STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Petition of Northland Solar LLC for a Certificate of Public Good, pursuant to 30 V.S.A. § 248, authorizing the installation and operation of a 4.999 MW solar electric generation facility off Route 100 in Lowell, Vermont to be known as the "Northland Solar Project"	)	Case No. 25-____-PET

PREFILED DIRECT TESTIMONY OF THOMAS HAND

October 1, 2025

Summary: Mr. Hand's testimony provides an overview of the proposed Northland Solar Project, and compliance with certain of the section 248 criteria including: Need for the Project; System Stability and Reliability; Economic Benefit to the State; Environmental (including air and water pollution, use of natural resources, traffic, educational services, municipal services, public investments, public health and safety, and greenhouse gas impacts); Least-Cost Integrated Resource Plan, Comprehensive Energy Plan; Transmission Facilities; and Setbacks.

Exhibits

NS-TH-1: Resume
NS-TH-2: Site Plans
NS-TH-3: Representative Equipment Specifications
NS-TH-4a: System Impact Study
NS-TH-4b: VEC Interconnection Letter
NS-TH-5: Decommissioning Plan
NS-TH-6: SHEI MOU

Q1. Please state your name, occupation, and business address.

A1. My name is Thomas Hand. I am the manager of Northland Solar LLC, and in that capacity I have been developing the proposed project. The business address for Northland Solar LLC ("NS") is 170 Bonnet Street, Manchester Center, VT 05255.

Q2. What is the purpose of your testimony?

A2. My testimony supports NS's petition for section 248 approval to construct and operate a 4.999 megawatt ("MW") alternating current ("AC") solar electric generation project, to be known as the Northland Solar Project ("Project"), located off Vermont Route 100 in Lowell, Vermont. I provide background information about the Project, describe aspects of its construction and operation, and provide testimony on the Project's compliance with certain 30 V.S.A. § 248(b) criteria including: Need for the Project – § 248(b)(2); System Stability and Reliability – § 248(b)(3); Economic Benefit to the State – § 248(b)(4); Environmental Considerations – § 248(b)(5), including Air and Water Pollution; Traffic; Educational Services; Municipal Services; Public Investments; Public Health and Safety; Use of Natural Resources; and Greenhouse Gas Impacts; Least-Cost Integrated Resource Plan – § 248(b)(6); Comprehensive Energy Plan – § 248(b)(7); Transmission Facilities – § 248(b)(10); and Setbacks – § 248(s).

Q3. Please describe your professional background, qualifications and experience.

A3. I grew up in Dorset, VT and graduated from Burr & Burton Academy in Manchester, VT. I attended Middlebury College and studied economics and environmental science before entering the alternative energy & energy efficiency industry. I have over fifteen years of experience

working in renewable energy and energy efficiency in roles ranging from energy auditor to project finance. In 2010, I began developing and building solar projects in the Manchester area and have completed projects with The Dorset School, Fisher Elementary and Maple Street School. I have developed approximately 30,000 kW of ground mounted projects in Vermont over the past 14 years. Outside of Vermont I have worked for alternative energy firms in a variety of roles including program management, project finance, and origination. I have direct solar project development experience in Vermont, Minnesota, and California. My resume is attached as ***Exhibit NS-TH-1.***

Q4. Have you previously testified before the Public Utility Commission?

A4. Yes. I have provided testimony to the Commission on behalf of a number of solar projects. Recent projects include Hunt Road Solar, Case No. 23-2420-PET; Barnet Solar, Case No. 23-3381-PET; Furnace Brook Solar, Case No. 23-4028-PET; Post Road Solar, Case No. 23-4324-PET; Little Brook Solar, Case No. 23-4324-PET and Stone House Solar, Case No. 25-1827-PET.

Project Description and Overview

Q5. Please provide an overview of the Project.

A5. The proposed Project is a 4.999 MW AC solar electric generation facility to be located off Route 100 in Lowell, Vermont. The proposed Project will occupy 26.97 (±) acres on a parcel of land which totals 43.9 (±) acres, a portion of which NS has the option to purchase.

The Project site is primarily located on existing hay field east of Route 100. The site is slightly uphill from and separated from the road and nearly residences by an existing substation

and a line of trees that substantially screen the site. No vegetative clearing is proposed on the site. Approximately 1,480 sf ft of vegetative management is proposed in two areas where the interconnection line will run, and may include clearing one tree near the existing Vermont Electric Cooperative ("VEC") substation. 32.97(±) acres of the site are within the limits of disturbance for the Project and will be included in the construction stormwater permit. The area within the perimeter fence will be 26.97 acres.

Access to the Project site will make use of the existing roads within the area, including Route 100 via a new approximately 1,320 foot long, 12-foot-wide gravel access road. An additional approximately 925 feet of temporary construction or pervious access road will be installed to access the northern array sections, while keeping the total amount of impervious acreage on the parcel to 0.49 acres. The Project will be set back approximately 312 feet from VT Route 58, the closest traveled way, and approximately 191 feet from the nearest off-site residence. ***Exh. NS-TH-2 (Site Plans).***

The Project will use solar panels mounted on single axis trackers ("SAT") oriented due south. At their highest point, the panels will reach a maximum height of approximately 10' from the ground. String inverters will be located as shown on the Site Plan. The solar panels will be connected to the inverters, which will convert the DC electricity to AC. The power from each inverter will be fed to one of two pad-mounted transformers, with secondary containment, as shown on the Site Plan, to step up the inverters' output voltage to match that of the utility's distribution grid. See ***Exh. NS-TH-2.***

Q6. Please further describe the equipment to be used for the Project.

A6. The Project's equipment consists of the following: approximately 14,000 590-watt solar panels (±), or the equivalent, mounted on SAT racking; 20 CPS inverters rated at 250 and 249 kW (AC) each for a maximum capacity of 4,999 kW AC; two 2,800 kVA pad-mounted transformers; equipment pads and/or racks; above- and below-ground electrical lines; and nine new utility poles between the transformers and the point of interconnection. The Project will interconnect to VEC's distribution system at an existing pole near the VEC substation off Route 100. ***See Exhs. NS-TH-2, and TH-3 (Equipment Specs), and TH-4a (System Impact Study).***

The transformer will use a non-toxic, biodegradable cooling oil. In addition, the transformer will be equipped with a secondary oil containment pan capable of holding 110 percent of the volume of oil plus a minimum of five inches of freeboard. The containment system is shown in ***Exh. NS-TH-2.***

The Project will be enclosed within a fixed knot, game-style fence that will be a minimum of 7' high in order to meet the National Electric Safety Code. ***See Exhs. NS-TH-2, and TH-3.*** The fencing will be secured and kept relatively close to ground level to avoid access by large wildlife and to prevent access to the Project.

The specifications shown in ***Exh. NS-TH-3*** contains pictures and specifications of representative solar panels, inverters, transformers, and fencing. The final selection of equipment will be made after permitting is complete and equipment vendors are selected.

Q7. Please state the Project's capacity and anticipated energy production.

A7. The Project will have a nameplate capacity of 4.999 MW AC, and is expected to generate 10,000 (+/-) megawatt hours (MWh) of electricity per year, the equivalent of powering approximately 1,538 homes, based on an average residential usage of 6,500 kWh per year.

Q8. Please describe the property on which the Project will be located.

A8. As noted above, the Project will be sited on a 26.97 (±) acre portion of a 43.9 (±) acre parcel of land off VT Route 100. ***Exh. NS-TH-2.*** The parcel is owned by Robert and Rita Raboin and is primarily a hay field. An existing utility line traverses the parcel, along with a row of trees on the northern portion of the parcel. The Project will avoid these features. See ***Exhibit NS-TH-2.***

The Project is bordered to the north by forested areas, to the east by a forested area and a single private residence behind a hedge row. To the south it is bordered by two private residences, and to the west by two utility substations and then Vermont Route 100. Beyond the immediate vicinity of the site, there are a few residences to the south and southwest and forested areas to the north and east.

Q9. Please describe the overall site plan and design objectives.

A9. The overall Project configuration was designed to avoid and/or minimize impacts to environmental resources and on the surrounding land uses. The siting of the Project took a number of factors into account:

1. Minimizing Environmental Impacts: The Project is sited on an existing hay field and is designed to reduce and limit impacts to sensitive natural resources such as wetlands, streams, and critical wildlife habitat.
2. Optimal Solar Feasibility: The Project is designed to capture solar energy efficiently without undue shading. The DC and AC electrical wiring has been designed to minimize transmission distances and therefore minimize resistive losses.
3. Setbacks from Residences: All setbacks conform to state minimum standards from highways and bordering property boundaries. The distance from the edge of the Project to the closest residence is approximately 191'.
4. Site Restoration: When the Project is ultimately decommissioned, the Project's equipment will be dismantled on-site and will then be removed from the Project site and sold, re-used, recycled, and/or disposed of in accordance with the applicable waste laws and regulations that exist at the time of decommissioning.

Q10. How will the Site be accessed and how will the equipment be delivered?

A10. The site will be accessed using existing public roads in the area, specifically Vermont Route 100 and an existing driveway leading to the parcel. A new 1,320-foot (±) long, 12'-wide (±) extension to the access road will be added to the center of the Project site, and an additional 925' long temporary construction or pervious access road will run to the northern array sections. ***Exh. NS-TH-2***. Equipment will be transported to the site via Vermont Route 100. The solar panels and racking components will be shipped on pallets, typically delivered by standard tractor-trailer trucks. The transformer will be delivered assembled on standard-width flatbed tractor trailers.

Other Project equipment, e.g., inverters, solar panels, racking, wire, cable, conduit, and construction materials, will also be transported on standard-width trucks.

On-site heavy construction equipment will be limited to pile-driving or similar equipment for installing the racking; backhoes and the like for conduit excavation and inverter/transformer pad construction; dump trucks, bulldozers, and excavators for the civil construction; cement trucks for delivery of concrete for the foundations under the transformer pad; and a small crane to place the enclosures on these concrete pads.

Q11. What is the anticipated sequencing and schedule for Project construction?

A11. Construction of the Project is expected to span approximately 30-40 weeks following receipt of all necessary regulatory approvals due to time of year restrictions proposed for certain construction related activities. The first phase of construction will include installing silt fencing and any other required erosion control measures and then site preparation including grading and leveling for the installation of the access road will commence thereafter.

The second phase of construction will involve construction of the solar array support structures, underground trenching, and installation of conduit and cabling between arrays and to the inverter/transformer pad locations.

The final phase of construction will involve installing the solar modules to the racking, installation of inverters, wiring to inverters, and installation of the data acquisition system, transformer installation, and completion of the perimeter fence. Following completion of these activities, the system will be tested and commissioned.

Q12. What are the operation and maintenance activities for the Project?

A12. The operation of the Project is totally automatic and requires no on-site personnel. The plant will be continually monitored via the internet to confirm proper operation and performance. Energy metering will also be accomplished by remote telemetry.

On-site maintenance activities will be limited to periodic vegetative management, snow removal in winter to provide access to the Project as needed, annual equipment and wiring inspections, and maintenance of project equipment on an as-needed basis.

Q13. Has the Petitioner provided 45-day notice to the local and regional bodies pursuant to Commission Rule 5.402(A)?

A13. Yes, a 45-day notice letter was mailed to the Town of Lowell Selectboard and Planning Commission, and the Northeastern Vermont Development Association ("NVDA"), on July 21, 2025. A copy of the advanced written notice of this application was filed on ePUC on July 21, 2025, and assigned Case No. 25-1466-AN.

Prior to submitting this Petition, and pursuant to Commission Rule 5.402(B)(3), a list of adjoining landowners was obtained from the Town of Lowell using the Vermont Center for Geographical Information maps online as they existed no more than 60 days prior to the date of notice. The list was confirmed accurate by the Lowell Town Clerk on July 16, 2025. Adjoining landowners to the Project parcels will be provided notice of the filing of this Petition by mail within two business days of when the Commission deems the Petition to be complete. A copy of the letter to adjoiners and the list of recipients is included in the cover materials submitted with the Petition.

Q14. Please describe any comments concerning the Project that Northland Solar has received to date from the local or regional bodies or others in the local community.

A14. NS has received the following comments following the 45-day notice letter:

- The Agency of Agriculture, Food, & Markets ("AAFM") provided comments to NS on September 8th, 2025, requesting that the Project include a delineation of primary agricultural soils ("PAS") on the site plan along with the limits of disturbance and any proposed soil stockpiles. AAFM also requested that NS include standard PAS-related conditions in a proposed CPG, as applicable. NS has included PAS mapping, impact numbers, and stockpile locations on the site plan (**Exhibit NS-TH-2)** and has further described and addressed the impacts and treatment of PAS consistent with the requirements of AAFM's Act 250 guidance in the testimony of Seth Goddard.
- The Agency of Natural Resources ("ANR") provided comments to NS on Thursday, August 13, 2025, noting: (1) the need for an access drive to access the northernmost section of panels and potential riparian buffer and wetland impacts in this area; (2) the presence of a ground water source protection area ("SPA"), and a request asking NS to identify and label the SPA on its site plan and adopt best management practices; and (3) the presence of grassland birds on the Project site and requesting mitigation using a habitat compensation ratio of 2:1. NS has included the SPA and aforementioned access drive on its updated Site Plan and has further described and addressed the impacts to the SPA, grassland bird habitat, and wetlands in the testimony of Seth Goddard and Michael Lew-Smith. NS received two requests from

community members asking that VAST trail access be allowed across the property. NS seeks to be a good neighbor and intends to work with VAST stakeholders to provide continued trail access across the property while avoiding the Project.

Q15. Please describe NS's plans to decommission the Project at the end of its useful life.

A15. At the end of the useful life of the Project, a determination will be made whether the Project can be re-powered (after any necessary regulatory approval), or whether it will be decommissioned and the site restored. If decommissioned, the Project equipment will be dismantled and removed from the site and sold, re-used, recycled, and/or disposed of in accordance with applicable waste laws and regulations in existence at that time, and the site will be restored to its condition prior to the installation of the facility to the greatest extent practicable in accordance with the decommissioning plan and cost estimate as provided in ***Exh. NS-TH-5.*** The cost estimate includes costs at current rates, and does not take any salvage value into account. A form surety bond comparable to those approved by the Commission in past proceedings is included with the decommissioning plan. Once the Commission issues a CPG for the Project, NS will file an executed surety bond prior to beginning site preparation or construction.

Q16. What is the timeline for this Project?

A16. The Investment Tax Credit ("ITC") that helps reduce the cost of renewable energy projects is phasing out for solar facilities. In order for the Project to take advantage of the ITC, which in turn lowers the cost of the Project output to VEC customers, the Project must commence construction before July 2026. In order to be able to commence site preparation by this time, NS

will need the Section 248 and all ancillary permits in hand by June of 2026 to meet the Commission's standards to begin site preparation. NS is therefore seeking a decision from the Commission on this petition by March 1, 2026.

Q17. Is the Petitioner aware of any other solar electric generation facilities that are existing, approved, proposed, or planned on the same parcel of land as the Project site or on any adjoining parcels to the Project site? If so, please describe.

A17. No. There are no other solar facilities on the Project parcel and NS is not aware of any other solar projects that are existing, approved, proposed or planned on any adjoining parcels.

Q18. Will the Project involve any vegetative clearing?

A18. Yes. While no vegetative management or tree clearing is proposed within the Project's fence line or access road footprint, a total of 0.03 acres of minor vegetative management will occur in two locations along the Project's interconnection line. This vegetative management may include some tree clearing but will not involve stumping or grubbing.

SECTION 248 CRITERIA

Need for the Project – 30 V.S.A. § 248(b)(2)

Q19. Is the Project required to meet the need for present and future demand for service which could not otherwise be provided in a more cost-effective manner through energy conservation programs and measures and energy efficiency and load management measures?

A19. The energy from the Project is needed in order for Vermont to meet growing electric demand. The Vermont Comprehensive Energy Plan ("CEP") highlights that electrification will more than double electricity consumption by 2050 and that cost-effective resources are needed to meet this growing demand.[1] Likewise, Load Forecasts for Vermont shows significant growth in retail electric sales beginning in 2022 and continuing until at least 2041, in all scenarios (low, base and high growth). The Project is needed to meet this demand.

The Project will sell its energy output and environmental attributes to VEC via a power purchase agreement ("PPA"). NS and VEC have reached agreement on PPA terms, and notice of the PPA was filed with the Commission on July 25th, 2025.

The Project will also help to mitigate climate change disruption and to reduce air pollution by generating low carbon energy in the New England region, thus allowing for the displacement of fossil fuel-based energy sources.[2] By selling Renewable Energy Credits ("RECs") from the Project to VEC, the Project will also directly help Vermont achieve renewable energy targets identified in the CEP, such as the goal of obtaining 75 percent of the state's total energy needs from renewable sources by 2032.

The Project will help to keep energy costs low for VEC ratepayers by delivering power and RECs from a local renewable energy plant that is expected to be able to take advantage of federal investment tax credits that will be expiring and/or reduced starting in 2026. By starting

[1] *See* CEP at 231-232, 259.
[2] *See, e.g.,* ISO New England, "2021 ISO-NE Electric Generator Air Emissions Analysis: Draft Report" (February 16, 2023), https://www.iso-ne.com/static-assets/documents/2023/02/draft_2021_emissions_report_presentation.pdf, Slide 30, showing in 2021 fossil fuel generators were the marginal unit each month nearly 100% of the time on a load-weighted basis, and that emissions rates exceeded 800lbs/MW every month of the year.

construction prior to July 5th, 2026 the plant will be able to "safe harbor" its tax status and likely obtain Federal Investment Tax credits.

Finally, the Project is being developed as a merchant plant by NS, and as such is not being financed directly or indirectly by Vermont ratepayers. Moreover, NS is not a regulated distribution utility, and thus is not required to, and does not have the ability to, deliver energy efficiency or load management services to retail customers.

System Stability and Reliability - 30 V.S.A. § 248(b)(3)

Q20. Please describe the status of the interconnection application under PUC Rule 5.500.

A20. VEC has prepared a System Impact Study ("SIS"), ***Exh. NS-TH-4a,*** dated February 20th, 2025, and provided it to MHG Solar LLC. Following the SIS, VEC issued a memo updating some of the conclusions to the distribution upgrades required at the point of interconnection. See ***Exh. NS-TH-4b.*** MHG Solar intends to assign the Generator Interconnection Agreement, when issued by VEC, to Northland Solar LLC.

Q21. Please describe the results of the interconnection study.

A21. As stated in the SIS, VEC's distribution circuit will require some minor upgrades, and the implementation of other requirements, in order to allow the Project to operate on the grid. These include the following:

- Extend three phase line from the Project site to the point of interconnection near the substation;
- Install one (1) Generator Disconnect, one (1) PCC recloser, and one (1) Primary Meter;
- Enable distributed generation settings at the #5 Lowell Substation bus regulators.

- Change settings for the #5 Lowell Substation bus regulators and for the midline regulator at Pole 9B 2 on Carter Road; and
- Install 46 kV Overvoltage Protection Scheme (OVP) scheme for the #5 Lowell Substation transformer.

See Exh. NS-TH-4a. Although the SIS initially placed the point of interconnection across Route 100 and indicated that reconductoring along some of the existing distribution line on that road would be required, VEC subsequently confirmed that it was more efficient for the point of interconnection to be an existing pole on the site of the VEC substation. As a result, the few spans of conductor referenced in the SIS would no longer need to be upgraded because they are no longer part of the interconnection path back to the substation. ***Exh. NS-TH-4b***.

NS will be responsible for the costs to complete the required system improvements to interconnect the Project, and these improvements will be completed prior to interconnection.

Q22. Will the Project adversely affect system stability and reliability?

A22. No. Given that the interconnection studies conclude that the Project can be safely interconnected following the implementation of the above-referenced upgrades, and NS will be required to implement and/or pay for the required upgrades prior to interconnection, there will be no adverse impact to system stability and reliability as a result of the Project. See ***Exhibits NS-TH-4a and NS-TH-4b.***

Economic Benefit to the State – 30 V.S.A. § 248(b)(4)

Q23. Please describe the economic benefits of the Project to the State and its residents.

A23. The Project will provide a range of economic benefits for the State and its residents.

First, during the development and construction phases, NS will retain (directly or through contractors) dozens of Vermont-based firms and individuals to work on engineering, environmental, aesthetic, legal/permitting, and construction-related tasks when commercially feasible. During the operations phase, several individuals employed by NS and its contractors will be involved in operating, maintaining, and monitoring the Project. NS will also pay state property taxes for the Project that are expected to be $19,996 ($4/kW) per year, and a smaller amount in municipal taxes per year (based upon a valuation of the Project which has not yet been finalized).

Second, the Project will be economically beneficial to Vermont by generating renewable energy for VEC customers at a stabilized price through a long-term power purchase agreement between NS and VEC. This PPA takes advantage of the federal ITC before its phase out starting in 2026.[3]

Third, a report prepared in December 2020 by Synapse Energy Economics showed that behind-the-meter[4] solar reduced wholesale market costs in New England by $1.1 billion between 2014 and 2019. In addition, the report found that behind-the-meter solar created $87 million in public health benefits and $515 million in climate benefits in New England over this period by displacing fossil fuel-fired generation, thereby lowering greenhouse gas pollution and criteria

[3] "Avoided Cost" means the incremental cost to the Interconnecting Utility of electric energy or capacity or both, which, but for the purchase from the Qualifying Facility, the Interconnecting Utility would generate itself or purchase from another source. PUC Rule 4.103.

[4] The Project would be considered "behind-the-meter" because it is less than 5 MW and thus not subject to ISO-New England interconnection requirements.

pollutants.[5] By selling energy at or below avoided costs, the Project thus provides climate and health benefits with no additional cost to Vermont taxpayers.

Finally, on September 24, 2025, Petitioner and VEC entered into a Memorandum of Understanding (the "SHEI MOU"), attached to my testimony as ***Exh. NS-TH-***6, which requires the NS to pay VEC a fee of $62,737.45 (the "SHEI Mitigation Fee") to mitigate any potential negative economic impact of the Project due to its location in the Sheffield-Highgate Export Interface ("SHEI"). Pursuant to the SHEI MOU, VEC will allocate the SHEI Mitigation Fee among the other impacted distribution utilities. See ***Exh. NS-TH-6***

The Project will therefore provide an economic benefit to the State and its residents.

Environmental Considerations – 30 V.S.A. § 248(b)(5)

Air Pollution – 10 V.S.A. § 6086(a)(1)

Q24. Will the Project cause undue air pollution?

A24. No. Construction of the Project would result in temporary emission of minimal levels of air pollutants. These emissions would primarily be generated by typical construction equipment and would not result in any permanent increase in hydrocarbon emissions from those generated during a typical construction project or be out of character with the surrounding area. The proposed operation of the Project would only result in infrequent and minimal emissions associated with maintenance operations (e.g., periodic field mowing of grass). These temporary and infrequent emissions will not cause undue air pollution.

[5] See https://www.synapse-energy.com/sites/default/files/Solar_Savings_in_New_England_20-082.pdf.

Operation of the Project will not emit any air pollutants, other than de minimis levels associated with maintenance vehicles periodically traveling to the site, mowing if needed, and the like.

The prefiled testimony of Seth Goddard addresses potential air pollution in the context of Project sound levels and concludes that the Project will not have an undue adverse impact.

Water Pollution and Water Purity – 10 V.S.A. § 6086(a)(1)

Q25. Will the Project have an undue adverse effect on water purity or cause undue water pollution?

A25. No, the Project will not have an undue adverse impact on water purity or cause undue water pollution. As further discussed in the prefiled direct testimony of Michael Lew-Smith, the Project is designed so that it will not have an undue adverse effect on and/or is not located near any outstanding resource waters, floodways or flood fringes, or shorelines. The Project will not require the use of water for its construction or operation phases (other than water that might be used for dust suppression, which will be brought to the site if needed), and will not result in water disposal. For these reasons, the Project will not have an undue adverse impact on water purity.

Transportation Systems – 10 V.S.A. § 6086(a)(5)

Q26. Will the Project cause unreasonable congestion or unsafe conditions with respect to transportation systems?

A26. No, the Project will not cause unreasonable congestion or unsafe conditions with respect to transportation systems. Access to the site will be off Vermont Route 100 using a new access drive that will lead to the middle of the project site. During construction, approximately 40-45 (±) tractor trailers will deliver modules, racking, and inverters to the site, over the entire multi-week construction period. Following initial delivery, construction-related traffic will be limited to more infrequent deliveries for smaller, necessary electrical supplies and workers entering and exiting the site. No oversize or overweight loads requiring special permits are expected.

During operation of the Project, entry to the Project will be limited to maintenance and repairs, and therefore there will be only occasional Project-related traffic that will not cause unreasonable traffic or unsafe conditions.

Educational Services – 10 V.S.A. § 6086(a)(6)

Q27. Will the Project cause an unreasonable burden on the Town of Pittsford to provide educational services?

A27. The Project will not create any full-time, permanent jobs, and thus no new school-aged children would enter the system in the town.

Municipal Services – 10 V.S.A. § 6086(a)(7)

Q28. Will the Project cause an unreasonable burden on the Town of Lowell to provide municipal services?

A28. No, the Project will not cause an unreasonable burden on the Town to provide municipal services. It will not require any municipal water or sewer, nor any unique fire, police, or rescue services.

Historic Sites – 10 V.S.A. § 6086(a)(8)

Q29. Please describe the Project's potential impacts to Historic Sites, either on-site archaeological resources or above-ground structures (on or off site).

A29. NS requested that the Vermont Division for Historic Preservation ("VDHP") review the Project site and VDHP conducted a desktop review of the Project parcel. Based upon that review, VDHP notified NS that additional archeological studies may be required. In order to ensure that fieldwork is done in coordination with VDHP and that any impacts to below-ground archaeological resources are avoided or sufficiently mitigated to avoid any undue adverse impacts:

1. Petitioner will conduct these archaeological investigation(s) and prepare related reports to identify, evaluate, and mitigate, if necessary, any further potential impacts to archaeological sites within the Project area. Petitioner's archaeological consultant will

submit any scope of work to the VDHP for review and approval before commencing the work.

2. Prior to the completion of all relevant archaeological investigations, the Petitioner, in consultation with the VDHP, will identify the Project area as a not-to-be-disturbed archaeological buffer zone. Topsoil removal, grading, scraping, cutting, filling, stockpiling, logging or any other type of ground disturbance will be prohibited within the archaeological buffer zones until all necessary archaeological work is completed. Agricultural cultivation consistent with past practices to facilitate the archaeological review will not constitute ground disturbance.
3. All relevant archaeological studies to identify, evaluate, or mitigate impacts to archaeological sites will be carried out by a qualified consulting archaeologist. All such studies and associated reports will follow the VDHP *Guidelines for Conducting Archaeological Studies in Vermont* (2017). A digital copy of the final report will be submitted to the VDHP. Any archaeological reports submitted to the Public Utility Commission will have specific archaeological site locational information redacted in accordance with 22 V.S.A. § 761(b) and 1 V.S.A. § 317(c) (20).
4. The archaeological investigations will be scheduled so that mitigation measures, if any are determined to be necessary, can be satisfactorily planned and accomplished prior to site preparation and construction of the Project. Any archaeological sites within the Project area will not be impacted until mitigation measures have been completed. Proposed mitigation measures will be approved by the VDHP prior to implementation. Mitigation may include but is not limited to further site evaluation, data recovery, or

modification of the buffer zone boundaries or the specific conditions that refer to the same.

5. Any changes to the Project that arise via compliance these conditions and/or resulting from mitigation measures approved by VDHP will be subject to requirements regarding substantial changes or material deviations pursuant to Commission rule 5.408, including that any substantial changes must be approved by the Commission.

These steps will ensure that reasonable mitigation measures that are necessary to address any resources that may be found in an investigation, if any, are implemented prior to construction of the Project. If any such mitigation measures involve substantial changes to the Project, Petitioner will comply with applicable Commission Rule 5.400 requirements for such changes. With these steps, the Project will not result in undue adverse impact to archaeological historic sites. NS further expects to enter into a memorandum of understanding with VDHP following the petition filing that will contain the same or substantially similar commitments set forth above.

With respect to above-ground historic resources, there are no above-ground historic resources within the Project area. Staff for VDHP also reviewed and confirmed that no properties in the vicinity of the Project are listed the National/State Register of Historic Places and that based on the topography, intervening vegetation and proposed mitigation the Project will not diminish the integrity of any potentially eligible properties in the area.

Public Investments – 10 V.S.A. § 6086(a)(9)(K)

Q30. Will the Project unnecessarily or unreasonably endanger the public or quasi-public investment in adjacent lands, services, or facilities, or materially jeopardize or interfere with the public's use and enjoyment of those lands, services, or facilities?

A30. No. The closest public investment to the Project site is Vermont Route 58, located approximately 312' to the south of the Project. The Project will not impact or create any adverse burdens on this public investment given the limited and temporary use of the road during construction and operation. Therefore, the Project will not endanger or interfere with the public's use or enjoyment of this public investment.

Public Health & Safety – 30 V.S.A. § 248(b)(5)

Q31. Will the Project conform to applicable electrical, safety, power quality, and interconnection requirements established by the National Electrical Safety Code and the National Electric Code?

A31. Yes, the Project will be designed to meet the applicable requirements set forth in the National Electrical Safety Code and the National Electric Code, including the proposed fence as shown in the representative equipment specification sheets submitted as ***Exh. NS-TH-3***.

Q32. Will the Project have an undue adverse effect on public health and safety?

A32. No. The Project does not present any unique risks to the public and it will not pose an undue adverse effect to public health and safety. Specifically:

- As noted above, the Project will be installed to meet the applicable electric code safety standards and utility interconnection standards for safe and reliable operation of solar electric plants.
- All switchgear equipment will be inside a locked, UL-listed, code-approved electrical enclosure.
- The electrical lines that connect the inverters and transformer to the VEC transmission system will be located at an adequate height above ground. In addition, the electricity will be transmitted from the Project to the existing VEC transmission system at a voltage and in a manner that does not pose undue risks related to electromagnetic fields.
- A perimeter fence with a minimum height of 7' will prevent vandals and trespassers from accessing the Project array. The fence will be posted with appropriate electrical warning signs.
- The solar panels are designed to absorb rather than reflect the sun's energy, which will prevent undue glare.
- The transformers will be installed with a secondary containment structure capable of holding 110 percent of the volume of oil in each transformer plus a minimum of five inches of freeboard so that the surrounding land and water resources would be protected in the unlikely event that any transformer fluid leaks from the transformer. Additionally, the transformer will use a non-toxic, biodegradable cooling oil.

Greenhouse Gas Impacts – 30 V.S.A. § 248(b)(5)

Q33. Will the Project have an undue adverse impact with respect to greenhouse gasses?

A33. No, it will not. The Project's solar panels will annually produce an estimated 10,000 (±) megawatt hours of electricity without creating any greenhouse gas emissions during its operation. To the contrary, the Project will have the effect of reducing GHG emissions within the ISO-New England regional grid, by replacing power that would otherwise be produced by fossil fuels. A December 2020 report prepared by Synapse Energy Economics, Inc. found that from 2014 to 2019, behind-the-meter solar in New England avoided 4.6 million metric tons of climate-damaging carbon dioxide that would have been emitted by natural gas-fired power plants and other power plants fueled by fossil fuels.[6] Furthermore, "94 percent of the generation avoided [by energy produced by solar power plants] came from natural gas-fired power plants, while an additional 6 percent came from power plants fueled by oil, coal, or other resources." Put another way every 100 kWh of power produced by solar power plants displaced 94 kWh of natural gas fired generation. In addition, I understand the PUC has previously found that solar projects of this type do not have undue adverse greenhouse gas impacts. See, e.g., *Petition of Wallingford Solar, LLC*, Docket No. 18-3082-PET, findings ¶¶ 32, 34-38 (04/1/19) (2.2 MW solar project).

[6] See https://www.synapse-energy.com/sites/default/files/Solar_Savings_in_New_England_20-082.pdf.

Least-Cost Integrated Resource Plan – 30 V.S.A. §248(b)(6)

Q34. Is the Project consistent with the principles for resource selection expressed in an approved least cost integrated plan?

A34. The Commission has previously ruled that this provision does not apply to projects sponsored by private developers, such as NS.

Comprehensive Energy Plan – 30 V.S.A. § 248(b)(7)

Q35. Does the Project comply with the Vermont Comprehensive Electric Plan?

A35. The Comprehensive Energy Plan ("CEP") covers electricity, heating and process fuels, and energy in transportation and land use decisions. Broadly, the CEP seeks to mitigate climate change disruption and to reduce air pollution.[7] As discussed above, the Project will help advance these goals by generating low carbon energy in the New England region, thus allowing for the displacement of fossil fuel-based energy sources.[8]

In addition, the CEP highlights that electrification will more than double electricity consumption by 2050, and that cost-effective resources are needed to meet this growing demand.[9] Vermont's need for affordable energy is also echoed in statutory goals that are embodied in the CEP.[10] By providing energy at or below avoided costs, the Project will help to meet these goals.

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[7] *See, e.g.,* CEP at 29.
[8] *See also.,* ISO New England, "2021 ISO-NE Electric Generator Air Emissions Analysis: Draft Report" (February 16, 2023), https://www.iso-ne.com/static-assets/documents/2023/02/draft_2021_emissions_report_presentation.pdf, Slide 30, showing in 2021 fossil fuel generators were the marginal unit each month nearly 100% time on a load-weighted basis, and that emissions rates exceeded 800lbs/MW every month of the year
[9] *See* CEP at 231-232, 259.
[10] *See* CEP at 26-29.

The CEP sets ambitious goals of obtaining 75 percent of the state's total energy needs from renewable sources by 2032, and 90 percent of the state's total energy needs from renewable sources by mid-century. With respect to the electric sector, the 2022 CEP establishes the goal of meeting 100% of energy needs from carbon-free resources by 2032, with at least 75% from renewable energy. The Project will help to achieve these ambitious targets by selling Project RECs to VEC.

The Project's siting also furthers the CEP's siting goals of minimizing conversion of natural lands while seeking to maintain the lands' ecological functions.[11] The Project is located on an existing hay field, whose prime agricultural soils will be preserved.

Transmission Facilities – 30 V.S.A. § 248(b)(10)

Q36. Can the Project be served economically by existing or planned transmission facilities without an undue adverse effect on Vermont utilities or customers?

A36. Yes, the Project can be served economically by existing or planned transmission facilities without an undue adverse effect on Vermont utilities or customers. As described above under System Stability and Reliability, the Project will interconnect with VEC's existing distribution line located east of the Project along Vermont Route 100. Moreover, the costs of any electrical system modifications required to interconnect the Project to the VEC distribution system will be borne by NS. See ***Exhs. NS-TH-4a.*** In addition, VEC and NS have executed an MOU addressing the potential for economic impacts from the Project as a result of its location within

[11] *See* CEP at 271.

the SHEI. Under the MOU, the Project will pay a grid adjustor fee of $62,737.47 to offset any potential impacts and ensure that the ratepayers of the affected distribution utilities are not adversely impacted. VEC and NS have also agreed that the following condition should be included in the Project CPG:

> Within 10 days of commissioning the Project and receipt of a written permission to operate notice from the interconnecting utility, the CPG Holder shall pay to Vermont Electric Cooperative (VEC) $62,737.45 by Automated Clearing House or wire. VEC shall confirm receipt of funds within three business days and subsequently distribute the funds among itself and any other impacted distribution utilities pursuant to a separate allocation agreement. The CPG Holder's failure to comply with this condition will result in revocation of the CPG without further action by VEC or the Commission. Failure to comply with this condition will also allow the interconnecting utility to disconnect the Project from its system without further notice. This provision supersedes any term or condition contained in an interconnection rule or agreement.

See Exhibit NS-TH-6.

Setbacks – 30 V.S.A. § 248(s)

Q37. Does the Project comply with the minimum setbacks set forth in 30 V.S.A. § 248(s)?

A37. Yes, the Project complies with Vermont's statutory setback requirements. The Project's setbacks from adjoining property lines are approximately as follows:

North:	50'
South:	50'
East:	61'
West:	123'

Additionally, the Project is set back approximately 312' from the edge of the nearest traveled way, Vermont Route 58.

Q38. Does this conclude your testimony at this time?

A38. Yes, it does.