

# Sorenson-Maddox Circuit Addition

## General Information

Proposing entity name	AEPSCT
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	AEP_L
PJM Proposal ID	334
Project title	Sorenson-Maddox Circuit Addition
Project description	The project will perform work to string the open positions of the 345 kV line between Maddox Creek and Sorenson stations in order to establish a new 345 kV circuit between the two stations (42.6 miles). As part of the proposal the existing conductors on the line will be reconducted. To accommodate the new 345 kV circuit and address additional loading on the Maddox Creek-East Lima 345 kV line, work will be performed at Maddox Creek, Sorenson, and East Lima stations.
Email	nckoehler@aep.com
Project in-service date	06/2027
Tie-line impact	No
Interregional project	No
Is the proposer offering a binding cap on capital costs?	No
Additional benefits	Project will address 42+ miles of Paper Expanded (PE) conductor originally installed in 1955 that has become an asset renewal concern for AEP across our footprint. AEP has concerns of increased core corrosion on PE conductors based upon review of conductor samples following recovery events. AEP shared additional details on the PE conductor concerns with stakeholders during the May 9th 2023 TEAC meeting. The proposal also creates a second path between Sorenson and Maddox Stations while utilizing existing infrastructure in the area.

## Project Components

1. Sorenson-Maddox Creek Circuit Addition
2. Sorenson Station Work
3. Maddox Creek Breaker Additions
4. East Lima Breaker Replacements

## Transmission Line Upgrade Component

Component title	Sorenson-Maddox Creek Circuit Addition
Project description	Perform work to string the open positions of the 345 kV line between Maddox Creek and Sorenson stations in order to establish a new 345 kV circuit between the two stations (42.6 miles). Due to the existing positions of the conductor on the towers, the existing line will also be reconducted in order to utilize the open positions on the towers.
Impacted transmission line	Sorenson-Maddox Creek 345 kV
Point A	Sorenson
Point B	Maddox Creek
Point C	
Terrain description	Flat terrain in a mix of urban and rural territory.

### Existing Line Physical Characteristics

Operating voltage	345
Conductor size and type	2303.5 ACAR 54/37, 1275 ACSR/PE 54/19, 1414 ACSR/PE 62/19
Hardware plan description	Existing hardware will be removed. New hardware to be installed. Existing towers will be re-used.
Tower line characteristics	This line is 1955 constructed double circuit lattice towers with porcelain suspension insulators. The line has 224 open hardware conditions relating to worn insulator assembly hardware, worn shield wire hardware, broken insulator-suspension hardware and broken insulators.

### Proposed Line Characteristics

	<b>Designed</b>	<b>Operating</b>
Voltage (kV)	345.000000	345.000000

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1096.000000	1203.000000
Winter (MVA)	1423.000000	1511.000000
Conductor size and type	2-1272 54/19 Pheasant ACSS	
Shield wire size and type	2x OPGW	
Rebuild line length	42.6 miles	
Rebuild portion description	<p>Approximately ~42.6 miles of 345kV will be reconducted from Sorenson-Maddox Creek 345kV for the existing Allen-Sorenson, Allen-RP Mone, RP Mone-Maddox 345kV circuits. A second circuit consisting of ~42.6 miles 345kV will be strung on the towers to create a new Sorenson-Maddox Creek 345kV circuit. Most of the towers will be re-used with 14 towers planned to be replaced which are dead ends, some angle structures and some single circuit poles. -Structures (typ. SJ1 lattice tower, vintage 1955) will be structurally reinforced as necessary, to mitigate any overloading caused by the addition of a second circuit. -Structures (typ. SJ1 lattice tower, vintage 1955) will be modified to accept 2 offset shield wires, instead of the currently designed 1 central shield wire -Structures (typ. SJ1 lattice tower, vintage 1955) will be modified to increase clearances as necessary, due to the new conductors increased MTL sag -Assume for scoping purposes that existing structures/towers are in good condition, and can receive modifications as required to increase structural strength, span clearance, and grounding/shielding performance -Assume towers will be inspected and conditions verified -Dead-End structures will be added/replaced at some points throughout the line to help with stringing and cascading failure performance -Typical spans range from 1300'-1400' on the East Lima - Sorenson 345kV Line. These span lengths will remain the same</p>	
Right of way	All existing ROW will be used. Supplemental easements may be obtained if/as needed along the line route.	
Construction responsibility	AEP	
Benefits/Comments		
<b>Component Cost Details - In Current Year \$</b>		
Engineering & design	Detailed cost breakdown	
Permitting / routing / siting	Detailed cost breakdown	
ROW / land acquisition	Detailed cost breakdown	

Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	\$119,185,468.35
Component cost (in-service year)	\$119,185,468.35

### **Substation Upgrade Component**

Component title	Sorenson Station Work
Project description	Install a 345 kV breaker at Sorenson station in order to terminate new circuit from Maddox Creek station.
Substation name	Sorenson
Substation zone	205 - AEP
Substation upgrade scope	Terminate new Sorenson - Maddox Creek 345kV circuit into Sorenson station. Install new 345kV circuit breaker.

### **Transformer Information**

None	
New equipment description	(1) 3000A 50kA 345kV Circuit Breaker
Substation assumptions	Outages are available and adequate room exists in the 345 kV yard and control house.
Real-estate description	N/A. All work to be performed inside existing station fence and AEP property
Construction responsibility	AEP
Benefits/Comments	

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

Engineering & design	Detailed cost breakdown
Permitting / routing / siting	Detailed cost breakdown
ROW / land acquisition	Detailed cost breakdown
Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	\$3,453,530.10
Component cost (in-service year)	\$3,453,530.10

### Substation Upgrade Component

Component title	Maddox Creek Breaker Additions
Project description	Install four 345 kV breakers at Maddox Creek station in order to terminate new circuit from Sorenson station. Replace breakers 'B1' and 'B' at Maddox Creek.
Substation name	Maddox Creek
Substation zone	205 - AEP
Substation upgrade scope	Terminate new Maddox Creek - Sorenson 345 kV circuit into Maddox Creek. Install 4x new 345kV circuit breakers and replace 345kV breakers B and B1.

### Transformer Information

None	
New equipment description	(2x) 4000A 50kA 345kV Circuit Breakers (4x) 3000A 50kA 345kV Circuit Breakers

Substation assumptions  
 IPP scope of work has been executed to previously install CB-B. Existing station property is sufficient. Cable excavations will be hydro-vac. For foundation the top 2-ft of soil will be hydro-vac before machine digging. Any and all necessary permitting will be available. All necessary outages will be available Existing facilities for CB-B &CB-B1 are adequate for re-use with the new 4000A circuit breakers.

Real-estate description  
 N/A. All work proposed to be inside existing fence and AEP property.

Construction responsibility  
 AEP

Benefits/Comments

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

Engineering & design  
 Detailed cost breakdown

Permitting / routing / siting  
 Detailed cost breakdown

ROW / land acquisition  
 Detailed cost breakdown

Materials & equipment  
 Detailed cost breakdown

Construction & commissioning  
 Detailed cost breakdown

Construction management  
 Detailed cost breakdown

Overheads & miscellaneous costs  
 Detailed cost breakdown

Contingency  
 Detailed cost breakdown

Total component cost  
 \$9,996,954.20

Component cost (in-service year)  
 \$9,996,954.20

**Substation Upgrade Component**

Component title  
 East Lima Breaker Replacements

Project description  
 Replace two 345kV breakers 'M' and 'M2' at East Lima Station

Substation name  
 East Lima

Substation zone  
 205 - AEP

Substation upgrade scope

Replace 345kV breakers M and M2 at East Lima

### **Transformer Information**

None

New equipment description

(2x) 4000A 50kA 345kV Circuit Breakers

Substation assumptions

Existing foundation, control cable, and other supporting facilities are in good working order to be re-used with the new breakers All necessary outages will be available

Real-estate description

N/A. All work to be performed inside existing station fence and AEP property.

Construction responsibility

AEP

Benefits/Comments

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

Engineering & design

Detailed cost breakdown

Permitting / routing / siting

Detailed cost breakdown

ROW / land acquisition

Detailed cost breakdown

Materials & equipment

Detailed cost breakdown

Construction & commissioning

Detailed cost breakdown

Construction management

Detailed cost breakdown

Overheads & miscellaneous costs

Detailed cost breakdown

Contingency

Detailed cost breakdown

Total component cost

\$1,760,711.70

Component cost (in-service year)

\$1,760,711.70

### **Congestion Drivers**

None

## Existing Flowgates

FG #	Fr Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
2023W2-GD-W12	243211	05ALLEN	242933	05RPMONE	1	345	205	Winter Gen Deliv	Included
2023W2-GD-W58	242933	05RPMONE	246929	05MADDOX	1	345	205	Winter Gen Deliv	Included
2023W2-GD-W21	242933	05RPMONE	246929	05MADDOX	1	345	205	Winter Gen Deliv	Included
2023W2-GD-S142	242933	05RPMONE	246929	05MADDOX	1	345	205	Summer Gen Deliv	Included
2023W2-GD-S170	242933	05RPMONE	246929	05MADDOX	1	345	205	Summer Gen Deliv	Included

## New Flowgates

None

## Financial Information

Capital spend start date 06/2024

Construction start date 12/2025

Project Duration (In Months) 36

## Additional Comments

None