
NORTH SENECA
SOLAR PROJECT

North Seneca Solar Project

ORES Permit Application No. 23-00036

1100-2.6 Exhibit 5

Design Drawings

Revision 1

TABLE OF CONTENTS

EXHIBIT 5 DESIGN DRAWINGS.....	1
(a) Design Drawings	1
(b) Setback Requirements for Wind Turbine Towers	1
(c) Power, Hub Height, Rotor Diameter, Total Height of Turbines.....	1
(d) Setback Requirements for Solar Facility Components.....	1
(e) Maximum Height of Solar Facility Components.....	3
(f) Site Plans and Drawings.....	3
(1) General Site Plans	3
(2) Typical Design Detail Drawings and Plans	4
(3) Site Suitability Reports for Turbine Models.....	5
(4) Engineering Codes, Standards, Guidelines, and Practices	5
(5) Manufacturer Design, Safety and Testing Information of Equipment.....	6
REFERENCES	7

LIST OF TABLES

Table 5-1. Article VIII Setback Requirements and as Designed	1
Table 5-2. Typical Detail Drawings	4

LIST OF APPENDICES

- Appendix 5-A: Preliminary Civil Design Drawings – Revision 1
- Appendix 5-B: Electrical Design & Substation Plan Drawings – Revision 1
- Appendix 5-C: Equipment Technical and Safety Manuals

EXHIBIT 5 DESIGN DRAWINGS

(a) Design Drawings

North Seneca Solar Project, LLC (the Applicant) proposes to construct the North Seneca Solar Project, an up to 90-megawatt solar energy generating facility located within the towns of Waterloo and Junius, Seneca County, New York (the Facility). The preliminary Civil Drawings (Appendix 5-A) and other supporting drawings for the Facility were prepared at a common engineering scale by Environmental Design and Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) under the direction of a professional engineer, licensed and registered in New York State. These drawings are labeled “not for construction.” More information is provided in Section (f).

(b) Setback Requirements for Wind Turbine Towers

The proposed Facility is not a wind energy generating facility, and therefore the requirements of Title 16 New York Codes, Rules and Regulations (16 NYCRR) Section 1100-2.6(b) are not applicable.

(c) Power, Hub Height, Rotor Diameter, Total Height of Turbines

The proposed Facility is not a wind energy generating facility, and therefore the requirements of 16 NYCRR Section 1100-2.6(c) are not applicable.

(d) Setback Requirements for Solar Facility Components

The Facility layout (see Figure 2-2) has been designed to meet or exceed the setback requirements in 16 NYCRR Section 1100-2.6(d). This includes the following setbacks applied to solar infrastructure (not including collection lines):

Table 5-1. Article VIII Setback Requirements and as Designed

Setback Feature	Article VIII Requirement (feet)	Facility Setbacks as Designed (feet)
Non-Participating Residential Property Line	100	100
Centerline of Public Roads	50	200 ¹
Non-participating property lines (non-residential)	50	100
Non-participating occupied residences	250	300

¹Designed set back is 200 feet from road right-of-way line.

Residential and non-residential parcels were defined using the New York State Office of Real Property Tax Service categorizations for property classification. Those parcels within the 200 class are defined as “Property used for human habitation” and are therefore classified as residential for the purposes of

determining setbacks from property lines (NYSORPS, 2023). All other property types within and adjacent to the Facility Site (e.g., Agricultural, Vacant land, Commercial, Recreation & Entertainment, and forested, Community Services, Industrial, Public Services, and Wild, Conservation Lands and Public Parks) were defined as non-residential.

In addition, the Applicant conducted a field-verified sensitive receptor survey in March 2023 for the purposes of studying the impacts of noise within the Facility Site (see Exhibit 7). Receptors were identified using recent aerial imagery (NAIP, 2022) and the New York State Street Address Mapping for all structures within 3,000 feet of the Facility Site (Receptor Study Area) and field-verified to confirm the use described in the desktop analysis. All receptors were field verified from publicly accessible roadways and vantage points. The classifications assigned to receptors during the survey included: Occupied Residence, Uninhabitable Structure, Commercial, Public, Utility, Historic, and Other. The locations of receptor structures were then used to determine setback boundaries for Article VIII requirements. These setbacks are shown in the design drawings included in Appendix 5-A.

In addition to the setbacks required under 16 NYCRR Section 1100-2.6(d), the Applicant reviewed setback standards established by the Towns in which the Facility is proposed.

Solar setbacks are governed by Section 134.6(B)(4)(a) of Chapter 134, *Solar Energy Systems*, of the Code of the Town of Waterloo:

"Large-scale solar energy systems shall be sited to create a front setback of no less than 200 feet from the right-of-way line of the road and setbacks of 100 feet from all side and rear property lines. In addition, no large-scale energy system shall be located closer than 300 feet from any residential structure located on another parcel."

As outlined in Table 5-1, the Facility has been designed to meet the 100-foot setback from all nonparticipating properties, the 200-foot setback from road right-of-way lines, and the 300-foot setback from residential structures, with respect to the placement of solar infrastructure other than collection lines¹.

While the Facility has been designed to be in compliance with all Town setback requirements to the extent reasonably practicable, the Applicant is seeking a waiver from certain requirements, particularly with respect to the 100-foot side and rear property line setbacks as they apply to participating parcels, and to all setbacks as they apply to the placement of underground collection lines. These waivers are necessary to ensure that Facility components are sited efficiently and effectively to maximize Facility layout while also minimizing overall project footprint and associated environmental impacts. Please see Exhibit 24 (Local Laws and Ordinances) for additional information related to the waiver request.

The Applicant reviewed the Town of Junius local laws, ordinances, regulations, standards and other requirements to the construction or operation of the Facility. The Town does not appear to have enacted any local laws or ordinances applicable to solar facilities. The Town also does not appear to have a zoning ordinance, a local law land use or site plan law, flood damage prevention law, street, road or highway

¹ All collection lines for the Facility have been designed to be below ground.

preservation or restoration law, or a local law providing for the administration and enforcement of the New York State Uniform Fire Prevention and Building Code. Therefore, no substantive provisions for the Town of Junius have been identified.

(e) Maximum Height of Solar Facility Components

The height of the PV arrays will vary throughout the day as the structures will be mounted on a low-profile single axis tracking system that rotates to track the sun from east to west during the day. The maximum height of PV modules will be designed to not exceed 12 feet above grade, with heights below 12 feet anticipated for the majority of time during daylight hours.

(f) Site Plans and Drawings

(1) General Site Plans

The site plan is detailed in the preliminary Civil Design Drawings (Appendix 5-A) and other supporting design drawings are organized by discipline (civil and electrical) at a common engineering scale of 1" = 100'. Generally, the drawing sets for each of these disciplines are further organized by defined engineering area, or by Facility component.

The preliminary Civil Design Drawings (Appendix 5-A) include a layout for all Facility components, including:

- PV array locations, and associated racking structures
- Access roads, and turn-around areas
- Buried electric collection line corridors
- Collection substation and POI substation outlines, including local setbacks, access driveways and fence lines
- Storage trailer
- Perimeter fencing
- Grading showing proposed final contours
- Locations that will utilize trenchless methods of electric cable installation (e.g., HDD), including details showing the typical layout, setbacks, and depth
- Locations of permanent stormwater infrastructure
- Approximate limits of disturbance for all Facility components (PV arrays, inverters, access roads, buildings, electric lines, collection substation, etc.)
- Approximate clearing limits for all Facility components (PV arrays, inverters, access roads, buildings, electric lines, collection substation, etc.)
- Proposed setbacks from occupied structures, property lines and easements, existing overhead electric lines, and roads
- Location of property lines, existing utility lines and equipment, and utility easements
- The location of proposed landscape plantings for visual screening of the Facility.

During trenching and excavation, proper methods for segregating topsoil and spoil material will be implemented. Topsoil and subsoil spoils will be separated and placed in upland locations best suited to their storage, adjacent to the sites where they are excavated. Topsoil stockpiling locations are not depicted in the Preliminary Design Drawings included as part of this Application as these locations depend on how the facility will ultimately be constructed and as such, are developed later in the process in coordination with the Engineering, Procurement, and Construction Contractor. Topsoil stockpiling locations will be provided as part of the Final Site Plans submitted as a pre-construction compliance filing consistent with 16 NYCRR Section 1100-10.2(c) requirements. However, the Preliminary Design Drawings do include details showing how soil will be stockpiled, and the erosion and sediment control measures utilized to prevent soil erosion (see Appendix 5-A, sheet C-601). Final cut and fill storage areas will be available as part of the Construction Operations Plan and will be included in the pre-construction compliance filings consistent with the requirements of 16 NYCRR Section 1100-10.2 (e)(2).

Trenchless technologies are planned for installation of the collection cables under streams, wetlands, roadways, and other sensitive environmental sites. Further discussion of proposed trenchless installation is included in Exhibit 10 (Geology, Seismology, and Soils), and the locations of proposed trenchless crossings are depicted on Figure 10-2.

The electrical drawings included in Appendix 5-B were prepared by Applied High Voltage, LLC (AHV) and provide plans and details specific to the electrical collection system, the collection substation, and the POI substation. The parcel that hosts the collection substation and POI substation will be purchased (see Exhibit 4 [Real Property] for additional information regarding land agreements). The Applicant will construct the POI substation, with the intention of turning over the land and switchyard facility components to National Grid, the owner of the Farmington to Hamilton Road 115 kV line that the Facility will use for the POI, on or about commercial operation.

(2) Typical Design Detail Drawings and Plans

The Preliminary Design Drawings contain typical design details for all Facility components drawn to scale using computer graphics or computer-aided design (CAD) software. Table 5-2 includes more information regarding what is included for each component.

Table 5-2. Typical Detail Drawings

Facility Component	Drawing Set(s)
PV Arrays and Support Structures <ul style="list-style-type: none"> • Typical details include the configuration of PV arrays, mounting details, and support structures. 	Appendix 5-A
Laydown Yards	Appendix 5-A
Access Roads <ul style="list-style-type: none"> • Typical details include permanent points of access, installation plan view, cross section and side view with all appropriate dimensions. 	Appendix 5-A

Facility Component	Drawing Set(s)
Culverts	Appendix 5-A
Trenchless Installations	Appendix 5-A
Underground Collection Lines <ul style="list-style-type: none"> • Typical details include single and multiple-circuit layouts, junction details, dimensions of proposed depth, trench width, and level of cover, separation requirements between circuits, limits of disturbance, and a circuit map. 	Appendix 5-A; Appendix 5-B
Substation and Associated Structures <ul style="list-style-type: none"> • Typical details include elevation plans for buildings and overhead structures, substation and switchyard layouts, and limits of disturbance. 	Appendix 5-B

(3) Site Suitability Reports for Turbine Models

The proposed Facility is not a wind energy generating facility, and therefore the requirements of Section 1100-2.6(f)(3) are not applicable.

(4) Engineering Codes, Standards, Guidelines, and Practices

The list of codes and standards that have been, and will continue to be considered during the design, construction, operation, and maintenance of this Facility is extensive. The following is provided as a representative list of organizations which issue applicable codes and standards. This list will be updated with specific codes, standards, and guidelines following Certification, during final design.

- The Aluminum Association (AA)
- American Association of State Highway and Transportation Officials (AASHTO)
- American Concrete Institute (ACI)
- American Institute of Steel Construction (AISC)
- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)
- American Society for Testing and Materials (ASTM)
- American Welding Society (AWS)
- Concrete Reinforcing Steel Institute (CRSI)
- Edison Electric Institute Publications (EEI-AEIC)
- Federal Energy Regulatory Commission (FERC)
- Insulated Cable Engineers Association (ICEA)
- International Electro-technical Commission (IEC)
- Institute of Electrical and Electronics Engineers (IEEE)
- Mine Safety and Health Administration (MSHA)
- National Bureau of Standards (NBS)
- National Electrical Manufacturers Association (NEMA)

- National Electric Code (NEC)
- National Electric Safety Code (NESC)
- National Electrical Testing Association (NETA)
- National Fire Protection Association (NFPA)
- National Institute of Standards and Technology (NIST)
- National Ready Mixed Concrete Association (NRMCA)
- Occupational Safety and Health Administration (OSHA)
- Portland Cement Association (PCA)
- Rural Electrification Administration (REA)
- Society of Automotive Engineers (SAE)
- Society for Protective Coatings (SSPC)
- Uniform Building Code (UBC)
- Underwriter's Laboratories, Inc. (UL).

The transmission generation tie-line will be designed in accordance with the specific standards below.

- ANSI C2-2012 - National Electrical Safety Code (NESC)
- ANSI 05.1.2008 - Wood Poles – Specifications & Dimensions
- ASCE 48-2011 - Design of Steel Transmission Pole Structures
- ASCE MOP 74-2010 - Guidelines for Electrical Transmission Line Structural Loading
- ASCE MOP 91-1997 - Design of Guyed Electrical Transmission Structures
- IEEE 81-2012 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System
- IEEE 516-2009 - IEEE Guide for Maintenance Methods on Energized Power Lines
- IEEE 524-2003 - Guide to the Installation of Overhead Transmission Line Conductors
- IEEE 563-1978 - Guide on Conductor Self-Damping Measurements
- IEEE 644-1994 - Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines
- IEEE 656-1992 - Standard for the Measurement of Audible Noise from Overhead Transmission Lines
- IEEE 691-2001 - Guide for Transmission Structure Foundation Design and Testing
- IEEE 738-2006 - Standard for Calculating the Current-Temperature of Bare Overhead Conductors
- IEEE 977-1991 - Guide to Installation of Foundations for Transmission Line Structures
- IEEE 1243-1997 - Guide for Improving the Lightning Performance of Transmission Lines
- IEEE 1313.2-1999 - Guide for the Application of Insulation Coordination
- IEEE Std 1542-2007 - Guide for Installation, Maintenance, and Operation of Irrigation Equipment Located Near or Under Power Lines.

(5) Manufacturer Design, Safety and Testing Information of Equipment

Technical and safety manuals, to the extent available from the manufacturers, are included in Appendix 5-C for PV modules and inverters in accordance with Section 1100-2.6(f)(5). A specification sheet for a proposed single-axis tracker is also provided. Details regarding equipment for the substation and POI substation are not available at this time, as they will be determined in cooperation with National Grid.

REFERENCES

National Agricultural Imagery Program (NAIP). 2022. Available at: <https://naip-usdaonline.hub.arcgis.com/>.

New York State Office of Real Property Services (NYSORPS). 2023. *Property Tax Classification Codes*. Available at: <https://www.tax.ny.gov/research/property/assess/manuals/prclas.htm>. Updated January 30, 2023.