RIVERSIDE SOLAR, LLC

Matter No. 21-00752

900-2.6 Exhibit 5

Design Drawings

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Acronym List

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AES	The AES Corporation, Inc.
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
DANC	Development Authority of the North Country
HDD	horizontal directional drilling
ICEA	Insulated Cable Engineers Association
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IFP	Issued for Permit
kW	kilowatt
LOD	limit of disturbance
MVA	Mega Volt-Amp
MWAC	Megawatts-Alternating Current
NEC	National Electric Code
NEMA	National Electric Manufacturers Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
O&M	operations and maintenance
ORES	Office of Renewable Energy Siting
OSHA	Occupational Safety and Health Administration
PE	Professional Engineer
ROW	right-of-way
RUS	Rural Utilities Service
TR	tiling ribbon
USCs	Uniform Standards and Conditions

Glossary Terms

Applicant	Riverside Solar, LLC, a subsidiary of The AES Corporation, Inc. (AES), the entity seeking a siting permit for the Facility from the Office of Renewable Energy Siting (ORES) under Section 94-c of the New York State Executive Law.
Facility	The proposed components to be constructed for the collection and distribution of energy for the Riverside Solar Project, which includes solar arrays, inverters, electric collection lines, and the collection substation.
Facility Site	The parcels encompassing Facility components which totals 1,168 acres in the Towns of Lyme and Brownville, Jefferson County, New York (Figure 2-1).
Limits of Disturbance	The area to which construction impacts will occur, totaling approximately 628 acres.
Towns	The Towns of Lyme and Brownville, Jefferson County, New York.

Exhibit 5: Design Drawings

This Exhibit provides information required in accordance with the requirements of §900-2.6 of the Section 94-c Regulations and contains the Issued for Permit (IFP) Design Drawings (IFP Design Drawings) as Appendix 5-1.

As described previously in Exhibit 2 (Overview and Public Involvement), the Facility is a 100 megawatt-alternating current (MWAC) solar electric generating facility proposed within the 1,168-acre Facility Site in the Towns of Lyme and Brownville, Jefferson County, New York (Towns). Electric generating components, as well as the collection substation, collection lines, and inverters will be installed entirely within the Facility Site and will require approximately 628 acres (referred to as the Limit of Disturbance LOD)). The Facility also includes the construction of 3.4 miles of haul roads, the majority of which are within the Facility, some of which will extend offsite for connection to existing public roadways. Interconnection facilities required for the Facility include an approximately 330-foot overhead, three wire 115 kV interconnection line which will tie the Facility Site to the existing National Grid Lyme Tap Line off the Thousand Islands – Coffeen St. 115 kV transmission line #4. The following subsections include descriptions of the proposed Facility components and reference the applicable locations where the information can be found on the IFP Design Drawings included as Appendix 5-1.

5(a) Statement of Engineer Qualifications

The IFP Design Drawings and supporting documentation prepared for the Application, and included as Appendix 5-1, were developed under the direction of a licensed Professional Engineer (PE) in the State of New York, as identified on Sheet PV-G.00.01.

5(b) Conformance with Setback Requirements for Wind Turbines

The proposed Facility is a solar project. Therefore, this section is not applicable.

5(c) Wind Turbine Model Descriptions

The proposed Facility is a solar project. Therefore, this section is not applicable.

5(d) Conformance with Setback Requirements for Solar Facilities

The Facility has been designed to meet or exceed the setback requirements listed in Table 5-1, below, which correspond directly to the requirements presented in Table 2 of §900-2.6(d) of the Section 94-c Regulations.

Table 5-1. Setback Requirements for Solar Facility Components[1]

Setback Type	Solar Facility Setback	Town of Lyme Zoning	Town of Brownville Zoning
Non-participating residential property lines	100 feet	60 feet	n/a
Centerline of Public Roads	50 feet	n/a	n/a
Non-participating property lines (non-residential)	50 feet	60 feet	n/a
Non-participating occupied residences	250 feet	60 feet	n/a

[1] Table adapted from Table 2 under §900-2.6(d) of the Section 94-c Regulations.

[2] The Facility was designed to meet the more stringent setback.

The IFP Design Drawings in Appendix 5-1 depict setbacks in accordance with Section 94-c (per table above), as well as the Towns, where appropriate. Fencing, collection lines, haul roads, and landscaping may be constructed within the setbacks, however, all solar arrays, inverters, and the collection substation, will be constructed in accordance with the required setbacks.

5(e) Solar Array Height

The maximum height of the Facility solar arrays is eight feet 11 inches (2.72 meters). Therefore, the arrays will not exceed 20 feet from finished grade. The height of the arrays is measured from the highest natural grade below each solar panel to its maximum potential height. As identified in §900-2.6(e), this height restriction does not apply to electric collection, transmission or substation components.

5(f) Issued for Permitting Design Drawings

As required per §900-2.6(f) of the Section 94-c Regulations, the following sections describe the information included on the IFP Design Drawings (Appendix 5-1) and within supporting documentation.

(1) Site Plans

The Site Plan of the proposed Facility has been provided within Appendix 5-1, depicting Facility components as required in the following subsections.

(i) Solar Facility Site Plan Drawings

General Site Plan drawings of all Facility components are included throughout the IFP Design Drawings in Appendix 5-1 at a scale of 1" = 100'. Additionally, the Applicant has provided two full-size (22" x 34") hard copy sets of the IFP Design Drawings with the Application. Per the Section 94-c regulations, the IFP Design Drawings include the following proposed and existing features.

(a) Solar Panels and Setbacks

The Overall Site Layout (Sheet PV-G.01.03 of Appendix 5-1) depicts the locations of the Facility solar arrays, property lines, and the applicable setbacks described above in Section 5(d). Detailed drawings inclusive of solar arrays, inverters, property lines, and setbacks (as well as additional Facility components) are depicted on Sheets PV-C.01.01 through PV-C.01.17. The Facility consists of 245,440 solar modules consisting of 26 modules per string (total of 9,440 strings). The inverters proposed for the Facility are Sungrow SG3600UD-MV inverters with a 3,600-kilowatt (kW) rating. The Facility proposes to use 30 inverters centrally located throughout the panel arrays. The collection substation includes a 75/100/125 mega volt-amp (MVA) rated step up transformer which steps up the voltage from the collection line voltage of 34.5 kV to 115 kV for interconnection to the National Grid 115 kV system. The collection substation transformer is shown on the collection substation single line diagram, Sheet HV-E.02.01.

(b) Haul Roads

The Facility proposes the use of permanent haul roads (referred to on the drawings in Appendix 5-1 as "haul roads") throughout the Facility Site. Extents of proposed haul roads, including indications of any existing haul roads to be utilized, and any turn-around areas are shown. Site entrance improvement details are included on Sheet PV-C.08.01. Proposed permanent haul road widths vary throughout the Facility, with the majority designed at 20 feet wide, which is

consistent with local fire code. The Facility contains a total of 3.4 miles of permanent haul roads. Additional 14-foot-wide areas designated for access are dispersed throughout the Facility.

Limited use pervious haul roads are proposed to provide access to the equipment pads, collector substation, and operations and maintenance (O&M) yard. Stabilized limited use pervious haul roads will be used in areas where grades make the use of culverts is impractical, and stormwater runoff will flow over the road. Limited use pervious haul roads are intended for post-construction use only.

(c) Collection Lines

The Facility includes 29,051 linear feet of 34.5 kV collection lines that will gather power from the inverters and transport it underground to the collection substation. Collection lines will be installed underground via trenching with the exception of eight locations where horizontal directional drilling (HDD) will be employed to avoid impacts to sensitive resources and road crossings. Collection lines have been co-located with haul roads to the maximum extent practicable to reduce the extent of impacts within the Facility Site. There are no overhead collection lines proposed as part of the Facility. Specific details regarding collection lines are located on Sheets PV-E. 02.01 – PV-E. 02.13 of the IFP Design Drawings included in Appendix 5-1.

(d) Existing Utility and Interconnection Plan

A new proposed interconnection line will originate from the collection substation and extend from the Facility Site to the existing National Grid Lyme Tap Line off the Thousand Islands – Coffeen St. 115 kV transmission line #4. Interconnection facilities include an approximately 330-foot 115 kV transmission line between the Facility's proposed collection substation and the existing transmission line. Interconnect details, including the location of the existing transmission line and proposed new transmission structures is shown on Sheet HV-C.09.01 and HV-C.09.02, respectively, of Appendix 5-1. The limits of utilities outside of the Facility Site are identified on the IFP Design Drawings. There is an existing fiber optic line, operated by the Development Authority of the North Country

(DANC), that passes through the Facility Site. However, this feature is located southwest of the LOD, along NYS Route 12E. The DANC will identify the location in the field prior to the commencement of construction. Therefore, the fiber optic line will not be impacted by Facility components. There are no pipelines or other existing utilities mapped within the Facility Site.

(e) Limits of Disturbance

The approximate LOD for the Facility is 628 acres and includes the limits of all areas to be disturbed as part of the Facility, including locations of solar panels, temporary and permanent haul roads, collection lines, inverters, the collection substation and interconnection, and fence line. The LOD also includes areas that will be temporarily disturbed during construction including laydown yards and clearing limits.

(f) Clearing Limits

The vegetative clearing limits for the Facility are shown on Sheet PV-C.00.012 through PV-C.00.17 of Appendix 5-1. Vegetative clearing has been minimized to the maximum extent practicable for construction, placement of Facility components, and to prevent module shading during operation, and includes a total of 138 acres, including for solar panel placement, haul roads, electric collection lines, and shading vegetation.

(g) Interconnection Facilities and Setbacks

The collection substation, interconnection, and existing National Grid right-of-way (ROW) is depicted on Sheet PV-C.01.06 of Appendix 5-1. The collection substation will be accessible via a new permanent haul road off Case Road and adheres to both Section 94-c and the Town of Lyme setback requirements. Full details of the collection and interconnection design are located on the following Sheets in Appendix 5-1:

- Collection Substation: Sheets HV-P.01.01 through HV-P.15.02,
- Collection System: Sheets PV-C.13.00 through PV-C.14.05, and
- Transmission Drawings: Sheets HV-C.09.01 through HV-E.15.01.

(h) Energy Storage Systems and Setbacks for Solar Facilities

No battery energy storage systems are proposed for the Facility.

(i) Site Security Features

A discussion of site security for the Facility is included in Section 6(b) of Exhibit 6 (Public Health, Safety and Security), including security features such as access controls, electronic security and surveillance, security lighting, and cyber system security. Additionally, a Site Security Plan detailing security features and risk mitigation measures has been included as Appendix 6-2. The security fencing for the array will consist of a 7-foot tall chain link fence, with no barbed wire, surrounding the Facility as shown on Sheet PV-C.10.01. Fencing specific to the collection substation is shown on Sheet PV.C.10.02. The fencing will be six feet in height with an additional one foot of barbed wire for additional security at the collection substation. The locations of Facility fencing are shown on Sheets PV-C.01.01 through PV-C.01.17.

(j) Landscaping Improvements

Sheets PV-C. 13.00 through PV-C. 14.05 of Appendix 5-1 include details of the Landscaping Plan for the Facility. The landscape drawings detail the location of proposed vegetative screening in relation to Facility components and adjacent sensitive receptors. Additionally, Sheets PV-C. 14.01 through PV.C. 14.05 include general planting notes, details on plantings and identifies the quantities and types of tree and shrub species that are proposed. No berms or retaining walls are proposed for the Facility.

(ii) Wind Facility Site Plan Drawings

The proposed Facility is a solar project. Therefore, this section (and subsections (ii)(a) through (ii)(l)) are not applicable.

(2) Design Detail Drawings

The Applicant has provided the following typical design detail drawings within Appendix 5-1 as required by the Section 94-c regulations. The plans were prepared using AutoCAD Civil 3D

design software and are generally presented at a scale of 1-inch equals 100-feet, with the exception of those intended to provide an overview of the Facility Site.

(i) Typical Elevation Drawings

Typical elevation drawings for the collection substation and interconnection facilities are included in Appendix 5-1 and described further in subsections 5(2)(i)(b) and (c), below. Drawings include the length, width, height, material of construction, color and finish of all structures and fixed equipment as part of the Facility are described by Facility component in the following sections. There will be a control house at the proposed collection substation and container storage at the O&M yard.

(a) Wind Turbine Elevation Drawings

The proposed Facility is a solar project. Therefore, this subsection is not applicable.

(b) Interconnection Facilities Drawings

Interconnection facilities include an approximately 330-foot 115 kV transmission will originate from the collection substation and extend from the Facility Site to the existing National Grid Lyme Tap Line off the Thousand Islands – Coffeen St. 115 kV transmission line #4. An elevation drawing for the interconnection line and proposed new transmission structures is included on Sheet HV-C.09.02 of Appendix 5-1, with additional details on Sheets HV-C.09.01, HV-C.09.03, and HV-E.15.01. The proposed interconnection line is approximately 330 feet long, 27 feet wide, and 38.5 feet above ground. The color of the line will be galvanized gray and will be guyed cross-braced direct buried steel poles with a ground sleeve.

(c) Collection Substation Drawings

The Applicant has included with this application drawings for collection substation (including fencing, gates, take-off structure, and all substation equipment); a general arrangement plan has been included in the drawing set showing elevation mark pointers (arrows) with reference to associated elevation views (including views of all components of the substation). The general arrangement plan is included on Sheet HV-P.01.01 of Appendix 5-1, with additional electrical

equipment elevations included on Sheets HV-P.02.01 and HV-P.02.02. The control house general arrangement and details are included on Sheets HV-P.14.01, HV-P.15.01, and HV-P.15.02.

Table 5-2. Collection Substation Specifications

Length	242 feet
Width	127 feet
Height	63 feet 7 inches (Take-off structure)
Material of Construction	Steel structures, steel equipment enclosures, and steel control building.
Color and Finish	Galvanized steel structures, Equipment painted light gray and control building painted light gray.

(d) Energy Storage Drawings

No battery energy storage systems are proposed for the Facility.

(ii) Permanent Point of Access Drawings

Each proposed permanent point of access and access type has been depicted in the design plans. Per the Section 94-c regulations, these drawings include a typical installation plan view, cross section and side view with appropriate dimensions (temporary and permanent width(s)) and identification of materials to be used along with corresponding material thickness. Where existing accessways will be used, a description of proposed upgrades for Facility construction has been provided.

(iii) Underground Infrastructure Drawings

Typical underground infrastructure/collection system details have been provided, including single and multiple circuit layouts with dimensions of proposed depth, trench width, level of cover, separation requirements between circuits, clearing width limits for construction and operation of the facility, LOD, required permanent ROW and a description of the cable installation process. Sheet PV-C.12.03 of Appendix 5-1 includes

details on the collection system and installation information. Typical details of any proposed splice vaults have also been provided, including vault dimensions, level of cover, required trench length, width and depth, clearing width limits for construction and operation of the facility, and LOD.

(iv) Overhead Electric Transmission and Collection Drawings

Details have been provided for typical overhead electric transmission lines, including a profile of the centerlines at an exaggerated vertical scale and typical elevation plans including height above grade and structure layouts. An elevation drawing for the interconnection line and proposed new transmission structures is included on Sheet HV-C.09.02 of Appendix 5-1, with additional details on Sheets HV-C.09.01, HV-C.09.03, and HV-E.15.01. There are no overhead collection lines proposed for the Facility.

(3) Compatibility of Wind Turbine with Existing Conditions

The proposed Facility is a solar project. Therefore, this section is not applicable.

(4) Engineering Codes, Standards, and Guidelines

The Applicant intends to conform to the below listed engineering codes, standards, guidelines, and practices to conform to during the planning, designing, construction, and operation of the Facility's solar arrays, electric collection system, substation, transmission line, interconnection, and associated structures, as applicable:

- American National Standards Institute (ANSI)
- Institute of Electrical and Electronics Engineers (IEEE)
- International Electrotechnical Commission (IEC)
- Insulated Cable Engineers Association (ICEA)
- American Society of Mechanical Engineers
- National Electric Code (NEC)
- National Electrical Safety Code (NESC)
- National Electric Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- Uniform Building Code

- United Laboratories
- American Iron and Steel Institute
- American Institute of Steel Construction
- International Building Code 2006
- American Association of State Highway and Transportation Officials (AASHTO) Standard for Aggregates
- American Society of Civil Engineers (ASCE)
- Federal Occupational Safety and Health Administration (OSHA) 1910.269
- American Concrete Institute (ACI)
- Rural Utilities Service (RUS) Bulletins

(5) Design, Safety, and Testing of Equipment

The Applicant intends to utilize a module similar to the Jinko Solar Tiger Pro 72HC-TV 530W Bifacial Module. The Applicant is also proposing to utilize the DuraTrack HZ v3 array tracking system, or similar, which will be installed with minimal ground disturbance via driven posts. A specification sheet for the modules and tracking system have been included as Appendices 2-1 and 2-2, respectively. The collection system will include a CAB© cabling system or underground line to connect the solar modules to the inverters and ultimately to collection substation. The Applicant intends to use a Sungrow SG3600UD-MV inverter, or a similar inverter, for this Facility. A specification sheet for this inverter has been included in Appendix 5-2. A specification sheet for the main power step up transformer at the collection substation has also been included in Appendix 5-3. All Facility components including the solar modules, collection system, inverters, substation, transmission line, and interconnection systems have been designed to meet the specifications that are provided by the manufacturer of each component and specifications listed in Section 5(f)(4). All systems will be tested prior to commercial operation of the Facility and to ensure components are functioning properly.

Conclusions

The IFP Design Drawings and supporting documentation prepared for the Application are provided within Appendix 5-1 and were developed under the direction of a licensed PE in the State of New York. The Facility has been designed to meet or exceed the requirements under Section 94-c, including setback requirements and maximum panel height. The Applicant intends

to conform to all applicable engineering codes, standards, guidelines, and practices during the planning, designing, construction, and operation of the Facility's solar arrays, electric collection system, substation, and interconnection. The Facility has been designed to comply with 19 NYCRR § 900-2.6 and the Uniform Standards and Conditions (USCs).