

Community Solar Project Interconnection  
**Community Solar Project System Impact Study Report**

Completed for  
**(“Applicant”)**  
**OCS086**

Proposed Point of Interconnection  
**Circuit 5R285 out of Jacksonville substation at 12.47 kV**

**July 23, 2024**

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# TABLE OF CONTENTS

<b>1.0 DESCRIPTION OF THE COMMUNITY SOLAR PROJECT</b>	<b>2</b>
<b>2.0 APPROVAL CRITERIA FOR TIER 4 INTERCONNECTION REVIEW .....</b>	<b>2</b>
<b>3.0 SCOPE OF THE STUDY .....</b>	<b>2</b>
<b>4.0 PROPOSED POINT OF INTERCONNECTION.....</b>	<b>2</b>
<b>5.0 STUDY ASSUMPTIONS.....</b>	<b>3</b>
<b>6.0 REQUIREMENTS .....</b>	<b>4</b>
6.1 COMMUNITY SOLAR PROJECT REQUIREMENTS.....	4
6.2 TRANSMISSION SYSTEM MODIFICATIONS.....	5
6.3 DISTRIBUTION/TRANSMISSION LINE MODIFICATIONS .....	5
6.4 EXISTING BREAKER MODIFICATIONS – SHORT-CIRCUIT .....	6
6.5 PROTECTION REQUIREMENTS .....	6
6.6 DATA REQUIREMENTS (RTU) .....	7
6.7 COMMUNICATION REQUIREMENTS.....	7
6.8 SUBSTATION REQUIREMENTS .....	7
6.9 METERING REQUIREMENTS .....	7
<b>7.0 COST ESTIMATE .....</b>	<b>7</b>
<b>8.0 SCHEDULE .....</b>	<b>8</b>
<b>9.0 PARTICIPATION BY AFFECTED SYSTEMS.....</b>	<b>8</b>
<b>10.0 APPENDICES .....</b>	<b>8</b>
10.1 APPENDIX 1: HIGHER PRIORITY REQUESTS .....	9
10.2 APPENDIX 2: INFORMATIONAL NETWORK RESOURCE INTERCONNECTION SERVICE ASSESSMENT .....	10
10.3 APPENDIX 3: PROPERTY REQUIREMENTS.....	11

## **1.0 DESCRIPTION OF THE COMMUNITY SOLAR PROJECT**

Medford Irrigation District (“Applicant”) proposed interconnecting 0.8 MW of new generation to PacifiCorp’s (“Public Utility”) circuit 5R285 out of Jacksonville substation located in Jackson County, Oregon. Medford Floating Solar project (“Project”) will consist of 8 inverters for a total requested output of 0.8 MW. The requested commercial operation date is March 31, 2024.

The Public Utility has assigned the Project “OCS086.”

## **2.0 APPROVAL CRITERIA FOR TIER 4 INTERCONNECTION REVIEW**

Pursuant to the Section I(1) of the Public Utility’s CSP Interconnection Procedures, a Public Utility must use the Tier 4 review procedures for an application to interconnect a Community Solar Project that meets the following requirements:

- (a) The Community Solar Project does not qualify for or failed to meet Tier 2 review requirements; and
- (b) The Community Solar Project must have a nameplate capacity of three (3) megawatts or less.

## **3.0 SCOPE OF THE STUDY**

Pursuant to Section I(6)(g) of the CPS Interconnection Procedures, the System Impact Study Report shall consist of: (1) the underlying assumptions of the study; (2) a short circuit analysis; (2) a stability analysis; (3) a power flow analysis; (4) voltage drop and flicker studies; (5) protection and set point coordination studies; (6) grounding reviews; (7) the results of the analyses; and (8) any potential impediments to providing the requested Interconnection Service, including a non-binding informational NRIS portion that addresses the additions, modifications, and upgrades to the Public Utility’s Transmission System that would be required at or beyond the point at which the Interconnection Facilities connect to the Public Utility’s Transmission System to accommodate the interconnection of the CSP Project. In addition, the System Impact Study shall provide a list of facilities that are required as a result of the Community Solar Project request and non-binding good faith estimates of cost responsibility and time to construct.

## **4.0 PROPOSED POINT OF INTERCONNECTION**

The Applicant’s proposed Community Solar Project is to be interconnected to the Public Utility’s distribution circuit 5R285 out of Jacksonville substation via a 12.47 kV primary meter. The proposed Point of Interconnection will be located at approximately facility point 01337002.0282400, near 5045 Jacksonville Highway located in Jackson County, Oregon. Figure 1 below is a one line diagram that illustrates the interconnection of the proposed generating facility to the Public Utility’s system.

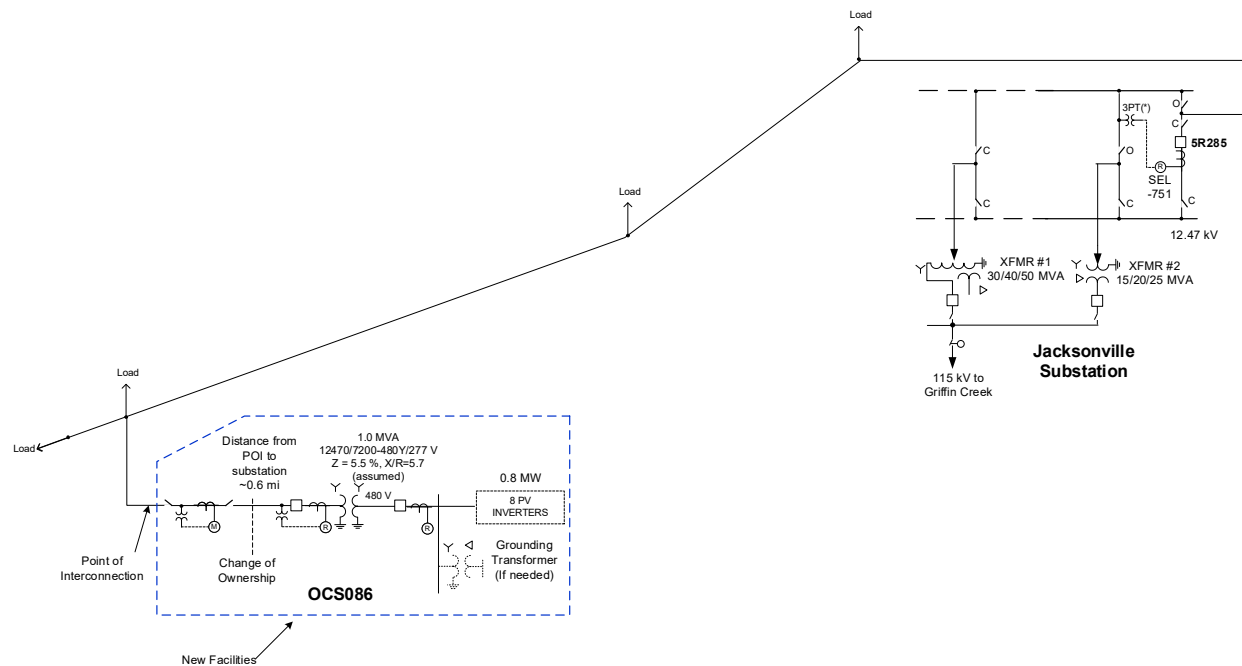


Figure 1: System One Line Diagram

## 5.0 STUDY ASSUMPTIONS

- All active higher-priority requests for transmission service and/or generator interconnection service (including requests in the traditional interconnection queue and other requests in the Community Solar queue) in the local area of the requested POI will be considered in this study and are listed in Appendix 1. If any of these requests are withdrawn, the Public Utility reserves the right to restudy this request, as the results and conclusions contained within this study could significantly change.
- The Applicant's request for interconnection service in and of itself does not convey transmission service.
- This study assumes the Project will be integrated into Public Utility's system at the agreed upon and/or proposed Point of Interconnection.
- The Applicant will construct and own any facilities required between the Point of Interconnection and the Project unless specifically identified by the Public Utility.
- Line reconductor or fiber underbuild required on existing poles will be assumed to follow the most direct path on the Public Utility's system. If during detailed design the path must be modified it may result in additional cost and timing delays for the Applicant'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 Public Utility performance and design standards.
- The line extension is assumed to originate at facility point 01337002.0282400.
- The generators were assumed to operate during daylight hours, 7 days per week, 12

- months per year. The generation contribution at the POI was assumed to be 800 kW at unity power factor.
- The study assumes that the Applicant will provide constant power factor control at unity power factor (100% PF).
  - A Jacksonville T-3833 substation transformer daytime minimum load of 4242 kW at unity power factor was measured in April 2023. Reverse flow is not expected during daytime minimum loading conditions.
  - A Jacksonville 5R285 circuit daytime minimum load of 2063 kilowatts was measured in May 2023. Reverse flow is not expected during daytime minimum loading conditions.
  - For Jacksonville T-3833, a summer peak loading of 19,776 kVA at 97% power factor and a winter peak loading of 17,311 kVA at 99% power factor were assumed.
  - For Jacksonville 5R285, a summer peak loading of 9950 kVA at 96% power factor and a winter peak loading of 7255 kVA at 99% power factor were assumed.
  - Jacksonville Load Tap Changer output based on current settings is assumed as follows:
    - Daytime Minimum Load case: 1.013 per unit
    - Summer Peak Load case: 1.029 per unit
    - Winter Peak Load case: 1.029 per unit
  - This report is based on information available at the time of the study. It is the Applicant's responsibility to check the Public Utility's web site regularly for transmission system updates (<https://www.oasis.oati.com/ppw>)

## **6.0 REQUIREMENTS**

### **6.1 COMMUNITY SOLAR PROJECT REQUIREMENTS**

The Community Solar Project and Interconnection Equipment owned by the Applicant are required to operate under constant power factor mode with a unity power factor setting unless specifically requested otherwise by the Public Utility. The Community Solar Project is expressly forbidden from actively participating in voltage regulation of the Public Utilities system without written request or authorization from the Public Utility. The Community Solar Project shall have sufficient reactive capacity to enable the delivery of 100 percent of the plant output to the POI at unity power factor measured at 1.0 per unit voltage under steady state conditions.

Generators shall be capable of operating under Voltage-reactive power mode, Active power-reactive power mode, and Constant reactive power mode as per IEEE Std. 1547-2018. This project shall be capable of activating each of these modes one at a time. The Public Utility reserves the right to specify any mode and settings within the limits of IEEE Std 1547-2018 needed before or after the Community Solar Project enters service. The Applicant shall be responsible for implementing settings modifications and mode selections as requested by the Public Utility within an acceptable timeframe. The reactive compensation must be designed such that the discreet switching of the reactive device (if required by the Applicant) does not cause step voltage changes greater than +/-3% on the Public Utility's system. In all cases the minimum power quality requirements in PacifiCorp's Engineering Handbook section 1C shall be met and are available at

<https://www.pacificpower.net/about/power-quality-standards.html>. Requirements specified in the System Impact Study that exceed requirements in the Engineering Handbook section 1C power quality standards shall apply.

The proposed inverters shall be compliant with IEEE 1547-2018, UL 1741 SB and shall be able to control the healthy-phases overvoltages in case of a single-phase-to-ground fault. If the inverters do not comply with this requirement a grounding transformer shall be installed to guarantee an effective grounding system

All generators must meet applicable WECC low voltage ride-through requirements as specified in the interconnection agreement.

## **6.2 TRANSMISSION SYSTEM MODIFICATIONS**

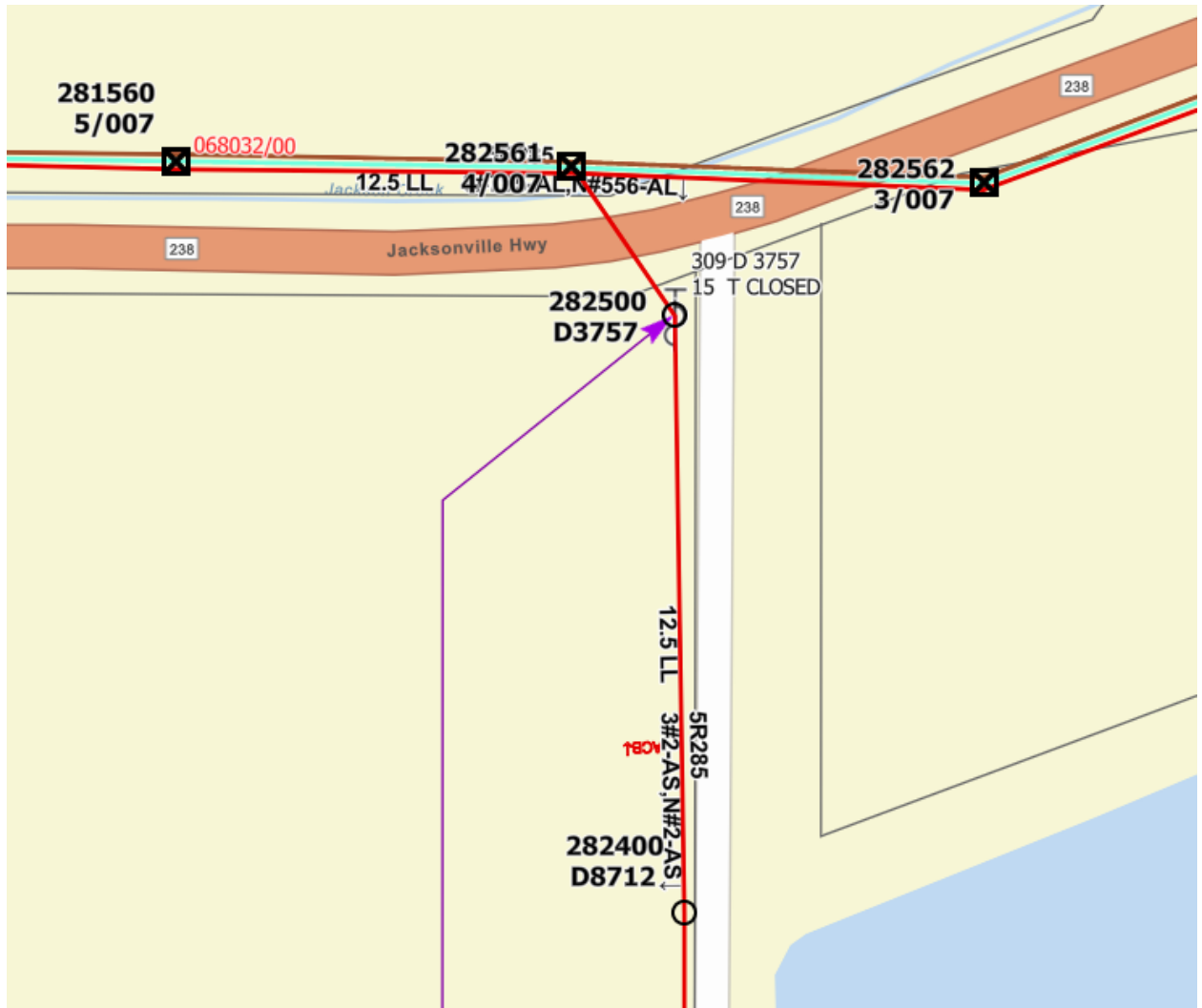
No transmission system modifications are required to accommodate the proposed Applicant's generation facility.

## **6.3 DISTRIBUTION/TRANSMISSION LINE MODIFICATIONS**

The load flow model was modified from its present state to its future state by including the following construction items:

- Replace the 3-15T fuses at pole 01337002.0282500 with 3-125E slow fuses.
- Extend 12.47 kV facilities 100 feet of three-phase 1/0 ACSR from the new pole near 01337002.0282400 to the POI. This line extension will require a minimum of two new utility poles. A three-phase, gang-operated, load break disconnect switch is required on the first pole. A primary metering assembly is required on the second pole. Additional poles may be required if other utility departments specify a control house and/or utility protective device. The Applicant will be responsible for obtaining all necessary permissions and easements. NOTE: The Applicant's site plan drawing E-102 does not show locations for the required Public Utility facilities. It is likely that more property will be needed to install the two Public Utility poles.
- The load tap changer settings for Jacksonville will be modified to output 123.0 volts with no compensation during all loading conditions.

The map below shows the location of the pole for the line extension. The applicant drawing number E-001 shows a job sketch from the utility line to the point of interconnection.



#### 6.4 EXISTING BREAKER MODIFICATIONS – SHORT-CIRCUIT

The increase in the fault duty on the system as the result of the addition of the 0.8 MW Community Solar Project with photovoltaic arrays connected to a 1.0 MVA 12.47 kV – 480V transformer with 5.5 % impedance, will not push the fault duty above the interrupting rating of any of the existing fault interrupting equipment.

#### 6.5 PROTECTION REQUIREMENTS

The SEL-751 relay associated with CB 5R285 at Jacksonville must be set to be directional. It must be coordinated with the recloser at the OCS086 location. This recloser will have overvoltage, undervoltage, overfrequency and underfrequency elements set to disconnect the plant in case the voltage and/or frequency reaches vales unacceptable by the Distribution Provider.

Due to the expected balance load/generation, this project does not need direct transfer trip from the Jacksonville to the OCS086 plant; therefore, no extra communications for P&C

purposes are needed. In case the CB 5R285 is disconnected, the plant will automatically be disconnected by local relays as it is expected that the load will be larger than the plant capacity.

#### **6.6 DATA REQUIREMENTS (RTU)**

Due to the size to the proposed generating facility no real time telemetry is required.

#### **6.7 COMMUNICATION REQUIREMENTS**

No communications upgrades are required.

#### **6.8 SUBSTATION REQUIREMENTS**

No substation modifications are required to accommodate the proposed Applicant's generation facility.

#### **6.9 METERING REQUIREMENTS**

##### Interchange Metering

The metering will be located on the high side of the customer generator step up transformer at the Point of Interconnection. The metering will be installed overhead on a pole per distribution DM construction standards. The Public Utility will procure, install, test, and own all revenue metering equipment. The metering will be bi-directional to measure KWH and KVARH quantities for both generation received, and back feed retail load delivered. There will be no additional station service metering for supplying generation load. The metering generation and billing data will be remotely interrogated via the Public Utility's MV90 data acquisition system.

##### Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility as holding the certificated service territory rights for the area in which the load is physically located. Station service and temporary construction power metering shall conform to the Six State Electric Service Requirements manual.

Please note, prior to back feed, Applicant must arrange distribution voltage retail meter service for electricity consumed by the Project and arrange back up station service for power that will be drawn from the distribution line when the Project is not generating. Applicant must call the PCCC Solution Center 1-800-640-2212 to arrange this service. Approval for back feed is contingent upon obtaining station service.

#### **7.0 COST ESTIMATE**

The following estimate represents only scopes of work that will be performed by the Public Utility. Costs for any work being performed by the Applicant are not included.

<b>Distribution System</b>	<b>\$129,000</b>
<i>Fuse replacement, line extension</i>	



<b>Metering</b> <i>Primary metering package</i>	\$21,600
<b>Protection and Control</b> <i>Substation settings changes, customer settings review</i>	\$45,652
<b>Project Management</b> <i>Project manager, project control specialist</i>	\$17,520
<b>Other</b> <i>Capital surcharge, contingency, administrative support</i>	\$49,228
<b>Total</b>	\$263,000

\*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 Public Utility must develop the Project schedule using conservative assumptions. The Applicant may request that the Public Utility perform this field analysis, at the Applicant's expense, prior to the execution of an Interconnection Agreement in order to obtain more cost and schedule certainty.

Note: Costs for any excavation, duct installation and easements shall be borne by the Applicant and are not included in this estimate. 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 Public Utility to interconnect this Community Solar Project to Public Utility's electrical distribution or transmission system. An estimate, based on finer detail, will be calculated during the Facilities Study. The Applicant will be responsible for all actual costs, regardless of the estimated costs communicated to or approved by the Applicant.

## **8.0 SCHEDULE**

The Public Utility estimates it will require approximately 15-18 months to design, procure and construct the facilities described in this report following the execution of an Interconnection Agreement. The schedule will be further developed and optimized during the Facilities Study.

## **9.0 PARTICIPATION BY AFFECTED SYSTEMS**

Public Utility has identified the following Affected Systems: None

## **10.0 APPENDICES**

Appendix 1: Higher Priority Requests

Appendix 2: Informational Network Resource Interconnection Service Assessment

Appendix 3: Property Requirements

**10.1 APPENDIX 1: HIGHER PRIORITY REQUESTS**

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

Transmission/Generation Interconnection/Community Solar Queue Requests considered:

OCS046 2.25 MW  
OCS048 1.45 MW  
OCS055 1.35 MW  
OCS058 1.25 MW  
OCS067 1.00 MW  
OCS082 1.00 MW  
TCS-28 2.99 MW

## **10.2 APPENDIX 2: INFORMATIONAL NETWORK RESOURCE INTERCONNECTION SERVICE ASSESSMENT**

The study results described above reflect an energy resource interconnection service (“ERIS”) evaluation, modified in the CSP program rules to examine only generation and load conditions local to the requested CSP project’s interconnection point (sometimes referred to as the “zoomed in view”). The “zoomed in view” functions to: (1) study the project’s proposed interconnection without considering certain existing or higher-queued requests outside of the local area; and (2) to inform whether the CSP facility must cap its project to mitigate, although not eliminate, the risk of potential deliverability-related network upgrades to accommodate the proposed CSP generator.

By contrast, the following informational section provides a network resource interconnection service (“NRIS”) evaluation performed with traditional assumptions, i.e., not modified to examine only local generation and load conditions, but rather one that assumes that all existing interconnections, higher-queued requests for interconnection service (in both the traditional and CSP queue), and generators with executed contracts beyond the local area are in-service. Depending on the severity of the conditions created when absorbing additional generation (capped or not capped) in that broader, “zoomed out” area, the local area-focused generator size cap developed in the “zoomed in” examination may not be sufficient to mitigate the need for deliverability-related network upgrades. Regardless of this report’s informational NRIS results, the deliverability-related network upgrades ultimately necessary to accommodate the proposed CSP generator will depend on conditions present when the future transmission service study is performed, as well as whether network upgrade alternatives are available at that time.

There are currently a significant number of higher-queued requests seeking interconnection in the southern Oregon area where the CSP generator proposes to interconnect. These interconnection studies must be completed before the transmission provider can determine what upgrades and associated cost estimates may be required for the aggregate of generation in the local area to be delivered to the aggregate of load on the transmission provider’s transmission system (the NRIS study scope).

### **10.3 APPENDIX 3: PROPERTY REQUIREMENTS**

#### **Requirements for rights of way easements**

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

#### **Real Property Requirements for Point of Interconnection Substation**

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

The Applicant 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.

Applicant 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 Public Utility. The real property shall be a permitted or able to be permitted use in all zoning districts. The Applicant shall provide Public Utility with a title report and shall transfer property without any material defects of title or other encumbrances that are not acceptable to Public Utility. 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:

- 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 Public Utility unless waived by Public Utility.

- 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. Public Utility may require Applicant to procure various studies and surveys as determined necessary by Public Utility.
- Operational: inadequate access for Public Utility'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 Public Utility.