502 Junction - Black Oak - Woodside - Gant, Woodside SVC + Cap Banks

General Information

Proposing entity name	Proprietary Company Information
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	Proprietary Company Information
PJM Proposal ID	853
Project title	502 Junction - Black Oak - Woodside - Gant, Woodside SVC + Cap Banks
Project description	New Woodside 500/138 kV substation + SVC + Cap Banks, New Gant 500 kV substation, New 502 Junction - Black Oak - Woodside - Gant 500 kV line, plus various modifications to existing lines and substations. Proposal permitting and overhead costs are captured in Component 4CA. See attachment 1 for flowgate information.
Email	Proprietary Company 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 Gant substation Segment 1
3. 23s5 - New Woodside Substation - 6 terminal
4. 23sb - Stonewall substation two 138kV breaker expansion

5. 04AE - Black Oak substation 500kV six breaker and new transformer expansion
6. 10C3 - New 500kV line between new Woodside substation and new Gant substation Segment 2
7. 39a3 - New Gant substation - 3 terminal
8. 46a - New 500kV line from existing 502 Junction substation to existing Black Oak substation
9. 46b - 502 Junction substation two 500 kV circuit breaker expansion
10. 46b1 - Kammer to 502 Junction 500kV upgrade

Greenfield Transmission Line Component

Component title	4CA - New 500kV transmission line from existing Black Oak substation and new Woodside substation	
Project description	Proprietary Company Information	
Point A	Black Oak	
Point B	Woodside	
Point C	N/A	
	Normal ratings	**Emergency ratings**
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 sited adjacent to the existing t-line ROW 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 to construct a new 500/138 kV structure, which will be responsibility of the incumbent TO.
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 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 strcture, 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.
Tower characteristics	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.
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

Component Cost Details - In Current Year $

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information

Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	$163,502,990.00
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 Gant substation Segment 1
Project description	Proprietary Company Information
Point A	Woodside
Point B	Gant
Point C	

	Normal ratings	Emergency ratings
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 10c3 begins to continue the route to Gant 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 sited adjacent to the existing t-line ROW 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 Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
Component Cost Details - In Current Year $	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information

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

Greenfield Substation Component

Component title	23s5 - New Woodside Substation - 6 terminal
Project description	Proprietary Company Information
Substation name	Woodside
Substation description	New 3 bays breaker and a half 500kV switchyard . Interconnect Bismark-Doubs, new Black Oak Stonewall and Stonewall- Gant 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

	Name	Capacity (MVA)
Transformer	Transformer 1	485/619

	High Side	Low Side	Tertiary
Voltage (kV)	500	138	N/A

	Name	Capacity (MVA)
Transformer	Transformer 2	485/619

	High Side	Low Side	Tertiary
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.

	Normal ratings	Emergency ratings
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 Company 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 Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information

Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company 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 Company 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 Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

Component Cost Details - In Current Year $

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information

Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	$2,800,000.00
Component cost (in-service year)	$3,090,676.00

Substation Upgrade Component

Component title	04AE - Black Oak substation 500kV six breaker and new transformer expansion
Project description	Proprietary Company 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 Terminate the new Fort Martin-Black Oak line in the second bay east position Total 6 new 500 kV circuit breakers and 12 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

High Side	Low Side	Tertiary

Voltage (kV)	500	138	N/A
New equipment description	AC Substation: Add three (3) 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 Company Information		
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process		

Component Cost Details - In Current Year $

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

Greenfield Transmission Line Component

Component title	10C3 - New 500kV line between new Woodside substation and new Gant substation
Project description	Proprietary Company 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 Woodside substation 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	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 have its own corridor and will have a width of 165 ft.	
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 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."
Tower characteristics	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.
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

Component Cost Details - In Current Year $

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information

Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	$64,718,803.00
Component cost (in-service year)	$71,437,450.00

Greenfield Substation Component

Component title	39a3 - New Gant substation - 3 terminal
Project description	Proprietary Company Information
Substation name	Gant
Substation description	AC Air Insulated Substation (AIS): New proposed 500 kV Substation. New 500 kV Breaker and a Half (BAAH) switchyard, two (2) bays, three (3) line terminals, five (5) 500kV, 5000A, 63kAIC Breakers.
Nominal voltage	AC
Nominal voltage	500

Transformer Information

None

Major equipment description	AC Air Insulated Substation (AIS): New proposed 500 kV Substation. New 500 kV Breaker and a Half (BAAH) switchyard, two (2) bays, three (3) line terminals, five (5) 500kV, 5000A, 63kAIC Breakers.

	Normal ratings	**Emergency ratings**
Summer (MVA)	0.000000	0.000000
Winter (MVA)	0.000000	0.000000

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 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.
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 Company 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 Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	$58,079,000.00
Component cost (in-service year)	$64,108,349.00

Greenfield Transmission Line Component

Component title	46a - New 500kV line from existing 502 Junction substation to existing Black Oak substation
Project description	Proprietary Company Information
Point A	502 Junction
Point B	Black Oak
Point C	N/A

	Normal ratings	**Emergency ratings**
Summer (MVA)	4295.000000	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 approxiamtely 67 miles long. Starting at a new dead end structure at the 502 substation the line routes east adjacent to the existing 502 Junction to Fort Marin 500kV transmission ROW until just west of the Fort Martin substation where the line then routes south-southeast for less than a mile before crossing over the Monongahela River. As the line continues east of the river, it routes fro about 1.5 miles before coinciding with the existing West Run - Lake Lynn 138kV transmission ROW, which the route follows for about 4 miles, with small deviations from the ROW to minimize residential impacts. The line turns east at Lake Lynn substation and detours southeast to avoid residential impacts at McMelin for about 3 miles and then crosses to the north side of the existing Lake Lynn - Hazelton 138kV transmission ROW to avoid impacts at the quarry about 1.6 miles east of McMelin. About 1 mile east of the quarry, the line crosses back over to the south side of the transmission line ROW for about 21 miles, with short detours off the transmission ROW to minimize residential impacts, to the intersection of Hazelton - Jennings 138kV transmission line and Black Oak - Hatfield 500kV trnasmission line. The line then routes east-southeast to follow along the Black Oak - Hatfield 500kV transmission ROW for about 28 miles until it terminates at the Black Oak substation.	
Terrain description	The Project is located in Monongalia and Preston Counties, West Virgina, traversing east through Garrett and Allegany Counties, Maryland. The western part of the project, in the Allegheny and Cumberland Plateaus of West Virginia is predominantly covered by hardwood forests, while the eastern part of the project lies in the Allegheny Mountains, which form the western flank of the Appalachian Mountain Range. As is typical in the Allegheny region, broad flats generally lie below the ridge crests at elevations of approximately 500 feet (150 m). River valleys are generally narrow and deep, with ravines typically 1,000 to 1,800 feet (550 m) below surrounding peaks.	
Right-of-way width by segment	The new right of way will be sited adjacent to the existing t-line ROW for the majority of the route length. The right of way will be 165 ft wide for approximately 95% of the route length, however the width will be reduced to 75 ft where crossing constrained areas, for roughly 5% of the route length.	
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 4 forested national wetland inventory (NWI) wetlands and 42 waterbodies, but it appears that most features are small and could be avoided without permitting. The crossing of the Monongahela River and Cheat Lake will require additional agency consultations. 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 flat spired three-toothed snail, and snuffbox mussel, 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 of the proposed structures will be single circuit 500kV lattice towers (TTVS-500) in a horizontal configuration. A single circuit 500kV steel monopole (TVS-500) in a delta conductor configuration will be used in constrained areas. Any proposed deadend structure will either be a steel lattice tower or a 3-pole, one phase per pole configuration. See proposed structure drawing set included in attachment 10.
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
Component Cost Details - In Current Year $	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information

Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	$181,896,400.00
Component cost (in-service year)	$200,779,591.00

Substation Upgrade Component

Component title	46b - 502 Junction substation two 500 kV circuit breaker expansion
Project description	Proprietary Company Information
Substation name	502 Junction
Substation zone	Allegheny Power
Substation upgrade scope	Install two new 500kV breakers and four MODs to create a new double-breaker, double-bus bay in which to terminate new Black Oak to 502 Junction 500kV line.

Transformer Information

None

New equipment description	AC Substation: Add two (2) new 500 kV circuit breakers and four (4) MODs to create new double-breaker, double bus bay.
Substation assumptions	Area within the substation fence, south of the 500 kV yard, appears to be available.
Real-estate description	No expansion of substation fence anticipated
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

Component Cost Details - In Current Year $

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information

ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	$9,800,000.00
Component cost (in-service year)	$5,408,683.00

Transmission Line Upgrade Component

Component title	46b1 - Kammer to 502 Junction 500kV upgrade
Project description	Proprietary Company Information
Impacted transmission line	Kammer - 502 Junction 500kV
Point A	Kammer
Point B	502 Junction
Point C	
Terrain description	Work required is within existing ROW.

Existing Line Physical Characteristics

Operating voltage	500
Conductor size and type	Incumbent / Current Transmission owner specific
Hardware plan description	Utilize existing line hardware to extent possible.
Tower line characteristics	Utilize existing towers to extent practicable.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	**Emergency ratings**
Summer (MVA)	3204.000000	3729.000000
Winter (MVA)	3928.000000	4140.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Utilize existing shield wire to extent practicable	
Rebuild line length	42	
Rebuild portion description	Proposing to upgrade limiting elements to achieve specific rating.	
Right of way	Use of existing ROW to extent practicable.	
Construction responsibility	Proprietary Company Information	
Benefits/Comments	AEP and/or APS could be responsible for construction depending on location of limiting element(s).	

Component Cost Details - In Current Year $

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information

Contingency	Proprietary Company Information
Total component cost	$5,000,000.00
Component cost (in-service year)	$5,519,064.00

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 Company Information
Cost cap (in-service year)	Proprietary Company 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 Gant substation - NEETMA
3. 23s5 - New Woodside Substation - 6 terminal - NEETMA

4. 10C3 - New 500kV line between new Woodside substation and new Gant substation - NEETMA

5. 39a3 - New Gant substation - 3 terminal - NEETMA

6. 46a - New 500kV line from existing 502 Junction substation to existing Black Oak substation - 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 Company 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 Company Information
Additional cost containment measures not covered above	Proprietary Company Information

Additional Comments

None