

**STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL**

Petition of Bristol Solar One, LLC for Declaratory Ruling, Pursuant to Conn. Gen. Stat. §§4-176 and 16-50k, for the Proposed Construction, Maintenance and Operation of a 3.25 MW AC Solar Photovoltaic Electric Generating Facility Located at 399 Hill Street, Bristol, Connecticut, and Associated Electrical Interconnection

Petition No. 1421

September 15, 2020

**BRISTOL SOLAR ONE, LLC'S RESPONSES TO THE CONNECTICUT
SITING COUNCIL'S FIRST SET OF INTERROGATORIES**

The petitioner, Bristol Solar One, LLC (“Bristol Solar One” or “the Petitioner”), respectfully submits this response to the Connecticut Siting Council’s August 26, 2020 First Set of Interrogatories in the above-referenced Petition. In response to the Siting Council’s Interrogatories, Bristol Solar One states as follows:

Project Development

- 1. If the project is approved, identify all permits necessary for construction and operation, and indicate which entity will hold the permit(s).**

The following permits are anticipated to be required for construction and operation of the Bristol Solar One facility. The Petitioner will obtain and hold the permits.

- a. Connecticut Department of Energy and Environmental Protection, General Permit for the Discharge of Stormwater and Dewatering Wastewater from Construction Activity.
- b. City of Bristol, Building Permit.
- c. City of Bristol, Electrical Permit.

- 2. Referencing page 5 of the Petition, Bristol Solar One, LLC states that, “Alternatively, in the event virtual net metering capacity becomes available, energy produced by the Project may be delivered to Eversource...” As an update, what is the status of the availability of virtual net metering capacity for this project? Would the project be viable based on the market-based tariff if virtual net metering is not available?**

Bristol Solar One, LLC objects to this interrogatory to the extent that it is beyond the scope for a petition for declaratory ruling pursuant to Connecticut General Statutes §4-176 and

§16-50k. Subject to the foregoing objection, Bristol Solar One, LLC states that the Eversource Virtual Net Metering program is currently accepting applications for the State, Municipal, and Agricultural host funding program. Funding for the program is currently capped and projects are being placed on a waitlist in the event funding is increased or projects with funding allocated cease development or construction and forfeit their allocated funding. The Bristol Solar One project is in several different postures with respect to the Virtual Net Metering Program. For a portion of the project, Bristol Solar One has successfully submitted a Virtual Net Metering application to Eversource. For another portion of the project, Bristol Soar One is currently on the waitlist for the Agricultural Sector of the virtual Net Metering Program. Excess credits produced by the facility will be allocated to the Host Municipality, Bristol. However, it should be noted that the project is still viable based on the market-based tariff if virtual net metering is not available.

- 3. Referencing page 5 of the Petition, the Petitioner notes that, “Energy produced by the Project will be sold to Eversource at market rates specified in the applicable utility tariff...” Would the Petitioner also sell its renewable energy certificates (RECs) it expects to generate with the proposed project? If so, to which public utility? If the RECs are to be sold to more than one public utility, provide the percentage to be sold to each public utility.**

Bristol Solar One, LLC objects to this interrogatory to the extent that it is beyond the scope for a petition for declaratory ruling pursuant to Connecticut General Statutes §4-176 and §16-50k. Subject to the foregoing objection, Bristol Solar One states that it will sell renewable energy certificates (RECs) to The Connecticut Light & Power Company, d/b/a/ Eversource Energy via a 15-year fixed price Low Emission Renewable Energy Certificate (LREC) Contract that was executed in August of 2019. Any RECs that are produced in excess of the maximum annual quantity defined in the LREC Contract may be sold on the spot market.

- 4. Would the Petitioner participate in the ISO-NE Forward Capacity Auction? If yes, which auction(s) and capacity commitment period(s)?**

Yes. Bristol Solar One intends to participate in the ISO-NE Forward Capacity Market. At this time, the intention is to participate in the ISO-NE Forward Capacity Auction #15 in 2021 for commitment period in 2024/2025.

Proposed Site

- 5. In the lease agreement with the landowner, are there any provisions related to site restoration at the end of the project’s useful life? If so, please provide any such provisions.**

Yes, Section 12.1 - Condition of Premises. Upon expiration or other termination of this Lease the Solar Arrays and any improvements constructed on the Leased Premises shall be removed by Tenant. All trade fixtures and signs, whether by law deemed to be a part of the realty or not, installed by the Tenant at any time or anyone claiming under the Tenant, shall

remain the property of the Tenant or persons claiming under the Tenant and may be removed by the Tenant or anyone claiming under the Tenant at any time or times during the Lease Term. If any such trade fixtures or signs are not removed within sixty (60) days after expiration of the term, they shall be deemed to be abandoned. A copy of this portion of the lease is attached as Exhibit A hereto.

6. Is Minor Street a City of Bristol owned road? If so, would the necessary upgrades to Minor Street (Petition p. 12) require City approval? If so, at what point will the Petitioner present its proposed road upgrades to the City?

Minor Street is a City of Bristol owned road. The proposed upgrades to Minor Street are anticipated to require approval from the City of Bristol. The Petitioner has presented the proposed improvements to the relevant City departments. The Petitioner intends to secure necessary approvals / sign off for the improvements to Minor Street during the Municipal permitting process that would follow an approval from the Council.

7. Petition p. 15 states sheep would be allowed to graze at the site.

- a. Have there been other solar projects in CT where sheep have been allowed to graze within the array area? Is there a potential of damage to the panels/wiring from grazing?**
- b. Would the specified seed mix for the solar array areas be altered to provide adequate forage?**
- c. Is a shed/shelter necessary/proposed for the site? If so, where would it be located?**

a. The Petitioner is unaware of specific projects in Connecticut where sheep are currently actively grazing solar sites, however, the Petition is aware that such grazing has been proposed by other projects. In addition, the Petitioner will be working with Agrovoltaic Solutions to handle its solar grazing requirements. Agrovoltaic Solutions is currently actively grazing solar project of similar size and scale in New York and is aware of active grazing sites in Massachusetts and Rhode Island as well. The potential for damage caused by the grazing is minimized with a 36-inch leading edge of the modules, as sheep are not likely to jump and damage modules. Additionally, string wiring and module connections on the back sides of the modules have been optimized through the racking design to accommodate the bi-facial modules. Therefore, wiring and connections on the backsides of modules are not expected to be of hazard to sheep or technicians.

b. Yes, the Petitioner, with guidance from Agrovoltaic Solutions, will adjust the originally proposed seed mixes in order to provide: good forage for the sheep, protection against runoff, and allowance for the sun/shade mix that solar provides.

c. No, a shed /shelter is not necessary for the proposed site. Sheep often seek shelter beneath the solar modules on hot days and in the rain.

Energy Output

8. **Have electrical loss assumptions been factored into the output of the facility? What is the output (MW AC) at the point of interconnection?**

Yes, electrical loss assumptions have been factored into the output of the facility. The output of the facility is 3.25 MW AC at the point of interconnection.

9. **What is the projected capacity factor (expressed as a percentage) for the proposed project? For clarity, is this capacity factor based on a ratio of AC MWh to AC MWh, or a ratio of AC MWh to DC MWh?**

The Project's net capacity factor is estimated to be 20.63% (Annual AC MWh Production/ (Nameplate Capacity MW AC * (8760 [hours in a year]))).

10. **Is the project being designed to accommodate a potential future battery storage system? If so, please indicate the anticipated size of the system and where it may be located on the site.**

Currently, Petitioner has no plans to incorporate a battery energy storage system ("BESS"). However, in the event a BESS is incorporated at the site at a later date, it is anticipated that it will be situated on the customer side of the existing DC/AC inverters and will not disrupt the existing interconnection approval with Eversource. There is no PPA for a BESS for the Project at this time, therefore it is not possible to estimate the anticipated size of any such system.

11. **Would the impact of soft or hard shading reduce the energy production of the proposed project? If so, was this included in the proposed project's capacity factor? What are the expected losses year to year and at what point would panel cleaning be necessary?**

Yes, soft or hard shading would impact energy production at the facility. Shading and the other appropriate factors have been included in the production modeling assumptions for the Project. The expressed degradation year-to-year was modeled at 0.5% annually. Panel cleaning is not currently anticipated at any point during the operation of the proposed project.

12. **Does the design of the Project, including the method of interconnection, allow it to serve as a microgrid?**

Bristol Solar One was not contemplated to serve as a microgrid, nor is the current interconnection design suitable to do so. Having the project serve as a microgrid would require extensive design changes. Microgrid functionality would require the Project to have an energy storage component, or local connected load and dispatch capabilities which are not currently included in the Project's design.

13. **Referring to petition p. 16:**

a. **what "infrastructure upgrades" are proposed that will improve reliability?**

b. how will reduction in energy demand during peak usage decrease energy costs for ratepayers statewide?

a. what “infrastructure upgrades” are proposed that will improve reliability?

The Bristol Solar One project, like all distributed generation of its class, works with the interconnecting electric distribution company (Eversource) to make necessary upgrades to the distribution network to permit the project’s interconnection. All upgrades made to the distribution network are at Bristol Solar One’s expense. Upgrades vary on an asset by asset basis, and can include, among other things, three-phase line upgrades, tree and other impediment clearing, and new utility pole installation. Specifically, the Bristol One Project will be improving access to existing utility infrastructure (15U2 circuit) located on Minor Street and installing new poles for interconnection.

Beyond the specific physical upgrades made by the Bristol Solar One project, or any other similarly situated distributed generation asset, these projects reduce the overall load (demand) for electricity on the applicable interconnecting circuit. Such reduction in demand mitigates the overall risk of outages caused by a sudden influx of demand overloading the transmission network, equipment failure elsewhere in the network, or centrally located generator malfunction.

b. how will reduction in energy demand during peak usage decrease energy costs for ratepayers statewide?

Reducing demand for electricity at peak times reduces the wholesale cost of electricity. The wholesale electricity cost is a significant component of the ratepayer’s utility bill. The ISO-NE energy market works to procure electricity at the most cost-effective rate possible, and reduction in demand during peak times means that incremental (and often times more expensive) production does not need to be utilized, therefore reducing the wholesale electricity price.

Due to access to solar insolation, solar photovoltaic distributed facilities produce consistently during peak times in the summer months. This reduction in demand caused by the presence of distributed solar assets has been shown to reduce the wholesale electricity prices in New England as a whole, and in Connecticut specifically. See <https://suncommon.com/wp-content/uploads/2018/08/Wholesale-Cost-Savings-of-Distributed-Solar-New-England-SunCommon.pdf>.

In addition to the quantifiable savings caused by demand reduction, the presence of distributed generation reduces strain and congestion on distribution network, as well as the interlinked transmission grid. This reduces wear and tear on existing utility equipment and decreases the need to build incremental utility infrastructure. Ratepayers save by avoiding these additional utility hard costs.

14. **If one section of the solar array experiences electrical problems causing the section to shut down, could other sections of the system still operate and transmit power to the grid?**

Yes, for example if one of the DC/AC inverters was not producing energy, other DC/AC inverters that make up the system would continue to produce energy and deliver that energy to the grid.

15. **Do solar facilities present a challenge for the independent system operator for balancing loads and generation (to maintain the system frequency) due to the changing (but not controlled) megawatt output of a solar facility? What technology or operational protocols could be employed to mitigate such challenges?**

In general, the Petitioner believes that intermittent resources create a minor challenge for the independent service operator (“ISO”) as they work to match the supply and demand of the energy markets. This challenge is driven by the relative uncertainty of production due to the availability of the intermittent resource’s fuel source. For solar photovoltaic generators in particular, weather forecasts are made to anticipate the solar insolation and relative irradiance at a given time. These forecasts help the ISO anticipate supply but are not perfect. In circumstances of unanticipated production from intermittent resources (or lack thereof), the ISO (and the market incentives it has devised) encourage production from other generators in times of scarcity and discourage production in times of abundance. The ISO can curtail or dispatch resources in circumstances where the economic incentives are insufficient to balance energy supply and demand.

Additionally, in the energy markets, size and scale matter. Projects under 5 MW AC that are interconnecting to the distribution network (as opposed to the transmission network) may register with the ISO as a “settlement-only generator” or choose not to register with ISO as a “load reducer”. Due to the minimal impact these generators have on the overall grid, they are not subject to the same ISO oversight (not centrally dispatched nor monitored in real time). The Project at issue here is beneath that 5 MW AC threshold and will most likely exist as a “settlement-only generator” (such a designation is necessary to participate in the capacity markets).

The technology that can most help the ISO as it navigates the increasing presence of intermittent resources on the grid is storage. The most prevalent form of storage at this time is lithium-ion BESS. By increasing the penetration of BESS’s and increasing the ISO’s connectivity to those systems, the grid supply demand could be better balanced and the necessity for curtailment (and potential waste) mitigated.

Site Components and Solar Equipment

16. **Is the wiring from the panels to the inverters installed on the racking? If wiring is external, how would it be protected from potential damage from weather exposure, vegetation maintenance, or animals?**

The majority of the wiring will be run on the racking itself. Where wiring is not run on the racking, it would run in conduit. All PV wire is weatherproof and rated up to 194°F.

17. How many panels can each rack hold?

Each racking table will hold either 12, 16, or 20 modules and each complete row of modules will be made up of these racking tables.

Interconnection

18. Referencing page 7 of the Petition, would Eversource be responsible for any interconnection work or necessary permits/approvals? If so, would the demarcation point of the Petitioner's/Eversource's control (or responsibility for permitting) be at the proposed equipment pads or at another location?

Eversource will be responsible for interconnection work including but not limited to the installation of utility poles for metering and protections and controls equipment such as a recloser. The demarcation point will be at the point of change of ownership located at the Eversource-installed utility metering poles. These metering poles will be located between the existing Distribution Circuit on Minor Street, and the equipment pad within the array area.

19. Is the existing electrical distribution on Minor Road three-phase or would it have to be upgraded from single-phase to three-phase?

The existing electrical infrastructure on Minor Street is three-phase (13.8kV).

20. Is the project interconnection required to be reviewed by ISO-NE?

The Petitioner initially filed interconnection applications with Eversource Energy, conducted Distribution System Impact Studies through Eversource, and earlier in February of 2020, signed interconnection agreements with Eversource. As part of the interconnection agreement executed with Eversource, Petitioner provided notice to Eversource indicating that it intends to participate in the wholesale markets. Based on the size and scale of the project, as well as other generators on the applicable distribution circuit, Petitioner and Eversource do not anticipate any additional interconnection agreement or study need be signed or performed with ISO-NE.

Public Safety

21. Referring to Petition p. 17, has there been any discussion with the local fire marshal regarding compliance with the CT State Fire Prevention Code, Ground Mounted Photovoltaic System Installations section 11.12.3 in regards to site design clearance requirements around the perimeter of the solar array? If not, when will the petitioner contact the Fire Marshall?

Yes, the petitioner has contacted the Fire Marshal for the City of Bristol. The Petitioner has designed the system in accordance with section 11.12.3 of the CT State Fire prevention Code.

22. Referring to Petition p. 17:

- a. Are the proposed access roads designed to accommodate emergency vehicles?**
 - b. Would outreach and/or training be conducted for local emergency responders in the event of a fire or other emergency at the site?**
 - c. In the event of a brush or electrical fire, how would the Petitioner mitigate potential electric hazards that could be encountered by emergency response personnel?**
 - d. Could the entire facility be shut down and de-energized in the event of a fire? If so, how?**
- a. Yes. The proposed access roads have been designed to accommodate emergency service vehicles.
 - b. The Petitioner is prepared to provide assistance or training in the event that such assistance or training is requested by local emergency responders.
 - c. In the event of a fire, the Petitioner would notify local emergency response personnel and de-energize the system remotely.
 - d. Yes, the facility can be de-energized remotely in the event of a fire. The Petitioner will be able to access the SCADA system that can tell the recloser to close the remotely operable breaker so the system can be de-energized.

23. Are there any drinking water wells on the site or in the vicinity of the site? If so, how would the Petitioner ensure wells and/or water quality are not impacted from construction activities?

There are no drinking water wells on the site (399 Hill Street) or in the vicinity of the proposed facility (43 Minor Street).

24. Referring to Petition p. 38, please clarify the name and distance to the nearest federally-obligated airport.

Robertson Field Airport, located in Plainville, Connecticut is the closest federally-obligated airport to the project site. It is located approximately 5.7 miles to the east of the proposed facility.

Environmental

25. Referring to Petition p. 9, p. 11, Appendix A and Appendix C, different values are given for the size of the property, amount of clearing/disturbance, and percent that will remain outside the limit of disturbance. Please clarify.

The size of the property is approximately 26.9 acres per the A-2 Survey. The total amount of disturbance for the project is ± 18.9 acres. There will be ± 8 acres remaining undisturbed by the Project on site, which is 29.7% of the property.

26. **Referring to Petition Appendix C, p. 32, it states 4.5 acres of upland forest would be cleared; however, Appendix C, p. 9 states upland forest totals 2.4 acres. Additionally, Appendix E states 0.68 acres of forest are to be cleared. Please clarify the amount of upland forest that would be cleared for the project.**

The amount of upland forest that will be cleared for the project is ± 2.69 acres. This number is a result of the clearing associated with the forested and woodland habitats on site. The woodland habitat on site, as described in the Petition Appendix C, p. 9 occupies ± 3.82 acres with a lightly forested habitat of less than 50 percent canopy closure. The clearing associated with the woodland habitat is estimated to be 50 percent of the ± 3.8 acres impacted by the project (Petition Appendix C, p. 11 Table 1) or 1.9 acres. The clearing associated with the forested habitat is ± 0.79 acres which is 100 percent of the acres impacted by the project (Petition Appendix C, p. 11 Table 1).

27. **The Greenhouse Gas (GHG) Assessment in Appendix M of Council Petition No. 1352 compared the life cycle GHG emissions from a solar project to a scenario where the solar project is avoided and an equivalent amount of natural gas-fired electric generation operated for the estimated life of the solar facility. For the proposed project, how would the net GHG emissions (or reduction) over the life of the solar facility and carbon debt payback be affected under this natural gas-fired generation versus proposed solar generation scenario?**

Using the methods and general assumptions provided in Appendix M of Council Petition No. 1352 as a foundation and applying those principles proportionally to the subject project (Petition No. 1421), Petitioner estimates that there would be an 89% reduction in GHG emissions by pursuing solar instead of natural gas.

Specifically, over 20 years, Petitioner estimates the instant solar project (“Project”) will generate 118,949 MWh of electricity, while emitting approximately 23,160 tons of CO_{2e}. To achieve the equivalent MWh production over 20 years as the Project, a natural gas generator would emit an estimated 203,651.55 tons of CO_{2e}. See Figure 1 on the next page.

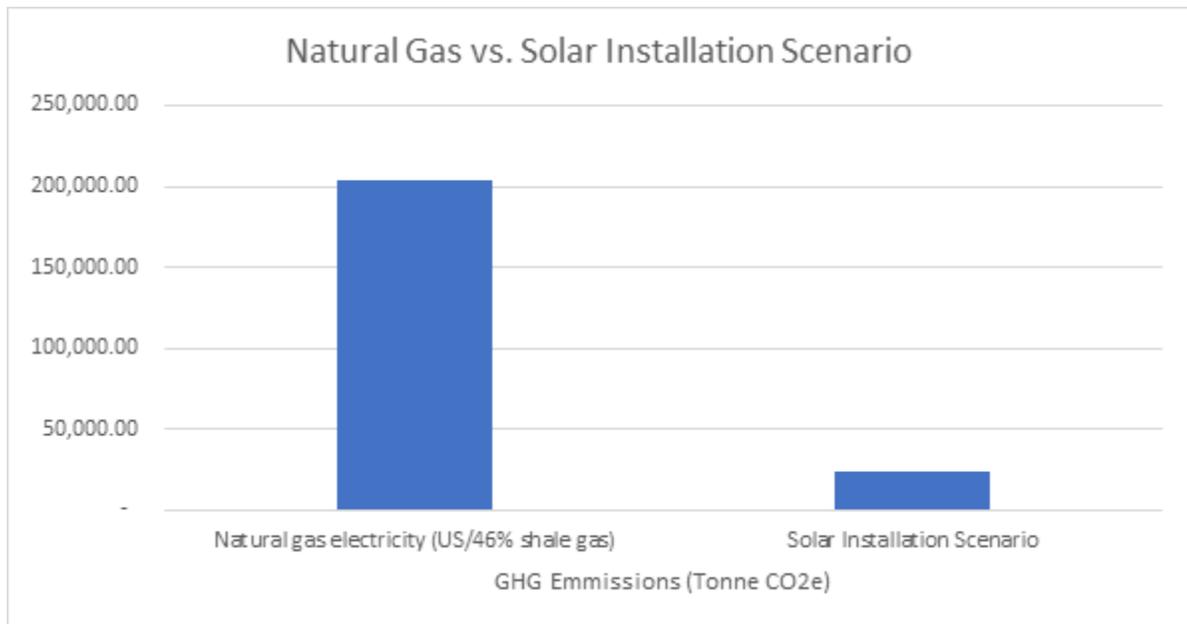


Figure 1: Greenhouse Gas Emissions over 20-years for Natural Gas Scenario vs. Solar Scenario per 118,949 MWh

For additional detail as to the equivalencies used to arrive at the above conclusions, please see Exhibit B attached hereto.

28. **Referring to Petition p. 29, would the proposed arborvitae plantings present a shading issue as they mature? If so, would the plantings be trimmed or replaced?**

The Petitioner has proposed the arborvitae plantings at a distance of about 150 feet from the start of the solar modules. This is about three-times the distance of the anticipated mature height of the plantings. Shading issues are not anticipated however, if they become an issue the Petitioner will trim and replace the plants on an as needed basis.

29. **Can solid/stockade fencing be installed in the southeast corner of the site to provide additional screening of the solar array area from residences to the east and south?**

Given the amount of vegetative screening that will serve to shield the project from the view of residences to the south and east, the petitioner initially proposed the chain-link fence for the entirety of the array fencing. Notwithstanding the presence of this vegetative screening, the petitioner is willing to add privacy slats to the chain link fencing along the southern fence line in the south east corner of the array, should this be desired by the Council.

30. **Can red cedar or other native low growing tree/shrubs be used as a visual screen instead of arborvitae?**

Yes, as the Council is well aware, there is a preference for hardy, native trees and shrubs that are resistant to grazing from deer and other animals. To that end, arborvitae were originally chosen to comprise the vegetative screen. Other similar and native low growing trees/shrubs can also be used as visual screening along the southern property line. A few of these species include: Thuja Green Giants, Spartan Juniper, and Juniper Keteleeri (Similar to eastern red cedar).

31. **Referring to the fence detail on Sheet DN-1, revise the specification to include a minimum 6-inch gap between the fence fabric and ground level to allow for small wildlife movement through the site, as specified on Petition p. 26.**

The project has been informed that for sheep grazing, the fence should be placed flush with the ground. Accordingly, the Petitioner wishes to revise the project's fence specifications to allow for this to occur.

32. **Referring to Petition p. 24, what is the approximate area of prime farmland soils that would be excavated and stockpiled? Will this soil be permanently stored on top layers of the berms or mixed in with all excavated soils that comprise the berms?**

Approximately 2.1 acres of farmland soils will be excavated and stockpiled. Yes, the soil will be permanently stored on the top layers of the berms.

33. **Has the Petitioner had any meetings with the Department of Energy and Environmental Protection (DEEP) Stormwater Division regarding the Stormwater design? If so, when and with whom? Were any recommendations incorporated into the Petition site plans prior to filing with the Council?**

Yes, In January of 2020 the Petitioner and their civil engineer met with Neal Williams and Chris Stone of the CT DEEP Stormwater Division for purposes of a pre-permit submission meeting. The only recommendations made by DEEP staff were to utilize the current version of "Appendix I," which Petitioner has done in its submittal. The recommendations taken from that meeting were incorporated into the petition site plans prior to filing with the Council.

34. **Referring to Petition p. 32, it states the Project has been designed to meet the current draft of DEEP's Appendix I, Stormwater Management at Solar Array Construction Projects. Please explain how the Project meets the wetland buffer criteria in Appendix I Section (1)(e).**

Appendix I Section (1) states that if the requirements of (a)-(e) cannot be met, then the solar panels should be considered effective impervious for the purposes of calculating water quality volume. Since the site encroached into the wetland buffer with the stormwater controls and grading, the project did not meet the requirement of Section (1)(e). As such, the water quality volume treatment plan for the Project was designed by considering the solar panels effective impervious cover, as is permitted under Appendix I. See Petition Appendix E p. 3 and Appendix E Water Quality Volume Calculations.

35. **How would project output be affected if the project was designed with 100-foot wetland buffers to on-site wetlands?**

A majority of the encroachment into the 100-foot upland review area for the Project is the result of grading associated with the stormwater management basins and swales for the Project. The basin's size, and thus the encroachment into the upland review area, is partially a direct result of the Petitioner's compliance with a required reduction in Hydrologic Soil Group required by draft Appendix I of the DEEP General Permit. It is estimated that the Project output could be affected by as much as 250-450kW AC if the Project were to design as to not encroach within the 100-foot upland review area.

36. **Referring to Petition p. 38, what nearby noise receptors are referred to and what would be the calculated noise levels at these receptors?**

Petition Appendix C, p. 29, notes that the closest property line relative to the nearest inverter/transformer is approximately 65 feet to the north, across Minor Street. This parcel (identified by the City of Bristol as James P. Casey Road, Map-Block-Lot 65-2-2+2-1) is zoned Residential (R-25) and currently undeveloped. The nearest residentially developed parcel is 43 Minor Street, located approximately 472 feet to the east of the proposed equipment. Sound from the proposed transformers is listed as 68 dB measured from 1 ft away. Using the Inverse Square Law, the approximate noise level at each location would be 31.9 dB and 14.5 dB, respectively.

Facility Construction

37. **Would the concrete be pre-cast or poured on site for the proposed electrical equipment concrete pads? What other concrete components are proposed at the site? Where and by what method would cement trucks be cleaned at the site?**

The concrete is expected to be poured on site for the proposed electrical equipment pads. If any of the foundation post encounter refusal during post driving construction, then those posts may require a drilled pier concrete foundation. A concrete washout area will be provided on site in the vicinity of the access for the trucks to be cleaned on site with a hose and water.

38. **Referring to Petition p. 14, and Sheet EC-1, Phase 2 note 8 states *Install remaining electrical conduit*. Where was conduit installed prior to this step? Please clarify.**

Yes, conduits are to be installed in Phase 1. Please see, Petition p. 14, note 4.

39. **Referring to Sheet EC-8, rip-rap slope protection is specified in the western portion of the solar field. Quantify the area that would be stabilized by rip-rap. Why is rip-rap necessary in this area? Is the rip-rap surface considered impervious or have a different Stormwater CN number than meadow? If so, was this CN value used in the Appendix E Stormwater calculations?**

There is a total of ±6,250 square yards of rip-rap slope protection proposed on the entrance slopes into stormwater basins B1-A, B1-B, and B3. The rip-rap is designed to mitigate any concerns associated with erosion on the slope into the basins due to potential ground water seepage in those area. Since the rip-rap is proposed as an erosion control measure, it is not considered as part of the stormwater calculations.

40. **Identify areas of the site that have post-construction slopes greater than 15 percent as measured along the alignment of the row of solar panels.**

There are three areas where slopes are greater than 15 percent. The locations are the far eastern portion, the center portion, and the far western portion of the array for a total area of 1.9 acres. Please see the map that is attached as Exhibit C for additional information.

41. **The Site Plans show the outlet and emergency overflow of Stormwater Basin B-3 discharging towards abutting properties along Clover Street. What is the distance from the outlet structure end points to the property lines? What are the grades after the point of discharge? Will basin discharge flow onto these properties?**

Discharge from Stormwater Basin B-3 does not flow directly to the southern properties. The discharge follows the existing contours of the land towards the wetlands to the west where stormwater flows today and then leaves the Property to the south. The outlet location is approximately 40 feet from the property line.

42. **The Site Plans show the outlet and emergency overflow of Stormwater Basin B-2 discharging towards an abutting property. Can the basin be designed so that discharge point is to the northeast so that outflow will be directed on the site property towards Wetland 2?**

Wetland 2 is defined in Petition Appendix C p. 18 as a headwater wetland seep that drains from its high point elevation 726' south off site approximately elevation 715' at the property line. Due to the depth requirement of the basin and the existing topography on site moving the discharge point of the Stormwater Basin B-2 to the north east would result in additional disturbance and grading closer than 50' to Wetland 2. Additionally, the water would still discharge out toward the property line to the south and would likely not enter the limits of Wetland 2. For reference the outlet elevation of Stormwater Basin B-2 is 720' and the elevation of WF-2-06 approximately 75 feet to the west is also at 720'.

43. **The 4 stormwater basins are specified as “pond” detention basins. Would the basins contain standing water year-round?**

The stormwater basins are not expected to have standing water year-round but have been designed to account for standing water in the basins due to a seasonable high ground water table on site.

44. **Project construction is estimated at 5 months. When is the anticipated start date? What are the typical construction hours and work days of the week? Are these hours/days consistent with City of Bristol ordinances?**

The Petitioner anticipates a start date of 11/2/2020, assuming the Project is approved by the Siting Council. Typical construction hours and work days of the week are as follows, Monday – Friday 7:00 AM to 4:00 PM. Saturday (if needed) 7:00 AM to 4:00 PM. Sunday (if needed) 9:00 AM to 4:00 PM. These work days and hours are consistent with the City of Bristol Ordinances.

45. **If the proposed construction schedule has a majority of work occurring during winter months, provide detailed winter work procedures that address construction erosion and sediment control as well as work area soil stabilization.**

The Project anticipates the completion of Phase 1 of the construction sequence prior to the winter months. This will allow for the establishment of the temporary sediment basins and other erosion control measures for the site. Soil stabilization will be applied on site as required per the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

46. **Has a comprehensive geotechnical study been completed for the site to determine if site conditions support the overall Project design (e.g. solar array, roads, stormwater basins)? If so, summarize the results. If not, has the Petitioner anticipated and designed the Project with assumed subsurface conditions? What are these assumed conditions?**

Yes, a comprehensive geotechnical study has been completed for the site. Findings of this study were used in the development of the overall project design. The results are summarized as follows:

A geotechnical investigation, including borings, analysis and laboratory testing has been performed. Subsurface conditions were found to include Fill, Glacial Till, and Weathered Rock. The test took borings from 8 locations spread throughout the project site. On average, the following was found:

1'-2' Fill (Topsoil and forest debris)
3'-14' Glacial Till (Mostly sand and silt with some fine gravel mixed in)

For boring locations B-3, B-4 and B-6, weathered rock or bedrock was examined. All of these boring locations are on the eastern portion of the project area. At these locations, the depth of weathered rock was at a minimum of 8' deep and was not found 10' beneath the surface at Boring location 6.

The results of the geotechnical study along with obtained driven beam pull testing data, found that using a driven pile system for this project would likely see very few refusals. Although the geotechnical report found bedrock in certain locations, this was at depths of 8' or greater. After completion of the geotechnical analysis and pull-testing data, the

determined racking system for this project is driven piles with an 8' minimum embedment depth.

47. **What effect would runoff from the drip edge of each row of solar panels have on the site drainage patterns? Would channelization below the drip edge be expected? Are energy dissipators, as depicted in DEEP's draft Appendix I, Stormwater Management at Solar Array Construction Projects-Figure 2, proposed for this Project? If not, why not?**

The rows of solar panels are not considered "closed systems," because there are gaps between each module (both north/south and east/west). As such, the drip edge of each solar panel will not have an impact on the Site's drainage patterns, as stormwater will flow off the panels at multiple locations as the panels follow the contours of the existing land. For the same reason, after construction is complete and the Site is fully stabilized, channelization along the drip edge is not expected. Since channelization along the drip edge is not expected energy dissipators were not deemed necessary for this project.

Maintenance Questions

48. **Provide a post-construction Operations and Maintenance Plan that includes provisions for vegetation management within and outside the array/rip-rap areas that incorporates mowing/vegetation management restrictions related to listed-species, and inspection/corrective action protocols for site equipment, stormwater features, and landscaping.**

The Resource Protection Plan included within Appendix C - Environmental Assessment provides details of protection measures proposed for the two listed species, the Eastern box turtle and bobolink, identified in the vicinity of the Project. These protection measures satisfy the requirements from the Connecticut Department of Energy and Environmental Protection Wildlife Division in accordance with their Natural Diversity Data Base determination. Should vegetation management require the use of mowing and is to occur during the active Eastern Box Turtle season (April 1st to October 30th), vegetation shall be mowed to no lower than 7 inches above the ground surface to minimize injury to turtles. Flail type mowers with guide bars that ride along the ground shall not be used for mowing during the active turtle season. Please note that given the grazing that will occur at the site, less mowing than would normally be the case is expected.

49. **Would the installed solar panels require regular cleaning or other, similar, maintenance? If so, describe cleaning procedures including substances used. Would this maintenance activity have any impacts to water quality?**

The installed solar panels are not anticipated to require regular cleaning. No cleaning materials are anticipated to be used and no impacts to water quality are expected either.

50. **How will sediment be removed and transported from stormwater features? Where would accumulated sediment be disposed of?**

Sediment will likely be removed and transported from the stormwater features via a skid-steer loader. The sediment can be spread and stabilized within upland areas on site or disposed of offsite in accordance with applicable laws and regulations.

51. **Would the petitioner store any replacement modules on-site in the event solar panels are damaged or are not functioning properly? If so, where?**

No, the Petitioner does not anticipate the need to store any replacement modules on site.

Respectfully Submitted,

Bristol Solar One, LLC



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