NextEra Energy Transmission Southwest

Facility Study Report

GEN- 2022-054 (Bourbon 2 Solar)

1. Background:

1.1 Per the Generator Interconnection Procedures (GIP), Attachment V, Section 8.11, SPP requests that NextEra Energy Transmission Southwest (NEET SW) perform a facilities study for the following Interconnection and/or Network Upgrade(s):

Upgrade Type	Upgrade Name
Interconnection	Wolf Creek - Blackberry 345kV GEN-2022-054 Interconnection (Non- Shared NU) (NEET SW)
Interconnection	Wolf Creek - Blackberry 345kV GEN-2022-054 Interconnection (TOIF) (NEET SW)

2. Study Requirements:

NEET SW has performed this Facility Study report in accordance with the Generator Interconnection Procedures (GIP), Attachment V, Section 8.11 for the Interconnection and/or Network Upgrade(s) as described in Section 1.

2.1. The Facility Study report includes an evaluation of the following:

2.1.1. Perform/develop a substation layout, perform a preliminary bus design, determine all electrical equipment requirements, and if required, determine a suitable site location to accommodate the Request. Develop/compile cost estimates for all NEET SW labor, overheads, equipment additions, modifications, etc. to accommodate the generator interconnection.

2.1.2 Develop an overall construction schedule for completion of the necessary additions and/or modifications.

2.1.3. Point Of Change of Ownership shall mean the point, as set forth in Appendix A to the Generator Interconnection Agreement, where the Interconnection Customer's Interconnection Facilities connect to the Transmission Owner's Interconnection Facilities. For the purposes of this Facility Study report, the Point of Change of Ownership location is defined as the overhead 345kV line connecting the Interconnection Customer’s substation to the Point of Change of Ownership (“POCO”) at Transmission Owner’s dead-end structure outside Transmission Owner’s existing Wolf Creek - Blackberry 345kV Substation.

2.1.4. The Point of Interconnection is the physical point where the interconnection facilities attach to the new 345kV substation bus station built by the transmission owner to interconnect the Bourbon 2 solar project.

2.1.5. Other Interconnection/Metering Requirements. Basic indication, metering, monitoring control, and relaying requirements due to a generator interconnection are included in the cost estimate. NEET SW generation metering requirements, as an SPP Transmission Owner, must be met. A list of specific needs will be provided by NEET SW once design has progressed.

3. Study results for GEN-2022-054:

The following results document the analysis of the required facilities for this Interconnection Request as outlined in Section 1 for interconnecting the Wolf Creek - Blackberry 345 kV line with a five (5) breaker, two (2) bay, breaker-and-a-half (BAAH) configured station. The 345kV switchyard construction will include installation of five (5) circuit breakers, five (5) breaker disconnect switches, one (1) line disconnect switch, three (3) potential transformers, three (3) current transformers, all associated bus work required for connection and required protection and control additions. Reference Figure A2, Conceptual One-line Diagram, and Figure A3, Overall Electrical Plan – General Arrangement. All protection and control schemes will follow NEET SW's internal design standards. NEET SW has determined that the following additions and improvements are required to maintain a safe and reliable interconnection to NEET SW transmission system.

3.1.3. Physical

The physical scope includes:

- (5) – 345kV, 3000A, 63kA GIB (Gas Insulated Breakers)
- (10) – 345kV Hand Crank Vertical Break Switches
- (3) – 345kV Motor Operated Vertical Break Line Switches
- (3) – Current Metering Transformer (CT)
- (3) – Potential Metering Transformer (PT)
- (15) – Capacitive Voltage Transformer No Carrier (CVT)
- (9) – Surge Arrestors
- (2) – Station Service Voltage Transformer (SSVT)
- (1) – Control House
- (1 Lot) – Conduit and Grounding
- (1 Lot) – Aluminum Bus, Stranded Jumpers, and Connectors

3.2. Civil & Structural

The Civil and Structural scope includes:

- (1 Lot) – Site Work/Water Diversion
- (1 Lot) – Ground Grid
- (1 Lot) – Security Fence
- (1 Lot) – Lot Final Surfacing (Crushed Limestone)
- (1 Lot) – Foundations

- (1 Lot) – Structural Steel
    - A-frames
    - Bus supports
    - Equipment supports
    - Static Masts

3.3. Relay & Control

The study assesses that the control house will have room to install metering and relaying panels, and any other equipment as needed, including future panels for the ultimate layout:

- (1) – Metering Panel
- (1 Lot) – Relay panels
- (1 Lot) – Control Cable Installation and Termination

3.4. **Environmental Requirements** Compliance with all applicable federal, state, and local regulations will be strictly adhered to. Additionally, all applicable and required permits and approvals will be obtained prior to construction.

4. Transmission Line Scope

The transmission line scope for this project involves the loop in and out of the 5-breaker station proposed for Bourbon 2 solar project with the cut-in of the Wolf Creek to Blackberry 345kV circuit that is approximately .50 miles. Along with an interconnection facilities line approximately .10 miles in length. The cut-in for Transmission Line will require four (4) new steel structures (3 dead-ends and 1 tangent) on drilled pier foundations.

4.1. The new interconnection facilities line will route to a Point of Change of Ownership (POCO) structure approximately .10 miles away from the new switchyard. The Generator will provide the installation of the last span into the new collection substation. (See Figure A1: Point of Change of Ownership (POCO) Detail).

5. Point of Change of Ownership (POCO)

This study will not represent or outline the Customer facilities required for the interconnection other than the physical Point of Change of Ownership (POCO) between the generating facilities and the interconnection facilities. The Generator shall be responsible to extend its 345 kV generation tie line and, at a minimum, 96 count optical ground wire (OPGW) from the POCO to the Generator's facility. Generator shall extend the OPGW to the Generator's provided splice can, which is to be mounted by the Generator on the Generator's interconnecting dead-end structure, where the Generator will terminate the fibers and route back to its control house in the Generator's station. The Generator shall acquire easement, or similar, rights allowing for installation of the Generator's assets to the defined POCO structure.

6. Construction Schedule

The preliminary project schedule provided is for planning level purposes only and will be adjusted with additional project definition. If it is determined that National Environmental Policy Act (NEPA) and/or ROW condemnation is required, 12-18 months will be added to the In-Service date.

Activity	Estimated Duration	Estimated Start	Estimated Finish
Total duration	44 months		
Development (FIS/IA/Land)	12 months	Month 0	Month 12
Environmental Survey	12 months	Month 12	Month 24
Equipment Procurement	36 months	Month 0	Month 36
Switchyard Construction	19 months	Month 24	Month 43
T-line Construction	9 months	Month 34	Month 43
Testing & Commissioning	1 month	Month 43	Month 44
Total Duration	44 months		

7. Cost Estimate

GEN-2022-054 Estimated Costs Non Shared Network Upgrades (NSNU)	Current Year $
Line Costs (Loop in – Loop out)	
Engineering & Overhead	$120,000
Materials	$740,000
EPC (Labor & Materials)	$1,000,000
Contingency & Escalation	$850,000
AFUDC & Taxes	$124,220
Line Sub Total	**$2,834,220**
Station Costs	
Engineering & Overhead	$1,280,000
Materials	$8,920,000
EPC (Labor & Materials)	$7,980,000
Contingency & Escalation	$5,030,000
Land, Environmental, Legal & Development	$665,000
AFUDC & Taxes	$1,270,000
Station Sub Total	**$25,145,000**
GEN-2022-054 NSNU Total Costs	**$27,979,220**

GEN-2022-054 Estimated Costs TOIF Network Upgrades	Current Year $
Engineering & Overhead)	$30,000
Materials	$220,000
EPC (Labor & Materials)	$280,000
Contingency & Escalation	$250,000
AFUDC & Taxes	$35,780
GEN-2022-054 Total TOIF Cost	**$815,780**

Total Interconnection Cost (NSNU+TOIF)	**$28,795,000**

8. Disclaimer

The facility study assumes the work will be performed by an EPC service provider. This information will allow the Generator to evaluate the necessary work required, project duration, and ability to negotiate a generation interconnection agreement with the Transmission Owner to construct the facilities. In performing the Facility Study, data/information provided by third parties was used, and assumptions/information regarding the state of the SPP's system, considered reasonable and valid at the time this report was prepared, were leveraged.

Appendix A: Project drawings

- **Figure A1: Point of Change of Ownership (POCO)**
- **Figure A2: Conceptual One-line Diagram**
- **Figure A3: Overall Electrical Plan (General Arrangement)**

Figure A1: Point of Change of Ownership (POCO)

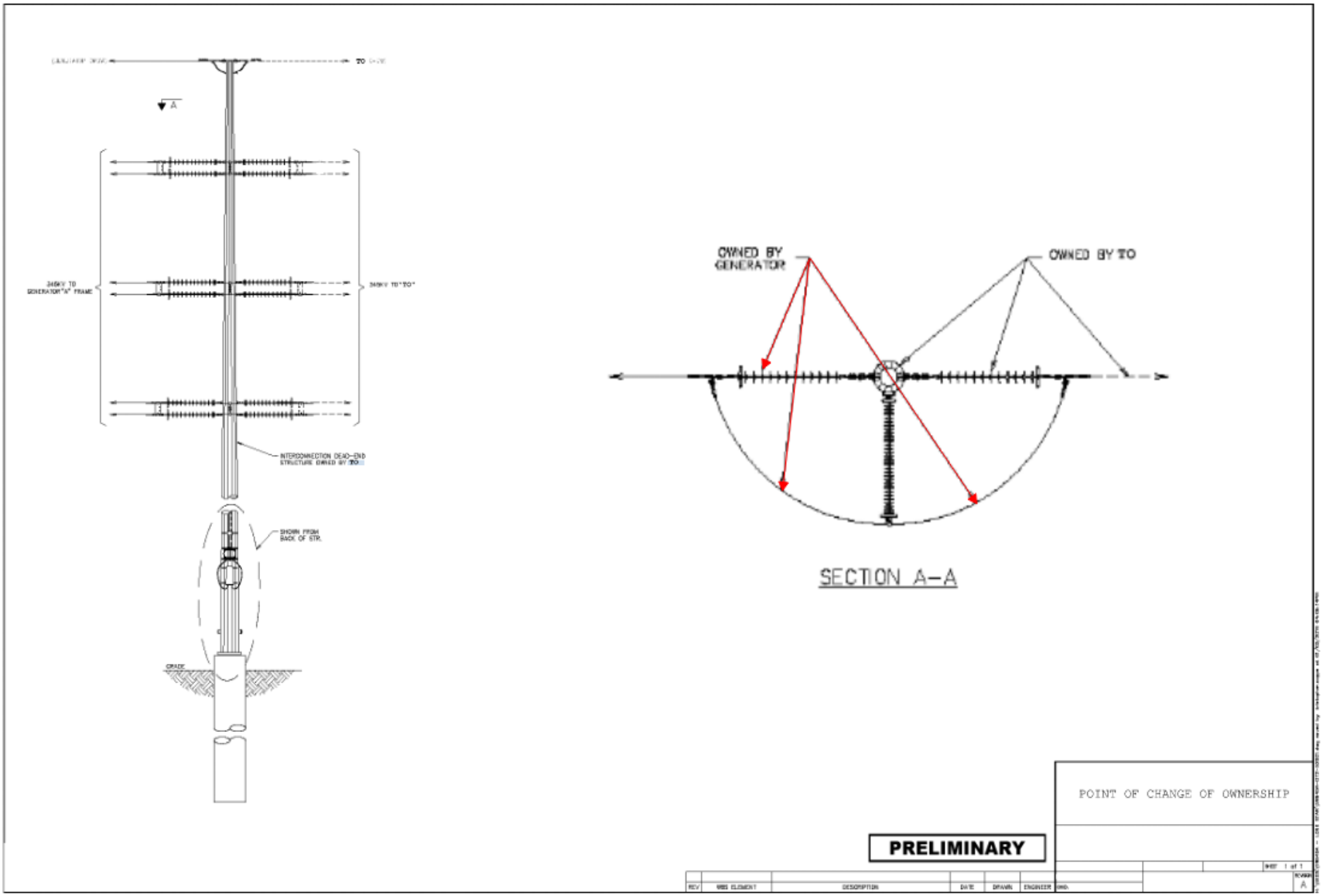
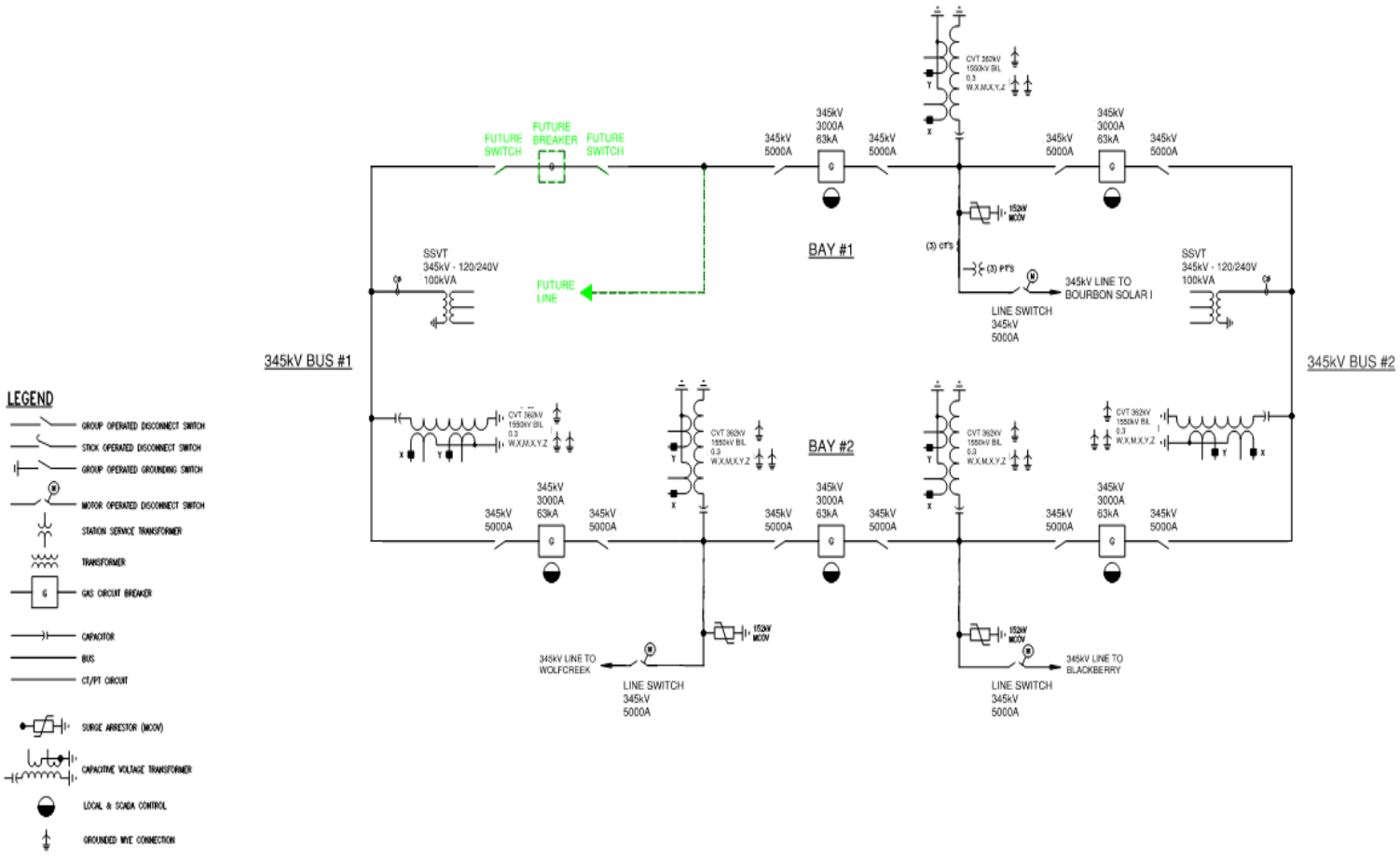
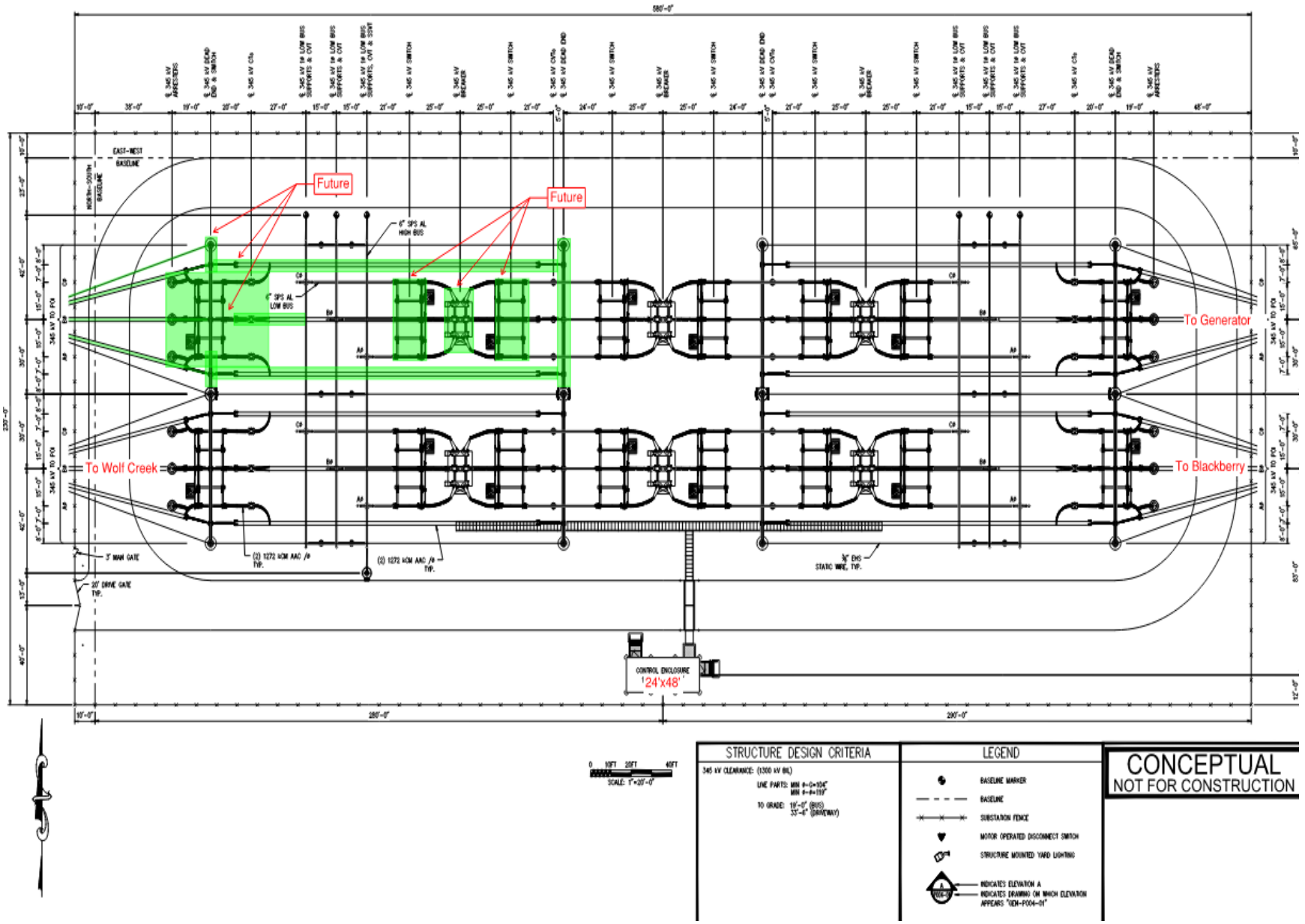


Figure A2: Conceptual One Line Diagram



PRELIMINARY
NOT FOR CONSTRUCTION

Figure A3: Overall Electrical Plan - General Arrangement



Current Study

Costs associated with
DISIS-2022-001
Build a new EMPEC-Gen-2021-096
345kV Line 1 to 1180 MVA
October 2025

Introduction

This report summarizes the scope of the Interconnection Facilities Analysis for Network Upgrade(s) to determine costs related to the addition of the SPP-GI DISIS-2022-001 Interconnection Request(s). Evergy, as a TO, is receiving an unprecedented amount of GI interconnect requests. The cost estimates and interconnect information supplied are based on current system configuration. There are many cases of multiple GI's requesting POIs at the same substation. Ongoing changes in Evergy's transmission system configuration could affect the required system upgrades and costs necessary to meet any particular GI interconnect request in the future.

Southwest Power Pool Generation Interconnection Request:

Per the SPP Generator Interconnection Procedures (GIP), SPP has requested that Evergy perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with the Scope of Interconnection Facilities Study GIP Section 8.10 and the Interconnection Facilities Study Procedures in accordance with GIP Section 8.11 for the following Interconnection Request(s):

Upgrade Type	UID	Upgrade Name	DISIS Cost Estimate	DISIS Lead Time
Current Study	170692	Build a new EMPEC-Gen-2021-096 345kV Line 1 to 1180 MVA	$ 97,742,347.00	56 Months

Build a new EMPEC-Gen-2021-096 345kV Line 1 to 1180 MVA

345kV Line

Network Upgrades to build a new 345kV line from Emporia Energy Center-Gen-2021-096 Line 1 to a minimum of 1180 MVA. This upgrade includes substation upgrades, for both GEN-2021-096 345kV substation and Emporia Energy Center 345kV and new line between the two substations. GEN-2021-096 345kV substation will be converted to a breaker and half configuration with a new rung for a new line terminal. Emporia Energy Center 345kV substation will add a new rung and a new line terminal for the additional line. The transmission line estimates include a 25 mile long greenfield 345kV circuit, built to a 3000 amp standard. New easements, routing study and KCC siting application will be required. UID 170692

Total Cost

The total cost estimate for this Network Upgrade is:

$	75,456,000	Transmission Line
$	20,255,654	Substation
$	286,349	AFUDC
$	1,744,344	Contingency
$	97,742,347	Total

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study

Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

Engineering Time	48-56	Months
Procurement Time	48-56	Months
Construction Time	48-56	Months
Total Project Length	48-56	Months

Figure 1 – Build a new line from Emporia Energy Center-GEN-2021-096 345kV Line 1