

2021 SAA Proposal to Support NJ OSW: Option 1a

General Information

Proposing entity name	Company specific
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	Company specific
PJM Proposal ID	17
Project title	2021 SAA Proposal to Support NJ OSW: Option 1a
Project description	Project proposal to build the necessary transmission to meet New Jersey's goal of facilitating the delivery of a total of 7,500 MW of offshore wind by 2035.
Email	Company specific
Project in-service date	06/2032
Tie-line impact	Yes
Interregional project	No
Is the proposer offering a binding cap on capital costs?	No
Additional benefits	Company specific

Project Components

1. O1029 (Oyster Creek-Manitou No.2) 230kV
2. Manitou Substation
3. Oyster Creek Substation
4. East Windsor-Smithburg 500kV Line
5. East Windsor-Smithburg 230kV Line

6. East Windsor Substation
7. T5020 Smithburg-Deans 500kV
8. K137 Windsor-Twin Rivers-Wyckoff Street 34.5kV
9. X752 Jerseyville-Smithburg 34.5kV
10. B158 Gravel Hill Smithburg 34.5kV
11. Smithburg 230 kV Substation
12. N1028 Manitou-Oyster Creek 230kV
13. Manitou Substation 230kV
14. C1017 (Clarksville-Windsor) 230kV
15. Windsor Substation 230 kV Substation
16. D1018 (Clarksville-Lawrence) 230kV
17. Hopewell-Lawrence 230kV
18. Smithburg Substation
19. Lake Nelson-Kilmer No. 1 230kV
20. Middlesex Substation 230kV
21. Oyster Creek Substation (2)

Transmission Line Upgrade Component

Component title	O1029 (Oyster Creek-Manitou No.2) 230kV
Project description	This information is considered confidential and proprietary
Impacted transmission line	Oyster Creek-Manitou No.2 230kV
Point A	Oyster Creek 230kV
Point B	Manitou 230kV
Point C	N/A
Terrain description	The line traverses an area that is a relatively flat coastal plain with deciduous forest.

Existing Line Physical Characteristics

Operating voltage	230 kV
Conductor size and type	1590 kcmil 45/7 ACSR shielded by 7#6 Alumoweld.
Hardware plan description	It is assumed that all hardware and insulators will be replaced.
Tower line characteristics	The existing line is primarily constructed on double circuit lattice towers shared with the N1028 (Oyster Creek-Manitou No.1) 230kV line. The existing conductor is 1590 kcmil 45/7 ACSR shielded by 7#6 Alumoweld.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1136.000000	1311.000000
Winter (MVA)	1139.000000	1379.000000
Conductor size and type	1590 kcmil 54/19 "Falcon" ACSS MA3	
Shield wire size and type	The Shield will be OPGW with minimally #7 Aluminum	
Rebuild line length	approximately 11.6 miles	
Rebuild portion description	Reconductor the O1029 (Oyster Creek-Manitou No.2) 230kV line from the Oyster Creek substation to the Manitou substation (approximately 11.6 miles) with 1590 kcmil 54/19 "Falcon" ACSS MA3 wire.	
Right of way	The reconducted line will use the existing corridor. Note the existing line crosses Interstate 95 (New Jersey Turnpike) between structures #141 & #142. Crossing permits will be required. The existing route crosses through Double Trouble State Park from Str. #96-#119 (approximately 4.3 miles).	
Construction responsibility	Company Specific	
Benefits/Comments		

Component Cost Details - In Current Year \$

Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$21,303,431.83
Component cost (in-service year)	\$24,376,273.65

Substation Upgrade Component

Component title	Manitou Substation
Project description	This information is considered confidential and proprietary
Substation name	Manitou 230 kV
Substation zone	JCPL
Substation upgrade scope	Replace (1) 230kV, 2000A circuit breaker with 3000A, 63kAIC breaker. Replace (1) 230kV MOAB with 3000A equipment. Replace (4) 230kV GOAB with 3000A equipment. Replace (1) 230kV wave trap, line tuner, and coax with 3000A equipment. Replace line drop and breaker leads with new conductor that meets or exceeds ratings of 1136/1311/1139/1379MVA SN/SSTE/WN/WSTE Replace existing 230kV Manitou line relaying with (1) line relaying panel containing (2) SEL-421, (1) SEL-501 BFT, and (1) SATEC meter

Transformer Information

None

New equipment description	Replace (1) 230kV, 2000A circuit breaker with 3000A, 63kAIC breaker. Replace (1) 230kV MOAB with 3000A equipment. Replace (4) 230kV GOAB with 3000A equipment. Replace (1) 230kV wave trap, line tuner, and coax with 3000A equipment. Replace line drop and breaker leads with new conductor that meets or exceeds ratings of 1136/1311/1139/1379MVA SN/SSTE/WN/WSTE Replace existing 230kV Manitou line relaying with (1) line relaying panel containing (2) SEL-421, (1) SEL-501 BFT, and (1) SATEC meter
Substation assumptions	Existing switch and wave trap structures can be reused. Existing DC and SCADA systems are adequate. Line relaying will be replaced as part of another project.
Real-estate description	This work will fit within the confines of the existing substation.
Construction responsibility	Company Specific
Benefits/Comments	
Component Cost Details - In Current Year \$	
Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$2,053,571.66
Component cost (in-service year)	\$2,235,976.61
Substation Upgrade Component	
Component title	Oyster Creek Substation
Project description	This information is considered confidential and proprietary

Substation name	Oyster Creek 230 kV
Substation zone	JCPL
Substation upgrade scope	Replace (1) 230kV MOAB with 3000A equipment. Replace (4) 230kV GOAB with 3000A equipment. Replace (1) 230kV wave trap, line tuner, and coax with 3000A equipment. Replace line drop and breaker leads with new conductor that meets or exceeds ratings of 1136/1311/1139/1379MVA SN/SSTE/WN/WSTE.

Transformer Information

None	
New equipment description	Replace (1) 230kV MOAB with 3000A equipment. Replace (4) 230kV GOAB with 3000A equipment. Replace (1) 230kV wave trap, line tuner, and coax with 3000A equipment. Replace line drop and breaker leads with new conductor that meets or exceeds ratings of 1136/1311/1139/1379MVA SN/SSTE/WN/WSTE.
Substation assumptions	Existing switch and wave trap structures can be reused. Existing AC and DC systems are adequate. Line relaying will be replaced as part of another project.
Real-estate description	All work will occur within the confines of the existing substation.
Construction responsibility	Company Specific
Benefits/Comments	

Component Cost Details - In Current Year \$

Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary

Total component cost \$1,449,719.67

Component cost (in-service year) \$1,585,580.51

Transmission Line Upgrade Component

Component title East Windsor-Smithburg 500kV Line

Project description Convert the six-wired East Windsor-Smithburg E2005 230kV line (9.0 mi.) to two circuits. One a 500kV line and the other a 230kV line.

Impacted transmission line East Windsor-Smithburg 230kV

Point A East Windsor

Point B Smithburg

Point C

Terrain description The line traverses an urbanized area that is a relatively flat coastal plain with some deciduous forest.

Existing Line Physical Characteristics

Operating voltage 230 kV

Conductor size and type 1590 kcmil 45/7 ACSR conductor shielded with two 7#6 Alumoweld shield wires

Hardware plan description The plan is for all new hardware and structures.

Tower line characteristics The existing E2005 line is six-wired with 1590 kcmil 45/7 ACSR conductor supported on steel monopoles for first three spans out of East Windsor Substation (span into East Windsor Sub is bundled wire from aerial imagery, see attached file for Str 140A) and then on lattice towers from structure 141 to the Smithburg Substation. The line is shielded with two 7#6 Alumoweld shield wires. In addition to the three steel monopole structures outside of East Windsor substation, the line is supported on 51 lattice towers including: • 42 Tangents • 5 Running Angles • 4 Deadends Between structures 144 and 145 the line passes under PSE&G's V5022 (Deans-East Windsor) 500kV line. The ROW for the existing line is 180' wide. The line generally runs east-west and the centerline of the existing structures is located 75' off the north ROW line. FE's K137 Windsor-Twin Rivers-Wyckoff Street 34.5kV line is located in the ROW from East Windsor substation to Structure 143.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	3914.000000	4792.000000
Winter (MVA)	4428.000000	5685.000000
Conductor size and type	Double Bundled 2493 kcmil 54/37 ACAR	
Shield wire size and type	48 Fiber OPGW	
Rebuild line length	~9.15 Circuit Miles	
Rebuild portion description	<p>Project involves rebuilding the E2005 (East Windsor-Smithburg) 230kV line between the East Windsor and Smithburg Substations as a double circuit 500kV over 230kV line on self-supporting steel monopole structures with drilled shaft foundations. The 500kV line will exit East Windsor from the east, and will be positioned to the north of the existing PSE&G V5022 Deans-East Windsor 500kV line. The new 500kV line will share two structures with the rebuilt 230kV line to Cedarville Road and then cross underneath the PSE&G V5022 Deans-East Windsor 500kV line before joining the 230kV line near structure #146. From that point, the rebuild will essentially be structure for structure until structure #129, at which point the 500kV line will cross over the E2005 (East Windsor-Smithburg) and M2039 (Englishtown-Smithburg) 230kV circuits and enter Smithburg from the northwest. See attached KMZ for preliminary line layout.</p>	
Right of way	Assume full siting review and application submittal to BPU. Some new ROW will be required to route line into substations.	
Construction responsibility	Company Specific	
Benefits/Comments		
Component Cost Details - In Current Year \$		
Engineering & design	This information is considered confidential and proprietary	
Permitting / routing / siting	This information is considered confidential and proprietary	

ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$104,206,476.94
Component cost (in-service year)	\$119,989,477.60

Transmission Line Upgrade Component

Component title	East Windsor-Smithburg 230kV Line
Project description	Convert the six-wired East Windsor-Smithburg E2005 230 kV line (9.0 mi.) to two circuits. One a 500kV line and the other a 230kV line.
Impacted transmission line	East Windsor-Smithburg 230kV Line
Point A	East Windsor 230kV
Point B	Smithburg 230kV
Point C	
Terrain description	The line traverses an urbanized area that is a relatively flat coastal plain with minimal deciduous forest.

Existing Line Physical Characteristics

Operating voltage	230 kV
Conductor size and type	six-wired with 1590 kcmil 45/7 ACSR conductor
Hardware plan description	All hardware is planned to be replaced.

Tower line characteristics

The existing E2005 line is six-wired with 1590 kcmil 45/7 ACSR conductor supported on steel monopoles for first three spans out of East Windsor Substation (span into East Windsor Sub is bundled wire from aerial imagery, see attached file for Str 140A) and then on lattice towers from structure 141 to the Smithburg Substation. The line is shielded with two 7#6 Alumoweld shield wires. In addition to the three steel monopole structures outside of East Windsor substation, the line is supported on 51 lattice towers including: • 42 Tangents • 5 Running Angles • 4 Deadends
 Between structures 144 and 145 the line passes under PSE&G’s V5022 (Deans-East Windsor) 500kV line. The ROW for the existing line is 180’ wide. The line generally runs east-west and the centerline of the existing structures is located 75’ off the north ROW line. FE’s K137 Windsor-Twin Rivers-Wyckoff Street 34.5kV line is located in the ROW from East Windsor substation to Structure 143.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1418.000000	1739.000000
Winter (MVA)	1610.000000	2062.000000
Conductor size and type	Double Bundled 1590 kcmil 45/7 ACSR “Lapwing”	
Shield wire size and type	SFPOC SFSJ-J-6641 48 Fiber OPGW	
Rebuild line length	9.15 miles	
Rebuild portion description	Project involves rebuilding the E2005 (East Windsor-Smithburg) 230kV line between the East Windsor and Smithburg Substations as a double circuit 500kV/230kV line on self-supporting steel monopole structures with drilled shaft foundations. For estimating purposes, it is assumed that the first three steel poles out of East Windsor (and the existing conductor between them) will be reused for the 230kV line. The 500kV line will exit East Windsor from the east, positioned to the north of the existing PSE&G V5022 Deans-East Windsor 500kV line. The new 500kV line will share two structures with the rebuilt 230kV line to Cedarville Road and then cross underneath the PSE&G V5022 Deans-East Windsor 500kV line before joining the 230kV line near structure #146. From that point, the rebuild will essentially be a structure for structure rebuild.	
Right of way	Assume full siting review and application submittal to BPU. Some new ROW will be required to route line into substations.	

Construction responsibility

Company Specific

Benefits/Comments

Component Cost Details - In Current Year \$

Engineering & design

This information is considered confidential and proprietary

Permitting / routing / siting

This information is considered confidential and proprietary

ROW / land acquisition

This information is considered confidential and proprietary

Materials & equipment

This information is considered confidential and proprietary

Construction & commissioning

This information is considered confidential and proprietary

Construction management

This information is considered confidential and proprietary

Overheads & miscellaneous costs

This information is considered confidential and proprietary

Contingency

This information is considered confidential and proprietary

Total component cost

\$37,802,086.84

Component cost (in-service year)

\$43,715,985.70

Substation Upgrade Component

Component title

East Windsor Substation

Project description

Convert the six-wired East Windsor-Smithburg E2005 230 kV line (9.0 mi.) to two circuits. One 500 kV line and the other a 230 kV line.

Substation name

East Windsor

Substation zone

JCPL

Substation upgrade scope

Install (1) prefabricated control building large enough for the 230kV and 500kV yard. Relocate (1) 500/230kV No. 1 TR Install (1) 500kV TR MOAB Install (1) 500kV dead-end structure for the New Freedom line terminal Install (1) 500kV dead-end structure for the Deans line terminal Install (1) 500kV dead-end structure for the Smithburg line terminal Install (2) 500kV circuit breaker Install (4) 500kV MOD switches Install (2) 500kV line MOAB disconnect switch Install (15) 500kV CVTs Install (9) 500kV surge arresters Install (4) 500kV line traps, line tuners, coax Install (1) 230kV transformer MOAB Install (1) lot bus, connectors, insulators, support structures as indicated on the attached layout Relay & Control Install (1) prewired relaying panel for Deans 500kV line Install (1) prewired relaying panel for New Freedom 500kV line Install (1) prewired relaying panel for the Smithburg 500kV line Install (2) transformer relaying panels for the No. 1 500/230kV TR Install (2) transformer relaying panels for the No. 2 500/230kV TR Install (10) breaker control panels Install (1) prewired relaying panel for F2006 230kV line Install (1) prewired relaying panel for J2009 230kV line Install (1) prewired relaying panel for the G2007 230kV line Install (1) carrier relaying panel for Deans 500kV line Install (1) carrier relaying panel for New Freedom 500kV line Install (1) SCADA RTU, HMI panel, RTAC 3530 and other standard communication equipment Additional Equipment to be Removed Remove (2) 500kV dead end structure Remove (1) control building Remove (1) lot of bus, insulators, connectors, support structures, foundations as indicated on the attached layout Remove (1) 500kV breaker Remove (2) 500kV disconnect switches

Transformer Information

None

New equipment description

Install (1) prefabricated control building large enough for the 230kV and 500kV yard. Relocate (1) 500/230kV No. 1 TR Install (1) 500kV TR MOAB Install (1) 500kV dead-end structure for the New Freedom line terminal Install (1) 500kV dead-end structure for the Deans line terminal Install (1) 500kV dead-end structure for the Smithburg line terminal Install (2) 500kV circuit breaker Install (4) 500kV MOD switches Install (2) 500kV line MOAB disconnect switch Install (15) 500kV CVTs Install (9) 500kV surge arresters Install (4) 500kV line traps, line tuners, coax Install (1) 230kV transformer MOAB Install (1) lot bus, connectors, insulators, support structures as indicated on the attached layout Relay & Control Install (1) prewired relaying panel for Deans 500kV line Install (1) prewired relaying panel for New Freedom 500kV line Install (1) prewired relaying panel for the Smithburg 500kV line Install (2) transformer relaying panels for the No. 1 500/230kV TR Install (2) transformer relaying panels for the No. 2 500/230kV TR Install (10) breaker control panels Install (1) prewired relaying panel for F2006 230kV line Install (1) prewired relaying panel for J2009 230kV line Install (1) prewired relaying panel for the G2007 230kV line Install (1) carrier relaying panel for Deans 500kV line Install (1) carrier relaying panel for New Freedom 500kV line Install (1) SCADA RTU, HMI panel, RTAC 3530 and other standard communication equipment

Substation assumptions

Coordination will be needed to modify/upgrade relays at Deans Substation (PSE&G) and New Freedom Substation (AEC).

Real-estate description

Substation will need expanded. FirstEnergy does not anticipate any difficulty acquiring additional property from third parties.

Construction responsibility

Company Specific

Benefits/Comments

Component Cost Details - In Current Year \$

Engineering & design

This information is considered confidential and proprietary

Permitting / routing / siting

This information is considered confidential and proprietary

ROW / land acquisition

This information is considered confidential and proprietary

Materials & equipment

This information is considered confidential and proprietary

Construction & commissioning

This information is considered confidential and proprietary

Construction management

This information is considered confidential and proprietary

Overheads & miscellaneous costs

This information is considered confidential and proprietary

Contingency

This information is considered confidential and proprietary

Total component cost

\$32,098,868.83

Component cost (in-service year)

\$36,364,059.70

Transmission Line Upgrade Component

Component title

T5020 Smithburg-Deans 500kV

Project description

Convert the six-wired East Windsor-Smithburg E2005 230 kV line (9.0 mi.) to two circuits. One 500 kV line and the other a 230 kV line.

Impacted transmission line

Smithburg-Deans 500kV

Point A

Smithburg 500kV

Point B

Deans 500kV

Point C

Terrain description

The line traverses an urbanized area that is relatively flat coastal plane with some deciduous forest.

Existing Line Physical Characteristics

Operating voltage	500 kV
Conductor size and type	Double Bundled 2493 kcmil 54/37 ACAR – 0.1 Circuit Miles
Hardware plan description	Relocate the existing T5020 (Smithburg-Deans) 500kV line to a new bay position at Smithburg substation to the north of its current location. Structure 1 will likely need to be replaced with a vertical steel monopole and an additional vertical steel monopole structure will be inserted between Structure 1 and the new substation bay.
Tower line characteristics	The existing line is primarily constructed on steel H-frame structures and steel 3-pole structures supported by caisson foundations. The existing conductor is double bundled 2493 kcmil 54/37 ACAR shielded by (2) 19#9 Alumoweld.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	3215.000000	3998.000000
Winter (MVA)	3890.000000	4334.000000
Conductor size and type	Double Bundled 2493 kcmil 54/37 ACAR – 0.1 Circuit Miles	
Shield wire size and type	Transfer existing wire and shield wire to new structure #1. (2) 19#9 Alumoweld.	
Rebuild line length	0.1 miles	
Rebuild portion description	Relocate the existing T5020 (Smithburg-Deans) 500kV line to a new bay position at Smithburg substation to the north of its current location. Structure 1 will likely need to be replaced with a vertical steel monopole and an additional vertical steel monopole structure will be inserted between Structure 1 and the new substation bay.	
Right of way	There will be minimal impact to the existing ROW	
Construction responsibility	Company Specific	

Benefits/Comments

Component Cost Details - In Current Year \$

Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$13,236,569.17
Component cost (in-service year)	\$15,302,656.21

Transmission Line Upgrade Component

Component title	K137 Windsor-Twin Rivers-Wyckoff Street 34.5kV
Project description	Convert the six-wired East Windsor-Smithburg E2005 230 kV line (9.0 mi.) to two circuits. One 500 kV line and the other a 230 kV line.
Impacted transmission line	Windsor-Twin Rivers-Wyckoff Street 34.5kV
Point A	Windsor 34.5kV
Point B	Twin Rivers 34.5kV
Point C	Wyckoff Street 34.5kV
Terrain description	The line traverses an urbanized area that is a relatively flat coastal plain with some deciduous forest.

Existing Line Physical Characteristics

Operating voltage	34.5 kV
Conductor size and type	397.5 KCMIL 18/1 ACSR
Hardware plan description	Structures Removed 3 – 34.5kV Deadends 6 – 34.5kV Tangents Insulators Removed 18 – 34.5kV Porcelain Deadends 18 – 34.5kV Porcelain Horizontal Post Wire Removed Approximately 0.3 circuit miles of 397.5 KCMIL 18/1 ACSR Approximately 0.3 circuit miles of unknown shield wire.
Tower line characteristics	Existing Conditions The existing line is constructed on single wood pole structures with distribution underbuild. The existing conductor is 397.5 KCMIL 18/1 ACSR and shield wire is unknown.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	34.500000	34.500000
	Normal ratings	Emergency ratings
Summer (MVA)	40.000000	50.000000
Winter (MVA)	40.000000	50.000000
Conductor size and type	2 cables per phase, 1250 kcmil copper Underground Cable	
Shield wire size and type	N/A	
Rebuild line length	1650 ft	
Rebuild portion description	Convert the existing overhead K137 Windsor-Twin Rivers-Wyckoff Street 34.5kV line to an underground line from Cedarville Road (structure #80) to structure #88 near East Windsor Substation (approximately 1650') to accommodate the new East Windsor-Smithburg 500kV over 230kV line.	
Right of way	Existing centerline along Cedarville Road appears to be located in Road ROW. may require procurement of new ROW.	
Construction responsibility	Company Specific	
Benefits/Comments		

Component Cost Details - In Current Year \$

Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$6,198,104.54
Component cost (in-service year)	\$7,140,808.11

Transmission Line Upgrade Component

Component title	X752 Jerseyville-Smithburg 34.5kV
Project description	Convert the six-wired East Windsor-Smithburg E2005 230 kV line (9.0 mi.) to two circuits. One 500 kV line and the other a 230 kV line.
Impacted transmission line	Jerseyville-Smithburg 34.5kV
Point A	Jerseyville 34.5kV
Point B	Smithburg 34.5kV
Point C	
Terrain description	The line traverses an urbanized area that is a relatively flat coastal plain with some deciduous forest.

Existing Line Physical Characteristics

Operating voltage	34.5 kV
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Conductor size and type	795 KCMIL ACSR 26/7
Hardware plan description	Structures Removed 1 – 34.5kV Deadend (#606B) 2 – 34.5kV Double Circuit Tangents (#605 and #605-1) 1 – 34.5kV Strain Structure (#604B) 1 – 34.5kV Tangent Structure (#603B) 1 – 34.5kV UG Riser Structure (#602B) Insulators Removed 15 – 34.5kV Porcelain Deadends 12 – 34.5kV Porcelain Vertical Posts 2 – 34.5kV Porcelain Horizontal Post 2 – 34.5kV Porcelain Suspensions Wire Removed Approximately 0.2 circuit miles of 795 KCMIL ACSR 26/7. Approximately 0.2 circuit miles of unknown shield wire.
Tower line characteristics	The existing line is primarily constructed on single wood pole structures, sometimes shared with the B158 Gravel Hill-Smithburg 34.5kV line. The overhead line ends at UG Riser Str. #602B, at which point the line goes underground into Smithburg Substation.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	34.500000	34.500000
	Normal ratings	Emergency ratings
Summer (MVA)	67.000000	85.000000
Winter (MVA)	84.000000	98.000000
Conductor size and type	2 cables per phase, 1250 kcmil copper underground	
Shield wire size and type	n/a	
Rebuild line length	1050 ft	
Rebuild portion description	Convert the existing overhead X752 Jerseyville-Smithburg 34.5kV Line to an underground line from Monmouth Road to Smithburg Substation (approximately 1050') to accommodate the new East Windsor-Smithburg 500kV over 230 kV line.	
Right of way	Existing centerline along Monmouth Road appears to be located in Road ROW. This may require new ROW.	
Construction responsibility	Company Specific	
Benefits/Comments		

Component Cost Details - In Current Year \$

Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$4,584,418.89
Component cost (in-service year)	\$5,265,461.01

Transmission Line Upgrade Component

Component title	B158 Gravel Hill Smithburg 34.5kV
Project description	Convert the six-wired East Windsor-Smithburg E2005 230 kV line (9.0 mi.) to two circuits. One 500 kV line and the other a 230 kV line.
Impacted transmission line	Gravel Hill - Smithburg 34.5kV
Point A	Smithburg 34.5kV
Point B	Gravel Hill 34.5kV
Point C	
Terrain description	The line traverses an urbanized area that is relatively flat coastal plane with some deciduous forest.

Existing Line Physical Characteristics

Operating voltage	34.5 kV
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Conductor size and type	795 KCMIL ACSR 26/7
Hardware plan description	Structures Removed 1 – 34.5kV Deadend (#606-A) 2 – 34.5kV Double Circuit Tangents (#605 and #605-1 included in other estimate 1 – 34.5kV Strain Structure (#604-A) 1 – 34.5kV Tangent Structure (#603-A) 1 – 34.5kV UG Riser Structure (#X602-A) Insulators Removed 15 – 34.5kV Porcelain Deadends 12 – 34.5kV Porcelain Vertical Posts 2 – 34.5kV Porcelain Horizontal Post 2 – 34.5kV Porcelain Suspensions Wire Removed Approximately 0.2 circuit miles of 795 KCMIL ACSR 26/7 Approximately 0.2 circuit miles of unknown shield wire.
Tower line characteristics	Existing Conditions The existing line is primarily constructed on single wood pole structures, sometimes shared with the X752 Jerseyville-Smithburg 34.5kV Line. The overhead line ends at UG Riser Str. #X602-A, at which point the line goes underground into Smithburg Substation.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	34.500000	34.500000
	Normal ratings	Emergency ratings
Summer (MVA)	44.000000	57.000000
Winter (MVA)	44.000000	57.000000
Conductor size and type	2 cables per phase, 1250 kcmil copper	
Shield wire size and type	N/A	
Rebuild line length	1050 ft	
Rebuild portion description	Convert the existing overhead B158 Gravel Hill-Smithburg 34.5kV Line to an underground line from Monmouth Road to Smithburg Substation (approximately 1050') to accommodate the new East Windsor-Smithburg 500kV over 230kV line	
Right of way	Existing centerline along Monmouth Road appears to be located in Road ROW. This may require procurement of new ROW.	
Construction responsibility	Company Specific	
Benefits/Comments		

Component Cost Details - In Current Year \$

Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$4,234,939.66
Component cost (in-service year)	\$4,877,621.60

Substation Upgrade Component

Component title	Smithburg 230 kV Substation
Project description	Convert the six-wired East Windsor-Smithburg E2005 230 kV line (9.0 mi.) to two circuits. One a 500 kV line and the other a 230 kV line.
Substation name	Smithburg
Substation zone	JCPL
Substation upgrade scope	Install (1) 500kV circuit breaker Install (2) 500kV breaker disconnect switches Install (1) 500kV motor operated line disconnect switch Install (1) 500kV A-Frame dead end structure Install (3) 500kV CVTs Install (3) 500kV surge arresters Install (1) lot of bus, fittings, insulators, and bus supports as indicated on the attached layout Relay & Control Install (1) pre-fabricated line relaying panel for the East Windsor line terminal. Install (1) pre-fabricated breaker failure relaying panel. Modify Relay Settings for East Windsor 230kV line.

Transformer Information

None	
New equipment description	Install (1) 500kV circuit breaker Install (2) 500kV breaker disconnect switches Install (1) 500kV motor operated line disconnect switch Install (1) 500kV A-Frame dead end structure Install (3) 500kV CVTs Install (3) 500kV surge arresters Install (1) lot of bus, fittings, insulators, and bus supports as indicated on the attached layout Relay & Control Install (1) pre-fabricated line relaying panel for the East Windsor line terminal. Install (1) pre-fabricated breaker failure relaying panel. Modify Relay Settings for East Windsor 230kV line.
Substation assumptions	Standard relaying requirements will be needed.
Real-estate description	The anticipated substation expansion resides on JCP&L property and property procurement will not be required.
Construction responsibility	Company Specific
Benefits/Comments	
Component Cost Details - In Current Year \$	
Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$4,118,301.26
Component cost (in-service year)	\$4,707,965.25
Transmission Line Upgrade Component	
Component title	N1028 Manitou-Oyster Creek 230kV

Project description	This information is considered confidential and proprietary
Impacted transmission line	Oyster Creek - Manitou No.1 230kV
Point A	Oyster Creek 230kV
Point B	Manitou 230kV
Point C	
Terrain description	The line traverses an urbanized area that is a relatively flat coastal plain with some deciduous forest.
Existing Line Physical Characteristics	
Operating voltage	230 kV
Conductor size and type	1590 kcmil 45/7 ACSR
Hardware plan description	It is assumed that all hardware and insulators will be replaced.
Tower line characteristics	The existing line is constructed on double circuit lattice towers shared with the O1029 (Oyster Creek-Manitou No.2) 230kV line. The existing conductor is 1590 kcmil 45/7 ACSR shielded by (1) OPGW AFL AC-71/571.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1136.000000	1311.000000
Winter (MVA)	1139.000000	1379.000000
Conductor size and type	1590 kcmil 54/19 "Falcon" ACSS	
Shield wire size and type	(1) OPGW AFL AC-71/571	
Rebuild line length	11.6 miles	

Rebuild portion description	Reconductor the N1028 (Oyster Creek-Manitou No.1) 230kV line from the Oyster Creek substation to the Manitou substation (approximately 11.6 miles) with 1590 kcmil 54/19 "Falcon" ACSS MA3 wire. All insulator assemblies on the line are assumed to be replaced. New assemblies will require high-temp clamps. Insulator assembly quantities are as follows: Suspension: (120) assemblies (TR-020350) Deadend/Strain: (114) assemblies (TR-020370) Six (6) 230kV substation deadend assemblies Approximately 11.6 circuit miles of 1590 kcmil 54/19 "Falcon" ACSS MA3 Six (6) engineered steel strain plates to convert the hardware configurations on lattice tower structures #99 and #100. It is assumed that each strain plate will use 50 lbs of steel at \$3/lb including freight. Many sections exceed the 60 deg 18% PJM limit for dampers, so it is assumed that dampers will need to be installed along the length of the line. It is assumed there will be 2 dampers per wire per high tension span The number and type of tower reinforcements will heavily depend on which load cases the tower must be able to withstand.
Right of way	Assume full application submittal to BPU. The existing line crosses Interstate 95 (New Jersey Turnpike) between structures #141 & #142. Crossing permits will be required. The existing route crosses through Double Trouble State Park from Str. #96-#119 (approximately 4.3 miles). Assume all work will be performed within existing ROW and no new ROW will be required. It is assumed all other lines within the shared ROW, including the mutual O1029 (Oyster Creek-Manitou No.2) 230kV line, are to remain in service.
Construction responsibility	Company Specific
Benefits/Comments	
Component Cost Details - In Current Year \$	
Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$16,658,958.18

Component cost (in-service year) \$19,104,227.00

Substation Upgrade Component

Component title Manitou Substation 230kV

Project description This information is considered confidential and proprietary

Substation name Manitou 230kV

Substation zone JCPL

Substation upgrade scope Replace (2) 230kV, 2000A circuit breakers with 3000A, 50kAIC breakers Replace (1) 230kV MOAB with 3000A equipment Replace (4) 230kV GOAB with 3000A equipment Replace (1) 230kV wave trap, line tuner, and coax with 3000A equipment Replace line drop and breaker leads with new conductor that meets or exceeds ratings of 1136/1311/1139/1379MVA SN/SSTE/WN/WSTE Relay & Control Replace existing 230kV Oyster Creek No. 1 line relaying with (1) line relaying panel containing (2) SEL-421, (1) SEL-501 BFT, and (1) SATEC meter

Transformer Information

None

New equipment description Replace (2) 230kV, 2000A circuit breakers with 3000A, 50kAIC breakers Replace (1) 230kV MOAB with 3000A equipment Replace (4) 230kV GOAB with 3000A equipment Replace (1) 230kV wave trap, line tuner, and coax with 3000A equipment Replace line drop and breaker leads with new conductor that meets or exceeds ratings of 1136/1311/1139/1379MVA SN/SSTE/WN/WSTE Relay & Control Replace existing 230kV Oyster Creek No. 1 line relaying with (1) line relaying panel containing (2) SEL-421, (1) SEL-501 BFT, and (1) SATEC meter

Substation assumptions Existing switch and wave trap structures can be reused Existing DC and SCADA systems are adequate Control building has adequate space for new panel

Real-estate description All work can be completed within the confines of the existing substation.

Construction responsibility Company Specific

Benefits/Comments

Component Cost Details - In Current Year \$

Engineering & design This information is considered confidential and proprietary

Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$2,130,486.08
Component cost (in-service year)	\$2,442,358.06

Transmission Line Upgrade Component

Component title	C1017 (Clarksville-Windsor) 230kV
Project description	This information is considered confidential and proprietary
Impacted transmission line	Clarksville-Windsor 230kV Line
Point A	Windsor 230kV
Point B	Clarksville 230kV
Point C	
Terrain description	The line traverses an urbanized area that is a relatively flat coastal plain with some deciduous forest.

Existing Line Physical Characteristics

Operating voltage	230 kV
Conductor size and type	1590 kcmil 45/7 ACSR conductor
Hardware plan description	(3) 230kV porcelain deadend insulator assemblies (3) 230kV substation deadend assemblies Approximately (0.1) circuit miles of 1590 kcmil 45/7 ACSR conductor

Tower line characteristics

The existing line is constructed on a double circuit steel monopole structure at #126. The C1017 (Clarksville-Windsor) 230kV line occupies both circuit positions in the back span as the existing configuration is 6-wired with 1590 kcmil 45/7 ACSR conductor with the western side being NIS . The ahead span to Windsor Substation is single 1590 kcmil 45/7 ACSR conductor. The existing line is shielded by (2) 7#6 Alumoweld wires in the back span of #126 and (1) 7#6 Alumoweld in the ahead span of #126 to Windsor Substation.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1140.000000	1387.000000
Winter (MVA)	1348.000000	1529.000000
Conductor size and type	Double Bundled 1590 kcmil 45/7 ACSR	
Shield wire size and type	No change - (2) 7#6 Alumoweld wires in the back span of #126 and (1) 7#6 Alumoweld in the ahead span of #126 to Windsor Substation.	
Rebuild line length	0.1 miles	
Rebuild portion description	Reconductor one span of the C1017 (Clarksville-Windsor) 230kV line from structure #126 to Windsor Substation with double bundled 1590 ACSR conductor, approximately (0.1) mile.	
Right of way	Existing rights pre-date any Green Acres restrictions in the corridor. Assume minimal ecological impact. The span crosses State Highway 33/US Route 130. Crossing permits may be required. Assume all work will be performed within existing ROW and no new ROW will be required.	
Construction responsibility	Company Specific	
Benefits/Comments		
Component Cost Details - In Current Year \$		
Engineering & design	This information is considered confidential and proprietary	
Permitting / routing / siting	This information is considered confidential and proprietary	

ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$1,717,934.86
Component cost (in-service year)	\$2,245,881.40

Substation Upgrade Component

Component title	Windsor Substation 230 kV Substation
Project description	This information is considered confidential and proprietary
Substation name	Windsor
Substation zone	JCPL
Substation upgrade scope	Replace (1) 230kV H-frame deadend structure Relocate (2) 230kV disconnect switches to new deadend Relocated (3) 230kV surge arresters to new deadend Relocate (2) 230kV CVTs to the new deadend Replace (1) wavetrapped/CVT combo with 3000A wavetrapped/CVT combo Mounted on H-frame Replace (1) 230kV line tuner Replace line drops, breakers leads, and 2.5" AL bus A-frames with new conductor that meets or exceeds ratings of 1140/1387/1348/1529MVA SN/SSTE/WN/WSTE Relay & Control Update relay settings for 230kV Clarksville line

Transformer Information

None	
New equipment description	Replace (1) 230kV H-frame deadend structure Relocate (2) 230kV disconnect switches to new deadend Relocated (3) 230kV surge arresters to new deadend Relocate (2) 230kV CVTs to the new deadend Replace (1) wavetrapped/CVT combo with 3000A wavetrapped/CVT combo Mounted on H-frame Replace (1) 230kV line tuner Replace line drops, breakers leads, and 2.5" AL bus A-frames with new conductor that meets or exceeds ratings of 1140/1387/1348/1529MVA SN/SSTE/WN/WSTE Relay & Control Update relay settings for 230kV Clarksville line

Substation assumptions	None
Real-estate description	The upgrade will fit within the confines of the existing substation.
Construction responsibility	Company Specific
Benefits/Comments	

Component Cost Details - In Current Year \$

Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$1,581,786.64
Component cost (in-service year)	\$2,096,549.93

Transmission Line Upgrade Component

Component title	D1018 (Clarksville-Lawrence) 230kV
Project description	This information is considered confidential and proprietary
Impacted transmission line	Clarksville-Lawrence 230kV
Point A	Clarksville 230kV
Point B	Lawrence 230kV
Point C	

Terrain description The line traverses an urbanized area that is a relatively flat coastal plain with minimal deciduous forest.

Existing Line Physical Characteristics

Operating voltage 230 kV

Conductor size and type single 1590 kcmil 45/7 ACSR shielded by DNO-11143 OPGW

Hardware plan description All towers and hardware to be replaced in the 0.8 miles work area

Tower line characteristics Removals (2) 230kV double circuit lattice tower deadend structures (2) 230kV double circuit lattice tower tangent structures (1) 230kV double circuit 3-way lattice tower structure (3) 230kV substation deadend assemblies Approximately (0.8) circuit miles of 1590 kcmil 45/7 ACSR

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1140.000000	1387.000000
Winter (MVA)	1342.000000	1495.000000
Conductor size and type	double bundled 1590 kcmil 45/7 ACSR	
Shield wire size and type	Transfer the existing shield wire/OPGW onto the new structures	
Rebuild line length	0.8 miles	

Rebuild portion description	<p>Description of Work Rebuild approximately 0.8 miles of the D1018 (Clarksville-Lawrence) 230kV Line between Lawrence Substation (PSEG) and Structure #63 with double bundled 1590 kcmil 45/7 ACSR. Installs (1) 230kV double circuit custom steel monopole structure (TR-230375) on a drilled shaft foundation. Existing structure #63 is a 3-way tower where the Hopewell-Lawrence 230kV Line and the D1018 (Clarksville-Lawrence) 230kV Line come in from the southwest with single wires and split in two different directions, the Hopewell-Lawrence 230kV Line is six-wired going to the northwest and the D1018 (Clarksville-Lawrence) 230kV Line is six-wired going to the southeast. The new steel pole will be designed for bundled conductors to the southwest. For constructability reasons, it is assumed the circuits on tower #63 will be separated and the tower will be replaced with (2) single circuit steel monopoles on drilled shaft foundations. This structure will include the installation of (9) porcelain deadend assemblies for the D1018 circuit. (2) 230kV double circuit deadend steel monopole structures (TR-230360) on drilled shaft foundations (2) 230kV double circuit tangent steel monopole structures (TR-230370) on drilled shaft foundations (3) 230kV substation deadend assemblies. Approximately (0.8) circuit miles of double bundled 1590 kcmil 45/7 ACSR "Lapwing". Transfer the existing shield wire/OPGW onto the new structures. The OPGW may need an outage to accommodate the new pole locations and heights. Per the PnPs, there are existing OPGW splice locations at #63, #64, and at Lawrence Substation.</p>
Right of way	<p>Assume full application submittal to BPU. Existing rights pre-date any Green Acres restrictions in the corridor. Assume minimal ecological impact. The line crosses Interstate 95 one time. Crossing permits will be required. Assume all work will be performed within existing ROW and no new ROW will be required.</p>
Construction responsibility	<p>Company Specific</p>
Benefits/Comments	
Component Cost Details - In Current Year \$	
Engineering & design	<p>This information is considered confidential and proprietary</p>
Permitting / routing / siting	<p>This information is considered confidential and proprietary</p>
ROW / land acquisition	<p>This information is considered confidential and proprietary</p>
Materials & equipment	<p>This information is considered confidential and proprietary</p>
Construction & commissioning	<p>This information is considered confidential and proprietary</p>
Construction management	<p>This information is considered confidential and proprietary</p>
Overheads & miscellaneous costs	<p>This information is considered confidential and proprietary</p>

Contingency	This information is considered confidential and proprietary
Total component cost	\$11,448,626.73
Component cost (in-service year)	\$15,029,295.38

Transmission Line Upgrade Component

Component title	Hopewell-Lawrence 230kV
Project description	This information is considered confidential and proprietary
Impacted transmission line	Rebuild approximately 0.8 miles of the D1018 (Clarksville-Lawrence) 230kV line between Lawrence Substation (PSEG) and Structure #63 with double bundled 1590 kcmil 45/7 ACSR.
Point A	Hopewell230kV
Point B	Lawrence 230kV
Point C	
Terrain description	The line traverses an urbanized area that is a relatively flat coastal plain with some deciduous forest.

Existing Line Physical Characteristics

Operating voltage	230 kV
Conductor size and type	single 1590 kcmil 45/7 ACSR
Hardware plan description	Removals (6) 230kV porcelain suspension insulator assemblies. (24) 230kV porcelain deadend insulator assemblies. The existing conductor is single 1590 kcmil 45/7 ACSR shielded by DNO 11143 OPGW. OPGW will be reused as will be the existing conductor.
Tower line characteristics	This portion of the existing line is constructed on double circuit lattice towers shared with the D1018 (Clarksville-Lawrence) 230kV line.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000

	Normal ratings	Emergency ratings
Summer (MVA)	709.000000	869.000000
Winter (MVA)	805.000000	1031.000000
Conductor size and type	1590 kcmil 45/7 "Lapwing" ACSR wire	
Shield wire size and type	To be reused - DNO 11143 OPGW.	
Rebuild line length	0.8 miles	
Rebuild portion description	Installs (1) 230kV double circuit custom steel monopole structure (TR-230375) on a drilled shaft foundation. Existing structure #63 is a 3-way tower where the Hopewell-Lawrence 230kV Line and the D1018 (Clarksville-Lawrence) 230kV Line come in from the southwest with single wires and split in two different directions, the Hopewell-Lawrence 230kV Line is six-wired going to the northwest and the D1018 (Clarksville-Lawrence) 230kV Line is six-wired going to the southeast. The new steel pole will be designed for bundled conductors to the southwest. For constructability reasons, it is assumed the circuits on tower #63 will be separated and the tower will be replaced with (2) single circuit steel monopoles on drilled shaft foundations. This structure will include the installation of (9) porcelain deadend assemblies for the Hopewell-Lawrence 230kV circuit. (6) 230kV porcelain suspension insulator assemblies. (24) 230kV porcelain deadend insulator assemblies. Transfer the existing conductor and shield wire onto the new structures.	
Right of way	Assume full application submittal to BPU. Existing rights pre-date any Green Acres restrictions in the corridor. Assume minimal ecological impact. The line crosses Interstate 95 one time. Crossing permits will be required. Assume all work will be performed within existing ROW and no new ROW will be required.	
Construction responsibility	Company Specific	
Benefits/Comments		
Component Cost Details - In Current Year \$		
Engineering & design	This information is considered confidential and proprietary	
Permitting / routing / siting	This information is considered confidential and proprietary	
ROW / land acquisition	This information is considered confidential and proprietary	
Materials & equipment	This information is considered confidential and proprietary	

Construction & commissioning	This information is considered confidential and proprietary
Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$3,133,122.96
Component cost (in-service year)	\$4,110,810.90

Substation Upgrade Component

Component title	Smithburg Substation
Project description	Install 500 kV breaker position for new transformer Install a new 500/230 kV transformer. Add a new string on the 230 kV breaker-and-a-half station at Smithburg Substation for a position for the new 500/230 kV transformer
Substation name	Smithburg
Substation zone	JCPL
Substation upgrade scope	Install (1) 500/230kV transformer to match existing TR4 500kV Yard Install (1) 500kV circuit breakers Install (2) 500kV breaker disconnect switches Install (1) 500kV motor operated disconnect switches Install (3) 500kV CVTs Install (3) 500kV surge arresters Install (1) lot of open air bus, fittings, insulators, and bus supports as indicated on the attached layout 230kV Yard Install (2) 230kV circuit breakers Install (4) 230kV breaker disconnect switches Install (1) 230kV motor operated disconnect switches Install (3) 230kV CVTs Install (3) 230kV surge arresters Install (1) lot of open air bus, fittings, insulators, and bus supports as indicated on the attached layout Relay & Control Install (2) pre-fabricated transformer relaying panels for new 500/230kV transformer. Install (3) pre-fabricated breaker failure relaying panels.

Transformer Information

	Name	Capacity (MVA)
Transformer	No. 3 500/230 TR	914/1152/1348 SN/STE/SLD 1156/1283/1538 WN/WTE/WLD
	High Side	Low Side Tertiary

Voltage (kV)	500	230
New equipment description	Below Grade Foundations, conduit, and grounding for new equipment as indicated on the attached layout. Oil containment for new transformer. Above Grade Install (1) 500/230kV transformer to match existing TR4 500kV Yard Install (1) 500kV circuit breakers Install (2) 500kV breaker disconnect switches Install (1) 500kV motor operated disconnect switches Install (3) 500kV CVTs Install (3) 500kV surge arresters Install (1) lot of open air bus, fittings, insulators, and bus supports as indicated on the attached layout 230kV Yard Install (2) 230kV circuit breakers Install (4) 230kV breaker disconnect switches Install (1) 230kV motor operated disconnect switches Install (3) 230kV CVTs Install (3) 230kV surge arresters Install (1) lot of open air bus, fittings, insulators, and bus supports as indicated on the attached layout Relay & Control Install (2) pre-fabricated transformer relaying panels for new 500/230kV transformer. Install (3) pre-fabricated breaker failure relaying panels.	
Substation assumptions	None	
Real-estate description	The proposed substation expansion will require the fence to be moved. The additional property required is already owned by Jersey Central Power & Light.	
Construction responsibility	Company Specific	
Benefits/Comments		
Component Cost Details - In Current Year \$		
Engineering & design	This information is considered confidential and proprietary	
Permitting / routing / siting	This information is considered confidential and proprietary	
ROW / land acquisition	This information is considered confidential and proprietary	
Materials & equipment	This information is considered confidential and proprietary	
Construction & commissioning	This information is considered confidential and proprietary	
Construction management	This information is considered confidential and proprietary	
Overheads & miscellaneous costs	This information is considered confidential and proprietary	
Contingency	This information is considered confidential and proprietary	
Total component cost	\$13,402,211.32	

Component cost (in-service year) \$15,342,752.67

Transmission Line Upgrade Component

Component title Lake Nelson-Kilmer No. 1 230kV

Project description This information is considered confidential and proprietary

Impacted transmission line Lake Nelson-Raritan River No. 1 230 kV

Point A Lake Nelson 230 kV

Point B Kilmer 230 kV

Point C
Terrain description This line traverses a moderately urbanized area that is on relatively flat costal plane.

Existing Line Physical Characteristics

Operating voltage 230 kV

Conductor size and type 1590 ksmil 45/7 ACSR

Hardware plan description Remove (1) single phase wood pole strain structure Remove (33) porcelain suspension insulator assemblies Remove (26) porcelain deadend insulator assemblies Remove existing 1590 ksmil 45/7 ACSR conductor, approximately 2.0 miles.

Tower line characteristics The existing line is constructed on double circuit towers mutual with the Lake Nelson-Raritan River No. 2 230kV Line. There are (2) existing wood poles in span 74-75 – one pole supporting the bottom phase of each circuit. With the new ACSS/AW conductor, violations occur between the middle phase and the existing wood pole supporting the bottom phase. It is assumed the wood pole supporting the bottom phase of the Lake Nelson-Raritan River No. 1 230kV circuit will be replaced with a taller wood pole equivalent monopole to support all (3) phases.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings

Summer (MVA)	1136.000000	1311.000000
Winter (MVA)	1139.000000	1379.000000
Conductor size and type	1590 kcmil 54/19 ACSS/AW (approximately 2.0 miles).	
Shield wire size and type	A new OPGW shield wire will be installed size to be determined.	
Rebuild line length	~2.0 miles	
Rebuild portion description	Reconductor the Lake Nelson (PSEG)-Kilmer (PSEG) line section of the Lake Nelson-Raritan River No. 1 230kV Line with 1590 kcmil 54/19 ACSS/AW (approximately 2.0 miles). Install (6) engineered steel strain plates to convert the hardware configurations on existing Type I lattice towers. Install (1) single circuit wood pole equivalent tubular steel monopole strain structure (similar to TR-230225) Install (27) 230kV porcelain/glass suspension insulator assemblies (TR-020350-1-16) Install (42) 230kV porcelain/glass deadend insulator assemblies (TR-020370-2-18) Install (3) 230kV polymer post insulator assemblies (TR-020300) Install new 1590 kcmil 54/19 ACSS/AW conductor, approximately 2.0 miles.	
Right of way	The ROW will not expand as part of this project. A full application to the BPU will be required. Assume minimal ecological impact.	
Construction responsibility	Company Specific	
Benefits/Comments		
Component Cost Details - In Current Year \$		
Engineering & design	This information is considered confidential and proprietary	
Permitting / routing / siting	This information is considered confidential and proprietary	
ROW / land acquisition	This information is considered confidential and proprietary	
Materials & equipment	This information is considered confidential and proprietary	
Construction & commissioning	This information is considered confidential and proprietary	
Construction management	This information is considered confidential and proprietary	
Overheads & miscellaneous costs	This information is considered confidential and proprietary	
Contingency	This information is considered confidential and proprietary	

Total component cost	\$4,421,716.41
Component cost (in-service year)	\$5,685,740.84

Substation Upgrade Component

Component title	Middlesex Substation 230kV
Project description	Replace the 2000A Circuit Switcher at Middlesex Switch point for the Lake Nelson I1023 230kV exit
Substation name	Middlesex 230 kV
Substation zone	JCPL
Substation upgrade scope	Below Grade Conduit and grounding for new equipment. Above Grade Replace (1) 230kV, 2000A circuit switcher with 3000A equipment

Transformer Information

None	
New equipment description	Replace (1) 230kV, 2000A circuit switcher with 3000A equipment.
Substation assumptions	Circuit switcher can be mounted on existing steel. Circuit switcher is a like for like replacement. No relaying is required.
Real-estate description	This project will fit within the confines of the existing substation
Construction responsibility	Company Specific
Benefits/Comments	

Component Cost Details - In Current Year \$

Engineering & design	This information is considered confidential and proprietary
Permitting / routing / siting	This information is considered confidential and proprietary
ROW / land acquisition	This information is considered confidential and proprietary
Materials & equipment	This information is considered confidential and proprietary
Construction & commissioning	This information is considered confidential and proprietary

Construction management	This information is considered confidential and proprietary
Overheads & miscellaneous costs	This information is considered confidential and proprietary
Contingency	This information is considered confidential and proprietary
Total component cost	\$526,899.89
Component cost (in-service year)	\$667,319.59

Substation Upgrade Component

Component title	Oyster Creek Substation (2)
Project description	This information is considered confidential and proprietary
Substation name	Oyster Creek
Substation zone	JCPL
Substation upgrade scope	Replace (2) 230kV, 2000A circuit breakers with 3000A, 50kAIC breakers Replace (1) 230kV MOAB with 3000A equipment Replace (4) 230kV GOAB with 3000A equipment Replace (1) 230kV wave trap, line tuner, and coax with 3000A equipment Install (3) 230kV surge arresters Replace line drop and breaker leads with new conductor that meets or exceeds ratings of 1136/1311/1139/1379MVA SN/SSTE/WN/WSTE Relay & Control Replace existing 230kV Manitou No. 1 line relaying with (1) line relaying panel containing (2) SEL-421, (1) SEL-501 BFT, and (1) SATEC meter

Transformer Information

None	
New equipment description	Replace (2) 230kV, 2000A circuit breakers with 3000A, 50kAIC breakers Replace (1) 230kV MOAB with 3000A equipment Replace (4) 230kV GOAB with 3000A equipment Replace (1) 230kV wave trap, line tuner, and coax with 3000A equipment Install (3) 230kV surge arresters Replace line drop and breaker leads with new conductor that meets or exceeds ratings of 1136/1311/1139/1379MVA SN/SSTE/WN/WSTE Relay & Control Replace existing 230kV Manitou No. 1 line relaying with (1) line relaying panel containing (2) SEL-421, (1) SEL-501 BFT, and (1) SATEC meter
Substation assumptions	Existing switch and wave trap structures can be reused Existing AC and DC systems are adequate Control building has adequate space for new panel Breaker NC breaker failure relaying will not be replaced
Real-estate description	This work can be completed within the confines of the existing substation.

Construction responsibility

Company Specific

Benefits/Comments

Component Cost Details - In Current Year \$

Engineering & design

This information is considered confidential and proprietary

Permitting / routing / siting

This information is considered confidential and proprietary

ROW / land acquisition

This information is considered confidential and proprietary

Materials & equipment

This information is considered confidential and proprietary

Construction & commissioning

This information is considered confidential and proprietary

Construction management

This information is considered confidential and proprietary

Overheads & miscellaneous costs

This information is considered confidential and proprietary

Contingency

This information is considered confidential and proprietary

Total component cost

\$2,151,351.20

Component cost (in-service year)

\$2,466,202.49

Congestion Drivers

None

Existing Flowgates

FG #	From Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
28-GD-S66	206316	28WINDSOR	219752	CLRKSVLL_1	1	230	228/231	Gen Deliv (Summer)	Included
28-GD-W18	206236	28GILBERT	208091	SFLD	1	230	228/229	Gen Deliv (winter)	Included
28-GD-S2-S9	206302	28OYSTER C	206297	28MANITOU	1	230	228	Gen Deliv (Summer)	Included
28-GD-S2-S11	206302	28OYSTER C	206297	28MANITOU	2	230	228	Gen Deliv (Summer)	Included
28-GD-S2-S8	206302	28OYSTER C	206297	28MANITOU	1	230	228	Gen Deliv (Summer)	Included

FG #	From Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
28-GD-W21	232012	HOPE CREEK	232014	LSPWR CABLE	1	230	225	Gen Deliv (winter)	Included
28-GD-W22	232012	HOPE CREEK	232014	LSPWR CABLE	2	230	225	Gen Deliv (winter)	Included
28-GD-S2-W9	232012	HOPE CREEK	232014	LSPWR CABLE	1	230	225	Gen Deliv (winter)	Included
28-GD-S2-W9	232012	HOPE CREEK	232014	LSPWR CABLE	2	230	225	Gen Deliv (winter)	Included
35-GD-W22	232012	HOPE CREEK	232014	LSPWR CABLE	1	230/230	225/225	Gen Deliv (winter)	Included
35-GD-W23	232012	HOPE CREEK	232014	LSPWR CABLE	2	230/230	225/225	Gen Deliv (winter)	Included
35-GD-S2-W10	232012	HOPE CREEK	232014	LSPWR CABLE	1	230/230	225/225	Gen Deliv (winter)	Included
35-GD-S2-W11	232012	HOPE CREEK	232014	LSPWR CABLE	2	230/230	225/225	Gen Deliv (winter)	Included
35-GD-S2-W12	206236	28GILBERT	208091	SFLD	1	230/230	228/229	Gen Deliv (winter)	Included
28-GD-S2-S3	206316	28WINDSOR	219752	CLRKSVLL_1	1	230	228/231	Gen Deliv (Summer)	Included
28-GD-W15	214277	RICHMOND35	214012	WANEETA3	1	230	230	Gen Deliv (winter)	Included
28-GD-S2-W9	214277	RICHMOND35	214012	WANEETA3	1	230	230	Gen Deliv (winter)	Included
35-GD-S2-W12	214277	RICHMOND35	214012	WANEETA3	1	230/230	230/230	Gen Deliv (winter)	Included
35-GD-W16	214277	RICHMOND35	214012	WANEETA3	1	230/230	230/230	Gen Deliv (winter)	Included
28-GD-S72	219104	CLRKSVLL_2	217150	LAWRENCE	1	230	231	Gen Deliv (Summer)	Included
28-GD-L14	218306	DEANS	218304	BRUNSWCK	1	230	231	Light Load - Gen Deliv	Included
35-GD-L14	218306	DEANS	218304	BRUNSWCK	1	230	231	Light Load - Gen Deliv	Included
28-GD-S64	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (Summer)	Included
28-GD-S65	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (Summer)	Included
28-GD-W109	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included
28-GD-W108	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included
28-GD-W3	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included
28-GD-W8	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included
28-GD-W6	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included
28-GD-S2-S1	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (Summer)	Included
28-GD-S2-S2	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (Summer)	Included
28-GD-S2-W7	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included
28-GD-S2-W6	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included

FG #	From Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
28-GD-S2-W92	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included
28-GD-S2-W92	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included
28-GD-S2-W92	218306	DEANS	218304	BRUNSWCK	1	230	231	Gen Deliv (winter)	Included
28-GD-W17	218333	LNELSN_I	218301	MIDDLESEX_I	1	230	231	Gen Deliv (winter)	Included
28-GD-S2-W39	218333	LNELSN_I	218301	MIDDLESEX_I	1	230	231	Gen Deliv (winter)	Included
28-GD-S2-W102	218333	LNELSN_I	218301	MIDDLESEX_I	1	230	231	Gen Deliv (winter)	Included
35-GD-S2-W13	218306	DEANS	218304	BRUNSWCK	1	230/230	231/231	Gen Deliv (winter)	Included
35-GD-S2-W15	218306	DEANS	218304	BRUNSWCK	1	230/230	231/231	Gen Deliv (winter)	Included
35-GD-S2-W16	218306	DEANS	218304	BRUNSWCK	1	230/230	231/231	Gen Deliv (winter)	Included
35-GD-W4	218306	DEANS	218304	BRUNSWCK	1	230/230	231/231	Gen Deliv (winter)	Included
35-GD-W7	218306	DEANS	218304	BRUNSWCK	1	230/230	231/231	Gen Deliv (winter)	Included
35-GD-W9	218306	DEANS	218304	BRUNSWCK	1	230/230	231/231	Gen Deliv (winter)	Included
35-GD-S2-S2	218306	DEANS	218304	BRUNSWCK	1	230/230	231/231	Gen Deliv (Summer)	Included

New Flowgates

This information is considered confidential and proprietary

Financial Information

Capital spend start date 04/2023

Construction start date 10/2025

Project Duration (In Months) 110

Additional Comments

I had to change the file extension to .txt for the .dxt short circuit files to not get an error uploading the zip file.