilities

Add/Replace Transformers
Past System Reliability/Performance

Problem Statement:

- The 230/115 kV No. 13 Transformer at Raritan River Substation was manufactured over 60 years ago and is reaching end of life.
- The transformer has exhibited heavy oil leaks that have been difficult to repair due to the condition of the transformer.
- The transformers measured dielectric strength is below acceptable IEEE limits.
- Incidental oil leaks at end-of-life period along with current dielectric strength greatly increases risk of failure.
- Existing transformer ratings:
  - 256/323/324/361 MVA (SN/SSTE/WN/WSTE)



JCPL Transmission Zone M-3 Process
Raritan River Substation

Need Number: JCPL-2023-060

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Replace the 230-115 kV No. 13 Transformer at Raritan River Substation with a 224 MVA unit.
- Replace high side switch with a circuit breaker
- Upgrade transformer relaying

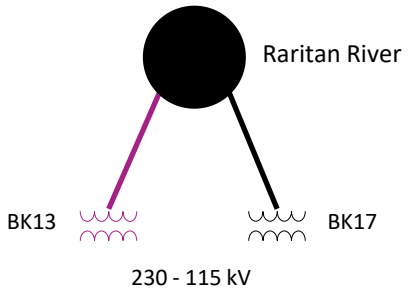
Transformer Ratings:

- Raritan River 230-115 kV No. 13 Transformer:
  - Before Proposed Solution: 256/323/324/361 MVA (SN/SSTE/WN/WSTE)
  - After Proposed Solution: 280/334/354/390 MVA (SN/SSTE/WN/WSTE)

Estimated Project Cost: $5.4M

Projected In-Service: 06/30/2026

Supplemental Project ID: s3260.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Middlesex 230 kV Switching Station

Need Number: JCPL-2023-062

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 12/05/2023

Solution Meeting 02/06/2024

Project Driver:

System Performance and Operational Flexibility

Specific Assumption Reference:

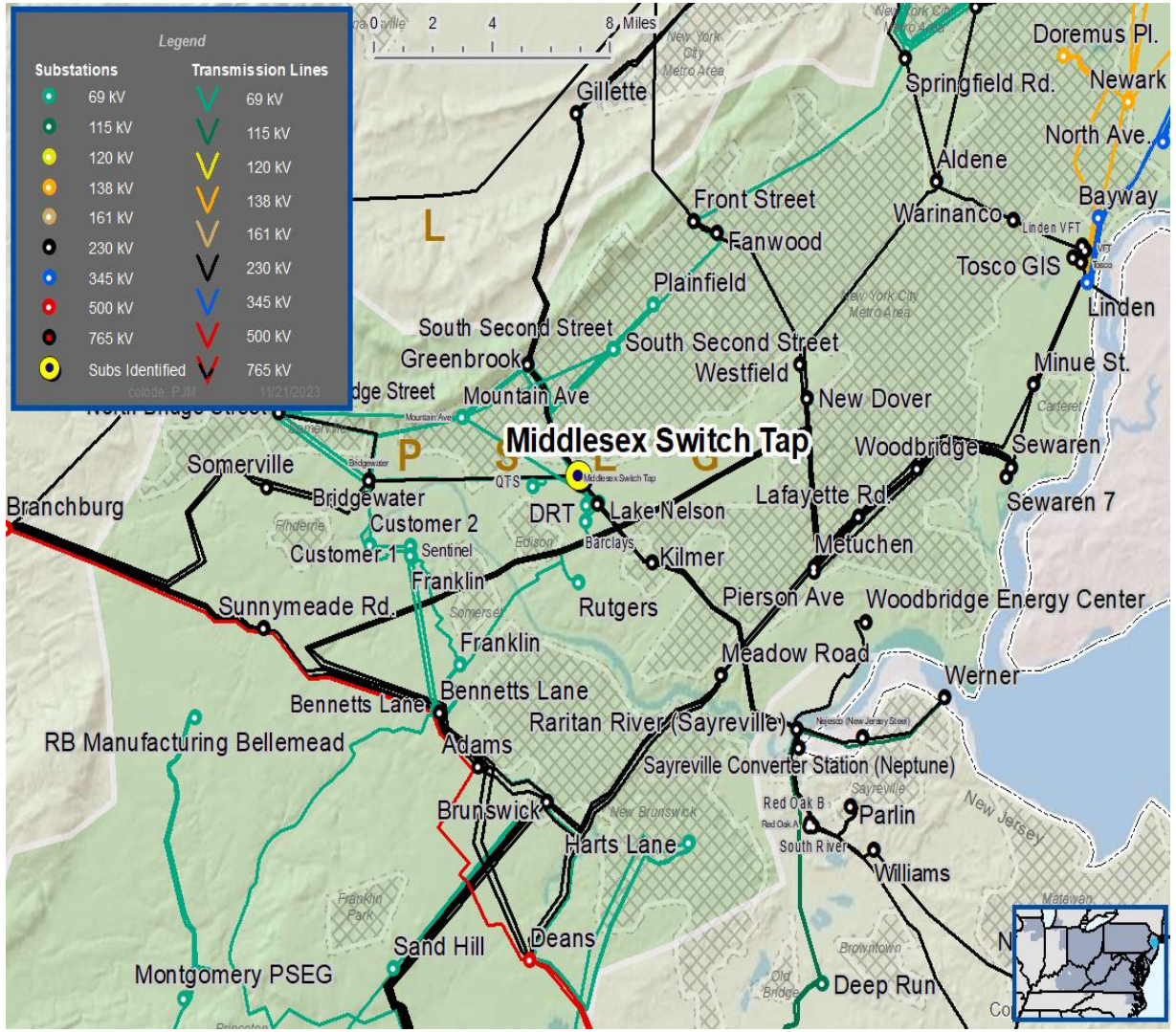
- System reliability and performance
- Add/Expand Bus Configuration
- Loss of substation bus adversely impacts transmission system performance
- Eliminate simultaneous outages to multiple networked elements
- Capability to perform substation maintenance

Problem Statement:

– The current configuration of the I1023 Line is a three-terminal line with terminals at Lake Nelson (PSEG), Bridgewater (PSEG), and Gillette substations.

– The Middlesex Switching Station serves as the connection point to the rest of the I1023 Line for the Bridgewater section. The I1023 Line is one of only a few lines that interconnect the Jersey North and Jersey Central regions.

– Over the past five years, the Gillette-Lake Nelson-Bridgewater I1023 230 kV Line experienced two unscheduled outages



JCPL Transmission Zone M-3 Process
Middlesex 230 kV Switching Station

Need Number: JCPL-2023-062

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Convert the existing Middlesex 230 kV Switching Station to a three (3) breaker ring bus.
- Upgrade limiting switches and TL drops at the Middlesex 230 kV Switching Station.

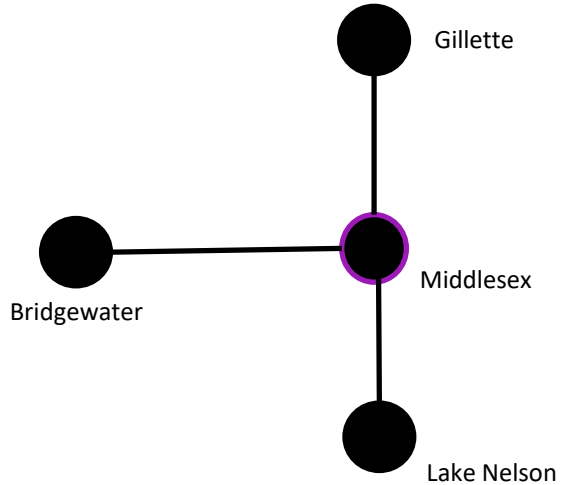
Transmission Line Ratings:

- Bridgewater(PSEG) - Middlesex 230 kV Line:
  - Before Proposed Solution: 709/ 819 / 797 / 819 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 732 / 887 / 823 / 980 MVA (SN/SE/WN/WE)
- Lake Nelson(PSEG) – Middlesex 230 kV Line:
  - Before Proposed Solution: 709/ 819 / 797 / 819 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 709 / 869 / 805 / 1031 MVA (SN/SE/WN/WE)
- Gillette – Middlesex 230 kV line section:
  - Before Proposed Solution: 709/ 819 / 797/ 819 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 709 / 869 / 805/ 1031 MVA (SN/SE/WN/WE)

Estimated Project Cost: $8.85M

Projected In-Service: 6/1/2026

Supplemental Project ID: s3261.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
East Windsor Substation

Need Number: JCPL-2023-064

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 12/05/2023
Solution Meeting 02/06/2024

Project Driver:

Operational Flexibility and Efficiency

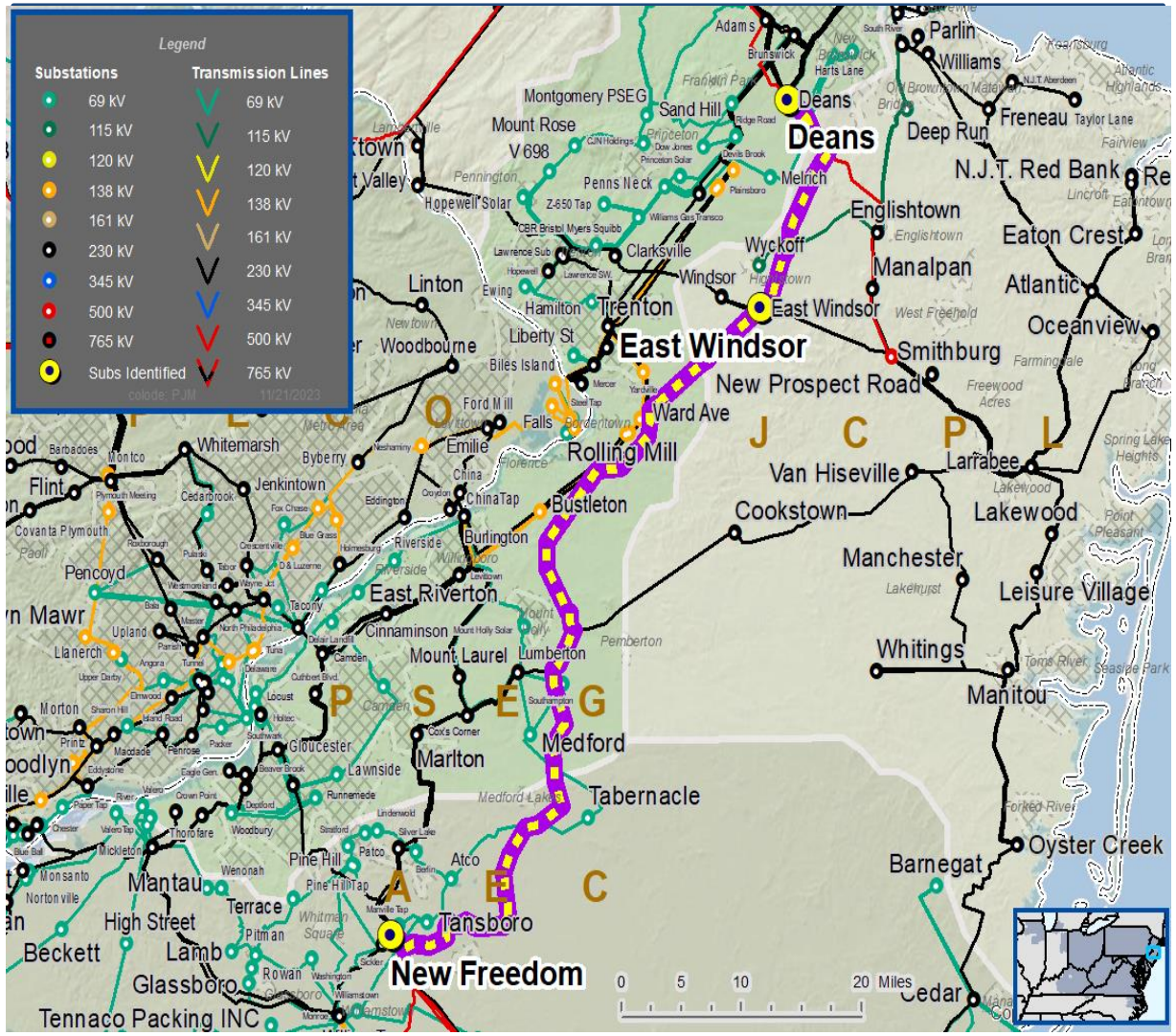
Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

Problem Statement:

- PSEG has identified a need (PSEG-2023-0013) at New Freedom and Deans substations to upgrade communication on the following lines:
  - Deans – East Windsor 500 kV 5022 Line
  - New Freedom – East Windsor 500 kV 5038 Line
- Existing communication equipment at East Windsor Substation is currently PLC.
- Transmission line ratings are limited by communication equipment.



JCPL Transmission Zone M-3 Process
East Windsor Substation

…Continued from previous page

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
JCPL-2023-064	East Windsor – New Freedom 5038 500 kV Line East Windsor – Deans 5022 500 kV Line	2644 / 2844 2644 / 2844	2940 / 3733 2940 / 3733

JCPL Transmission Zone M-3 Process
East Windsor Substation

Need Number: JCPL-2023-064

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Upgrade communication equipment from PLC to fiber at East Windsor Substation on the 5022 and 5038 500 kV lines
  - Retire line traps, tuners and carrier equipment
  - Replace static wire
  - Replace line relays

Transmission Line Ratings:

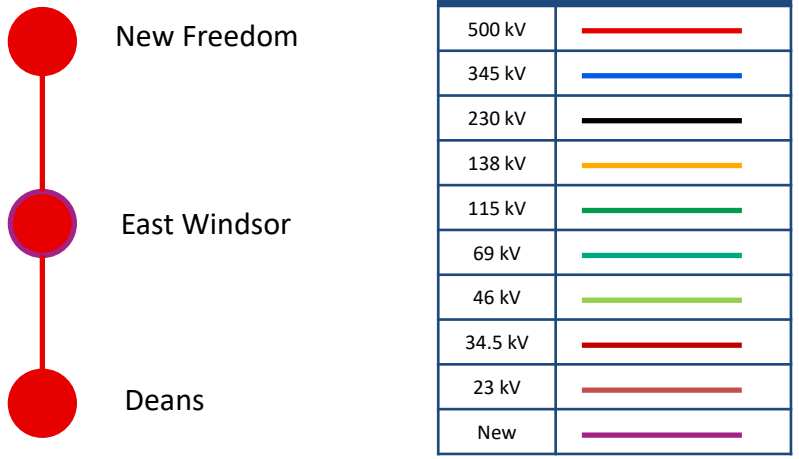
- East Windsor – Deans 5022 500 kV Line:
  - Before Proposed Solution: 2644/2844/2946/3106 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 2940/3733/3618/4424 MVA (SN/SE/WN/WE)

- East Windsor – New Freedom 5038 500 kV Line:
  - Before Proposed Solution: 2644/2844/2917/3106 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 2940/3386/3478/3827 MVA (SN/SE/WN/WE)

Project Cost: $2.00M

Projected In-Service: 12/2025 (East Windsor – Deans 5022 500 kV Line)
6/2027 (East Windsor – New Freedom 5038 500 kV Line)

Supplemental Project ID: s3262.1



JCPL Transmission Zone M-3 Process Misoperation Relay Project

Need Number: JCPL-2023-046

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/31/2023
Solution Meeting 01/09/2024

Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption References:
Global Factors

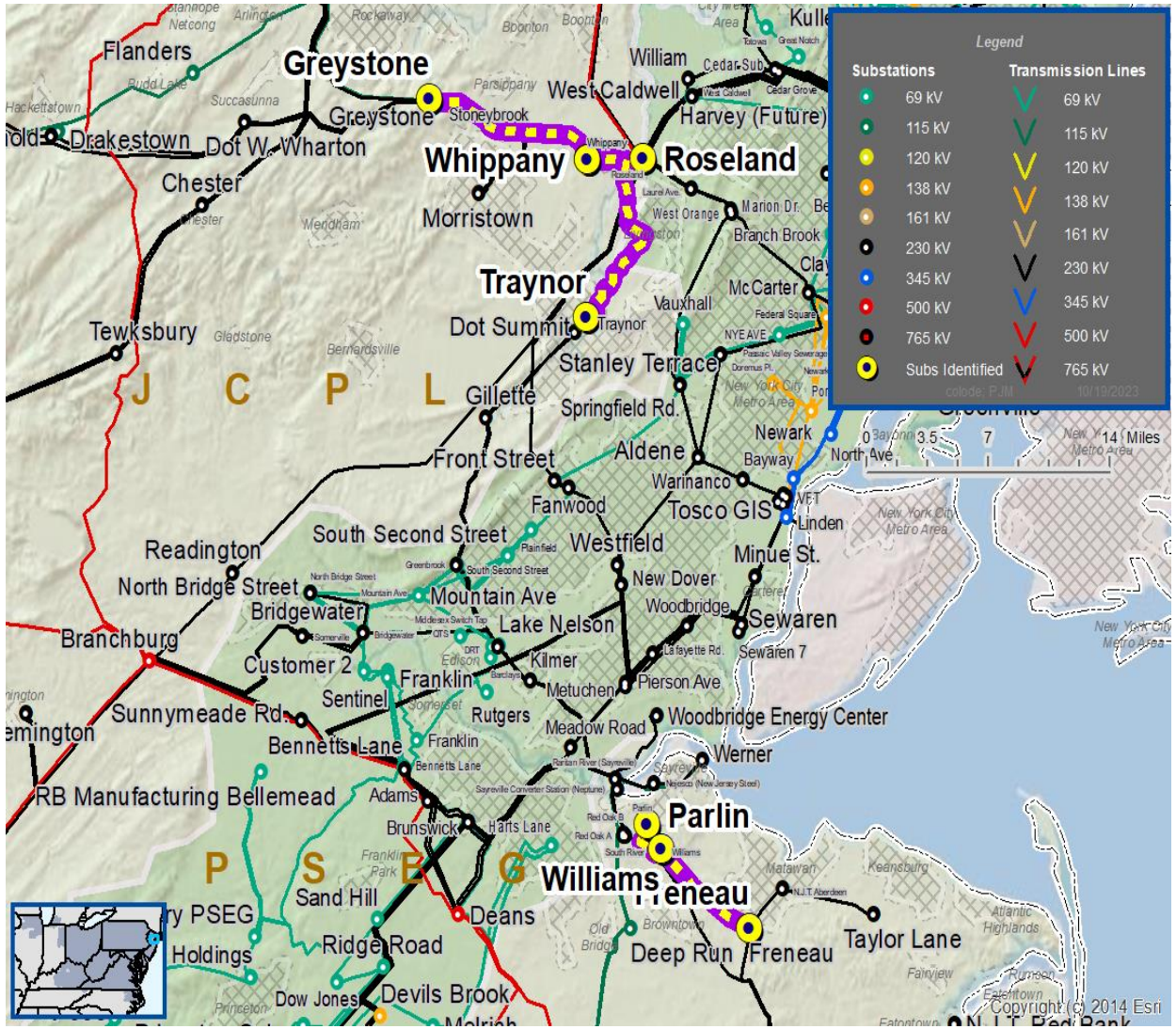
- System reliability and performance
- Substation / line equipment limits

Upgrade Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.



JCPL Transmission Zone M-3 Process Misoperation Relay Project

…Continued from previous page

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
JCPL-2023-046	Roseland – Whippany 230 kV A941 Line	1306 / 1697 / 1610 / 1905	2228 / 2570 / 2232 / 2704

JCPL Transmission Zone M-3 Process Misoperation Relay Project

Need Number: JCPL-2023-046

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Replace relaying and limiting substation conductor at Whippany Substation.

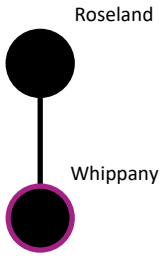
Transmission Line Ratings:

- Roseland – Whippany A941 230 kV Line
  - Before Proposed Solution: 1306/1697/1610/1905 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 1593/1850/1789/1994 MVA (SN/SE/WN/WE)

Estimated Project Cost: $2.33M

Projected In-Service: 5/30/2025

Supplemental Project ID: s3272.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Kittatinny Substation

Need Number: JCPL-2023-049

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/31/2023

Solution Meeting 01/09/2024

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

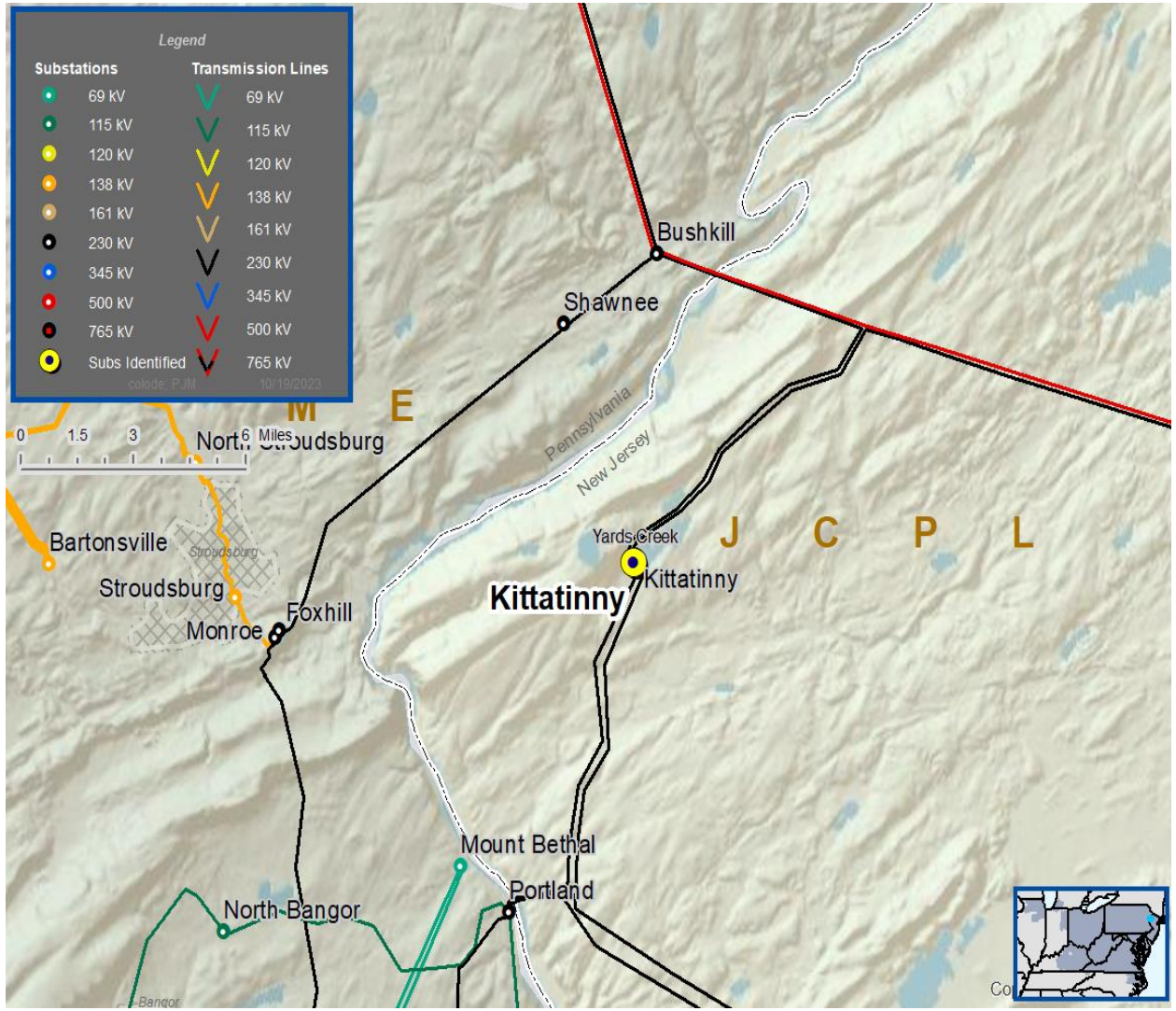
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 230-34.5 kV No. 1 Transformer at Kittatinny is approximately 60 years old and is reaching end of life.
- Recent dissolved gas analysis (DGA) showed elevated Ethane gas levels compared to IEEE standards.
- Carbon oxide gas production also suggests thermal stressing of paper insulation.
- Existing transformer ratings:
  - 60/63/76/77 MVA (SN/SLTE/WN/WLTE)



JCPL Transmission Zone M-3 Process
Kittatinny Substation

Need Number: JCPL-2023-049

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace the 230-34.5 kV No. 1 Transformer at Kittatinny Substation with a 90 MVA unit.
- Replace high side switch with a circuit breaker.
- Upgrade transformer relaying

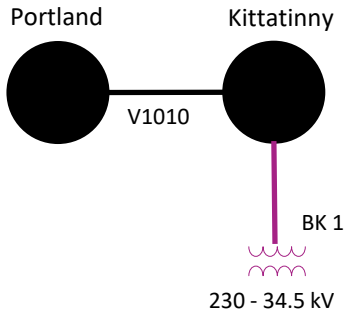
Transformer Ratings:

- Kittatinny 230-34.5 kV No. 1 Transformer:
  - Before Proposed Solution: 60/63/76/77 MVA (SN/SLTE/WN/WLTE)
  - After Proposed Solution: 123/142/148/166 MVA (SN/SE/WN/WLTE)

Estimated Project Cost: $7.0M

Projected In-Service: 12/31/2024

Supplemental Project ID: s3273.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
East Flemington Substation

Need Number: JCPL-2023-051

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/31/2023
Solution Meeting 01/09/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

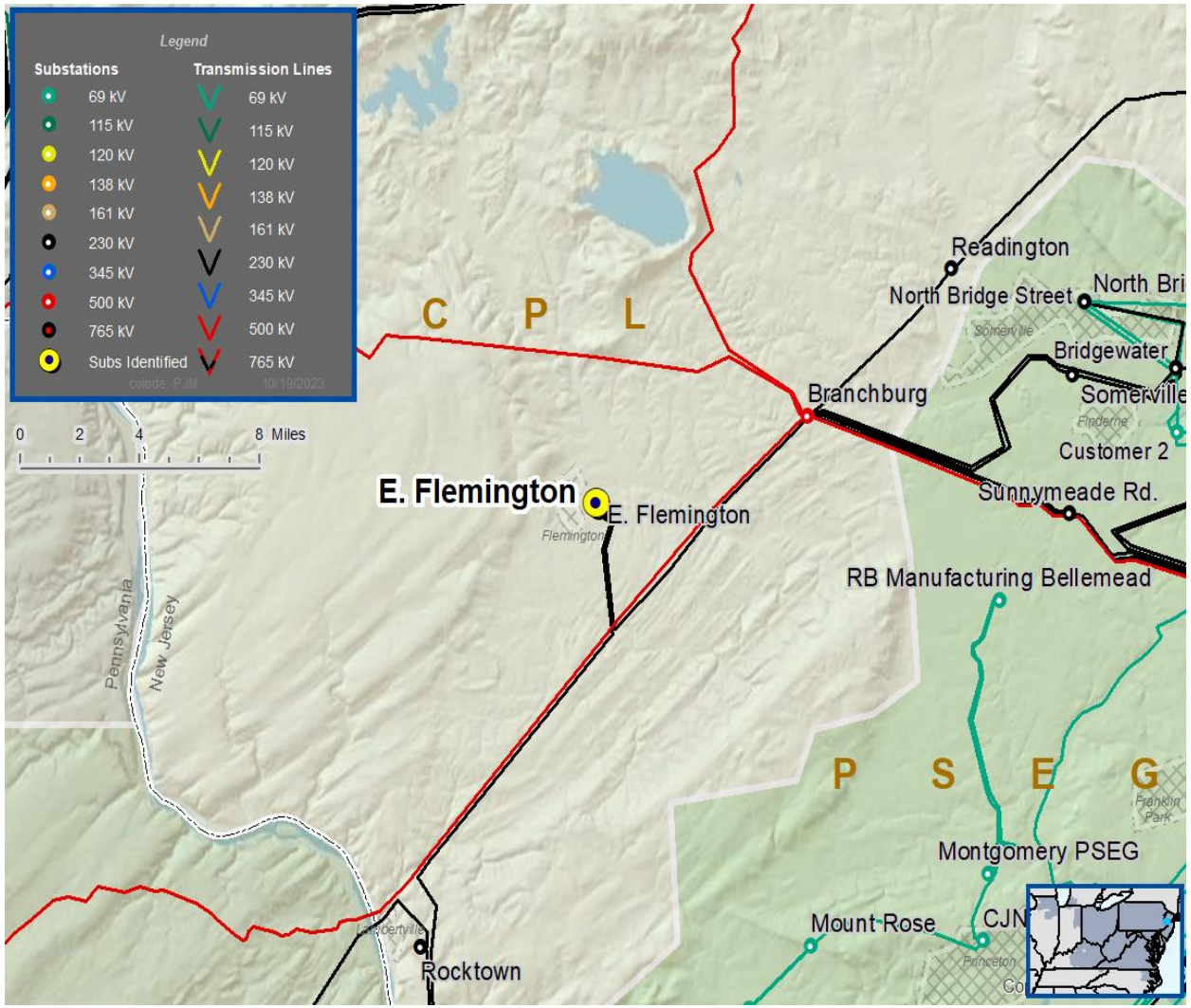
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 230-34.5 kV No. 3 Transformer at East Flemington is approximately 45 years old and is reaching end of life.
- Recent dissolved gas analysis (DGA) showed elevated Ethane gas levels compared to IEEE standards.
- Existing transformer ratings:
  - 77/81/97/99 MVA (SN/SLTE/WN/WLTE)



JCPL Transmission Zone M-3 Process
East Flemington Substation

Need Number: JCPL-2023-051

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace the 230-34.5 kV No. 3 Transformer at East Flemington Substation with a 125 MVA unit.
- Install a 34.5 kV breaker with SCADA control
- Upgrade transformer relaying

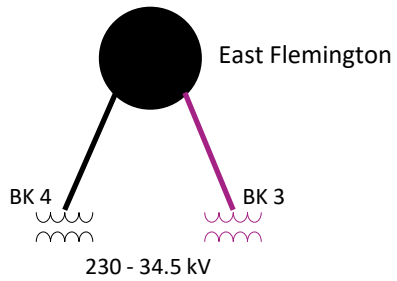
Transformer Ratings:

- East Flemington 230-34.5 kV No. 3 Transformer:
  - Before Proposed Solution: 77/81/97/99 MVA (SN/SLTE/WN/WLTE)
  - After Proposed Solution: 162/169/209/214 MVA (SN/SE/WN/WLTE)

Estimated Project Cost: $7.18M

Projected In-Service: 12/31/2026

Supplemental Project ID: s3274.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
East Flemington Substation

Need Number: JCPL-2023-052

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/31/2023

Solution Meeting 01/09/2024

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

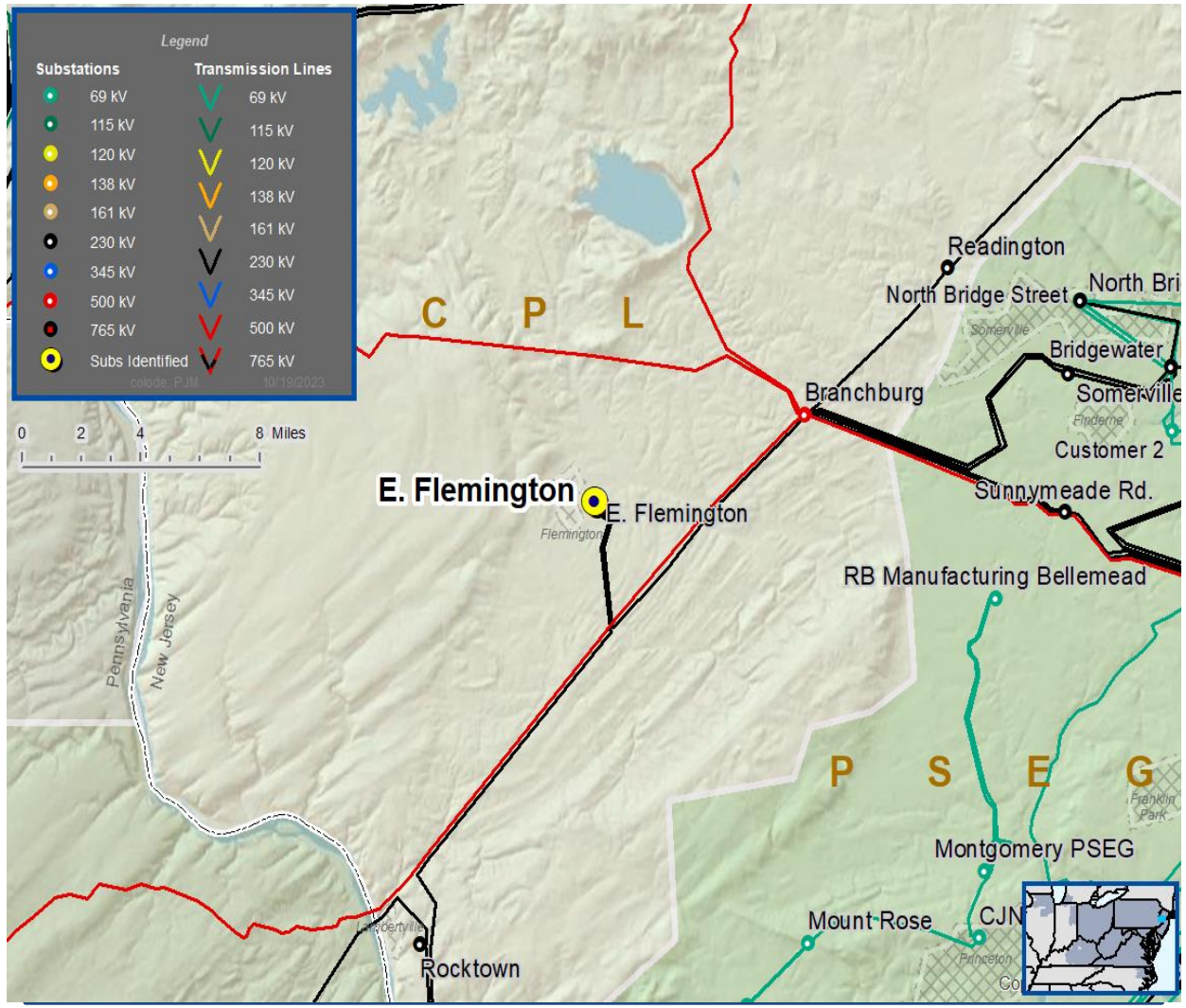
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 230-34.5 kV No. 4 Transformer at East Flemington is approximately 45 years old and is reaching end of life.
- In recent months, the transformer exhibited oil leaks that needed repaired. Incidental oil leaks at end-of-life period increases risk of failure.
- Existing transformer ratings:
  - 76/81/97/99 MVA (SN/SLTE/WN/WLTE)



JCPL Transmission Zone M-3 Process
East Flemington Substation

Need Number: JCPL-2023-052

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace the 230-34.5 kV No. 4 Transformer at East Flemington Substation with a 125 MVA unit.
- Install a 34.5 kV breaker with SCADA control
- Upgrade transformer relaying

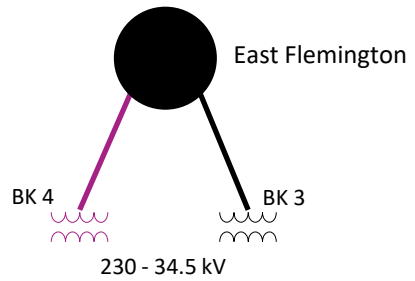
Transformer Ratings:

- East Flemington 230-34.5 kV No. 4 Transformer:
  - Before Proposed Solution: 76/81/97/99 MVA (SN/SLTE/WN/WLTE)
  - After Proposed Solution: 162/169/209/214 MVA (SN/SE/WN/WLTE)

Estimated Project Cost: $7.18M

Projected In-Service: 12/31/2027

Supplemental Project ID: s3275.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Raritan River – Werner (D30) 115 kV Customer Connection

Need Number: JCPL-2023-004

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting - 6/15/2023

Solution Meeting – 02/15/2024

Project Driver(s):

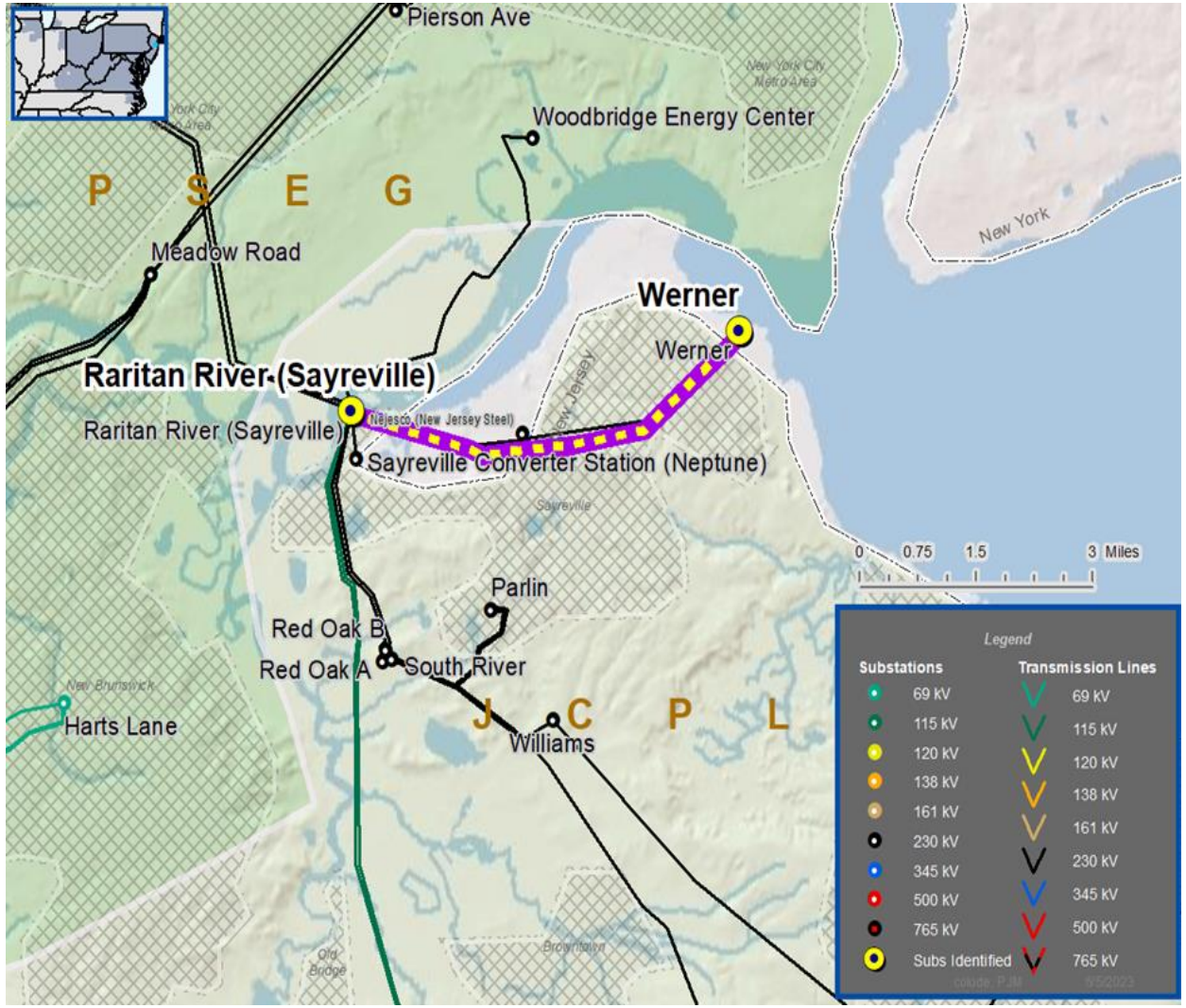
Customer Service

Specific Assumption Reference(s):

New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

New Customer Connection – A customer requested a delivery point for approximately 22 MVA of capacity; location is near the Raritan River – Werner D30 115 kV Line.



JCPL Transmission Zone M-3 Process
Raritan River – Werner (D30) 115 kV Customer Connection

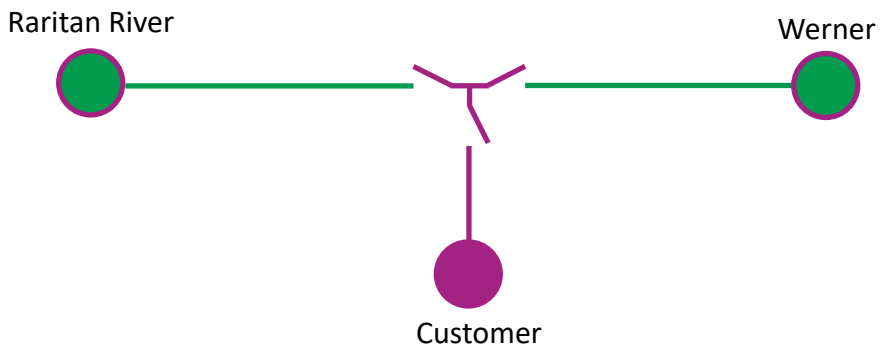
Need Number: JCPL-2023-004

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

Raritan River – Werner (D30) 115 kV Line:

- Construct approximately 1.5 miles of new 115 kV transmission line from the tap point to the customer's substation.
- Install two main line switches and one tap switch. Switches to be SCADA controlled.
- Modify relay settings at Raritan River Substation and Werner Substation.



Estimated Project Cost: $5.8M

Projected In-Service: 10/15/2025

Supplemental Project ID: s3280.1

Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
EH Werner Substation

Need Number: JCPL-2023-037

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 11/16/2023

Solution Meeting 02/15/2024

Project Driver:

Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

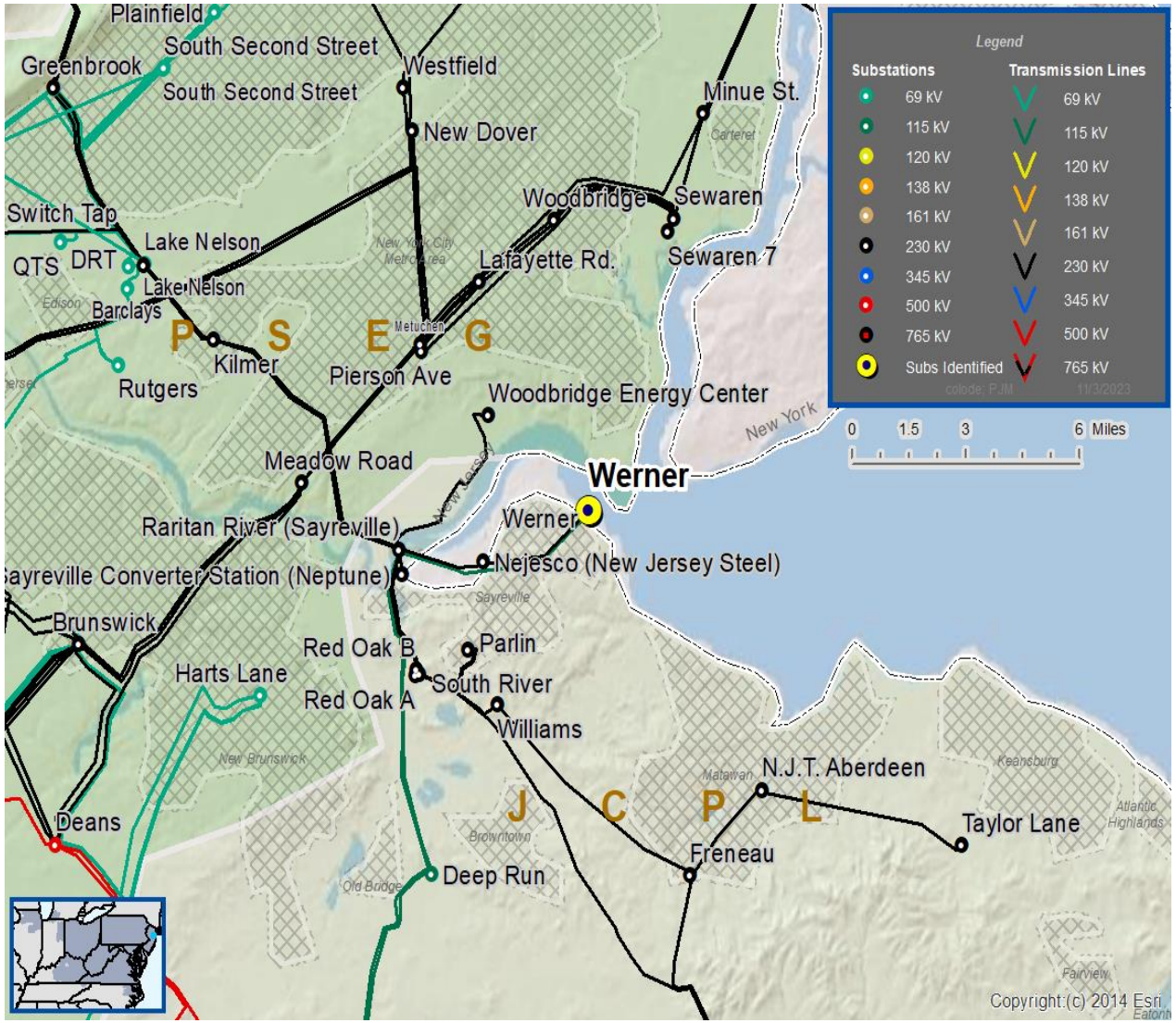
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 115-34.5 kV No. 12 Transformer at Werner Substation was manufactured approximately 60 years ago and is approaching end of life.
  - Transformer is constructed with type U bushings
    - Type U bushing designs have been documented to dramatically increase the risk of bushing failures.
- Existing Transformer Ratings:
  - 92/120/121/132 MVA (SN/SSTE/WN/WSTE)



JCPL Transmission Zone M-3 Process
EH Werner Substation

Need Number: JCPL-2023-037

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace the 115-34.5 kV No. 12 Transformer at EH Werner Substation with a 125 MVA unit.
- Upgrade transformer relaying.

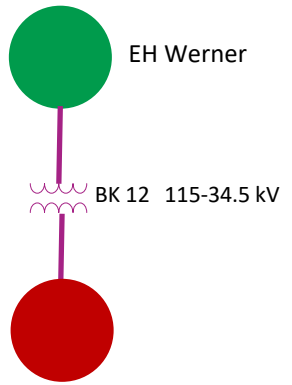
Transformer Ratings:

- EH Werner 115-34.5 kV No. 12 Transformer:
  - Before Proposed Solution: 92/120/121/132 MVA (SN/SSTE/WN/WSTE)
  - After Proposed Solution: 148/158/190/192 MVA (SN/SSTE/WN/WSTE)

Estimated Project Cost: $6.4M

Projected In-Service: 12/31/2024

Supplemental Project ID: s3281.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Pequest River Substation

Need Number: JCPL-2023-055

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 11/16/2023
Solution Meeting 02/15/2024

Project Driver:

Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

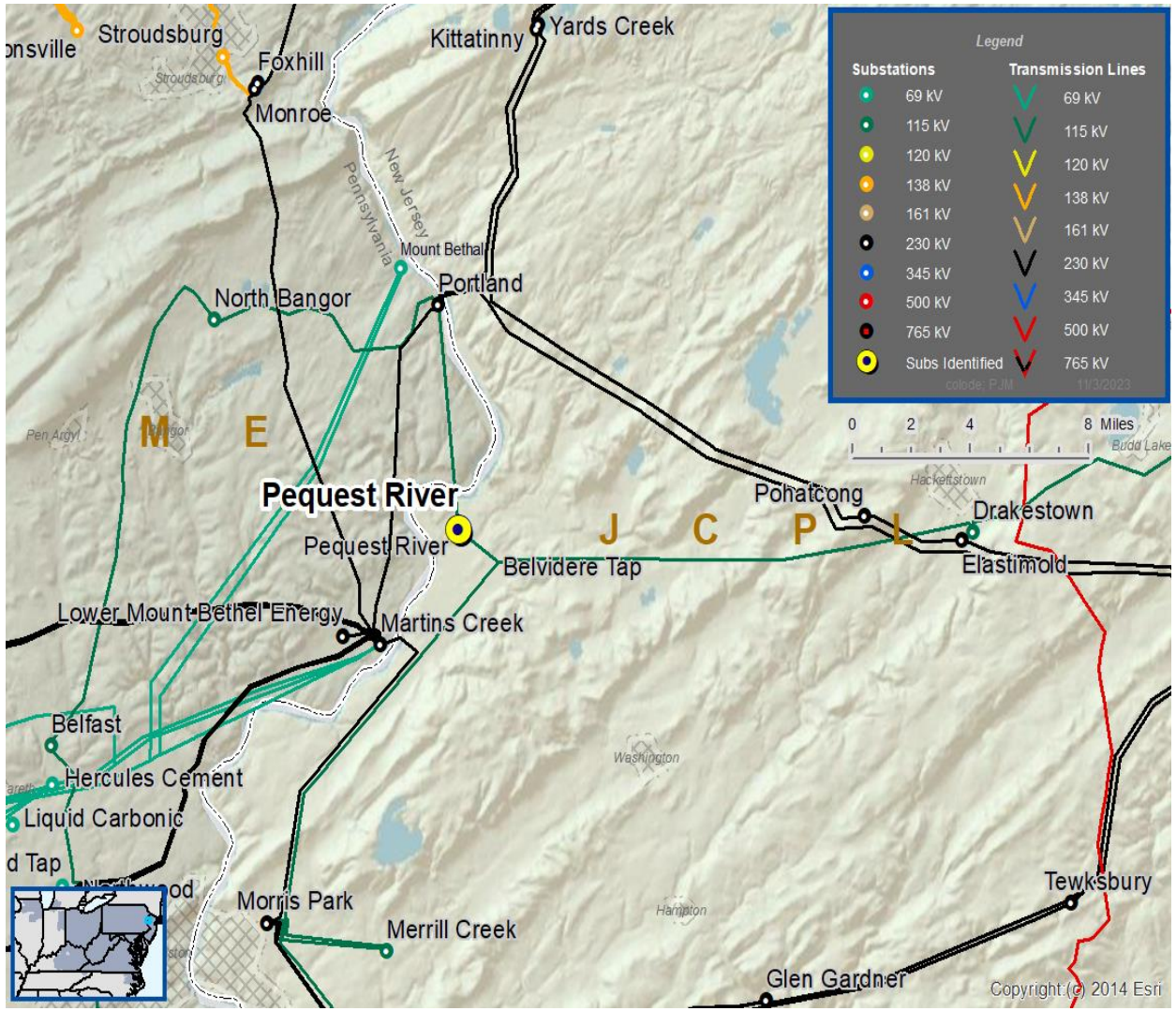
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 115-34.5 kV No. 2 Transformer at Pequest River Substation was manufactured approximately 50 years ago and is approaching end of life.
  - Most recent DGA results showed elevated ethane gas levels compared with IEEE Standards
- Existing Transformer Ratings:
  - 65/69 MVA (SN/SSTE)



JCPL Transmission Zone M-3 Process
Pequest River Substation

Need Number: JCPL-2023-055

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan
6/24/2024

Selected Solution:

- Replace the 115-34.5 kV No. 2 Transformer at Pequest River with a 90 MVA unit.
- Upgrade transformer relaying.

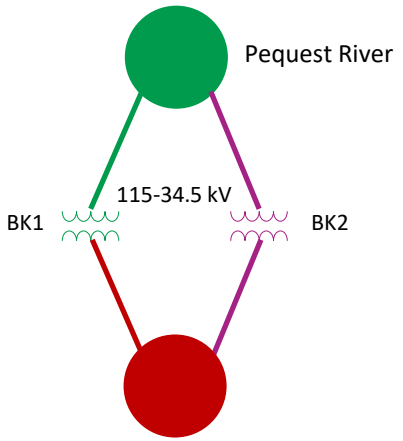
Transformer Ratings:

- Pequest River 115-34.5 kV No. 2 Transformer:
  - Before Proposed Solution: 65/69/82/94 MVA (SN/SSTE/WN/WSTE)
  - After Proposed Solution: 137/172/168/175 MVA (SN/SSTE/WN/WSTE)

Estimated Project Cost: $4.23M

Projected In-Service: 5/1/2025

Supplemental Project ID: s3283.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Vermont Ave 34.5 kV Customer Connection

Need Number: JCPL-2023-059

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting – 11/16/2023

Solution Meeting – 02/15/2024

Project Driver(s):

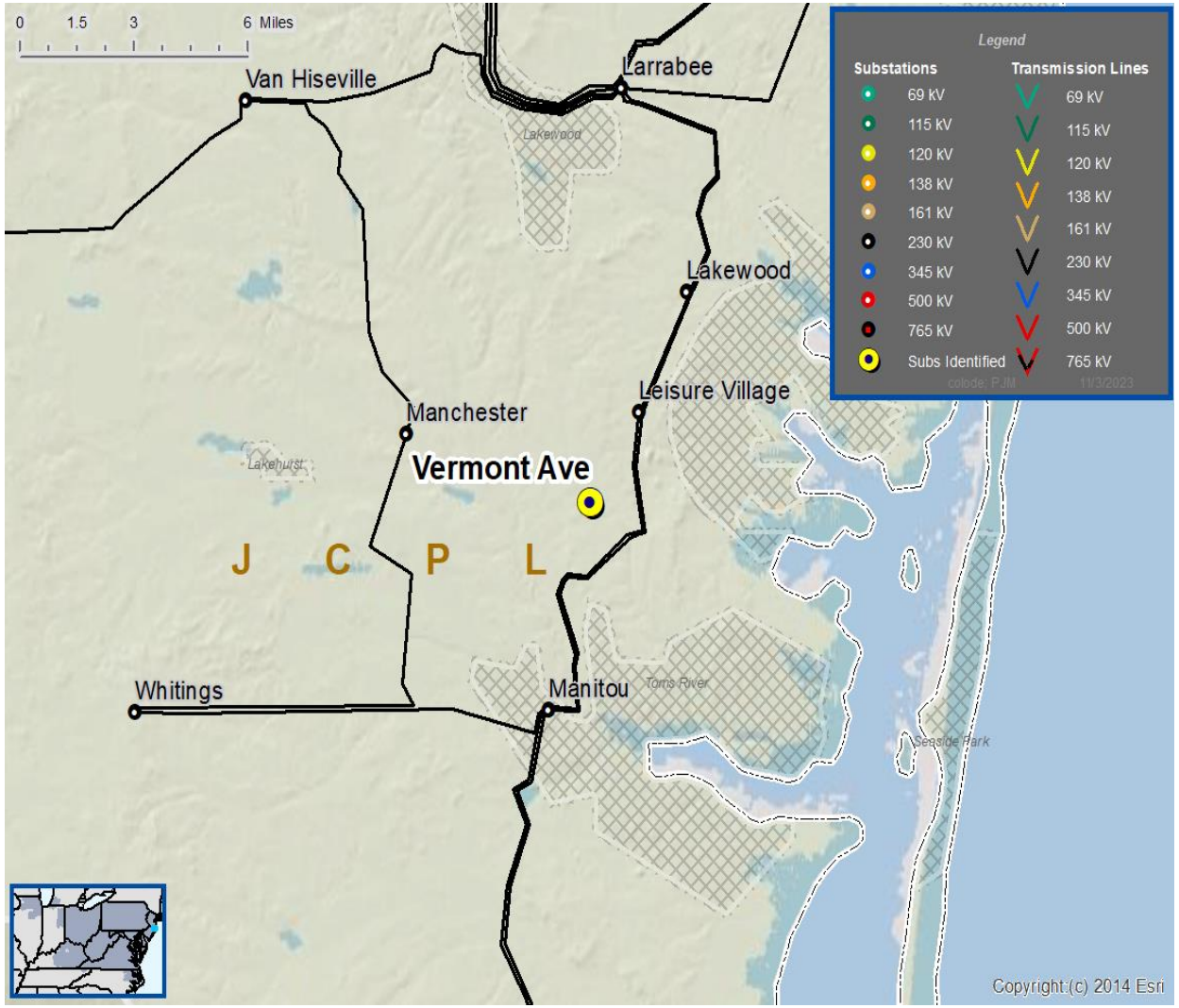
Customer Service

Specific Assumption Reference(s):

New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

New Customer Connection – A customer has requested 34.5 kV service for a load of approximately 10 MVA near Vermont Ave Substation.



JCPL Transmission Zone M-3 Process
Vermont Ave 34.5 kV Customer Connection

Need Number: JCPL-2023-059

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

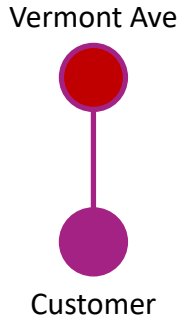
Selected Solution:

- Install a new 34.5 kV breaker, disconnect switch and relaying to connect to the existing 34.5 kV bus at Vermont Ave Substation.
- Modify relay schemes/settings on the Leisure Village – South Lakewood 34.5 kV F214 Line.
- Modify relay schemes/settings on the Larrabee – Metedeconk 34.5 kV E213 Line.

Estimated Project Cost: $0.3M

Projected In-Service: 03/31/2026

Supplemental Project ID: s3284.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCP&L Transmission Zone M-3 Process
Cookstown – Larrabee – Whitings 230 kV Line

Need Number: JCPL-2022-005

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 09/06/2022
Solution Meeting 12/5/2023

Project Driver:

Operational Flexibility, Improved Reliability Performance

Specific Assumption Reference:

System Performance Projects Global Factors

- Past system reliability and performance

Add/Expand Bus Configuration

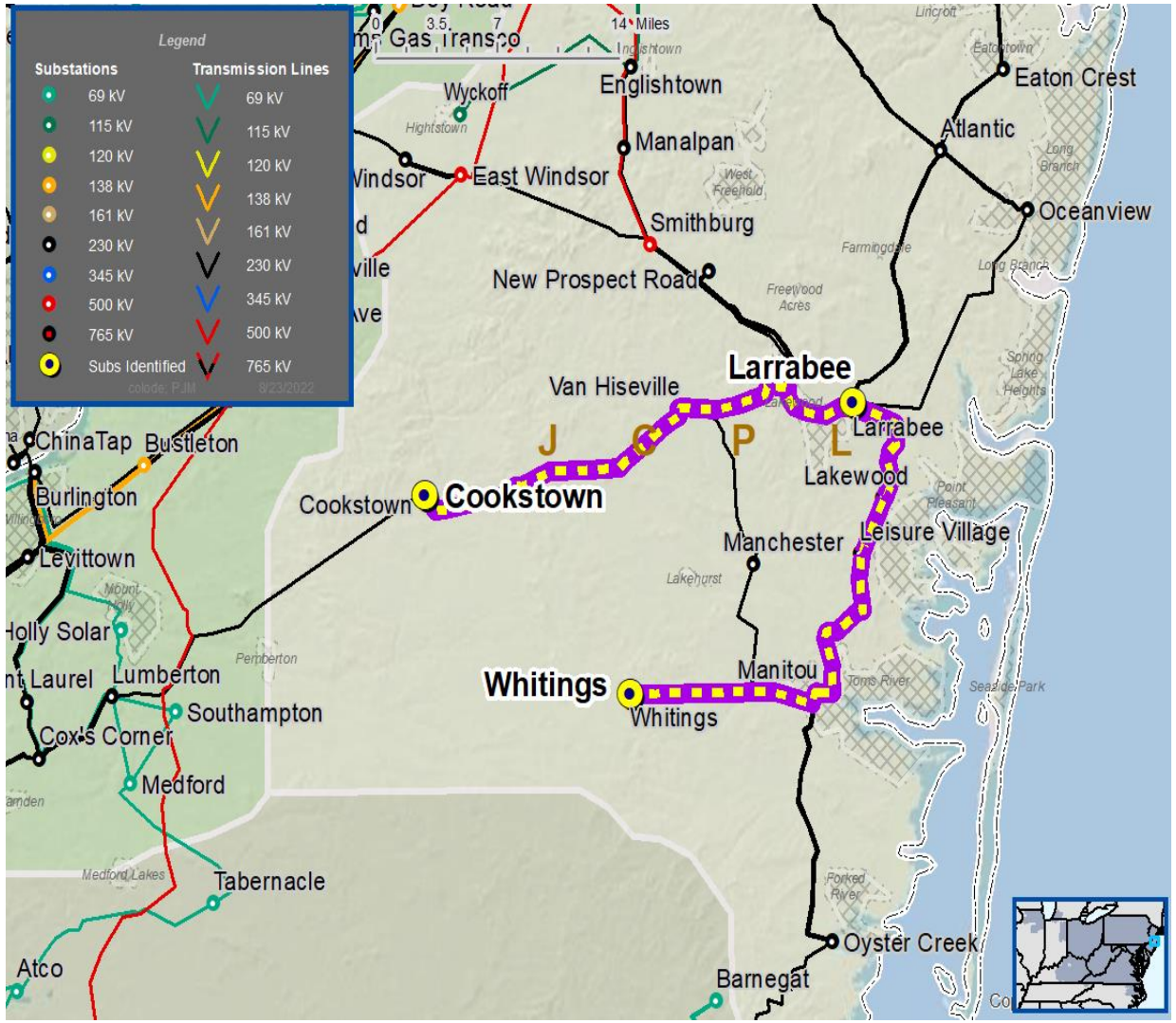
- Eliminate simultaneous outages to multiple networked elements

Reconductor/Rebuild Transmission Lines

- Three or more terminal transmission line.

Problem Statement:

The Cookstown – Larrabee – Whitings 230 kV Line is presently a 3-terminal line that removes multiple facilities from service under N-1 contingency scenarios.



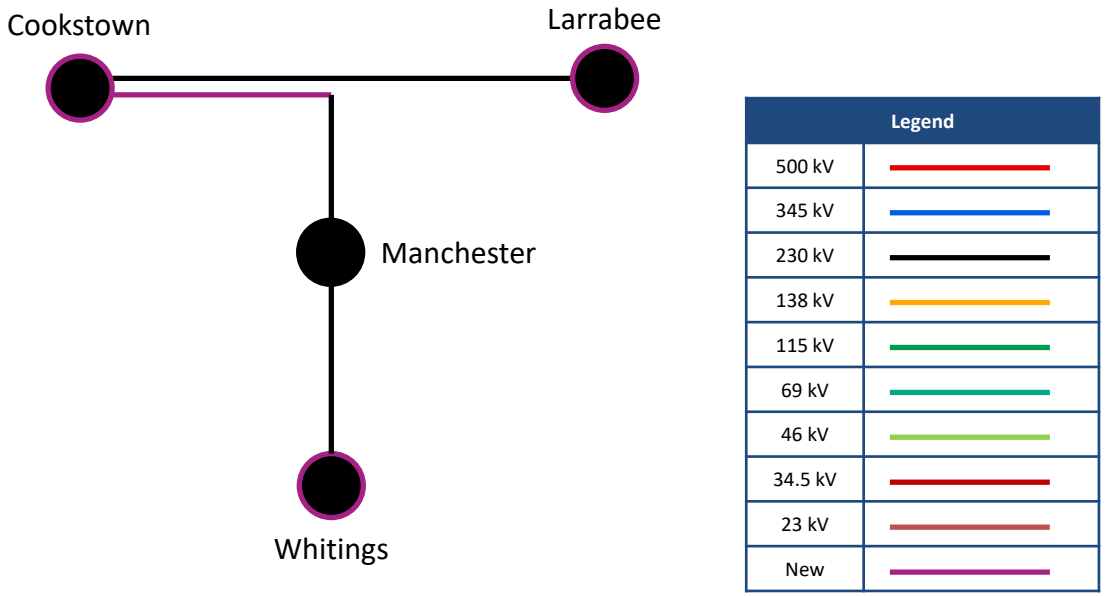
JCP&L Transmission Zone M-3 Process
Cookstown – Larrabee – Whitings 230 kV Line

Need Number: JCPL-2022-005

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Expand Cookstown Substation from a four-breaker ring bus to a five-breaker ring bus (s3294.1)
- Construct a new 230 kV circuit from Cookstown Substation to the Van Hiseville Junction on existing vacant circuit position, creating two new 230 kV lines:
  - Cookstown – Larrabee 230 kV
  - Cookstown – Whitings 230 kV (s3294.2)
- At Cookstown Substation:
  - Replace circuit switcher, line trap and relaying
  - Install 230 kV circuit breaker, disconnect switches, and line trap (s3294.3)
- At Larrabee Substation:
  - Replace line trap, substation conductor and relaying (s3294.4)
- At Whitings Substation:
  - Replace line trap, substation conductor and relaying (s3294.5)



JCP&L Transmission Zone M-3 Process
Cookstown – Larrabee – Whitings 230 kV Line

Need Number: JCPL-2022-005

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution (continued..):

Transmission Line Ratings:

Cookstown – Larrabee 230 kV (New line)
- Before Proposed Solution: N/A
- After Proposed Solution: 709/869 MVA (SN/SE)

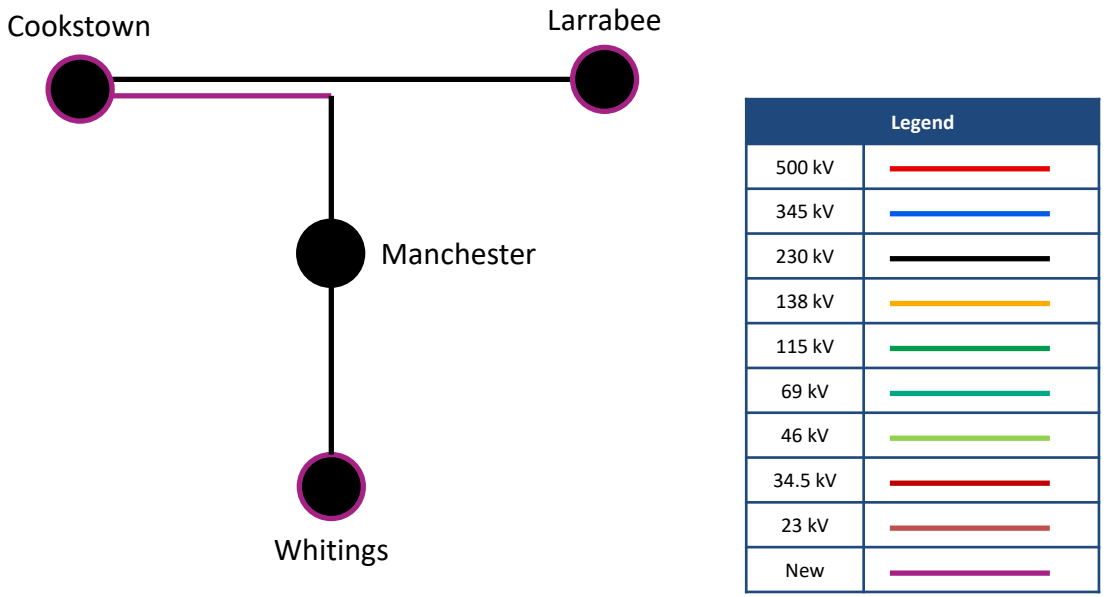
Cookstown – Manchester 230 kV (New line)
- Before Proposed Solution: N/A
- After Proposed Solution: 709/869 MVA (SN/SE)

Manchester – Whitings 230 kV
- Before Proposed Solution: 678/813 MVA (SN/SE)
- After Proposed Solution: 709/869 MVA (SN/SE)

Estimated Project Cost: $50.4M

Projected In-Service: 12/1/2024

Supplemental Project ID(s): s3298.1, s3298.2, s3298.3, s3298.4, s3298.5



JCPL Transmission Zone M-3 Process
Flanders Substation

Need Number: JCPL-2023-039

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/18/2024

Need Meeting 10/19/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

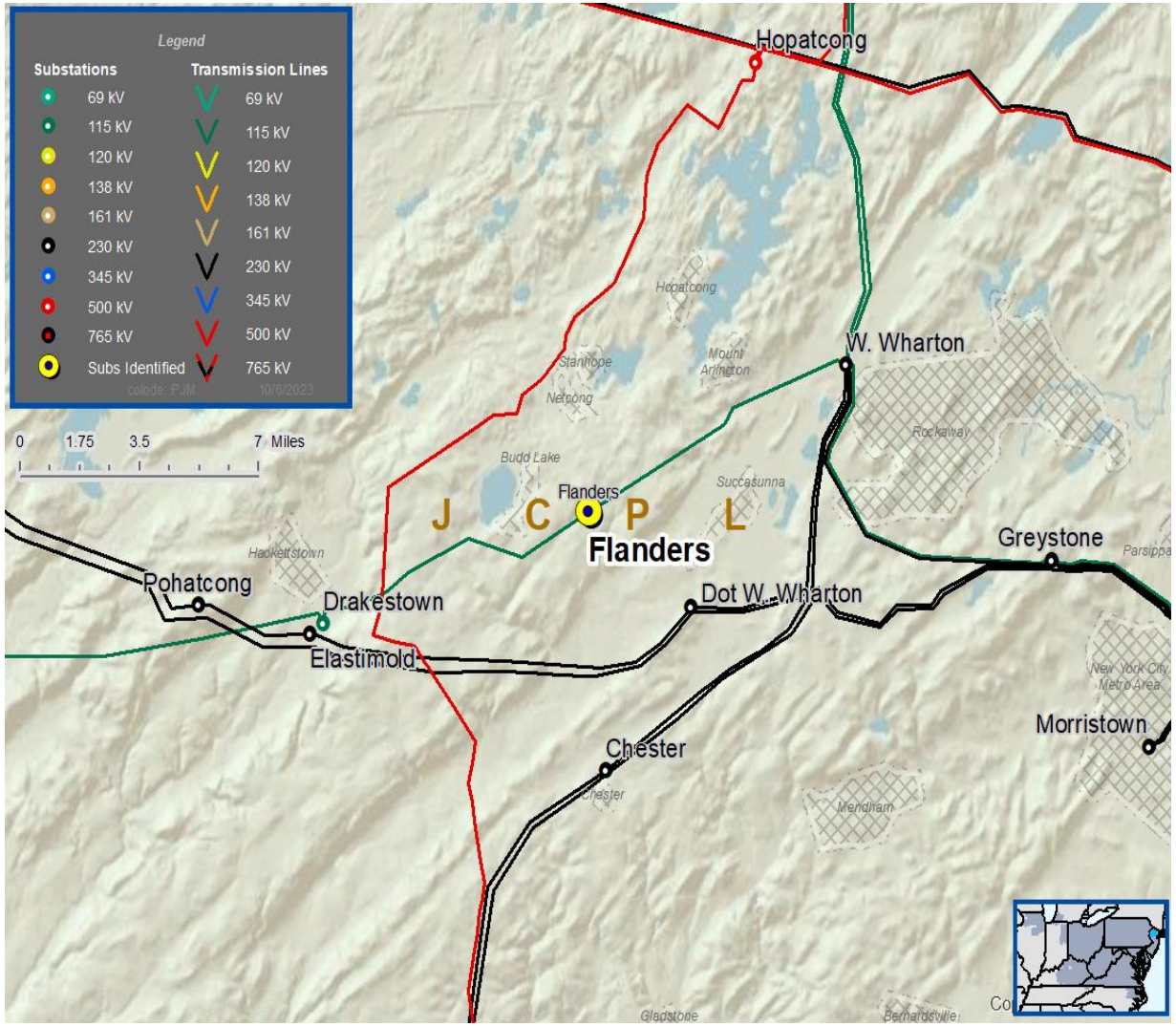
Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Problem Statement:

- The 115 – 34.5 kV No. 1 Transformer at Flanders Substation is approximately 50 years old and is approaching end of life. Recent analysis shows combustible hot metal gasses have developed.
- Existing Transformer Ratings:
  - 76 / 80 MVA (SN/SE)



JCPL Transmission Zone M-3 Process
Flanders Substation

Need Number: JCPL-2023-039

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Selected Solution:

- Replace the 115 – 34.5 kV No. 1 Transformer at Flanders substation with a 90 MVA unit.
- Replace 115kV Circuit Switcher with Circuit Breaker
- Upgrade transformer relaying

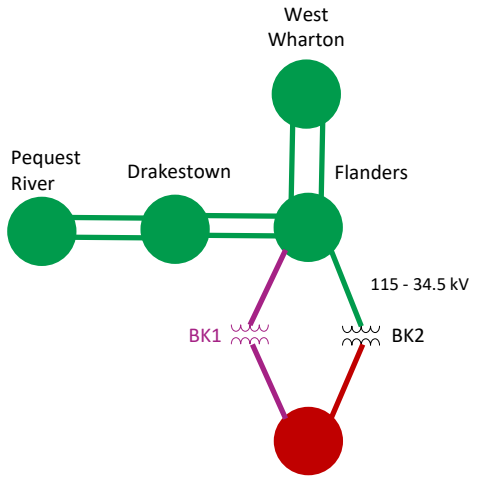
Transformer Ratings:

- Flanders 115 – 34.5 kV No. 1 Transformer:
  - Before Proposed solution: 76 / 80 MVA (SN/SE)
  - After Proposed Solution: 161 / 161 MVA (SN/SE)

Estimated Project Cost: $5.1 M

Projected In-Service: 5/30/2026

Supplemental Project ID: s3325.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Flanders Substation

Need Number: JCPL-2023-057

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024
Previously Presented: Solution Meeting 04/18/2024
Need Meeting 11/16/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

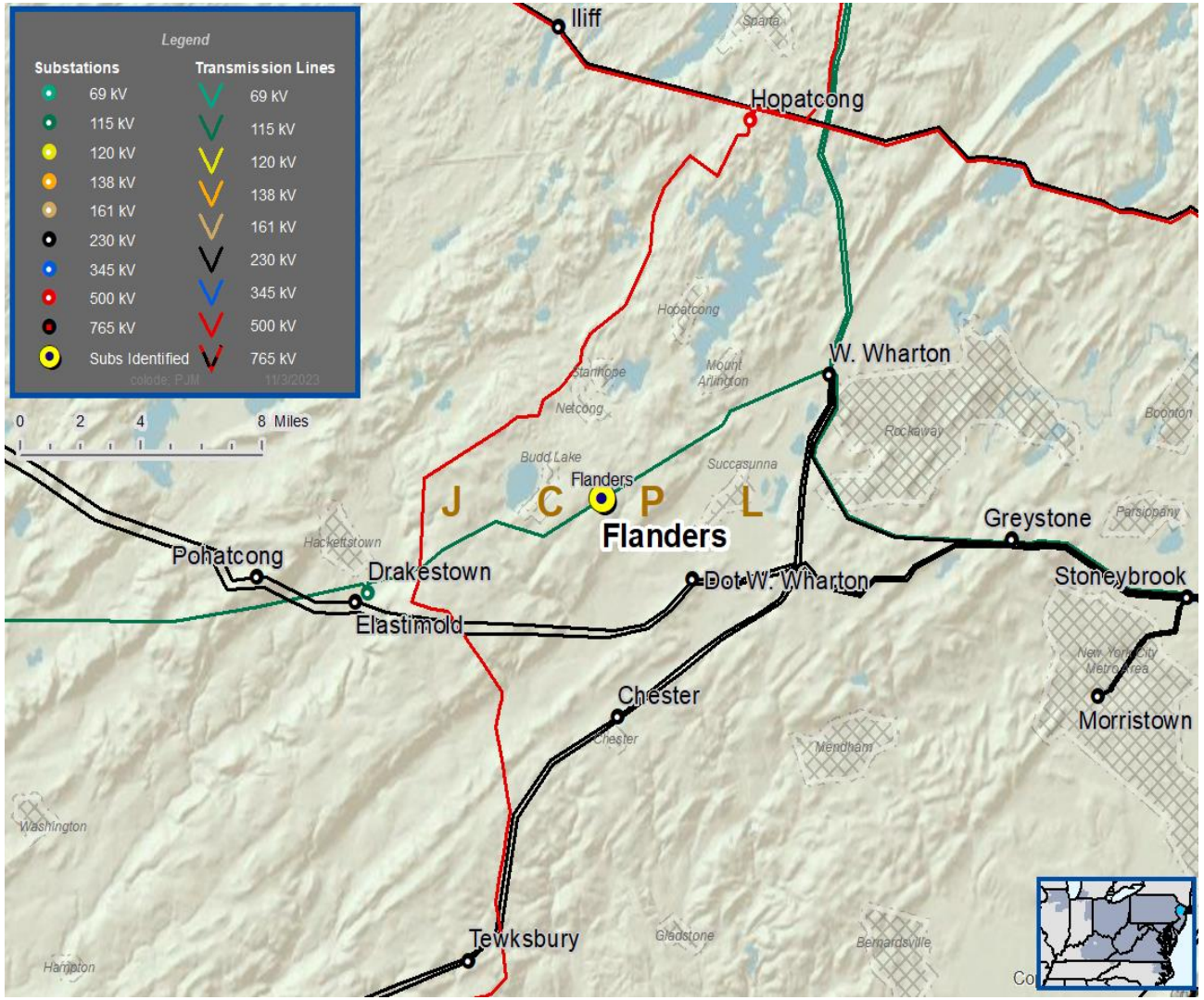
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 115-34.5 kV No. 2 Transformer at Flanders Substation was manufactured approximately 70 years ago and is approaching end of life.
- High levels of moisture continue to develop in the transformer.
  - Moisture can reduce oil dielectric strength increasing risk of flashover and arcing.
- Existing TR Ratings:
  - 61 / 66 MVA (SN/SE)



JCPL Transmission Zone M-3 Process
Flanders Substation

Need Number: JCPL-2023-057

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Selected Solution:

- Replace the 115 – 34.5 kV No. 2 Transformer at Flanders substation with a 90 MVA unit.
- Replace 115kV Circuit Switcher with Circuit Breaker
- Upgrade transformer relaying

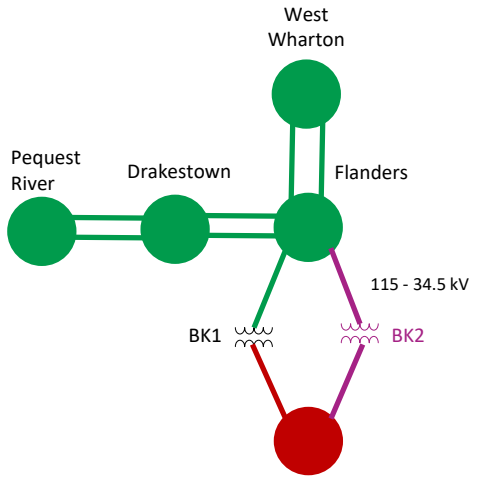
Transformer Ratings:

- Flanders 115 – 34.5 kV No. 2 Transformer:
  - Before Proposed solution: 61 / 66 MVA (SN/SE)
  - After Proposed Solution: 161 / 161 MVA (SN/SE)

Estimated Project Cost: 4.9 M

Projected In-Service: 5/29/2026

Supplemental Project ID: s3326.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process Misoperation Relay Project

Need Number: JCPL-2024-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/18/2024

Need Meeting 02/15/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption References:

System Performance Global Factors

- System reliability and performance
- Substation / line equipment limits

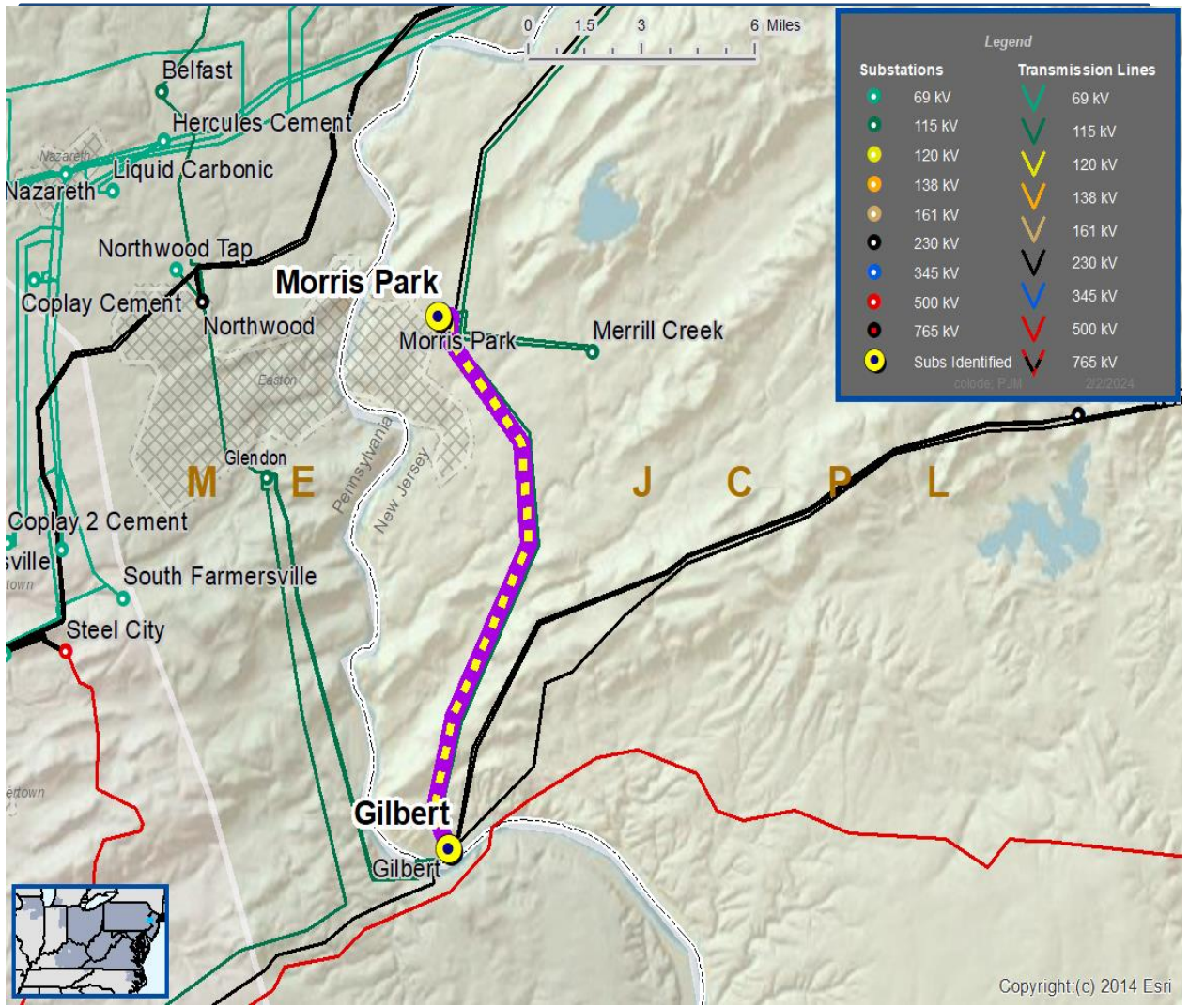
Upgrade Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

Continued on next slide…



JCPL Transmission Zone M-3 Process Misoperation Relay Project

…Continued from previous page

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
JCPL-2024-007	Gilbert – Morris Park 115kV S919 Line	118/152/168/189	184/223/208/264

JCPL Transmission Zone M-3 Process Misoperation Relay Project

Need Number: JCPL-2024-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Selected Solution:

- Replace relaying and limiting substation conductor at Gilbert substation.

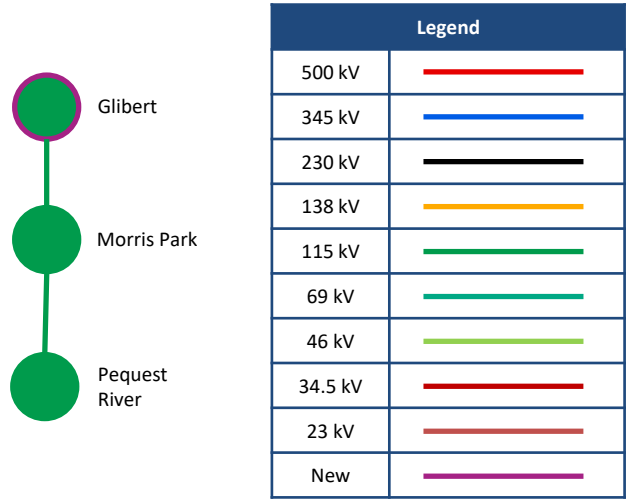
Transmission Line Rating:

- Gilbert – Morris Park 115 kV S919 Line
  - Before Proposed Solution: 118/152/168/189 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 184/223/208/264 MVA (SN/SE/WN/WE)

Estimated Project Cost: $ 3.27M

Projected In-Service: 12/17/2026

Supplemental Project ID: s3327.1



JCPL Transmission Zone M-3 Process
Misoperation Relay Projects

Need Number: JCPL-2024-010

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/18/2024

Need Meeting 03/14/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption References:

System Performance Global Factors

- System reliability and performance
- Substation / line equipment limits

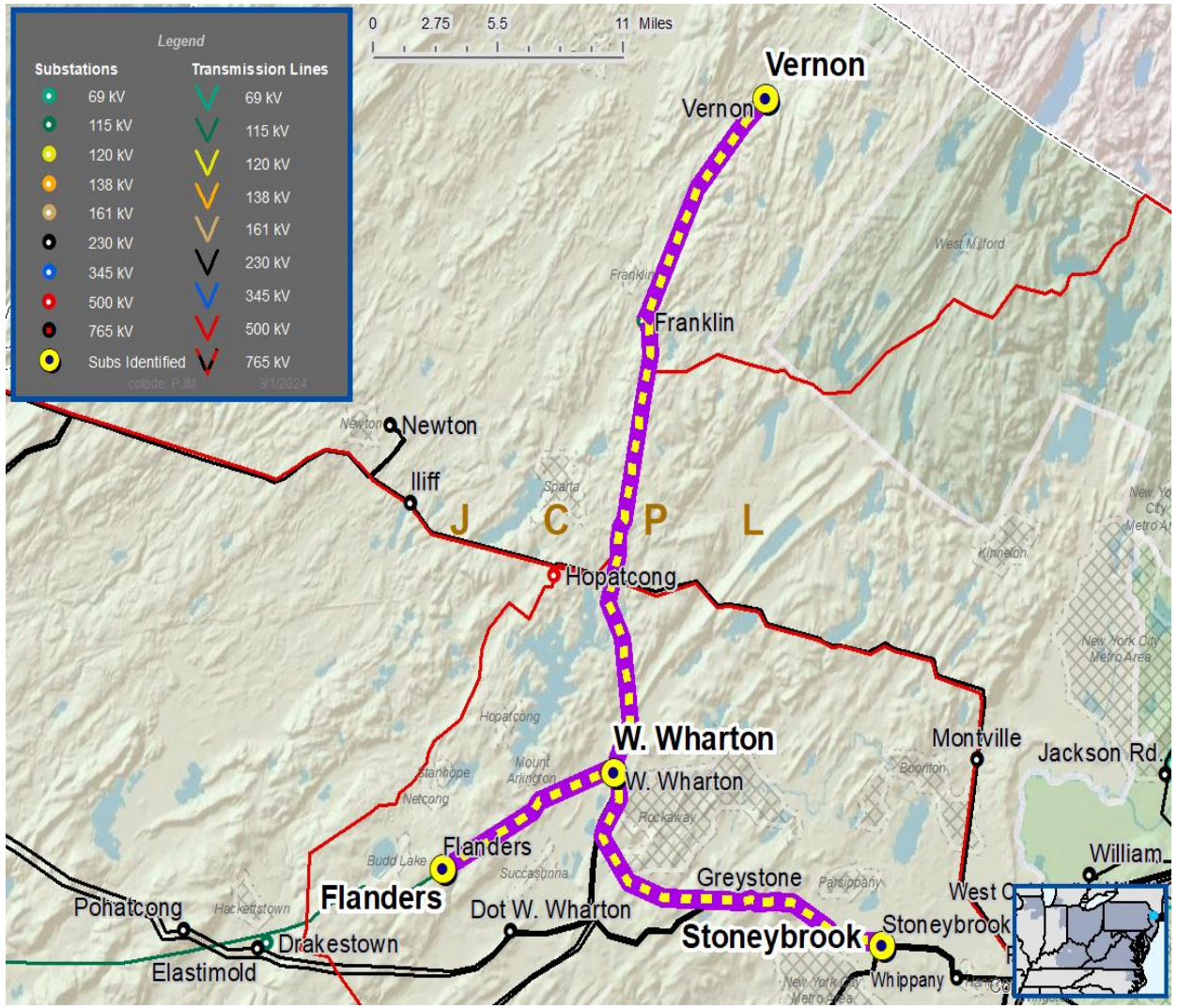
Upgrade Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Problem Statement:

- The existing control building at West Wharton Substation is congested. There is not sufficient space for relay panel upgrades.
- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

Continued on next slide…



JCPL Transmission Zone M-3 Process
Misoperation Relay Projects

…Continued from previous page

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
JCPL-2024-010	West Wharton – Stony Brook 115 kV G943 Line	239 / 239 / 239 / 239	355 / 435 / 403 / 515
	West Wharton – Flanders 115 kV R918 Line	147 / 191 / 208 / 219	184 / 223 / 208 / 264
	West Wharton – Vernon 115 kV J932 Line	147 / 148 / 148 / 148	148 / 179 / 167 / 212

JCPL Transmission Zone M-3 Process Misoperation Relay Projects

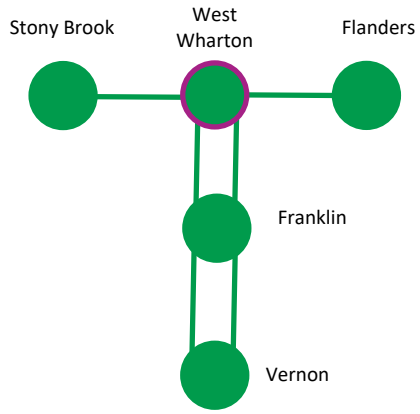
Need Number: JCPL-2024-010
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Selected Solution:

- Install a new West Wharton control building to allow for adequate space needed for relay panel upgrades.
- Replace relaying and limiting substation conductor at West Wharton substation.

Transmission Line Ratings:

- West Wharton – Stony Brook 115 kV G943 Line
  - Before Proposed solution: 239 / 239 / 239 / 239 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 355 / 435 / 403 / 515 MVA (SN/SE/WN/WE)
- West Wharton – Flanders 115 kV R918 Line
  - Before Proposed solution: 147 / 191 / 208 / 219 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 184 / 223 / 208 / 264 MVA (SN/SE/WN/WE)
- West Wharton – Vernon 115 kV J932 Line
  - Before Proposed solution: 147 / 148 / 148 / 148 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 148 / 179 / 167 / 212 MVA (SN/SE/WN/WE)



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

Estimated Project Cost: $13.82 M

Projected In-Service: 04/04/2025

Supplemental Project ID: s3328.1

JCPL Transmission Zone M-3 Process
Smithburg Substation

Need Number: JCPL-2024-005

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solutions Meeting – 04/30/2024
Need Meeting – 04/02/2024

Project Driver:

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

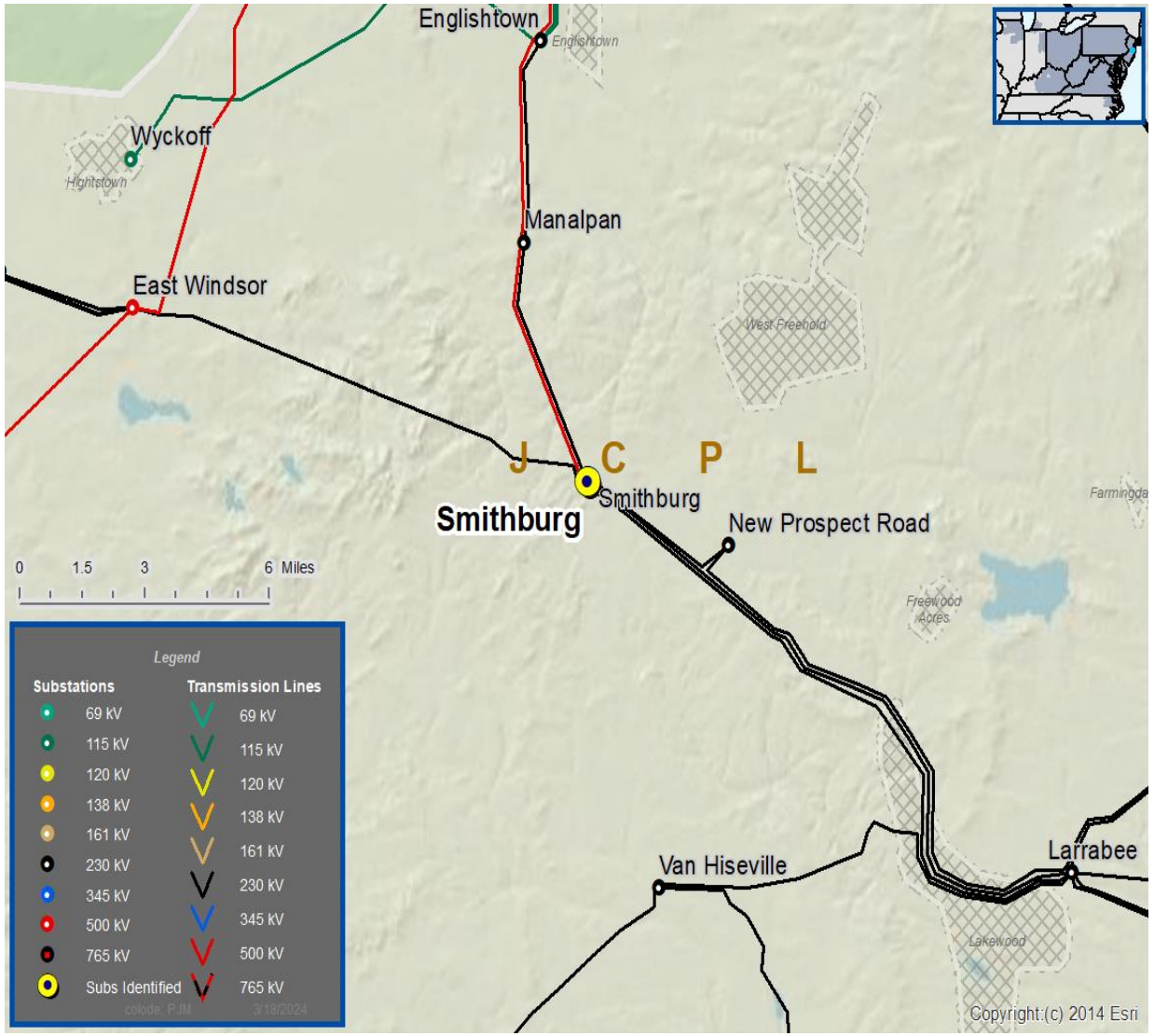
Specific Assumption Reference:

System Performance Projects Global Factors

- Reliability of Bulk Electric System (BES) Facilities
- Past system reliability and performance
- Add/Expand Bus Configuration
- Substation / line equipment limits

Problem Statement:

- Smithburg 230 kV GIS substation is an over 40 year old, aging facility which has a history of poor reliability, system performance, and maintenance issues due to specialized parts needed for replacement.
- The Smithburg 230 kV substation is configured as a nine breaker BAAH. Due overlapping equipment protection zones, N-1 contingencies or maintenance outages cause multiple elements to be removed from service:
  - An outage on the 230 kV H2008 line requires the 500/230 kV transformer to be removed from service.
  - An outage on the 230 kV G1021 line requires the 230/34.5 kV transformer to be removed from service
- Transmission line ratings are limited by terminal equipment



JCPL Transmission Zone M-3 Process
Smithburg Substation

Need Number: JCPL-2024-005

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

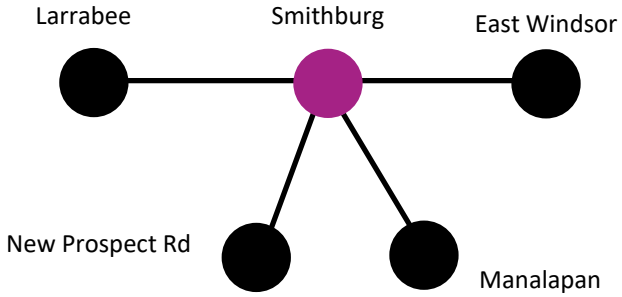
Selected Solution:

Smithburg 230 kV station Rebuild

- Rebuild the existing 230 kV GIS substation bus as an open-air 230 kV breaker and a half station with 11-230 kV breakers. Re-terminate the existing 230 kV transmission lines and transformers to the new station layout.
- Retire the 12 mile Smithburg – Larrabee No. 2 230 kV line.

Transmission Line Ratings:

- **East Windsor – Smithburg 230 kV line**
  - Before Proposed Solution: 1245 MVA SN / 1272 MVA SE / 1560 MVA WN / 1560 MVA WE
  - After Proposed Solution: 1418 MVA SN / 1739 MVA SE / 1610 MVA WN / 2062 MVA WE
- **Manalapan – Smithburg 230 kV line**
  - Before Proposed Solution: 709 MVA SN / 869 MVA SE / 805 MVA WN / 952 MVA WE
  - After Proposed Solution: 709 MVA SN / 869 MVA SE / 805 MVA WN / 952 MVA WE
- **Larrabee – Smithburg 230 kV No. 1 line**
  - Before Proposed Solution: 709 MVA SN / 869 MVA SE / 805 MVA WN / 952 MVA WE
  - After Proposed Solution: 709 MVA SN / 869 MVA SE / 805 MVA WN / 952 MVA WE
- **New Prospect Rd – Smithburg 230 kV line**
  - Before Proposed Solution: 478 MVA SN / 641 MVA SE / 641 MVA WN / 713 MVA WE
  - After Proposed Solution: 709 MVA SN / 869 MVA SE / 805 MVA WN / 952 MVA WE

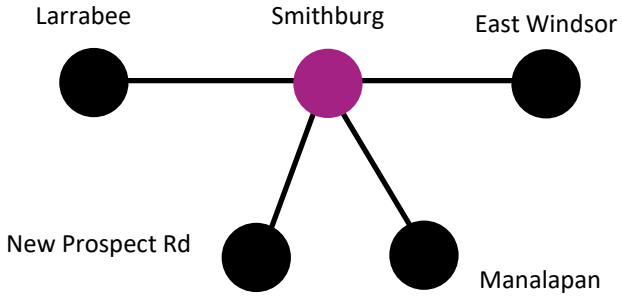


Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Smithburg Substation

Need Number: JCPL-2024-005
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024
Previously Presented: Solutions Meeting – 04/30/2024
Need Meeting – 04/02/2024

Estimated Project Cost: $30.1 M
Projected In-Service: 06/01/2027
Supplemental Project ID: s3329.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Customer Connection

Need Number: JCPL-2024-016

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting - 05/16/2024
Need Meeting - 04/18/2024

Project Driver:

Customer Service

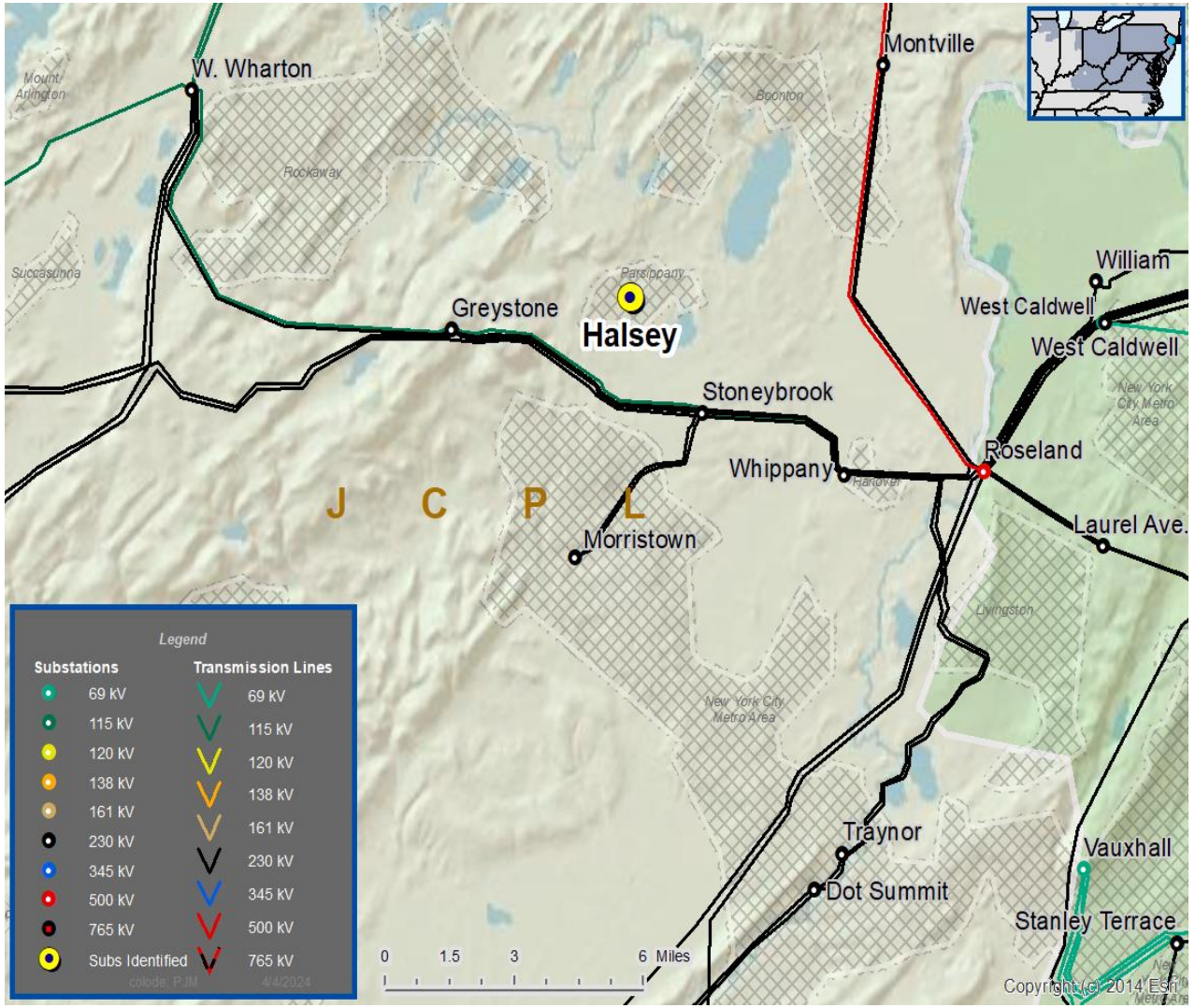
Specific Assumption Reference:

New customer connection requests will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

New Customer Connection - A retail customer requested 34.5 kV service for load of approximately 11 MVA; location is near the Halsey Substation.

Requested in-service date is 6/30/2024



JCPL Transmission Zone M-3 Process Customer Connection

Need Number: JCPL-2024-016

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Selected Solution:

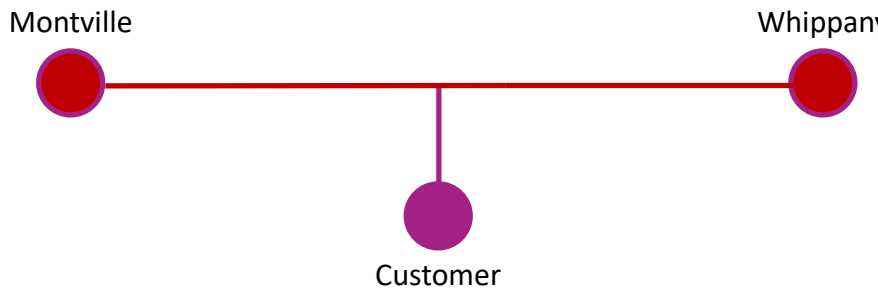
34.5 kV Transmission Line Tap

- Tap the Montville – Whippany 34.5 kV D4 Line
- Add SCADA controlled switches
- Modify relay settings on the Montville– Whippany 34.5 kV D4 Line

Estimated Project Cost: $1.45M

Projected In-Service: 06/30/2024

Supplemental Project ID: s3336.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zones M-3 Process
Windsor Substation

Need Number: JCPL-2023-005

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Need Meeting – 06/06/2023
Solution Meeting – 09/05/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

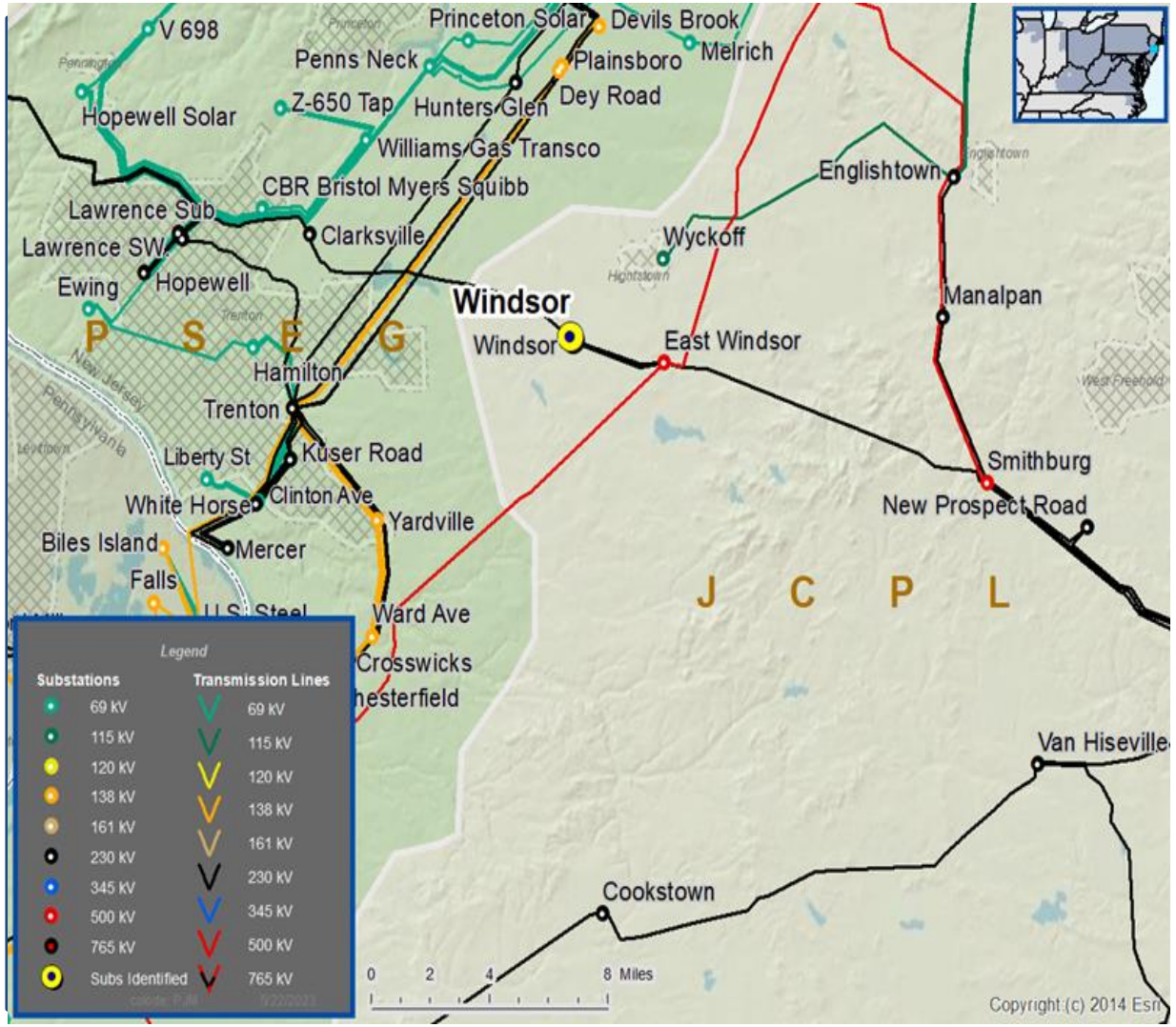
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 230 – 34.5 kV No. 1 Transformer at Windsor was manufactured in 1973 and is approaching end of life.
- At the transformer, combustible hot metal gasses have developed and continue to fluctuate.
  - Outages have cost $33k O&M in last 5 years.
  - Transformer has a high risk of failure.
- Existing TR Ratings:
  - 140 / 140 MVA (SN / SE)



JCPL Transmission Zones M-3 Process
Windsor Substation

Need Number: JCPL-2023-005

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace the 230 – 34.5 kV No. 1 Transformer at Windsor with a 168 MVA unit.
- Upgrade transformer relaying

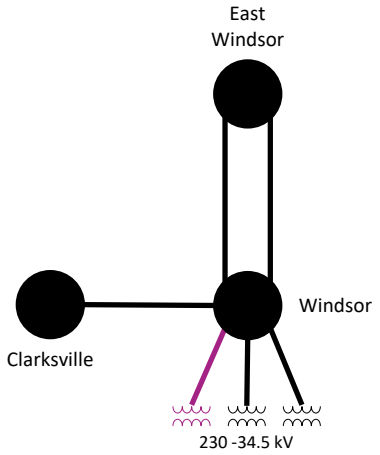
Transformer Ratings:

- Windsor 230 – 34.5 kV No. 1 Transformer:
  - Before Proposed Solution: 140 / 140 MVA (SN / SE)
  - After Proposed Solution: 216 / 216 MVA (SN / SE)

Estimated Project Cost: $6.3M

Projected In-Service: 11/2/2023

Supplemental Project ID: s3394.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Eaton Crest – Woodbine (R226) 34.5 kV Customer Connection

Need Number: JCPL-2023-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting - 10/19/2023

Need Meeting – 06/15/2023

Supplemental Project Driver(s):

Customer Service

Specific Assumption Reference(s):

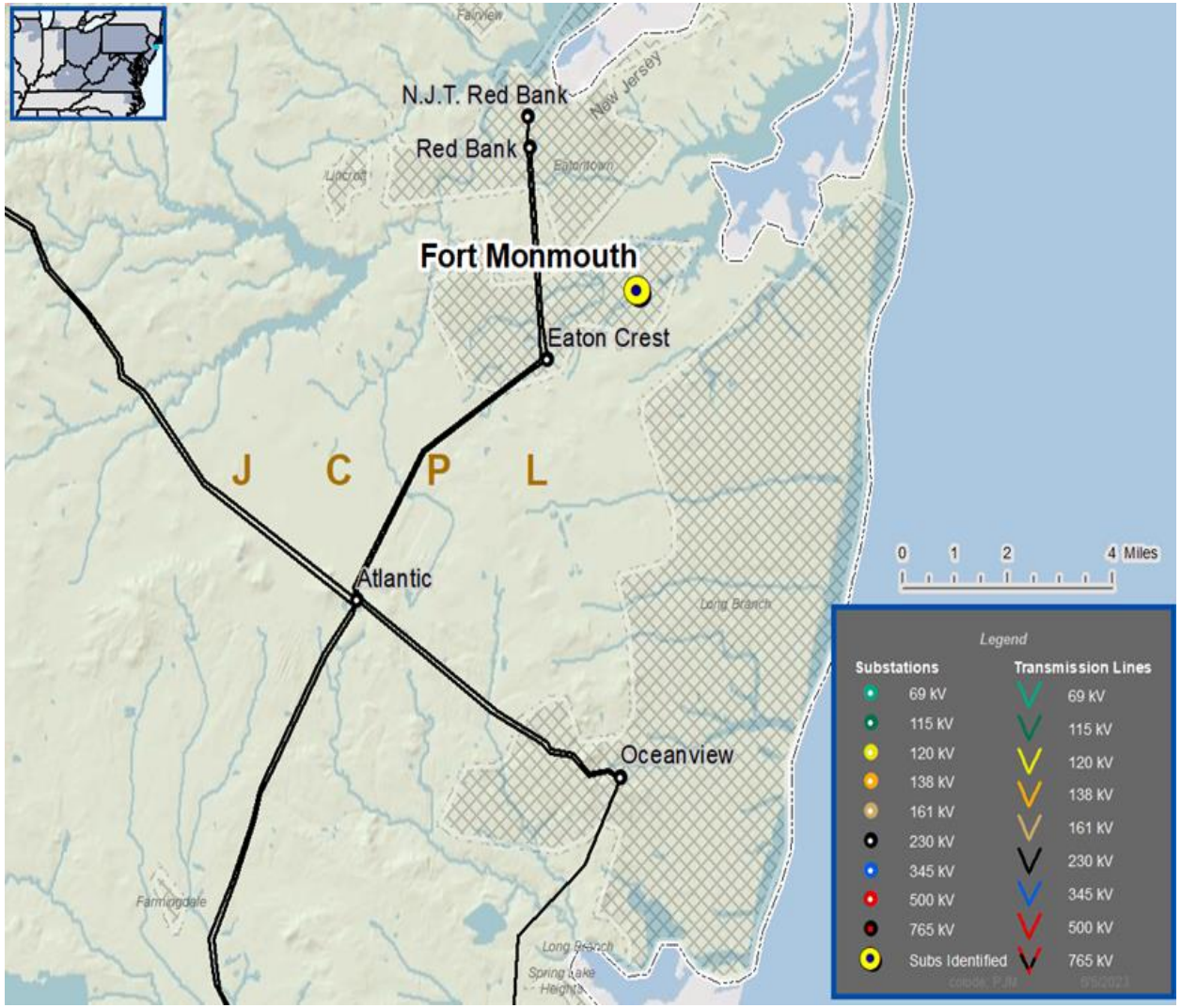
New Customer connection requests will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

New Customer Connection – A customer requested 34.5 kV service for load of approximately 17 MVA of capacity; location is near the Fort Monmouth Substation.

Requested in-service date:

12/31/2023



JCPL Transmission Zone M-3 Process
Eaton Crest – Woodbine (R226) 34.5 kV Customer Connection

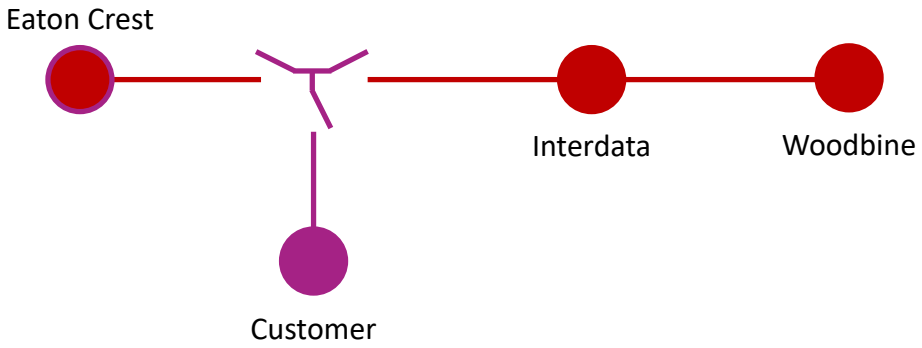
Need Number: JCPL-2023-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

34.5 kV Line Tap

- Install two main line and one tap line SCADA controlled switches
- Construct one span of 34.5 kV line between tap point and customer substation
- Review/modify relay settings on the Eaton Crest – Woodbine (R226) 34.5 kV line



Estimated Project Cost: $1.4M

Projected In-Service: 4/1/2024

Supplemental Project ID: s3397.1

Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Automatic Restoration Projects

Need Numbers: JCPL-2023-012, -015, -022, -023, -025, -027, -031 thru -034

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting 10/19/2023
Need Meeting 09/14/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance

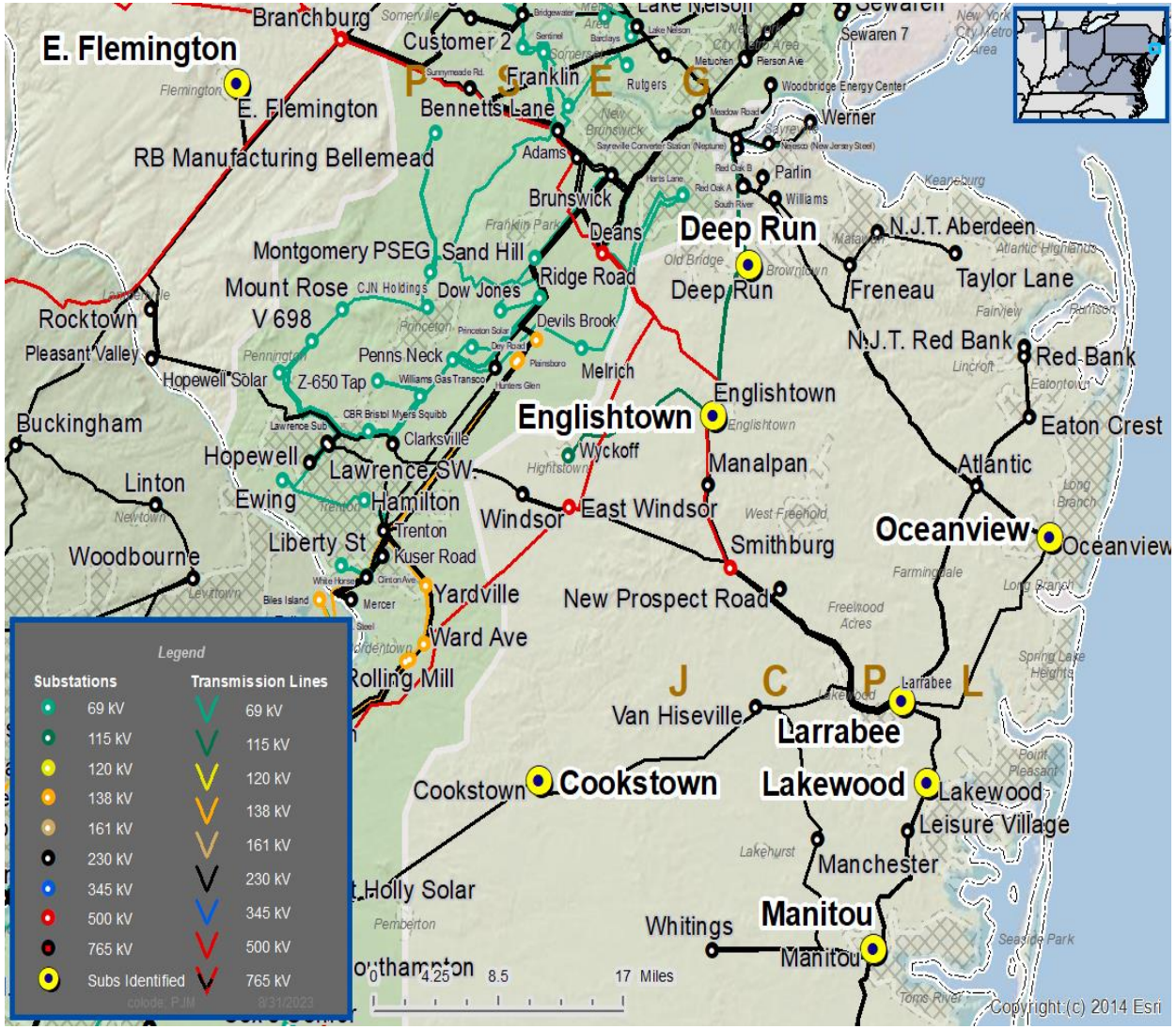
Upgrade Relay Schemes

- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- There is a lack of automatic restoration of 34.5 kV lines following tripping events without the intervention of Transmission Operators.
- Manual restoration increases the risk of system constraints on adjacent facilities, especially for critical lines as identified by Transmission Operations.
- Obsolete electromechanical relay schemes. In many cases, the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- Transmission line ratings are limited by terminal equipment.

Continued on next slide…



JCPL Transmission Zone M-3 Process
Automatic Restoration Projects

Need #	Transmission Line	Existing Line Rating (SN/SE/WN/WE)	Existing Conductor Rating (SN/SE/WN/WE)
JCPL-2023-012	Long Branch - Monmouth Park F110 34.5 kV	44/48/48/48	44/53/50/63
JCPL-2023-015	Taylor Lane - Crawfords Corner Tap K37 34.5 kV	44/48/48/48	44/53/50/63
JCPL-2023-022	Asbury Park Tap - Bradley Beach U47 34.5 kV	55/66/63/76	55/67/63/79
JCPL-2023-023	East Flemington - Visqueen Tap H736 34.5 kV	40/48/40/48	40/50/40/50
JCPL-2023-025	Farmingdale - Howell Solar Tap Q225 34.5 kV	55/67/63/72	55/67/63/79
	Farmingdale - Larrabee W49 34.5 kV	44/57/63/65	55/67/63/79
JCPL-2023-027	Cookstown - McGuire T98 34.5 kV	35/46/48/48	41/50/48/60

JCPL Transmission Zone M-3 Process
Automatic Restoration Projects

Need #	Transmission Line	Existing Line Rating (SN/SE/WN/WE)	Existing Conductor Rating (SN/SE/WN/WE)
JCPL-2023-031	Smithburg - Central States Tap X752 34.5 kV	67/85/79/96	70/85/79/100
JCPL-2023-032	High Bridge Switch Point - Lebanon R720 34.5 kV	39/47/45/47	39/48/45/56
	Lebanon - North Branch Tap J764 34.5 kV	42/52/50/59	44/53/50/63
JCPL-2023-033	Halecrest U Tap - Washington U723 34.5 kV	39/47/45/47	39/48/45/56
	Domin Lane Solar Tap - Washington Q719 34.5 kV	44/47/47/47	44/53/50/63
JCPL-2023-034	Whitesville - Asbury Park Tap U47 34.5 kV	55/67/63/72	55/67/63/79
	Oceanview - Whitesville F132 34.5 kV	35/46/48/48	55/66/62/78

JCPL Transmission Zones M-3 Process
Automatic Restoration Projects

Selected Solution:

Need #	Transmission Line	New Line Rating (SN/SE/WN/WE)	Scope of Work	Estimated Cost ($ M)	Target ISD	Supplemental Number
JCPL-2023-012	Long Branch - Monmouth Park F110 34.5 kV	44/53/50/63	• At Long Branch Substation, replace relaying	$ 0.64 M	12/5/2024	s3398.1
JCPL-2023-015	Taylor Lane - Crawfords Corner Tap K37 34.5 kV	44/53/50/63	• At Taylor Lane Substation, replace relaying	$ 0.64 M	11/16/2024	s3399.1
JCPL-2023-022	Asbury Park Tap - Bradley Beach U47 34.5 kV	55/67/63/79	• At Bradley Beach Substation, replace relaying	$ 0.64 M	12/31/2025	s3400.1
JCPL-2023-023	East Flemington - Visqueen Tap H736 34.5 kV	40/50/40/50	• At East Flemington Substation, replace relaying	$ 0.64 M	12/31/2025	s3401.1
JCPL-2023-025	Farmingdale - Howell Solar Tap Q225 34.5 kV	55/67/63/79	• At Farmingdale Substation, replace relaying	$ 1.28 M	12/31/2025	s3402.1
	Farmingdale - Larrabee W49 34.5 kV	44/57/63/71				
JCPL-2023-027	Cookstown - McGuire T98 34.5 kV	35/46/48/56	• At McGuire Substation, replace relaying	$ 0.64 M	12/31/2024	s3403.1
JCPL-2023-031	Smithburg - Central States Tap X752 34.5 kV	70/85/79/100	• At Smithburg Substation, replace relaying	$ 0.64 M	12/31/2027	s3404.1

JCPL Transmission Zones M-3 Process
Automatic Restoration Projects

Selected Solution:

Need #	Transmission Line	New Line Rating (SN/SE/WN/WE)	Scope of Work	Estimated Cost ($ M)	Target ISD	Supplemental Number
JCPL-2023-032	High Bridge Switch Point - Lebanon R720 34.5 kV	39/48/45/56	• At Lebanon Substation, replace relaying	$ 1.28 M	5/31/2028	s3405.1
	Lebanon - North Branch Tap J764 34.5 kV	44/53/50/63				
JCPL-2023-033	Halecrest U Tap - Washington U723 34.5 kV	39/48/45/56	• At Washington Substation, replace relaying	$ 1.28 M	6/1/2028	s3406.1
	Domin Lane Solar Tap - Washington Q719 34.5 kV	44/53/50/63				
JCPL-2023-034	Whitesville - Asbury Park Tap U47 34.5 kV	55/67/63/79	• At Whitesville Substation, replace relaying	$ 1.92 M	6/1/2028	s3407.1
	Oceanview - Whitesville F132 34.5 kV	35/46/50/57				

JCP&L Transmission Zone

Need Numb5er(s): JCPL-2019-008, -009

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting 10/31/2023
Need Meeting 04/11/2019

Project Driver(s):

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

Specific Assumption Reference(s)

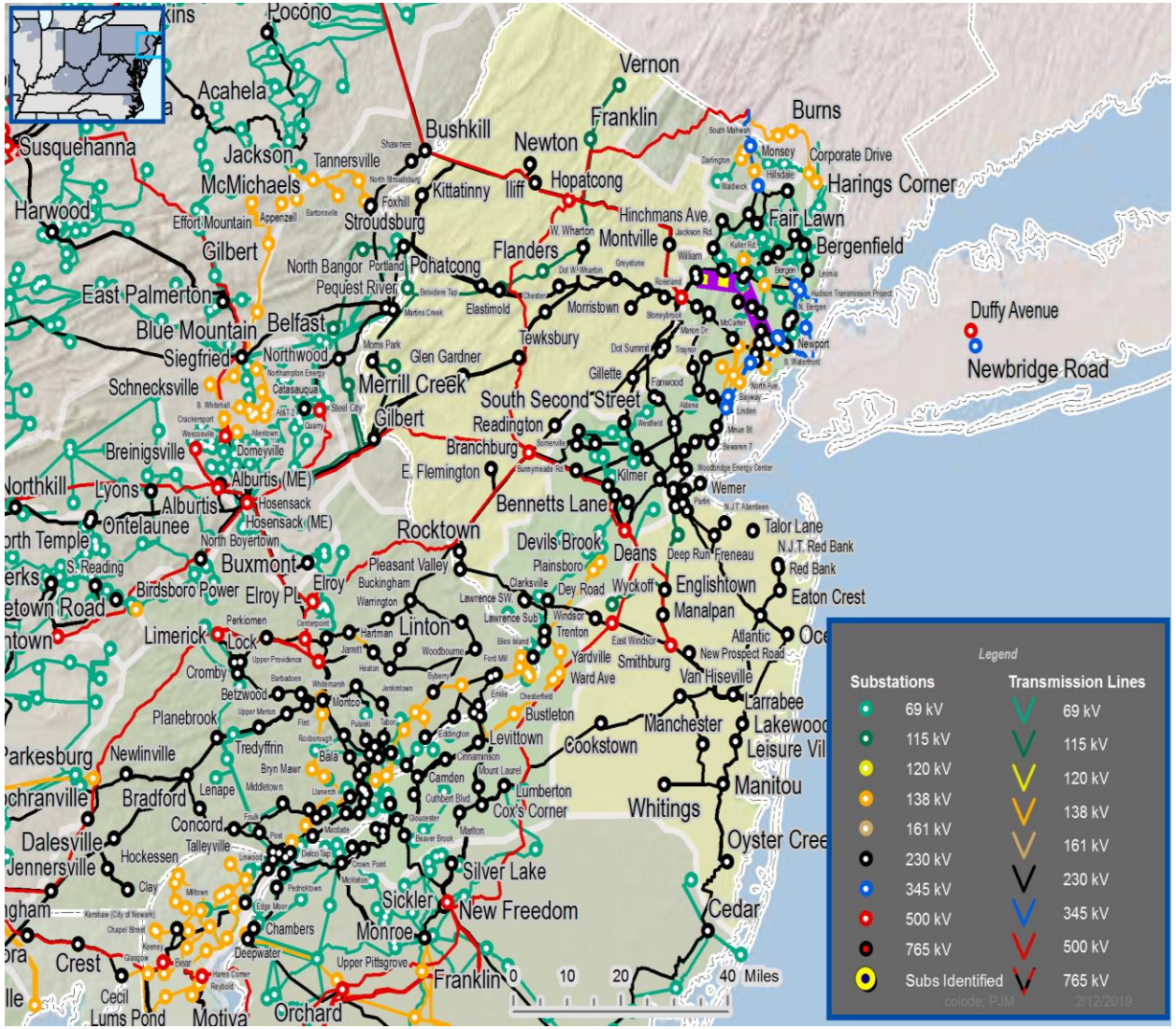
System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits Upgrade

Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Continued on next slide…



Problem Statement

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
JCPL-2019-008	Atlantic – Red Bank (S1033) 230 kV Line	678 / 780	709 / 869
JCPL-2019-009	Atlantic – Eaton Crest – Red Bank (T2020) 230 kV Line	678 / 780	709 / 869

JCPL Transmission Zones M-3 Process
Atlantic – Red Bank S1033 230 kV Misoperation Relays

Need Numbers: JCPL-2019-008

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace relaying and limiting substation conductor at Atlantic and Red Bank 230 kV Substations

Transmission Line Ratings:

- Atlantic – Red Bank S 1033 230 kV Line
  - Before Proposed Solution: 678 / 780 MVA (SN / SE)
  - After Proposed Solution: 709 / 869 MVA (SN / SE)

Estimated Project Cost: $ 2.0 M

Projected In-Service: 04/17/2026

Supplemental Project ID: s3411.1

Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zones M-3 Process
Atlantic – Red Bank T2020 230 kV Misoperation Relays

Need Numbers: JCPL-2019-009

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace limiting substation conductor at Eaton Crest 230 kV
- Replace relaying at Atlantic and Red Bank 230 kV substations

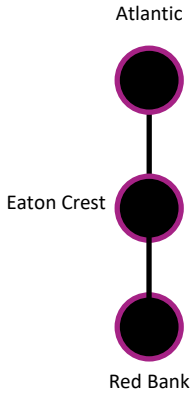
Transmission Line Ratings:

- Atlantic – East Crest 230 kV
  - Before Proposed Solution: 678 / 813 MVA (SN / SE)
  - After Proposed Solution: 709 / 869 MVA (SN / SE)
- Eaton Crest – Red Bank 230 kV
  - Before Proposed Solution: 678 / 813 MVA (SN / SE)
  - After Proposed Solution: 709 / 869 MVA (SN / SE)

Estimated Project Cost: $ 2.0 M

Projected In-Service: 11/20/2026

Supplemental Project ID: s3412.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Chester-West Wharton 230 kV Misoperation Relays

Need Number: JCPL-2019-021

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

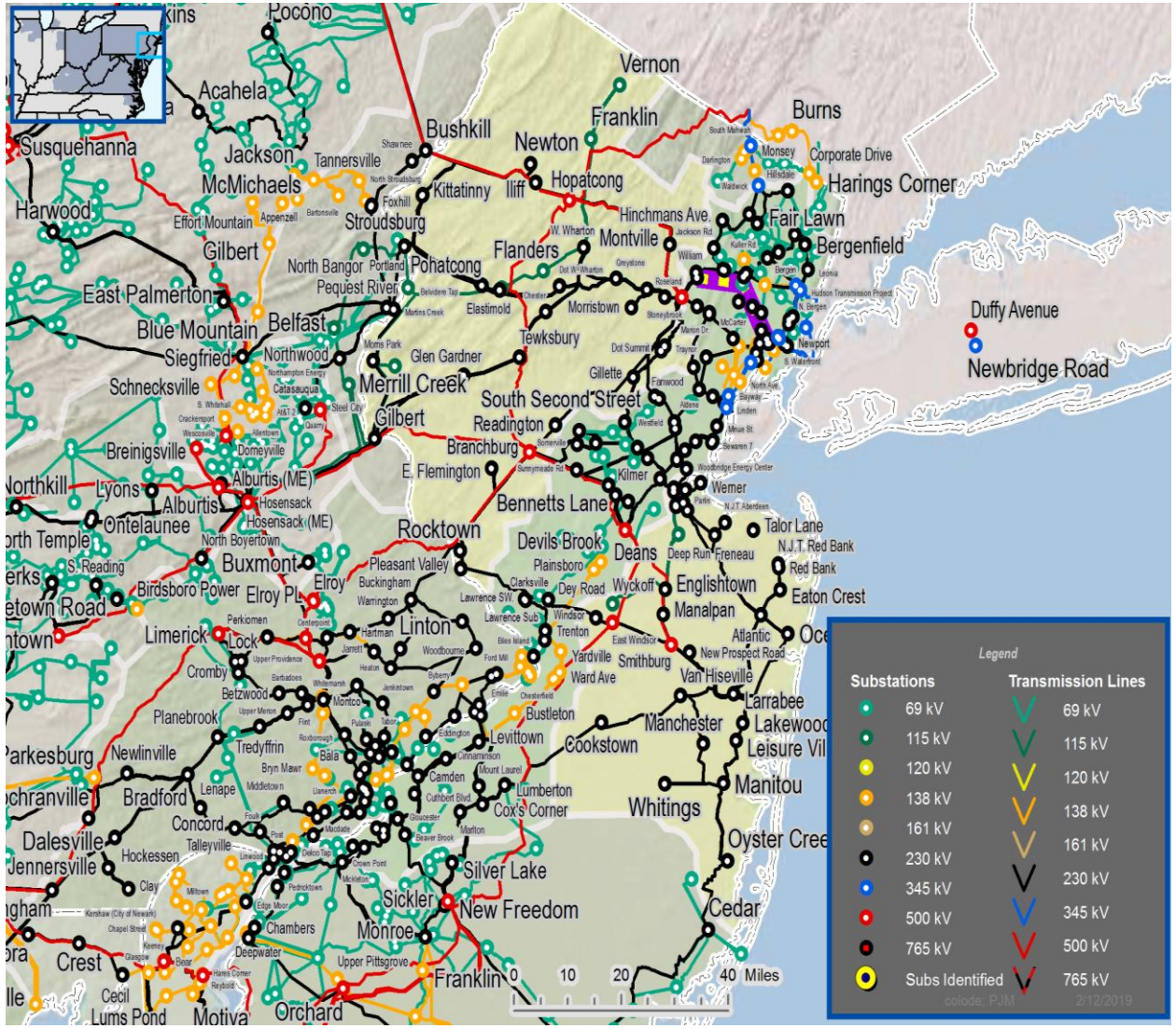
Previously Presented: Solutions Meeting 10/31/2023
Need Meeting 03/25/2019

Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption References:
Global Factors
- System reliability and performance
- Substation / line equipment limits

Upgrade Relay Schemes
- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Problem Statement:
- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.



JCPL Transmission Zone M-3 Process
Chester-West Wharton 230 kV Misoperation Relays

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
JCPL-2019-021	Chester-West Wharton 230 kV M1027 Line	650 / 817	709 / 869

JCPL Transmission Zone M-3 Process
Chester-West Wharton 230 kV Misoperation Relays

Need Numbers: JCPL-2019-021

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace relaying and limiting substation conductor at Chester and West Wharton 230 kV Substations

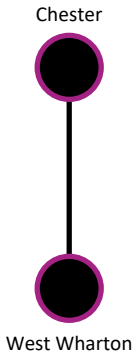
Transmission Line Ratings:

- Chester-West Wharton H2034 230 kV Line
  - Before Proposed Solution: 650 / 817 MVA (SN / SE)
  - After Proposed Solution: 709 / 869 MVA (SN / SE)

Estimated Project Cost: $ 2.0 M

Projected In-Service: 10/11/2024

Supplemental Project ID: s3413.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zones M-3 Process
Cookstown Substation

Need Number: JCPL-2023-010

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting – 10/31/2023

Need Meeting – 09/05/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

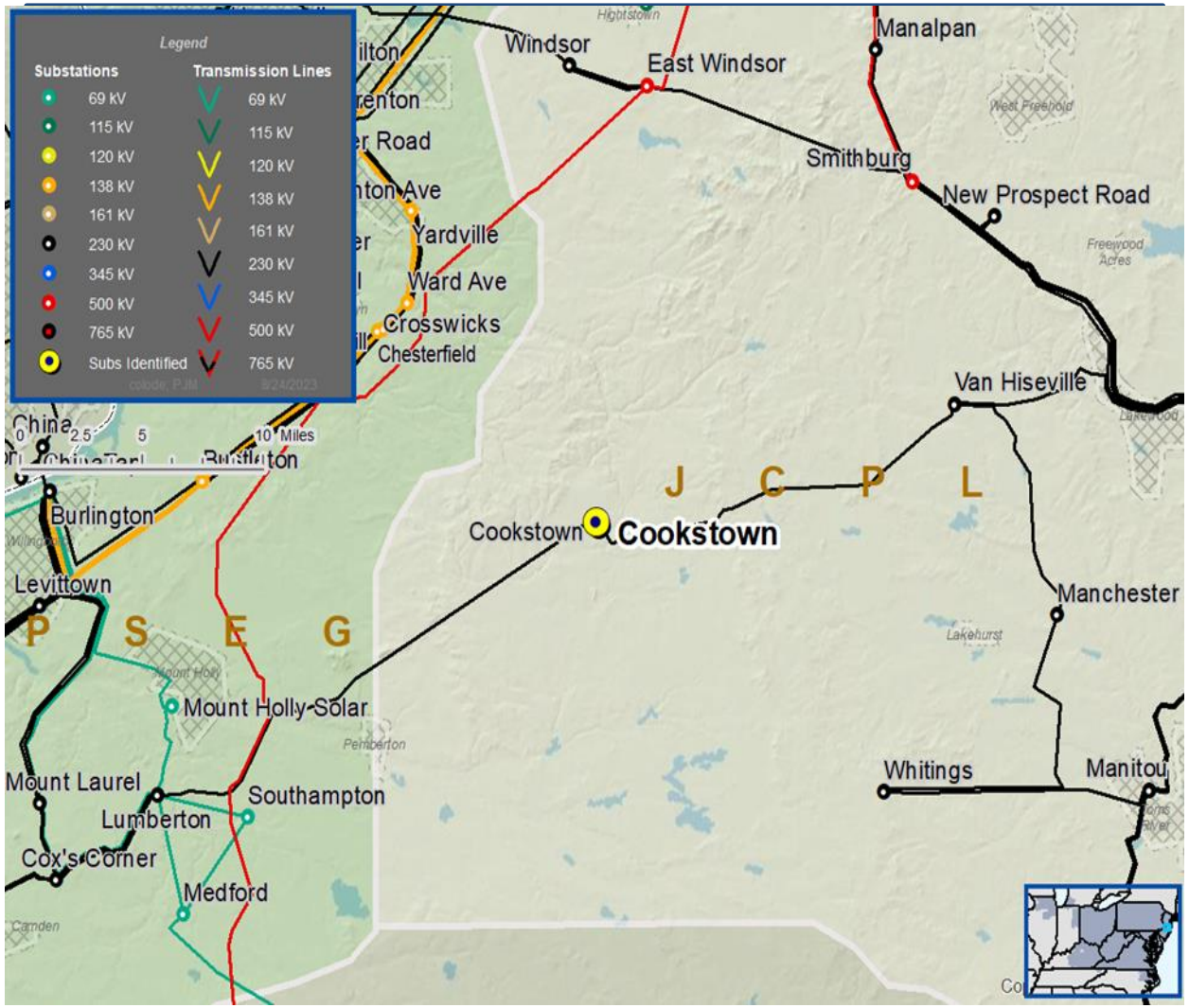
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 230 – 34.5 kV No. 2 Transformer at Cookstown was installed 49 years ago and is approaching end of life.
  - Ethane gas has consistently been exhibited as elevated compared to IEEE standards.
- Existing TR Ratings:
  - 141 / 141 MVA (SN / SLTE)



JCPL Transmission Zones M-3 Process
Cookstown Substation

Need Number: JCPL-2023-010

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace the 230-34.5 kV No. 2 Transformer at Cookstown with a 168 MVA unit.
- Upgrade transformer relaying

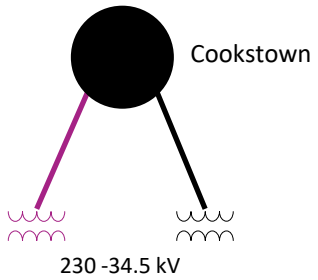
Transformer Ratings:

- Cookstown 230 – 34.5 kV No. 2 Transformer:
  - Before Proposed Solution: 141 / 141 MVA (SN / SE)
  - After Proposed Solution: 216 / 216 MVA (SN / SE)

Estimated Project Cost: $ 7.95 M

Projected In-Service: 1/31/2024

Supplemental Project ID: s3414.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Kittatinny-Yards Creek 230 kV Misoperation Relays

Need Number: JCPL-2023-035

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

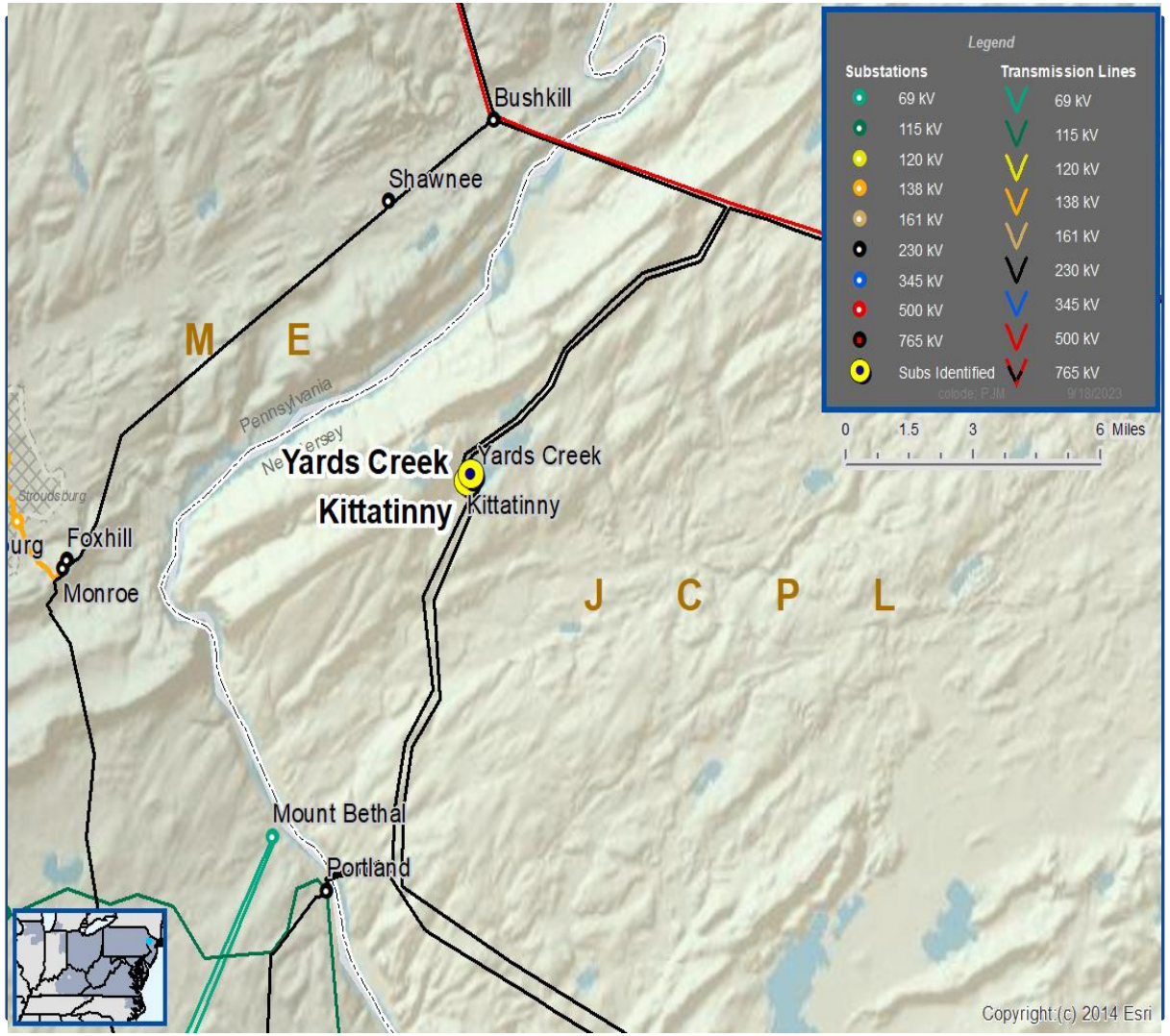
Previously Presented: Solution Meeting – 10/31/2023
Need Meeting –10/03/2023

Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption References:
Global Factors
- System reliability and performance
- Substation / line equipment limits

Upgrade Relay Schemes
- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Problem Statement:
- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.



JCPL Transmission Zone M-3 Process
Kittatinny-Yards Creek 230 kV Misoperation Relays

…Continued from previous page

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
JCPL-2023-035	Kittatinny-Yards Creek 230 kV M1027 Line	648 / 648	709 / 850

JCPL Transmission Zones M-3 Process
Kittatinny-Yards Creek 230 kV Misoperation Relays

Need Number: JCPL-2023-035

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace relaying, limiting substation conductor and line disconnect switches at Kittatinny substation

Transmission Line Ratings:

- Kittatinny-Yards Creek M1027 230 kV Line
  - Before Proposed Solution: 648 / 648 MVA (SN / SE)
  - After Proposed Solution: 709 / 850 MVA (SN / SE)

Estimated Project Cost: $ 1.3 M

Projected In-Service: 12/03/2022

Supplemental Project ID: s3415.1

Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCP&L Transmission Zone M-3 Process
West Wharton – Sugarloaf 115 kV Lines

Need Number: JCPL-2023-002

Process State: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting 08/17/2023

Need Meeting 04/20/2023

Project Driver:

Performance and Risk

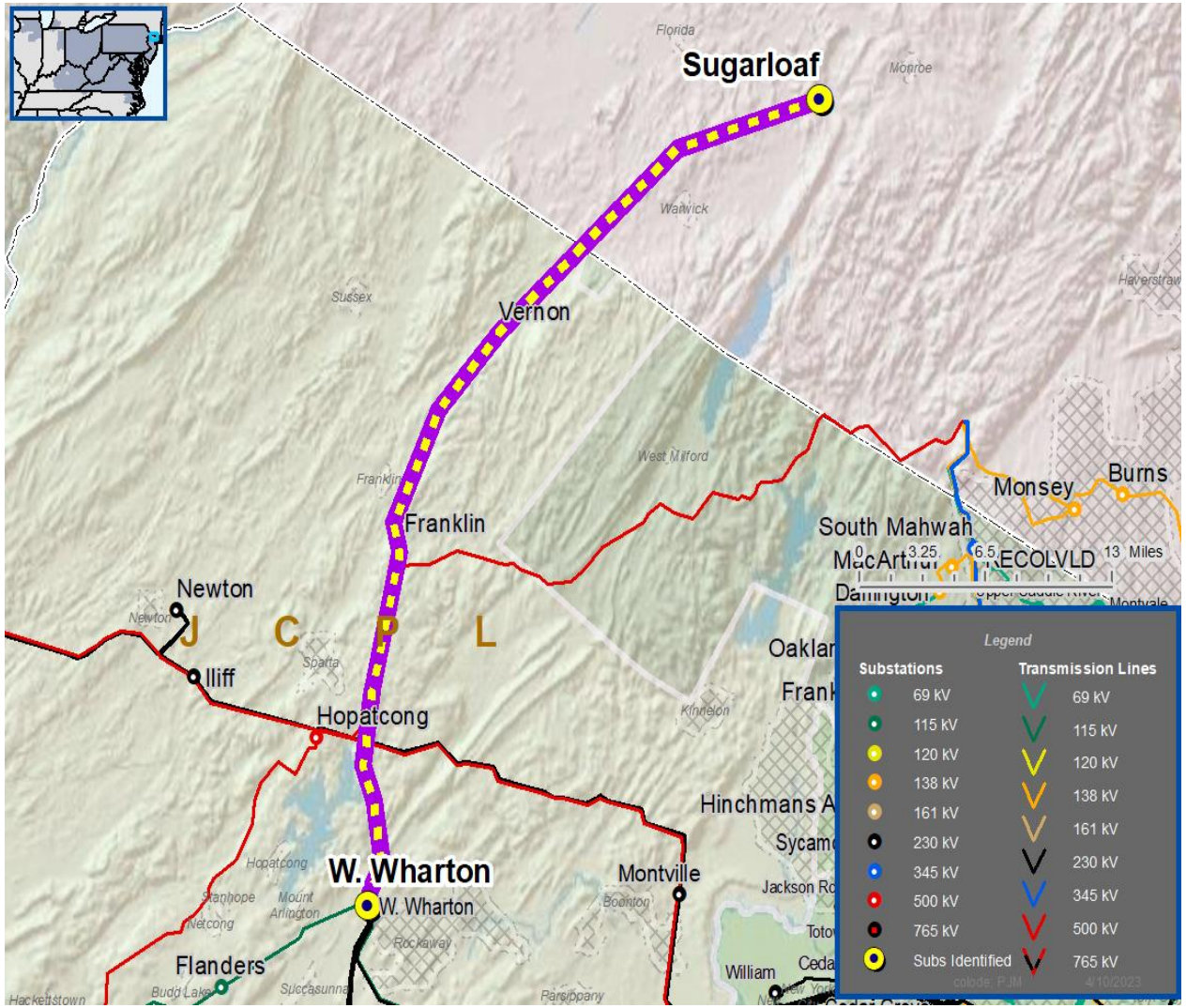
Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance

Problem Statement:

- FE and Central Hudson have two normally open lines that have not been utilized for approximately 10 years and will no longer be required.



JCP&L Transmission Zone M-3 Process
West Wharton – Sugarloaf 115 kV Lines

Need Number: JCPL-2023-002

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

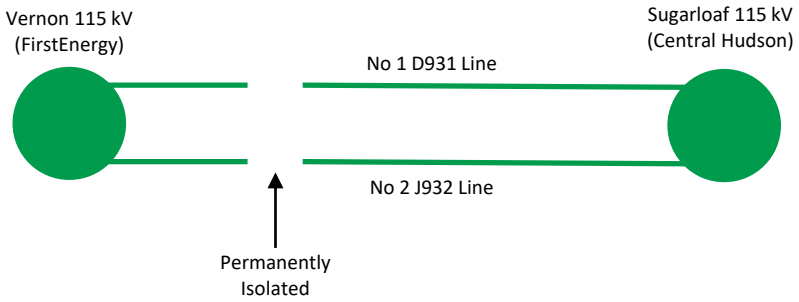
Selected Solution:

- Remove the normally open Interconnections between Vernon (FE) and Sugarloaf (Central Hudson) by removing the line jumper loops on Structure 161 for the 115 kV Sugarloaf CH –West Wharton No 1 D931 and No 2 J932 Lines.

Estimated Project Cost: $0.05M

Projected In-Service: 7/25/2023

Supplemental Project ID: s3421.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Kittatinny No. 4 230-34.5 kV Transformer

Need Number: JCPL-2024-014

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting – 06/04/2024
Need Meeting – 04/02/2024

Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption References:

System Performance Projects Global Factors

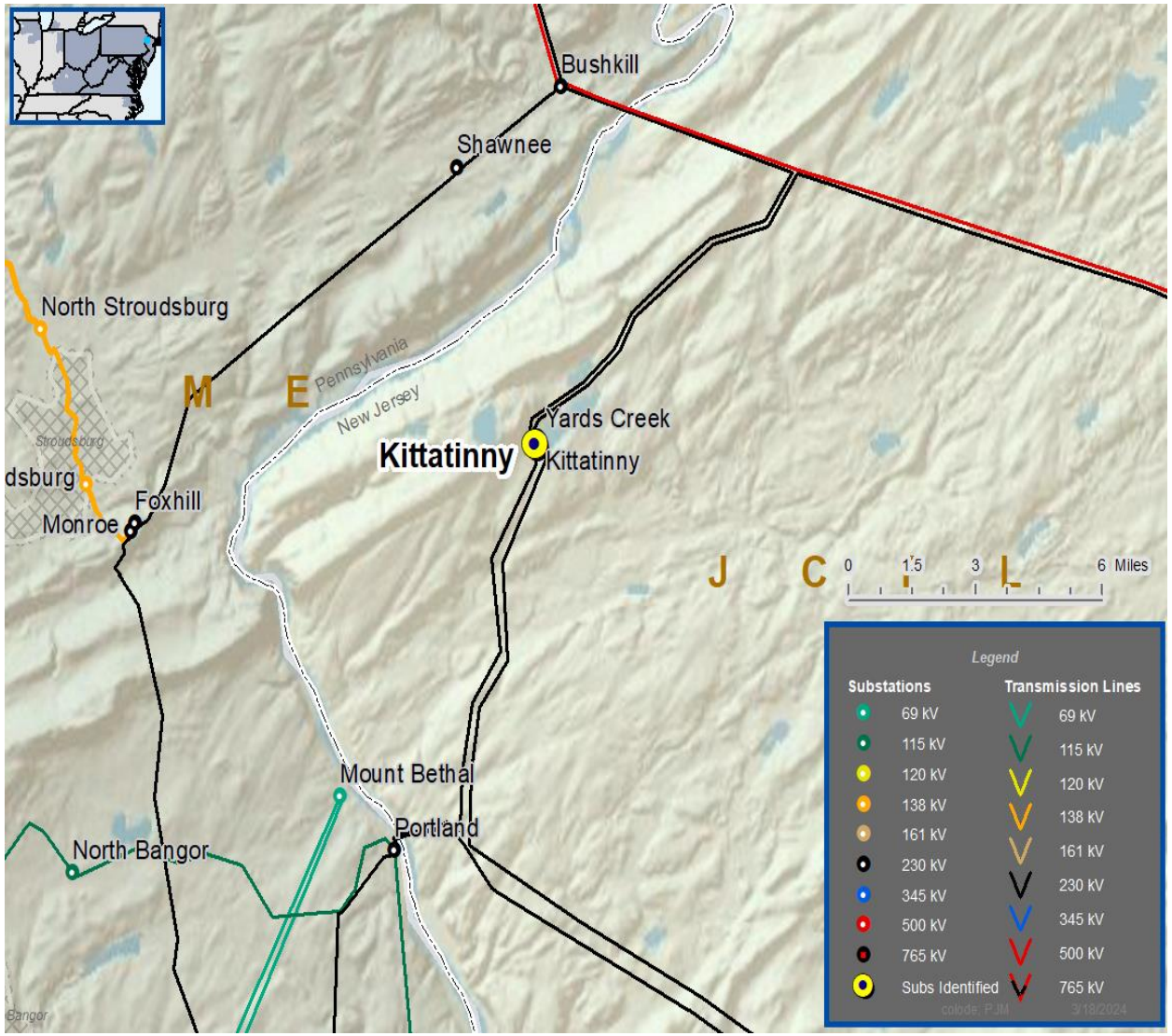
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 230-34.5 kV No. 4 Transformer at Kittatinny Substation was manufactured approximately 64 years ago and is reaching end of life.
- Most recent DGA results showed elevated ethane gas levels compared with IEEE Standards
- Transformer is constructed with Type U bushings
  - Type U bushing designs have been documented to dramatically increase the risk of bushing failures.
- Existing Transformer Ratings:
  - 92/99/121/128 MVA (SN/SSTE/WN/WSTE)



JCPL Transmission Zone M-3 Process
Kittatinny No. 4 230-34.5 kV Transformer

Need Number: JCPL-2024-014

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace the Kittatinny No. 4 230-34.5 kV Transformer with a 125 MVA unit.
- Replace the transformer relaying.

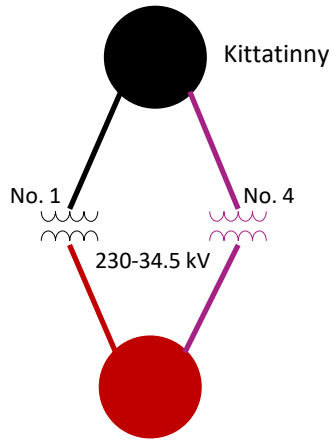
Transformer Ratings:

- Kittatinny 230-34.5 kV No. 4 Transformer:
  - Before Proposed Solution: 92 / 122 / 121 / 136 MVA (SN/SSTE/WN/WSTE)
  - After Proposed Solution: 162 / 169 / 209 / 214 MVA (SN/SSTE/WN/WSTE)

Estimated Project Cost: $5M

Projected In-Service: 5/1/2028

Supplemental Project ID: s3432.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Lakewood Gen No. 6 230-34.5 kV Transformer

Need Number: JCPL-2024-015

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting – 06/04/2024
Need Meeting – 04/02/2024

Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption References:

System Performance Projects Global Factors

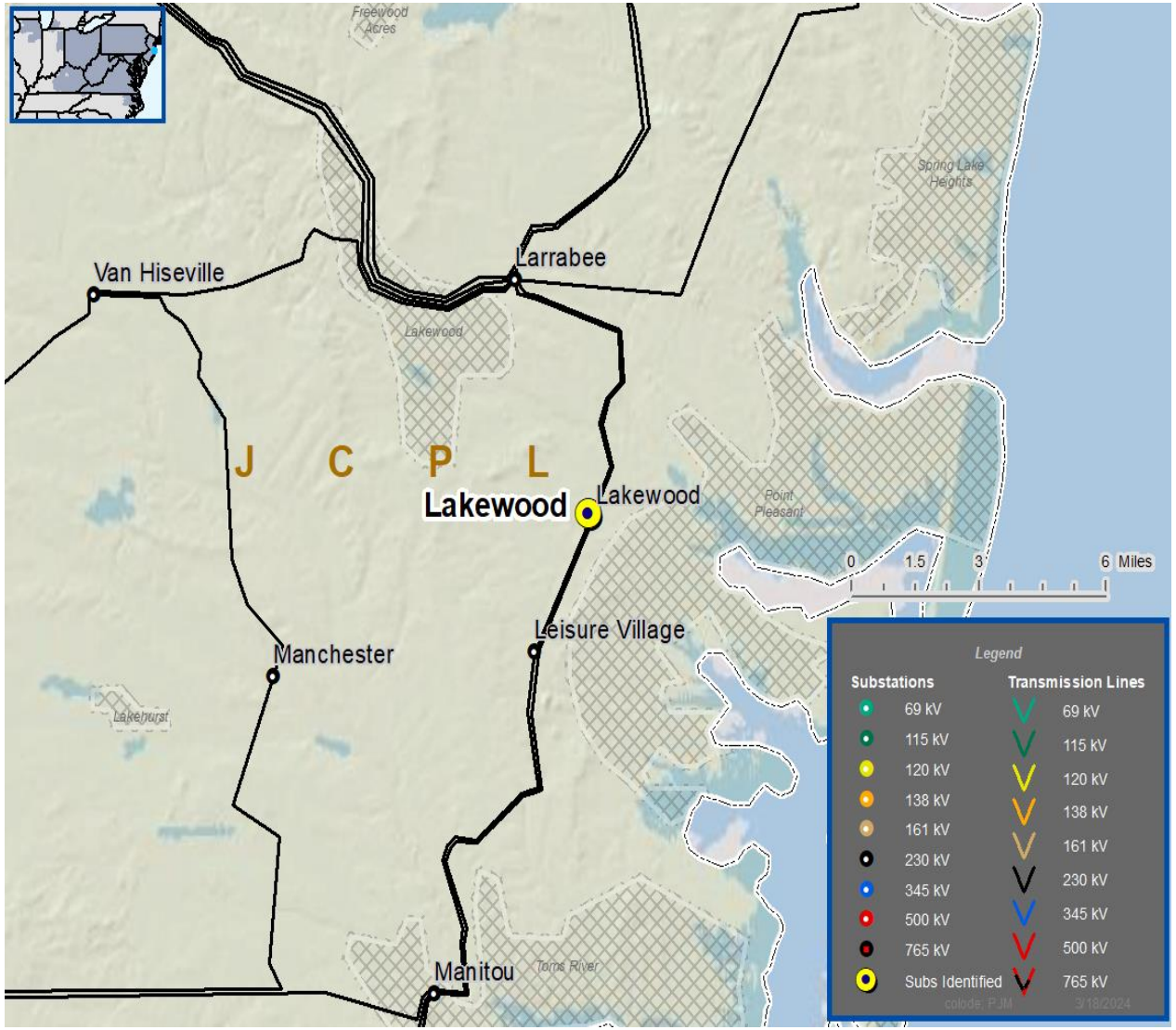
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 230-34.5 kV No. 6 Transformer at Lakewood Gen Substation was manufactured approximately 57 years ago and is reaching end of life.
- The transformer has exhibited leaking oil from the radiators, pumps and gauges.
  - Incidental oil leaks at end-of-life period increases risk of failure.
- Existing Transformer Ratings:
  - 105 / 129 / 132 / 144 MVA (SN/SSTE/WN/WSTE)



JCPL Transmission Zone M-3 Process
Lakewood Gen No. 6 230-34.5 kV Transformer

Need Number: JCPL-2024-015

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace the Lakewood Gen No. 6 230-34.5 kV Transformer with a 125 MVA unit.
- Replace the transformer relaying.

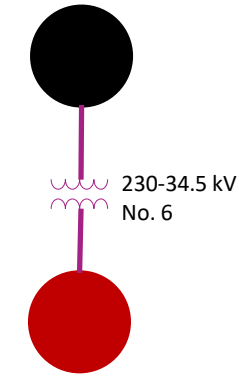
Transformer Ratings:

- Lakewood Gen 230-34.5 kV No. 6 Transformer:
  - Before Proposed Solution: 105 / 129 / 132 / 144 MVA (SN/SSTE/WN/WSTE)
  - After Proposed Solution: 162 / 169 / 209 / 214 MVA (SN/SSTE/WN/WSTE)

Estimated Project Cost: $6M

Projected In-Service: 05/24/2028

Supplemental Project ID: s3433.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Branchville – Franklin 34.5 kV Q745 Line Customer Connection

Need Number: JCPL-2022-004

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting 06/13/2024
Need Meeting 11/17/2022

Project Driver(s):

Customer Service

Specific Assumption Reference(s):

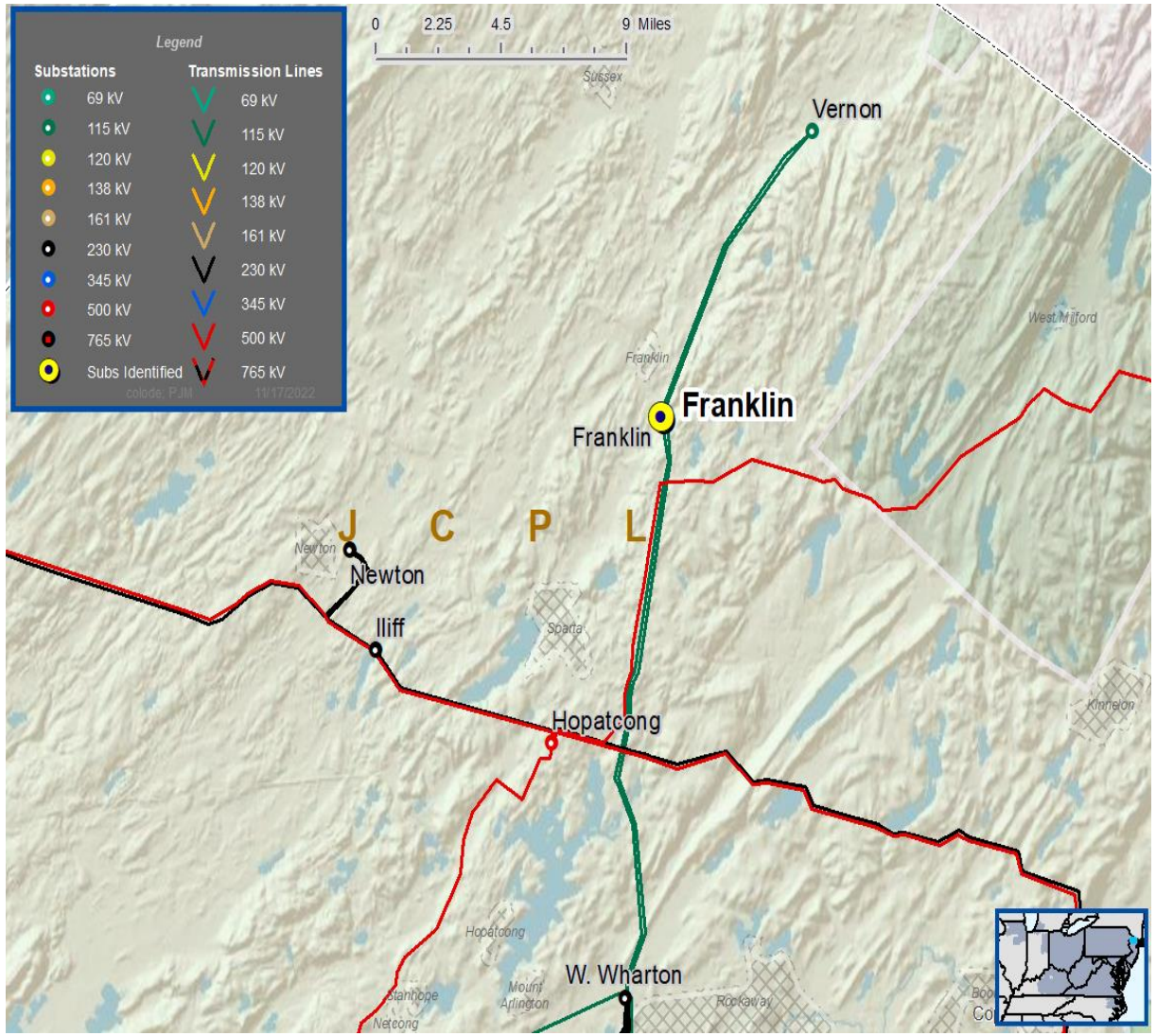
New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

New Customer Connection – A customer requested 34.5 kV service; anticipated load is 10 MVA near the Franklin 34.5 kV Substation.

Requested in-service date:

6/01/2023



JCPL Transmission Zone M-3 Process
Branchville – Franklin 34.5 kV Q745 Line Customer Connection

Need Number: JCPL-2022-004

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

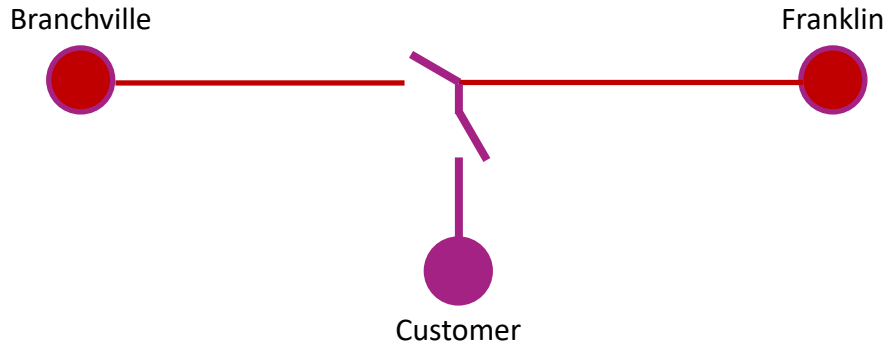
34.5 kV Line Tap

- Install one in-line and one tap-line SCADA controlled switches
- Construct an approximately 0.2-mile 34.5 kV line extension to the customer
- Review/modify relay settings on the Branchville – Franklin 34.5 kV Q745 Line

Estimated Project Cost: $0.8M

Projected In-Service: 06/02/2025

Supplemental Project ID: s3437.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Washington 34.5 kV Circuit Breakers

Need Number: JCPL-2024-030

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting – 07/18/2024

Need Meeting – 05/16/2024

Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption Reference:
System Performance Projects Global Factors

- System reliability/performance
- Substation/line equipment limits

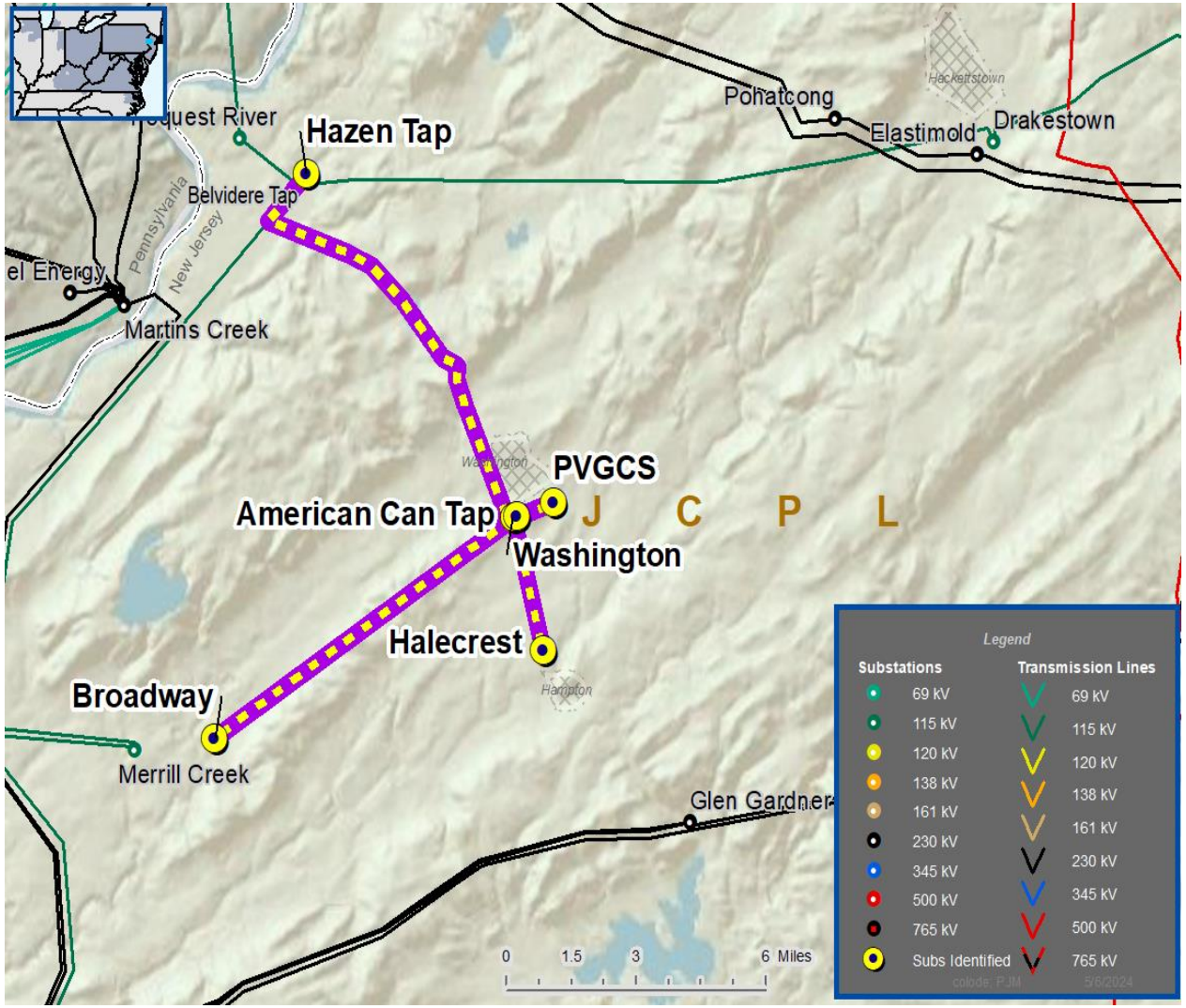
Substation Condition Rebuild/Replacement

- Age/condition of substation equipment
- Circuit breakers and other fault interrupting devices

Problem Statement:

- The existing Washington 34.5 kV breakers C705, P718, Q719, W23A, W23B, U723A and U723B are between 57-73 years old and are approaching end of life.
- Replacement components are difficult to source in quantity leading to non-standard repairs.
- The circuit breakers require frequent maintenance to preserve the integrity of the oil and replacement of parts on pneumatic systems.
- The line protection relaying is obsolete.
- The lines are currently limited by terminal equipment.

Continued on next slide…



JCPL Transmission Zone M-3 Process
Washington 34.5 kV Circuit Breakers

Need #	Transmission Line / Substation Locations	Existing Line Rating (MVA SN / SE / WN / WE)	Existing Conductor Rating (MVA SN / SE / WN / WE)
JCPL-2024-030	Washington – Broadway 34.5 kV W23 Line	39 / 48 / 45 / 56	39 / 48 / 45 / 56
	Washington – Halecrest 34.5 kV U723 Line	39 / 47 / 45 / 47	39 / 48 / 45 / 56
	Washington – American Can Tap 34.5 kV P718 Line	37 / 38 / 42 / 42	37 / 38 / 42 / 42
	Washington – PVGCS Tap 34.5 kV Q719 Line	44 / 47 / 47 / 47	44 / 53 / 50 / 63
	Washington – Hazen Tap 34.5 kV C705 Line	39 / 48 / 45 / 56	39 / 48 / 45 / 56

JCPL Transmission Zone M-3 Process
Washington 34.5 kV Circuit Breakers

Need Number: JCPL-2024-030

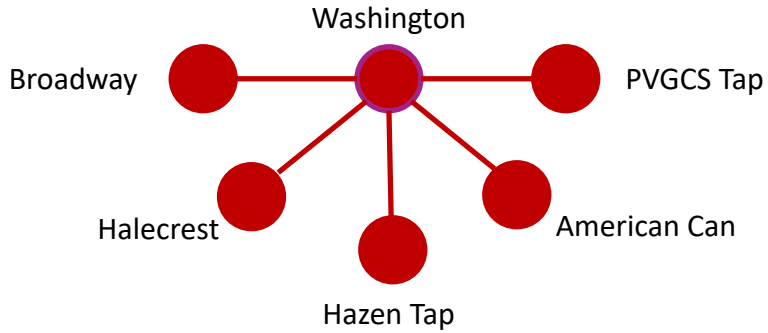
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace Washington 34.5 kV C705, P718, Q719, W23A, W23B, U723A and U723B circuit breakers
- Replace bus and line disconnect switches
  - Install line disconnect switches for C705 and Q719 breakers

Transmission Line Ratings:

- Washington – Broadway 34.5 kV W23 Line
  - Before Proposed Solution: 39 / 48 / 45 / 56 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 39 / 48 / 45 / 56 MVA (SN/SE/WN/WE)
- Washington – Halecrest 34.5 kV U723 Line
  - Before Proposed Solution: 39 / 47 / 45 / 47 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 39 / 48 / 45 / 56 MVA (SN/SE/WN/WE)
- Washington – American Can Tap 34.5 kV P718 Line
  - Before Proposed Solution: 37 / 38 / 42 / 42 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 37 / 38 / 42 / 42 MVA (SN/SE/WN/WE)
- Washington – PVGCS Tap 34.5 kV Q719 Line
  - Before Proposed Solution: 44 / 47 / 47 / 47 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 44 / 53 / 50 / 63 MVA (SN/SE/WN/WE)
- Washington – Hazen Tap 34.5 kV C705 Line
  - Before Proposed Solution: 39 / 48 / 45 / 56 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 39 / 48 / 45 / 56 MVA (SN/SE/WN/WE)



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

JCPL Transmission Zone M-3 Process
Washington 34.5 kV Circuit Breakers

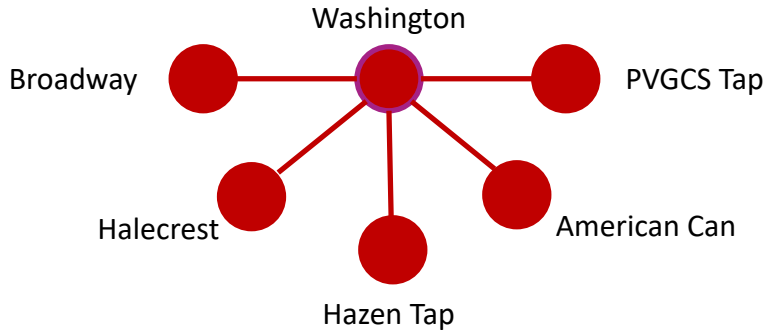
Need Number: JCPL-2024-030

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Estimated Project Cost: $5.4M

Projected In-Service: 08/27/2027

Supplemental Project ID: s3438.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

Questions?

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

6/24/2024 – V1 – Local Plan for s3232.1, s3233.1, s3234.1-s3251.1, s3299.1-.4, s3252.1, s3253.1, s3254.1, s3255.1, s3256.1, s3257.1, s3258.1, s3259.1, s3260.1, s3261.1, s3262.1, s3272.1, s3273.1, s3274.1, s3275.1, s3280.1, s3281.1, s3283.1, s3284.1, s3298.1, s3298.1, s3298.2, s3298.3, s3298.4, s3298.5, s3294.5, s3294.4, s3294.3

9/17/2024 – V2 – s3325.1 – s3329.1 and s3336.1 added to local plan
9/23/2024 – V3 – s3394.1, s3397.1-s3407.1, s3411.1-s3415.1, s3421.1, s3432.1, s3433.1, s3437.1, s3438.1