PACIFICORP

Large Generator Interconnection
Facilities Study Report

FINAL

Completed for

(“Interconnection Customer”)
TCS-48

Proposed Point of Interconnection
Terminal substation

October 12, 2021

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1.0 DESCRIPTION OF THE PROJECT

("Interconnection Customer") proposed interconnecting 200 MW of new generation to the Transmission Provider's Terminal substation located in Salt Lake County, Utah. The Interconnection Request is proposed to consist of sixty-eight (68) Power Electronics PCSM FP3510M3 US-UL battery storage inverters for a total requested output of 200 MW at the Point of Interconnection. The requested commercial operation date is December 31, 2023.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Transmission Provider has assigned the Project "TCS-48."

2.0 STUDY SCOPE AND OBJECTIVES

The objective of the facilities study is to:

- complete a facilities analysis, which shall specify and estimate the cost of equipment, engineering, procurement, and construction required to address issues as outlined in the system impact study, and
- provide a scope of work and an estimated cost and schedule for completing the scope of work.

3.0 STUDY ASSUMPTIONS

- All active higher priority transmission service and/or generator interconnection requests will be considered in this study and are listed in Appendix 1. If any of these requests are withdrawn, the Transmission Provider reserves the right to restudy this request, as the results and conclusions contained within this study could significantly change.
- For study purposes there are two separate queues:
    - Transmission Service Queue: to the extent practical, all network upgrades that are required to accommodate active transmission service requests will be modeled in this study.
    - Generation Interconnection Queue: Interconnection Facilities associated with higher queue interconnection requests will be modeled in this study.
- The Interconnection Customer's request for energy or network resource interconnection service in and of itself does not convey transmission service. Only a Network Customer may make a request to designate a generating resource as a Network Resource. Because the queue of higher priority transmission service requests may be different when a Network Customer requests network resource designation for this Generating Facility, the available capacity or transmission modifications, if any, necessary to provide network resource interconnection service may be significantly different. Therefore, the Interconnection Customer should regard the results of this study as informational rather than final.
- This study assumes the Project will be integrated into Transmission Provider's system at the agreed upon and/or proposed Point of Interconnection ("POI").
- The Interconnection Customer will construct and own any facilities required between the POI and the Project.
- Line reconductor or fiber underbuild required on existing poles will be assumed to follow the most direct path on the Transmission Provider's system. If during detailed design the path

must be modified it may result in additional cost and timing delays for the Interconnection Customer's Project.

- Generator tripping may be required for certain outages.
- All facilities will meet or exceed the minimum Western Electricity Coordinating Council ("WECC"), North American Electric Reliability Corporation ("NERC"), and Transmission Provider performance and design standards.
- This report is based on information available at the time of the study. It is the Interconnection Customer's responsibility to check the Transmission Provider's web site regularly for Transmission system updates at (https://www.oasis.oati.com/ppw)

4.0 TYPE OF INTERCONNECTION SERVICE

The Interconnection Customer has selected Network Resource (NR) Interconnection Service.

5.0 PROPOSED POINT OF INTERCONNECTION

The Interconnection Customer's proposed Generating Facility is to be interconnected to the Transmission Provider's 345 kV Terminal substation via a new line position. Figure 1 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

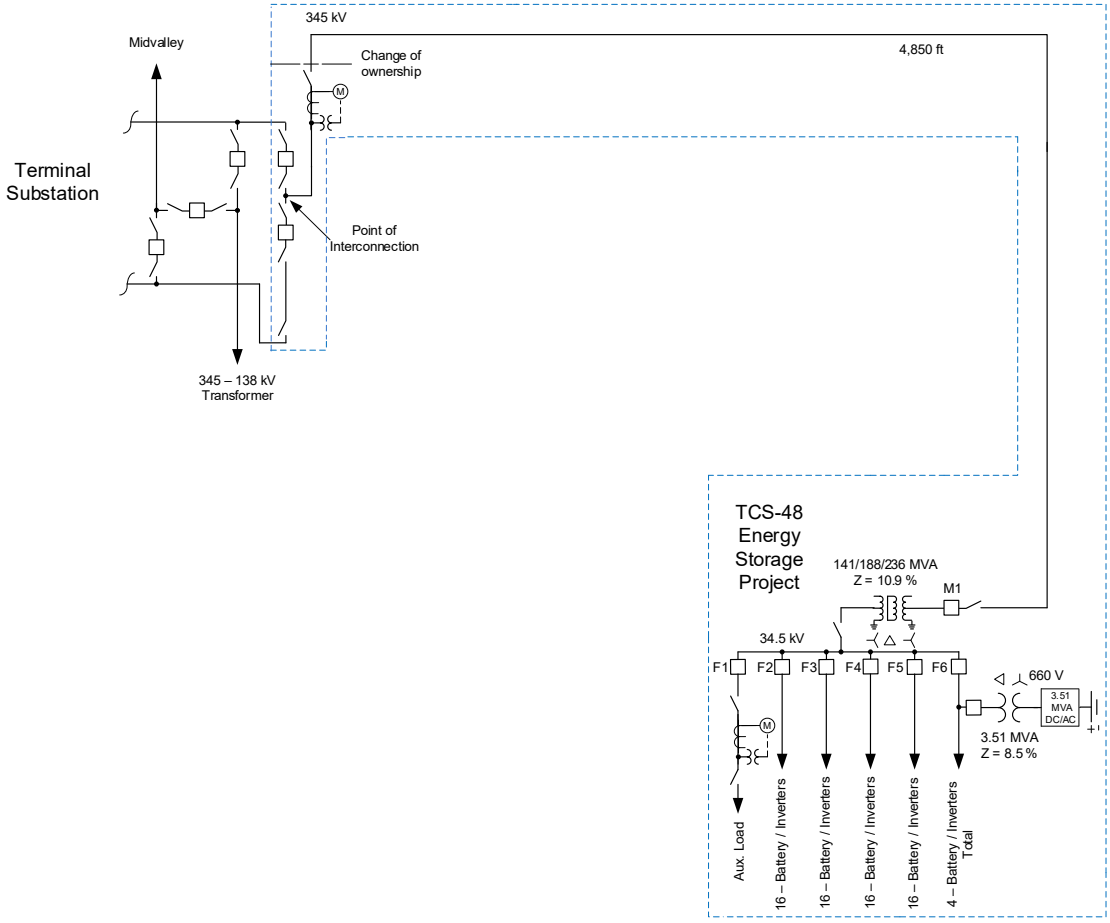

Figure 1: System One Line Diagram

6.0 SCOPE OF WORK

6.1 Generating Facility Requirements

The following outlines the design, procurement, construction, installation, and ownership of equipment at the Interconnection Customer's Generation Facility.

6.1.1 INTERCONNECTION CUSTOMER TO BE RESPONSIBLE FOR

- Procure all necessary permits, lands, rights of way and easements required for the construction and continued maintenance of the Interconnection Customer's Generating Facility and collector substation.
- Design, procure, construct, own and maintain the Interconnection Customer's Generating Facility and associated collector substation.
- Design the Generating Facility with reactive power capabilities necessary to operate within the full power factor range of 0.95 leading to 0.95 lagging as measured at the high side of the Interconnection Customer's GSU transformer. This power factor range shall be dynamic and can be met using a combination of the inherent dynamic reactive power capability of the generator or inverter,

dynamic reactive power devices and static reactive power devices to make up for losses.

- Design the Generating Facility such that it can provide positive reactive support (i.e., supply reactive power to the system) immediately following the removal of a fault or other transient low voltage perturbations or install dynamic voltage support equipment. These additional dynamic reactive devices shall have correct protection settings such that the devices will remain on line and active during and immediately following a fault event.
- Operate the Generating Facility to the voltage set point to be provided by the Transmission Provider.
- Equip the Generating Facility with automatic voltage-control equipment and operate with the voltage regulation control mode enabled unless explicitly authorized to operate another control mode by the Transmission Provider.
- Install, maintain and operate a functioning governor or equivalent controls to ensure primary frequency capability as required under FERC Order 842.
- Install a Phasor Measurement Unit to collect data from the Project. The data must be collected, held for a minimum of 90 days and be able to stream to the Planning Coordinator for each of the Generator Facility's step-up transformers measured on the low side of the GSU at a sample rate of at least 60 samples per second and synchronized within +/- 2 milliseconds of the Coordinated Universal Time (UTC). Initially, the following data must be collected:
  - Three phase voltage and voltage angle (analog)
  - Three phase current (analog)

  Data requirements are subject to change as deemed necessary to comply with local and federal regulations.
- Operate the Generating Facility so as to maintain the voltage at the POI, or other designated point as deemed appropriate by Transmission Provider, at a voltage schedule to be provided by the Transmission Provider following testing. Voltage will typically be required to operate between 1.00 and 1.04 per unit.
- Operate the Generating Facility with a voltage droop.
- Have any Transmission Provider required studies, such as a voltage coordination study, performed and provide results to Transmission Provider. Any additional requirements identified in these studies will be the responsibility of the Interconnection Customer.
- Meet the Federal Energy Regulatory Commission (FERC) and WECC low voltage ride-through requirements as specified in the interconnection agreement.
- Provide test results to the Transmission Provider verifying that the inverters for this Project have been programmed to meet all PRC-024 requirements rather than manufacturer IEEE distribution standards.
- Provide the Transmission Provider the manufacturer Electromagnetic Transient Modeling ("EMT") model a minimum of 180 days prior to Commercial Operation.
- Provide the Transmission Provider a standard model from the WECC Approved Dynamic Model Library.

- Provide the Transmission Provider documentation demonstrating registration with NERC as the Generator Owner ("GO") and Generator Operator ("GOP") for the Large Generating Facility. Confirmation that registration documentation has been submitted to NERC must be provided prior to initial synchronization. Confirmation of registration with NERC must be provided within 30 days of Commercial Operation and be maintained throughout the lifetime of the Interconnection Agreement or the Large Generating Facility will be disconnected.
- Design the Generating Facility control system such that it can receive an analog output from the Transmission Provider for setpoint control and provide an analog input back to the Transmission Provider on the status of the setpoint.
- Provide a separate graded, grounded and fenced area along the perimeter of the Interconnection Customer's shared collector substation for the Transmission Provider to construct a communications site. The site will share a fence and ground grid with the Interconnection Customer collector substation and have separate, unencumbered access for the Transmission Provider. Fencing, gates and road access shall meet Transmission Provider standards. The Interconnection Customer shall provide a Transmission Provider approved easement for its communications site.
- Perform a CDEGS grounding analysis for the Transmission Provider communications site and provide the results to the Transmission Provider.
- Provide permanent AC power to the Transmission Provider's communications site control building.
- Design, procure and install conduit and control cabling and hard wire the Interconnection Customer's source devices to Transmission Provider's control building data concentrator. Replicated values are not acceptable.
- Provide the following points which are based on the Interconnection Customer's most recent design information. Please note that this list of points could change if the Interconnection Customer's final design changes:

  Analog Written to the RTU:
  - Max Gen Limit MW Set Point

  Analogs:
  - Max Gen Limit MW Set Point Feed Back
  - Potential Power MW
  - A phase 345 kV voltage
  - B phase 345 kV voltage
  - C phase 345 kV voltage
  - 34.5 kV Real power 52-F1
  - 34.5 kV Reactive power 52-F1
  - 34.5 kV Real power 52-F2
  - 34.5 kV Reactive power 52-F2
  - 34.5 kV Real power 52-F3
  - 34.5 kV Reactive power 52-F3
  - 34.5 kV Real power 52-F4
  - 34.5 kV Reactive power 52-F4
  - 34.5 kV Real power 52-F5

- 34.5 kV Reactive power 52-F5
- 34.5 kV Real power 52-F6
- 34.5 kV Reactive power 52-F6

Status:

- 345 kV transformer breaker 52-M1
- 34.5 kV breaker 52-F1
- 34.5 kV breaker 52-F2
- 34.5 kV breaker 52-F3
- 34.5 kV breaker 52-F4
- 34.5 kV breaker 52-F5
- 34.5 kV breaker 52-F6
- Line relay alarm

- Procure and install Transmission Provider approved H-Frame structures for the Transmission Provider's 34.5 kV instrument transformers. The installation location shall be coordinated with the Transmission Provider.
- Install complete conduit and control cable provided by the Transmission Provider from the Transmission Provider's instrument transformers to the Transmission Provider's control building. Leave sufficient quantities of control cable to allow the Transmission Provider to terminate the cable inside its control building.
- Install the Transmission Provider provided instrument transformers.
- Procure and install disconnect switches on each side of each of the instrument transformers.
- Provide Transmission Provider unfettered and maintained access to the Transmission Provider's instrument transformers.
- Procure and install Transmission Provider approved fiber optic cable from the Transmission Provider's control building to a splice with the Transmission Provider fiber optic cable installed on the Interconnection Customer's transmission tie line. Provide sufficient cable to allow the Transmission Provider to terminate the fiber in its control building.
- Establish permanent station retail service with the Transmission Provider's retail business unit for power that will flow from the Transmission Provider's system when the Project is not generating.
- Establish transmission service for battery storage charging mode.
- Provide any construction or backup retail service necessary for the Project.

6.1.2 TRANSMISSION PROVIDER TO BE RESPONSIBLE FOR

- Provide the Interconnection Customer the designated point at which the voltage is to be maintained and the associated voltage schedule.
- Identify any necessary studies that the Interconnection Customer must have performed.
- Construct a new communications site on the property prepared by the Interconnection Customer. The site shall include a control building, tower, antenna, microwave radio and various communications equipment.

- Procure and install a backup DC battery system for the Transmission Provider control building.
- Procure and install a line current differential relay system to monitor the 345 kV transformer breaker and the tie line.
- Procure and install a communications rack and associated communications equipment in the Transmission Provider's control building and coordinate the termination of the fiber and control cable to be installed by the Interconnection Customer.
- Coordinate with the Interconnection Customer on the location of the Transmission Provider's instrument transformers.
- Provide the Interconnection Customer the specifications for the instrument transmission installation structures.
- Provide the control cable to be installed by the Interconnection Customer from the instrument transformers to the Transmission Provider's control building and coordinate on the location of the cable.
- Procure and provide to the Interconnection Customer a set of 34.5 kV instrument transformers to be installed for auxiliary load.
- Design, procure and install a set of 34.5 kV revenue metering equipment including metering panels, primary and secondary revenue quality meters, test switches, junction boxes and secondary metering wire.
- Establish an Ethernet connection for retail sales and generation accounting via the MV-90 translation system.

6.2 Tie Line Requirements

The following outlines the design, procurement, construction, installation, and ownership of equipment associated with the radial line connecting the Interconnection Customer's Generating Facility to the Transmission Provider's Point of Interconnection substation.

6.2.1 Interconnection Customer to be Responsible For

- Procure all necessary permits, property rights and/or rights of way for the new transmission line between the Interconnection Customer's collector substation and the POI substation. Interconnection Customer will be responsible for all required regulatory or compliance reporting associated with its transmission tie line facilities.
- Design, construct, own and maintain the 345 kV transmission tie line between the Interconnection Customer's collector substation and the POI substation.
- Design, procure, and install Transmission Provider standard fiber optic cable on the transmission tie line. The fiber will be owned and maintained by the Transmission Provider.
- Provide the Transmission Provider the necessary easement for its fiber optic cable on the tie line.
- Splice to the fiber to the fiber running from the Transmission Provider collector substation control building.
- Design the final structure of the tie line outside the POI substation to Transmission Provider standards.

- Provide and install conductor, fiber, shield wire and line hardware in sufficient quantities to allow the Transmission Provider to terminate the tie line into POI substation dead-end structure.

6.2.2 TRANSMISSION PROVIDER TO BE RESPONSIBLE FOR

- Provide the Interconnection Customer the specifications for the Transmission Provider's fiber optic cable to be installed on the tie line.
- Provide the Interconnection Customer the necessary specifications for the last structure of the Interconnection Customer's tie line.

6.3 Point of Interconnection

The following outlines the design, procurement, construction, installation, and ownership of equipment at the Point of Interconnection.

6.3.1 INTERCONNECTION CUSTOMER TO BE RESPONSIBLE FOR

- Coordinate with the Transmission Provider to test and commission the communication path from Interconnection Customer's collector substation to the POI substation.

6.3.2 TRANSMISSION PROVIDER TO BE RESPONSIBLE FOR

- Procure the necessary permits and/or property rights to expand the Terminal substation to the east for the construction of a new line position.
- Design, procure and construct the necessary infrastructure to create a line position for the Interconnection Customer's tie line. Extend the north and south buses to the new bay. The following major equipment will be installed:
  - (2) – 362KV, 3000A, Breaker
  - (5) – 345KV, 3000A, Horizontal Mount, Group Operated Switch
  - (1) – 345KV, 3000A, Horizontal Mount, Group Operated Switch, w/ Motor Operator
  - (3) – 345kV surge arresters
  - (1) – 480V – 120/240V pad mount station service transformer
  - (3) – CT/VT Metering Units
- Perform a CDEGS grounding analysis of the expanded section of the substation.
- Terminate the last span of the Interconnection Customer's tie line into the POI substation deadend structure.
- Design, procure and install a line current differential system to communicate with the line relays installed in the collector substation.
- Connect the new circuit breakers to the existing redundant north and south bus differential relay system.
- Modify protective relay elements in the existing line relays to monitor voltage and frequency of the Interconnection Customer's Large Generating Facility.
- Install fiber from the substation control building to the Interconnection Customer tie line dead end structure and splice to the fiber provided by the Interconnection Customer.

- Observe and coordinate with the Interconnection Customer's test of the communications system running from the collector substation to the POI substation and provide acceptance of functionality.
- The following data points from the POI substation will be acquired through the POI substation RTU:
  Analogs:
  - Net Generation MW
  - Net Generator MVAR
  - Interchange metering kWH
- Construct a new microwave system that establishes a link to the microwave site in the Interconnection Customer collector substation. This new microwave system will require the installation of a tower, antenna, microwave radio and various communications equipment.
- Install necessary communications equipment to tie in the communication paths to Interconnection Customer's collector substation.
- Design, procure and install 345 kV revenue metering equipment including two (2) revenue quality meters, test switch, instrument transformers, metering panels, junction box and secondary metering wire.
- Provide and install an Ethernet connection for retail sales and generation accounting via the MV-90 translation system.

6.4 Other

The following outlines the design, procurement, construction, installation, and ownership of equipment past the Point of Interconnection.

6.4.1 Transmission Provider to be Responsible For

- System Operations Control Centers
  - Update databases to include the Interconnection Facilities and Network Upgrades required for this Interconnection Request.

7.0 Cost Estimate (+/- 20%)

The following estimate represents only scopes of work that will be performed by the Transmission Provider. Costs for any work being performed by the Interconnection Customer are not included.

Direct Assigned

TCS-48 Collector Substation *Control building, relays, metering, and communication equipment*	$750,000
Terminal substation *Line termination and metering*	$1,071,000
Terminal DEMC Storage Yard *Relocate equipment in DEMC yard to make room for new 345kV bay*	$100,000

Total Direct Assigned: $1,921,000

Network Upgrades
Terminal substation $5,297,000
Construct new 345 kV bay with two 345 kV breakers

Total Network Upgrade: $5,297,000

Total Project Cost: $7,218,000

*Any distribution line modifications identified in this report will require a field visit analysis in order to obtain a more thorough understanding of the specific requirements. The estimate provided above for this work could change substantially based on the results of this analysis. Until this field analysis is performed the Transmission Provider must develop the Project schedule using conservative assumptions. The Interconnection Customer may request that the Transmission Provider perform this field analysis, at the Interconnection Customer's expense, prior to the execution of an Interconnection Agreement in order to obtain more cost and schedule certainty.

This estimate is as accurate as possibly given the level of detailed study that has been completed to date and approximates the costs incurred by Transmission Provider to interconnect this Generator Facility to Transmission Provider's electrical distribution or transmission system. The Interconnection Customer will be responsible for all actual costs, regardless of the estimated costs communicated to or approved by the Interconnection Customer.

8.0 SCHEDULE

Execute Interconnection Agreement	September 1, 2021
Provision of Financial Security	January 3, 2022
Interconnection Customer Approval for Transmission Provider to Commence Engineering and Procurement Activities	January 3, 2022
*Interconnection Customer Initial Design Package Provided	January 3, 2022
Transmission Provider Engineering & Procurement Commences	February 7, 2022
Energy Imbalance Market Modeling Data Submittal	March 4, 2022
Interconnection Customer Property/Permits/ROW Procured	June 3, 2022
Transmission Provider Property/Permits/ROW Procured	August 5, 2022
*Interconnection Customer Final Design Package Provided	August 15, 2022
Transmission Provider Engineering Design Complete	January 6, 2023
Interconnection Customer Approval for Transmission Provider to Commence Construction Activities	February 6, 2023
Construction Begins	March 13, 2023
Interconnection Customer Requests Voltage Schedule	April 3, 2023
Interconnection Customer Maintenance and Commissioning Plans Provided	June 2, 2023
Interconnection Customer and Transmission Provider Construction Complete	September 8, 2023
Transmission Provider Commissioning Activities Complete	October 20, 2023
Transmission Provider Commissioning Document Review Complete	October 27, 2023
Interconnection Customer's Facilities Receive Backfeed Power	October 30, 2023
Initial Synchronization/Generation Testing	November 6, 2023
Commercial Operation	December 15, 2023
NERC Registration Provided	January 12, 2024

*Interconnection Customer initial design package shall include final generating facility location, inverter/turbine selection, basic protection package, tie line route and collector system locations and data as applicable. Interconnection Customer final design package shall include PE stamped issued for construction ("IFC") drawings for generating facility, collector substation, tie line as well as an updated PSS/e model and updated WECC approved model, electromagnetic transient ("EMT") model and a detailed short circuit model of its generation system using the ASPEN OneLine short circuit simulation program as applicable. The WECC model parameters must be adjusted to reflect the plant's actual anticipated performance. The plant controller must be included in the model. If there is to be coordination between facilities or a master VAR controller, this must be included in the detailed WECC dynamic model, as well as in the PSS/e user-written model.

Please note, the time required to perform the scope of work identified in this report appears to result in a timeframe that does support the Interconnection Customer's requested Commercial Operation date of December 31, 2023.

9.0 Participation By Affected Systems

Transmission Provider has identified the following affected systems: None

10.0 Appendices

Appendix 1: Higher Priority Requests
Appendix 2: Contingent Facilities
Appendix 3: Property Requirements

10.1 Appendix 1: Higher Priority Requests

All active higher priority Transmission Provider projects, and transmission service and/or generator interconnection requests will be considered in this study and are identified below. If any of these requests are withdrawn, the Transmission Provider reserves the right to restudy this request, as the results and conclusions contained within this study could significantly change.

Transmission/Generation Interconnection Queue Requests considered:

TSR Q2611 (600 MW)
TSR Q2417 (32 MW)
TSR Q2789 (75 MW)
TSR Q2790 (80 MW)
TSR Q2865 (70 MW)
TSR Q2882 (25 MW)

GI Q0524 (6 MW)
GI Q0754 (80 MW)
GI Q0799 (67 MW)
GI Q0846 (75 MW)
GI Q1003 (10 MW)

10.2 Appendix 2: Contingent Facilities

The following Interconnection Facilities and/or upgrades to the Transmission Provider's system are Contingent Facilities for the Interconnection Customer's Interconnection Request and must be in service prior to the commencement of generation activities: None.

10.3 Appendix 2: Property Requirements

Property Requirements for Point of Interconnection Substation

Requirements for rights of way easements
Rights of way easements will be acquired by the Interconnection Customer in the Transmission Provider's name for the construction, reconstruction, operation, maintenance, repair, replacement and removal of Transmission Provider's Interconnection Facilities that will be owned and operated by PacifiCorp. Interconnection Customer will acquire all necessary permits for the Project and will obtain rights of way easements for the Project on Transmission Provider's easement form.

Real Property Requirements for Point of Interconnection Substation
Real property for a point of interconnection substation will be acquired by an Interconnection Customer to accommodate the Interconnection Customer's Project. The real property must be acceptable to Transmission Provider. Interconnection Customer will acquire fee ownership for interconnection substation unless Transmission Provider determines that other than fee ownership is acceptable; however, the form and instrument of such rights will be at Transmission Provider's sole discretion. Any land rights that Interconnection Customer is planning to retain as part of a fee property conveyance will be identified in advance to Transmission Provider and are subject to the Transmission Provider's approval.

The Interconnection Customer must obtain all permits required by all relevant jurisdictions for the planned use including but not limited to conditional use permits, Certificates of Public Convenience and Necessity, California Environmental Quality Act, as well as all construction permits for the Project.

Interconnection Customer will not be reimbursed through network upgrades for more than the market value of the property.

As a minimum, real property must be environmentally, physically, and operationally acceptable to Transmission Provider. The real property shall be a permitted or able to be permitted use in all zoning districts. The Interconnection Customer shall provide Transmission Provider with a title report and shall transfer property without any material defects of title or other encumbrances that are not acceptable to Transmission Provider. Property lines shall be surveyed and show all encumbrances, encroachments, and roads.

Examples of potentially unacceptable environmental, physical, or operational conditions could include but are not limited to:

1. Environmental: known contamination of site; evidence of environmental contamination by any dangerous, hazardous or toxic materials as defined by any governmental agency; violation of building, health, safety, environmental, fire, land use, zoning or other such regulation; violation of ordinances or statutes of any governmental entities having jurisdiction over the property; underground or above ground storage tanks in area; known remediation sites on property; ongoing mitigation activities or monitoring activities; asbestos; lead-based paint, etc. A

phase I environmental study is required for land being acquired in fee by the Transmission Provider unless waived by Transmission Provider.

2. Physical: inadequate site drainage; proximity to flood zone; erosion issues; wetland overlays; threatened and endangered species; archeological or culturally sensitive areas; inadequate sub-surface elements, etc. Transmission Provider may require Interconnection Customer to procure various studies and surveys as determined necessary by Transmission Provider.

Operational: inadequate access for Transmission Provider's equipment and vehicles; existing structures on land that require removal prior to building of substation; ongoing maintenance for landscaping or extensive landscape requirements; ongoing homeowner's or other requirements or restrictions (e.g., Covenants, Codes and Restrictions, deed restrictions, etc.) on property which are not acceptable to the Transmission Provider.