

# Hunterstown - Carroll 230 kV Double Circuit

## 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	476
Project title	Hunterstown - Carroll 230 kV Double Circuit
Project description	Rebuild the Hunterstown – Carroll 115/138 kV Corridor as Double Circuit using 230kV construction standards. New circuit will be operated at 230kV. Existing circuit to remain at 115/138kV. Construct a new 230 kV Ring Bus at Carroll (PE) and add a new 230 kV Breaker to the Hunterstown 230 kV Substation.
Email	Company specific
Project in-service date	06/2027
Tie-line impact	Yes
Interregional project	No
Is the proposer offering a binding cap on capital costs?	No
Additional benefits	Project alleviates congestion mitigating the need to open the Germantown Tie Line.

## Project Components

1. Rebuild the Germantown - Carroll 138 kV Line with 230kV double circuit standards (PE)
2. Taneytown terminal upgrade
3. Carroll 230 kV Substation Expansion
4. Rebuild the Germantown - Lincoln 115kV Line with 230kV double circuit standards

5. Rebuild the Hunterstown- Lincoln 115kV Line with 230kV double circuit standards
6. Construct New 230kV Hunterstown - Carroll Line (ME)
7. Rebuild the Germantown - Carroll 138 kV Line with 230kV double circuit standards (ME)
8. Revise Relay Settings at Germantown
9. Install Terminal at Hunterstown
10. Revise Relay Settings at Lincoln
11. Install DTT relaying at Straban
12. Network Upgrades at Carroll
13. Construct New 230kV Hunterstown - Carroll Line (PE)

### **Transmission Line Upgrade Component**

Component title	Rebuild the Germantown - Carroll 138 kV Line with 230kV double circuit standards (PE)
Project description	Rebuild the Germantown - Carroll 138 kV Line with 230kV double circuit standards
Impacted transmission line	Germantown - Carroll 138 kV Line
Point A	Germantown
Point B	Carroll
Point C	Taneytown
Terrain description	Terrain is hilly. Project will utilize existing right-of-way.
<b>Existing Line Physical Characteristics</b>	
Operating voltage	138 kV
Conductor size and type	556.5 kcmil 26/7 ACSR
Hardware plan description	Single circuit wood H-Frame structures are to be replaced with Double circuit steel monopole suspension structures. 13.8 miles of OPGW 48-fiber SFSJ-J-6641 to be installed.
Tower line characteristics	Existing structures being replaced to meet standards for double circuit construction.

### **Proposed Line Characteristics**

	<b>Designed</b>	<b>Operating</b>
Voltage (kV)	230.000000	138.000000
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	425.000000	522.000000
Winter (MVA)	483.000000	619.000000
Conductor size and type	1590 KCMIL 45/7 ACSR	
Shield wire size and type	OPGW 48-fiber SFSJ-J-6641	
Rebuild line length	13.8 miles	
Rebuild portion description	13.8 miles to be rebuilt. Single circuit wood H-Frame structures are to be replaced with Double circuit steel monopole suspension structures. Assuming structure for structure replacement, and existing ROW. The Scope is as follows: Assuming a structure for structure replacement: -(15) 230kV Double Circuit Tubular Steel Monopole Suspension Structure on Drilled Shaft Foundations -(45) Suspension Insulator Assemblies -(1) 230kV Double Circuit Tubular Steel Monopole Suspension Structure on Drilled Shaft foundations -(3) Suspension Insulator Assemblies -(2) 230kV Double Circuit Tubular Steel Monopole Deadend Structure on Drilled Shaft Foundations -(12) Deadend Insulator Assemblies -(1) 138kV Single Circuit Tubular Steel Monopole Deadend Structure on Drilled Shaft foundation -(3) 138kV Substation Assemblies -Install (2.8) miles of 1590 kcmil 45/7 ACSR 'Lapwing' shielded by (1) OPGW 48-fiber SFSJ-J-6641 -Approximately (0.7) miles of 7#8 Alumoweld.	
Right of way	All work is assumed to be performed within existing ROW and no new ROW will be required.	
Construction responsibility	Company specific	
Benefits/Comments		
<b>Component Cost Details - In Current Year \$</b>		
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	\$50,136,308.93
Component cost (in-service year)	\$55,771,560.05

### **Substation Upgrade Component**

Component title	Taneytown terminal upgrade
Project description	Install conduit for fiber.
Substation name	Taneytown
Substation zone	APS
Substation upgrade scope	Install conduit for fiber

### **Transformer Information**

None	
New equipment description	SEL-2506 DTT Relaying for both Carroll and Germantown terminals
Substation assumptions	SEL-2506 DTT relaying and patch panel needed, Existing DC system and SCADA RTU are adequate, Adequate space in existing panel for the new relays.
Real-estate description	
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	\$572,258.50
Component cost (in-service year)	\$655,176.38

### **Substation Upgrade Component**

Component title	Carroll 230 kV Substation Expansion
Project description	Upgrade substation for new equipment. Add ring bus configuration and new terminals for new line and existing 230 kV.
Substation name	Carroll
Substation zone	APS
Substation upgrade scope	Add ring bus configuration to 230 kV. Add new terminal for new Hunterstown - Carroll 230kV line. Upgrade / Add relays for existing and new equipment.

### **Transformer Information**

None

New equipment description

230 kV 3 breaker ring bus and associated disconnects. New Relays. all 230 kV equipment expected to meet or exceed 709 / 869 / 805 / 1031 MVA SN / SE / WN / WE. Below Grade -Install foundation, trench, conduit, and grounding for new equipment. -Install fencing, stoning, grading, access road, and ground grid for substation expansion. -Install conduit for fiber. Above Grade -Install (3) 230kV, 3000A, 63kAIC circuit breakers. -Install (6) 230kV, 2000A GOAB disconnect switches. -Install (2) 230kV, 2000A MOAB disconnect switches. -Install (6) 230kV CVTs, three each for the Hunterstown and Mt. Airy line terminals. -Install (6) 230kV surge arresters, three each for the Hunterstown and Mt. Airy line terminals. -Install (1) 230kV, 2000A wide band wave trap, line tuner and coax for the Mt. Airy line terminal. -Install (3) 230kV H-frames. -Install (1) 230kV SSVT. -Install (1) medium control building. -Install (1) lot of cables, rigid and strain bus, fittings, steel structures, and grounding as shown in the attached layout. Relay & Control -Revise relay settings for the 138kV Germantown line terminal relays. -Install (1) standard relaying panel for the 230kV Hunterstown line terminal containing (1) SEL-421 and (1) SEL-411L. -Install (3) breaker control panels containing (1) SEL-451 and (1) SATEC meter. -Install (1) SCADA RTU and (1) HMI panel, including RTAC and GPS clock. -Install (1) fiber patch panel. -Install (1) ATS. -Install (1) lot of control cables, SEL cables, and fiber.

Substation assumptions

-Backup station service will be from local distribution. -Execution engineer to conduct AC/DC system, lightning, and grounding studies. -Property to the west of current Carroll substation is available. -Property purchase, clearing, grading, and access road are required. -There may be a need for lead abatement and asbestos removal, but neither are included in this estimate. Please review at substation site visit and make determination.

Real-estate description

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	\$8,476,162.82
Component cost (in-service year)	\$9,643,072.10

### Transmission Line Upgrade Component

Component title	Rebuild the Germantown - Lincoln 115kV Line with 230kV double circuit standards
Project description	Rebuild the Germantown - Lincoln 115kV Line with 230kV double circuit standards
Impacted transmission line	Germantown - Lincoln 115 kV Line
Point A	Germantown
Point B	Lincoln
Point C	Straban
Terrain description	Terrain is hilly. Project will use existing ROW.

### Existing Line Physical Characteristics

Operating voltage	115 kV
Conductor size and type	556.5 kcmil 26/7 ACSR
Hardware plan description	Single circuit wood structures are to be replaced with double circuit steel monopole suspension structures. 7.5 miles of OPGW 48-fiber SFSJ-J-6641 to be installed.
Tower line characteristics	Existing structures are being replaced to meet standards for double circuit construction.

### Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	115.000000
	Normal ratings	Emergency ratings
Summer (MVA)	355.000000	435.000000

Winter (MVA)	403.000000	515.000000
Conductor size and type	1590 KCMIL 45/7 ACSR	
Shield wire size and type	OPGW 48-fiber SFSJ-J-6641	
Rebuild line length	7.5 miles	
Rebuild portion description	7.5 miles to be rebuilt. Single circuit wood structures are to be replaced with double circuit steel monopole suspension structures. Assuming structure for structure replacement. Assume a structure for structure rebuild -(41) 230kV Double Circuit Tubular Steel Monopole Suspension Structure on Drilled Shaft Foundations -(3) 230kV Double Circuit Tubular Steel Monopole Suspension Structure on Drilled Shaft Foundations -(2) 230kV Double Circuit Tubular Steel Monopole Deadend Structure on Drilled Shaft Foundations -(2) 230kV Double Circuit Tubular Steel Monopole Deadend Structure on Drilled Shaft Foundations -(1) 230kV Triple Circuit Tubular Steel Monopole Loop Structure on Drilled Shaft Foundations -(12) Deadend Insulator Assemblies -(2) 115kV Single Circuit Tubular Steel Monopole Suspension Structure on Drilled Shaft Foundations -(1) 115kV Single Circuit Tubular Steel Monopole Deadend Structure on Drilled Shaft Foundations -(12) 115V Substation Insulator Assemblies -Install (7.5) miles of 1590 kcmil 45/7 ACSR 'Lapwing' shielded by (1) OPGW 48-fiber SFSJ-J-6641	
Right of way	All work is assumed to be performed within existing ROW and no new ROW will be required.	
Construction responsibility	Company specific	
Benefits/Comments		
<b>Component Cost Details - In Current Year \$</b>		
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	\$32,720,794.87
Component cost (in-service year)	\$36,667,420.85

### Transmission Line Upgrade Component

Component title	Rebuild the Hunterstown- Lincoln 115kV Line with 230kV double circuit standards
Project description	Rebuild the Hunterstown- Lincoln 115kV Line with 230kV double circuit standards
Impacted transmission line	Hunterstown - Lincoln 115 kV Line
Point A	Hunterstown
Point B	Lincoln
Point C	
Terrain description	Terrain is hilly. Project will use existing ROW.

### Existing Line Physical Characteristics

Operating voltage	115 kV
Conductor size and type	795 kcmil 26/7 ACSR
Hardware plan description	Single circuit wood structures are to be replaced with double circuit steel monopole suspension structures. 2.6 miles of OPGW 48-fiber SFSJ-J-6641 to be installed.
Tower line characteristics	Existing structures being replaces to meet standards for double circuit construction.

### Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	115.000000
	Normal ratings	Emergency ratings
Summer (MVA)	355.000000	435.000000

Winter (MVA)	403.000000	515.000000
Conductor size and type	1590 KCMIL 45/7 ACSR	
Shield wire size and type	OPGW 48-fiber SFSJ-J-6641	
Rebuild line length	2.6 miles	
Rebuild portion description	2.6 miles to be rebuilt. Single circuit wood structures are to be replaced with double circuit steel monopole suspension structures. Assuming a structure for structure replacement: -(13) 230kV Double Circuit Tubular Steel Suspension Structure on Drilled Shaft Foundations -(4) 230kV Double Circuit Tubular Steel Suspension Structure on Drilled Shaft Foundations -(1) 230kV Double Circuit Tubular Steel Deadend Structure on Drilled Shaft Foundations -(3) 115kV Single Circuit Tubular Steel Monopole Suspension Structure on Drilled Shaft Foundations -(2) 115kV Single Circuit Tubular Steel Monopole Deadend Structure on Drilled Shaft Foundations -(1) 115kV Single Circuit Tubular Steel 3-Pole Deadend Structure -(1) 115kV Single Circuit Tubular Steel H-Frame Suspension Structure on Drilled Shaft Foundations. -(6) 115kV Substation Deadend Assemblies -(6) 115kV Deadend Assemblies -Install (2.6) miles of 1590 kcmil 45/7 ACSR 'Lapwing' shielded by (1) OPGW 48-fiber SFSJ-J-6641	
Right of way	All work is assumed to be performed within existing ROW and no new ROW will be required.	
Construction responsibility	Company specific	
Benefits/Comments		
<b>Component Cost Details - In Current Year \$</b>		
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	\$12,387,751.20
Component cost (in-service year)	\$13,692,014.32

### Greenfield Transmission Line Component

Component title	Construct New 230kV Hunterstown - Carroll Line (ME)
Project description	Build new 230kV line between Hunterstown (ME) and Carroll (PE) Substations along existing 115/138kV corridor on double circuit steel structures.
Point A	Hunterstown
Point B	Carroll
Point C	

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	709.000000	869.000000
Winter (MVA)	805.000000	1031.000000
Conductor size and type	1590 KCMIL 45/7 ACSR	
Nominal voltage	AC	
Nominal voltage	230KV	
Line construction type	Overhead	
General route description	The new 230kV Hunterstown - Carroll will follow the existing ROW of the 115/138kV path from Hunterstown - Lincoln - Germantown - Carroll substations.	
Terrain description	Terrain is Hilly. Project will use existing ROW.	
Right-of-way width by segment	The segments will use existing ROW.	
Electrical transmission infrastructure crossings	None	
Civil infrastructure/major waterway facility crossing plan	None	

Environmental impacts	An environmental review will be required to identify any additional construction constraints or additional permitting requirements.
Tower characteristics	New towers for this segment will be single circuit tubular steel monopole suspension structures. Structures Installed -(2) 230kV Single Circuit Tubular Steel Monopole Suspension Structure (TR-230310) on Drilled Shaft Foundations -(4) 230kV Single Circuit Tubular Steel Monopole Angle Structure on Drilled Shaft Foundations -(3) 230kV Single Circuit Tubular Steel Monopole Deadend Structure on Drilled Shaft Foundations -(1) 230kV Single Circuit Tubular Steel 3-Pole Deadend Structure on Drilled Shaft Foundations -(1) 230kV Single Circuit Tubular Steel 3-Pole Deadend Structure on Drilled Shaft Foundations -(2) 230kV Single Circuit Tubular Steel H-Frame Suspension Structure (Similar to TR-230045) on Drilled Shaft Foundations -(231) 230kV Suspension Insulator Assemblies -(48) 230kV Deadend Insulator Assemblies -(3) 230kV Substation Assemblies -Approximately (13.1) miles of 1590 kcmil 45/7 ACSR 'Lapwing' shielded by (1) OPGW 48-fiber SFSJ-J-6641 -Approximately (1.2) miles of 7#8 Alumoweld.
Construction responsibility	Company specific
Benefits/Comments	
<b>Component Cost Details - In Current Year \$</b>	
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	\$19,243,366.34
Component cost (in-service year)	\$21,336,181.61

**Transmission Line Upgrade Component**

Component title	Rebuild the Germantown - Carroll 138 kV Line with 230kV double circuit standards (ME)	
Project description		
Impacted transmission line	Germantown - Carroll 138 kV Line	
Point A	Germantown	
Point B	Carroll	
Point C	Taneytown	
Terrain description	Terrain is hilly. Existing ROW to be used.	
<b>Existing Line Physical Characteristics</b>		
Operating voltage	138	
Conductor size and type	556.5 kcmil 26/7 ACSR	
Hardware plan description	Single circuit wood structures are to be replaced with double circuit steel monopole suspension structures. 2.8 miles of OPGW 48-fiber SFSJ-J-6641 to be installed.	
Tower line characteristics	Existing structures being replaced to meet standards for double circuit construction.	
<b>Proposed Line Characteristics</b>		
	<b>Designed</b>	<b>Operating</b>
Voltage (kV)	230.000000	138.000000
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	425.000000	522.000000
Winter (MVA)	483.000000	619.000000
Conductor size and type	1590 KCMIL 45/7 ACSR	
Shield wire size and type	OPGW 48-fiber SFSJ-J-6641	
Rebuild line length	2.8 miles	

Rebuild portion description	2.8 miles to be rebuilt. Single circuit wood structures are to be replaced with double circuit steel monopole suspension structures. Assuming a structure for structure replacement: -(15) 230kV Double Circuit Tubular Steel Monopole Suspension Structure on Drilled Shaft Foundations -(1) 230kV Double Circuit Tubular Steel Monopole Suspension Structure on Drilled Shaft foundations -(2) 230kV Double Circuit Tubular Steel Monopole Deadend Structure on Drilled Shaft Foundations -(1) 138kV Single Circuit Tubular Steel Monopole Deadend Structure on Drilled Shaft foundation -(3) 138kV Substation Assemblies -Install (2.8) miles of 1590 kcmil 45/7 ACSR 'Lapwing' shielded by (1) OPGW 48-fiber SFSJ-J-6641 -Approximately (0.7) miles of 7#8 Alumoweld.
Right of way	All work is assumed to be performed within existing ROW and no new ROW will be required.
Construction responsibility	Company specific
Benefits/Comments	
<b>Component Cost Details - In Current Year \$</b>	
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	\$13,236,147.44
Component cost (in-service year)	\$14,654,425.19
<b>Substation Upgrade Component</b>	
Component title	Revise Relay Settings at Germantown
Project description	Install conduit for fiber and revise relay settings for 115 kV 998 line and 115/138kV 999 line.

Substation name	Germantown
Substation zone	ME
Substation upgrade scope	Install conduit for fiber, Revise relay settings for 115kV 998 line and 115/138kV 999 line. Upgrade relay equipment.

**Transformer Information**

None	
New equipment description	New fiber. Relay setting changes.
Substation assumptions	Existing relays for 998 and 999 will be reused.
Real-estate description	
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	\$532,241.99
Component cost (in-service year)	\$611,369.71

## Substation Upgrade Component

Component title	Install Terminal at Hunterstown
Project description	install terminal equipment at Hunterstown for new 230KV line.
Substation name	Hunterstown
Substation zone	ME
Substation upgrade scope	Install 230kV CB and associated disconnects, CVTs, surge arresters, structures, and relays. Below Grade -Install foundation, conduit, and grounding for new equipment. -Install conduit for fiber. Above Grade -Install (1) 230kV, 3000A, 63kAIC circuit breaker. -Install (1) 230kV, 2000A MOAB disconnect switch. -Install (2) 230kV, 2000A GOAB disconnect switches. -Install (3) 230kV CVTs. -Install (3) 230kV surge arresters. -Install (1) 230kV H-frame. -Install (1) lot of cables, steel structures, rigid bus, fittings, and grounding as shown in the attached layout. Relay & Control -Revise relay settings for the 115kV Hunterstown-Lincoln 962 and SEL-352 for B2 breaker failure relaying. -Install (1) standard relay panel for the new 230kV Carroll line terminal containing (1) SEL-421, (1) SEL-411L, and (1) SEL-451 BFT. -Install (1) lot of control cables, SEL cables, and fiber.

## Transformer Information

None	
New equipment description	New 230kV CB and associated disconnects. ratings are to meet or exceed 709 / 869 / 805 / 1031 MVA SN / SE / WN / WE Below Grade -Install foundation, conduit, and grounding for new equipment. -Install conduit for fiber. Above Grade -Install (1) 230kV, 3000A, 63kAIC circuit breaker. -Install (1) 230kV, 2000A MOAB disconnect switch. -Install (2) 230kV, 2000A GOAB disconnect switches. -Install (3) 230kV CVTs. -Install (3) 230kV surge arresters. -Install (1) 230kV H-frame. -Install (1) lot of cables, steel structures, rigid bus, fittings, and grounding as shown in the attached layout. Relay & Control -Revise relay settings for the 115kV Hunterstown-Lincoln 962 and SEL-352 for B2 breaker failure relaying. -Install (1) standard relay panel for the new 230kV Carroll line terminal containing (1) SEL-421, (1) SEL-411L, and (1) SEL-451 BFT. -Install (1) lot of control cables, SEL cables, and fiber.
Substation assumptions	Existing AC/DC systems and SCADA RTU are adequate. Related existing relays to be reused. Adequate space in control house for the new panel.
Real-estate description	
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	\$2,665,317.62
Component cost (in-service year)	\$3,048,843.68

**Substation Upgrade Component**

Component title	Revise Relay Settings at Lincoln
Project description	Install conduit for fiber and revise relay settings for 115kV 998 line to Germantown and the 962 line to AD1-020
Substation name	Lincoln
Substation zone	ME
Substation upgrade scope	Install conduit for fiber and revise relay settings for 115kV 998 line to Germantown and the 962 line to AD1-020. Upgrade relay equipment.

**Transformer Information**

None	
New equipment description	New fiber. Relay setting changes.

Substation assumptions	Existing relays for 998 and 962 lines will be reused.
Real-estate description	
Construction responsibility	Company specific
Benefits/Comments	
<b>Component Cost Details - In Current Year \$</b>	
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	\$347,180.31
Component cost (in-service year)	\$398,223.45
<b>Substation Upgrade Component</b>	
Component title	Install DTT relaying at Straban
Project description	Install DTT relaying for Lincoln and Germantown line terminals
Substation name	Straban
Substation zone	ME
Substation upgrade scope	Install DTT relaying for Lincoln and Germantown line terminals, and fiber patch panel.

## Transformer Information

None	
New equipment description	New SEL-2506 DTT relaying for Lincoln and Germantown line terminals.
Substation assumptions	Existing DC system and SCADA RTU are adequate. Adequate space in existing panel for new DTT relays.
Real-estate description	
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	\$750,256.02
Component cost (in-service year)	\$857,639.27

## Substation Upgrade Component

Component title	Network Upgrades at Carroll
Project description	Design, install, and test/commission MPLS Equipment for SCADA transport in the 138kV and 230kV control houses at Carroll.

Substation name	Carroll
Substation zone	APS
Substation upgrade scope	Design, install, and test/commission MPLS Equipment for SCADA transport in the 138kV and 230kV control houses at Carroll.

**Transformer Information**

None	
New equipment description	Network Upgrades
Substation assumptions	New MPLS Equipment
Real-estate description	
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	\$436,275.29
Component cost (in-service year)	\$462,451.81

## Greenfield Transmission Line Component

Component title	Construct New 230kV Hunterstown - Carroll Line (PE)	
Project description	Build new 230kV line between Hunterstown (ME) and Carroll (PE) Substations along existing 115/138kV corridor on double circuit steel structures.	
Point A	Hunterstown	
Point B	Carroll	
Point C		
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	709.000000	869.000000
Winter (MVA)	805.000000	1031.000000
Conductor size and type	1590 KCMIL 45/7 ACSR	
Nominal voltage	AC	
Nominal voltage	230KV	
Line construction type	Overhead	
General route description	The new 230kV Hunterstown - Carroll will follow the existing ROW of the 115/138kV path from Hunterstown - Lincoln - Germantown - Carroll substations.	
Terrain description	Terrain is Hilly. Existing ROW to be used.	
Right-of-way width by segment	The segments will use existing ROW.	
Electrical transmission infrastructure crossings	None	
Civil infrastructure/major waterway facility crossing plan	None	
Environmental impacts	An environmental review will be required to identify any additional construction constraints or additional permitting requirements.	

Tower characteristics

New towers for this segment will be single circuit tubular steel monopole suspension structures. Tower Characteristics identified in the other line rebuild components. Additional Structures are as follows: Structures Installed -(2) 230kV Single Circuit Steel Monopole Deadend Structure -(240) 230kV Suspension Insulators Assemblies -(30) 230kV Deadend Insulator Assemblies -(3) 230kV Substation Assemblies -Install (11.2) miles of 1590 kcmil 45/7 ACSR 'Lapwing' (1) OPGW 48-fiber SFSJ-J-6641 -Approximately (0.1) miles of 7#8 Alumoweld.

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

\$7,332,874.13

Component cost (in-service year)

\$8,119,531.18

**Congestion Drivers**

None

**Existing Flowgates**

FG #	Fr Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
2022W1-GD-S10	204544	27LINCOLN	204538	27STRABAN	1	115	227	Summer Gen Deliv	Included

FG #	Fr Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
2022W1-GD-S578	204538	27STRABAN	204529	27GERMANTN	1	115	227	Summer Gen Deliv	Included
2022W1-GD-W39	204544	27LINCOLN	204538	27STRABAN	1	115	227	Winter Gen Deliv	Included
2022W1-GD-W33	204538	27STRABAN	204529	27GERMANTN	1	115	227	Winter Gen Deliv	Included
2022W1-GD-S14	204538	27STRABAN	204529	27GERMANTN	1	115	227	Summer Gen Deliv	Included
2022W1-GD-W37	204538	27STRABAN	204529	27GERMANTN	1	115	227	Winter Gen Deliv	Included
2022W1-GD-W37	204544	27LINCOLN	204538	27STRABAN	1	115	227	Winter Gen Deliv	Included
2022W1-GD-S570	204544	27LINCOLN	204538	27STRABAN	1	115	227	Summer Gen Deliv	Included

## New Flowgates

None

## Financial Information

Capital spend start date 04/2023

Construction start date 12/2025

Project Duration (In Months) 50

## Additional Comments

None