Generation Interconnection

Facilities Study Report

for

Queue Project AD1-106

North Waldo - Wildcreek 138 kV

Marion County, Ohio

March 2022

1 Facilities Study Summary

1.1 Project Description

Chestnut Solar, LLC proposes to install PJM Project AD1-106, a 60 MW (22.8 MW Capacity) solar generating facility in Marion County, Ohio (Figure 2). The point of interconnection for the generating facility will be via a new station cut into AEP's North Waldo – LaRue 138 kV section of the West Mount Vernon – LaRue 138 kV circuit (Figure 1).

1.2 Amendments/Changes to the Impact Study Report

Baseline project B2794 is adding the LaRue ring bus station in the North Waldo – Wildcreek section of the West Mount Vernon – South Kenton 138kV Circuit. The projected in service date of the B2794 project is 6/30/2022.

1.3 Interconnection Customer Schedule

PJM and AEP understand that the Interconnection Customer has established the following schedule dates:

Receive back feed power from AEP: Fall 2022

Generation Commercial Operation Date: December 2022

Acknowledgement of the Interconnection Customer's requested back feed and commercial operation dates does not imply AEP's commitment to or guarantee of these dates.

1.4 AEP's Scope of Work to Facilitate Interconnection

- **AEP will perform a review of the Interconnection Customer's Option to Build design documents and drawings. The Interconnection customer is required to follow the parameters outlined in the "Independent Power Producer (IPP) Option to Build Guidelines". These requirements can be accessed at:** https://www.aep.com/assets/docs/requiredpostings/TransmissionStudies/docs/2020/IPPOptiontoBuildGuidelinesv2.pdf**.**

- AEP will install two (2) new dead end structures in the existing North Waldo – LaRue 138 kV section of West Mount Vernon – LaRue 138 kV Right of Way. One span of transmission line will be extended from each dead end structure to the proposed West Waldo 138 kV Station in an in-and-out arrangement.

- AEP Protection and Control Engineering will perform a P&C equipment checkout and end-to-end testing.

- AEP will provide construction oversight.

- It is understood that the Interconnection Customer is responsible for all of the connection costs associated with interconnecting the PJM project AD1-106 to the AEP transmission system. The cost of the customer's generating facility and the costs for the lines connecting the generating facility to AEP's transmission system (beyond the first span exiting AEP's station) are not included in this report; these are assumed to be the Customer's responsibility.

- AEP will extend the half mile of fiber from North Waldo station to the proposed West Waldo 138 kV station.

1.5 Description of Transmission Owner Facilities Included in the Facilities Study

1.5.1 Direct Connection Work

- AEP Protection and Control Engineering will perform a P&C equipment checkout and end-to-end testing.
- AEP will provide construction oversight.

1.5.2 Non-Direct Connection Work

- AEP will install two (2) new dead end structures in the existing North Waldo – LaRue 138 kV section of West Mount Vernon – LaRue 138 kV Right of Way. One span of transmission line will be extended from each dead end structure to the proposed West Waldo 138 kV Station in an in-and-out arrangement.

- AEP will review and adjust (as needed) the protection and control setting at the West Mount Vernon 138 kV Station.

1.5.3 Attachment Facilities Work

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- **None**

1.5.4 Network Upgrade Work

Due to system overloads found during the PJM studies, the following network reinforcements are required:

- **None**

1.6 No AEP facility upgrades will be needed. Total Cost of Transmission Owner Facilities Included in the Facilities Study:

Attachment Facilities	$0
Direct Connection Facilities	$467,269.99
Non-Direct Connection Facilities	$1,180,317.01
Network Upgrade Facilities	$0
Total Cost	$1,647,587.00

The estimates do not include the impact that delays in obtaining ROW, permits, or other approvals may have.

1.7 Summary of Schedule Milestones for Completion of Transmission Owner Work Included in Facilities Study:

Option To Build Process

Task (Option to Build Process)	Dates
Design Review (At 30%, 60%, 90%, Complete)	**60 days after submission for review**
Outage Request Submitted	**Customer Driven**
Transmission Line Analysis	**Customer Driven**
Construction Management	**Customer Driven**
Transmission Line Cut-Over	**Customer Driven**
P&C Checkout	**Customer Driven**

Assumptions (Standard Process)

- **Estimates provided are based on a table top process without the benefit of the results of site specific engineering studies (e.g., soil borings, environmental survey, ground grid, etc.), unless otherwise provided by the Interconnection Customer**
- **System conditions must allow scheduled outages to occur.**
- **All transmission outages are subject to PJM and AEP Operations outage scheduling requirements.**
- **The Interconnection customer will obtain, at its cost, all necessary provisions for the AEP direct connection facilities.**
- **The Interconnection customer will perform site development and road construction in accordance with AEP specifications. OPSB applications will be coordinated between IC and TO.**
- **The customer will provide a site acceptable to AEP (for transfer to AEP in Fee Simple) and any additional easements for West Waldo 138 kV station and line work required to enable access to all facilities and structures.**
- **The proposed West Waldo 138 kV Station interconnecting AD1-106 will be located in close proximity to the existing North Waldo – LaRue section of the West Mount Vernon – LaRue 138 kV circuit 138 kV circuit Right of Way.**
- **The customer will have their construction and required checkout completed prior to the start of the cut-in and testing outage.**
- **There are no relay setting changes needed at the LaRue station.**

Additional Assumptions (Option to Build Process)

- **The Interconnection Customer will use firms from the AEP approved list that have experience in the transmission region where the POI is located.**
- **The Interconnection Customer follows the requirements specified in 'AEP Siting, Permitting, Right of Way, and Real Estate Requirements for Independent Power Producers exercising the Option to Build', available at: https://www.aep.com/assets/docs/requiredpostings/TransmissionStudies/docs/2019/MerchantGenerationGuidelinesPJMoptiontoBuild.pdf**

2 Transmission Owner Facilities Study Results

2.1 Transmission Lines – New

- AEP will install two (2) new dead end structures in the existing North Waldo – LaRue section of the West Mount Vernon – LaRue 138 kV Right of Way. One span of transmission line will be extended from each dead end structure to the proposed West Waldo 138 kV Station in an in-and-out arrangement

2.2 Transmission Line – Upgrades

- No transmission line upgrades will be required for this project.

2.3 Substation Facilities – New

- **AEP will provide construction oversight during the Interconnection Customer construction of the new station.**
- **AEP will perform a protection and controls checkout including end-to-end testing following completion of the Interconnection Customer's construction of the new West Waldo 138 kV Station.**

2.4 Substation Facilities – New

- Protective-relay settings at AEP's West Mount Vernon remote-end station will need to be reviewed and updated (as needed) to coordinate with the proposed 138 kV substation.

2.5 Metering & Communications

Standard 138 kV metering will be installed at the proposed West Waldo 138 kV station. A standard station communication scheme will be used. All metering equipment shall meet the requirements as specified by AEP in the "AEP Metering and Telemetering Requirements for AEP Transmission Customers" document (SS-490011). Communication requirements are published in the "AEP SCADA RTU Requirements at Transmission Interconnection Facilities" (SS-500000).

The Generation Interconnection Agreement does not in or by itself establish a requirement for American Electric Power to provide power for consumption at the developer's facilities. A separate agreement shall be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand, and proper metering equipment is installed. The metering work above and cost indicated below does not include any potential work or cost to address metering requirements of the local service provider. It is the responsibility of the developer to contact the local service provider to obtain the local service agreement that is required prior to energization.

2.6 Environmental, Real Estate and Permitting issues

The Interconnection customer is expected to obtain, at its cost, all necessary permits and provisions for the IPP station adjacent to the proposed West Waldo 138 kV Station.

2.7 System Modeling & Operating Requirements

In addition to the IPP modeling requirements imposed by PJM as part of the Generation Interconnection process, the following system modeling parameters will need to be supplied by the Interconnection Customer to AEP:

- Modeling parameters are required as outlined in the 'Connection Requirements for the AEP Transmission System.' These requirements can be accessed at: https://aep.com/requiredpostings/AEPTransmissionStudies

2.8 Summary of Results of Study

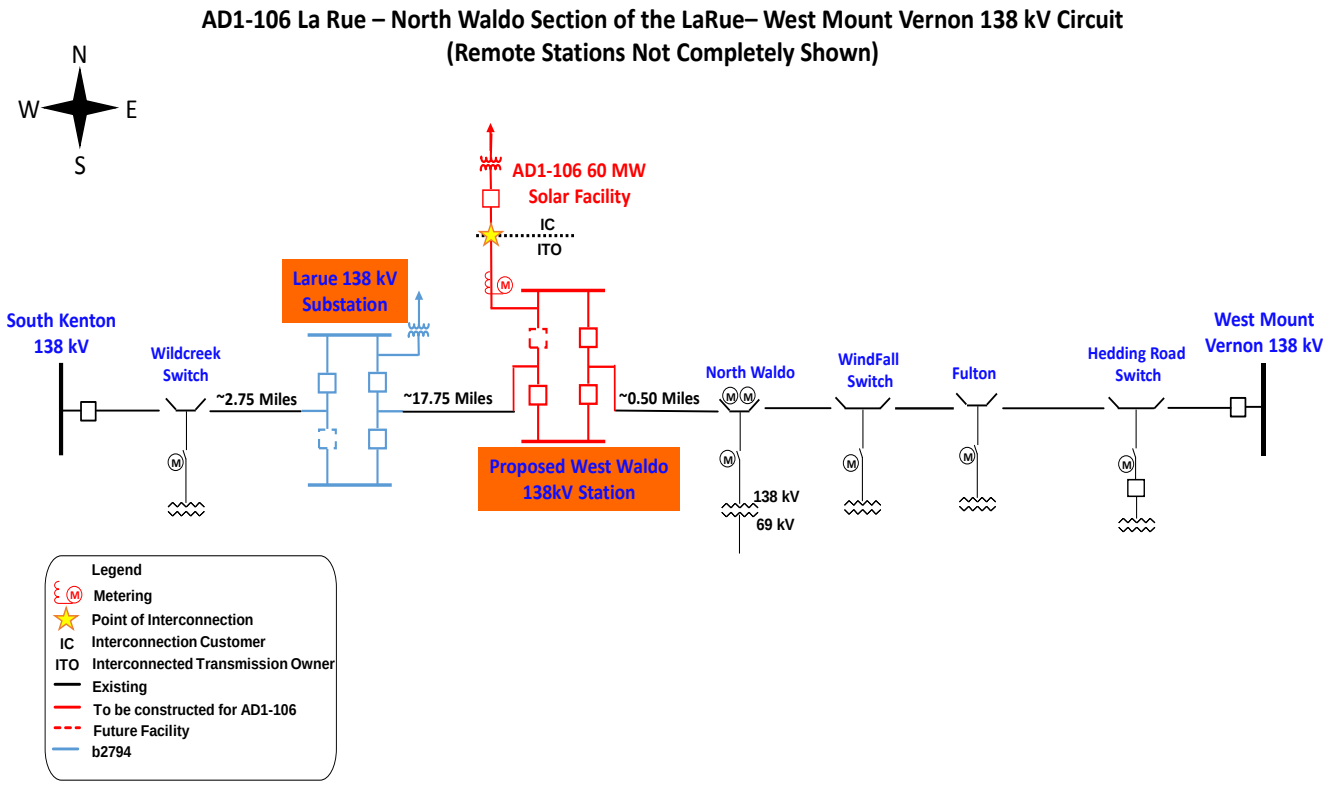
Cost Estimates for AEP

Task	Network Upgrade Number	Engineering	Material	Construction	Other	TOTAL
Oversight of Proposed West Waldo 138 kV Station Constructed by IC	N7988	$66,004.33	$108,771.33	$187,737.33	$104,757.00	**$467,269.99**
North Waldo – LaRue T-line Cut In	N7989	$183,210.00	$98,775.00	$397,845.00	$156,074.00	**$835,904.00**
Upgrade line protection and controls at the West Mount Vernon 138 kV substation.	N7990	$6,423.00	$1,584.00	$1,161.00	$9,001.00	**$18,178.00**
North Waldo Fiber Extension	N8047	$28,308.67	$51,721.67	$187,279.67	$58,934.00	**$326,244.01**
TOTAL		**$283,946.00**	**$260,852.00**	**$774,023.00**	**$328,766.00**	**$1,647,596.00**

2.9 Information Required for Interconnection Service Agreement

Description	DCF Facility	NUF Facility	ATF Facility	TOTAL
Direct Material	$108,771.33	$152,080.67	$0.00	$260,852.00
Direct Labor	$253,741.66	$804,236.33	$0.00	$1,057,969.00
Indirect Material	$25,807.24	$35,541.77	$0.00	$61,349.01
Indirect Labor	$78,949.76	$188,467.23	$0.00	$267,416.99
TOTAL	$467,269.99	$1,180,326	$0.00	$1,647,596.00

Figure 1: Point of Interconnection One-Line Diagram



The Point of Interconnection is the first structure outside of AEP's proposed West Waldo 138 kV station (such structure being located in Interconnection Customer's Collector Substation) with the Interconnected Transmission Owner owning the first span of conductors, and the Interconnection Customer owning the first structure.

Figure 2: Point of Interconnection Map