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October 16, 2020

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS ON THE DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: Fairland Farm Solar
PROJECT MUNICIPALITY	: Norton
PROJECT WATERSHED	: Taunton
EEA NUMBER	: 16138
PROJECT PROPONENT	: NextSun Energy, LLC
DATE NOTICED IN MONITOR	: September 9, 2020

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G.L. c. 30, ss. 61-62I) and Section 11.08 of the MEPA regulations (301 CMR 11.00), I have reviewed the Draft Environmental Impact Report (DEIR) and hereby determine that it **adequately and properly complies** with MEPA and its implementing regulations. The Proponent must prepare and submit for review a Final Environmental Impact Report (FEIR) in accordance with the Scope provided in this Certificate.

Project Description

As described in the DEIR, the project includes the construction of an approximately 2.0-megawatt (MW) alternating-current (AC) solar energy facility (3.9 MW direct current (DC) facility) on Fairland Farms in the Town of Norton. The project will occupy four (4) active cranberry bogs as well as disturbed areas adjacent to the bogs. The ENF indicates that the project follows the Department of Energy Resources (DOER) current design guidelines for dual-use solar as described Agricultural Solar Tariff Generation Unit (ASTGU) guidelines, in conjunction with the Solar Massachusetts Renewable Target (SMART) program.[1]

[1] I note, however, that DOER is in the process of updating the ASTGU guidelines, and has made its proposed changes available for public comment on its website. See https://www.mass.gov/doc/agricultural-solar-tariff-generation-units-guideline-straw-proposal/download. Among other items, the proposed changes would impose a maximum DC rated capacity of 125% of the AC capacity of the project. As currently designed, this project would not satisfy DOER's proposed design standards for future projects qualifying for the SMART program.

The ground-mounted solar photovoltaic (PV) facility consists of four distinct solar-tracking arrays located within active cranberry bogs, with a footprint of approximately 15 acres. As described in the DEIR, the project includes a total of approximately 10,540 tracking solar panels, supported by approximately 2,480 pile supports (either helical piles or vibrationally driven I-beams). The equipment area, located within disturbed areas adjacent to the bogs, includes 2 inverters and 8 battery storage containers and will be elevated above the 100-year floodplain of elevation (el.) 77 feet (ft) NAVD88 on 8 skids with 11 piles each, and enclosed by security fencing. Interconnection to the electrical grid is proposed through an adjacent parcel to the west (further described below), via an existing interconnection corridor that is utilized by an existing solar facility on this adjacent parcel. The DEIR states a total of 14 new utility poles are proposed along the electrical route.

Project Site

The approximately 182-acre project site is located at 210 Bay Road, bounded to the north by the Easton town line and to the east by Bay Road. As described in the DEIR, an adjacent parcel to the west of the project site contains an existing large-scale, ground-mounted solar facility and associated access road and interconnection. The ENF indicated this parcel is owned by the Proponent, but that the solar facility was constructed in the 2014/2015 time period by a separate entity,[2] and is currently owned and operated by this separate entity. Based on the maps provided in the DEIR, the project site appears bounded to the south by Mulberry Meadow Brook and associated wetlands. Surrounding land use is characterized as forested upland, wetlands, and low-density residential development, in addition to a commercial plant nursery. The site contains active cranberry bogs and associated wooded uplands and wetlands, as well as access roads, water control structures, pump houses, and a storage building. Mulberry Meadow Brook, a perennial stream, bisects the project site.

The entirety of the project site is located within the Canoe River Aquifer, Snake River, Watson Pond and Lake Sabbatia Area of Critical Environmental Concern (ACEC), which is generally defined by the Canoe River watershed basin and underlying aquifer.[3] The project site contains wetland resource areas including Bordering Land Subject to Flooding (BLSF), Riverfront Area (RFA), Bordering Vegetated Wetland (BVW), and Land Under Water (LUW). Additionally, the entirety of the project site is mapped as Zone II Approved Wellhead Protection Area by the Massachusetts Department of Environmental Protection (MassDEP). The project site also contains a historic resource (Old Bay Road Historic District), listed on the Massachusetts Historical Commission's (MHC's) Inventory of Historic and Archaeological Resources of the Commonwealth (the Inventory). The project is not located within Priority and Estimated Habitat as mapped in the *Massachusetts Natural Heritage Atlas* (14th Edition) by the Division of Fisheries and Wildlife's (DFW) Natural Heritage and Endangered Species Program (NHESP).

Environmental Impacts and Mitigation

Potential environmental impacts of the project are associated with the construction, installation, and operation of the solar arrays and associated infrastructure. As described in the

[2] Construction time period of the adjacent solar facility stated in an email from the Proponent's consultant, Mary Schneeweis (Beals and Thomas), to Eva Murray (MEPA Office) sent on October 15, 2020.
[3] The ACEC designation document is available at: https://www.mass.gov/files/documents/2016/08/um/cra-des.pdf

DEIR, the project will permanently impact 100 square feet (sf) of RFA, 1,300 (0.03 acres) of BLSF, and 3,300 sf (0.08 acres) of ACEC. The project will temporarily impact 6,300 sf (0.14 acres) of RFA, 23,000 sf (0.53 acres) of BLSF, and 36,700 sf (0.84 acres) of ACEC. The project will also result in the fill of 1,250 cubic feet (cf) of BLSF. According to the DEIR there are additional areas of currently altered BLSF and ACEC that will be utilized for landscaping (visual screenings) and staging/storage areas (further described below).

As described in the DEIR, measures to avoid, minimize, and mitigate environmental impacts include: locating the project within upland bog areas considered to be in active farmland (therefore, already disturbed) or the sand track and other minimally vegetated areas associated with the farming activities; limited narrow trenching for subsurface conduits to minimize vegetation disturbance; erosion and sediment control measures; regrading and restoration of areas temporarily impacted during construction surrounding the cranberry bogs; visual screening plantings; and the creation of compensatory flood storage.

Jurisdiction and Permitting

This project is subject to MEPA review and preparation of an ENF pursuant to Sections 11.03(3)(b)(l)(f) and 11.03(11)(b) because it requires a State Agency Action and will alter more than one-half-acre of wetlands and is located with an ACEC (respectively). The project requires a Superseding Order of Conditions (SOC) from MassDEP. As an EIR is required for the project, it is subject to the MEPA GHG Policy and Protocol (GHG Policy).

The project requires an Order of Conditions from the Norton Conservation Commission, which was issued on June 28, 2019 and subsequently appealed by the proponent, initiating the SOC determination process by MassDEP. The project requires a Building Permit from the Norton Inspectional Services Department and Site Plan Approval from the Norton Planning Board. The project also may require a Floodplain Overlay District Special Permit from the Norton Planning Board, though whether or not such permit is required is currently the subject of litigation between the Proponent and the Town of Norton.

The project is not receiving Financial Assistance from the Commonwealth. Therefore, MEPA jurisdiction is limited to those aspects of the project that are within the subject matter of any required or potentially required Agency Actions and that may cause Damage to the Environment. The MEPA regulations specify that the ACEC review thresholds shall be considered to be related to the subject matter of any required Permit applicable to the project.

Review of the DEIR

The DEIR described the proposed project and changes since the filing of the ENF. The DEIR identified existing and proposed conditions, identified potential environmental impacts, and identified measures to avoid, minimize, and mitigate project impacts. It also included a discussion of alternatives considered for the project. The DEIR included updated site plans for existing and post-development conditions at a legible scale with clearly delineated wetland resource areas. It included a list of required State Permits, Financial Assistance, or other State approvals. The DEIR included a Response to Comments received on the ENF and provided draft Section 61 Findings identifying the Proponent's mitigation commitments.

As required by the Scope, the DEIR included: a copy of the Decommissioning Plan, Stormwater Report, Hydrologic Analysis, and Long-Term Pollution Prevent Plan; feedback from the Norton Fire Department; updated impact calculations to ACEC and wetland resource areas; a description of project components (including number of solar panels, arrays, estimated number of racking supports, and number of batteries as well as technical aspects of battery storage containers); details regarding piling installation methods; GHG emission analysis; discussion of the project's compliance with the Norton Open Space and Recreation Plan and South Coast Rail Corridor Plan; and an analysis of the resiliency of the project. The DEIR also provided the results of the most recent water quality analysis conducted on the site, as required by the Scope, and included a commitment for the Proponent to continue water quality monitoring and submit the result of future monitoring to the Norton Conservation Commission upon request. Comments from the Norton Conservation Commission request the Proponent provide the Decommissioning Plan and an associated bond to the Town of Norton.

Changes to the proposed project since the ENF was filed include the elimination of two staging and stockpile areas as they were deemed unnecessary through project refinement. Additionally, the DEIR states that trenching of electrical cables below solar panels was eliminated in favor of mounting them beneath the panels, as requested by MassDEP in order to reduce temporary impacts.

Alternatives Analysis

The DEIR evaluated the following alternatives: a No-Build Alternative (Alternative 1), Increased Equipment Area Setback from Abutting Properties Alternative (Alternative 2), Relocating Equipment Area Outside of the BLSF Alternative (Alternative 3), and the Preferred Alternative (as described herein). According to the DEIR, Alternative1(No-Build) was dismissed as it would not achieve the project goals of developing a solar PV facility is eligible for dual-use incentives under the SMART program. As required by the Scope, Alternative 2 evaluated increased setbacks of the equipment area from non-affiliated abutting properties. The DEIR evaluated ten different locations based on the following criteria: proximity to the nearest abutting property, interference with cranberry operations, technical and financial viability, and ease of access for first responders as well as proximity to the existing agricultural reservoir for use in firefighting. According to the DEIR, two of the ten locations did not interfere with cranberry operations. The preferred location of the equipment area, which has been incorporated into the Preferred Alternative, is approximately 58.5 feet from the nearest abutting property. According to the DEIR, this location was selected as it had similar environmental impacts to the other alternative, and was more technically feasible.

As requested by the Scope, Alternative 3 evaluated locating the battery storage and associated equipment area outside of BLSF and 100-year floodplain. The DEIR states there are no upland areas located entirely outside of the BLSF that are of sufficient size to accommodate the equipment area, are located outside of the 50-foot property line setback required by zoning, and do not interfere with existing cranberry operations. Alternative 3 evaluated an alternative location that was located partially within BLSF, but outside of the 100-year floodplain. The DEIR states this alternative location was not selected as it is located closer to abutting properties than the Preferred Alternative. According to the DEIR, the Preferred Alternative (described herein) is the smallest project size possible that meets the minimum revenue required to overcome the costs of interconnection and land. The DEIR also evaluated alternative solar panel

footing options for the arrays, consisting of either individual posts with concrete footings, or a "tray" (i.e. concrete ballast) extending the length of each row. According to the DEIR, concrete footings and concrete ballasts would allow for a shallower foundation (or in the case of the ballasts, eliminate any subsurface foundation) compared to the Preferred Alternative but would significantly increase ground disturbance, thereby resulting in greater impacts to wetland and agricultural resources than the Preferred Alternative (utilizing helical piles or driven I-beams).

Wetlands and Water Quality

The DEIR included a narrative that quantified the temporary and permanent wetland impacts in a tabular format. The DEIR describes the active cranberry bogs where the solar arrays will be installed as upland cranberry bogs, and therefore excludes these areas from the calculations of wetland impacts. Comments from MassDEP indicate that the cranberry bogs, while not traditionally wetland bogs, could be considered BVW, and state that this determination will be made by MassDEP during their review as part of the Superseding Order of Conditions process. As described below, additional analysis of potential impacts to BVW is required in the Scope for the FEIR.

As requested by the Scope, the DEIR quantified impacts to ACEC and additional alteration of BLSF and RFA areas associated with staging/stockpiling construction materials, the creation of compensatory flood storage, and landscaping proposed as mitigation. The DEIR identified an additional 10,700 sf of permanent impacts to RFA associated with propose landscaping. Additional impacts to BLSF include 72,200 sf of temporary impacts associated with staging, and 49,500 total sf of permanent impacts associated with landscaping (48,700 sf) and creation of compensatory flood storage (800 sf). Impacts to ACEC are associated with project construction and creation of compensatory flood storage (36,700 sf temporary, 3,300 sf permanent); construction staging areas (87,500 sf temporary); and landscaping (96,100 sf permanent). The DEIR describes the proposed landscaping as native plant species proposed to act as visual screenings and assist in noise reduction. The DEIR states construction staging and stockpiling areas are located within areas that are currently disturbed and will not result in adverse impacts to the resource areas. The project will reduce flood storage by 1,250 cubic feet (cf). To mitigate wetland impacts, the DEIR states compensatory flood storage will be created in excess (identified as 3,560 cf in the ENF). All temporarily disturbed resource areas will be restored to pre-construction conditions.

The DEIR indicates the decision to use helical piles or I-beams will be determined by soil conditions. I-beams will be used where firmer soils (clay) are present whereas helical piles will be utilized in looser soils (sand). According to the DEIR, both sandy and clay soils are expected to be encountered during construction. A geotechnical investigation will be conducted prior to application for the Building Permit from the Norton Inspectional Services Department to determine the soil types present in the project site which will inform which racking support type will be used.

The DEIR clarified the project is located outside of the Canoe River Sole Source Aquifer area. Comments noted a significant concern regarding the impacts of the proposed batteries on water quality should they batteries catch fire and/or leak. The DEIR states the proposed lithium-ion battery storage systems will be installed in accordance with the Massachusetts Comprehensive Fire Safety Code (527 CMR 1.00). The DEIR further states the batteries will be

elevated above the 100-year floodplain elevation and enclosed with containers that include a supervised fire detection and suppression system, dry piped sprinkler system, and a heating and cooling system (further described below).

Climate Change Adaptation and Resiliency

The DEIR states the project is designed to be resilient to future climate change, although specific climate change scenarios were not assessed. The inverters, transformers, converters, and battery storage containers will be elevated 5 feet above the floodplain elevation. The DEIR states infrastructure located within the 100-year floodplain is limited helical piles/I-beams and utility poles. The DEIR further states all of the proposed equipment has been designed to withstand extreme weather for a period of over 30 years, and that the proposed battery storage containers will include HVAC and heating to provide temperature control as necessary.

The project is subject to the MEPA Greenhouse Gas Policy and Protocol (GHG Policy) because it exceeds thresholds for a mandatory EIR. The GHG Policy includes a de minimus exemption for projects that will produce minimal amounts of GHG emissions. This is renewable energy project that will reduce reliance on fossil fuels and resulting GHG emissions. Expansion of renewable energy sources within the Commonwealth is consistent with the mandates outlined in the Global Warming Solutions Act of 2008 for sectors of the economy to reach a target of a 25 percent reduction of Greenhouse Gas (GHG) emissions by 2020 and an 80 percent reduction by 2050. The DEIR indicated the project will reduce GHG emissions by 4,048,880 pounds per year over the twenty to forty-year life of the project compared to current electric grid emissions. As such, this project falls under the de minimus exemption; therefore, the Proponent is not required to prepare a GHG analysis. GHG emissions will be limited to the construction period of the project. I encourage the Proponent to incorporate measures to avoid and minimize GHG emissions (and other air pollutants) during the construction period such as limiting idling and using bio-fuels in off-road construction equipment.

Construction Period

As described in the DEIR, the project is anticipated to be constructed over a period of 6 to 9 months beginning in the spring of 2021 and completed by the end of 2021. Project construction will result in approximately 20 vehicle trips per day, include work within active cranberry bogs, and result in previously described alteration of wetland resource areas. To mitigate for vehicle emissions from construction, the DEIR states driver training, periodic inspections by site supervisors, and signage posting during construction to ensure compliance with the Massachusetts Idling Regulations (310 CMR 7.11), and that an effort will be made to select contractors that participate in MassDEP's Diesel Retrofit Program. Additionally, the DEIR states permanent signs will be installed on the project site after construction limiting idling to five minutes or less. Comments from The Norton Conservation Commission state the Proponent should commit to diesel engine retrofits.

The DEIR states erosion and sedimentation control barriers will be installed and maintained during construction, and that disturbed areas will be restored post-construction. As described in the DEIR, dust from the site will be controlled by using a mobile pressure-type distributor truck to apply water to disturbed areas as needed. As requested in the Scope, the DEIR evaluated Time of Year (TOY) restrictions to reduce impacts on cranberry bogs from

construction. TOY restrictions are not proposed in final project design or construction. According to the DEIR, TOY restrictions would not decrease environmental impacts as the work proposed within the bogs is similar in magnitude and nature to typical agricultural operations. The DEIR states construction is anticipated to occur during the driest times of year to minimize impacts to the cranberry bogs, with disturbed areas proposed to be replanted the following spring. Construction period mitigation measures were not incorporated into Draft Section 61 Findings.

Noise

Comments raised significant concerns regarding noise generated by the project. As required in the Scope, the DEIR described the project's compliance with MassDEP's noise regulations (310 CMR 7.00). The DEIR states a post-construction noise evaluation will be conducted to confirm compliance with MassDEP's Noise Pollution Policy. The DEIR further states that should noise exceed the levels outlined in the MassDEP Noise Pollution Policy additional noise mitigation will be incorporated. The project proposes landscaping that, according to the DEIR, will buffer potential noise from the project in addition to acting as visual screenings. Comments note the proposed plantings may not mature for 10-15 years after planting and note significant concern regarding noise impacts in the interim. The DEIR states the project will comply with state and local limitations on construction hours as applicable.

Conclusion

Based on a review of the DEIR, comment letters, and consultation with State Agencies, I have determined that the DEIR adequately and properly complies with MEPA and its implementing regulations. The Proponent must prepare and submit for review a FEIR in response to the limited Scope included below.

SCOPE

General

The FEIR should follow Section 11.07 of the MEPA regulations for outline and content, in addition to the information and analyses identified in this Scope. Additional recommendations provided in this Certificate may result in a modified design that enhances the project's ability to avoid, minimize, or mitigate Damage to the Environment. The FEIR should discuss the steps the Proponent has taken to further reduce the impacts since the filing of the DEIR, or, if certain measures are infeasible, the FEIR should discuss why these measures will not be adopted.

Project Description and Permitting

The FEIR should include a detailed description of the project and describe any changes to the project and/or proposed mitigation measures since the filing of the DEIR. The FEIR should identify, describe, and assess the environmental impacts of any changes in the project that have occurred between the preparation of the DEIR and FEIR. The FEIR should include updated site plans for existing and post-development conditions at a legible scale.

The FEIR should provide a brief description and analysis of applicable statutory and regulatory standards and requirements, and describe how the project will meet those standards. It should include a table listing all required state, local and federal permits or other approvals and provide an update on the status of the permit applications. It should specifically identify any changes to the list of required permits since the filing of the ENF and DEIR.

Wetlands and Water Quality

The FEIR should clarify the commitment in the DEIR to conduct annual water quality monitoring, including the selection criteria for the 14 metals included in the analysis and the frequency with which the Proponent will conduct water quality monitoring. This information should be incorporated into Section 61 Finding as applicable. The DEIR does not appear to include project work that will occur in areas of RFA or BLSF in impact calculations to ACEC. The FEIR should refine impact calculations to reflect impacts to both ACEC and RFA/BLSF where both resources are located. The FEIR should also provide a conservative comparison of impacts to wetland resources areas assuming a scenario where the dual-use cranberry bogs are classified as BVW.

Mitigation and Draft Section 61 Findings

The Draft Section 61 Findings provided with the DEIR were limited to measures to address impacts to wetland resource areas. The FEIR should include a section that summarizes proposed mitigation measures and provides draft Section 61 Findings for each State Agency Action, including but not limited to potential impacts to resources within the designated ACEC and construction period impacts. It should contain clear commitments to implement these mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation. The FEIR should reflect comments from MassDEP stating they do not concur with the statement "MassDEP finds that there are no significant unmitigated impacts" included in the DEIR Draft Section 61 Findings, as the project has not received a final Superseding Order of Conditions at this time.

Response to Comments

The FEIR should contain a copy of this Certificate and a copy of each comment letter received. In order to ensure that the issues raised by commenters are addressed, the FEIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended, and shall not be construed, to enlarge the scope of the FEIR beyond what has been expressly identified in this certificate.

Circulation

The Proponent should circulate the FEIR to those parties who commented on the ENF and/or DEIR, to any State and municipal agencies from which the Town will seek permits or approvals, and to any parties specified in section 11.16 of the MEPA regulations. The FEIR

submitted to the MEPA office should include a digital copy of the complete document. A copy of the FEIR should be made available for review in the Norton public library.[4]

K. Theoharides

October 16, 2020
Date

Kathleen A. Theoharides

Comments received:

10/09/2020 Residents for Responsible Solar Energy
10/09/2020 Joseph Cogliano
10/13/2020 Norton Conservation Commission
10/13/2020 Massachusetts Department of Environmental Protection (MassDEP), Southeast Regional Office (SERO)

KAT/ELM/elm

[4] Requirements for hard copy distribution or mailings will be suspended during the Commonwealth's COVID-19 response. Please consult the MEPA website for further details on interim procedures during this emergency period: https://www.mass.gov/orgs/massachusetts-environmental-policy-act-office.

Commonwealth of Massachusetts
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Kathleen A. Theoharides
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Martin Suuberg
Commissioner

October 9, 2020

Kathleen A. Theoharides,
Secretary of Energy and Environment
Executive Office of Energy and Environmental Affairs
ATTN: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: DEIR Review EOEEA #16138
NORTON. Fairland Farm Solar at 210 Bay Road

Dear Secretary Theoharides,

The Southeast Regional Office of the Department of Environmental Protection (MassDEP) has reviewed the Draft Environmental Impact Report (DEIR) for the Fairland Farm Solar at 210 Bay Road, Norton, Massachusetts (EOEEA #16138). The Project Proponent provides the following information for the Project:

The Project consists of the construction, installation, and operation of a 2± MW AC (3.9± MW DC) ground-mounted, dual-use solar energy facility on ±23 acres of active upland cranberry bogs. Dual-use solar projects have been incorporated into the Massachusetts Department of Energy Resources (DOER) Solar Massachusetts Renewable Target (SMART) program. The SMART program provides financial incentives to farmers for the development of new solar photovoltaic energy sources in a manner that is compatible with ongoing agricultural practices. A requirement to qualify for the dual-use program includes the continued cultivation, harvest and delivery of cranberry crops. This requirement necessitates a different type of solar array than typical ground mounted arrays in Massachusetts to date, including increased panel height and row spacing to allow continued mechanical cultivation and irrigation practices. The increased spacing, which requires more acreage for a permissible project, also allows for reduced shading on the crop from the panels above.

In addition to the solar panels within the cranberry bogs, an equipment area will be located within a disturbed area adjacent to the existing storage building. The equipment area for the Project will contain inverters and battery storage and will be enclosed by security fencing. Site access will be from the cranberry farm's existing access point on Bay Road, and the existing gate will be replaced with a roller gate for security. Interconnection to the grid will occur via new utility poles and above-ground wires to be located within existing on-site agricultural access roads and other disturbed areas, extending off-site along an existing access road and utility line corridor associated with an adjacent existing solar facility, to the terminus of Fairlee Lane.

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.
TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

Printed on Recycled Paper

Bureau of Water Resources Comments

Wetlands and Waterways. The main issue for wetlands is whether the cranberry bogs proposed for work are "upland." This was highlighted during the ENF review period and has been addressed by the DEIR. The Norton Conservation Commission has already determined through their Order of Conditions (OOC) that the cranberry bogs proposed for work are "upland". Since this Project is presently before DEP for issuance of a Superseding Order of Conditions **(**SOC**),** this issue will be reviewed, and a recommendation will be made to DEP. The Project Proponent has provided information addressing this issue in the Notice of Intent application, at which time the Department will review shortly for the preparation of the SOC. The Section 61 findings state that "MassDEP finds that there are no significant unmitigated impacts." At this time, MassDEP does not concur with this statement because the Project has not received the final SOC.

Bureau of Air and Waste Comments

Solid Waste. MassDEP Solid Waste staff has reviewed the Draft Environmental Impact Report (DEIR) for the Fairland Farms Solar Project in Norton (EEA No. 16138) and verified the DEIR addressed the comments previously provided on the Project.

If you should have any further questions please contact Mark Dakers, Solid Waste Section chief at (508) 946-2847 or Cynthia Baran at (508) 508-2887.

Air Quality. The Proponent has adequately addressed the Program's requirement as specified in 310 CMR 7.09 (Dust, Odor, Construction, and Demolition) and 310 CMR 7.10 (Noise) and those related to construction and excessive idling.

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Proposed s.61 Findings

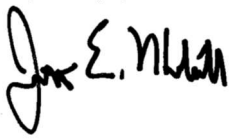
Pursuant to MEPA Regulations 301 CMR 11.12(5)(d), the Proponent has prepared Proposed Section 61 Findings and included them in the DEIR in a separate chapter updating and summarizing proposed mitigation measures. In accordance with 301 CMR 11.07(6)(k), this chapter has also included separate updated Section 61 Findings for each State agency that will issue permits for the Project. The Section 61 Findings contain clear commitments to implement mitigation measures, estimates the individual costs of each proposed measure, identifies the parties responsible for implementation, and contains a schedule for implementation.

The "Certificate of the Secretary of Energy and Environmental Affairs on the Final Environmental Impact Report (FEIR)" may indicate that this Project requires further MEPA review and the preparation of a Supplemental Final Environmental Impact Report (SFEIR).

Other Comments/Guidance

The MassDEP Southeast Regional Office appreciates the opportunity to comment on this proposed Project. If you have any questions regarding these comments, please contact George Zoto at (508) 946-2820.

Very truly yours,



Jonathan E. Hobill,
Regional Engineer,
Bureau of Water Resources

JH/GZ

Cc: DEP/SERO

ATTN: Millie Garcia-Serrano, Regional Director
David Johnston, Deputy Regional Director, BWR
Seth Pickering, Deputy Regional Director, BAW
Gerard Martin, Deputy Regional Director, BWSC
Jennifer Viveiros, Deputy Regional Director, ADMIN
Dan Gilmore, Chief, Wetlands and Waterways, BWR
Gary Makuch, Wetlands and Waterways, BWR
Mark Dakers, Chief, Solid Waste, BAW
Alison Cochrane, Solid Waste, BAW
Allen Hemberger, Site Management, BWSC

Norton Conservation Commission
70 East Main Street
Norton MA 02766
508-285-0275
508-285-0277 fax
conservation@nortonmaus.com

October 9, 2020

Kathleen Theoharides
Secretary of Energy and Environmental Affairs
Executive Office of Energy and Environmental Affairs (EEA)
Attention: MEPA Office
Eva Murray: EEA No. 16138
100 Cambridge St, Suite 900
Boston MA 02114

RE: EEA 16138: Fairland Farm Solar DEIR

Dear Secretary Theoharides,

The Norton Conservation Commission has received and reviewed the Draft Environmental Impact Report (DEIR) for the Fairland Farm solar project proposed in Norton, MA by NextSun LLC (the "proponent"). We offer the following comments based upon review of the DEIR and the Request for Superseding Order of Conditions filed by the project proponent with MA Department of Environmental Protection (DEP) file # 250-1036.

1. As noted in our comment letter of January 16, 2020 for the Environmental Notification Form (ENF), the proposed project was approved with conditions by the Conservation Commission for DEP# 250-1036. The proponent appealed the Conservation Commission's Order of Conditions to DEP for a Superseding Order of Conditions. MassDEP's decision on the superseding order request cannot be issued prior to the issuance of the Secretary's Certificate.

2. The Commission notes the proponent's stated agreement to provide the Conservation Commission with copies of the geotechnical reports prior to construction and copies of annual water quality testing by the landowner for the 14 standard metals. We note that these items were agreed to by the proponent during the public hearings but were later appealed by the proponent and requested that DEP remove those conditions. The proponent should be required to provide these documents and we request that DEP require this in the Superseding Order.

3. The Commission notes the inclusion of the decommissioning plan and request that the proponent be required to provide the plan and bond to the Town of Norton, through the Conservation Commission or the Planning Board.

4. The proponent should provide a strong commitment to, rather than encourage, the diesel engine retrofits, to meet the Tier 3 or Tier 4 federal emission standards.

Norton Conservation Commission
70 East Main Street
Norton MA 02766
508-285-0275
508-285-0277 fax
conservation@nortonmaus.com

5. While the alternatives analysis shows it is impractical to relocate the equipment outside the Bordering Land Subject to Flooding (BLSF), the proponent has improved protection of (BLSF) by elevating the equipment area, providing secondary containment and an automatic fire suppression system. Additionally, the inclusion of containers for temporary stockpiles in the laydown areas is an improvement to prevent alteration of BLSF and sedimentation of wetland resource areas.

6. The proponent has clarified the location of the project is outside the Canoe River Sole Source Aquifer.

The Conservation Commission appreciates the opportunity to provide public comment on this project.

Thank you.

Sincerely,

Jennifer Carlino
Conservation Agent

CC: via email
Michael Yunits, Town Manager myunits@nortonmaus.com
Paul DiGuiseppe, Norton Director of Planning & Economic Development
pdiguiseppe@nortonmaus.com
Bill Napolitano, SRPEDD bnap@srpedd.org
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Karen Gallo, Canoe River Aquifer Advisory Committee, kgallo@easton.ma.us
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Gary Makuch, DEP-SERO, Gary.Makuch@mass.gov
Fred Bottomley, Fairland Farm LLC, fredcbottomley@hotmail.com
Kelly Gallagher, kgallagher30@outlook.com and Joseph Cogliano, cogliano@comcast.net

RRSE
Residents for Responsible Solar Energy

October 9, 2020

By Email: eva.murray@state.ma.us

Ms. Eva Murray
Massachusetts Environmental Policy Act (MEPA) Office
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Draft Environmental Impact Report (DEIR) filed by Beals + Thomas dated August 28, 2020: Proposed project by NextSun Energy, LLC, Fairland Farms, 210 Bay Road, Norton.

Dear Ms. Murray:

On behalf of approximately 50 abutters and members of the local group, Residents for Responsible Solar Energy (RRSE), I am submitting this letter to identify what we believe to be some of the inaccurate and misleading information submitted in the Draft Environmental Impact Report (DEIR), filed by Beals + Thomas on August 28, 2020 regarding the above referenced project. Unfortunately, it appears Beals + Thomas and NextSun Energy continue to submit questionable and inadequate material to the Massachusetts Environmental Policy Act Office in an effort to obtain a favorable outcome for their proposed project.

DEIR-1 p. 1-1 *The Fairland Farm Solar Project (the Project) is located at 210 Bay Road Norton, Massachusetts, and consists of the construction of a dual-use solar energy system on four upland cranberry bogs and ancillary disturbed and unvegetated areas.*

The Proponent claims the Project would be constructed on four upland cranberry bogs. Soil tests for these cranberry bogs have not been conducted and therefore it has not been confirmed whether these bogs have been constructed out of upland.

DEIR-2 p. 1-1 *The Project includes significant visual screening plantings that also will provide food and shelter opportunities for wildlife. The screening is also anticipated to buffer potential noise from the Project.*

The Project includes an insufficient amount of mature visual screening plantings. The Norton Planning Board requested additional screening

plantings than what NextSun has proposed for the Fairlee Lane abutters, however NextSun has refused. Furthermore, NextSun informed the Planning Board during the August 6, 2019 public hearing visual screening plantings would be provided along Bay Rd, located on the Polillio Sand & Gravel Corp (Polillio) property, and presented a letter of intent to enter into a Purchase and Landscaping Agreement with Polillio. Conveniently, four days later and after the public hearing was now closed, NextSun terminated the Purchase and Landscaping Agreement with Polillio.[1] Beals + Thomas/NextSun have failed to provide the dampening efficacy of the proposed plantings. In addition, a representative from Beals + Thomas informed the Norton Planning Board it would take 10-15 years for the screening to mature to full height, or 50%-75% into the life of the project.

DEIR-3 p. 1-2 *Surrounding land uses consist mainly of forested uplands and wetlands and low-density residential development as well as a commercial plant nursery.*

The proponent falsely claims the surrounding land consists of low-density residential development. The surrounding land consists of 161 residences, certified by the Town of Norton as legal abutters, outlining high-density residential development.

DEIR-4 p. 1-2 *There are no pedestrian or bicycle amenities located on Bay Road, nor does the Property generate pedestrian or bicycle traffic.*

There are no public recreational resources on the Property.

The proponent falsely claims the Property does not generate pedestrian or bicycle traffic, and there are no public recreational resources. The owner of the Property, Fred Bottomley, has recently and repeatedly posted on public social media pages, inviting the public to enjoy the Property for recreational purposes. The Property generates a significant amount of traffic due to its advertised recreational resources. The public frequents the bogs to walk, jog, walk their dogs, ride dirt bikes/ATVs, and fish. Abutters to the Bog property have also confirmed on social media, ATV enthusiasts use the bog frequently.[2]

DEIR-5 p. 1-2 *Cranberry farming on the Property plays an important role in the local economy and in preserving Massachusetts' heritage.*

If the cranberry farming on the Property plays such an important role in the local economy and in preserving Massachusetts' heritage, why is the farm manager comfortable with risking an unproven 20 year experiment that may possibly destroy cranberry production and the purpose of the bog's

[1] 8/10/19 Termination of Polillio Landscaping Agreement
[2] Social Media Posts by Fairland Farm Owner Fred Bottomley and Abutter to Bog

existence?

DEIR-6 p. 1-2 *The existing commercial cranberry bog operation has been using the Property to produce agricultural products for nearly 100 years, and will continue to do so upon completion of the Project.*

The Proponent makes an unproven claim that after completion of the Project, the Property will continue to produce agricultural products. No proper studies have been conducted to determine the impacts of solar over cranberry bogs. The Proponent contributed to funding a plywood mockup in Carver, MA at the end of the 2019 summer. Please see the two peer reviews of this attempt at an experiment.[3]

DEIR-7 p. 1-2 *Beyond replacement of the existing gate with a roller gate, no changes are proposed within this district, and no comments were received from the Massachusetts Historical Commission (MHC) on the ENF.*

Did the Proponent reach out to the MHC? If so, how and when?

DEIR-8 p. 1-4 *The Project includes a total of approximately 10,540 tracking solar panels, supported by approximately 2,480 pile supports (helical pile or vibratory driven I-beam).*

More than two years since the Proponent began development of the Project, they still have not been able to provide what percentage would be helical piles and what percentage would be vibratory driven I-beam. They cannot provide this data because they have failed to complete the geotechnical analysis, which has been requested by the Norton Conservation Commission since January 2019.

DEIR-9 p. 1-4 *The equipment area will be elevated above ground level (so as to be above the 100-year floodplain elevation of 77 feet above sea level) on 8 skids with 11 piles each, and will be enclosed by seven-foot tall security fencing. This area will contain 2 inverters and 8 battery storage containers*.

The Proponent has not provided any documentation showing what effect raising the equipment area will have on the noise pollution produced by the inverters. The area would contain almost 300,000 lbs of toxic batteries in a flood plain, well protection zone II, over the Canoe River Aquifer, and in an area of critical environmental concern.

DEIR-10 p.1-4 *The Project received a pre-determination approval from the Massachusetts Department of Energy Resources (DOER) and the Massachusetts*

[3] Carver, MA Plywood Mock Up Peer Reviews

Department of Agricultural Resources (MDAR) enclosed in Section 9.0. Note that this approval was for the larger originally-proposed project.

The Proponent falsely claims the DOER pre-determination approval was for the larger originally-proposed project. The Proponent received a denial letter from the DOER regarding the originally-proposed project. The Proponent received a DOER preliminary pre-determination approval for the smaller, reduced project, which also states it is not a final approval.[4]

DEIR-11 p.1-4 *The summary letter enclosed in Section 9.0 states that the data from this experiment, "…increases our confidence that a viable yield of cranberries could be produced under a dual-use PV array."*

A proper scientific experiment has yet to be conducted to determine effects of solar over cranberry bogs. Please review the two peer reviews by cranberry experts regarding the Carver, MA plywood mock up. Furthermore, Giverson Mupambi of UMass Cranberry Station, who collected the Carver data, concluded the study was preliminary and too limited in scope to be applied to crop yield and that future studies are needed but presently there is no access to funding. [5]

DEIR-12 p.1-4 *However, herein and in other documents provided, the Proponent continues to demonstrate the environmental safety of the Project and the social benefits related to renewable energy generation,…*

It is very concerning the Proponent uses the words environmental safety to describe the proposed Project. As previously submitted documentation to the MEPA Office outlines; the solar panels are at risk of catching fire and releasing toxins, the batteries are at risk of exploding and causing a toxic fire, and lead from the galvanized steel piles may leach into the bogs, groundwater, and contaminate nearby private wells. The Proponent admitted in their March 2019 letter to the Norton Conservation Commission, negative impacts from the Project to groundwater quality and nearby residential wells is unknown. If they had confidence with regard to the water quality of the abutters' wells, why would they appeal the Planning Board and Conservation Commission's conditions of water contaminant testing? What is purpose of designating an area an ACEC if state agencies do not uphold the protections afforded to the designation?

DEIR-13 p. 1-7 *The Project will not impair water quality within the ACEC, which totals 17,190 acres, and was designated for containing fishery habitat, inland wetlands, inland surface waters, water supply areas, natural hazard areas, agricultural areas, historic/archaeological resources, and special use areas.*

[4] DOER Documentation
[5] Email re: Giverson Mupambi from UMass Cranberry Station

It's interesting the Proponent makes such a bold claim to the MEPA Office without evidence, especially considering they informed the Norton Conservation Commission of the contrary in their March 2019 letter, which states "The condition could also stipulate that proposed piles shall not extend through/below a water confining layer, if found, unless a hydrogeologic evaluation is undertaken and determines that negative impacts to ground water supply (including to the cranberry bogs or to nearby residential wells) would not occur."

DEIR-14 p.1-7 *While the Project is located within a Zone II Public Water Supply, solar arrays and battery storage are not land uses prohibited in Zone IIs, as set forth in 310 CMR 22.21(2)(a) and (b).*

The Proponent fails to mention the Project does not qualify as a permitted use under Norton Bylaw 175.14.5.A, Water Resource Protection District and that battery storage is not allowed under Town zoning bylaws.

DEIR-15 p. 1-8 *The materials that comprise the solar panels are inert and are not hazardous, as referenced in the report entitled Clean Energy Results Questions & Answers Ground Mounted Solar Photovoltaic Systems prepared by DOER, MassDEP, and the Massachusetts Clean Energy Center (MassCEC).*

During the January 22, 2019 Norton planning board hearing, Adam Schumaker, VP of Development for NextSun Energy, stated the panels contain toxic materials.

DEIR-16 p.1-8 *The Project also includes an energy storage system composed of lithium ion battery cells, with a combined storage capacity of 24 MWh. The Planning Board approved the batteries as part of the Project's Site Plan Approval.*

The Project contains almost 300,000 lbs of toxic batteries, located in a well protection zone II, flood plain, over an aquifer, and in an area of critical environmental concern. There are zero fire hydrants in the surrounding neighborhoods and Norton Fire Department confirmed hazardous material would result from any firefighting efforts. We continue to hold the position that storage batteries are not allowed under Norton bylaws and the abutters anticipate a favorable decision by the Court on this matter in the future. If the area is of critical concern, do almost 300,000 lbs of toxic batteries belong there?

DEIR-17 p.1-9 *If the automatic fire suppression system is ineffective at extinguishing the battery fire, first responders can pump water into the dry piped sprinkler system from the exterior of the enclosure if they determine that it is safe to do so. As a result of the dry piped sprinkler system, there is no need for first*

responders to open or enter the storage container to extinguish the fire. Additionally, the exterior of the battery enclosure should be sprayed with water for cooling purposes.

Lithium-ion batteries are notorious for exploding and for being difficult to extinguish. Fire suppression systems provide little benefit when an explosion occurs.

DEIR-18 p.1-9 *The Fire Department indicated that the proposed access road width and layout is adequate for emergency vehicles.*

Unfortunately the Norton Fire Department may not be familiar with the driving conditions of the Property and may not be aware of the fact the sand track roads turn to mud during certain times of the year and many large trucks have been immobilized in the bogs due to these conditions.

DEIR-19 p.1-9 *The Fire Department review focused on the inverter/battery storage area, as the solar panels themselves do not catch fire.*

The Proponent's claim regarding solar panels is false. Solar panels are notorious for catching fire and several examples were provided by RRSE to the MEPA Office on 1/28/20.

DEIR-20 p.1-9 *Gases emitted by a potential battery fire do not pose a threat to residences, the nearest of which is approximately 900 feet away.*

The Proponent has made another false claim. Documentation regarding the toxic gases released by lithium-ion battery explosions and fires was provided by RRSE to the MEPA Office on 1/28/20.

DEIR-21 p. 1-10 *…to help maintain the viability of the cranberry bogs at the Property by providing a stable and diversified revenue stream (through lease payments) to the farmer, to help the Town of Norton in its desire to be a Green Community, and to provide significant payment in lieu of taxes (PILOT) revenue to the Town.*

The Proponent continues a pattern of making inaccurate statements. There is insufficient evidence solar over cranberry bogs will help maintain the viability. However, there is evidence the Massachusetts Department of Agriculture anticipates solar to decrease crop yields. The Project has zero impact or effect on Norton's Green Community status. Furthermore, the "significant payment in lieu of taxes revenue to the Town" is actually less than a quarter of one percentage point (.18%) of the annual town budget.

DEIR-22 p. 1-10 *…,the Project must meet a minimum revenue requirement, which can only be achieved with the size of the Project as currently designed.*

This was the same language used by the Proponent in their previous documentation regarding the original and larger project.

DEIR-23 p. 1-10 *The proposed dual-use solar array that permits continued use of the Property as active cranberry bogs will extend the economic feasibility of maintaining land in active agricultural use for at least 20 years, and avoids what may otherwise potentially become an uneconomical, outdated land use that could succumb to other, less environmentally-beneficial development pressures.*

Another statement made without any evidence to support such a claim. There is insufficient evidence solar over cranberry bogs will help maintain the viability and the bogs were converted to organic crops which pay a higher market price.

DEIR-24 p. 1-11 *At the site visit with the Norton Fire Department, the Department indicated its preference to access the Site from the entrance at 210 Bay Road, and noted that the water supply available in the agricultural reservoir adjacent to the existing shed would be a helpful resource for firefighting.*

There would be no way to extinguish a fire from the solar panels or equipment area if the agricultural reservoir is frozen in the winter. There are no fire hydrants in the neighborhoods surrounding the bogs.

DEIR-25 p. 1-17 *The proximity of Area 1 to the agricultural reservoir also provides for the closest and most direct access to the water supply for firefighting purposes.*

Area 1 was confirmed by the Norton Planning Board and the abutters to be the problematic proposed location.

DEIR-26 p. 1-18 *While final geotechnical and structural engineering would be necessary to confirm the extent of impacts resulting from these alternative footings, appropriate assumptions have been made based on the Proponent's past experience, specifically to estimate the minimum impact that would result from these alternative approaches to the footings.*

Although it has been repeatedly requested by the Norton Conservation Commission, the Proponent has failed to submit geotechnical data over the past 21 months. Throughout this process the Proponent continues to make numerous mistruths and therefore assumptions should be scrutinized.

DEIR-27 p. 1-19 *With the proposed helical pile/I-beam pier supports, the farmer will be able to operate in between and underneath the rows of panels going in either a north/south or east/west direction.*

Another statement made by the Proponent with insufficient evidence to support such a claim. Cranberry experts disagree with the Proponent's

optimistic assumptions. Please see two peer reviews of Carver, MA plywood mockup.

DEIR-28 p. 1-26 *The Proponent notes that commenters on the ENF raised concerns regarding galvanized steel used in residential plumbing, which is not applicable to the Project.*

RRSE raised concerns over lead leaching from galvanized steel, especially when exposed to a wet and acidic environment. This concern was corroborated by Norton Conservation Commisson's peer reviewer and wetlands scientist Patrick Garner.

DEIR-29 p. 1-26 *The Proponent will continue the water quality monitoring which is currently undertaken by the landowner annually. This monitoring tests for 14 metals in compliance with the Massachusetts drinking water standards.*

The Proponent agreed to water testing of abutters' wells during the conservation and planning board hearings. At the conclusion of those hearings, the Proponent appealed the conditions and asked for the water quality monitoring to be removed.

DEIR-30 p. 1-32 *Furthermore, in Section 20.05(5)(k), the Regulations require that all projects with a capacity of 500 kW (0.5MW) or greater "must be co-located with an Energy Storage System that meets the eligibility requirements for an Energy Storage Adder…". The Project meets this requirement.*

These new battery regulations were not enacted until the summer of 2020. Initially, the battery storage systems were needed to improve financials and to circumvent the agricultural guideless of 2 MW AC. However, since battery storages systems are not allowed under Norton zoning bylaws, the Project cannot meet the requirement stated.

DEIR-31 p. 1-33 *As stated at 225 CMR 21.01: "The purpose of 225 CMR 21.00 is to establish a Clean Peak Energy Portfolio Standard to increase clean energy during the periods when Net Demand of electricity is the highest. Clean Peak Resources contribute to the Commonwealth's environmental protection goals concerning air emissions including, but not limited to, those required by the Global Warming Solutions Act, M.G.L. c. 21N, §§ 1-9, by displacing nonrenewable generating resources during Seasonal Peak Periods, while also having added benefits of reducing peak demand and system losses and increasing grid reliability."*

The Proponent conveniently left out the last sentence of 225 CMR 21.01 which states "Clean Peak Resources that participate in the CPS program pursuant to 225 CMR 21.00 <u>do so on a voluntary basis</u> but must comply with the terms and requirements of 225 CMR 21.00"

DEIR-32 p. 1-34 *The Proponent is committed to meeting MassDEP noise requirements, and will conduct a post-construction noise evaluation to confirm compliance.*

The abutters have requested a pre-construction baseline sound study numerous times, before the Project would be constructed, but the Proponent has refused.

DEIR-33 p. 1-35 *Quite simply, the OSRP was not drafted with projects such as this in mind.*

There are many good reasons for this such as implementing and achieving goals to preserve farmland, cranberry bogs, historical qualities, as well as to preserve recreational areas.

DEIR-34 p. 1-35 *The Project does not include design elements related to adequacy of infrastructure, but the proposed dual-use solar array will not increase demand on municipal services such as water or sewer or generate vehicular or pedestrian traffic outside the construction period.*

The Project will decrease home values, cause noise pollution, may contaminate abutters' private wells, may cause negative health effects from EMFs, and may cause damage to the environment, wildlife and homes nearby.

DEIR-35 p. 1-35 *The Project will allow the existing agricultural operation on the Property to continue, which is consistent with the goals of the OSRP.*

The Proponent has provided no evidence that solar over cranberry bogs will have any positive impact on the agricultural operation on the Property. See two peer reviews of Carver, MA mockup.

DEIR-36 p. 1-35 *"Goal 3: Prevent the loss of the rural, cultural, and historical qualities and assets of the Town," as "Objective d: Preserve the Bucklin Land, Balfour and Bay Rd cranberry bogs."*

The Project is in direct opposition of Goal 3 of the town's OSRP. The Project would be an eyesore for the abutters and travelers of Bay Rd. It would diminish the rural, cultural and historical qualities and assets of the Town. Furthermore, the Project brings a real and devastating risk to the cranberry bogs and surrounding homes. This Project is in direct opposition of the town's OSRP.

DEIR-37 p. 1-35 *Through the SMART program, the Property will continue to be used for active cranberry harvesting, thus preventing the loss of this asset.*

The Project itself may cause the loss of this asset. There is insufficient evidence cranberries can continue to survive and achieve commercial success under solar panels.

DEIR-38 p. 1-35 *As outlined elsewhere in this EIR, the Project will allow the landowner to continue active cranberry harvesting, thus protecting existing farmland.*

Another statement made by the Proponent without any supportive evidence. The Proponent has failed to provide any science that shows solar over cranberry bogs can be successful, or that cranberry harvesting equipment can even be successfully used under and between solar panels and the piers they sit on.

DEIR-39 p. 1-37 *Additionally, significant visual screening plantings in the form of mixed evergreens and deciduous trees and shrubs are included in the Project. These plantings includes numerous native specimens in RFA and BLSF that will provide wildlife habitat in addition to visual screening. The screening will also buffer potential noise from the Project. Although existing vegetation will provide screening of the proposed solar array, the Applicant has undertaken a significant effort to provide additional screening based on feedback from the Planning Board, the Director of Planning & Economic Development, as well as certain abutters.*

The Project includes an insignificant amount of visual screening plantings. The Norton Planning Board requested additional screening plantings than what NextSun has proposed for the Fairlee Lane abutters, however NextSun has refused. Furthermore, NextSun informed the Planning Board during the August 6, 2019 public hearing visual screening plantings would be provided along Bay Rd, located on the Polillio Sand & Gravel Corp (Polillio) property, and presented a letter of intent to enter into a Purchase and Landscaping Agreement with Polillio. Conveniently, four days later and after the public hearing was now closed, NextSun terminated the Purchase and Landscaping Agreement with Polillio. Beals + Thomas/NextSun have failed to provide the dampening efficacy of the proposed plantings. In addition, a representative from Beals + Thomas informed the Norton Planning Board it would take 10-15 years for the screening to mature to full height, or 50%-75% into the life of the project.

DEIR-40 p. 4-4 *The project is located in a state designated inland Area of Critical Environmental Concern (ACEC) – why was the state's Ecology and ACEC Program not copied on the document circulation list, and will they now be given adequate time to review the proposal? The comments of the EPA and the Ecology and ACEC Program Director must be considered before any final plans are developed.*

The Massachusetts Department of Conservation and Recreation Ecology & ACEC Program is not included in the filing and circulation requirements at

301 CMR 11.16(2), nor is it on the Distribution List included with the online instructions for filing an ENF.

The Proponent failed to answer SRPEDD's question. Even if these agencies aren't on the official circulation list, the Proponent should still make a good faith effort and submit the Project proposal to these agencies. Again, what is the purpose of designating land an area of critical environmental concern if there are no safeguards in place to review potential development within it? What is the purpose of the state having an Ecology and ACEC Program if Proponents can arbitrarily decide not to alert them to potential development?

DEIR-41 p. 4-7 *The Project does not contain useable open space in the form of recreation areas open to the public, but will maintain the existing open space associated with the cranberry farm.*

As previously mentioned the owner of the Property, Fred Bottomley, has recently and repeatedly posted on public social media pages, inviting the public to enjoy the Property for recreational purposes. The Property generates a significant amount of traffic due to its advertised recreational resources. The public frequents the bogs to walk, jog, walk their dogs, ride dirt bikes/ATVs, and fish. Abutters to the Bog property have also confirmed on social media, ATV enthusiasts use the bog frequently.

DEIR-42 p. 4-11 *Use of galvanized steel piles will not affected groundwater quality, as described in Section 1.5.2.*

The Proponent admitted in their March 2019 letter to the Norton Conservation Commission, negative impacts from the Project to nearby residential wells is unknown. If they had confidence with regard to the water quality of the abutters' wells, why would they appeal the Planning Board and Conservation Commission's conditions of water contaminant testing?

DEIR-43 p. 4-13 *In the unlikely event of a fire, NextSun would encourage the Department to take all reasonable measures to extinguish the fire as rapidly as possible.*

It was Adam Schumaker, VP of Development for NextSun, who stated at a February 5, 2019 Norton Planning Board hearing, the typical firefighting protocol for solar panel fires is to "let it burn."

DEIR-44 p. 4-15 *Generally speaking and as discussed during the Conservation Commission hearings, groundwater flows in the direction of surficial topography.*

As discussed during the Conservation Commission hearings, Norton's peer reviewer and wetlands scientist Patrick Garner confirmed the piles could change the direction of groundwater flow.

DEIR-45
Stormwater Management Report p. 1-1

The Project is situated on a 15±-acre portion (the Site) of the larger 182± acre Property.

As described in all other documentation submitted by the Proponent, including their Amended Application for Site Plan and Special Permit, "The 2 MW AC (3.9 MW DC) dual-use solar array will occupy approximately 23.3 acres within active upland cranberry bogs."

DEIR-46
Stormwater Management Report p. 1-1

Runoff from the Site generally remains onsite and infiltrates within the cranberry bogs, reservoirs, and Mulberry Brook.

This claim is likely false, as shown by the fact the town of Norton has an issue with invasive weeds in Winnecunnet Pond. Mulberry Meadow Brook, located in the Bay Rd cranberry bogs, feeds directly into Winnecunnett Pond. The fertilizers used on the Bay Rd cranberry bogs travel south via Mulberry Meadow Brook to Winnecunnet, contributing to the overgrowth of weeds.

DEIR-47
Stormwater Management Report p. 3-1

Upon completion of the work the area will be stabilized and no negative impacts to environmental resources will occur.

The Proponent has failed to provide any evidence the Project would not cause any negative impacts to the cranberries, the groundwater, the aquifer, nearby private wells, residents' health and safety, and wildlife.

DEIR-48
Stormwater Management Report p. 125 of DEIR

"As the future site owner, I will ultimately be responsible for implementing the Long Term Pollution Prevention Plan." Signed by Adam Schumaker

Interestingly, Adam Schumaker, VP of Development for NextSun, has officially stated in this document he will be the future site owner, yet he previously informed the Norton Planning Board, Norton Conservation Commission, MEPA Office and Land Court, he will only be a lessee.

The proposed project is a first of its kind in the country. One must turn to science to find answers as to what impacts will occur from this project. Further studies of the site and project are needed. Due to the uniqueness of the proposal, there is limited science to review, however

the science that has been published, clearly shows the negative impacts solar installations can have on animals and the environment. While we disagree with the town of Norton Conservation Commission's approval of the project, the order of conditions for this proposed project should be stronger than typically applied due to the risks to the environment, and the serious concerns regarding impact to the Canoe River Aquifer, the ACEC, well protection zone and floodplain district. The proposed project cannot mitigate the risks of potential environmental damage and negative impacts to the population and neighborhood from an unproven 20 to 40 year experiment.

All governing agencies must exercise the precautionary principal when reviewing this project. The proposed project area is of utmost concern, due to its critical sensitivity. What is the purpose of designating an area as an ACEC if state and local agencies won't enforce the protections that accompany that designation? While we are hopeful that solar energy will offer a better future for the people of Massachusetts, clearly, this is the wrong project on the wrong site.

Sincerely,

Kelly Gallagher

Kelly Gallagher
201 Bay Road

Norton Abutters and Residents for Responsible Solar Energy

Charles Gallagher	201 Bay Road	Merideth Falconer	11 Fuller
Dr Pat Nazarian	9 Fuller Drive	Brian Falconer	11 Fuller
Deborah Knopf	5 Fuller Dr	Kenneth Knopf	5 Fuller Dr
Michael Wagner	211 Bay Road	Mark Mobilia	1 Fuller Dr
Ryan Sherman	222 Bay Road	Markcaya Mobilia	1 Fuller Dr
Jessica Sherman	222 Bay Road	Diane Callahan	4 Karol Dr
Linda Sweeney	6 Stone Run Dr	Steven Stem	13 Fuller Dr
John Sweeney	6 Stone Run Dr	Kathleen Stem	13 Fuller Dr
George Arvanitidis	207 Bay Road	Tracy Poliseno	7 Fairlee Lane
Gina Arvanitidis	2Q7 Bay Road	Chris Poliseno	7 Fairlee Lane
Joel Johnson	208 Bay Road	Heather Hay	18 Fairlee Ln
Marianne Johnson	208 Bay Road	Loren Carbone	1 Fairlee Lane
Joseph Cogliano	202 Bay Road	Alex Carbone	1 Fairlee Lane
Tony Medeiros Jr	108 Bay Road	Mireilla Farhat	10 Fairlee Ln
Aimee Medeiros	108 Bay Road	Jill Sirtoli	9 Fairlee Ln
Joseph Sirtoli Jr.	9 Fairlee Ln	Louise Horgan	213 Bay Rd
Cheryl Bowden	130 Bay Road	Jean Sirtoli	11 Fairlee Ln
Jeff Bowden	130 BayRoad	Joseph Sirtoli	11 Fairlee Ln
Rachel Salomon	134 Bay Road	John Willard	561 Bay Road
Sanjay Solomon	134 Bay Road	Adam Crossman	120 Bay Rd

Julie Crossman	120 Bay Rd	Michelle Godin	4 Fairlee Ln
Maureen Willard	561 Bay Road	Molly Jacques	6 Fairlee Ln
Scott Godin	4 Fairlee Lane	MJ Ryan	14 Fairlee Ln
Kyle Jacques	6 Fairlee Lane	Roz Zevola	14 Fairlee Ln
Jeanine Simmons	15 Massasoit Ave		

cc by email: purvi.patel@mass.gov;
gary.makuch@state.ma.us;
jcarlino@nortonmaus.com

NextSun Energy

NextSunEnergy.com

Solar Solutions For Generations

August 10, 2019

RE: Termination of Letter of Intent

Dear Mr. Polillio,

On March 26, 2019, NextSun Energy LLC ("NextSun"), a New York limited liability company with a principal place of business at 97 Main Street, E206, Edwards, CO 81632 and Polillio Sand & Gravel Corp ("Owner") executed a Letter of Intent (LOI) to enter into a Purchase and Landscaping Agreement pertaining to your land along Bay Rd in Norton, MA, known as Norton Tax Assessor Parcel ID 6-64-0 (the "Property"). Given changes to the proposed solar project NextSun is planning on the abutting Fairland Farm property, the Purchase and Landscaping Agreement with Polillio Sand & Gravel Corp is no longer necessary. We appreciate you working with us on this and hereby agree to terminate the LOI and release Polillio Sand & Gravel of any obligations under the LOI.

Agreement:

(a) NextSun and Owner agree to terminate the Letter of Intent executed on March 26, 2019;

(b) NextSun and Owner shall have no further obligations under the Letter of Intent; and

(c) NextSun and Owner agree to waive any and all past or future claims against one another relating to the Letter of Intent.

Acknowledged and agreed:

Polillio Sand & Gravel Corp	**NextSun Energy LLC**
By: [signature] 8/15/19	By: [signature]
Name: Daniel polillio, President	Name: Adam Schumaker
Title:	Title: VP, Development
Date:	Date: 8/16/19

NextSun Energy LLC | 97 Main Street, E206, Edwards, CO 81632 |
PO Box 974
T: 1.970.569.2005 | Fax 617.440.7554 |
NextSunEnergy.com

Fred Bottomley
March 23

Fairland Farm, 210 Bay Rd, Norton is open for anyone that wants to take their walks. We have over 6 miles of bog dike roads. Park at the gate and enjoy our own Nature Preserve. Anyone asks say Fred Bottomley sent us.

48 12 Comments 6 Shares

Like Comment Share

Robin Therrien How nice of you !!
Like · Reply · 26w

Anna Collins Congratulations, Fred.....great project, great offering.
Like · Reply · 26w

Suzanne Elizabeth Thank you. So thoughtful.
Like · Reply · 26w

Kevin Willis A great offer in these difficult times,thanks Fred.
Like · Reply · 26w

Jen White Charles Ty so much
Like · Reply · 26w

Anne MacDougal Carine Thank you!
Like · Reply · 26w

Leslie Raucci Awesome
Like · Reply · 26w

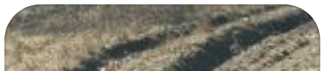
Leslie Raucci Spent alot of time there. I need to revisit.
Like · Reply · 26w

Kerry Ann Please make sure everyone picks up after their dogs
Like · Reply · 25w

Janet Barros Kerry.....was that message from you the other day???
Like · Reply · 25w

Danielle Bellavance Thank you so much!
Like · Reply · 25w

Danielle Bellavance



Like · Reply · 25w

Write a comment...

;

Fred Bottomley
March 23

Mother In Laws are welcome. My 265 acre Nature Preserve is now Open for all walkers including those with dogs. Spouses, Kids, pets and Yes Mother In Laws are welcomed to come to my cranberry bogs at 210 Bay Road, Norton.
Enjoy over 6 miles of bog dike roads for runners and walkers alike.
Get out of the house, exercise and enjoy our NATURE.
Just say Fred sent us.

123 45 Comments 15 Shares

Like Comment Share

Kate Bellavance WOW! Very nice of you, Fred. (Kathy Berg).
Like · Reply · 26w

Fred Bottomley Author Kate Bellavance thank you. I hope everyone comes and uses our site Especially while being in Nature is the best activity that we can do
Like · Reply · 26w 1

Leslie Raucci Fred Bottomley spent alot of time there. Now my son lives nearby. Was telling them about this place. Thats so Awesome .
Like · Reply · 26w

Rhonda Czerwonka Thank you.
Like · Reply · 26w

Judy A. Barr Thank you
Like · Reply · 26w

Timothy Thomas Fred love to take stroll on the grounds but it's a bit of a drive.
Like · Reply · 26w

Leslie Raucci I spent alot of time there. Thats Awesome
Like · Reply · 26w

Fred Bottomley Author Tim, next time you are back home you are more than welcome to come over
Like · Reply · 26w

Patti A. Gill-Morrissey Thanks Fred!
Like · Reply · 26w

Jill Sheridan So nice!!!

Like · Reply · 26w

Fred Bottomley Author Patti Morrisey just a short stroll down the road. Come visit

Like · Reply · 26w

Randal MacCaffrie Thanks Fred would love to explore that area

Like · Reply · 26w

Debbie Conley I spent so much time in the bogs growing up. It a great spot to spend some time.

Like · Reply · 26w

Diane Dumont Rogers Ty

Like · Reply · 26w

Judith Karen Rubin Matana And will people stay 6 ft apart? The question is whether this is a great idea for folks to get out...or does increase community spread?

Like · Reply · 26w

Fred Bottomley Author Judith Karen Rubin Matana with so much land available and over 6 miles of walking roads people I am sure can stay more than 6 ft apart especially out in Nature

Like · Reply · 26w 5

Andrea Bianchini Berlo What a very nice gesture in these unusual times. Thank you!

Like · Reply · 26w

Dawn Fitzgerald Thank you for sharing your piece of nature!

Like · Reply · 26w

Rachel Yorke Kearney Thank you!!

Like · Reply · 26w

Kerry Ann Thank you!

Like · Reply · 26w

Donna Brown You
are awsome

Like · Reply · 26w

Allison Murrey Chancey Thank you

Like · Reply · 26w

Christine Marie Thank you, that is so nice of you!

Like · Reply · 26w

Dayle Mann Carroll Thank you!!

Like · Reply · 26w

Anne Teixeira Ferioli That is such a nice gesture, Thank You!

Like · Reply · 26w

Denise O'Neill Thank you

Like · Reply · 26w

Stacey May Wow!! Thank you!!

Like · Reply · 26w

Frank Ritz Very nice Thank you

Like · Reply · 26w

Darlene MacDonald Ronn Thank you and I will go someday

Like · Reply · 25w

Naomi Rodrigues Can horses go there ?

Like · Reply · 25w

Cherrie Carine !

Like · Reply · 25w

Cherrie Carine In my youth my friends and I would spend hours riding the horses there. Even would swim at the dam in Summer (leaches!). Sandy open paths were the best. Horses loved it there We could go through the woods on Burt St. (my home) and be at the bogs in 5 min Fun times They stopped us from riding there anymore when they started spraying chemicals on the Cranberries !!!

Like · Reply · 25w · Edited

Fred Bottomley **Author** Sorry. We are now Organic and have been for years you are welcome to come over.
Fred

Like · Reply · 25w · Edited

Kate Bellavance

Like · Reply · 25w

Kate Bellavance "Mothers' in law!" Grace Kiernan ! ! ! Just saying! Thank you for sharing

Like · Reply · 25w

Kate Bellavance

Like · Reply · 25w

Fred Bottomley **Author** Kate Bellavance do I know you ? Mentioning a Grace Kieran brings back so much hard English work

Like · Reply · 25w 2

Kate Bellavance Fred Bottomley Kathy Berg! Class of '72!

Like · Reply · 25w

Fred Bottomley **Author** Kate Bellavance a youth to this guy from “67”

Like · Reply · 25w 1

Kate Bellavance Fred Bottomley ya! But, I remember you. I think because I was a social butterfly! New Nancy Inman ,Doug Caswell, Tim McEndy , Mary LaComb, Mary Fran McEndy, Mike Gonsalves, The Sergeant bros. On & on & on!

Like · Reply · 25w

Kate Bellavance Grew up in Peter St.

Like · Reply · 25w

Fred Bottomley **Author** Kate Bellavance , Berniers on the Corner and Caswell at the end. Knew that street very well. You were too young for me to date so I don’t have to offer any apologies. LOL

Like · Reply · 25w 1

Fred Bottomley **Author** Kate Bellavance where do you live now?

Like · Reply · 25w

Kate Bellavance Corner Power & So. Worcester. Loved the neighborhood, I guess! Little single family cedar shake house tucked behind a white house. Next door to Mrs. Jesse LaMarce ...big Victorian on the corner.

Like · Reply · 25w

Fred Bottomley **Author** Kate Bellavance I know the house well.

Like · Reply · 25w 1

Write a reply...

Write a comment...

Fred Bottomley
March 24

Fishermen and Fisherwomen bring your shiners and lures. Of course please bring you kids. Our ponds and rivers are open to all for fishing. Fairland Farm , 219 Bay Road, Norton welcomes you. Fred Bottomley says it is not about catching the fish but in these times it is about Patience. Please enjoy what we have to offer for you and your family.

34 6 Comments 2 Shares

Like Comment Share

Leslie Raucci Great place. A lot of memories there. Hoping to return.

Like · Reply · 25w

MaryJane Dion Laprise Thank you very nice of you.

1

Like · Reply · 25w

Beth Wry Thanks

Like · Reply · 25w

Elizabeth Reilly Dahl Jason Dahl

1

Like · Reply · 25w

Kelly Rei i used to love fishing there back in the 80s and 90s in the hottest days of summer if its the place i"m thinkin about . ! dream about it all the time . saw the biggest bird i"ve ever seen in my life there one day . wing span was easily 10 feet acr… See More

Like · Reply · 25w · Edited

Anthony Defilippo Great fishing there. Plenty of large mouth bass pickerel perch you can even see otters playing in the rivers and ponds

Like · Reply · 25w

Write a comment...

;

Fred Bottomley
April 28

Dave Lennon and his boys fishing at the Norton Cranberry Bogs. Great catch and a release. Glad I could let them use the property.

71 49 Comments 4 Shares

Like Comment Share

Dayle Mann Carroll Gorgeous fish
Like · Reply · 20w 1

Dave Lennon Thanks Fred for opening up the farm!
Like · Reply · 20w

Leslie Raucci Awesome
Like · Reply · 20w 1

Leslie Raucci Spent alot of time there many years back. Now my son lives nearby and my grandchildren.
Like · Reply · 20w

Fred Bottomley **Author** Leslie Raucci take a walk over there
Like · Reply · 20w 1

Leslie Raucci Fred Bottomley yes I definately will!! Thank you!!
Like · Reply · 20w

Penny Watters Fred Bottomley where about can we park ? I used to go there as a kid but don't remember

Like · Reply · 20w

View 2 more replies

Chanan McIntyre I was fishing there before it became the Cranberry Bogs. I love to take my family there

Like · Reply · 20w 1

Dayle Mann Carroll Chanan LaCombe me too

Like · Reply · 20w 1

Dan Gefis I used to fish there in the early 70's. My uncle worked at Harco Orchards which if I remember correctly is just down the street. As kids we'd play at King Phillips Cave and then go through the woods to the bogs. Good times.

Like · Reply · 20w 1

Linda Gefis Dan Gefis yup. Me too. Loved the caves. I twisted my ankle there by jumping from the top of one rock to another. Couldn't walk for three days. Still had to go to school!

Like · Reply · 20w

Dan Gefis Fred- what is the bog now? Still getting cranberries? Do you own or manage that area?

Like · Reply · 20w

Fred Bottomley **Author** Dan Gefis you are welcomed back anytime. Remembering the good times of ones youth is the benefit of getting old.

Like · Reply · 20w 2

Fred Bottomley **Author** I bought it years ago and switched to organic cranberries. A great hobby for this 71 yr old

Like · Reply · 20w 2

Dan Gefis When I lived in Lake Winnecunnet as kid, the beach would be covered in cranberries that came down the river after the bogs were flooded.

Like · Reply · 20w

Dayle Mann Carroll Dan Gefis did you live on Charlotte Ave?

Like · Reply · 20w

Dan Gefis Dayle Mann Carroll I did. Do I know you?

Like · Reply · 20w

View 19 more replies

Frank Lopes Hi dan I worked

With u at Kmart years ago mechanic

Like · Reply · 20w

Dan Gefis Frank Lopes did we call you Frankie? D if d you have a fumanchu mustache?

Like · Reply · 20w

Frank Lopes Yes lol David houle worked too with us

Like · Reply · 20w

View 2 more replies

Anthony Defilippo Love fishing the river end that goes to winniecunnet great bass fishing

Like · Reply · 20w

Anthony Defilippo 12 shiners 12 bass simple as that you can even see otters playing

Like · Reply · 20w

Diane Marie I use to swim there years ago .
I grew up on Burt st we use to walk there all the time..

Like · Reply · 20w

Sean Dooley Fred, thanks for opening up your land. Where should we park. I'd like to take my son fishing.

Like · Reply · 20w

Fred Bottomley **Author** Outside the gate at the street

Like · Reply · 20w

Sean Dooley Thank you

Like · Reply · 18w

Write a comment...

;

Jessica Carbone Sherman
September 10

Ok so I don't want to be this person but my husband and I don't know what else to do... if anyone lives on or around cranberry lane and has a child who rides a dirt bike or 4 wheeler please ask them to stop cutting through my property to access the cranberry bogs. We have kindly asked a few kids to stop, tried blocking access but they are now moving everything to be able to drive through. Tire marks are now ruining our grass and we have a small child and a dog who play outside a lot. We do not want to bother the police with this but do not know what else to do.

14 31 Comments

Like Comment

Katie Harpel Johnson Wow. That's not right.

Like · Reply · 1w 2

Nicole St John Rip Wait for them confront them ask them nicely stop coming on to your property, with there toys tell them go play in your own yard, or you could follow them to there house and talk to the parents

Like · Reply · 1w · Edited

Nicole St John Rip If it were me I'd talk to the parents set them straight

Like · Reply · 1w

Jessica Carbone Sherman Author Nicole St John Rip we've tried to stop them before but they just drive right past us! It's a group of 4-5 teenage boys. It looks like today must have happened while we were at work

Like · Reply · 1w 1

Nicole St John Rip Jessica Carbone Sherman that's so disrespectful

Like · Reply · 1w 1

Write a reply...

Jessica Carbone Sherman Author We also recently had an older couple ride their bikes through while I was having a cookout with my family outside... very strange!!

Like · Reply · 1w 1

Brandy Chambers Jessica Carbone Sherman I can pretty much guarantee that couple were these kids' parents and so unfortunately reaching out to them isn't likely to do much good. You're going to have to reach out to the PD (or fence your yard in).

Like · Reply · 1w

Paula Werkowski Taylor Make sure you put up no trespassing signs and maybe also put in a trail camera to capture who these kids are. I would also call the non emergency line at the police to let them know the problem your having. They may also have some ideas.

Like · Reply · 1w 5

Jenny Rose Put up a sign!

Like · Reply · 1w

Jen Suchocki Put up a no trespassing sign and call the EPA. But also we had this issue, talked to the kid, and then his dad walked him over to our house to apologize and talk about it. Hasn't happened since.

Like · Reply · 1w

Jeanne Behen It's ok to be "that person" when they are "those people".

Like · Reply · 1w 15

Teddy Harding Jeanne Behen No it's not? It's dangerous and not appropriate

Like · Reply · 1w

Jeanne Behen Teddy Harding I believe you misunderstood. The opening sentence said she didn't want to that person (ie: complaining and maybe having to go to the police). My statement was merely saying it's ok to do that since those kids clearly don't respect her property or her request. Not sure what you think I was talking about????

Like · Reply · 1w

Teddy Harding Jeanne Behen Got it, I thought you were saying the opposite
I agree with you

Like · Reply · 1w 1

Write a reply...

Teddy Harding Try an animal camera, it captures movement. Then you can take images to police, file a personal property damage report, submit police report and claim to your home owners insurance
Your home owner insurance will handle the rest and seek monetary damages. You would be amazed when it hits their wallet, raise their homeowners insurance how quickly they will stop

Like · Reply · 1w 6

Amy Berteletti Hi. I live in the neighborhood and yes the kids on atv/dirt bikes has been a little out of control and the neighborhood in general is done w it. I would call the EPD and discuss your options w them. Hoping their moms on this page and deal w it personally before the neighborhood does.

Like · Reply · 1w 3

Jessica Carbone Sherman Author Amy Berteletti yesss so glad it's not just us that are over it but sorry the neighborhood is dealing with it as well!

Like · Reply · 1w

Ashlee Brie Barb wire works great

Like · Reply · 1w 1

Stephanie Teebagy North please don't do this. This is no different than the risks described above with spike strips.

Like · Reply · 1w 2

Ashlee Brie Stephanie Teebagy North its not at all the same if you use it properly & obviously block the access again, they can move stuff but won't be able to take the wire down without cutters.

Like · Reply · 1w

Stephanie Teebagy North Ashlee Brie would suggest you consult a lawyer or at least google it. It's the same- if someone is injured, the homeowner could be liable.

Like · Reply · 1w

Write a reply...

Jessica Carbone Sherman Author Thanks everyone! The problem with blocking it off to much is we walk our dog down there twice a day and our daughter loves the play but a camera and sign sounds like a great place to start

Like · Reply · 1w 2

Paula Werkowski Taylor Along with no trespassing signs you can always add a sign that says 'Smile as you trespass!! It will help the police'. Be sure to hide the camera.

Like · Reply · 1w 1

Stacy Lee Murphy I am almost positive it's not even "legal " to ride anywhere in Easton. Maybe they're coming from the trails on Bay road coming from Taunton area? Either way I would call the police and ask them- My son has a quad but we take him to a town that allows them with trails and my husband rides with him but yeah, they need to be told not to be in the area because its not only annoying / RUDE to property owners but may result in a fine.

Like · Reply · 1w · Edited 1

Keena Botelho Howarth Stacy Lee Murphy where do you take them? We just don't one and are looking into places they can go.

Like · Reply · 1w

Stacy Lee Murphy Wrentham State Forest; and Franklin State Forest . Also -they are required to complete an approved OHV safety course and carry the Massachusetts OHV Safety Certificate when riding on public lands. If the rider is under 16, the safety course includes one mandatory session to be attended by the rider's parent or guardian. They have classes for this at the old Raynham dog track, well they did before Covid ..

Like · Reply · 1w 1

Lisa McGonagle Olsen Try to figure out who the parents are and speak to them.
I'm a little horrified that anyone on a "moms" page would suggest things that could hurt these kids. I get it that the bikes can be annoying but remember they're still kids. Hurting anyone is never the solution.

Like · Reply · 1w 1

Gayle Marshall More often than not it is adults not kids. Having a problem with them in our hayfields

Like · Reply · 1w 1

Kim Gould Im going to be that mom that says I know they are loud and the destruction of property should not be happening but would rather them out riding then sitting in on the TV . Growing up there were places to ride now with all the new neighborhoods it taken… See More

Like · Reply · 1w 3

Cari Medina-Rivera Call the police

Like · Reply · 1w

Melissa Stafford I could be wrong but wouldn't you be held liable if one of them falls off their ATV or crashes while on your property? I'd put up signs and contact the police. I get that it's good kids are doing something outdoors but they are trespassing-

Like · Reply · 1w

Write a comment...

Teryl R. Roper, Professor
Dept. of Plants, Soils, and Climate
Utah State University
4820 Old Main Hill
Logan, UT 84322-4820

February 23, 2020

Joseph Cogliano
202 Bay Road
Norton, MA 02766

Re: SMART Program ASTGU Guideline and UMass Carver Experiment

Dear Mr. Cogliano:

I have reviewed the documents you provided via e-mail as listed below:

- 10-17-19 letter from UMass Extension to MDAR (Mass Dept of Ag Resources) regarding the Carver plywood study used to evaluate shading over cranberries.
- 10-21-19 letter from MDAR to DOER (Dept of Energy Resources) regarding the Carver data and the proposed solar development over cranberry bogs in Norton MA.
- 11-13-19 predetermination letter from DOER to NextSun Energy claiming that largely based on the UMass data from the Carver study the Fairland Farm, Norton project "…likely satisfies all criteria set forth in 225 CMR 20.00 to be considered an ASTGU."
- 5-19 UMass Extension fact sheet: Expectations for Cranberry Growth and Productivity under Solar (Photovoltaic) Panels.
- 9-16-2019 predetermination letter denial from Eric Steltzer, DOER to Adam Schumaker of NextSun Energy.
- 10-3-19 email stream between Adam Schumaker and Kaitlin Kelly, DOER regarding summary of revised calculations for Fairland Farm.
- 10-10-19 email stream between Adam Schumaker and Kaitlin Kelly, DOER regarding PAR data spreadsheet.
- 4-26-18 Solar Massachusetts Renewable Target Program: Guideline
- PAR data (July 2019 thru Sept 2019) from NextSun Energy to DOER.
- Norton Shading Calculation data from NextSun Energy to DOER.

Based on the documents I was provided, it appears that for a solar project to qualify to be an Agricultural Solar Tariff Generation Unit, the project must meet each of six criteria. I will comment on the criteria by number.

1. The Solar Tariff Generation Unit will not interfere with the continued use of the land beneath the canopy for agricultural purposes;

   I have not seen complete data from the Carver experiment that speaks to this point for cranberries. The Carver data to date is inadequate to answer this question due to inadequate methodology, lack of sufficient duration of the study and other limitations. A well-funded, well planned three to five-year study would be needed to properly answer whether or not solar collectors over cranberries can meet these criteria.

   For example, the Carver mock-up has more posts than would likely be found in a commercial installation. I would think that the landowner and NextSun Energy would need to show that farm implements can be driven under the installation and that the span between posts is not a hindrance to normal production and harvest activities, including retrieving full bins of harvested fruit by helicopter or by other means. Further, if these properties are normally flooded in the winter the post structures would need to be shown to be able to withstand the potential pressure exerted by the movement of ice during the coldest winter months. Photos and/or video data would need to demonstrate that sufficient clearance is present.

2. The Solar Tariff Generation Unit is designed to optimize a balance between the generation of electricity and the agricultural productive capacity of the soils beneath;

   Although the Carver study was intended to address this question, thus far, it has failed to do so. As reported to date, that study has significant limitations. First, it was begun too late in the season in 2019. The fruit comprising the 2019 crop were already set when shading began. The mock-up is not large enough to prevent indirect solar radiation from coming in from the sides. Apparently, samples for yield data were collected, but have not yet been reported. One would expect the 2019 crop to be unaffected. The full results will be known when shading has reduced light at bud induction, fruit set, and fruit coloring periods over a multi-year period.

   The general principle of agricultural plant productivity is that yield is commensurate with light captured. The critical light measurement is not the instantaneous Photosynthetic Photon Flux Density (PPFD) that is reported by light sensors. This is only a 'flow rate'. What is important is the Daily Light Integral, usually reported as moles of photons m^{-2} day^{-1}. This relates to the total photosynthetic light energy striking a given land area. This should be the basis of decision making about shading, not the instantaneous flux measurements.

   This criterion also assumes that shading has a uniform effect throughout a growing season. We know this is not true for cranberries. Shading during the fruit set period reduced fruit set in two of three years in Wisconsin (Roper et al, 1995). However, in this

study each year shading was imposed in new locations, not repeatedly in the same location as would be true of solar panels. I am not aware of data showing the results of multi-year shading on the same land area for cranberries. Our short-term shading always reduced the carbohydrate concentration in the shaded vines, but carbohydrates recovered after a few weeks of normal illumination. It is not clear what would happen following long-term shading, but it seems likely that the carbon resources of the plants would decline over time.

This criterion rests solely on productivity. That may be too narrow of a consideration for cranberries. In fruit crops, profitability is not solely equal to productivity. Fruit quality measured as fruit size and color are also included. While yield may not be affected, if fruit size and color are reduced, profitability can be significantly reduced. Thus, profitability should be the criterion measured, not just productivity.

3. <u>The Solar Tariff Generation Unit is a raised structure allowing for continuous growth of crops underneath the solar photovoltaic modules, with height enough for labor and/or machinery as it relates to tilling, cultivating, soil amendments, harvesting, etc. and grazing animals;</u>

   My response to this criterion is the same as for number 1. Data may exist showing cranberry implements can operate under the canopy, but I have not seen them. However, this raises some other considerations. The Carver data suggests that temperatures may be warmer under the photovoltaic units than away from them. If that is true, then insect and disease pest growth will vary from fields with solar canopy installation to those without. Thus, pest scouting would have to be done separately. Applications of pest control measures would need to be done at different times in covered fields compared to uncovered fields. The need for irrigation may be different in covered fields than for non-covered fields. The need to irrigate for frost protection may be different in uncovered than for covered fields. Thus, the management of pests and soil moisture would, necessarily need to be done separately for covered and uncovered fields. This may not affect productivity, *per se*, but the extra management time would likely affect profitability.

4. <u>Crop(s) to be grown to be provided by the farmer or farm agronomist in conjunction with UMass Amherst agricultural extension services, including compatibility with the design of the agricultural solar system for such factors as crop selection, sunlight percentages, etc.</u>

   While it appears this work is underway, it is not yet complete. A well-done study to address the SMART program criteria for solar development over a perennial crop like cranberries will take at least three years to have data strength to be able to make predictions with confidence. A single year of work is simply insufficient for perennial crops. Further, UMass needs to be given sufficient funding to do this work. They need to engage an environmental biophysicist to help design the experiments and to correctly interpret the data.

5. Annual Reporting to the Department and MDAR of the productivity of the crop(s) and herd, including pounds harvested and/or grazed, herd size growth, success of the crop, potential changes, etc. shall be provided after project implementation and throughout the SMART incentive period;

   Most cranberry growers track yield by production unit: bog/field/bed. However, the data are pretty crude, usually begun as truckloads or bins and knowing the approximate capacity of a truck or bin. The guidance letter gives little direction as to how yield data is to be collected and reported. Will MDAR simply trust producers to report the production per land area of covered and uncovered sites? How geographically proximal should covered and uncovered sites be? Will MDAR be present to verify the data? Will a trusted third party verify the results? Is weight of crop per unit area the only criterion? For cranberries, average fruit size and fruit color of covered and uncovered fields contribute significantly to grower returns, especially if the fruit are destined for fresh sales (as opposed to processing).

   Another question that the landowner may wish to consider is what penalty is assessed if yield is reduced under solar panels. Does the grower only lose the incentive for that year? Are they ineligible for future years? Would the panels have to be removed? Should a reduction in fruit quality of covered vs. uncovered fields be sufficient to lose the incentive? Who 'owns' this risk?

   Therefore, after a proper study is completed, the SMART program guidelines for solar panels over cranberries should be updated with specific parameters to answer these and other questions related to perennial crops.

6. Other system design information, ...

   I've not seen details of the design of the proposed solar system to be installed over cranberry fields. However, other potential problems here include the damage to the vines that will occur through construction as piers, posts, and crossbeams are installed. This will certainly involve driving heavy equipment through the fields. Damage to the vines will be extensive and will take years to recover—in a limited light environment.

The chief weakness of the guidelines for installing solar panels over agricultural lands is that it depends on maintaining 50% of the baseline photosynthetic photon flux, not the daily light integral that would be a measure of total photosynthetic light energy received by the crop canopy. The secondary weakness is that the guidelines deal only with gross yield and disregards crop quality considerations that are critical to profitability in a perennial fruit crop. Third, it is not clear who will determine yield/quality of the crop, what happens if crops actually are reduced subsequent to installation of the solar panel system, and who 'owns' the risk of crop yield declining over time?

Based on my review of the information provided, the SMART program guidelines and the limitations of the Carver experiment I conclude the following:

1. The Carver experiment, as reported to date, is inadequate to answer the questions required to determine if cranberries can be permanently and successfully farmed under solar panels. Properly designed and executed research conducted over three to five years is needed before being able to answer the fundamental questions of this matter.

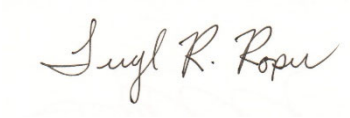
2. The DOER and MDAR should not rely on the current Carver data to determine if projects involving solar collectors over cranberries are eligible for or meet the criteria under the SMART program. In my opinion, the incomplete Carver study data does not support the claim in the 11-13-19 DOER letter that the Fairland Farm, Norton project "…likely satisfies all criteria set forth in 225 CMR 20.00 to be considered an ASTGU."

3. Projects involving large scale solar development over cranberry fields should not be undertaken in Massachusetts until a properly funded study (minimum of 3 to 5 years) has been completed, analyzed, and peer reviewed. Reasonably predictive outcomes are not possible with the current data.

4. The SMART program guidelines require further development and changes for perennial crops such as cranberries.

I hope this document will begin further discussion among the regulatory agencies involved so that good workable policies will be put in place to achieve the renewable energy goals of the Commonwealth of Massachusetts, while not reducing important agricultural productivity. In a separate document, I have outlined some elements of a proper experiment to address these important matters.

Cordially,



Teryl R. Roper, PhD

Literature cited:

Roper, T. R., J. Klueh, and M. Hagidimitriou. 1995. Shading timing and intensity influences fruit set and yield in cranberry. HortScience 30:525-527.

Teryl R. Roper, Professor
Dept. of Plants, Soils, and Climate
Utah State University
4820 Old Main Hill
Logan, UT 84322-4820

February 24, 2020

Joseph Cogliano
202 Bay Road
Norton, MA 02766

Re: A Study Involving Cranberry Growth and Productivity under Solar Panels

Dear Mr. Cogliano:

I was contacted by you in January 2020 to review research information and policy documents concerning placing solar panels over cranberry plantings in Massachusetts. As for my background, I am currently a Professor of Horticulture at Utah State University. I hold BS and MS degrees in Botany from Brigham Young University and a PhD in Horticulture from Washington State University. I worked as a Professor for 20 years at the University of Wisconsin-Madison. During those 20 years I worked extensively with the cranberry industry both in Wisconsin and across the country. I have published numerous peer reviewed papers dealing with cranberry productivity, especially regarding the physiology of cranberry yield. I left Wisconsin because Utah is home and to be closer to family.

I have reviewed the study regarding the effects of solar panels over cranberry fields that was recently begun by the University of Massachusetts Cranberry Experiment Station. From what I read, the study is incomplete and some data remain to be analyzed, interpreted, and reported. Further, their letter did not provide any data tables with statistical analysis to give an idea of the variability of their data. Clearly, this was a preliminary report. However, rather than critique this study, below I have outlined an experiment that would better answer the questions of whether cranberries can still be both productive and profitable if covered by solar panels. Research of this type needs to include an environmental biophysicist on the team to ensure the data are collected and interpreted correctly.

1. In order to be successful, the research needs to have devoted funding. If done well, the study can be estimated to cost more than-$150,000. This would include installation of solar panels or surrogates, instrumentation, collection of field data, data interpretation, and publication. The study will require a substantial amount of staff and scientist labor. The solar company and the landowner have the burden of proof to show a solar installation would not adversely affect an underlying crop. It is not reasonable to require or to expect scientists at the Massachusetts Cranberry Experiment Station to do quality work without sufficient funding.

2. The solar company and landowner should be responsible for installing a portion of the proposed solar collection system. This would include the posts, piers, crossbeams, wiring, connections, and panels. The model should replicate as closely as possible what would eventually be installed, should commercial solar collectors over cranberries be shown to work effectively as planned. The mockup should be extensive, comprising perhaps an acre. Perhaps old non-functional panels could be used as this would be as close to 'real world' as possible. If the ultimate installation is to be solar tracking, it would be best if this feature could be installed in the trial. This would also demonstrate the construction that would need to take place during installation. The experiment should be done in at least three locations in southeastern Massachusetts. Replication is essential to data interpretation.

3. Instrumentation: Quantum sensors (measuring light between 400 and 700 nm) should be installed to measure light incident on the cranberry canopy. Point sensors would be acceptable, but line sensors would be preferred. Four to six sensors should be placed in a grid pattern under the solar panels with the top of the sensors at the top of the canopy. These should be near the middle of the installation to avoid 'leakage' of diffuse light from outside away from the panels. Thermocouples or thermistors should be placed near each light sensor. An identical array of light and temperature sensors should be placed well away from the solar panel installation where the panels would not provide shade, probably on an adjacent field. Data would be collected by a datalogger and could be transmitted via cell modem or through regular downloads to a laptop. The light incident on the sensors should be summed daily to determine the total solar radiation between 400 and 700 nm incident on the area under the solar panels and in the nearby unshaded area (daily light integral) through at least three complete growing seasons. This is reported as moles of photons m^{-2} d^{-1}. Then a regression is made comparing daily light integral with yield of shaded and unshaded areas.

4. Each year in the spring, eight individual square foot areas will be identified under the solar panels and not under the solar panels at each site. In the fall just before regular harvest, the uprights from within each square foot will be cut and taken to a laboratory for measurement. For each square foot sample, the following data will be collected: total number of uprights, number of fruiting uprights, number of fruit per fruiting upright, total fruit number, total fruit weight, and length of new growth per upright. A subsample of fruit will be analyzed for total anthocyanins. Data from this analysis will be subjected to analysis of variance to see if growth and fruiting vary between shaded and unshaded locations at each of the three sites. This is the most important part of the project.

5. Collection of the data in points three and four should continue for at least three years. We would not expect to see differences in year one. The year-one crop is produced as a result of buds that were produced the prior year. If differences are found, they would be found in years two or three and beyond.

6. The landowner will need to demonstrate, with video cameras recording the efforts, that farm implements can be operated under the panels. This would include fertilizer

applicators, pest control equipment, irrigation equipment, and harvest equipment. The time recorded to navigate posts should be noted compared to uncovered areas.

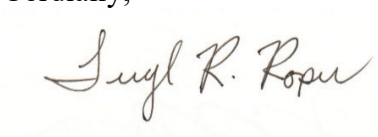
I would note a couple of concerns about how the data are interpreted. For the light measurements, the important information is not the light striking the canopy at a given point, it is the summation or integration of the total light incident over time (daily light integral). In every other temperate fruit crop with which I am familiar, yield per acre is nearly linearly related to light captured by the crop canopy. If light incident on the crop is reduced, reductions in yield will almost surely follow. Further, the time of shading is also important. The most critical time for shading to reduce yield is in the immediate post-bloom period. This is when fruit are set. Unfortunately, the 2019 Carver study did not impose shading until July. By that time fruit set had already occurred. Thus, no impact on yield by shading would have been expected for 2019.

Another question that could be asked is whether the newest hybrid cultivars from New Jersey respond the same to prolonged shading as older cultivars such as Ben Lear, Early Black, and Howes, or older hybrids like Stevens.

Based on my research and years of experience with the cranberry industry, I speculate shading from solar panels will cause three things to happen. First, the vines will become 'leggy'. The uprights will elongate trying to find light to capture. That was clearly obvious in my shading studies in the early 1990's in Wisconsin. Second, the percentage of uprights that become fruiting uprights will decline over time. Third, fruit color is going to be reduced. Fruit color in cranberries is a function of sunlight and cool temperatures, especially at night. It may well remain warmer under the panels both daytime and nighttime and this will delay or reduce fruit color. When fruit are delivered to a receiving station a subsample is taken and anthocyanin content is measured. Fruit that does not meet minimum color standards is rejected by handlers.

For the record, I don't have a vested interest in the Massachusetts cranberry industry. I have not worked with the industry for about 12 years. I receive no current financial support from the industry. My only reason for becoming involved in this matter is that I strongly believe that important decisions should be based on good science. I hope this research outline will lead to good science being done as a proper study will benefit the cranberry growers and the people of Massachusetts.

Cordially,



Teryl R. Roper, PhD

Relevant Literature:

DeVetter, L, J. Colquhoun, J. Zalapa, and R. Harbut. 2015. Yield estimation in commercial cranberry systems using physiological, environmental, and genetic variables. Scientia Horticulturae 190:83-93.

Eaton, G.W. and T.R. Kyte. 1978. Yield component analysis in the cranberry. J. Amer. Soc. Hort Sci. 103:578-583

Roper, T. R., J. Klueh, and M. Hagidimitriou. 1995. Shading timing and intensity influences fruit set and yield in cranberry. HortScience 30:525-527.

Roper, T. R. 1987. Physiology of Cranberry Yield. https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1015&context=cranberry_factsheets

DATE: January 18, 2020

TO: Mr. Joseph Cogliano
202 Bay Road
Norton MA 02766

FROM: **Nicholi Vorsa**
Professor
Foran Hall, 59 Dudley Rd
School of Evironmental and Biological Sciences
Rutgers University
New Bunswick, NJ 08901

Director
P.E. Marucci Center for Blueberry & Cranberry Research & Extension
Rutgers University
125A Lake Oswego Rd
Chatsworth, NJ 08019

Re: UMass Extension - Carver, MA Experiment – Cranberry Production Under Solar Photovoltaic Installation & Fairland Farms, Norton MA – ASTGU Eligibility

I have reviewed the following documents:

- October 17, 2019 UMass Extension letter to Mr. Gerard Kennedy of the Mass Dept. of Agricultural Resources regarding the Carver data and cranberry production under a solar photovoltaic installation.

- October 21, 2019 Mass Dept. of Agricultural Resources letter from Gerry Palano to Kaitlin Kelly of the Mass Dept. of Energy Resources regarding Fairland Farms, Norton MA – ASTGU Eligibility Application.

- November 13, 2019 Dept. of Energy Resources letter from Eric Steltzer to Adam Schumaker of NextSun Energy regarding pre-determination of the Fairland Farms site as an ASTGU.

Background

The American cranberry is an evergreen woody perennial, having a trailing stoloniferous vine. Flowers are typically borne on indeterminate ascending vertical stems referred to colloquially as "uprights," which arise from stolons, and are referred to as "runners." The requirement of an acidic media or soil (maximum pH 5.5) limits the American cranberry's adaptation. Having a fine root system lacking root hairs, it is best suited to soils such as sands, loamy sands, and

organic soils consisting of coarse peat or muck. Cranberry, being a temperate woody perennial with normal growth and flowering in spring, requires a minimum of 800–1000 hours of winter-chilling (~0–10 °C) to fulfill the winter dormancy requirement. Inflorescence buds, having 5–7 florets, are formed in late summer and fall, mostly at the apex of the vertical stems with upward facing adaxial leaf surfaces. For the subsequent year's crop, in regions having moderate to severe winter freezes, e.g., Wisconsin, New Jersey, and Massachusetts, inflorescence buds and leaf tissues are typically protected with a "winter flood," which can span from December to April. Spring growth typically initiates in mid to late April, with flowering initiating in mid to late June and terminating by mid-July. Vertical shoots, i.e. uprights, can be defined as fruiting (having a floral inflorescence bud or 'non-fruiting' with vegetative bud only. Depending on both cultivar and environment, the proportion of uprights fruiting in a given area of subsequent years varies. Non-fruiting uprights of a given year are expected to form floral buds for the subsequent year's crop. For fruit set, cranberry requires insect pollination, which occurs with mostly hymenopteran insects. Growers typically supply honeybee colonies to supplant pollination. Commercial cultivars are highly self-fertile and do not require nor appear to benefit from cross-pollination for seed set nor fruit set (Sarracino and Vorsa 1991). In the northern hemisphere the majority of fruit development occurs during August, with seed maturation occurring in September. Early maturing varieties, e.g., 'Ben Lear', 'HyRed', 'Crimson Queen', typically begin to ripen in early September, and later maturing varieties, e.g., 'Stevens', in October.

Multiple year assessment of cranberry's response to environmental factors

Cranberry is a woody perennial setting fruit typically in mid-June to mid-July, with fruit sizing and development through August, and has concurrent primordial inflorescence bud set developing during late-summer early fall for subsequent season's cropping. Thus, it has been noted that management, e,g., plant nutrition, and crop load, as well as climatic conditions, etc. of a given year, likely impact the following season's, 'next years', productivity. Like with many woody perennials biennial fruit bearing is a well noted phenomenon in cranberry. In fact, environmental effects such as plant nutrition, climatic stresses and cropping of a given year, can influence plant parameters well into the future (3-5 years). Effects of a nitrogen fertilization experiment (Davenport and Vorsa 1999) were noted in high nitrogen treatment plots exhibiting 'second bloom' three years following treatment years (Vorsa, unpublished data). In contrast to annual crop species, e.g., corn, where one year's conditions do not impact future cropping, multiple years are needed to assess plant habit and productivity in cranberry following management treatments. It might be suspected that shading cranberry over time will result in reduced fruit bud set and encourage transition to greater stolon production, and thus lower productivity. For example, shading during a given year may affect the formation of floral bud set on fruiting and non-fruiting uprights that will be realized, predictably reduced, the following year. Note: uniformity is required for agronomic efficiency.

Effect of shading and saturating radiation level

Few studies regarding the effects of shading in cranberry have been published. A study published by Roper et al. (1995), studied shading at various time points (1-month spans) during the growth phase of cranberry through pre-bloom to harvest of current season's response, using shade cloth. The effect of

shading treatments were found to reduce non-structural carbohydrate concentrations but did not always reduce fruit set or yield the treatment year. No data was presented for effects in subsequent years. Kumudini (2004) reported that depending on temperature, maximum photosynthesis (P max) was ≈10 or 12 μmol CO 2/m 2/s (net photosynthesis) and the saturating radiation level was estimated to be 600 to 800 μmol·m-2·s-1. Note: the UMass Extension report used 500 μmol·m-2·s-1 as the threshold. Based on the referenced publication by Kumudini, (2004), the 500 μmol·m-2·s-1 threshold may underestimate the maximum saturating radiation level that cranberry can utilize, thus the value underestimates cranberry's photosynthetic full potential. Thus, one would need long term empirical data to determine if the 500 μmol·m-2·s-1 threshold is valid.

Farm management issues anticipated with solar structures

1) Structures will impede fertilization, fungicide, insecticide application/uniformity.
2) Structures will impede irrigation uniformity.
3) Not apparent efficient method on how the fruit harvest will be carried out.
4) Insect IPM sweeping impeded?
5) An efficient method of sand application, 'sanding', a standard cultural management technique in cranberry, is not obvious.
6) Fertilization distribution will likely be impacted by rain distribution by structures. Drip edge will elute fertilizer whereas little if no elution under the solar structures.

Potential physiological issues

1) Fruit ripening/coloring will likely be affected, i.e. reduced.
2) Yield, flower bud set, flowering, fruit set will be reduced, particularly in subsequent years.
3) Stolon biomass will increase, requiring increased pruning.

Carver, MA Experiment

The data and methods of the Carver experiment are wholly inadequate to assess the impact of PV structures on the physiology of the cranberry plant, and how the structures will impact farming operations, i.e., management such as uniformity of irrigation, fertilization, pesticide application, sanding, and harvest efficiency. The preliminary 'experiment' was flawed to assess effect on the plant through the entire growing season, being it appears the reading was taken at only a one time point.

The 'solar photovoltaic (PV) units' as described, and being deployed July 3, 2019 in the 'Stevens' cranberry bed and where sensors monitoring environmental impacts were deployed August 27, 2019 to assess putative impact of the structures on cranberry operation: The assumption is that the installation of a PV and readings was to make a determination on the impact on photosynthesis. However, the report states that "…photosynthetic measurements were only taken on one day". One issue is that since the sun angle continuously changes through the growing season (April – September), the estimate of total season's photosynthesis output with this experiment's shading would be an unreliable estimate. There are two issues to consider: 1)

one is the impact on the physiology of the plant, and 2) the impact of the structures on cranberry management (operations). Briefly, the design of this experiment is wholly inadequate as to assess the physiological impact on the plant, either the year (2019) the data were taken or the longer impact of cranberry agriculture (for reasons discussed previously). The 'experiment' is inadequate from a number of aspects including: the structures were installed too late (July 3rd) towards the end of 'fruit set' season. Note: The UMass report acknowledges this "…We do not have data for spring…". The cranberry plant would have initiated growth in April/May synthesizing carbohydrates which would impact fruit set (crop productivity) for that season. Furthermore, the impact of the shading is likely to have a profound effect on the subsequent year's (2020) crop. As stated in the UMass report that "…is critical to understand that the analysis presented…and our interpretation of data presented…is based was preliminary in nature…on this limited review". The physiological impacts of these structures on commercial cranberry production cannot be determined from this data. Moreover, the methods used were severely flawed to assess this.

In addition, the 'experiment' utilized only 3 panels, whereas it is assumed the entire bed would be utilized. It would seem there would be more shading as one moves away from the summer solstice and from the effects of multiple rows of panels. Although it is stated in the UMass report that the" …commercial PV panels will transmit a portion of light…" there is no determination on the effect of impact on the light spectrum. The limitations of the presented data expressed on page 3 of the October 17, 2019 letter to MDAR are significant.

<u>Assessment of "In order to qualify for an Agricultural Solar Tariff Generation Unit adder under 225 CMR 20.00, the Project must satisfy all five components of the special provisions for Agricultural Solar Tariff Generation Units detailed in 225 CMR 20.06(1)(d) …."</u>

1. *the Solar Tariff Generation Unit will not interfere with the continued use of the land beneath the canopy for agricultural purposes;*

   As presented the structures will interfere with continued use of the land. The structures will interfere with irrigation, fertilization, pesticide application, sanding, and harvest efficiency.

2. *the Solar Tariff Generation Unit is designed to optimize a balance between the generation of electricity and the agricultural productive capacity of the soils beneath*;

   As presented the structures will interfere with the agricultural productive capacity (e.g. nutrition and water distribution) of the soils beneath by affecting the physiology of the plant since farming operations (uniformity) will be impacted. Therefore, agricultural productive capacity is likely to be severely reduced.

3. *the Solar Tariff Generation Unit is a raised structure allowing for continuous growth of crops underneath the solar photovoltaic modules, with height enough for labor and/or machinery as it relates to tilling, cultivating, soil amendments, harvesting, etc. and grazing animals*;

   As presented the structures will interfere with continued use of the land. The structures will interfere with irrigation, fertilization, pesticide application, sanding, and harvest efficiency.

4. *crop(s) to be grown to be provided by the farmer or farm agronomist in conjunction with UMass Amherst agricultural extension services, including compatibility with the design of the agricultural solar system for such factors as crop selection, sunlight percentage, etc.*;

   Inadequate assessment although crop productivity will degrade over time (current season as well as subsequent years).

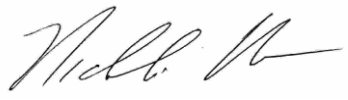
5. *annual reporting to the Department and MDAR of the productivity of the crop(s) and herd, including pounds harvested and/or grazed, herd size growth, success of the crop, potential changes, etc., shall be provided after project implementation and throughout the SMART incentive period; and*

   N/A

Conclusion

The UMass Extension Carver, MA 'experiment' does not provide the necessary data to make a reasonable 'Assessment' of whether cranberry culture with these PV structures "…*will not interfere with the continued use of the land beneath the canopy for agricultural purposes".* Moreover, it is impossible to make a determination due to the limitations, e.g. lack of necessary scale of the 'experiment' and the insufficient duration regarding the long-term viability of cranberry crops under solar photovoltaic installations. Based on the expectations of the SMART program, the data from the Carver 'experiment' is inadequate to support eligibility or qualification for a project involving solar installation over cranberry crops under the SMART program. A minimum 4 to 5-year study is required, as well as increased scale, to determine the impacts to cranberry crops from solar photovoltaic installations. The bed management issues also need to be addressed.

Very truly yours,



Nicholi Vorsa

Enclosures: Self and Cross Fertility in Cranberry (Sarracino and Vorsa 1991), Shading Timing and Intensity Influences Fruit Set and Yield in Cranberry (Roper et al 1995), Effects of Radiation and Temperature on Cranberry Photosynthesis (Kumudini 2004)

From: Judge, Michael (ENE)
To: Adam Schumaker; Kelly, Kaitlin (ENE)
Cc: Jake Laskin; Brian Wick; sstearns@bealsandthomas.com; iain@neconsultingservices.com; FredCBottomley@hotmail.com
Subject: RE: Fairland Farm Solar ASTGU Pre-Determination Request
Date: Monday, March 4, 2019 11:37:04 AM
Attachments: image002.png
image003.png

Adam,

Based on DOER's conversations with Gerry and others at MDAR, DOER is inclined to agree that this project does not meet the eligibility criteria to qualify as an Agricultural Solar Tariff Generation Unit as presently designed. Our concerns are primarily focused around the lack of supporting evidence that the yield of the cranberry crop will not be significantly impacted by the amount of projected shading.

I would add that the primary purpose of the adder is to ensure that agricultural activity is not impeded by the presence of solar. DOER and MDAR remain very concerned that this project as presently designed could lead to a situation where the bog in question either no longer is capable of producing a viable crop or has its crop yield significantly impacted by the project.

Happy to discuss further and have noticed that folks are trying to schedule a meeting for this week. DOER's preference would be to meet at our offices in Boston.

Regards,

Michael Judge
Director, Renewable and Alternative Energy Division
Massachusetts Department of Energy Resources
100 Cambridge Street, Suite 1020, Boston, MA 02114
Ph: 617.626.7368 Fax: 617.727.0030

Creating a Clean, Affordable and Resilient Energy Future for the Commonwealth

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From: Adam Schumaker <aschumaker@nextsunenergy.com>
Sent: Friday, March 1, 2019 7:11 PM
To: Kelly, Kaitlin (ENE) <kaitlin.kelly@mass.gov>
Cc: Judge, Michael (ENE) <michael.judge@mass.gov>; Jake Laskin <jake@nextsunenergy.com>; Brian Wick <bwick@cranberries.org>; sstearns@bealsandthomas.com; iain@neconsultingservices.com; FredCBottomley@hotmail.com
Subject: Re: Fairland Farm Solar ASTGU Pre-Determination Request

Just to avoid any confusion about the percentages provided below, the evidence shows that cranberries fully function with 35% of available light (i.e. 65% shading).

Adam
385.315.0024

On Mar 1, 2019, at 3:32 PM, Adam Schumaker <aschumaker@nextsunenergy.com> wrote:

> Kaitlin and Michael,
> Gerry just called Fred to tell him that he will not "approve" the pre determination request because he does not like the projects size and is "concerned" about there being shading up to 50%. As discussed previously, his claims of having the right to prevent us from receiving a pre-determination are unfounded in the first place. Further, the size of the project fully complies with the regulation as does the project design and resulting shading. The evidence regarding cranberry productivity in high shade environments provided below should make this entirely a non issue, but Gerry seems to be taking a personal stance against this simply because it's not what he had in mind.
>
> He's asked for another meeting with us to discuss, but I don't think that would be productive since he has stated he will not "approve" the project as is. Because we fully comply with the regulations, we will change nothing about the project.
>
> Last week, we had a meeting with Clean Energy Extension and Hillary Sandler, Director of the UMass Cranberry Station. Despite Hillary telling Gerry that cranberries fully function with 35% of available sunlight and do not make use of any additional sunlight above that amount, Gerry is basing his concern on his gardening experiences with kale and peppers (he literally said this).
>
> We ask you to please step in here as the voice of reason. Could we set up a call for early next week?
>
> Thank you,
>
> Adam

FW: Future Cranberry Bog / Solar Power Dual-use Studies

[redacted]

Thu 9/24/2020 2:28 PM

To: [redacted]>

2 attachments (3 MB)

G_Mupambi_Solar.pdf; Expectations for Cranberry Growth and Productivity Under Solar Pa (1).pdf;

This email was to document what Giverson and discussed on the phone, and attached are the study documents that he sent to me.

Regards,

[redacted]

From: [redacted]
Sent: Wednesday, September 23, 2020 4:23 PM
To: gmupambi@umass.edu
Subject: Future Cranberry Bog / Solar Power Dual-use Studies

Giverson,

Thank you for taking my call today.

The purpose of this email to is to ensure that I correctly understood your comments.

1. Your preliminary study was too limited in scope (due to funding constraints) to be applied to crop yield. However, it did allow you to identify areas for further study.
2. Future studies.
   i. It is my understanding that you do not have the funding to do a longitudinal, split-plot design.
   ii. You do have plans to collect harvest data from dual-use bogs, but at present you have neither the funding nor identified bog(s).
   iii. You would like to collect data relating to vine damage (and subsequent recovery) from the construction of solar farms, but you have no funding.
   iv. You would like to study the effects of lead leaching from the galvanized steel support rods in to the ground water supply, but you have no funding.

Personally, I would like to see a study of the susceptibility of cranberries to lead uptake from contaminated water supplies.

Please, send any corrections and / or additions to the above at you convenience.

Regards,

[redacted]

From:	JOSEPH COGLIANO
To:	Theoharides, Kathleen (EEA); Murray, Eva (EEA)
Subject:	Public Comments - MEPA EEA#16138 Fairland Farm Solar - Norton
Date:	Friday, October 9, 2020 4:27:57 PM
Attachments:	10-9-20 NextSun DEIR - JC Response.pdf NV Carver MA Evaluation 1-18-20.pdf 2-24-20 TR - Cran Solar Study Outline.pdf 2-23-20 TR - Cran Solar - SMART - Carver Study.pdf
Importance:	High

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Secretary Theoharides and Ms. Murray:

Please see attached letter and attachments.

Thank you

Joe

Teryl R. Roper, Professor
Dept. of Plants, Soils, and Climate
Utah State University
4820 Old Main Hill
Logan, UT 84322-4820

February 23, 2020

Joseph Cogliano
202 Bay Road
Norton, MA 02766

Re: SMART Program ASTGU Guideline and UMass Carver Experiment

Dear Mr. Cogliano:

I have reviewed the documents you provided via e-mail as listed below:

- 10-17-19 letter from UMass Extension to MDAR (Mass Dept of Ag Resources) regarding the Carver plywood study used to evaluate shading over cranberries.
- 10-21-19 letter from MDAR to DOER (Dept of Energy Resources) regarding the Carver data and the proposed solar development over cranberry bogs in Norton MA.
- 11-13-19 predetermination letter from DOER to NextSun Energy claiming that largely based on the UMass data from the Carver study the Fairland Farm, Norton project "…likely satisfies all criteria set forth in 225 CMR 20.00 to be considered an ASTGU."
- 5-19 UMass Extension fact sheet: Expectations for Cranberry Growth and Productivity under Solar (Photovoltaic) Panels.
- 9-16-2019 predetermination letter denial from Eric Steltzer, DOER to Adam Schumaker of NextSun Energy.
- 10-3-19 email stream between Adam Schumaker and Kaitlin Kelly, DOER regarding summary of revised calculations for Fairland Farm.
- 10-10-19 email stream between Adam Schumaker and Kaitlin Kelly, DOER regarding PAR data spreadsheet.
- 4-26-18 Solar Massachusetts Renewable Target Program: Guideline
- PAR data (July 2019 thru Sept 2019) from NextSun Energy to DOER.
- Norton Shading Calculation data from NextSun Energy to DOER.

Based on the documents I was provided, it appears that for a solar project to qualify to be an Agricultural Solar Tariff Generation Unit, the project must meet each of six criteria. I will comment on the criteria by number.

1. The Solar Tariff Generation Unit will not interfere with the continued use of the land beneath the canopy for agricultural purposes;

   I have not seen complete data from the Carver experiment that speaks to this point for cranberries. The Carver data to date is inadequate to answer this question due to inadequate methodology, lack of sufficient duration of the study and other limitations. A well-funded, well planned three to five-year study would be needed to properly answer whether or not solar collectors over cranberries can meet these criteria.

   For example, the Carver mock-up has more posts than would likely be found in a commercial installation. I would think that the landowner and NextSun Energy would need to show that farm implements can be driven under the installation and that the span between posts is not a hindrance to normal production and harvest activities, including retrieving full bins of harvested fruit by helicopter or by other means. Further, if these properties are normally flooded in the winter the post structures would need to be shown to be able to withstand the potential pressure exerted by the movement of ice during the coldest winter months. Photos and/or video data would need to demonstrate that sufficient clearance is present.

2. The Solar Tariff Generation Unit is designed to optimize a balance between the generation of electricity and the agricultural productive capacity of the soils beneath;

   Although the Carver study was intended to address this question, thus far, it has failed to do so. As reported to date, that study has significant limitations. First, it was begun too late in the season in 2019. The fruit comprising the 2019 crop were already set when shading began. The mock-up is not large enough to prevent indirect solar radiation from coming in from the sides. Apparently, samples for yield data were collected, but have not yet been reported. One would expect the 2019 crop to be unaffected. The full results will be known when shading has reduced light at bud induction, fruit set, and fruit coloring periods over a multi-year period.

   The general principle of agricultural plant productivity is that yield is commensurate with light captured. The critical light measurement is not the instantaneous Photosynthetic Photon Flux Density (PPFD) that is reported by light sensors. This is only a 'flow rate'. What is important is the Daily Light Integral, usually reported as moles of photons m^{-2} day^{-1}. This relates to the total photosynthetic light energy striking a given land area. This should be the basis of decision making about shading, not the instantaneous flux measurements.

   This criterion also assumes that shading has a uniform effect throughout a growing season. We know this is not true for cranberries. Shading during the fruit set period reduced fruit set in two of three years in Wisconsin (Roper et al, 1995). However, in this

study each year shading was imposed in new locations, not repeatedly in the same location as would be true of solar panels. I am not aware of data showing the results of multi-year shading on the same land area for cranberries. Our short-term shading always reduced the carbohydrate concentration in the shaded vines, but carbohydrates recovered after a few weeks of normal illumination. It is not clear what would happen following long-term shading, but it seems likely that the carbon resources of the plants would decline over time.

This criterion rests solely on productivity. That may be too narrow of a consideration for cranberries. In fruit crops, profitability is not solely equal to productivity. Fruit quality measured as fruit size and color are also included. While yield may not be affected, if fruit size and color are reduced, profitability can be significantly reduced. Thus, profitability should be the criterion measured, not just productivity.

3. <u>The Solar Tariff Generation Unit is a raised structure allowing for continuous growth of crops underneath the solar photovoltaic modules, with height enough for labor and/or machinery as it relates to tilling, cultivating, soil amendments, harvesting, etc. and grazing animals;</u>

   My response to this criterion is the same as for number 1. Data may exist showing cranberry implements can operate under the canopy, but I have not seen them. However, this raises some other considerations. The Carver data suggests that temperatures may be warmer under the photovoltaic units than away from them. If that is true, then insect and disease pest growth will vary from fields with solar canopy installation to those without. Thus, pest scouting would have to be done separately. Applications of pest control measures would need to be done at different times in covered fields compared to uncovered fields. The need for irrigation may be different in covered fields than for non-covered fields. The need to irrigate for frost protection may be different in uncovered than for covered fields. Thus, the management of pests and soil moisture would, necessarily need to be done separately for covered and uncovered fields. This may not affect productivity, *per se*, but the extra management time would likely affect profitability.

4. <u>Crop(s) to be grown to be provided by the farmer or farm agronomist in conjunction with UMass Amherst agricultural extension services, including compatibility with the design of the agricultural solar system for such factors as crop selection, sunlight percentages, etc.</u>

   While it appears this work is underway, it is not yet complete. A well-done study to address the SMART program criteria for solar development over a perennial crop like cranberries will take at least three years to have data strength to be able to make predictions with confidence. A single year of work is simply insufficient for perennial crops. Further, UMass needs to be given sufficient funding to do this work. They need to engage an environmental biophysicist to help design the experiments and to correctly interpret the data.

5. Annual Reporting to the Department and MDAR of the productivity of the crop(s) and herd, including pounds harvested and/or grazed, herd size growth, success of the crop, potential changes, etc. shall be provided after project implementation and throughout the SMART incentive period;

   Most cranberry growers track yield by production unit: bog/field/bed. However, the data are pretty crude, usually begun as truckloads or bins and knowing the approximate capacity of a truck or bin. The guidance letter gives little direction as to how yield data is to be collected and reported. Will MDAR simply trust producers to report the production per land area of covered and uncovered sites? How geographically proximal should covered and uncovered sites be? Will MDAR be present to verify the data? Will a trusted third party verify the results? Is weight of crop per unit area the only criterion? For cranberries, average fruit size and fruit color of covered and uncovered fields contribute significantly to grower returns, especially if the fruit are destined for fresh sales (as opposed to processing).

   Another question that the landowner may wish to consider is what penalty is assessed if yield is reduced under solar panels. Does the grower only lose the incentive for that year? Are they ineligible for future years? Would the panels have to be removed? Should a reduction in fruit quality of covered vs. uncovered fields be sufficient to lose the incentive? Who 'owns' this risk?

   Therefore, after a proper study is completed, the SMART program guidelines for solar panels over cranberries should be updated with specific parameters to answer these and other questions related to perennial crops.

6. Other system design information, ...

   I've not seen details of the design of the proposed solar system to be installed over cranberry fields. However, other potential problems here include the damage to the vines that will occur through construction as piers, posts, and crossbeams are installed. This will certainly involve driving heavy equipment through the fields. Damage to the vines will be extensive and will take years to recover—in a limited light environment.

The chief weakness of the guidelines for installing solar panels over agricultural lands is that it depends on maintaining 50% of the baseline photosynthetic photon flux, not the daily light integral that would be a measure of total photosynthetic light energy received by the crop canopy. The secondary weakness is that the guidelines deal only with gross yield and disregards crop quality considerations that are critical to profitability in a perennial fruit crop. Third, it is not clear who will determine yield/quality of the crop, what happens if crops actually are reduced subsequent to installation of the solar panel system, and who 'owns' the risk of crop yield declining over time?

Based on my review of the information provided, the SMART program guidelines and the limitations of the Carver experiment I conclude the following:

1. The Carver experiment, as reported to date, is inadequate to answer the questions required to determine if cranberries can be permanently and successfully farmed under solar panels. Properly designed and executed research conducted over three to five years is needed before being able to answer the fundamental questions of this matter.

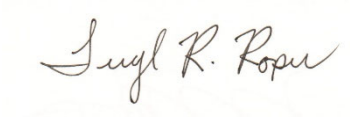
2. The DOER and MDAR should not rely on the current Carver data to determine if projects involving solar collectors over cranberries are eligible for or meet the criteria under the SMART program. In my opinion, the incomplete Carver study data does not support the claim in the 11-13-19 DOER letter that the Fairland Farm, Norton project "…likely satisfies all criteria set forth in 225 CMR 20.00 to be considered an ASTGU."

3. Projects involving large scale solar development over cranberry fields should not be undertaken in Massachusetts until a properly funded study (minimum of 3 to 5 years) has been completed, analyzed, and peer reviewed. Reasonably predictive outcomes are not possible with the current data.

4. The SMART program guidelines require further development and changes for perennial crops such as cranberries.

I hope this document will begin further discussion among the regulatory agencies involved so that good workable policies will be put in place to achieve the renewable energy goals of the Commonwealth of Massachusetts, while not reducing important agricultural productivity. In a separate document, I have outlined some elements of a proper experiment to address these important matters.

Cordially,



Teryl R. Roper, PhD

Literature cited:

Roper, T. R., J. Klueh, and M. Hagidimitriou. 1995. Shading timing and intensity influences fruit set and yield in cranberry. HortScience 30:525-527.

Teryl R. Roper, Professor
Dept. of Plants, Soils, and Climate
Utah State University
4820 Old Main Hill
Logan, UT 84322-4820

February 24, 2020

Joseph Cogliano
202 Bay Road
Norton, MA 02766

Re: A Study Involving Cranberry Growth and Productivity under Solar Panels

Dear Mr. Cogliano:

I was contacted by you in January 2020 to review research information and policy documents concerning placing solar panels over cranberry plantings in Massachusetts. As for my background, I am currently a Professor of Horticulture at Utah State University. I hold BS and MS degrees in Botany from Brigham Young University and a PhD in Horticulture from Washington State University. I worked as a Professor for 20 years at the University of Wisconsin-Madison. During those 20 years I worked extensively with the cranberry industry both in Wisconsin and across the country. I have published numerous peer reviewed papers dealing with cranberry productivity, especially regarding the physiology of cranberry yield. I left Wisconsin because Utah is home and to be closer to family.

I have reviewed the study regarding the effects of solar panels over cranberry fields that was recently begun by the University of Massachusetts Cranberry Experiment Station. From what I read, the study is incomplete and some data remain to be analyzed, interpreted, and reported. Further, their letter did not provide any data tables with statistical analysis to give an idea of the variability of their data. Clearly, this was a preliminary report. However, rather than critique this study, below I have outlined an experiment that would better answer the questions of whether cranberries can still be both productive and profitable if covered by solar panels. Research of this type needs to include an environmental biophysicist on the team to ensure the data are collected and interpreted correctly.

1. In order to be successful, the research needs to have devoted funding. If done well, the study can be estimated to cost more than-$150,000. This would include installation of solar panels or surrogates, instrumentation, collection of field data, data interpretation, and publication. The study will require a substantial amount of staff and scientist labor. The solar company and the landowner have the burden of proof to show a solar installation would not adversely affect an underlying crop. It is not reasonable to require or to expect scientists at the Massachusetts Cranberry Experiment Station to do quality work without sufficient funding.

2. The solar company and landowner should be responsible for installing a portion of the proposed solar collection system. This would include the posts, piers, crossbeams, wiring, connections, and panels. The model should replicate as closely as possible what would eventually be installed, should commercial solar collectors over cranberries be shown to work effectively as planned. The mockup should be extensive, comprising perhaps an acre. Perhaps old non-functional panels could be used as this would be as close to 'real world' as possible. If the ultimate installation is to be solar tracking, it would be best if this feature could be installed in the trial. This would also demonstrate the construction that would need to take place during installation. The experiment should be done in at least three locations in southeastern Massachusetts. Replication is essential to data interpretation.

3. Instrumentation: Quantum sensors (measuring light between 400 and 700 nm) should be installed to measure light incident on the cranberry canopy. Point sensors would be acceptable, but line sensors would be preferred. Four to six sensors should be placed in a grid pattern under the solar panels with the top of the sensors at the top of the canopy. These should be near the middle of the installation to avoid 'leakage' of diffuse light from outside away from the panels. Thermocouples or thermistors should be placed near each light sensor. An identical array of light and temperature sensors should be placed well away from the solar panel installation where the panels would not provide shade, probably on an adjacent field. Data would be collected by a datalogger and could be transmitted via cell modem or through regular downloads to a laptop. The light incident on the sensors should be summed daily to determine the total solar radiation between 400 and 700 nm incident on the area under the solar panels and in the nearby unshaded area (daily light integral) through at least three complete growing seasons. This is reported as moles of photons m^{-2} d^{-1}. Then a regression is made comparing daily light integral with yield of shaded and unshaded areas.

4. Each year in the spring, eight individual square foot areas will be identified under the solar panels and not under the solar panels at each site. In the fall just before regular harvest, the uprights from within each square foot will be cut and taken to a laboratory for measurement. For each square foot sample, the following data will be collected: total number of uprights, number of fruiting uprights, number of fruit per fruiting upright, total fruit number, total fruit weight, and length of new growth per upright. A subsample of fruit will be analyzed for total anthocyanins. Data from this analysis will be subjected to analysis of variance to see if growth and fruiting vary between shaded and unshaded locations at each of the three sites. This is the most important part of the project.

5. Collection of the data in points three and four should continue for at least three years. We would not expect to see differences in year one. The year-one crop is produced as a result of buds that were produced the prior year. If differences are found, they would be found in years two or three and beyond.

6. The landowner will need to demonstrate, with video cameras recording the efforts, that farm implements can be operated under the panels. This would include fertilizer

applicators, pest control equipment, irrigation equipment, and harvest equipment. The time recorded to navigate posts should be noted compared to uncovered areas.

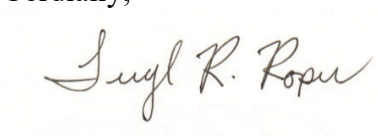
I would note a couple of concerns about how the data are interpreted. For the light measurements, the important information is not the light striking the canopy at a given point, it is the summation or integration of the total light incident over time (daily light integral). In every other temperate fruit crop with which I am familiar, yield per acre is nearly linearly related to light captured by the crop canopy. If light incident on the crop is reduced, reductions in yield will almost surely follow. Further, the time of shading is also important. The most critical time for shading to reduce yield is in the immediate post-bloom period. This is when fruit are set. Unfortunately, the 2019 Carver study did not impose shading until July. By that time fruit set had already occurred. Thus, no impact on yield by shading would have been expected for 2019.

Another question that could be asked is whether the newest hybrid cultivars from New Jersey respond the same to prolonged shading as older cultivars such as Ben Lear, Early Black, and Howes, or older hybrids like Stevens.

Based on my research and years of experience with the cranberry industry, I speculate shading from solar panels will cause three things to happen. First, the vines will become 'leggy'. The uprights will elongate trying to find light to capture. That was clearly obvious in my shading studies in the early 1990's in Wisconsin. Second, the percentage of uprights that become fruiting uprights will decline over time. Third, fruit color is going to be reduced. Fruit color in cranberries is a function of sunlight and cool temperatures, especially at night. It may well remain warmer under the panels both daytime and nighttime and this will delay or reduce fruit color. When fruit are delivered to a receiving station a subsample is taken and anthocyanin content is measured. Fruit that does not meet minimum color standards is rejected by handlers.

For the record, I don't have a vested interest in the Massachusetts cranberry industry. I have not worked with the industry for about 12 years. I receive no current financial support from the industry. My only reason for becoming involved in this matter is that I strongly believe that important decisions should be based on good science. I hope this research outline will lead to good science being done as a proper study will benefit the cranberry growers and the people of Massachusetts.

Cordially,



Teryl R. Roper, PhD

Relevant Literature:

DeVetter, L, J. Colquhoun, J. Zalapa, and R. Harbut. 2015. Yield estimation in commercial cranberry systems using physiological, environmental, and genetic variables. Scientia Horticulturae 190:83-93.

Eaton, G.W. and T.R. Kyte. 1978. Yield component analysis in the cranberry. J. Amer. Soc. Hort Sci. 103:578-583

Roper, T. R., J. Klueh, and M. Hagidimitriou. 1995. Shading timing and intensity influences fruit set and yield in cranberry. HortScience 30:525-527.

Roper, T. R. 1987. Physiology of Cranberry Yield. https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1015&context=cranberry_factsheets

202 Bay Road
Norton, MA 02766

October 9, 2020

By Email: Kathleen.theoharides@mass.gov; eva.murray@state.ma.us

Ms. Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

MEPA Office, Attn: Eva Murray
100 Cambridge Street
Suite 900
Boston, MA 02114

Re: Public Comments – MEPA EEA#16138 Fairland Farm Solar – Norton

Dear Secretary Theoharides and Ms. Murray:

As a Norton resident and abutter to the proposed project and Trustee of the Joseph D. Cogliano and Eleanor E. Cogliano Realty Trusts, please find below my comments on the DEIR for the proposed project.

The DEIR prepared for NextSun Energy by Beals and Thomas for the above project contains numerous errors, inadequacies and concerns which include the following:

1. The applicant has claimed that the project area consists of upland bogs. This claim can not be substantiated without soil tests, topographical analysis, and historical studies. While the topography around the northern bogs of the project site may offer some support to the applicant's claim, the bogs located to the south and west do not support this claim. The applicant has not provided sufficient evidence to support their claim that all of the bogs where the Project is proposed were constructed in uplands.

2. A noise problem in the site area already exists due to the inverter from a solar installation on land owned by the applicant and adjacent to the Fairland Farm site. Adding two more inverters to the already existing noise pollution is unconscionable. Noise is one of the main problems with large scale solar systems and one of the reasons they do not belong in residential areas. The Town of Norton Planning Board failed to properly address this concern when it required a noise study after construction. Should residents believe the project will be taken down after it is built, when the noise problem is finally calibrated?

The applicant should be required to fund a noise study as part of the MEPA process as the noise pollution may have a profound effect on local wildlife, residents, and the public.

3. For all the work being proposed in an ACEC and the introduction of toxic materials to an ecologically sensitive area, the only mitigation being offered is visual screening and minimal compensatory storage for boarding land subject to flooding. The mitigation proposed is inadequate. The visual screening proposed has been reduced from what was promised to the Town and abutters. For example, the project would now be visible from Bay Road. Also, the plant screening as presently proposed will take many years to mature before being functional.

   Open space protection should be provided to prevent further development to the site with a permanent land restriction continuing agricultural and recreational use only. A conservation restriction would allow public access for recreation and continue long term agricultural use for the cranberry farm.

4. The proposed project requires almost 300,000 pounds of toxic lithium-ion batteries for its energy storage system. These types of batteries contain cobalt, a toxic heavy metal. If a catastrophe, like thermal runaway occurs, the batteries can burn, explode, and release toxic fumes.

   a. Adding toxic materials like batteries to the Canoe River Aquifer, an ACEC, well protection zone and flood plain is nonsensical. The risk to the environment, the river and well water **CANNOT** be mitigated. Why take the risk for a project that can be done elsewhere in Massachusetts outside an ACEC, Aquifer, well protection zone and flood plain?

   b. Battery energy storage systems for large scale solar projects are not allowed under the Town of Norton's zoning bylaws. This is one of the central issues of the pending case in the Land Court.

   c. The purpose of the batteries is, in part, to circumvent the current agricultural guideline of 2 MW AC. (A newly proposed agricultural guideline may change the current limit.)

   d. There is a reason the TSA prohibits spare lithium-ion batteries in checked baggage when you board a plane, i.e. they are dangerous and life threatening.

5. The applicant claims compliance with relevant codes and the fire department. However, because of the project's location in an ACEC, Aquifer, well protection zone and flood plain, a much higher standard must be imposed.

Unfortunately, the Fire department cannot mitigate the damage to the environment, well water or neighborhood if a catastrophe occurs. Existing emergency and fire systems are not adequate to deal with problems such as thermal runaway. Adam Schumaker, VP of Development for NextSun, stated during a February 5, 2019 Norton Planning Board hearing on the project that the fire department's protocol for solar related fires is "to let it burn". This customary response would release dangerous toxic materials into the air and ground water.

6. The applicant has failed to mitigate toxic hazards with the proposed project including:

    a. The solar panels and support structures contain lead soldering, cadmium, and lead in the zinc coating. These substances are hazardous materials that the proposed project will add to an ecologically sensitive area and place the local residents at unnecessary risk.

    b. The equipment area (including battery storage) is located within the BLSF.

    Because these risks cannot be mitigated; and lead, cadmium, zinc, and cobalt batteries do not belong in an ACEC, Aquifer, well protection zone and flood plain, the proposed project is simply the wrong project on the wrong site.

7. The applicant has not provided any long-term studies to prove that solar development over cranberry bogs is possible or practical. The short-term UMass experiment that the applicant, MDAR and DOER relied upon for the DOER's pre-determination letter is inadequate and not of sufficient duration to offer any meaningful evidence to their claim. (Please see two unbiased expert letters attached.) The applicant should be required to fund a proper 3 to 5-year study as outlined in the expert letters. The DOER has been presented with this expert evidence and as of the date of this letter has taken no action to correct its error regarding the flawed pre-determination letter.

8. Contrary to the claims made by the applicant, the site is used by the public and public access had been promoted by the manager of Fairland Farm. Access has been publicly posted.

9. The applicant has identified a discrepancy between references regarding whether the site is located in the Canoe River Sole Source Aquifer. The applicant claims the Mass GIS to be correct in representing the site is not part of the sole source aquifer. The applicant should have to prove their claim because a discrepancy exists.

10. The proposed equipment and battery storage area is only 58 feet from our Trust's property line and will negatively impact our property. It will produce unacceptable noise pollution via its inverters, may contaminate our wells and harm us financially by negatively impacting any future site development. Would you want to live next to a large-scale solar power plant?

11. The applicant claims, "low density residential development" in the project area. There are 161 homes in the neighborhood. How many potentially contaminated wells are acceptable to the applicant?

12. The applicant owns the land under an adjacent solar project that along with the proposed project may violate SMART program regulations regarding maximum project size under common adjacent ownership.

13. Why were there no comments from Mass Historical in the DEIR? Why wasn't Mass Historical on the circulation list? Bay Road is listed on the National Registry of Historic Places.

14. The applicant has falsely claimed the project avoids, minimizes, and mitigates damage to the environment and cannot prove "the Project will not impair water quality within the ACEC" since no long term studies have been completed for solar development over cranberry bogs. Given the concerns regarding noise, wetland bogs, hazardous materials, batteries, working in the Canoe River Aquifer, an ACEC, well protection zone and flood plain and whether the project is even feasible, the applicant has failed to meet its claims in the DEIR.

The Applicant should be required to:

- File a final EIR and specifically and thoroughly answer all comments and questions and not simply refer to earlier inadequate answers and documentation; and complete studies as requested.

- Fund a noise study satisfactory to the Town and abutters as part of the MEPA process.

- Fund a 3 to 5-year study as part of the MEPA process in accordance with the expert letters provided, regarding the feasibility of placing solar panels over cranberry bogs where the underlying agriculture remains the primary use of the land.

- Perform soil tests, topographical and historical studies to prove all project bogs are upland bogs.

- Place a conservation restriction on the entire site to restrict further development and to allow public access for recreation and long-term agricultural use.

In addition, Secretary Theoharides, I request that you take the following actions:

- Do not conclude the MEPA process until the DEP has issued a superseding order of conditions, if any, as the project will change if the bogs are not proven to be upland bogs.

- Instruct the DEP to take no action on this project until the matters in Land Court have been resolved. It is unlikely the project will be approved due to notification failures and the fact that storage batteries are not allowed under Town bylaws. Why waste time and resources on this matter when the project will likely be prohibited anyway?

- Find that the proposed project cannot avoid, minimize, or mitigate the potential hazardous impacts to the environment at the Fairland Farm site.

Very truly yours,

Joseph Cogliano

Joseph D. Cogliano, Jr.

Enclosures: Jan 18, 2020 Vorsa letter; Feb 23, 2020 Roper letter; Feb 24, 2020 Roper Study Outline

DATE: January 18, 2020

TO: Mr. Joseph Cogliano
202 Bay Road
Norton MA 02766

FROM: **Nicholi Vorsa**
Professor
Foran Hall, 59 Dudley Rd
School of Evironmental and Biological Sciences
Rutgers University
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Director
P.E. Marucci Center for Blueberry & Cranberry Research & Extension
Rutgers University
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Re: UMass Extension - Carver, MA Experiment – Cranberry Production Under Solar Photovoltaic Installation & Fairland Farms, Norton MA – ASTGU Eligibility

I have reviewed the following documents:

- October 17, 2019 UMass Extension letter to Mr. Gerard Kennedy of the Mass Dept. of Agricultural Resources regarding the Carver data and cranberry production under a solar photovoltaic installation.

- October 21, 2019 Mass Dept. of Agricultural Resources letter from Gerry Palano to Kaitlin Kelly of the Mass Dept. of Energy Resources regarding Fairland Farms, Norton MA – ASTGU Eligibility Application.

- November 13, 2019 Dept. of Energy Resources letter from Eric Steltzer to Adam Schumaker of NextSun Energy regarding pre-determination of the Fairland Farms site as an ASTGU.

Background

The American cranberry is an evergreen woody perennial, having a trailing stoloniferous vine. Flowers are typically borne on indeterminate ascending vertical stems referred to colloquially as "uprights," which arise from stolons, and are referred to as "runners." The requirement of an acidic media or soil (maximum pH 5.5) limits the American cranberry's adaptation. Having a fine root system lacking root hairs, it is best suited to soils such as sands, loamy sands, and

organic soils consisting of coarse peat or muck. Cranberry, being a temperate woody perennial with normal growth and flowering in spring, requires a minimum of 800–1000 hours of winter-chilling (~0–10 °C) to fulfill the winter dormancy requirement. Inflorescence buds, having 5–7 florets, are formed in late summer and fall, mostly at the apex of the vertical stems with upward facing adaxial leaf surfaces. For the subsequent year's crop, in regions having moderate to severe winter freezes, e.g., Wisconsin, New Jersey, and Massachusetts, inflorescence buds and leaf tissues are typically protected with a "winter flood," which can span from December to April. Spring growth typically initiates in mid to late April, with flowering initiating in mid to late June and terminating by mid-July. Vertical shoots, i.e. uprights, can be defined as fruiting (having a floral inflorescence bud or 'non-fruiting' with vegetative bud only. Depending on both cultivar and environment, the proportion of uprights fruiting in a given area of subsequent years varies. Non-fruiting uprights of a given year are expected to form floral buds for the subsequent year's crop. For fruit set, cranberry requires insect pollination, which occurs with mostly hymenopteran insects. Growers typically supply honeybee colonies to supplant pollination. Commercial cultivars are highly self-fertile and do not require nor appear to benefit from cross-pollination for seed set nor fruit set (Sarracino and Vorsa 1991). In the northern hemisphere the majority of fruit development occurs during August, with seed maturation occurring in September. Early maturing varieties, e.g., 'Ben Lear', 'HyRed', 'Crimson Queen', typically begin to ripen in early September, and later maturing varieties, e.g., 'Stevens', in October.

Multiple year assessment of cranberry's response to environmental factors

Cranberry is a woody perennial setting fruit typically in mid-June to mid-July, with fruit sizing and development through August, and has concurrent primordial inflorescence bud set developing during late-summer early fall for subsequent season's cropping. Thus, it has been noted that management, e,g., plant nutrition, and crop load, as well as climatic conditions, etc. of a given year, likely impact the following season's, 'next years', productivity. Like with many woody perennials biennial fruit bearing is a well noted phenomenon in cranberry. In fact, environmental effects such as plant nutrition, climatic stresses and cropping of a given year, can influence plant parameters well into the future (3-5 years). Effects of a nitrogen fertilization experiment (Davenport and Vorsa 1999) were noted in high nitrogen treatment plots exhibiting 'second bloom' three years following treatment years (Vorsa, unpublished data). In contrast to annual crop species, e.g., corn, where one year's conditions do not impact future cropping, multiple years are needed to assess plant habit and productivity in cranberry following management treatments. It might be suspected that shading cranberry over time will result in reduced fruit bud set and encourage transition to greater stolon production, and thus lower productivity. For example, shading during a given year may affect the formation of floral bud set on fruiting and non-fruiting uprights that will be realized, predictably reduced, the following year. Note: uniformity is required for agronomic efficiency.

Effect of shading and saturating radiation level

Few studies regarding the effects of shading in cranberry have been published. A study published by Roper et al. (1995), studied shading at various time points (1-month spans) during the growth phase of cranberry through pre-bloom to harvest of current season's response, using shade cloth. The effect of

shading treatments were found to reduce non-structural carbohydrate concentrations but did not always reduce fruit set or yield the treatment year. No data was presented for effects in subsequent years. Kumudini (2004) reported that depending on temperature, maximum photosynthesis (P max) was ≈10 or 12 μmol CO 2/m 2/s (net photosynthesis) and the saturating radiation level was estimated to be 600 to 800 μmol·m-2·s-1. Note: the UMass Extension report used 500 μmol·m-2·s-1 as the threshold. Based on the referenced publication by Kumudini, (2004), the 500 μmol·m-2·s-1 threshold may underestimate the maximum saturating radiation level that cranberry can utilize, thus the value underestimates cranberry's photosynthetic full potential. Thus, one would need long term empirical data to determine if the 500 μmol·m-2·s-1 threshold is valid.

Farm management issues anticipated with solar structures

1) Structures will impede fertilization, fungicide, insecticide application/uniformity.
2) Structures will impede irrigation uniformity.
3) Not apparent efficient method on how the fruit harvest will be carried out.
4) Insect IPM sweeping impeded?
5) An efficient method of sand application, 'sanding', a standard cultural management technique in cranberry, is not obvious.
6) Fertilization distribution will likely be impacted by rain distribution by structures. Drip edge will elute fertilizer whereas little if no elution under the solar structures.

Potential physiological issues

1) Fruit ripening/coloring will likely be affected, i.e. reduced.
2) Yield, flower bud set, flowering, fruit set will be reduced, particularly in subsequent years.
3) Stolon biomass will increase, requiring increased pruning.

Carver, MA Experiment

The data and methods of the Carver experiment are wholly inadequate to assess the impact of PV structures on the physiology of the cranberry plant, and how the structures will impact farming operations, i.e., management such as uniformity of irrigation, fertilization, pesticide application, sanding, and harvest efficiency. The preliminary 'experiment' was flawed to assess effect on the plant through the entire growing season, being it appears the reading was taken at only a one time point.

The 'solar photovoltaic (PV) units' as described, and being deployed July 3, 2019 in the 'Stevens' cranberry bed and where sensors monitoring environmental impacts were deployed August 27, 2019 to assess putative impact of the structures on cranberry operation: The assumption is that the installation of a PV and readings was to make a determination on the impact on photosynthesis. However, the report states that "…photosynthetic measurements were only taken on one day". One issue is that since the sun angle continuously changes through the growing season (April – September), the estimate of total season's photosynthesis output with this experiment's shading would be an unreliable estimate. There are two issues to consider: 1)

one is the impact on the physiology of the plant, and 2) the impact of the structures on cranberry management (operations). Briefly, the design of this experiment is wholly inadequate as to assess the physiological impact on the plant, either the year (2019) the data were taken or the longer impact of cranberry agriculture (for reasons discussed previously). The 'experiment' is inadequate from a number of aspects including: the structures were installed too late (July 3rd) towards the end of 'fruit set' season. Note: The UMass report acknowledges this "…We do not have data for spring…". The cranberry plant would have initiated growth in April/May synthesizing carbohydrates which would impact fruit set (crop productivity) for that season. Furthermore, the impact of the shading is likely to have a profound effect on the subsequent year's (2020) crop. As stated in the UMass report that "…is critical to understand that the analysis presented…and our interpretation of data presented…is based was preliminary in nature…on this limited review". The physiological impacts of these structures on commercial cranberry production cannot be determined from this data. Moreover, the methods used were severely flawed to assess this.

In addition, the 'experiment' utilized only 3 panels, whereas it is assumed the entire bed would be utilized. It would seem there would be more shading as one moves away from the summer solstice and from the effects of multiple rows of panels. Although it is stated in the UMass report that the" …commercial PV panels will transmit a portion of light…" there is no determination on the effect of impact on the light spectrum. The limitations of the presented data expressed on page 3 of the October 17, 2019 letter to MDAR are significant.

<u>Assessment of "In order to qualify for an Agricultural Solar Tariff Generation Unit adder under 225 CMR 20.00, the Project must satisfy all five components of the special provisions for Agricultural Solar Tariff Generation Units detailed in 225 CMR 20.06(1)(d) …."</u>

1. *the Solar Tariff Generation Unit will not interfere with the continued use of the land beneath the canopy for agricultural purposes;*

   As presented the structures will interfere with continued use of the land. The structures will interfere with irrigation, fertilization, pesticide application, sanding, and harvest efficiency.

2. *the Solar Tariff Generation Unit is designed to optimize a balance between the generation of electricity and the agricultural productive capacity of the soils beneath*;

   As presented the structures will interfere with the agricultural productive capacity (e.g. nutrition and water distribution) of the soils beneath by affecting the physiology of the plant since farming operations (uniformity) will be impacted. Therefore, agricultural productive capacity is likely to be severely reduced.

3. *the Solar Tariff Generation Unit is a raised structure allowing for continuous growth of crops underneath the solar photovoltaic modules, with height enough for labor and/or machinery as it relates to tilling, cultivating, soil amendments, harvesting, etc. and grazing animals*;

   As presented the structures will interfere with continued use of the land. The structures will interfere with irrigation, fertilization, pesticide application, sanding, and harvest efficiency.

4. *crop(s) to be grown to be provided by the farmer or farm agronomist in conjunction with UMass Amherst agricultural extension services, including compatibility with the design of the agricultural solar system for such factors as crop selection, sunlight percentage, etc.*;

   Inadequate assessment although crop productivity will degrade over time (current season as well as subsequent years).

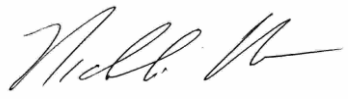
5. *annual reporting to the Department and MDAR of the productivity of the crop(s) and herd, including pounds harvested and/or grazed, herd size growth, success of the crop, potential changes, etc., shall be provided after project implementation and throughout the SMART incentive period; and*

   N/A

Conclusion

The UMass Extension Carver, MA 'experiment' does not provide the necessary data to make a reasonable 'Assessment' of whether cranberry culture with these PV structures "…*will not interfere with the continued use of the land beneath the canopy for agricultural purposes".* Moreover, it is impossible to make a determination due to the limitations, e.g. lack of necessary scale of the 'experiment' and the insufficient duration regarding the long-term viability of cranberry crops under solar photovoltaic installations. Based on the expectations of the SMART program, the data from the Carver 'experiment' is inadequate to support eligibility or qualification for a project involving solar installation over cranberry crops under the SMART program. A minimum 4 to 5-year study is required, as well as increased scale, to determine the impacts to cranberry crops from solar photovoltaic installations. The bed management issues also need to be addressed.

Very truly yours,



Nicholi Vorsa

Enclosures: Self and Cross Fertility in Cranberry (Sarracino and Vorsa 1991), Shading Timing and Intensity Influences Fruit Set and Yield in Cranberry (Roper et al 1995), Effects of Radiation and Temperature on Cranberry Photosynthesis (Kumudini 2004)