

Sand Creek 100 MW Interconnection

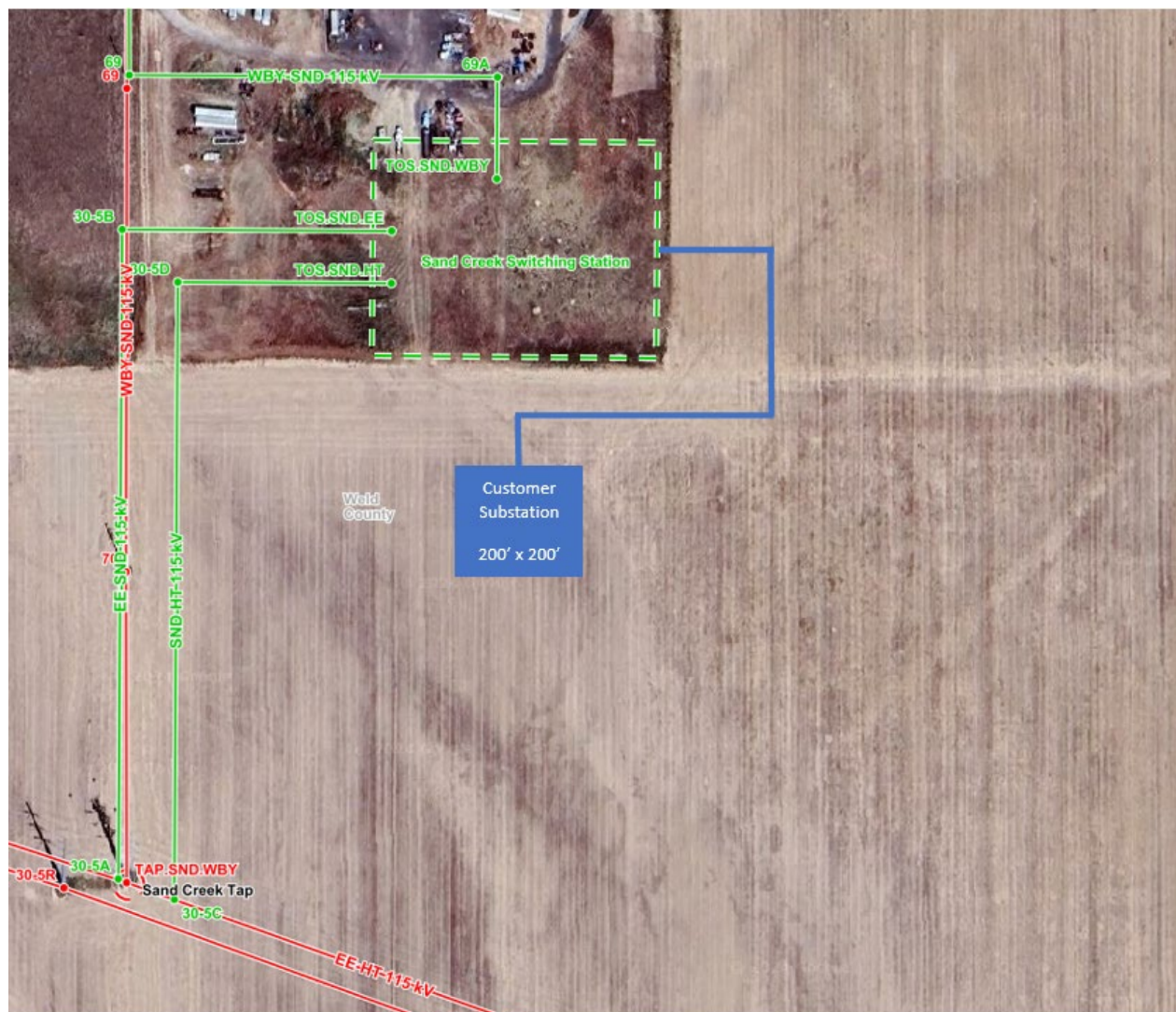
WESTERN AREA POWER ADMINISTRATION



Facilities Study

2022-G7

October 2024



Sand Creek and Proposed 2022-G7 Location

Facilities Study for Interconnection Request 2022-G7
100 MW PV Solar and Battery Interconnection at Sand Creek 115-kV Yard

EXECUTIVE SUMMARY

This Facilities Study is provided by Western Area Power Administration (WAPA) in response to the request to interconnect 100 MW (80MW solar generation + 20MW battery energy storage) of new generation at Sand Creek (SND) 115-kV yard. The Interconnection Customer (Customer) was assigned queue position 2022-G7.

The Customer's photovoltaic (PV) solar and battery interconnection will be in Weld County, Colorado approximately 25 miles east of Brighton, Colorado and approximately 5 miles south of Sand Creek Switching Station.

The Facilities Study provides estimates for WAPA's non-binding cost estimate, WAPA's scope inside Sand Creek Switching Station, and non-binding schedule to implement the project.

The Facilities Study further develops the project scope initiated by the System Impact Study and determined by WAPA that the project would require are as follows:

1. WAPA's SND switchyard is identified as a contingent facility, consisting of a 3-breaker ring bus and shall be constructed and placed in-service prior to the commercial operation date (COD). One additional bay is required for the interconnection of 2022-G7.
2. The 15.4-mile 115kV transmission line between WAPA's Prospect Valley Tap (PVT) and Willoby Switchyard (WBY) must be upgraded to 131MVA. The scope includes terminal work at Tri-State Generation and Transmission (TS) Lost Creek Tap facility.

The non-binding Good Faith Schedule shows the project duration after execution of a Large Generator Interconnection Agreement is approximately fifty (50) months.

The non-binding Good Faith Estimate for the scope of work required for 2022-G7 interconnection is \$7.7 million.

1. DESCRIPTION

1.1 2022-G7 Interconnection Request

In July 2023, Western Area Power Administration (WAPA) completed a System Impact Study for interconnecting a 100 MW generator to the Sand Creek Switching Station via a generation tie-line. Based on the Interconnection Customer WAPA assigned a Queue Position 2022-G7 in its Open Access Transmission Tariff (OATT). The requested commercial operation date (COD) of the 2022-G7 request is May 31, 2026.

The Customer owned 115-kV generator-tie line from their PV site will connect to a WAPA owned Take-off Structure (TOS) within the Sand Creek Switching Station. The jumpers at the TOS will serve as the Point Of Change Of Ownership (POCOO). See [Figure 1](#) for an example of a POCOO.

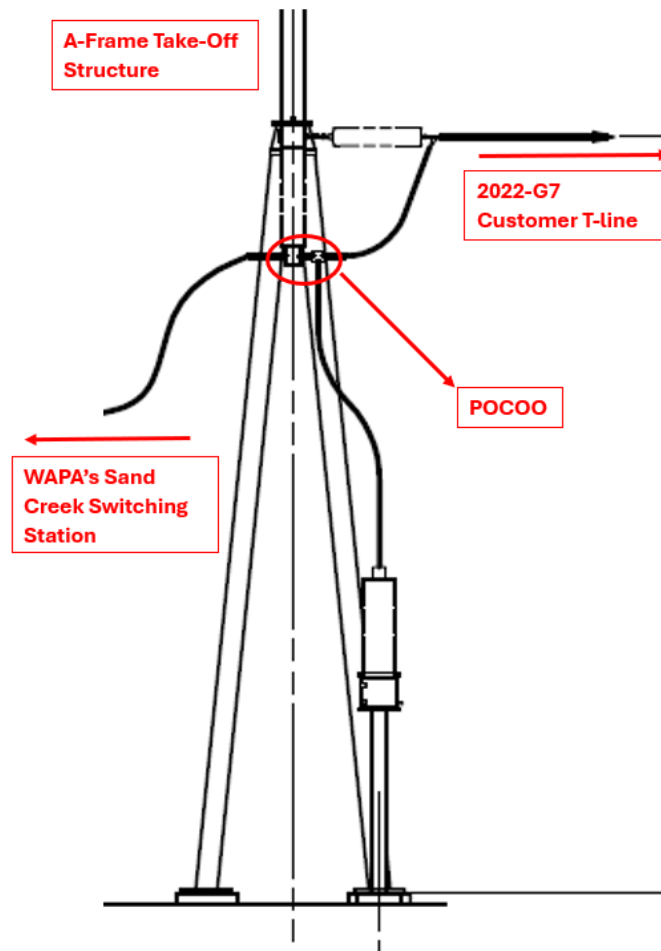


Figure 1- Example Of A Point Of Change Of Ownership (POCOO)



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1.2 Purpose

The purpose of this facilities study is to determine upgrades or modifications needed at the point of interconnection, SND 115-kV Yard, and the transmission line between WAPA's Prospect Valley Tap (PVT) and Willoby Switchyard (WBY) for the continuation to the Interconnection Process as described in Step 3: Facilities study and design on WAPA.GOV/Transmission

(<https://www.wapa.gov/transmission/interconnection/interconnection-process/>).

1.2.1 This Facilities Study specifies and estimates the cost of engineering design, equipment procurement, construction contract procurement, construction supervision, contract administration and project management for the work needed to implement the conclusions of the System Impact Study report dated July 11th, 2023.

1.2.2 The Facilities Study describes the future Sand Creek Switching Station which is a Ring Bus configuration.

1.2.3 The Facilities Study defines the scope, a non-binding schedule and cost estimate for WAPA to perform the associated work to interconnect 2022-G7.

1.2.4 The 2022-G7 project will require the installation of a new 115kV power circuit breaker, associated disconnect switches, instrument transformers including metering and protection and communications equipment at Sand Creek Switching Station.

1.2.5 The 2022-G7 project will require an upgrade of the transmission line between WAPA's Prospect Valley Tap (PVT) and Willoby Switchyard (WBY) to achieve a rating of 131MVA to address overloads identified in the System Impact Study. The scope includes terminal work at Tri-State Generation and Transmission (TS) Lost Creek Tap facility

1.3 Description of Connection Facility

The Customer asked to connect its photovoltaic (PV) solar generator and battery to the Sand Creek 115-kV Switching Station.

1.4 Description of Existing WAPA Facilities Related to Interconnection

The existing facilities are the WAPA 115-kV lines in and around Sand Creek Tap. WAPA is planning to replace Sand Creek Tap with the Sand Creek Switching Station by spring of 2027. The future Sand Creek Switching Station will be owned and operated by WAPA.

2. SUMMARY OF PRIOR STUDIES

2.1 Feasibility Study

A Feasibility Study was not performed for this Project.

2.2 System Impact Study

The System Impact Study (SIS) completed on July 11, 2023, summarized that to accommodate the 2022-G7 interconnection as a Network Resource the SND switchyard with a fourth 115-kV terminal bay and improvements to the PVT-LKT and LKT-WBY 115-kV lines sections must be completed. These additions are estimated to cost \$7.7M and contingent upon the construction of WAPA's Sand Creek Switchyard.

2.3 Environmental Studies

WAPA and Customer will enter into a separate environmental agreement for WAPA and the Customer's roles.

3. FACILITIES STUDY REQUIREMENTS

3.1 Contracts

WAPA and Customer have executed Contract No. 23-RMR-3377 to perform this Facilities Study to create a non-binding conceptual Good Faith Schedule ([Section 4.1.4](#)), non-binding Good Faith cost estimate ([Appendix A](#)) and a scope of work to interconnect the Customer's Project at Sand Creek. The Facilities Study also develops a switching diagram and a general arrangement plan. See [Appendix B](#) and [C](#) respectively.

3.2 Interconnection Facilities

Provided in WAPA's Open Access Transmission Tariff (OATT) Standard Large Generator Interconnection Procedures (LGIP), Interconnection Facilities shall mean WAPA's Interconnection Facilities. Collectively, Interconnection Facilities include all facilities and equipment between the Generating Facility and the Point of Interconnection, including

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any modifications, additions or upgrades that are necessary to interconnect the Generating Facility physically and electrically to WAPA's Transmission System.

3.3 Network Upgrades and/or Modifications

The OATT describes Network Upgrades as the additions, modifications, and upgrades to WAPA's system as a result of the interconnection of a Large Generator (Customer's Facility). The Transmission System additions, modifications and upgrades can be located at or beyond the Point of Interconnection. The Point of Interconnection is the location at which a solar and battery energy storage is interconnected with the Transmission System ([Section 4.1.2](#)). The required Network Upgrades are detailed in this Facilities Study ([Section 4.1.2.1](#)) and the estimated costs of the Network Upgrades are included in Appendix A.

3.4 Operations Requirements

An Interconnection Agreement is required prior to energization. An Operating Guide will be developed by WAPA to outline the necessary operating restriction on the PV solar generator. Coordination of the proposed work at all affected facilities could affect the generation output capability until all work is completed. The Customer is responsible for costs associated with developing the Operating Guide and it's not included in this Facilities Study.

3.5 Environmental Requirements

As the lead Federal agency, WAPA is responsible for compliance with the National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) consultation. WAPA and the Customer will enter into an environmental Letter Agreement (Agreement) identifying WAPA and the Customer's roles. The Customer will provide items identified in the Agreement (i.e. cultural survey reports, detailed project description, proposed layout) to WAPA. WAPA will complete an environmental review in accordance with the NEPA, Section 106 of the NHPA, Endangered Species Act, and other applicable regulations. WAPA will make a finding of effect per Section 106 of the NHPA and prepare the applicable NEPA document (categorical exclusion (CX), environmental assessment (EA), or environmental impact statement (EIS)).

3.6 Lands Requirements

Customer is responsible for land acquisitions, easements and obtaining ROW for its generation facility and tie-line to Sand Creek Switching Station. See [Figure 2- Proposed Customer Generator Location](#)

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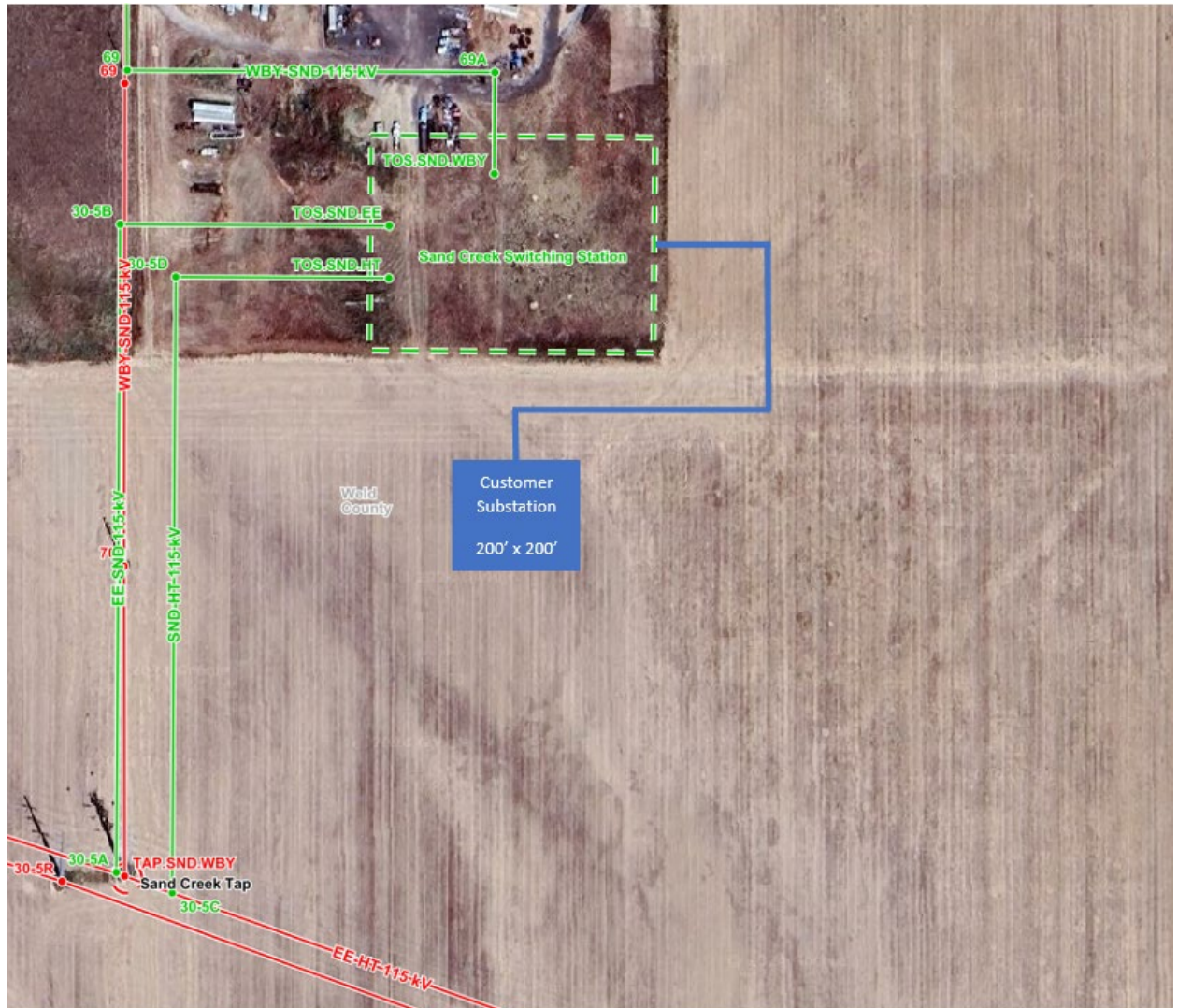


Figure 2- Proposed Customer Generator Location

3.7 WAPA Network Upgrades

WAPA has determined that Customer is not eligible for network credits for the reconductoring of the Prospect Valley Tap (PVT) to Willoby Switchyard (WBV) transmission line. WAPA has determined that Customer is not eligible for network credits for the interconnection at SND.

4. STUDY RESULTS

4.1 Interconnection Facility

The requirements of the Interconnection Facility findings of the SIS are verified by this Facilities Study.

4.1.2 WAPA's Interconnection Facility

The following provides a high-level overview of the work required to interconnect the Customer's substation to Sand Creek 115-kV Switching Station.

4.1.2.1 Sand Creek Switching Station New Bay Work (WAPA Work)

Design, equipment procurement, construction contract procurement, construction supervision and project management for adding a new 115-kV breaker bay to Sand Creek Switching Station

- Design and build foundations for outdoor electrical equipment such as disconnect switches, power breaker, bus support structures and instrument transformers
- Furnish and install steel structures
- Furnish and install two (2) 115-kV 3,000-amp Disconnect Switches
- Furnish and install one (1) 115-kV 3,000-amp Disconnect Switch with grounding blades
- Furnish and install one (1) 115-kV 3,000-amp 40kA Power Circuit Breaker
- Furnish and install three (3) 115-kV Metering CT's, VT's and associated steel structures
- Furnish and install two (2) 115-kV CCVT's and associated steel structures
- Furnish and install rigid bus and associated hardware
- Design, Furnish, and install new switchboard panel with necessary relay, control and metering equipment
- Coordination with Customer's Protection and Communication Engineers
- Testing and commissioning of all WAPA installed indoor and outdoor electrical equipment at Sand Creek Switch Station including functional checks, test all relays, annunciators, and meters
- RTU programming and testing with SCADA, programming, meters, and annunciators
- Review and adjust associated relay and protection systems at affected nearby facilities



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4.1.2.2 Prospect Valley Tap (PVT) to Willoby Switchyard (WBY)
Transmission Line (WAPA Work)

Design, equipment procurement, construction contract procurement, construction supervision and project management for reconductoring of this 15.4-mile transmission line to 131MVA. See [Figure 3- Prospect Valley Tap \(PVT\) to Willoby Switchyard \(WBY\) Transmission Line](#)



Figure 3- Prospect Valley Tap (PVT) to Willoby Switchyard (WBY) Transmission Line

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4.1.2.3 Customer Work

- Design and construct its photovoltaic (PV) solar generator and battery substation
- Design and construct a new 115-kV tie-line-from WAPA's Sand Creek Switching Station to Customer's generator substation
- Coordination with WAPA's Protection and Communication engineers on proposed design
- Coordinate with WAPA on final connections at the POCOO

4.1.3. Cost Estimate

The Project Cost Estimate is provided in [Appendix A](#). Total Costs will depend on actual expenditures and actual project schedule. The Cost Estimate identified in [Appendix A](#) will be evaluated at time of Construction. The Customer shall reimburse WAPA for actual expenditures.

4.1.4 Project Schedule

Standard Schedule Milestones (WAPA designs, procures, constructs, commissions)

The estimated schedule below is based on design and construction by WAPA. If receipt of project funding is delayed, WAPA will reevaluate equipment lead times, workload, and construction seasons to determine a reasonable schedule. This schedule shows the planning, design, construction, and commissioning for the equipment identified as WAPA's Interconnection Facility in [Section 4.1.2.1](#).



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Conceptual Schedule:

Activity	start	complete
Environmental Milestone: See note below		
Large Generator Interconnection Agreement (LGIA) signed, and funds received		April 2025
Design	October 2026	January 2028
Lands (WAPA's easement only)	October 2026	May 2027
Government Furnish Equipment (GFE)	April 2025	May 2028
Construction Contract Procurement	September 2027	January 2028
Contractor Performance Period	February 2028	April 2029
WAPA Commissioning	March 2029	June 2029
LGIA Interconnection in-service		June 2029

Note: Environmental requirements are outside scope of Facilities Study. Refer to WAPA's OATT.

References

1. ANSI/IEEE 693-2018 IEEE Recommended Practice for Seismic Design of Substations, IEEE Society, New York.
2. ANSI/IEEE Std. 80-2013 IEEE Guide for Safety in AC Substation Grounding, IEEE Society, New York.
3. WAPA Standard Specifications and Drawings:
<https://www.wapa.gov/DoingBusiness/SellingToWestern/Pages/what-western-buys.aspx>
4. WAPA Electrical Equipment Standards:
<https://www.wapa.gov/wp-content/uploads/2023/09/WAPA-2023-Electrical-Equipment-Standards.pdf>
5. System Impact Study "SIS – RMR 2022-G7" dated July 11, 2023.

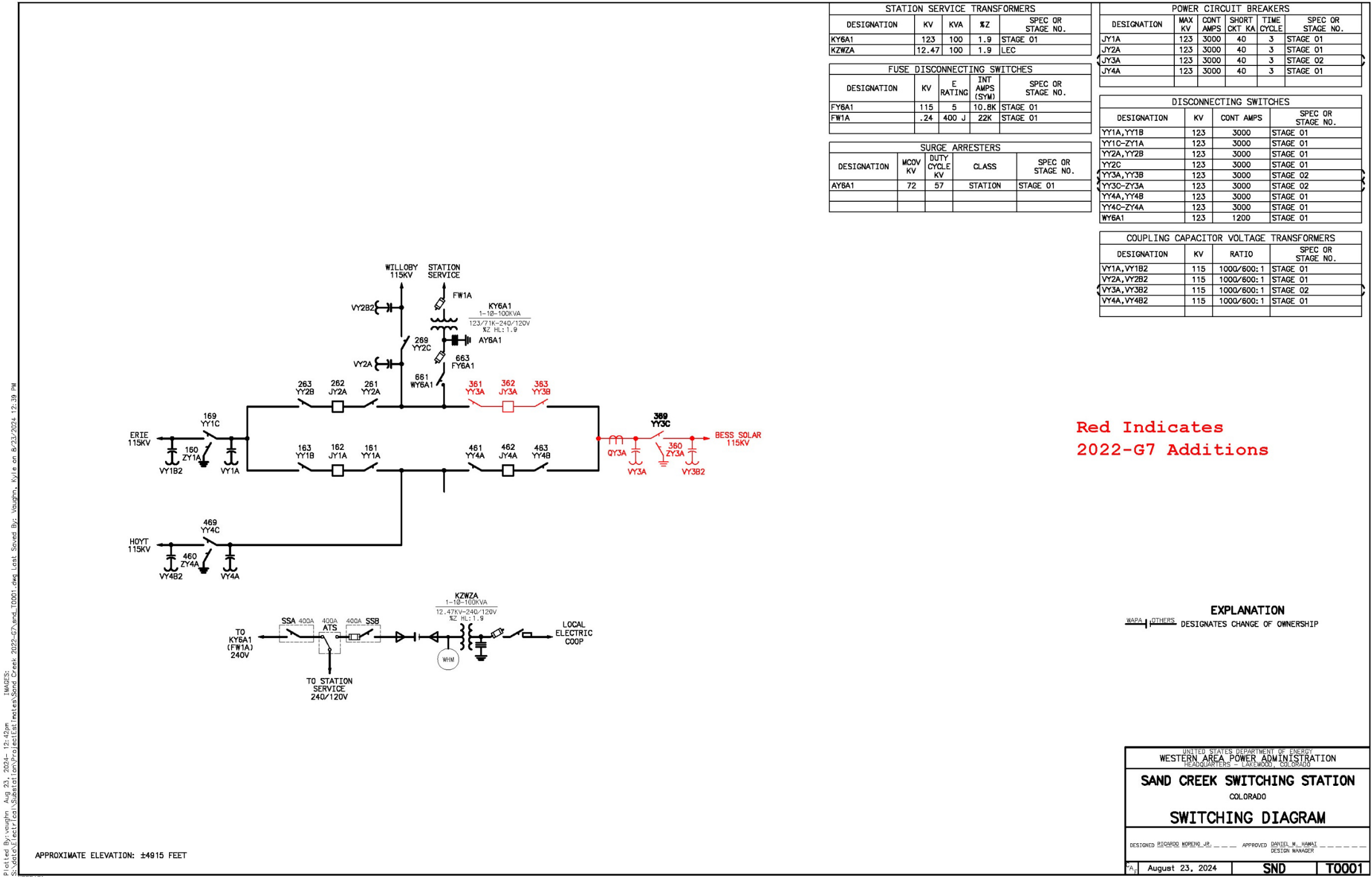
Appendix A: Cost Estimate

FERC Account Description	2022-G7 Direct Assignment Total
(30100) Construction Line Bay: Power Breaker, Instrument Transformers, Disconnect Switches, and associated controlled protection and metering.	\$1,323,000
(30100) 115-kV Line Reconductoring 15.4 mile	\$4,296,000
Management Reserve 10%	\$561,000
(30011) Environmental (Separate Agreement)	\$10,000
(30012) (30013) Survey and Design	\$523,000
(30021) Commissioning and Metering	\$122,000
(30001) (30010) (30014) (30022) Construction Supervision, Project Management	\$851,000
Totals	\$7,686,000

The non-binding Good Faith Estimate and Schedule are based on but not limited to the following assumptions:

1. A LGIA, and funds received is executed by April 2025 to begin the Design and Specifications Development pre-construction activities by the Customer and WAPA.
2. No complications associated with obtaining outages for construction or commissioning.
3. Customer will be responsible for all work outside Sand Creek Switching Station, tie-line, and connecting final jumpers as reflected on POCOO.
4. Labor rates for WAPA are within a forecast of 4% annual increase.
5. Material delivery time and costs do not increase.
6. The non-binding Good Faith Estimate and Schedule does not include land rights and acquisitions.
7. Land clearance has taken place; use of information in this report does not guarantee infringement upon privately owned lands will not occur. The report does not make any warranty, express or implied, and assume any legal liability for the information in this report. This report does not grant any rights for interconnection or use of transmission systems.
8. All environmental requirements are completed.

Appendix B: Conceptual Switching Diagram



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Appendix C: Conceptual General Arrangement Plan

