

# Black Oak - Stonewall - Gant, Stonewall SVC + Cap Banks, Gant - Farmwell, Cochran Tap - Round Table Solution

## General Information

Proposing entity name	Proprietary business information.
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	Proprietary business information.
PJM Proposal ID	676
Project title	Black Oak - Stonewall - Gant, Stonewall SVC + Cap Banks, Gant - Farmwell, Cochran Tap - Round Table Solution
Project description	New Woodside 500/138 kV substation + SVC + Cap Banks, new Black Oak - Woodside - Gant 500 kV line, Gant 500/230 kV substation, New 230 kV line from Gant - Farmwell, New Cochran Tap - Round Table 230 kV line, plus various modifications to existing substations. Proposal permitting and overhead costs are captured on component 4CA. See attachment 1 for flowgate information.
Email	Proprietary business information.
Project in-service date	06/2027
Tie-line impact	No
Interregional project	No
Is the proposer offering a binding cap on capital costs?	Yes
Additional benefits	

## Project Components

1. 4CA - New 500kV transmission line from existing Black Oak substation and new Woodside substation
2. 10C1A - New 500kV transmission line from new Woodside substation to Goose Creek substation

3. 04A1 - Black Oak substation 500kV five breaker and new transformer expansion
4. 23s5 - New Woodside Substation - 6 terminal
5. 23sb - Stonewall substation two 138kV breaker expansion
6. 36F - Belmont substation two 230kV circuit breaker expansion
7. 39E - Farmwell substation two 230kV circuit breaker expansion
8. 39G - Roundtable substation single 230kV circuit breaker expansion
9. 39a1 - New Gant substation - 5 terminal
10. 10C3 - New 500kV line between new Woodside substation and new Gant substation
11. 39D - New 230kV transmission line from new Gant substation to existing Farmwell substation
12. 39F - New 230kV transmission line from Cochran Tap to Roundtable

### Greenfield Transmission Line Component

Component title	4CA - New 500kV transmission line from existing Black Oak substation and new Woodside substation	
Project description	Proprietary business information.	
Point A	Black Oak	
Point B	Woodside	
Point C	N/A	
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	4357.000000	4357.000000
Winter (MVA)	5066.000000	5196.000000
Conductor size and type	3x 1780 kcmil Chukar ACSR	
Nominal voltage	AC	
Nominal voltage	500	
Line construction type	Overhead	

General route description

Route is approximately 53 miles long. Starting a new dead end structure at the existing Black Oak substation, the line routes east along the south side of the existing Black Oak - Bedington 500kV transmission ROW. The route follows the existing for 8 miles before deviating south from the existing ROW and creating a new ROW for 2.5 miles around Fort Ashbury to minimize structure and residential impacts. The line co-locates with the existing ROW east of Fort Ashbury and follows the southern side of the existing ROW for about 4.5 miles before turning south at the intersection of Black Oak - Bedington 500kV transmission line and Hampshire - Ridgeley 138kV transmission line. The line follows the existing Hampshire - Ridgeley transmission ROW for almost 17 miles before turning east at the existing Hampshire substation. The line then follows the existing Hampshire - Gore 138kV transmission ROW for about 4.5 miles until the Hampshire - Gore 138kV transmission line begins to co-locate with the Doubs - Bismark 500kV transmission line. The new line then follows the existing Doubs - Bismark 500kV transmission ROW on the northern side for almost 2.5 miles to Gore substation. Starting at Gore substation, the line utilizes the existing Gore - Stonewall 138kV transmission ROW for about 15 miles to the new Woodside substation. The line utilizes the existing 138kV transmission ROW by rebuilding the Gore - Stonewall 138kV circuit under the new Black Oak - Woodside 500kV circuit.

Terrain description

The project is located in the geological region known as the Ridge and Valley Province due to extensive river valleys between long ridges characterized by low hills with steep slopes with oak-hickory forest. Wide lowlands and rolling uplands with sandy or silty loam predominate the area.

Right-of-way width by segment

The new right of way will be an expansion of an existing transmission line corridor for approximately 70% of the route length, with a width of 125 ft (40%) and a width of 165 ft (30%). For approximately 30% of the route length, the existing transmission line ROW will be utilized and will require no additional ROW.

Electrical transmission infrastructure crossings

See Attachment 4 (Google Earth .kmz) with identified major crossings.

Civil infrastructure/major waterway facility crossing plan

See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.

Environmental impacts	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 4 national wetland inventory (NWI) wetlands and 64 waterbodies, but it appears that most features are small and could be avoided without permitting. Crossing of the branches of the Potomac River and North River will require additional agency consultations. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. One historic structure, the Capon Chapel, was identified within 1,000' of the transmission line and will require further consideration. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified including listed bats and the rusty patched bumble bee, but no critical habitat was identified along the proposed route. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the Tri-colored Bat, Northern Long-eared Bat, Bald Eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. Routing through the Appalachian Mountains will require additional control measures and monitoring. There are no unique or sensitive environmental concerns or impacts with the proposed transmission line that cannot be addressed.</p>
Tower characteristics	<p>The majority, approximately 75%, of the proposed structures will be single circuit 500kV lattice towers (TTVS-500) in a horizontal conductor configuration. Approximately 25% of the structures will be single circuit 500kV lattice towers with 138kV underbuild (TTVS-500-138) in a horizontal conductor configuration. The 138kV line to be underbuilt is an existing line. Any proposed deadend structure will either be lattice tower or a 3-pole, one phase per pole structure type. See proposed structure drawing set included in attachment 10.</p>
Construction responsibility	Proprietary business information.
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.

Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$163,551,990.00
Component cost (in-service year)	\$162,172,179.00

### Greenfield Transmission Line Component

Component title	10C1A - New 500kV transmission line from new Woodside substation to Goose Creek substation
Project description	Proprietary business information.
Point A	Woodside
Point B	Goose Creek
Point C	

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	4357.000000	4357.000000
Winter (MVA)	5066.000000	5196.000000
Conductor size and type	3x 1780 kcmil Chukar ACSR	
Nominal voltage	AC	
Nominal voltage	500	
Line construction type	Overhead	

General route description

Route is approximately 22 miles long. Starting at a new dead end structure at the new Woodside substation, the line routes east along the existing Stonewall - Feagan's Mill 138kV transmission line ROW for 11 miles with the entire Stonewall - Feagan's Mill 138kV transmission line rebuilt under the new greenfield transmission line. The new line routes around the existing Feagan's Mill substation and then resumes using the existing 138kV transmission ROW between Feagan's Mill and Millville, for about 2 miles where the 138kV transmission ROW separates from the existing Bismark - Doubs 500kV transmission ROW. The line routes adjacent to the existing 500kV transmission ROW for almost 4 miles before resumes using the existing Millville - Lovettsville 138kV transmission line. The line uses the Millville - Lovettsville 138kV transmission line ROW for approximately 4 miles to the east before deviating from the existing 138kV transmission ROW to create a new ROW. It is advantageous to rebuild the existing 138kV transmission circuits underneath the new 500kV transmission line to minimize viewshed impacts, reduce ROW acquisition costs, reduce residential and infrastructure impacts, and reduce tree clearing requirements, especially for the furthest east section where the new line crosses the Appalachian Trail. This line component ends east of the Appalachian Trail, where line component 10c2 begins to continue the route to Goose Creek substation.

Terrain description

Much of the project is located in the rolling hills and pastures of the Piedmont, where the bedrock consists mostly of gneiss, schist, and granite rocks at a typical depth of between 2 and 10 feet. Soils developed from these rocks and minerals form acid, infertile soils, with sandy loam surfaces. The rolling terrain is interrupted by steep ridges associated with the boundary of the Blue Ridge. Historically, much of the Piedmont region was cleared and farmed intensively, causing extreme erosion over much of the region. Many of the agricultural areas have since reverted to forests.

Right-of-way width by segment

The new right of way will be an expansion of an existing transmission line corridor for approximately 80% of the route length, where a 30 ft additional width will be required beyond the existing, assumed, ROW edge. For approximately 20% of the route length, the right of way will have its own corridor with a width of 115 ft (10%) and 165 ft (5%)

Electrical transmission infrastructure crossings

See Attachment 4 (Google Earth .kmz) with identified major crossings.

Civil infrastructure/major waterway facility crossing plan

See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.

Environmental impacts

"Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 1 national wetland inventory (NWI) wetlands and 18 waterbodies, but it appears that most features are small and could be avoided without permitting. The crossing of the Shenandoah River around Millville Dam will require additional agency consultations. The crossing of the Appalachian Trail will also require additional agency coordination and permitting with the National Parks Service. Consultation with the Army Corps of Engineers, Fish and Wildlife Service, and numerous state agencies is expected. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified including listed bats, the rusty patched bumble bee, and clam species, but no critical habitat was identified along the proposed route. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the Tri-colored Bat, Northern Long-eared Bat, Bald Eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. Routing through the Appalachian Mountains will require additional control measures and monitoring. There are no unique or sensitive environmental concerns or impacts with the proposed transmission line that cannot be addressed."

Tower characteristics

The majority, approximately 80%, of the proposed structures will be single circuit 500kV lattice towers with 138kV (TTVS-500-138) in a horizontal conductor configuration. The 138kV line to be underbuilt is an existing line. Approximately 20% of the structures will be single circuit 500kV lattice towers (TTVS-500) in a horizontal conductor configuration. Any proposed deadend structure will either be lattice tower or a 3-pole, one phase per pole structure type. See proposed structure drawing set included in attachment 10.

Construction responsibility

Proprietary business information.

Benefits/Comments

Resolves reliability issues identified per PJM's Gen. Deliv. Process

**Component Cost Details - In Current Year \$**

Engineering & design

Proprietary business information.

Permitting / routing / siting

Proprietary business information.

ROW / land acquisition

Proprietary business information.

Materials & equipment

Proprietary business information.

Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$58,453,430.00
Component cost (in-service year)	\$64,521,650.00

### Substation Upgrade Component

Component title	04A1 - Black Oak substation 500kV five breaker and new transformer expansion
Project description	Proprietary business information.
Substation name	Black Oak
Substation zone	Allegheny Power
Substation upgrade scope	Expand the existing Black Oak 500 kV yard by adding two new 500 kV bays. Re-use the existing bay that ties the West and East by installing two circuit breakers as shown in the one line diagram. Re-terminate Black Oak Bedington 500 kV line in that bay position (second bay from the top). Terminate the new Black Oak-Gore 500 kV line in the third bay position from the top Re-terminate the SVC in the fourth bay position from the top Total 5 new 500 kV circuit breakers and 10 MODs need to be installed for above work Add a second 500-138 kV transformer to the West Bus (provide same rating as the existing current transformer) Upgrade the protection scheme to remove non-redundancy (single point of failure).

### Transformer Information

	Name	Capacity (MVA)	
Transformer	Transformer 1	760	
	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>
Voltage (kV)	500	138	N/A



New equipment description	AC Substation: Add two (2) new 500 kV breakers to existing bay in breaker and a half (BAAH) bus. Add one (1) new 500 - 138 kV transformer bank and one (1) 500 kV breaker.
Substation assumptions	The use of a spare bay appears to be available. Open area west of the control house is available
Real-estate description	No expansion of substation fence anticipated
Construction responsibility	Proprietary business information.
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$14,000,000.00
Component cost (in-service year)	\$15,453,380.00

**Greenfield Substation Component**

Component title	23s5 - New Woodside Substation - 6 terminal
Project description	Proprietary business information.
Substation name	Woodside

Substation description New 3 bays breaker and a half 500kV switchyard . Interconnect Bismark-Doubs, new Black Oak Stonewall and Stonewall-Goose Creek 500 kV lines at the new Stonewall switchyard. Add two 150 MVAR Cap banks and -300 to +500 MVAR STATCOM and two new 500/138kV transformers

Nominal voltage AC

Nominal voltage 500/138

**Transformer Information**

	<b>Name</b>	<b>Capacity (MVA)</b>	
Transformer	Transformer 1	485/619	
	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>
Voltage (kV)	500	138	N/A

	<b>Name</b>	<b>Capacity (MVA)</b>	
Transformer	Transformer 2	485/619	
	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>
Voltage (kV)	500	138	N/A

Major equipment description AC Air Insulated Substation (AIS): New proposed 500 - 138 kV Substation. New Breaker and a Half (BAAH) 500kV Switchyard with three (3) bays, five (5) line terminals, twelve (12) 500kV, 5000A, 63kAIC Breakers, two (2) 500 kV, 150 MVAR shunt capacitor banks, one (1) -300 to +500 MVAR Static VAR Compensator (SVC), two (2) 500 KV - 138 kV transformer banks, two (2) 138kV, 5000A, 80kAIC breakers.

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	485.000000	619.000000
Winter (MVA)	569.000000	654.000000

## Environmental assessment

Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed site crosses no national wetland inventory (NWI) wetlands or waterbodies. Fatal flaws have not been identified for proposed site. A cultural resource professional assisted with the siting process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified including listed bats, but no critical habitat was identified in the area of the substation site. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed substation site that cannot be addressed.

## Outreach plan

The Company is committed to working with all interested stakeholders through a robust public outreach program to address/respond to community concerns and inform the public about the project to the greatest extent practicable. The Company believes a well-designed public outreach program can have numerous benefits, including fostering a cooperative relationship with landowners and other stakeholders, expediting the regulatory permitting process, and assisting with project development. In general, the purpose of the community outreach plan is to gain community support for the project. In the affected communities, the Company's public outreach plan will educate the public and relevant stakeholders on specific project details to enable timely regulatory approvals and construction activities. Elements of the public outreach plan will include the following: 1) Identify potential issues at an early stage by engagement with key community stakeholders at the outset; 2) Broaden the community engagement process to identify potential and relevant community benefits that can facilitate community support for the proposed project; 3) Develop a broad base of community support for the proposed project before the regulatory agencies; and 4) Develop a comprehensive administrative record documenting the community outreach process that can be presented to the regulatory agency or, in the event of a legal challenge, to the appropriate court. The outreach plan proposes to dedicate considerable time and resources in engaging the community, and specifically the affected community during the planning process to identify highly sensitive areas that have the least amount of cultural, environmental, and social impacts on the community. The plans will reflect avoidance of impacts rather than mitigation. However, in some cases, if avoidance is not possible, then the Company will involve the community in providing appropriate and practical mitigation measures. The Company will commence its public outreach activities following project award.

## Land acquisition plan

See Attachment 9 for Land Acquisition Plan.

## Construction responsibility

Proprietary business information.

Benefits/Comments Resolves reliability and market efficiency issues identified per PJM's. process. Substation is a switchyard with no voltage transformation.

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$125,298,600.00
Component cost (in-service year)	\$138,306,210.00

**Substation Upgrade Component**

Component title	23sb - Stonewall substation two 138kV breaker expansion
Project description	Proprietary business information.
Substation name	Stonewall
Substation zone	Allegheny Power
Substation upgrade scope	Add two new 138 kV breakers to existing ring and four new MODs to terminate new greenfield transformers.

**Transformer Information**

None	
New equipment description	AC Substation: Add two (2) new 138 kV breakers to existing ring.

Substation assumptions	Open area in the existing substation is available.
Real-estate description	No expansion of substation fence anticipated.
Construction responsibility	Proprietary business information.
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$2,800,000.00
Component cost (in-service year)	\$3,090,676.00
<b>Substation Upgrade Component</b>	
Component title	36F - Belmont substation two 230kV circuit breaker expansion
Project description	Proprietary business information.
Substation name	Belmont
Substation zone	Dominion
Substation upgrade scope	Add two new 230kV circuit breakers to existing ring bus at Belmont and tie-in into the new Gant substation.

## Transformer Information

None	
New equipment description	AC Substation: Add two (2) new 230 kV breakers to existing ring.
Substation assumptions	Area east of the existing substation is available.
Real-estate description	Expected expansion of fenceline is within utility owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

## Component Cost Details - In Current Year \$

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$2,800,000.00
Component cost (in-service year)	\$3,090,676.00

## Substation Upgrade Component

Component title	39E - Farmwell substation two 230kV circuit breaker expansion
Project description	Proprietary business information.
Substation name	Farmwell

Substation zone	Dominion
Substation upgrade scope	Expand the 230 kV ring by installing two new circuit breakers and four MODs at Farmwell
<b>Transformer Information</b>	
None	
New equipment description	AC Substation: Add two (2) new 230 kV breakers to existing ring.
Substation assumptions	The use of two (2) spare positions within the existing ring appears to be available.
Real-estate description	No expansion of substation fence anticipated
Construction responsibility	Proprietary business information.
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$3,500,000.00
Component cost (in-service year)	\$3,863,345.00
<b>Substation Upgrade Component</b>	
Component title	39G - Roundtable substation single 230kV circuit breaker expansion

Project description	Proprietary business information.
Substation name	Roundtable
Substation zone	Dominion
Substation upgrade scope	Terminate new 230 kV line from Cochran Tap at Roundtable substation by expanding the existing 230 kV ring bus by adding one CB and two MODs at Roundtable.

**Transformer Information**

None	
New equipment description	AC Substation: Add two (1) new breaker and a half (BAAH) bay and two (2) new 230 kV breakers.
Substation assumptions	Area south of substation fence is available.
Real-estate description	Expected expansion of fenceline is within utility owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$7,000,000.00
Component cost (in-service year)	\$7,726,690.00



## Greenfield Substation Component

Component title	39a1 - New Gant substation - 5 terminal
Project description	Proprietary business information.
Substation name	Gant
Substation description	AC Air Insulated Substation (AIS): New proposed 500 - 230 kV Substation. New 500 kV Breaker and a Half (BAAH) switchyard, two (2) bays, three (3) line terminals, seven (7) 500kV, 5000A, 63kAIC Breakers, two (2) 500 - 230 kV transformer banks. New 230 kV ring bus switchyard with seven (7) line terminals, seven (7) 230 kV, 80 kAIC breakers, two (2) 1% reactance series reactors.
Nominal voltage	AC
Nominal voltage	500/230

## Transformer Information

	Name	Capacity (MVA)		
Transformer	Transformer 1	1559/1940		
	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>	
Voltage (kV)	500	230	N/A	

	Name	Capacity (MVA)		
Transformer	Transformer 2	1559/1940		
	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>	
Voltage (kV)	500	230	N/A	

Major equipment description	AC Air Insulated Substation (AIS): New proposed 500 - 230 kV Substation. New 500 kV Breaker and a Half (BAAH) switchyard, two (2) bays, three (3) line terminals, seven (7) 500kV, 5000A, 63kAIC Breakers, two (2) 500 - 230 kV transformer banks. New 230 kV ring bus switchyard with seven (7) line terminals, seven (7) 230 kV, 80 kAIC breakers, two (2) 1% reactance series reactors.
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	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1559.000000	1940.000000
Winter (MVA)	1785.000000	2168.000000
Environmental assessment	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed site crosses no national wetland inventory (NWI) wetlands or waterbodies. Fatal flaws have not been identified for proposed site. A cultural resource professional assisted with the siting process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats, but no critical habitat was identified in the area of the substation site. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed substation site that cannot be addressed.</p>	

Outreach plan	<p>The Company is committed to working with all interested stakeholders through a robust public outreach program to address/respond to community concerns and inform the public about the project to the greatest extent practicable. The Company believes a well-designed public outreach program can have numerous benefits, including fostering a cooperative relationship with landowners and other stakeholders, expediting the regulatory permitting process, and assisting with project development. In general, the purpose of the community outreach plan is to gain community support for the project. In the affected communities, the Company's public outreach plan will educate the public and relevant stakeholders on specific project details to enable timely regulatory approvals and construction activities. Elements of the public outreach plan will include the following: 1) Identify potential issues at an early stage by engagement with key community stakeholders at the outset; 2) Broaden the community engagement process to identify potential and relevant community benefits that can facilitate community support for the proposed project; 3) Develop a broad base of community support for the proposed project before the regulatory agencies; and 4) Develop a comprehensive administrative record documenting the community outreach process that can be presented to the regulatory agency or, in the event of a legal challenge, to the appropriate court. The outreach plan proposes to dedicate considerable time and resources in engaging the community, and specifically the affected community during the planning process to identify highly sensitive areas that have the least amount of cultural, environmental, and social impacts on the community. The plans will reflect avoidance of impacts rather than mitigation. However, in some cases, if avoidance is not possible, then the Company will involve the community in providing appropriate and practical mitigation measures. The Company will commence its public outreach activities following project award.</p>
Land acquisition plan	See Attachment 9 for Land Acquisition Plan.
Construction responsibility	Proprietary business information.
Benefits/Comments	Resolves reliability and market efficiency issues identified per PJM's. process. Substation is a switchyard with no voltage transformation.
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.

Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$58,079,000.00
Component cost (in-service year)	\$64,108,349.00

### Greenfield Transmission Line Component

Component title	10C3 - New 500kV line between new Woodside substation and new Gant substation
Project description	Proprietary business information.
Point A	Woodside
Point B	Gant
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	4357.000000	4357.000000
Winter (MVA)	5066.000000	5166.000000
Conductor size and type	3x 1780 kcmil Chukar ACSR	
Nominal voltage	AC	
Nominal voltage	500	
Line construction type	Overhead	
General route description	Route is approximately 25 miles long. The component begins as a continuation of the 500kV - 138kV underbuild from the new Pike substation or new Woodside substation, depending on the solution. The line continues to follow the existing Doubs - Bismark 500kV transmission ROW for about 0.5 miles before turning south. The line maintains a predominately south-southeast direction for about 17 miles, with minor shifts in route direction to reduce impacts to existing structures, residences, and vegetation. The new line shifts east around Leesburg, Virginia, for about 5 miles, before reaching the Dulles Greenway. The line routes alongside the Dulles Greenway ROW for about a mile before turning north and terminating at the new Gant substation.	

Terrain description	<p>Much of the project is located in the rolling hills and pastures of the Piedmont, where the bedrock consists mostly of gneiss, schist, and granite rocks at a typical depth of between 2 and 10 feet. Soils developed from these rocks and minerals form acid, infertile soils, with sandy loam surfaces. The rolling terrain is interrupted by steep ridges associated with the boundary of the Blue Ridge. Historically, much of the Piedmont region was cleared and farmed intensively, causing extreme erosion over much of the region. Many of the agricultural areas have since reverted to forests.</p>
Right-of-way width by segment	<p>The new right of way will have its own corridor and will have a width of 165 ft.</p>
Electrical transmission infrastructure crossings	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings.</p>
Civil infrastructure/major waterway facility crossing plan	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.</p>
Environmental impacts	<p>" Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 18 national wetland inventory (NWI) wetlands and 30 waterbodies, but it appears that most features are small and could be avoided without permitting. Consultation with the Army Corps of Engineers, Fish and Wildlife Service, and numerous state agencies are expected. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. This proposed route will require additional consultations with the Waterford Historic District. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified including listed bats, the rusty patched bumble bee, and clam species, but no critical habitat was identified along the proposed route. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the Tri-colored Bat, Northern Long-eared Bat, Bald Eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed transmission line that cannot be addressed."</p>
Tower characteristics	<p>The proposed structures will be single circuit 500kV lattice towers (TTVS-500) in a horizontal conductor configuration. Any proposed deadend structure will either be lattice tower or a 3-pole, one phase per pole structure type. See proposed structure drawing set included in attachment 10.</p>
Construction responsibility	<p>Proprietary business information.</p>
Benefits/Comments	<p>Resolves reliability issues identified per PJM's Gen. Deliv. Process</p>

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$64,718,803.00
Component cost (in-service year)	\$71,437,450.00

**Greenfield Transmission Line Component**

Component title	39D - New 230kV transmission line from new Gant substation to existing Farmwell substation	
Project description	Proprietary business information.	
Point A	Gant	
Point B	Farmwell	
Point C		

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1573.000000	1810.000000
Winter (MVA)	1648.000000	1896.000000
Conductor size and type	3x 1780 kcmil Chukar ACSR	

Nominal voltage	AC
Nominal voltage	230
Line construction type	Overhead
General route description	<p>The route is approximately 11 miles long and is predominately double circuit with components 39D and 39F sharing a common tower for most of the route due to constructability considerations with minimizing ROW requirements. Starting a new dead end structure at the new Gant substation, the line routes north to coincide with the existing Goose Creek - Brambleton 500kV transmission ROW. Near the Pleasant View substation, the line deviates from the existing ROW and follows Cochran Mill Rd for about a half mile before turning west-southwest toward Belmont Ridge Rd where it follows north along the existing road ROW for about a half mile and then turns west-southwest again to follow the Harry Byrd ROW before turning south on the east side of Loudoun County Pkwy. The line follows the Loudoun County Pkwy ROW for a little more than 3 miles and shifts to the west side of Pkwy ROW near Interconnection Plaza to avoid conflict with 1757 Golf Club. The double circuit then splits into two single circuits near the intersection of Loudoun County Pkwy and Waxpool Road. Component 39D - Gant to Farmwell 230kV transmission line routes west along Waxpool Rd to the Farmwell substation and component 39F - Gant Cochran Rap to Roundtable continues along Loudoun County Pkwy to terminate at Roundtable substation.</p>
Terrain description	<p>The Project is located in the valley south of the Potomac River in Loudon County. A former agricultural region, the area is now densely developed with commercial buildings and planned residential communities within commuting distance to Washington, D.C. Some industrial facilities are located on the west end of the project area. Slopes are gentle, approximately 4%.</p>
Right-of-way width by segment	<p>The majority of the new right of way will have its own corridor and will be 45 ft wide, with select locations where a narrower right of way width may be required.</p>
Electrical transmission infrastructure crossings	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings.</p>
Civil infrastructure/major waterway facility crossing plan	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.</p>

Environmental impacts	Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 5 national wetland inventory (NWI) wetlands and 14 waterbodies, but it appears that most features are small and could be avoided without permitting. Consultation with the Army Corps of Engineers, Fish and Wildlife Service, and numerous state agencies are expected. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. The Belmont and Ashburn Presbyterian Church are historic structures that were identified in close proximity and will require further consultations. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified including listed bats, the rusty-patched bumblebee, and aquatic species. There is potential for Yellow Lance critical habitat to be identified along the proposed route and will require further consultation with the US Fish and Wildlife Service. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed transmission line that cannot be addressed.
Tower characteristics	The majority of the proposed structures will be double circuit 230kV steel monopoles (TVVS-230DC) in a vertical conductor configuration. Any proposed deadend structure will be a steel monopole. The proposed line is single circuit, so the double circuit structure allows for installation of component 39F. For approximately 0.75 miles, single circuit 230kV steel monopoles (TVVS-230) in a vertical conductor configuration will be used to reach and terminate into Farmwell Substation. For additional details, see proposed structure drawing set included in attachment 10.
Construction responsibility	Proprietary business information.
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.



Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$25,552,799.00
Component cost (in-service year)	\$28,205,510.00

### Greenfield Transmission Line Component

Component title	39F - New 230kV transmission line from Cochran Tap to Roundtable
Project description	Proprietary business information.
Point A	Cochran Tap
Point B	Roundtable
Point C	

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1573.000000	1810.000000
Winter (MVA)	1648.000000	1896.000000
Conductor size and type	3x 1780 kcmil Chukar ACSR	
Nominal voltage	AC	
Nominal voltage	230	
Line construction type	Overhead	

General route description

The route is approximately 11 miles long and is predominately double circuit with components 39D and 39F sharing a common tower for most of the route due to constructability considerations with minimizing ROW requirements. Starting a new dead end structure at the new Gant substation, the line routes north to coincide with the existing Goose Creek - Brambleton 500kV transmission ROW. Near the Pleasant View substation, the line deviates from the existing ROW and follows Cochran Mill Rd for about a half mile before turning west-southwest toward Belmont Ridge Rd where it follows north along the existing road ROW for about a half mile and then turns west-southwest again to follow the Harry Byrd ROW before turning south on the east side of Loudoun County Pkwy. The line follows the Loudoun County Pkwy ROW for a little more than 3 miles and shifts to the west side of Pkwy ROW near Interconnection Plaza to avoid conflict with 1757 Golf Club. The double circuit then splits into two single circuits near the intersection of Loudoun County Pkwy and Waxpool Road. Component 39D - Gant to Farmwell 230kV transmission line routes west along Waxpool Rd to the Farmwell substation and component 39F - Gant Cochran Rap to Roundtable continues along Loudoun County Pkwy to terminate at Roundtable substation.

Terrain description

The Project is located in the valley south of the Potomac River in Loudon County. A former agricultural region, the area is now densely developed with commercial buildings and planned residential communities within commuting distance to Washington, D.C. Some industrial facilities are located on the west end of the project area. Slopes are gentle, approximately 4%.

Right-of-way width by segment

The majority of the new right of way will have its own corridor and will be 45 ft wide, with select locations where a narrower right of way width may be required.

Electrical transmission infrastructure crossings

See Attachment 4 (Google Earth .kmz) with identified major crossings.

Civil infrastructure/major waterway facility crossing plan

See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.

Environmental impacts	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 5 national wetland inventory (NWI) wetlands and 14 waterbodies, but it appears that most features are small and could be avoided without permitting. Consultation with the Army Corps of Engineers, Fish and Wildlife Service, and numerous state agencies are expected. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. The Belmont and Ashburn Presbyterian Church are historic structures that were identified in close proximity and will require further consultations. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified including listed bats, the rusty-patched bumblebee, and aquatic species. There is potential for Yellow Lance critical habitat to be identified along the proposed route and will require further consultation with the US Fish and Wildlife Service. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed transmission line that cannot be addressed.</p>
Tower characteristics	<p>This proposed line will be installed on the double circuit 230kV steel monopoles (TVVS-230DC) proposed for component 39D. For approximately 1.25 miles, single circuit 230kV steel monopoles (TVVS-230) in a vertical conductor configuration will be used to reach and terminate into Roundtable Substation. For additional details, see proposed structure drawing set included in attachment 10.</p>
Construction responsibility	Proprietary business information.
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.

Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	\$26,735,800.00
Component cost (in-service year)	\$29,511,321.00

## Congestion Drivers

None

## Existing Flowgates

None

## New Flowgates

Proprietary Company Information

## Financial Information

Capital spend start date	09/2023
Construction start date	07/2025
Project Duration (In Months)	45

## Cost Containment Commitment

Cost cap (in current year)	Proprietary business information.
Cost cap (in-service year)	Proprietary business information.

## Components covered by cost containment

1. 4CA - New 500kV transmission line from existing Black Oak substation and new Woodside substation - NEETMA
2. 10C1A - New 500kV transmission line from new Woodside substation to Goose Creek substation - NEETMA
3. 23s5 - New Woodside Substation - 6 terminal - NEETMA
4. 39a1 - New Gant substation - 5 terminal - NEETMA
5. 10C3 - New 500kV line between new Woodside substation and new Gant substation - NEETMA
6. 39D - New 230kV transmission line from new Gant substation to existing Farmwell substation - NEETMA
7. 39F - New 230kV transmission line from Cochran Tap to Roundtable - NEETMA

### **Cost elements covered by cost containment**

Engineering & design	Yes
Permitting / routing / siting	Yes
ROW / land acquisition	Yes
Materials & equipment	Yes
Construction & commissioning	Yes
Construction management	Yes
Overheads & miscellaneous costs	Yes
Taxes	Yes
AFUDC	No
Escalation	No
Additional Information	Proprietary business information.
Is the proposer offering a binding cap on ROE?	Yes
Would this ROE cap apply to the determination of AFUDC?	Yes
Would the proposer seek to increase the proposed ROE if FERC finds that a higher ROE would not be unreasonable?	No
Is the proposer offering a Debt to Equity Ratio cap?	Proprietary business information.

Additional cost containment measures not covered above

Proprietary business information.

## **Additional Comments**

None