PACIFICORP

Community Solar Project Interconnection

Community Solar Project System Impact Study Report

Completed for

("Applicant")

OCS100

Proposed Point of Interconnection

Circuit 4M84 out of Village Green substation, 20.8 kV

January 29, 2025

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1.0 DESCRIPTION OF THE COMMUNITY SOLAR PROJECT

("Applicant") proposed interconnecting 1.5 MW of new generation to PacifiCorp's ("Public Utility") circuit 4M84 out of Village Green substation located in Lane County, Oregon. The ("Project") will consist of twelve (12) Sungrow SG125HV inverters for a total requested output of 1.5 MW. The requested commercial operation date is TBD.

The Public Utility has assigned the Project "OCS100."

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.

The information contained in this study report is based on preliminary information and not to be used for construction.

4.0 PROPOSED POINT OF INTERCONNECTION

The Applicant's proposed Community Solar Project is to be interconnected to the Public Utility's distribution circuit 4M84 out of Village Green substation via a 20.8 kV primary meter. The proposed Point of Interconnection will be located at approximately Facility Point ("FP") 01320003.0288908 located in Lane 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.

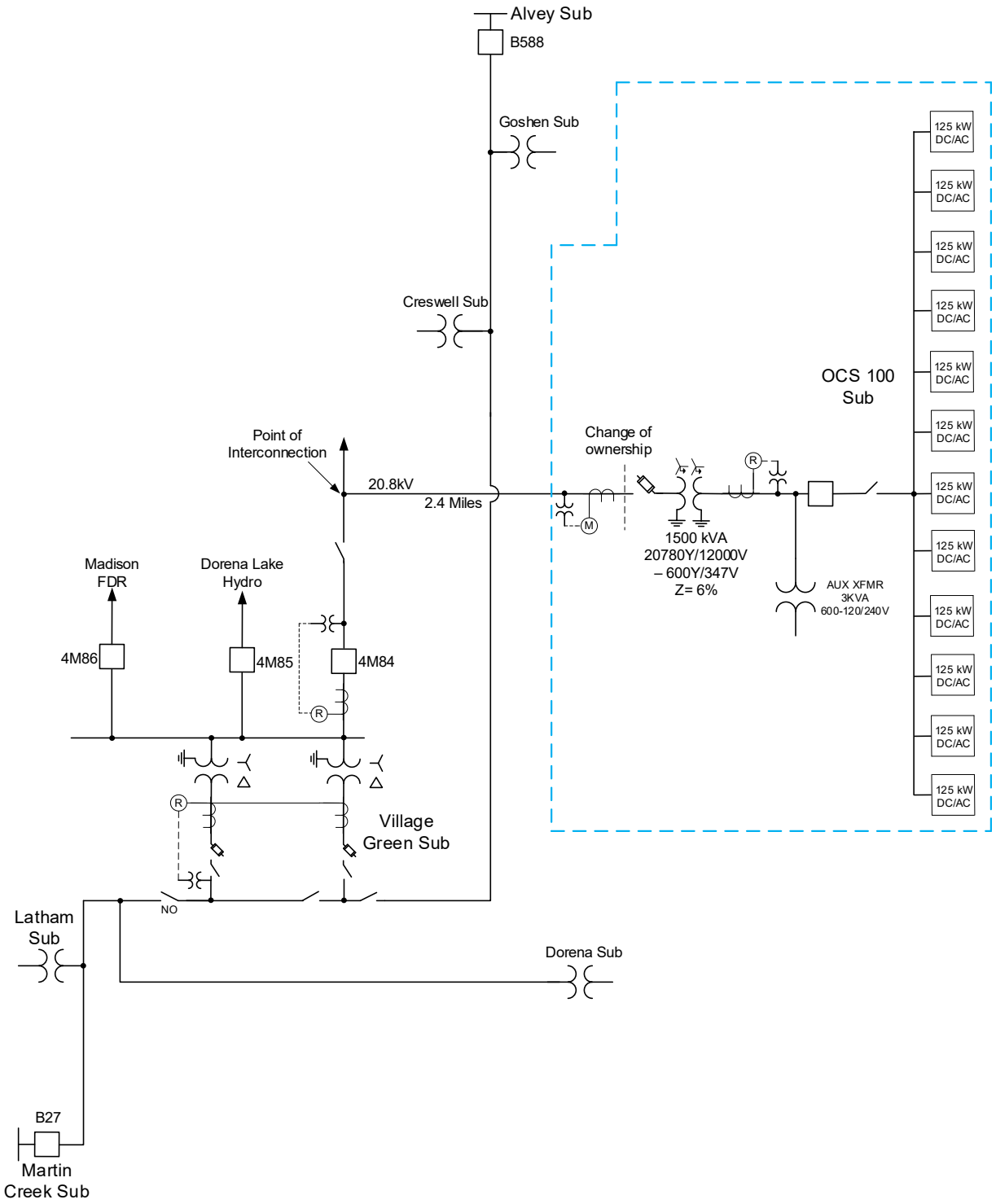


Figure 1: System One Line Diagram

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 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.
- 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.

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

6.2 Transmission System Modifications

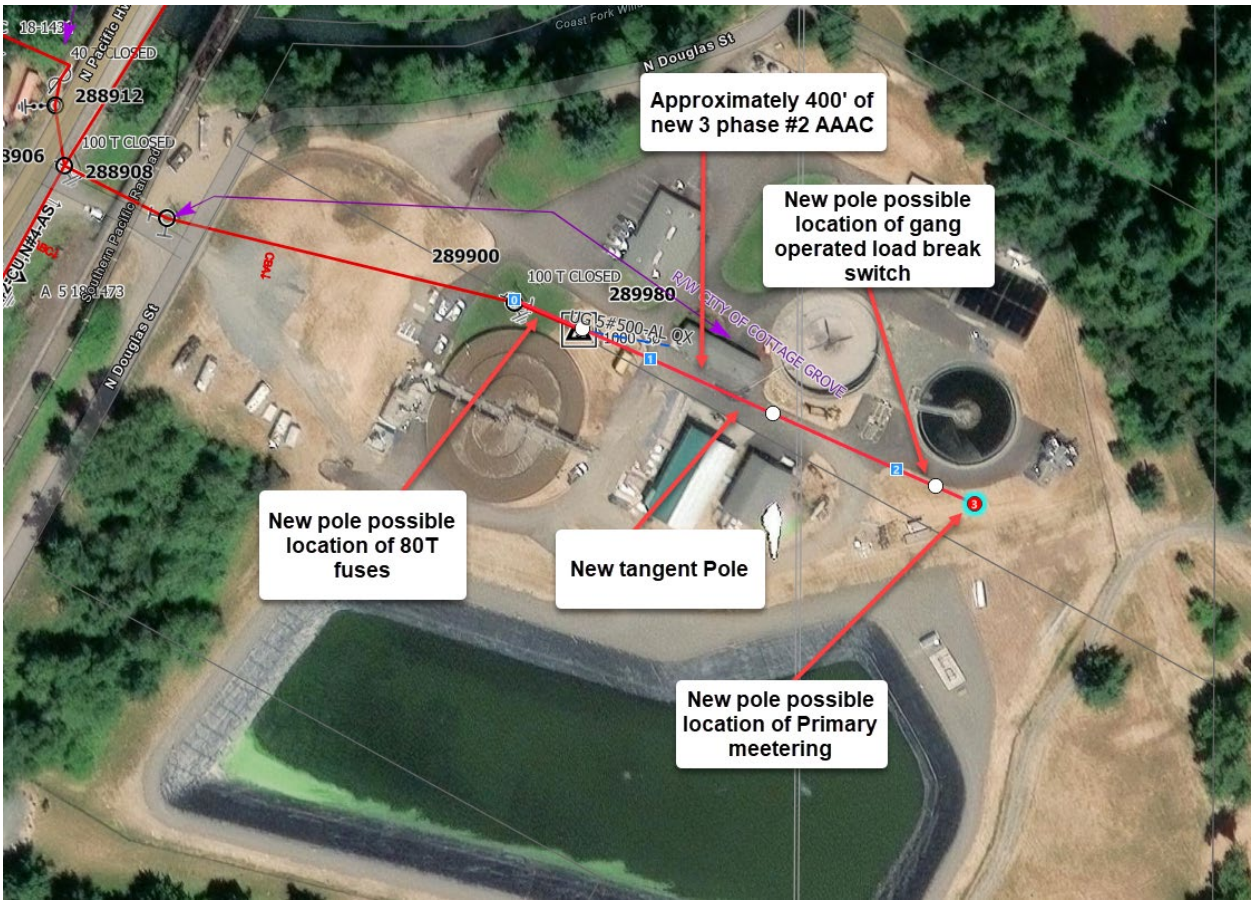
No transmission system modifications are required to accommodate the proposed Project.

6.3 Distribution/Transmission Line Modifications

Minimum daytime load on circuit 4M84 is 2.5 MW the addition of 1.5 MW of generation will reduce the MDL to 1 MW. No reverse power flow through automated protection was identified.

Upgrades required to the distribution system are listed below:

- Extend 3 phase OH #2AAAC from FP 01320003.0289900 approximately 400 feet and 4 additional poles will be required along this new extension.
- Install 3 phase fuse instillation on new pole to protect the new facilities install 80T fuses. Location of fuse instillation will be down stream of FP 01320003.0289900 along new 3 phase extension at a location yet to be determined.
- Install new pole and gang operated switch at a location along extension downstream of new fuses yet to be determined.
- Install new pole and primary metering at a location yet to be determined.



6.4 EXISTING BREAKER MODIFICATIONS – SHORT-CIRCUIT

Given current circuit configuration this is the primary available fault current at FP 01320003.0289900 without new generation.

Short-Circuit Box

Node - FP289900_426601003_JN175896

Fault Current	Amps	Amps with Zf	MVA	
LLL	1960		71	1961.45
LG	1733	1733	62	
LLG	1927		46	
LL	1695		61	
+ Sequence	Ohms		Per Unit	X/R Ratio
R:	2.0438		0.4724	2.83
X:	5.7923	Feet from Source	1.3388	
0 Sequence		12553.4		
R:	3.7983		0.8779	2.03
X:	7.7242		1.7854	

The increase in the fault duty on the system as a result of the addition of the generating facility with photovoltaic arrays fed through 12 – 125 kW 600V inverters connected to the distribution system through a single 1.5 MVA 20.8/12.0 KV – 600Y/347V transformer

with an impedance of 6%, will not require the replacement of any of the existing fault interrupting devices.

6.5 PROTECTION REQUIREMENTS

The Project will need to disconnect from the network in a high-speed manner for faults on the 20.8 kV line on circuit 4M84 out of Village Green substation. The minimum daytime load on circuit 4M84 is 2.5 MW which is above the maximum potential power output of the proposed Project. For this reason, the imbalance condition of the load and generation can be relied upon to cause the high-speed disconnection of the generating facilities for faults on the 20.8 kV distribution system. Due to the very low current contribution to a fault on 20.8 kV, and the absence of direct transfer trip, the inverters must be capable of disconnecting the plant for such a fault.

A deadline checking control circuit will be required for the feeder relay to delay the automatic reclose if the generation at the solar generating facility is not disconnected in a timely manner. Voltage instrument transformers will need to be installed on the line side of CB 4M84 for the deadline checking. The relay and controls associated with CB 4M84 will be replaced with SEL-751 relay to support the dead line check.

For a fault in one of the two 115 – 20.8 kV transformers at Village Green Substation the 115 kV fuses will blow and if the transformers are being operated in parallel at the time the bus tie breaker will open. There is a potential for the existing hydro generation facility to deliver substantial amounts of current to the transformer fault. To detect the condition in a timely manner, a directional overcurrent relays were installed to detect excess current flow into the transformer from the 20.8 kV side and trip the bus tie and tie line breakers. The trip circuit will be extended to trip feeder 4M84 for the 115 – 20.8 kV transformer faults when the existing hydro plant is connected.

The solar generating facility will need to be equipped with a main breaker that can disconnect all of the inverters from the distribution network. The main breaker needs to have stored energy operate capability so that the breaker can be tripped open in a zero AC voltage state. The main breaker is equipped with a SEL-751 relay. The SEL 751 relay will be configured to perform the following functions:

1. Detect faults on the solar generating facility
2. Monitor the voltage and react to under or over frequency, and / or magnitude of the voltage.

6.6 DATA REQUIREMENTS (RTU)

No SCADA work is required.

6.7 COMMUNICATION REQUIREMENTS

No communications work is required.

6.8 SUBSTATION REQUIREMENTS

Village Green substation

Three, 20.8 kV fuses, voltage instrument transformers (VT's), and arresters will be installed on the line side of circuit breaker 4M84. Conduit and cable will be installed to support the installation of the VT's and to modify how the feeder circuit exists at the substation.

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.

Village Green Substation **$720,000**

Expansion of substation to support installation of three (3) 20.8 kV fuses, three (3) 20.8 kV voltage transformers on line side of circuit breaker 4M84

*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 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

Copies of this report will be shared with each Affected System.

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:

N/A

10.2 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.