# Amos - Welton Springs - Point of Rocks 765 kV Line

### **General Information**

Proposing entity name

Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?

Company proposal ID

PJM Proposal ID

Project title

Project description

**Email** 

Project in-service date

Tie-line impact

Interregional project

Is the proposer offering a binding cap on capital costs?

Additional benefits

## **Project Components**

- 1. Amos Substation Upgrade
- 2. Amos Welton Spring 765 kV Line
- 3. Welton Spring Switchyard
- 4. Welton Spring Point of Rocks 765 kV Line

Confidential Information

Confidential Information

Confidential Information

708

Amos - Welton Springs - Point of Rocks 765 kV Line

This proposal incorporates construction of multiple transmission lines and substation expansions to provide a robust, expandable transmission solution to address the 2024 Open Window 1 violations. This proposal will also ensure the PJM transmission system can safely and reliably accommodate future load growth.

Confidential Information

12/2029

Yes

No

Yes

Confidential Information

- 5. Point of Rocks Substation
- 6. Point of Rocks 500 kV Line Cut-Ins
- 7. Black Oak Substation
- 8. Loop The 502 Jct Woodside 500 kV Line into Black Oak Substation
- 9. Doubs No. 1 500/230 kV Transformer Terminal Upgrades

### **Substation Upgrade Component**

Component title Amos Substation Upgrade

Project description Confidential Information

Substation name Amos

Substation zone AEP

Substation upgrade scope Add one 765 kV breaker at Amos Substation to expand the breaker and a half scheme to

accommodate the new Amos - Welton Spring 765 kV Line.

#### Transformer Information

None

New equipment description - New 765 kV breaker

Substation assumptions The existing AC station service is assumed to be sufficient to accommodate the new substation

equipment.

Real-estate description All necessary land rights are acquired.

Construction responsibility Confidential Information

Benefits/Comments Confidential Information

Component Cost Details - In Current Year \$

Engineering & design Confidential Information

Permitting / routing / siting Confidential Information

ROW / land acquisition Confidential Information

Materials & equipment Confidential Information

Construction & commissioning Confidential Information

Construction management Confidential Information

Overheads & miscellaneous costs Confidential Information

Contingency Confidential Information

Total component cost \$30,868,262.00

Component cost (in-service year) \$34,742,500.00

**Greenfield Transmission Line Component** 

Component title Amos - Welton Spring 765 kV Line

Project description Confidential Information

Point A Amos

Point B Welton Spring

Point C

Normal ratings Emergency ratings

Summer (MVA) 6743.000000 7253.000000

Winter (MVA) 7512.000000 7918.000000

Conductor size and type 6 Bundled – 795 kcmil (45/7 Strand) ACSR "Tern" conductor

Nominal voltage AC

Nominal voltage 765 kV

Line construction type Overhead

General route description		
	Terrain description	
	Right-of-way width by segment	
	Electrical transmission infrastructure crossings	
	Civil infrastructure/major waterway facility crossing plan	

This new approximate 175-mile 765 kV line will be constructed in West Virginia from the existing Amos Substation in eastern Putnam County to the proposed Welton Spring Substation in northwestern Hardy County. The transmission line corridor is proposed to cross twelve counties; Putnam, Kanawha, Roane, Calhoun, Braxton, Lewis, Upshur, Barbour, Tucker, Preston, Grant and Hardy. It is assumed that the 765 kV line will parallel existing ROW for approximately 42 miles and require new ROW for approximately 133 miles. Where feasible, consideration will be given to leveraging existing transmission ROW and transmission infrastructure. A full application will be required from the Public Service Commission of West Virginia.

The terrain for the transmission line corridor is variable and often steep with mountains and ridges, isolated knobs, deeply dissected valleys and streams and upland plateaus. The corridor crosses three major ecoregions; the Western Allegheny Plateau, the Central Appalachian and Ridge and Valley ecoregions. Elevations in the Western Allegheny Plateau range between approximately 435 feet to 1730 feet mean sea level (msl). The Central Appalachian ecoregion is steeper with elevations ranging from approximately 900 feet to 3,560 feet msl. The Ridge and Valley ecoregion in the easterly portion of the corridor ranges in elevation from approximately 445 feet to 4400 feet msl.

The right-of-way width is assumed to be 200 feet. This width is based on the typical ROW needed for a 765 kV line and does not account for structure configuration or span lengths. Width may vary depending upon final design and tree clearing requirements. Approximately 42 miles (24%) of the corridor parallels existing transmission facility infrastructure. Where feasible, consideration will be given to sharing transmission ROW or overbuilding existing transmission infrastructure. Any necessary ROW acquisition will be conducted by real estate agents that will approach private landowners for voluntary negotiations of the permanent and/or temporary rights needed for the project. Although eminent domain will be a last resort, it may be necessary for project completion. For public lands, the controlling agency will be contacted to obtain the necessary licenses, special use agreements or other agreements pursuant to their respective requirements. In sensitive areas, the structure type/configuration and span lengths will be evaluated to minimize the amount of ROW needed to accommodate the new line in these areas.

See information below. Each crossing will not be listed as the route is subject to change.

The proposed 765 kV transmission line corridor will have a total of approximately 25 highway crossings, including Interstate, US and State Highways. There are 5 known railroad crossings. Coordination with the appropriate highway and railroad entities for project control such as flagging, bonding and permitting will be conducted as part of project design. The proposed corridor crosses three 69 kV lines, ten 138 kV lines and five lines over 345 kV. There are numerous gas pipelines throughout the study area which will require coordination with the various gas pipeline owners for crossings. There is one known private airfield within one mile of the proposed transmission corridor. There are no known airports or heliports within the vicinity of the proposed line. The proposed corridor crosses seven major rivers including the Kanawha, Pocatalico, Little Kanasha, Buckhannon, Middle Fork, Tygart Valley and Cheat rivers. Permits through the WVDNR, WVDEP and/or USACOE will be required.

**Environmental impacts** 

Tower characteristics

Construction responsibility

Benefits/Comments

Component Cost Details - In Current Year \$

Engineering & design

Permitting / routing / siting

ROW / land acquisition

Materials & equipment

Construction & commissioning

Construction management

The 756 kV transmission line corridor crosses approximately 217 streams, and 30 wetlands. The wetland crossings comprise approximately 25 acres of palustrine forested, scrub shrub and palustrine emergent marsh. In-stream and wetland impacts will be avoided to the extent possible. Adherence to Best Management Practices (BMPs) and permit conditions will be required. Erosion and Sediment control plans and NPDES permits will be submitted for approval by the appropriate agencies. Tree clearing will be required along this corridor, but compatible vegetation such as small shrubs, grasses, ferns and forbs will not be removed. Paralleling existing transmission infrastructure where feasible will minimize vegetation impacts and forest fragmentation. There are several sensitive plants and animals, including several bat species, the bald eagle and the WV northern flying squirrel. The proposed corridor attempts to minimize traversing land specifically managed for conservation value such as the Monongahela National Forest, private conservation easements and Wildlife Management Areas (WMAs). The corridor crosses the northern portion of the Monongahela National Forest in Tucker County and the southern tail of the Burnsville Lake WMA in Braxton County. The corridor crosses the Allegheny Trail, Allegheny Highlands Rail-Trail and the American Discovery Trail. Coordination with the USDA-Forest Service, USDA, USFWS, WNDNR, WVDEP, WVSHPO and other permitting agencies will occur. Mitigation measures, such as seasonal restrictions and those outlined in permits, will be followed.

This 765 kV transmission line utilizes a combination of self-supporting and guyed-V lattice tower construction that is horizontally configured. The predominant structure type will be guyed-V suspension towers supported by a center grillage and four bridge-strand anchors. Self-supporting suspension towers, running-corner suspension towers, and tension structures will utilize concrete drilled piers to support foundation loads. Self-supporting suspension structures will be used to the extent possible as an effort to keep electrical infrastructure compatible with agricultural use.

Confidential Information

Overheads & miscellaneous costs Confidential Information Confidential Information Contingency Total component cost \$875,000,001.00 Component cost (in-service year) \$952,983,049.00 **Greenfield Substation Component** Component title Welton Spring Switchyard

Confidential Information Project description

Substation name Welton Spring

Substation description Construct a new switchyard (Welton Spring) with 765 kV bus, two 250 MVAR shunt capacitors, and a +/-500 MVAR STATCOM. Connect the 765 kV transmission lines: Amos - Welton Spring 765 kV

Nominal voltage

Nominal voltage 765 kV

Transformer Information

None

Major equipment description

Line and Welton Spring - Point of Rocks 765 kV Line.

AC

Below Grade: Install foundation, trench, conduit and grounding for new equipment. Install fencing, stoning, grading, access road, and ground grid for new substation. Install conduit for fiber. Above Grade: Install (10) 765 kV, 63 kAIC, 5000 A circuit breakers. Install (18) 765 kV MOAB disconnect switches. Install (6) 765 kV surge arresters. Install (6) 765 kV CVTs. Install (4) 765 kV, 250 MVAR cap banks. Install (2) 765 kV dead-end structures. Install (1) 765 kV, 500 MVAR STATCOM. Install (1) 765 kV SSVT. Install (1) Prefabricated control building. Install (1) lot of fencing and (1) gate. Install (1) lot of cables, steel structures, rigid bus, grounding, and fittings for new equipment. Relaying & Control: Install (2) standard line relaying panels over fiber. Install (4) standard cap bank relaying panels. Install (6) standard breaker control panels. Install (1) SCADA RTU. Install (1) ATS. Install (1) HMI panel including GPS clock and RTAC. Install (1) fiber patch panel. Install (1) lot of control cables, fiber, and SEL cables.

Normal ratings

**Emergency ratings** 

Summer (MVA)	6743.000000	7253.000000
Winter (MVA)	7512.000000	7918.000000
Environmental assessment	Approximately 35 to 40 acres of usable land will be needed for the substation footprint. This does not include land needed for site development (grading, stormwater management, etc.), transmission line ROW, access roads, onsite soils management or mitigation. A suitable site location has been identified. There is a stream and intermittent wetlands on the property that will be avoided for substation construction. Tree clearing will be minimized to the extent practicable and any seasonal restrictions or mitigation for any sensitive species will be followed, as necessary. Permits for construction will be acquired from the appropriate governing agencies. It is assumed that the substation will be included in the application for the associated transmission lines to the WV PSC.	
Outreach plan	Public outreach is a critical component to the Proposing Entity's siting process, so efforts will include properly informing the public; federal, state, and local agencies; local governments; and other key stakeholders on the need for, and benefits of, this Project. The Proposing Entity's approach to public outreach is to be always candid and transparent, and to offer a variety of tools and means for directly impacted parties to engage with our staff. The Proposing Entity will provide development updates to local government officials, key stakeholders, and impacted parties as the Project progresses. Public outreach also will involve collecting information about landowner properties and communicating with directly affected landowners during the final siting process.	
Land acquisition plan	Entity will contact the landowners to start discus Approximately 35 to 40 acres of usable land will	be needed for the substation footprint. This does rading, stormwater management, etc.), transmission
Construction responsibility	Confidential Information	
Benefits/Comments	Confidential Information	
Component Cost Details - In Current Year \$		
Engineering & design	Confidential Information	
Permitting / routing / siting	Confidential Information	
ROW / land acquisition	Confidential Information	
Materials & equipment	Confidential Information	

**Confidential Information** 

Construction & commissioning

Construction management Confidential Information

Overheads & miscellaneous costs Confidential Information

Contingency Confidential Information

Total component cost \$213,823,425.00

Component cost (in-service year) \$240,646,163.00

**Greenfield Transmission Line Component** 

Component title Welton Spring - Point of Rocks 765 kV Line

Project description Confidential Information

Point A Welton Spring

Point B Point of Rocks

Point C

Normal ratings Emergency ratings

Summer (MVA) 6743.000000 7253.000000

Winter (MVA) 7512.000000 7918.000000

Conductor size and type 6 Bundled – 795 kcmil (45/7 Strand) ACSR "Tern" conductor

Nominal voltage AC

Nominal voltage 765

Line construction type Overhead

General route description Terrain description Right-of-way width by segment

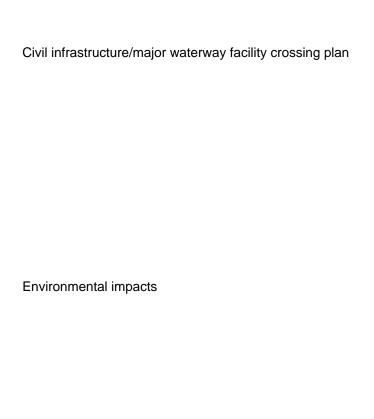
Electrical transmission infrastructure crossings

This new approximate 86-mile 765 kV line will be constructed from the proposed Welton Spring Switchyard in Hardy County, WV to the proposed Point of Rocks Substation in Frederick County, MD. The line will traverse Hardy, Hampshire and Jefferson counties in West Virginia; Frederick, Clarke and Loudoun counties in Virginia; and Frederick County, Maryland. It is assumed that the 765 kV line will parallel existing transmission ROW for most of the line except for deviations to avoid developed areas or other constraints. Where feasible, consideration will be given to leveraging existing transmission ROW and transmission infrastructure. Separate Commission applications will be required from the Public Service Commission of West Virginia, the Virginia State Corporation Commission and the Maryland Public Service Commission.

The terrain for the transmission line corridor generally slopes downhill from the proposed Welton Spring Switchyard to the proposed Point of Rocks Substation (west to east). The highest elevation is in Hardy County, West Virginia at near 3,000 feet msl to the lowest elevation near the Potomac River in Frederick County at approximately 220 feet msl. The corridor crosses three major ecoregions; the Ridge and Valley, Blue Ridge and Northern Piedmont ecoregions. Karst topography is present within the limestone valleys throughout the area, mainly east of Hardy and Hampshire counties.

The right-of-way width is assumed to be 200 feet. This width is based on the typical ROW needed for a 765 kV line and does not account for structure configuration or span lengths. Width may vary depending upon final design and tree clearing requirements. The 765 kV line will parallel existing transmission ROW for most of the line except for deviations to avoid developed areas or other constraints. Where feasible, consideration will be given to leveraging existing transmission ROW and transmission infrastructure. In sensitive areas, the proposed corridor is paralleling existing transmission corridors and will require some ROW expansion. However, the structure type/configuration and span lengths will be evaluated to minimize the amount of ROW expansion needed to accommodate the new transmission line in these areas. Any necessary ROW acquisition will be conducted by real estate agents that will approach private landowners for voluntary negotiations of the permanent and/or temporary rights needed for the project. Although eminent domain will be a last resort, it may be necessary for project completion. For public lands, the controlling agency will be contacted to obtain the necessary licenses, special use agreements or other agreements pursuant to their respective requirements.

See information below. Each crossing will not be listed as the route is subject to change.



Tower characteristics

The proposed 765 kV transmission line corridor will have numerous highway and road crossings, including crossings of major highways and interstates including US 220, US 50, US 522, US 11, US 340, US 15 and I-81. There are 7 known railroad crossings, including the crossing of the Baltimore and Ohio Recreational Rail Line in Hardy County, WV. Coordination with the appropriate highway and railroad entities for project control such as flagging, bonding and permitting will be conducted as part of project design. The line parallels the Bismark-Doubs 500 kV Line, crossing over one 138 kV transmission line until it reaches the Gore Substation. The line then continues to parallel the 500 kV and 138 kV transmission line corridor, crossing over the existing lines where necessary to avoid development and other constraints to the Doubs Substation. From there, the line heads in a southerly direction along the existing 500 kV and 230 kV corridor to the proposed Point of Rocks Substation. There are numerous gas pipelines throughout the study area which will require coordination with the various gas pipeline owners for crossings. The proposed corridor crosses four major rivers including the South Branch-Potomac River, Cacapon River, Shenandoah River and the Potomac River. State and Federal permits will be required.

The 756 kV transmission line corridor crosses approximately 90 streams, and approximately 20 acres of wetland across the three states. The wetland crossings comprise of palustrine forested, scrub shrub and palustrine emergent marsh. In-stream and wetland impacts will be avoided to the extent possible. Adherence to Best Management Practices (BMPs) and permit conditions will be required. Erosion and Sediment control plans and NPDES permits will be submitted for approval by the appropriate agencies. Tree clearing will be required along this corridor, but compatible vegetation such as small shrubs, grasses, ferns and forbs will not be removed. Paralleling existing transmission infrastructure where feasible will minimize vegetation impacts and forest fragmentation. There are several sensitive plants and animals, including several bat species, the bald eagle and the wood turtle. The proposed corridor attempts to minimize traversing land specifically managed for conservation value such as the Nathaniel and Short Mountain WMAs, the southernmost boundary of the Harpers Ferry National Historical Park, the Appalachian Trail and the C&O Canal Tow Path. In sensitive areas, the proposed transmission line corridor is paralleling existing transmission corridors and will require expansion. However, the structure type/configuration and span lengths will be evaluated to minimize the amount of ROW expansion needed to accommodate the new transmission line in these areas. Note that the Appalachian Trail Conservancy guidelines stipulate that any new utility crossing of the trail should be at already disturbed crossings, which this proposed transmission line will accomplish by using the same corridor as the existing transmission infrastructure. Coordination with USDA, USFWS, NPS and numerous state and local agencies will occur. Mitigation measures, such as seasonal restrictions and those outlined in permits, will be followed.

This 765 kV line utilizes a combination of self-supporting and guyed-V lattice tower construction that is horizontally configured. The predominant structure type will be guyed-V suspension towers supported by a center grillage and four bridge-strand anchors. Self-supporting suspension towers, running-corner suspension towers, and tension structures will utilize concrete drilled piers to support foundation loads. Self-supporting suspension structures will be used to the extent possible as an effort to keep electrical infrastructure compatible with agricultural use.

Construction responsibility Confidential Information

Benefits/Comments Confidential Information

Component Cost Details - In Current Year \$

Engineering & design Confidential Information

Permitting / routing / siting Confidential Information

ROW / land acquisition Confidential Information

Materials & equipment Confidential Information

Construction & commissioning Confidential Information

Construction management Confidential Information

Overheads & miscellaneous costs Confidential Information

Contingency Confidential Information

Total component cost \$430,000,000.00

Component cost (in-service year) \$468,323,098.00

**Greenfield Substation Component** 

Component title Point of Rocks Substation

Project description Confidential Information

Substation name Point of Rocks

Substation description Construct a new substation called Point of Rocks with a 765 kV and a 500 kV yard. Loop in the

Doubs - Goose Creek 500 kV Line, the Doubs - Aspen 500 kV Line, and the Woodside - Goose

Creek 500 kV Line.

Nominal voltage AC

Nominal voltage 765/500

#### Transformer Information

Voltage (kV)

Major equipment description

Name Capacity (MVA) Transformer Point of Rocks No. 1 500/667/833 Low Side High Side **Tertiary** Voltage (kV) 765 500 13.8 Name Capacity (MVA) Transformer Point of Rocks No. 2 500/667/833 High Side Low Side **Tertiary** 

765

Below Grade: Install (1 Lot) of foundations, conduit, and grounding for new equipment. Install (1 Lot) of cable trench. Install (1 Lot) of fencing, stoning, grading, access road, and ground grid for the new substation. Install (1 Lot) of conduit for fiber. Above Grade: Install (8) 765/500 kV single-phase transformers. (2 single-phase units are spare) Install (10) 765 kV circuit breakers. Install (21) 765 kV MOAB disconnect switches. Install (1) 765 kV +/-500 MVAR STATCOM. Install (2) 765 kV 250 MVAR capacitor banks. Install (18) 765 kV CCVTs. Install (3) 765 kV surge arresters. Install (5) 765 kV steel deadend structures. Install (14) 500 kV circuit breakers. Install (34) 500 kV MOAB disconnect switches. Install (2) 500 kV, 250 MVAR capacitor banks. Install (30) 500 kV CCVTs. Install (18) 500 kV surge arresters. Install (8) 500 kV steel dead-end structures. Install (4) aux power transformers to be fed from distribution system. Install (1 Lot) of 765 kV & 500 kV hard bus, fittings, insulators, conductor, connectors, and steel structures. Install (1 Lot) of shielding for lightning protection for new 765 kV & 500 kV yards. Install (1 Lot) of fencing and lighting for new substation yard. Install (2) prefabricated control buildings with battery systems, AC & DC aux power panels, security cabinets, and MPLS network equipment. Relaying & Control: Install (7) line protection panels consisting of (2) SEL-411L relays each. Install (7) bus protection panels consisting of (2) SEL-487B relays each. Install (2) transformer protection panels consisting of (1) SEL-487E, (1) SEL-587, and (1) SEL-421 relays each. Install (4) cap bank protection panels consisting of (2) SEL-487V relays each. Install (24) breaker control panels consisting of (1) SEL-451 relay each. Install (2) SCADA RTU cabinets. Install (2) HMI panels including GPS clocks and RTACs. Install (2) ATSs. Install (1 Lot) of control cable, SEL cables, and fiber jumpers.

13.8

Normal ratings Emergency ratings

500

Summer (MVA)	0.000000	0.000000	
Winter (MVA)	0.000000	0.000000	
Environmental assessment	not include land needed for site development (g line ROW, access roads, onsite soils management Potomac River and is relatively low lying with structure property. The substation site will be located on the avoid these features to the extent practicable. Do be present. Coordination with SHPO and PPRP substation construction. Seasonal restrictions are	he more upland portion of the property and will ue to its proximity to the river, cultural artifacts may will be required. Tree clearing will be necessary for mitigation will be followed. Permits for the governing agencies, include zoning and special	
Outreach plan	and means for directly impacted parties to enga-	ate, and local agencies; local governments; and lefits of, this Project. The Proposing Entity's did and transparent, and to offer a variety of tools ge with our staff. The Proposing Entity will provide als, key stakeholders, and impacted parties as the olve collecting information about landowner	
Land acquisition plan	acquisition plan  The Property is owned by the Proposing Party and no additional land acquisition is anticipated acquisition.		
Construction responsibility	Confidential Information		
Benefits/Comments	Confidential Information		
Component Cost Details - In Current Year \$			
Engineering & design	Confidential Information		
Permitting / routing / siting	Confidential Information		
ROW / land acquisition	Confidential Information		
Materials & equipment	Confidential Information		
Construction & commissioning	Confidential Information		

**Confidential Information** 

Construction management