TABLE OF CONTENTS

PART 1

PART 2

PART 3

SBAC's ADDITIONAL CONCERNS and ENHANCEMENT IDEAS

A REPORT

THE SOLAR BYLAWS ADVISORY COMMITTEE

---

8 August 2019

SUBMITTED TO THE BOARD OF SELECTMEN

Spencer, Massachusetts

MEMBERS of SBAC

DeFOSSE, Matthew	Citizen-at-large
EMERSON, Margaret	Liaison of the Conservation Committee
HICKS, Ralph	Selectman, Liaison of the Board of Selectman and the T/A
McAULEY, Tatyana	Citizen-at-large
ORCUTT, Paula	Citizen-at-large On the Board of Directors of the Common Land Trust Board and Head of the CLTB Monitoring Committee
TAME, Nancy	Citizen-at-large Member of the Finance Committee
VINER, Jonathan	Liaison, Chair of the Planning Board

INTRODUCTION

The purpose, goals, and mission of our committee are succinctly encapsulated in the very title of our committee, the Spencer Solar Bylaws Advisory Committee (SBAC).

We submit this Report to the Spencer Board of Selectmen. This document summarizes the results of our research, of excursions, several months of weekly meetings, and meetings with other Central Massachusetts towns representatives, discussions, and last but not least, the input by Spencer citizenry.

* * * *

The Report is divided into three parts:

Part 1

a) The current solar bylaws (in black) with the SBAC modifications and recommendations (in green), and deleted segments (in red).

b) SBAC submits a clean copy of the modified and improved bylaws for the BOS consideration.

Part 2 delineates SBAC's pertinent recommendations. The recommendations follow the sequence of solar bylaws.

Part 3 presents SBAC's additional concerns for the BOS's further consideration.

* * * *

PART 2

INTRODUCTION

On February 21, 2019 the Solar Bylaws Advisory Committee held a Listening Session for Spencer residents to hear concerns about solar facilities in town. SBAC wished to include those concerns in its work. There were many concerns about the cutting of trees, loss of productive farmland, and loss of wildlife habitat due to fragmentation of open space. There were concerns voiced about issues with drainage and erosion when cutting trees or grading, especially on slopes. Many people wanted to know what financial benefit there is for the town from these solar installations, and expressed that it seemed inadequate. There was concern about eventual decommissioning and possible costs to the Town as well as the presence of toxic chemicals in the panels.

There was also some support for solar projects, especially from residents worried for farmers no longer able to farm and with no further farming prospects for their land. At present their choices are limited: It comes down to selling land for housing developments or selling or leasing land for solar. Spencer residents were overwhelmingly in favor of regulating solar facilities more strictly. We kept all this in mind as we reviewed the existing bylaw.

(See *Exhibit A: A written record of Spencer residents' comments, February 21, 2019; also available on SCATV.org)*

SBAC RECOMMENDATIONS AND CONCERNS PERTAINING TO THE SPENCER SOLAR BYLAWS

This part of the Report presents most of the significant bylaw changes SBAC recommends following several months of work and deliberations, briefly, modifying and improving the existing bylaws. The Attorney General's office has approved in other towns bylaws with similar changes and wording.

Definitions

1/ The Term "Photovoltaic", etc.

We recommend that the word "photovoltaic" be removed from the name of solar facilities in the current bylaws. Ongoing research may yield new technologies and new names.

We recommend that a maximum size of no more then 10 acres with no more than 5 acres of panels, and no more than 5 acres of tree cutting.

It is important that the Town defines project area as any land allotted for the solar project, as that seems to be a grey area in the current bylaws. It caused confusion for SBAC and has created confusion among the members of the Planning Board as well.

We recommend adding a definition of canopy solar installations such as Lamoureux Ford has installed

2. Waivers never to be granted

We recommend the Planning Board disallow any and all waivers in the following instances:

a) No solar facilities on Prime Agricultural Soils. These soils are irreplaceable and we have seen the disruption that occurs during the building of these projects *(For example, Wilson facility)*.

b) Financial surety shall be a requirement for decommissioning/abandonment. These are too important to waive, even partially**.**

c) No solar facility shall be allowed on slopes greater than 15 degrees. (*Town of Warren allows only 8 degrees.)* This is an already existing requirement that <u>must</u> not be waived, even partially. We have seen significant erosions even on lesser slopes.

3. A Cap on Solar Facilities in Spencer

We recommend limiting to 25 the total number of solar installations within town borders. Spencer and Charlton have the highest number of solar installations in the region and residents have expressed concern about this situation. Neighboring North Brookfield has capped installations at fourteen (14), and New Braintree has only four (6) solar installations.

4. Size of Solar Installations and of Project Areas

We changed the unit designation for solar installations from megawatts to acres, in the belief that as the solar industry becomes more efficient, it will get more energy from the same amount of acreage. This change also aligns with language used in the Town's Open Space Plan.

5. Pre-hearing Abutter Notification Process

a) We recommend significant changes to the abutter notification process. It is our belief that for projects of such significant size and impact, the current notification radius of 300 feet is not sufficient. We recommend one-half mile as the notification radius.

(See Appendix, Exhibit B for the Attorney General's review letter addressed to Barre T/A.)

b) We recommend that a temporary sign be erected at the beginning of the application process at the proposed site to provide additional notice to residents that a solar facility is being planned. This sign would direct residents to contact ODIS for more information.

c) We recommend placing **an ad** on the front page of the *Spencer New Leader* (not to replace the normal notification of a hearing), which the developers would pay for. The ad would notify Spencer residents about the location, project acreage, the megawatt output, the applicant's name, the hearing date, and contact information. We feel the currently required legal ad notification is too easy to miss.

We believe these changes would address the concerns of many residents who feel they don't know about these projects until they are far along in the permitting process.

SAMPLE of Front Page Ads:

A. 4 x 4 4c

ATTENTION RESIDENTS
PROPOSED

SOLAR FACILITY

Location/Address

Parcel Acreage

Power Capacity/MW

Applicant(s) Name

Hearing Date

Office of Development & Inspectional Services
Contact 508.885.7500 ext. 180

B. 8 x 2 4c

ATTENTION RESIDENTS
PROPOSED: SOLAR FACILITY

Location/Address
Parcel Acreage
Power Capacity/MW
Applicant(s) Name
Hearing Date

Office of Development & Inspectional Services Contact 508.885.7500 ext. 180

---Provided by *The New Leader* via Matt DeFosse

6. Noise

Residents complained that some solar facilities make noise that can be heard off-site. The hum or buzz at the Treadwell solar facility was of particular concern and was described as quite annoying. We learned that the more efficient the inverter, the louder it is and for that reason, some solar developers use less efficient inverters to lower the sound level. (*This is according to Dan Barber, the Operations and Management Director who oversees solar facilities at St. Joseph's Abbey*). Additionally, with the new emphasis on battery storage, we are concerned that the batteries (actually the 'chillers') may be even louder.

To address these concerns, we recommend

a) Lowering the allowed sound level from 10 decibels dB(A) to 5 decibels dB(A).
b) Adding more testing requirements and
c) Requiring sound mitigation, such as walls, around noise-emitting equipment in the event they cannot meet the requirement. (*These noise-testing changes are based on Shirley's solar bylaw.)*
d) Increasing the setback for noise-emitting equipment to 250 feet from abutting property lines.

7. Required Documents For Application Submittal

We recommend

a) A signed Interconnection Service Agreement from the pertinent utility be included in the application as the practice has been on recent project already, thus avoiding the situation where the solar project was approved and later National Grid could not accept the

power output. This is unfair to the Town, the developer, and the property owner, if the land is leased. We recognize that as a result of the current situation with utilities in the Commonwealth of Massachusetts, this step may be unnecessary.

b) The submission of MSDS (material safety data sheets) be required for all equipment/system components to ascertain the presence of any hazardous or toxic substance.

c) Including views of the solar site from abutting properties and the street, showing computer-generated views before construction, and vegetative growth after construction, at 2, 5, 10 years. This should help the Planning Board to better assess the view mitigation. (*This recommendation is based on Barre bylaws.)*

d) The submission of a glare analysis and proposed mitigation if needed. There have been complaints from residents who live nowhere near the facility, but experience blinding/major glare at certain times of the year. There have also been complaints from people driving in other towns and suddenly being blinded by glare from a nearby solar facility. (*North Brookfield and West Brookfield bylaws address this issue in a similar way.)*

8. Decommissioning and Abandonment

Decommissioning is of critical importance to our town. After much deliberation, the SBAC recommends that only cash surety be requested from the solar developers with the following justification: Decommissioning presents significant risks, both known and unknown. We cannot overlook the possibility that solar facilities in 20 years could be abandoned and could become serious burdens to our Town, not only monetarily but potentially posing environmental risks.

a) Cash surety instead of decommissioning bonds

SBAC recommends several changes, most notably the form and amount of financial surety. We have concerns about using a form of surety other than cash, due to the longevity of solar facilities.

We ask:

"Will the bond company even be there in 20 + years?"

"What about bankruptcy, insolvency, etc. of bond company and/or facility owners?"

(Please consider the Language of PILOTs in Part 3, Section 12. The terms in PILOTs put the Town at a disadvantage.)

We are also concerned about the dollar amount of existing decommissioning bonds, which we believe is not enough. We recommend a cash surety figure at a **minimum** of $350,000 per megawatt.

b) Why do we recommend this?

- The cost of recycling/disposing of panels is expensive.

What constitutes a solar installation decommissioning?

- Removal/disposal of racks and all structures/hardware

- Removal/disposal of above- and below-ground equipment, conduits and equipment associated with inverters, transmission power systems, utility poles, transformers, cooling equipment, and battery storage equipment

-Removal/disposal of fencing and gates

- Restoration of landscape to pre-construction state, such as stormwater controls (berms, basins, rip-raps, etc.)

All of these tasks will consume time to plan and execute, and will include costs for labor, transportation, disposal and/or recycling.

c) Will any of the materials hold any recycling value after 25 years of exposure to vicissitudes of New England seasons?

- PV and/or other types of solar panels have significant disposal costs.

  - Currently, there are only a few companies in the US that are recycling solar panels. One of them is in California, named Recycle PV Solar, LLC (*See www.recyclepv.solar*). In 2019 this company charged $25 per panel, not including shipping from New England to CA. It is also not clear what size of panel – panel sizes vary – would cost $25 to recycle. Since the panels contain materials of unknown levels of toxicity, it might be necessary to recycle them. For example, the Wilson solar facility contains 9,815 panels (*See Appendix, Exhibits C and D. Decommissioning Chart and Solar Panel Waste*). At today's $25/panel rate it would cost $245,000 to recycle the panels. Removal and shipping not included.

d) West Brookfield already requires cash surety of $100,000 per MW. *(AG approved bylaws that contain this requirement.)*

- West Brookfield Selectman Daniel Bigda stated that he was convinced that the sum of $100,000 /MW was inadequate and that towns should increase the amount substantially. *(We are aware of* the *same sentiment also in Warren and elsewhere.)*

e) We recommend that the amount of the cash surety be reviewed every five years by a licensed Professional Engineer knowledgeable

in recycling solar panels, hired by Town, paid by solar developers, to keep the cash sum current with costs.

f) Battery storage is another item to consider. Decommissioning of battery storage units is a major issue for the industry and other stakeholders. Each battery is approximately the size of a truck container/shipping container, and each solar facility will require several (for example, 7 flow batteries are needed for a 1 MW solar facility in Shirley, MA). We, therefore, assume that the cost for the decommissioning and disposal/recycling of batteries will be considerable as well.

We recommend that the Town together with Town Counsel investigate whether it would be possible to negotiate cash surety for the decommissioning from the Wilson solar facility, which lacks one. The decommissioning bonds for other operating solar facilities in Spencer are inadequate.

We do not think that our figure for the decommissioning cash surety of $350,000 per MW is too high and may even be too low. *(Much of the wording we chose for this segment came from Barre and Orange bylaws.)*

g) More on panel recycling

It is difficult to remove toxic materials from panels, and once removed, there is no market for the chemicals since the recycled chemicals cost more than raw materials. We would like to see the State of Massachusetts mandate that any company that sells solar panels in the Commonwealth must provide an end-of-life recycling program. In our free-market economy, this will likely be the only way to force recycling. Washington State and California have adopted similar regulations already, and New York State is in the process. Disposal of panels and/or batteries in landfills is not a

viable option. (The *www.recyclepv.solar* is a very informative website.)

h) Abandonment of solar facilities is another serious concern because it could have a major impact on the Town. We agree with the wording in Barre bylaw, with SBAC only expanding the period of time the solar owner would have to complete the removal, from 90 days to 150 days. We do not think that the existing Spencer bylaw was strong enough. *(The Attorney General's office cautioned that towns cannot conduct warrantless searches to determine abandonment, but we think that that is covered in the existing bylaw.*) Orange, MA has extensive details in their bylaw about the abandonment process to be followed.

i) SBAC has concerns about protecting our Town in the event of extreme weather damage to the solar facility and subsequent decision by the facility's owner not to repair it. We would like the Town to inquire of Town Counsel whether it is possible to require the owner of the facility to carry insurance that would benefit the Town in such cases**.**

(Please refer to the Table of Decommissioning surety /Disposing of panels, Appendix, Exhibits C and D.)

j) SBAC wishes to highlight issues with batteries

- Explosion potential, fire, noxious fumes
- Noise from battery and its coolers/chillers (up to 80dB)
- Contamination from corrosive chemicals
- Battery size that will be difficult to screen
- Short life (a few years only), disposal issues.

9. Setbacks

Increase setbacks to 200 feet for the front, side, and rear yards if there are residences on abutting properties, and 250 feet for equipment such as inverters that might exceed allowable noise levels. This increase would allow for a wider vegetative buffer at the property lines and in some cases possibly eliminate the necessity for tree and shrub removal, thereby blocking view of the arrays. It would also lower the sound level at the property lines.

10. Batteries

There are serious safety issues with batteries, and we recommend not allowing their use in Spencer. There are currently three battery types:

7. Lithium-ion battery, the most common. Lithium is highly volatile and requires a narrow range of temperature for safety. As lithium-ion batteries reach their end-of-life, they become less stable and need to be monitored carefully. If the batteries get too hot, a fire may start and feeds on itself. There have been fires and a massive explosion at a 2MW facility in Arizona in April 2019. *(See Appendix, Exhibit F)*

7. Flow battery, promising, being field-tested. They have a longer life, use vanadium, iron, bromine, or sodium solution, which are all reportedly safer than lithium-ion.

T. McAuley participated in an excursion at the National Grid solar testing facility in Shirley, MA. Neither the one-acre solar facility, nor the seven (7) huge flow batteries and a chiller were in operation yet; hence we were unable to hear emitted noise. Anticipated date of operation is October 2019.)

7. Zinc-hybrid, not ready for commercial use yet. They are expected to be lower in cost, safer, and to have a similar life to lithium-ion but are not as efficient.

In the event that the Board of Selectmen decides to allow battery storage, we recommend noise testing during the quietest part of the night as well as the day. *(See Appendix, Exhibit E, an image of one battery)*

11. Panels:

SBAC has some concerns about the various types of panels currently available.

a) Most commonly used is silicon, either monocrystalline or polycrystalline. We believe that monocrystalline panels have been used in all of Spencer's installations thus far. These contain silicon, copper, and lead solder, which leaches if exposed. The main concern with these is the possibility of lead leaching into water. These panels may be recycled but in many areas are being discarded in landfills because states have not enacted regulations.

b) Thin-film, accounting for a small percentage of solar panels so far. These panels contain more toxic materials, most commonly cadmium telluride (CdTe) which is considered less dangerous than cadmium alone. It is safe as long as it is encapsulated but if broken, or in dust form, could leach into water *(unlikely because of the flexible material that surrounds that encapsulates the semiconductor layers).*

c) CIGS (cadmium indium gallium diselenide), another type of thin-film panel with similar concerns. These can be recycled but often

are not, because the raw material cadmium (a byproduct of zinc and copper mining) is less expensive than the recycled product.

Researchers seek to eliminate the use of cadmium, and some companies have already eliminated the use of lead solder. Still, there are impurities in the glass that renders it non-reusable. Those impurities could be released in the event of breakage. Many researchers have concerns about the possible degradation and subsequent leaching of materials used in panels, while others state there is no leaching.

Further, there are variables in the efficiency of the panels; how much sunlight a region receives, and whether or not the panels are mounted on track and follow the sun.

12. Visual Impact Mitigation; Vegetation Management and Land Clearing; Soil Erosion and Habitat Impacts

Sections 3, 8 and 14 in the current bylaws' Design and Performance Standards all deal with vegetation and belong together:

The main concern is the cutting of trees. Trees store carbon and trees are removed to clear space for solar facilities whose purpose is to cut carbon. We recommend capping tree removal at 5 acres of forested land-rather than 50% of a parcel. *(Similar to Shirley, MA bylaw.)*

To promote the growth of a new eco-system, which will help to mitigate the impact of the solar facility, we recommend planting native pollinators <u>outside</u> fencing that surrounds the arrays. <u>Inside</u> the fence, solar developers would be allowed to continue with current

practices. Currently, we mostly see grasses and clover being used (clover is not native, although it is a pollinator plant).

Many native insects are host-specific (e.g. monarch butterfly), requiring particular plants in order to complete their life cycles. There are many other insects that have similar requirements and their numbers have declined in recent years. Some of that decline is due to *neonicotinoids* (insect killing pesticides), but much is due to loss of habitat. Therefore, we recommend a reduced mowing schedule inside the fence to promote insect breeding and grassland bird nesting. We suggest a plan for mowing similar to crop rotation, cutting a different section of the area each year.

We recommend requiring installation of bird and bat houses at the edge of grass or tree areas on the land, in order to mitigate the loss of habitat.

Birdhouses are a great idea in meadow-type area because these can attract both bluebirds and Tree Swallows. Swallows can be aggressive with bluebirds, so we suggest pairing houses about 15 feet apart. This way the Tree Swallows will defend their box from other swallows, but allow the bluebirds to use the second box. The paired boxes should be a couple of hundred yards apart. It is important to monitor the boxes for House Sparrow, and if they take over a box, you might just want to shut it down and while it is legal for you to destroy the nests, the sparrows are very v persistent and will keep rebuilding. Bay houses do not present any problems with the bluebirds. ---From Massachusetts Audubon

Many residents complained about vegetative screening being inadequate, at least during the first few years. To adequately screen a solar installation within five years, large shrubs would need to be planted. This is impractical for sites where the shrubs cannot be watered regularly. For this reason, small shrubs are typically used, but take longer to grow to screening height. For that reason, we would suggest erecting a fence, such as a wood stockade type fence, with vertical openings to provide wildlife corridors (these openings are not to be confused with the 6-inch space required underneath fences). Screening fences could remain in place for the first few years until shrubs grew tall enough. -If batteries are permitted and are stacked, this could create an additional and major difficulty in screening mitigation.

We further recommend construction that causes minimal soil disturbance and suggest using methods that do not require permanent penetration of soils as far as is possible, recognizing that existing codes may require it. *(This idea is from Orange bylaw.)*

Info re: Authority on Soil Designation

a) Ellen Sousa:
I believe the USDA did the soil classifications originally. They can be seen as a Soil layer under Physical Resources on OLIVER which is the MA GIS Online mapping tool. http://maps.massgis.state.ma.us/map_ol/oliver.php

b) Mary Baker-Wood:

The Holden NCRS office I assume. I know local farmers who deal with them and they have been very helpful to our Envirothon teams.

Contact info: **Holden Field Office**
Serving Worcester County
52 Boyden Road, Suite 100, Holden, MA 01520
508-829-4477 ext. 3

13. Construction Process

We recommend that a Professional Engineer or other qualified construction savvy individual be hired by the Town and paid for by the developer. S/he would be given full access to monitor all phases of solar facility construction, creating and implementing photo-documentation, and ensure and enforce compliance with construction plans.

14. Utility Connections

Most, if not all, of the solar projects in Spencer have started producing electricity before receiving final approval from the Town. National Grid typically connects the facility upon approval of the Town's Electrical Inspector. We recommend that prior to interconnection to the utility, solar facilities receive final approval from each of the following **before** the Electrical Inspector gives the green light:

- Most importantly - the Planning Board
- Town Building Inspector
- Conservation Commission
  (If the Conservation Commission was involved)
- Electrical Inspector

Several operating solar installations in Spencer still have issues years after completion. Like closing the barn door after the horse has escaped, the Town currently has no means to force solar facility owners to correct the issues (mostly erosion) unless they want their Stormwater Bond returned.

15. Impact on Agricultural and Environmentally Sensitive Land

Many residents have expressed concern about open space and agricultural land, including those designated as Prime Agricultural Soils. To this end, we recommend protecting all lands with Prime Agricultural Soils designation from solar facility development. We would further extend this protection to unfragmented open land that is identified as a priority for conservation in the Open Space, Master Plan, or Community Development Plans. *(Barre protects all of the above categories in their bylaw.)*

We recommend not allowing solar installations on permanently protected open space or any protected habitats.

Chief among SBAC concerns is the protection of town's drinking water. We strongly recommend that solar installations not be permitted in the Aquifer Protection District. The Town has to safeguard a very precious resource, clean water, for the residents. *(Please see Section 11, Panels, on leaching.)*

We look forward to meeting with you to answer questions you may have.

--- Margaret Emerson, Author

--- Edited by Tatyana McAuley

References and Resources for Part 2.

www.recyclepv.solar –for information on recycling panels and other related issues like preventing storm damage

Barre solar bylaw: https://ecode360.com/31873652

https://www.townoforange.org/

https://www.northbrookfield.net

https://www.shirleyma.gov/sites/shirleyma/files/pages/final_pdf_amended_zoning_bylaws_may_2018.pdf to see Shirley's zoning bylaw

https://onlinelibrary.wiley.com/doi/epdf/10.1002/pip.624 - About risk of house fires in homes with CdTe solar panels on the roof

PART 3

SBAC's ADDITIONAL CONCERNS and ENHANCEMENT IDEAS

Submitted to the BOS for further consideration

INTRODUCTION

The members of the SBAC do not possess any special education about anything solar. Our research was by necessity limited to online research and to a few excursions

that were strongly PR in nature. SBAC had no budget to request consultations with experts or scientists at universities.

T. McAuley sought help at WPI re: inverter fan noise and how to measure such noise. The last WPI professor who was interested in such practical matters retired several years ago, and it was not possible to contact him.

SBAC members participated in monthly meetings of town representatives from 11 Central Mass towns — Charlton, Hardwick, New Braintree, North Brookfield, Oakham, Palmer, Spencer, Sturbridge, Ware, Warren and West Brookfield. At each meeting we focused on one issue relevant to solar facilities, and shared our knowledge and experiences. These meetings not only energized us, but also informed us. We learned that all towns struggle 100% with the same issues. We attended seven (7) meetings that were also attended by various Selectmen, Planning and ConsComm members, town planners, members of solar bylaws committees like SBAC, plus always a few solar developers and "community engagers."

We experienced many productive conversations. It was encouraging and inspiring to meet the leaders of other towns who shared the concerns of their bylaws committees. Were the atmosphere similar in our town and our invitations to participate accepted, this Report would have been a better collaborative document and, therefore, rich with experience of those who work with solar developers directly**.**

Nevertheless, we did not lose hope and wish to submit the following thoughts and points for consideration:

1. Town Administration and solar

a) Residents suggested to SBAC that the Town's Open Space Plan and Master Plan be respected. **The Master Plan is the only plan the Town of Spencer has had in its 250 years of existence.** It is a thoughtfully written, extraordinary document. A new Open Space Plan is in the works.

b) Town of Spencer should have **a specific plan for solar facilities** and their number in our town. The future Solar Facilities Plan should align its goals with the Town's Master Plan and the Open Space Plan, and with all other plans the Town has for its future. Solar facilities should not be welcomed into our town indiscriminately.

2. More Information on Solar Facilities

a) Ground-mounted residential and other small solar installations should require a Special Permit to ascertain that they are sited carefully and would not disturb or otherwise impact neighbors/abutters.

b) Currently, solar panels are only 11- 23% efficient. Some articles state 23%. Solar panels also utilize only about 20% of the absorbed solar heat; the rest of the heat is reflected/released into the air and increases general temperature. * Solar facilities are, therefore, also labeled as "hot spots". Another scientific article states that the released heat cannot be utilized.

*This information was found in an article on desalination of seawater with the help of solar panels in Saudi Arabia: https://www.popularmechanics.com/technology/infrastructure/a28355795/solar-panels-saltwater-farming/

3. Material Safety Data Sheets

We strongly recommend that the Town through its authority, the Planning Board, require MSDS (Material Safety Data Sheets) for all parts of the power generating equipment. Officials in other towns have not received these sheets when requested. SBAC wonders why these sheets have not been readily available?

4. Cyber Attack Concerns

Each solar facility in the USA is connected to the Internet and, for security and production reasons, is monitored remotely 24/7. Panels are most often produced in China. Some scientists are aware of **possible cyber attacks via solar facilities** to disrupt the grid all over the country. The industry is collaborating with the IT/AI sector to create software to prevent and stave off such events.

(See: *Solar Equipment Vulnerable to Cyberattack, Power Outage: Report (1)* - https://news.bloombergenvironment.com)

5. SOLAR ENERGY and transmission fee

Solar electricity is expensive energy; household electric costs will go up. We can already see small amounts for transmission on our electric bills from National Grid. The power is generated in our backyards, transmitted to a substation and from there goes to a central station, and than transmitted back to us-- and we pay the transmission fee. Does it make sense?

6. Real Estate Values and Impact on Lifestyle

Neither the solar nor the real estate industry talk or publish anything about the issue that solar facilities impact nearby real estate values. Both remain silent: the value of homes and properties near solar facilities is not a topic.

Living next to solar facilities changes abutters' lifestyle. It impacts abutters during the 8-10 months of construction (e.g. long hours of construction noise, dust, traffic on our narrow country roads,

concerns if the construction will impact our air and ground water, if it will be noisy, visible, other possible health impacts.

How abutters are impacted later, we know from speaking with people who live next to the solar facility. Issues with runoffs, more stormwater, wildlife disappearing in the area, some people hear the noise (Holmes, Treadwell), change of landscape and scenery. Only the future will tell if people experience other issues and what they might be.

7. A Window on the Future

SBAC is aware that solar facilities have a short history. The solar facilities in Spencer and our region might end their useful life in 20-25 years, all of them around the same time. What is in the future? Some facilities might be "repowered' with new panels. Some facilities might be properly decommissioned and others might be abandoned. A similar scenario was illustrated/narrated by a Spencer citizen during the February Listening Session. While he traveled recently in the West, he saw wind turbines non-functioning and abandoned everywhere. Broken turbines littered the countryside for miles and miles. Most certainly, none of us wishes for our town to become a similar solar cemetery? *(For a record of citizens' oral and written comments see Appendix, Exhibit A, Listening Session)*

8. Extreme Weather Plan

SBAC wonders what is the Town's contingency plan for extreme weather that is now increasingly more common or what if Acts of God should strike Spencer?

—T. McAuley is aware that there was a recent workshop attended by Spencer Town Planner that focused on how to develop such a plan. Please consider and include solar facilities in this plan.

9. Applicant Screening

SBAC suggests that solar applicants be screened or vetted as to their past history with construction, issues in this region, etc. For example, ZPT does not have the best reputation in Spencer or elsewhere, yet ZPT has placed the most solar facilities in Spencer. ZPT is the same company that negotiated a tax agreement with the Town of Charlton, and at the same time sought out a few non-profits to whom to sell its power generated in Charlton, and thusly, gain a tax-exempt status for doing so. The host, Town of Charlton, lost all planned taxes, and has to return certain sums. Such companies should be controlled.

(*Information received from Laurie Degnan, Chair of the Charlton Solar Bylaws Committee.)*

10. An Information List -- Solar Moratoria and Caps

- Towns' issues with solar facilities are the same everywhere:

Athol	15 months moratorium
Charlton	12 months (capped at 30 facilities)
East Brookfield	1 solar facility; 3 approved, no cap
Hardwick	Moratorium is on the ballot
New Braintree	6 months (capped at 6 facilities)
Leicester	12 months (capped at 20 facilities)
North Brookfield	3 in the pipeline (capped at 14)
Paxton	No morat., no solar facilities, municipal
Ware	14 months
Warren	6 months (capped at 18)
Spencer	No moratorium, no cap*
West Brookfield	10 solar facilities, capped at 10

*(*See also Appendix, Exhibit K. An Excel sheet that depicts solar situation in Spencer as of late spring 2019.)*

11. SBAC wishes to highlight issues with PILOT

agreements as we see them. Please note that most of the PILOTs use identical language. SBAC wishes to bring the wording to the close attention of the BOS and the Town Administrator.

We hope that the new Town Counsel will examine the new PILOTs closely and will shape/forge them carefully and to best advantage and protection of our town from possible long-term detrimental financial impacts.

12. PILOT agreements

Weigh the benefit of a **fixed PILOT tax vs. the expenses, concerns and risks to our town:**

- The loss of agricultural land
- The loss of open space
- Consider the possible pollution of our water and air the many acres cleared for solar facilities
- The huge number of trees being cut to make room for "green" energy.
- Trees absorb not only gallons of water but also CO2. The solar facilities are constructed to reduce the CO2 in our air.
- Significant numbers of volunteer work hours for the members of the Planning Committee, ConsComm, and other town volunteers

- The significant and uncounted paid work hours the Town administrators and the staff of various departments, plus Inspectors and Chiefs of Fire and Police have to expend on each solar facility and its developers
- Legal costs

Language in PILOTs

NB. The following examples on the left highlight excerpts from selected PILOTs and are referred to by page numbers. The pages are to be found in Appendix, Exhibit G.

Citation/wording from PILOTs	**Issue**
Page 1--Accurate projection/fixing the formula/ of developers' and Town's expenses and revenues…	Oxymoron? "Accurate projection" Is this in the best interest of the Town? *PILOTS were originally designed for non-profits (Courtesy of Wikipedia) Could this sound like special treatment for solar developers? Do incoming business get the same treatment? Residents do not get such luxury to know what taxes will be in 20 years.
Page 2 ---…valuation for the real estate shall remain fixed for a term of twenty (20) years	Property values rise: Town is losing money on fixed valuation; Is this advantageous to the solar applicant who receives fixed value and can sell the land profitably at the end of the 20 years?
Page 3-4, Section 4--- The Developer will update the Inventory annually…	How does the Town verify that the information is correct? Does this indicate that the developer can make annual improvements up to but under $25,000.00 and the Town would not

	collect tax on that improvement? A benefit to solar developers?
>Ms. LeBlanc, the Town assessor, informed us that PILOT is based on submitted receipts for inventory	The Town Administrator informed us that the PILOT is based on the MW of each solar facility. Probably both play a role in calculation. How are the PILOTs calculated to benefit our Town?
Page 5, Section 6-Town pays for expenses for an audit	Why should the Town incur this cost?
Page 5, Section 8—The Developer acknowledges that this Agreement is beneficial because it ensures that there will be mutually acceptable, steady, predictable, and reasonable payments of taxes for the Project and the Property.	Who decides what is reasonable in this case? How many people are involved in the final decision of the PILOT calculation**?**
Page 5, Section 12 – *Force Majeure:* The Parties recognize that there is the possibility during the term of this Agreement that all or a portion of the Property or Project may be damaged or destroyed or otherwise rendered unusable due to events beyond the control of either Party. These events are referred to as "*Force Majeure*." As used herein, *Force Majeure* includes, without limitation, the following events: a) Acts of God including floods, hurricanes, earthquakes, fires or other natural calamity; or b) Acts of War or other civil insurrection or terrorism. – If the Developer elects not (to rebuild the facility), then it may notify the	Should not the Town require a general liability insurance policy to protect the Town/us from these types of events? *Force Majeure* lets the solar developer off the hook should the event occur. Removal of the damaged solar facility is not mentioned. Who would be responsible? The wording in section #12 is rather disconcerting.

Town of its termination of this Agreement and the Project and all real and personal property will thereafter be assessed and taxed as though this Agreement does not exist…	
Page 7, section13 b) ii This Agreement constitutes the legal, valid and binding obligation of the Developer enforceable in accordance of its terms, except to the extent that the enforceability may be limited by applicable bankruptcy, insolvency or other laws affecting other enforcement of creditors' right generally or by general equitable principles.	Note the use of words 'except,' 'limited' etc. Almost all developers are LLC and they sign these Agreements. What is the Town left with if they fold?
Page 8, Section 13, b) vii The Developer is not a "manufacturing corporation" or " limited liability company engaged in manufacturing' under M. G. L. c. 59, Para 5 (16) (3).	Not an LLC? But it states on the 1st Page of the PILOT that developers are LLC. Puzzling segment!
Page 9, Sections 19 and 20 a), b) and c) Lender's Rights and Assignment-developer has the right to encumber, mortgage… and assign ...the title in this Agreement to any financial institution or other person…at any time… <u>terminate for any reason or ii) the Project ceases commercial operation</u> and is decommissioned.	Where does this leave the Town and the projected taxes it counted on? The T/P told SBAC that solar facilities are not a commercial entity, Dec. 17, 2018, yet here we read about "commercial operations."

---Prepared and submitted by Matt DeFosse

13. PILOTs, Money and Profits

a) SBAC has concerns about PILOT payments and the way they are calculated, given the lifespan of a solar project. The payments may not be adequate. We question whether regular taxes might not be better for the Town *(after the State corrects the loophole allowing developers to escape any payment at all).*

b) SBAC is concerned that there seems to be much secrecy around the PILOTs. SBAC had difficulties obtaining any PILOTs and later received a few redacted PILOTs from another Spencer citizen. SBAC was never able to ascertain even the general profit levels made by developers in our town. This secrecy should concern everyone.

14. Adding Batteries

Solar facilities in New England do not appear to be very efficient yet. Research indicates that due to our region's weather and availability of sunlight in general, the average facility generates only for 3.2-5 hours per day/year *(stated by Selectman Bidga, West Brookfield).* Solar panels are only 11-23% efficient and are able to absorb about 20% of solar heat; the remaining 80% releases into the air. (*For more details, see article on Desalination of Seawater in Saudi Arabia, Appendix, Exhibit H*).

This low efficiency during most hot summer days results in fluctuating levels of generation that impacts people and businesses. (*For example, the highest electricity demand occurs when people leave work and return home, between 5-10pm.*)

An obvious mismatch occurs when fluctuating solar supply cannot meet fluctuating energy demand. Whereas the electric power generated by hydro, fossil fuels or nuclear power plants has been steady and ready to meet the demand as it occurs. These sources have

to be turned on to even out the demand for power in the evening hours.

The National Grid utility is now suggesting to solar developers to add battery storage units to even out the curve of demand and supply.

As noted previously, the batteries are the size of an average trailer truck or a shipping container.

T. McAuley has been trying for several weeks now to find out the actual dimensions of a flow battery—the VIONX (vionx.com) company did not respond yet. --Several SBAC members will attend the August 15, 2019 excursion to the Sterling solar facility that utilizes lithium-ion batteries. We will have a tape measure with us.

15. Batteries and PILOTs

Adding batteries begs two questions:

- PILOTs will have to be renegotiated or amended to accommodate an addition of battery units; hence the Town should be entitled to a higher PILOT payment.
- Further, the batteries do have a specific life (a few years only) and will require decommissioning expenses. This reality needs to result in a higher decommissioning cash sum upfront.

About the flow batteries that Tatyana McAuley viewed in Shirley, MA in July 2019:

- This National Grid testing solar facility will be operational in October 2019. Its output will be only 1MW. There were in place six (6) batteries plus one central container that housed the wiring, hence seven (7) shipping containers. In addition, there were supporting transformers and at least one large "chiller". Chillers cool the

batteries.

- If a solar facility were 2 or 3 MW, these batteries would be stacked two three stories high. The result will be an enormous structure, ca. 25+ feet high and impossible to mitigate visually. The Shirley site was not operational; therefore, TM is not able to comment on noise generated. The cost of the flow batteries is very high and no exec on the site wished to share the actual cost. Flow batteries are used on a test site at the Holy Name HS in Worcester, but an older generation. *(Please see battery image in Appendix, Exhibit E)*

16. More on Panels

In the *Appendix, Exhibit I.* we include a document written by Daniel Bigda, Selectman of West Brookfield. With his permission, we share this document about panels with you**.**

17. Two Documents from Warren, MA

SBAC submits two important documents we requested from Warren, MA with the hope that the Spencer BOS would seriously consider adopting these town protection documents also for our town *(See Appendix, Exhibit J*):

a) Soil Testing after Decommissioning (NB. Establish a baseline at the beginning of construction)

b) Draw Schedule of the pertinent decommissioning cash sum.

(We include these documents courtesy of the Warren Planning Board Chair, Joyce Eichacker.)

****

CLOSING STATEMENT ---TO THE BOS

Dear Selectmen:

Members of the Solar Bylaws Advisory Committee wish to thank you for the opportunity to serve our town. We hope that the Spencer Town leadership carefully considers each and every one of our recommendations and our concerns.

Our work on bylaws (Part 1) focused on the 'right siting' of solar facilities, as we were originally directed to do by Selectman Gary Woodbury. In the Report (Parts 2 and 3) we voice and share our concerns in order to protect our town and secure the best outcomes for the town in which all of us reside.

Your decisions vis-à-vis this Report will impact our town one way or another. The decisions you will enact will be a part of your and our legacy, a far-reaching legacy, reaching a quarter of a century ahead of time, and beyond.

On behalf of my SBAC colleagues,

----Tatyana McAuley

The End.

This is the most recent version 6/9/19

ARTICLE 4.8.9 SOLAR PHOTOVOLTAIC GENERATING INSTALLATIONS (Amended 11/17/16 Art. 12)

A. Purpose - The purpose of this bylaw is to facilitate the creation of new Solar Photovoltaic Generating Installations by providing standards for the placement, design, construction, operation, monitoring, modification and removal of such installations that ~~address~~ protect public health, safety, and welfare, ~~minimize impacts on~~ residential properties and neighborhoods; protect ~~the environment, scenic,~~ natural resources, including wildlife habitat and corridors; and preserve ~~historic,~~ scenic and historical resources. To also provide adequate financial assurance for the eventual decommissioning of such installations consistent with the intent of Chapter 40A Section 3 of the Massachusetts General Laws. The intent of this bylaw shall be applied in accordance with the Town of Spencer Master Plan and Open Space Plan.

B. Applicability - The provisions set forth in this section shall apply to the construction, operation, repair and/or removal of Photovoltaic Generating Installations as permitted in Article 4.2. Use Regulations. All such facilities require a building permit and must comply with all applicable local, state and federal requirements, including but not limited to all applicable safety, construction, electrical, and communications requirements and other applicable provisions of Spencer's Zoning Bylaws.

The total number of non-residential Ground-Mounted Solar Installations in Spencer shall be limited to twenty-five (25). Facilities constructed or permitted prior to this bylaw are counted in this total. Municipal solar facilities are not counted in this total. North Brookfield

C. Definitions

~~Photovoltaic System (also referred to as Photovoltaic Installation): An active solar energy system that converts solar energy directly into electricity.~~

~~Solar Energy System, Grid-Intertie: A photovoltaic system that is connected to an electric circuit served by an electric utility.~~

~~Solar Energy System,~~ Ground-Mounted Solar Energy Installation: An Active Solar Energy System that is structurally mounted to the ground and is not roof-mounted; ~~may be of any size (small-, medium- or large-scale)~~ maximum size no more than 10 acres.

Residential Ground-Mounted Solar Energy Installation: An active Solar Energy System that is for the benefit and use of only the residence; it is not subject to this bylaw.

~~Solar Energy System, Off-Grid: A photovoltaic solar energy system in which the circuits energized by the solar energy system are not electrically connected in any way to electric circuits that are served by an electric utility.~~

Canopy Solar Generation Installation - A Solar Generation Installation with 100% of the nameplate capacity of the solar photovoltaic modules used for generating power installed on top of a parking surface, pedestrian walkway, or canal in a manner that maintains the function of the area beneath the canopy.

D. General Requirements

1. The construction and operation of all ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installations shall be consistent with all applicable local, state and federal requirements, including but not limited to all applicable safety, construction, electrical, and communications requirements. All buildings and fixtures forming part of a ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installation shall be constructed in accordance with the Massachusetts State Building Code.

2. ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installations shall not be constructed, installed or modified as provided in this section without first obtaining a building permit and paying any required fees.

In addition to the abutter notification requirements for Special Permits as contained in Section 7.2, the applicant for a Ground-Mounted Solar Energy Installation shall notify all property owners located with one-half (1/2) mile of the boundaries of the property on which the solar facility will be located. This notification shall include a description of the project, a locus map showing the location of the solar facility and any additional information. Then notification shall be mailed via certified mail with a return receipt. Any comments received from local property owners shall be included in the permit review by the Planning Board. The property owner shall erect a sign beside the major frontage road within 30

days of submitting an application for a Special Permit for the solar facility. The sign shall state the name of the solar contractor, the size and acres of the solar facility, and the total megawatt output of the facility. The sign shall include a site plan showing the location and extent of the solar facility and all nearby roads and highways. The sign lettering shall be of sufficient size to be read by someone driving along the road. Barre Atty Gen approved but states should consult with Town Counsel about this, they seem to have concerns about reasonableness

3. Noise generated by ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installations and associated equipment and machinery shall conform to applicable state and local noise regulations, including the DEP's Division of Air Quality noise regulations, 310 CMR 7.10. In addition, A source of sound will be considered in violation of said regulations if the source:

Increases the broadband sound level by more than ~~10~~ 5 db(A) above Pre-construction ambient noise level, or

Produces a "pure tone" condition, when an octave band center frequency sound pressure level exceeds the two (2) adjacent center frequency sound pressure levels by three (3) decibels or more, or

Results in sound or noise levels greater than 30 dBA.

Prior to the issuance of a building permit, the applicant shall conduct a test of ambient noise conditions during startup operations and provide a written report of noise decibel levels. Said criteria are measured both at the property line and at the nearest inhabited residence. In addition, the said criteria shall be measured at any property line that is subject to sound elevations higher than ambient sound as a result of higher or lower topography in the opinion of the applicants' acoustical engineer. "Ambient" is defined as the background A-weighted sound level that is exceeded 90% of the time measured during equipment hours, unless established by other means with the consent of the DEP. All testing required by this bylaw shall be done by a licensed professional acoustical engineer chosen by the Planning Board and paid for by the applicant. All testing shall be done in accordance with the professional standards of the appropriate accrediting agencies.

Sound levels in excess of the above levels shall be required to construct sound-absorbing walls around noise generating equipment If storage batteries are to be installed, testing shall be performed both during the quietest part of the day and the quietest part of the night. Shirley – we added the last paragraph ourselves

E. The ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installation's owner or operator shall maintain the facility in good condition. Maintenance shall include,

but not be limited to, painting, structural repairs, and integrity of security measures. Site access shall be maintained to a level acceptable to the local Fire Chief and Emergency Management Director. The owner or operator shall be responsible for the cost of maintaining the Solar Electric ~~Generating~~ Facilities and any access road(s).

The Planning Board may require, as a part of the review, on-site visits by the Planning Board during the application process. In addition the Planning Board may require on-site visits during the construction phase and from time to time, as determined by the Planning Board, following the date of completion. In the event the Planning Board receives a signed written complaint, the Planning Board will notify the applicant, owner and operator and schedule an on-site visit to resolve the matter. ~~In the event that the Planning Board finds that further steps are required to minimize the visual impact, the applicant, owner and/or operator shall take such steps as are required by the Planning Board, including replacing dead or unhealthy vegetation.~~

F. Required Submission Documents – Special Permit And/or Site Plan Review Applications shall include:

1.A properly completed and executed application form and application fee.

2.Any requested Waivers

3.Name, address, phone number and signature of the project proponent, as well as all co-proponents or property owners, if any.

4.Name, contact information and signature of any agents representing the project proponent.

5.Name, address, and contact information for proposed system installer.

6.Documentation of actual or prospective access and control of the project site

sufficient to allow for construction and operation of the proposed solar electric installation.

7.Proposed Hours of Operation

8.Route by which construction materials and equipment will be delivered to site.

9.Blueprints or drawings of the solar electric installation signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts showing the proposed layout of the system and any potential shading from nearby structures.

10.Utility Notification - evidence that the utility company that operates the electrical grid where the installation is to be located has been informed of the solar electric installation owner or operator's intent to install an interconnected facility and acknowledges receipt of such notification. A copy of a signed Interconnection Service Agreement accepting the proposed power output. A copy of an Interconnection Application filed with the utility including a one or three line electrical diagram detailing the solar electric installation, associated components, and electrical interconnection methods, with all Massachusetts Electrical Code (527 CMR § 12.00) compliant disconnects and overcurrent devices. Off-grid systems shall be exempt from this requirement. (Amended 11/16/17 Art.9)

11.Documentation of the major system components to be used, including the electric generating components, transmission systems, mounting system, inverter, batteries, etc. If the proposed system is located in Aquifer Protection District, documentation must include information on elements of the system that use materials that are in any way either hazardous or toxic.

12.Documentation by an acoustical engineer of the noise levels projected to be generated by the installation.

13. Operation & Maintenance Plan for the operation and maintenance of the Photovoltaic Generating Installation, which shall include measures for maintaining safe access to the installation, storm water and vegetation controls, and general procedures for operational maintenance of the installation. An Operation and

Maintenance report shall be filed annually with the Planning Board confirming that the operation is ongoing and has not been abandoned.

14. Abandonment & Decommissioning Plan - Any ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installation which has reached the end of its useful life or has been abandoned (i.e. when it fails to operate for more than ~~one year~~ six months without the written consent of the Planning Board) shall be removed. The owner or operator shall physically remove the installation within 150 days of abandonment or the proposed date of decommissioning. The owner or operator shall notify the Planning Board by certified mail of the proposed date of discontinued operations and plans for removal. The Abandonment & Decommissioning Plan shall include a detailed description of how all of the following will be addressed:

(a) Physical removal from the site and from the Town of Spencer of all above and below ground project related installations and structures; equipment, building, security barriers and transmission lines from the site, including any materials used to limit vegetation.

(b)Disposal of all solid and hazardous waste in accordance with local, state, and federal waste disposal regulations.

(c)The site shall be restored as near as reasonably possible to its condition prior to the commencement of construction. Stabilization or re-vegetation of the site as necessary to minimize erosion. The Planning Board may, depending on the proposed use of the land, allow the owner or operator to leave landscaping or designated below-grade foundations in order to minimize erosion and disruption to vegetation.

If the Ground-Mounted Solar Energy Installation is deemed abandoned by the Planning Board, the Town shall give the owner and operator 30 days' written notice to remove the facility. In the event that the owner and operator have not completed the removal at the conclusion of 150 days from the date of written notice, the Town may proceed, without taking any legal action, to enter the property to decommission, physically remove the facility and restore the property. The Town may recover any costs from the financial surety provided by the applicant. In the event that there are insufficient funds to complete the decommissioning, removal and restoration, the applicant, owner and operator (including such other parties or entities as appropriate) shall be jointly and severally liable to pay any excess costs incurred in order to do so.

This from Barre, we increased time from 90 to 150 days. Note-Atty Gen states that Municipal officials do not have the authority to conduct non-emergency warrantless searches of private property without permission of the owner. See above

(d)Description of financial surety for decommissioning - Proponents of ~~Solar Electric Generating Facilities~~ Ground-Mounted Solar Energy shall provide ~~a form of surety, either through escrow account, bond or other form of surety~~ security in the form of a cash deposit in the minimum amount of $100,000/MW (DC) of installed system capacity which sum shall be held by the Town Treasurer pursuant to MGL c 44 53G1/2, approved by the Planning Board to cover the cost of removal in the event the Town must remove the installation and remediate the landscape, ~~in an amount and form determined to be reasonable by the Planning Board, but in no event to exceed more than 125 percent of the cost of removal and compliance with the additional requirements set forth herein, as determined by the project proponent and the Town.~~ The amount required to be deposited in said account shall be determined from calculations based upon the all-inclusive costs of removal of the solar panels, removal of all electrical connections and equipment, and the legal proper disposal of all equipment and waste. The calculation shall also include all costs for returning the property to pre-project conditions. The calculations shall include all professional costs, labor costs, trucking, hauling, and disposal costs, landscaping costs, and any other cost not mentioned but which is expected to be incurred. Such surety will not be required for municipal or state-owned facilities. The project proponent shall submit a fully inclusive estimate of the costs associated with removal, prepared by a ~~qualified~~ licensed Professional Engineer. The amount shall include a mechanism for calculating increased removal costs due to inflation and unforseen circumstances. This estimate shall be reviewed every five years by a licensed Professional Engineer selected by the Town and paid for by the project proponent. This mostly from West Brookfield, apparently not approved yet.

(e)All legal documents required to enable the Town to exercise its rights and responsibilities under the plan to decommission the site, enter the property and physically remove the installation.

The owner/operator shall indemnify and hold harmless the Town of Spencer and/or any of its citizens from any and all liabilities, losses and/or damages, including reasonable attorney fees, resulting from the failure of the owner/operator to comply with the terms of this bylaw and/or negligence in the operations and maintenance of any structures built in accordance with it. Any surety provided for in this bylaw shall be available for the aforementioned indemnification.

15. Proof of liability insurance

16. A Site Plan with stamp and signature of Professional Engineer licensed to

practice in Massachusetts that prepared the plans including;

(a) Everything required under Section 7.4 Site Plan Review, plus all of the following;

(b) Existing Conditions Plan, showing property lines, map and lot from the Assessor's records, and physical features, including roads and topography, for the entire project site signed and sealed by a Registered Massachusetts Land Surveyor;

(c) Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, screening vegetation, fencing or structures including their height and placement of system signed and including, solar arrays and required appurtenances;

(d) An estimate of earthwork operations listing the amount of soil material to be imported or exported from the site.

(e) Locations of wetlands and Priority & Estimated Habitat Areas defined by the Natural Heritage & Endangered Species Program (NHESP), and "Habitat of Potential Regional or Statewide Importance" also known as "Important Habitat" mapped by the DEP. From Shirley

Locations of Permanently Protected Open Space.

(f) Locations of Floodplain area, as well as Aquifer Protection District (Zone 2)

(g) Existing isolated trees 10" caliper or larger and shrubs.

Locations of local or National Historic Districts.

(h) Zoning district designation for the parcel(s) of land comprising the project site (submission of a copy of a zoning map with the parcel(s) identified is suitable for this purpose).

(i) Materials, delivery, equipment staging area, including a list of any hazardous materials proposed to be located on the site in excess of household quantities and a plan to prevent their release to the environment.

(j) Proposed installation of screening vegetation or structures

Views of the site from all off-site abutting properties (and where the site is abutting a street, from the street) indicating what will be seen, prior to construction, immediately after construction is completed with no plantings in place, after construction with all plantings in place and at two, five and 10 years after construction with all plantings still in place (indicating normal anticipated growth). The view may be a sketch or computer generated from photographs or drawings. The views shall indicate both existing conditions and proposed modifications with particular attention as to how each modification is intended to reduce the visual impact of the proposed facility. The Planning Board may request

additional views. From Barre

A glare analysis and proposed mitigation, if any, to minimize the impact of glare on affected properties and roads.

G. Design and Performance Standards

1. Minimum Dimensional and Setback Requirements For Ground-Mounted Solar ~~Electric Generating Facilities~~ Solar Installations Appurtenant Structures (including but not limited to, equipment shelters, storage facilities, transformers, fencing, parking and substations):

~~(a) Lot size and frontage: Solar Electric Generating Facilities are considered a principal use and require the minimum lot size, lot width and frontage required for principal structures in the underlying district.~~

~~(b) Front yard: The same as in the underlying district except that no facilities are permitted between the front of the principal building and the front lot line.~~

~~(c) Side and Rear yard~~

~~Small Scale: equal to its height~~

~~Medium/Intermediate/Large Scale: same as required for underlying district~~

Setbacks:

For Ground-mounted Solar Energy Installations, front, side and rear setbacks shall be as follows:

Front yard: The front yard depth shall be at least 200 feet.

Side yard: Each side yard depth shall be at least 100 feet; provided, however, that where the side yard faces and/or abuts one or more residences, the side yard depth shall not be less than 200 feet.

Rear yard: The rear yard depth shall be at least 100 feet; provided, however, that where the rear yard faces and/or abuts one or more residences, the rear yard depth shall not be less than 200 feet.

All inverters, transformers or other equipment that have the potential to exceed allowable noise levels shall be located no less than 250 feet from property lines.

Natural Buffer for Ground-mounted Solar Energy Installations: The site plan shall provide a natural vegetative buffer of fifty feet (50') between a Ground-mounted Solar Energy Installation and a property in residential use, including houses across a street. If the applicant establishes, to the satisfaction of the Planning Board, that the visual buffer would have a detrimental effect on the ability to generate power, the Planning Board may grant a waiver from this requirement.

The Planning Board may allow a lesser setback along a property line where, in its judgment, the proposed facility is not likely to negatively affect an existing or permitted land use on the abutting property. The Planning Board may require a greater setback along a property line where, in its judgment, the proposed facility is likely to negatively affect an existing or permitted land use on the abutting property.

(d) Maximum Height of Structures

•Residential Districts: 10'

•Non-Residential Districts: 15'

Height of dual-use installations shall be up to the Planning Board

Jon-any concerns about this?

2. All appurtenant structures to ~~Solar Electric Generating Facilities~~ Ground-Mounted Solar Energy Installations shall be architecturally compatible with each other. Whenever reasonable, structures ~~should~~ shall be screened from view by vegetation and/or joined or clustered to avoid adverse visual impacts.

3. Visual Impact Mitigation - The plan for a ground-mounted solar photovoltaic installation shall be designed to maximize the preservation of on-site and abutting natural and developed features. In natural (undeveloped) areas, existing vegetation shall be retained to the greatest extent possible, especially where such vegetation provides a benefit to the natural environment. Removal of healthy trees is discouraged. In developed areas, the design of the installation shall consider and incorporate human-designed landscape features to the greatest extent, including contextual landscaping and landscape amenities that complement the physical features of the site and abutting properties. Whenever reasonable, structures should be screened from view by vegetation and/or joined or clustered to avoid adverse visual impacts and be architecturally compatible with each other. Vegetation shall be of varieties native to New England and a mix of deciduous and evergreen species. At least 75% of the plantings shall consist of evergreens and

shall be evenly spaced along the length of the buffer strip. Vegetative screening shall reach a mature form to effectively screen the installation within five years of installation. The mature height of the vegetated screening shall be such that the installation's structures are not apparent to a person upon any public road or anyone standing on an abutting property and viewing the installation from a height of 10 feet. Vegetative screening shall maintain a dense screen year-round. A brick, stone, or wood fence of a design approved by the Planning Board, or a planted earthen berm of a design approved by the Planning Board may be established and maintained with plantings. Any screening fence shall include openings to provide for the passage of wildlife, including large animals. Planting of the vegetative screening shall be completed prior to final approval of the photovoltaic installation by the Building Inspector. All landscaped areas including walls and fences, shall be properly maintained. Plantings that die shall be replaced within one growing season by the property owner.

4. Lighting - Lighting of ~~Solar Electric Generating Facilities~~ Ground-Mounted Solar Energy Installations shall be consistent with Article 6.4 of the local bylaw, state and federal law. Lighting of other parts of the installation, such as appurtenant structures, shall be limited to that required for safety and operational purposes, and shall be reasonably shielded from abutting properties. Lighting of the Photovoltaic Generating Installation shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution.

5. Signage - ~~Solar Electric Generating Facilities~~ Ground-Mounted Solar Energy Installations shall not be used for displaying any advertising signage except for reasonable identification of the manufacturer or operator of the solar electric installation. Signs on ~~Solar Electric Generating Facilities~~ Ground-Mounted Solar Energy Installations shall comply with Spencer's sign bylaw. A sign consistent with Spencer's sign bylaw shall be required to identify the owner, operator and interconnected utility and provide a 24-hour emergency contact phone number. The emergency contact shall be a local person. Jon-what constitutes local?

6. Utility Connections - Reasonable efforts, as determined by the Planning Board, shall be made to place all utility connections from the ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installation underground, depending on appropriate soil conditions, shape, and topography of the site and any requirements of the utility provider. Electrical transformers for utility interconnections may be above ground if required by the utility provider.

7. Roads - Access roads shall be constructed to minimize grading, removal of stone walls or trees and minimize impacts to environmental or historic resources as approved by the emergency services departments in the Town of Spencer (e.g. Fire, Police, and DPW).

8. Vegetation Management - Herbicides, pesticides, or chemical fertilizers shall not be used prior to or during construction, to manage vegetation at the ~~Photovoltaic~~ Ground-Mounted Solar Energy ~~Generating~~ Installation. Fertilizer may be used only at the initial sowing of grass. Herbicides may be used on individual plants for management of invasive species such as bittersweet inside the Ground-Mounted Solar Energy Installation fence. Pesticides shall not be used at the Ground-Mounted Solar Energy Installation. Mowing~~,~~ or grazing ~~or using geotextile materials~~ underneath the solar array are possible alternatives. In the Aquifer Protection District, low growing grasses are optimal. Other grasses must be regularly mowed or grazed so as to minimize the amount and height of "fuel" available in case of fire.

All land associated with the ground-mounted solar installation shall be covered and grown in natural vegetation. All ground surface areas beneath solar arrays and setback areas shall be pervious to maximize on-site infiltration of stormwater. Impervious paving of areas beneath solar arrays is prohibited. To the greatest extent possible, a diversity of plant species shall be used, with preference given to pollinator species that are native to New England. Use of plants identified by the most recent copy of the “Massachusetts Prohibited Plant List” maintained by the Massachusetts Department of Agricultural Resources is prohibited. Herbicides shall be applied only as necessary by properly licensed personnel in conformance with all applicable state regulations.

Bat houses and bird houses for species such as, but not limited to, bluebirds, tree swallows, and kestrels shall be installed on posts or poles on the edges of the arrays or in the shade buffers. These, along with native grasses and wildflowers will help to restore ecosystem functions and values to the site.

9. Hazardous Materials - If hazardous materials are utilized within the solar electric equipment then impervious containment areas capable of controlling any release to the environment and to prevent potential contamination of ground water are required. Hazardous materials stored, used, or generated on site shall not exceed the amount for a Very Small Quantity Generator of Hazardous Waste as defined by the DEP pursuant to Mass DEP regulations 310 CMR 30.000 and shall meet all requirements of the DEP including storage of hazardous materials in a building with

an impervious floor that is not adjacent to any floor drains to prevent discharge to the outdoor environment.

10. Impact on Agricultural and Environmentally Sensitive Land - The ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installation shall be designed to minimize impacts to agricultural and environmentally sensitive land and to be compatible with continued agricultural use of the land ~~whenever~~ to the maximum extent possible.

Solar energy facilities shall not be located on agricultural land with soils designated as prime or of statewide significance by the U.S. Natural Resource Conservation Service Soil Surveys. This requirement shall not be waived.

Ground-Mounted Solar Energy Installations shall not be located on unfragmented open land as identified as a priority for protection in the Town's Open Space and Recreation Plan, Master Plan or the Community Development Plan.
These two are from Barre

No more than 50-percent of the total ~~land area~~ project area proposed for the solar electric field may be occupied by the solar panels, with the remainder of the land remaining as undeveloped open space left in its natural state. This is still not clear

11. Drainage - The design shall minimize the use of concrete and other impervious materials to the greatest extent possible, to minimize erosion and transport of sediment, and prevent contamination of surface water and groundwater from operations on the premises involving the use, storage, handling, or containment of hazardous substances. A permit in accordance with the Spencer ~~Erosion and Sediment Control for~~ Stormwater Management Bylaw and Spencer Stormwater Regulations shall be required and can be run concurrent with the approval process under this section.

12. Projects shall be designed to:

(a) minimize the volume of cut and fill, the number of removed trees 10" caliper or larger, the length of removed stone walls, the area of wetland vegetation displaced, the extent of stormwater flow increase from the site, soil erosion, and threat of air and water pollution

(b) maximize pedestrian and vehicular safety both on the site and entering and exiting the site;

(c) minimize obstruction of scenic views from publicly accessible locations;

(d) minimize visual intrusion by controlling the visibility of parking, storage, or other outdoor service areas viewed from public ways or premises residentially used or zoned;

(e) minimize glare from headlights and light trespass;

(f) Ensure adequate access to each structure for fire and service equipment and adequate provision for utilities and stormwater drainage.

13. Emergency Services - The ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installation's owner or operator shall provide a copy of the project summary, electrical schematic, and site plan to the local Fire Chief. Upon request the owner or operator shall cooperate with local emergency services in developing an emergency response plan. All means of shutting down the ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installation shall be clearly marked. The owner or operator shall identify a responsible person for public inquiries throughout the life of the installation.

14. Land Clearing, Soil Erosion and Habitat Impacts – Clearing of natural vegetation shall be limited to what is necessary for the construction, operation and maintenance of the ~~Photovoltaic Generating~~ Ground-Mounted Solar Energy Installation or otherwise prescribed by applicable laws, regulations, and bylaws. Such installations shall not occur on any slopes greater than 15% in order to minimize erosion. No more than 50% of the land parcel utilized for Solar Electric Generating Facilities shall contain land requiring clearing of forest In no event shall clear cutting of forest exceed 5 acres. Shirley

Habitat Impacts – Ground-Mounted Solar Energy Installations shall not be located on Permanently Protected Open Space or Priority Habitat and BioMap 2 Critical Natural Landscape Core Habitat areas mapped by the Natural Heritage and Endangered Species Program (NHESP) and shall be designed to minimize impacts to "Habitat of Potential Regional or Statewide Importance" also known as "Important Habitat" mapped by the DEP to the maximum extent feasible. Shirley

15. No topsoil shall be removed from the land parcel under consideration for ~~Solar Electric Generating Facilities~~ Ground-Mounted Solar Energy Installations. If earthworks operations are required, topsoil shall be stockpiled within the property bounds and protected against erosion until such time earthwork operations are completed and topsoil can be re- spread over parcel. Earthworks shall be planned

to limit export of soil material (non-topsoil) to 1000 cubic yards per acre affected by installation. A detailed earthworks estimate is a required submittal component proving this quantity is maintained.

H. Waivers - The Planning Board may, upon the prior written request of the applicant, waive any of the requirements of this sub-section, but must state their reasons for doing so in writing as part of their decision.

Severability – The provisions of this bylaw are severable, and the invalidity of any section, subdivision, subsection, paragraph or other part of this bylaw shall not affect the validity or effectiveness of the remainder of this bylaw. For any provision of this bylaw that conflicts with another state or local bylaw, the most restrictive provision shall apply.

This from Barre-I think it is a really good idea but probably too much duplication and extra paperwork for employees

P. Prior to execution and delivery of special permit.

(1) Prior to the Planning Board signing and delivering any special permit approved hereunder, the applicant shall deliver to the Planning Board the following:

(a) Written confirmation that the Conservation Commission has reviewed the facility plan, inspected the site as to wetlands and other issues within the Conservation Commission's jurisdiction and approved the site for the work shown on the facility plan.

(b) Written confirmation that the Barre Board of Health has reviewed the facility plan and approved a site assignment for the facility. Or in the alternative a vote indicating that the Barre Board of Health has determined that a site assignment is not required.

(c) Written confirmation that the Barre Board of Assessors has determined that the parcel(s) involved are not subject to special real estate tax assessment such as Chapter 61, 61A or 61B. In the event the Board of Assessors has determined that all or part of the parcel(s) are subject to special real estate tax assessment, written confirmation shall be required from the Barre Tax Collector of the payment of any rollback tax, or other payment that is required to remove the parcel(s) from such special real estate tax assessment status.

(d) Written approval by the Barre Board of Health for the use of all chemicals listed on the document submitted pursuant to Subsection G(1)(i).

(e) Evidence of payment for the engineer to prepare estimate of cost of decommissioning [Subsection N(4)].

(2) Any approval voted by the Planning Board prior to receipt of the foregoing shall be provisional.

I had made a note that we may want to forbid them to hook up until final inspection by the electrical inspector

This is the most recent version 7/30/19

ARTICLE 4.8.9 GROUND-MOUNTED SOLAR ENERGY INSTALLATIONS (Amended 11/17/16 Art. 12)

A. Purpose - The purpose of this bylaw is to facilitate the creation of new Ground-Mounted Solar Energy Installations by providing standards for the placement, design, construction, operation, monitoring, modification and removal of such installations that protect public health, safety, and welfare, residential properties and neighborhoods; protect natural resources, including wildlife habitat and corridors; and preserve scenic and historical resources. This bylaw also provides that there will be adequate financial assurance for the eventual decommissioning of such installations consistent with the intent of Chapter 40A Section 3 of the Massachusetts General Laws. The intent of this bylaw shall be applied in accordance with the Town of Spencer Master Plan and Open Space Plan.

B. Applicability - The provisions set forth in this section shall apply to the construction, operation, repair and/or removal of Solar Energy Installations as permitted in Article 4.2. Use Regulations. All such facilities require a building permit and must comply with all applicable local, state and federal requirements, including but not limited to all applicable safety, construction, electrical, and communications requirements and other applicable provisions of Spencer's Zoning Bylaws.

The total number of Non-Residential Ground-Mounted Solar Energy Installations in Spencer shall be limited to twenty-five (25). Facilities constructed or permitted prior to this bylaw are counted in this total. Municipal solar facilities are not counted in this total.

C. Definitions

Residential Ground-Mounted Solar Energy Installation: An active Solar Energy System that is for the benefit and use of only the residence; it is not subject to this bylaw.

Ground-Mounted Solar Energy Installation (also referred to as solar energy facility): An Active Solar Energy System that is structurally mounted to the ground and is not roof-mounted; maximum size no more than ten acres with no more than five acres devoted to panels and no more than five acres of clearing/grubbing.

Canopy Solar Generation Installation: A Solar Generation Installation with 100% of the nameplate capacity of the solar photovoltaic modules used for generating power installed on top of a parking surface, pedestrian walkway, or canal in a manner that maintains the function of the area beneath the canopy.

Project Area: Any land area altered in order to accommodate the operation and maintenance of the facility including but not limited to land clearing, panels, fenced-in arrays, access roads, electrical equipment, and stormwater controls.

D. General Requirements

1. The construction and operation of all Ground-Mounted Solar Energy Installations shall be consistent with all applicable local, state and federal requirements, including but not limited to all applicable safety, construction, electrical, and communications requirements. All buildings and fixtures forming part of a Ground-Mounted Solar Energy Installation shall be constructed in accordance with the Massachusetts State Building Code.

2. Ground-Mounted Solar Energy Installations shall not be constructed, installed or modified as provided in this section without first obtaining a building permit and paying any required fees.

3. In addition to the abutter notification requirements for Special Permits as contained in Section 7.2, the applicant for a Ground-Mounted Solar Energy Installation shall notify all property owners located with one-half (1/2) mile of the boundaries of the property on which the solar facility will be located. This notification shall include a description of the project, a locus map showing the location of the solar facility and any additional pertinent information, including a mailing address for comments and concerns and the appropriate Town Hall phone number for more information or to view the plans. The notification shall be mailed via certified mail with a return receipt. Any comments received from local property owners shall be included in the permit review by the Planning Board.

Before acceptance by Office of Development & Inspectional Services (ODIS) of the Site Plan Review/Special Permit applications, a three square foot sign stating that a solar facility is proposed for the site. The sign must be readable from the road and prominently located.

Also, at the time of application, an ad (specify size) shall be placed on the front page of the Spencer New Leader, A Section, notifying residents of the proposed solar facility The ad shall give the location, size in acres, total megawatt output, the applicant's name, the hearing date, and contact information to view the plans or ask questions. The ad shall run two times.

4. Noise generated by Ground-Mounted Solar Energy Installations and associated equipment and machinery shall conform to applicable state and local noise regulations, including the DEP's Division of Air Quality noise regulations, 310 CMR 7.10. In addition, A source of sound will be considered in violation of said regulations if the source:

Increases the broadband sound level by more than 5 dB(A) above pre-construction ambient noise level, or

Produces a "pure tone" condition, when an octave band center frequency sound pressure level exceeds the two (2) adjacent center frequency sound pressure levels by three (3) decibels or more, or

Results in sound or noise levels greater than 30 dB(A).

Prior to the issuance of a building permit, the applicant shall conduct a test of ambient noise conditions during startup operations and provide a written report of noise decibel

levels. Said criteria are measured both at the property line and at the nearest inhabited residence. In addition, the said criteria shall be measured at any property line that is subject to sound elevations higher than ambient sound as a result of higher or lower topography in the opinion of the applicants' acoustical engineer. "Ambient" is defined as the background A-weighted sound level that is exceeded 90% of the time measured during equipment hours, unless established by other means with the consent of the DEP. All testing required by this bylaw shall be done by a licensed professional acoustical engineer chosen by the Planning Board and paid for by the applicant. All testing shall be done in accordance with the professional standards of the appropriate accrediting agencies.

If Sound levels are found to be in excess of the above levels, construction of sound-absorbing walls around noise generating equipment will be required to reduce the sound levels to or below the specified levels. If storage batteries are to be installed, testing shall be performed both during the quietest part of the day and the quietest part of the night.

E. The Ground-Mounted Solar Energy Installation's owner or operator shall maintain the facility in good condition. Maintenance shall include, but not be limited to, painting, structural repairs, and integrity of security measures. Site access shall be maintained to a level acceptable to the local Fire Chief and Emergency Management Director. The owner or operator shall be responsible for the cost of maintaining the Solar Electric Facilities and any access road(s).

F. The Planning Board may require, as a part of the review, on-site visits by the Planning Board during the application process. In addition the Planning Board may require on-site visits during the construction phase and from time to time, as determined by the Planning Board, following the date of completion. In the event the Planning Board receives a signed written complaint, the Planning Board will notify the applicant, owner and operator and schedule an on-site visit to resolve the matter.

G. Required Submission Documents – Special Permit And/or Site Plan Review Applications shall include:

1. A properly completed and executed application form and application fee.

2. Any requested Waivers

3. Name, address, phone number and signature of the project proponent, as well as all co-proponents or property owners, if any.

4. Name, contact information and signature of any agents representing the project proponent.

5. Name, address, and contact information for proposed system installer.

6. Documentation of actual or prospective access and control of the project site sufficient to allow for construction and operation of the proposed solar electric installation.

7. Proposed Hours of Operation

8. Route(s) by which construction materials and equipment will be delivered to site.

9. Blueprints or drawings of the solar electric installation signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts showing the proposed layout of the system and any potential shading from nearby structures.

10.Utility Notification - evidence that the utility company that operates the electrical grid where the installation is to be located has been informed of the solar electric installation owner or operator's intent to install an interconnected facility and acknowledges receipt of such notification. A copy of a signed Interconnection Service Agreement accepting the proposed power output. A copy of an Interconnection Application filed with the utility including a one or three line electrical diagram detailing the solar electric installation, associated components, and electrical interconnection methods, with all Massachusetts Electrical Code (527 CMR § 12.00) compliant disconnects and overcurrent devices. Off-grid systems shall be exempt from this requirement. (Amended 11/16/17 Art.9)

11. Documentation of the major system components to be used, including the electric generating components, panels used in the project, transmission systems, mounting system, inverters, etc. Documentation must include information, including the MSDS sheet, on elements of the system that use materials that are in any way either hazardous or toxic.

12. Documentation by an acoustical engineer of the noise levels projected to be generated by the installation.

13. Operation & Maintenance Plan for the operation and maintenance of the Ground Solar Energy Installation, which shall include measures for maintaining safe access to the installation, storm water and vegetation controls, and general procedures for operational maintenance of the installation. An Operation and Maintenance report shall be filed annually with the Town Administrator or the Building Inspector confirming that the operation is ongoing and has not been abandoned.

14. Abandonment & Decommissioning Plan - Any Ground-Mounted Solar Energy Installation which has reached the end of its useful life or has been abandoned (i.e. when it fails to operate for more than six months without the written consent of the Planning Board) shall be removed. The owner or operator shall physically remove the installation within 150 days of abandonment or the proposed date of decommissioning. The owner or operator shall notify the Planning Board by certified mail of the proposed date of discontinued operations and plans for removal. The Abandonment & Decommissioning Plan shall include a detailed description of how all of the following will be addressed:

(a) Physical removal from the site and from the Town of Spencer of all above and below ground project related installations and structures; equipment, building, security barriers and transmission lines from the site, including any materials used to limit vegetation.

(b) Disposal of all solid and hazardous waste in accordance with local, state, and federal waste disposal regulations.

(c) The site shall be restored as near as reasonably possible to its condition prior to the commencement of construction. Stabilization or re-vegetation of the site as necessary to minimize erosion. The Planning Board may, depending on the proposed use of the land, allow the owner or operator to leave landscaping or designated below-grade foundations in order to minimize erosion and disruption to vegetation.

(d) If the Ground-Mounted Solar Energy Installation is deemed abandoned by the Planning Board, the Town shall give the owner and operator 30 days' written notice to remove the facility. In the event that the owner and operator have not completed the removal at the conclusion of 150 days from the date of written notice, the Town may proceed, without taking any legal action, to enter the property to decommission, physically remove the facility and restore the property. The Town may recover any costs from the financial surety provided by the applicant. In the event that there are insufficient funds to complete the decommissioning, removal and restoration, the applicant, owner and operator (including such other parties or entities as appropriate) shall be jointly and severally liable to pay any excess costs incurred in order to do so.

(e) Description of financial surety for decommissioning - Proponents of Ground-Mounted Solar Energy Installations shall provide security in the form of a cash deposit in the minimum amount of $350,000/MW (DC) of installed system capacity which sum shall be held by the Town Treasurer pursuant to MGL c 44 53G1/2, approved by the Planning Board to cover the cost of removal in the event the Town must remove the installation and remediate the landscape. The amount required to be deposited in said account shall be determined from calculations based upon the all-inclusive costs of removal of the solar panels, removal of all electrical connections and equipment, and the legal proper disposal of all equipment and waste. The calculation shall also include all costs for returning the property to pre-project conditions. The calculations shall include all professional costs, labor costs, trucking, hauling, and disposal costs, landscaping costs, and any other cost not mentioned but which is expected to be incurred. Such surety will not be required for municipal or state-owned facilities. The project proponent shall submit a fully inclusive estimate of the costs associated with removal, prepared by a licensed Professional Engineer. The amount shall include a mechanism for calculating increased removal costs due to inflation and unforeseen circumstances. This estimate shall be reviewed every five years by a licensed Professional Engineer selected by the Town and paid for by the project proponent. The Planning Board shall not waive compliance with this section.

(f) All legal documents required to enable the Town to exercise its rights and responsibilities under the plan to decommission the site, enter the property and physically remove the installation.

The owner/operator shall indemnify and hold harmless the Town of Spencer and/or any of its citizens from any and all liabilities, losses and/or damages, including reasonable attorney fees, resulting from the failure of the owner/operator to comply with the terms of this bylaw and/or negligence in the operations and maintenance of any structures built in accordance with it. Any surety provided for in this bylaw shall be available for the aforementioned indemnification.

15. Proof of liability insurance

16. A Site Plan with stamp and signature of Professional Engineer licensed to practice in Massachusetts that prepared the plans including;

(a) Everything required under Section 7.4 Site Plan Review, plus all of the following;

(b) Existing Conditions Plan, showing property lines, map and lot from the Assessor's records, and physical features, including roads and topography, for the entire project site signed and sealed by a Registered Massachusetts Land Surveyor;

(c) Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, screening vegetation, fencing or structures including their height and placement of system signed and including, solar arrays and required appurtenances;

(d) A detailed construction sequence such that temporary stormwater basins and swales established and stabilized before earth-disturbing can occur.

(e) An estimate of earthwork operations listing the amount of soil material to be imported or exported from the site.

(f) Locations of wetlands and Priority & Estimated Habitat Areas defined by the Natural Heritage & Endangered Species Program (NHESP), and “Habitat of Potential Regional or Statewide Importance” also known as “Important Habitat” mapped by the DEP. From Locations of Permanently Protected Open Space.

(g) Locations of Floodplain area, as well as Aquifer Protection District (Zone 2)

(h) Existing isolated trees 10" caliper or larger and shrubs.

(i)Locations of local or National Historic Districts.

(j) Zoning district designation for the parcel(s) of land comprising the project site (submission of a copy of a zoning map with the parcel(s) identified is suitable for this purpose).

(k) Materials, delivery, equipment staging area, including a list of any hazardous materials proposed to be located on the site in excess of household quantities and a plan to prevent their release to the environment.

(l) Proposed installation of screening vegetation or structures

(m) Views of the site from all off-site abutting properties (and where the site is abutting a street, from the street) indicating what will be seen, prior to construction, immediately after construction is completed with no plantings in place, after construction with all plantings in place and at two, five and 10 years after construction with all plantings still in place (indicating normal anticipated growth). The view may be a sketch or computer generated from photographs or drawings. The views shall indicate both existing conditions and proposed modifications with particular attention as to how each modification is intended to reduce the visual impact of the proposed facility. The Planning Board may request additional views.

(n) A glare analysis and proposed mitigation, if any, to minimize the impact of glare on

affected properties and roads.

H. Design and Performance Standards

1. Minimum Dimensional and Setback Requirements For Ground-Mounted Solar Energy Installations Appurtenant Structures (including but not limited to, equipment shelters, storage facilities, transformers, fencing, parking and substations):

(a) Front yard: The front yard depth shall be at least 200 feet to the shade buffer.

(b) Side yard: Each side yard depth shall be at least 100 feet; provided, however, that where the side yard faces and/or abuts one or more residences, the side yard depth shall not be less than 200 feet to the shade buffer.

(c) Rear yard: The rear yard depth shall be at least 100 feet; provided, however, that where the rear yard faces and/or abuts one or more residences, the rear yard depth shall not be less than 200 feet to the shade buffer.

(d) All inverters, transformers or other equipment that have the potential to exceed allowable noise levels shall be located no less than 250 feet from property lines.

(e) The Planning Board may allow a lesser setback along a property line where, in its judgment, the proposed facility is not likely to negatively affect an existing or permitted land use on the abutting property. The Planning Board may require a greater setback along a property line where, in its judgment, the proposed facility is likely to negatively affect an existing or permitted land use on the abutting property.

(f) Maximum Height of Structures

Residential Districts: 10’

Non-Residential Districts: 15’

Height of dual-use installations shall be up to the Planning Board

2. All appurtenant structures to Ground-Mounted Solar Energy Installations shall be architecturally compatible with each other. Whenever reasonable, structures shall be screened from view by vegetation and/or joined or clustered to avoid adverse visual impacts.

3. No batteries shall be permitted on the site.

4. Visual Impact and Habitat Mitigation - The plan for a ground-mounted solar installation shall be designed to maximize the preservation of on-site and abutting natural and developed features. In natural (undeveloped) areas, existing vegetation shall be retained to the greatest extent possible, especially where such vegetation provides a benefit to the natural environment. Removal of healthy trees is discouraged. In developed areas, the design of the installation shall consider and incorporate human-designed landscape features to the greatest extent, including contextual landscaping and landscape amenities that complement the physical features of the site and abutting properties. Whenever

reasonable, structures should be screened from view by vegetation and/or joined or clustered to avoid adverse visual impacts and be architecturally compatible with each other. Vegetation shall be of varieties native to New England and a mix of deciduous and evergreen species. At least 75% of the plantings shall consist of evergreens and shall be evenly spaced along the length of the buffer strip. Vegetative screening shall reach a mature form to effectively screen the installation within five years of installation. The mature height of the vegetated screening shall be such that the installation's structures are not apparent to a person upon any public road or anyone standing on an abutting property and viewing the installation from a height of 10 feet. Vegetative screening shall maintain a dense screen year-round. A brick, stone, or wood fence of a design approved by the Planning Board may be established and maintained with plantings in order to achieve immediate screening. Any screening fence shall include openings to provide for the passage of wildlife, including large animals. Planting of the vegetative screening shall be completed prior to final approval of the photovoltaic installation by the Building Inspector. All landscaped areas including walls and fences, shall be properly maintained for the life of the project. Plantings that die shall be replaced within one growing season by the property owner.

Bat houses and bird houses for species such as, but not limited to, bluebirds, tree swallows, and kestrels shall be installed on posts or poles on the edges of the arrays or in the shade buffers in appropriate numbers. These, along with native grasses and wildflowers will help to restore ecosystem functions and values to the site.

5. Vegetation Management - Herbicides, pesticides, or chemical fertilizers shall not be used prior to or during construction, to manage vegetation at the Ground-Mounted Solar Energy Installation. Fertilizer may be used only at the initial sowing of grass. Herbicides may only be used on individual plants for management of invasive species such as bittersweet inside the Ground-Mounted Solar Energy Installation fence. Pesticides shall not be used at the Ground-Mounted Solar Energy Installation. Mowing or grazing underneath the solar array are possible alternatives. Low growing grasses are optimal. Other grasses must be regularly mowed or grazed so as to minimize the amount and height of "fuel" available in case of fire.

All land associated with the ground-mounted solar installation shall be covered and grown in natural vegetation. All ground surface areas beneath solar arrays and setback areas shall be pervious to maximize on-site infiltration of stormwater. Impervious paving of areas beneath solar arrays is prohibited. To the greatest extent possible, a diversity of plant species shall be used, with preference given to pollinator species that are native to New England. Outside the array, mowing shall be minimized in order to encourage pollinators and other species. Use of plants identified by the most recent copy of the "Massachusetts Prohibited Plant List" maintained by the Massachusetts Department of Agricultural Resources is prohibited. Herbicides shall be applied only as necessary by properly licensed personnel in conformance with all applicable state regulations.

6. Land Clearing, Soil Erosion and Habitat Impacts – Clearing of natural vegetation shall be limited to what is necessary for the construction, operation and maintenance of the Ground-Mounted Solar Energy Installation or otherwise prescribed by applicable laws, regulations, and bylaws. Such installations shall not occur on any slopes greater than 15%

in order to minimize erosion. This requirement shall not be waived. No more than 5 acres of forested land may be cleared for the project. Habitat Impacts – Ground-Mounted Solar Energy Installations shall not be located on Permanently Protected Open Space or Priority Habitat and BioMap 2 Critical Natural Landscape Core Habitat areas mapped by the Natural Heritage and Endangered Species Program (NHESP) and shall be designed to minimize impacts to "Habitat of Potential Regional or Statewide Importance" also known as "Important Habitat" mapped by the DEP to the maximum extent feasible.

7. Lighting - Lighting of Ground-Mounted Solar Energy Installations shall be consistent with Article 6.4 of the local bylaw, state and federal law. Lighting of other parts of the installation, such as appurtenant structures, shall be limited to that required for safety and operational purposes, and shall be reasonably shielded from abutting properties. Lighting of the Ground-Mounted Solar Energy Installation shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution.

8. Signage - Ground-Mounted Solar Energy Installations shall not be used for displaying any advertising signage except for reasonable identification of the manufacturer or operator of the solar electric installation. Signs on Ground-Mounted Solar Energy Installations shall comply with Spencer's sign bylaw. A sign consistent with Spencer's sign bylaw shall be required to identify the owner, operator and interconnected utility and provide a 24-hour emergency contact phone number. The emergency contact shall be a local person, located within fifteen miles of the site.

9. Utility Connections - Preference shall be given to above ground utility connections to minimize soil disturbance. Underground connections may be used of above ground connections are not practical. Energy generation shall not occur until final inspection by the electrical inspector and a Certificate of Occupancy from the Building Inspector and a Certificate of Compliance from the Conservation Commission if a wetland permit was required are issued. Electrical inspection shall occur after all other inspections are final.

10. Roads - Access roads shall be constructed to minimize grading, removal of stone walls or trees and minimize impacts to environmental or historic resources as approved by the emergency services departments in the Town of Spencer (e.g. Fire, Police, and DPW).

11. Hazardous Materials - If hazardous materials are utilized within the solar electric equipment then impervious containment areas capable of controlling any release to the environment and to prevent potential contamination of ground water are required. Hazardous materials stored, used, or generated on site shall not exceed the amount for a Very Small Quantity Generator of Hazardous Waste as defined by the DEP pursuant to Mass DEP regulations 310 CMR 30.000 and shall meet all requirements of the DEP including storage of hazardous materials in a building with an impervious floor that is not adjacent to any floor drains to prevent discharge to the outdoor environment.

12. Impact on Agricultural and Environmentally Sensitive Land - The Ground-Mounted Solar Energy Installation shall be designed to minimize impacts to agricultural and environmentally sensitive land and to be compatible with continued agricultural use of the land to the maximum extent possible.

Solar energy facilities shall not be located on agricultural land with soils designated as prime or of statewide significance by the U.S. Natural Resource Conservation Service Soil

Surveys. This requirement shall not be waived.

Ground-Mounted Solar Energy Installations shall not be located on unfragmented open land as identified as a priority for protection in the Town's Open Space and Recreation Plan, Master Plan or the Community Development Plan.

Hiking and snowmobile trails shall be protected as much as is possible, and relocated wherever disruption is necessary.

No solar energy installation shall be located in the Aquifer Protection District.

Ballasts, screw-type, or post driven pilings and other acceptable minimal soil impact methods that do not require footings or other permanent penetration of soils for mounting are required, unless the need for such can be demonstrated.

Any soil penetrations that may be required for providing system foundations necessary for additional structural loading or for providing system trenching necessary for electrical routing shall be done with minimal soils disturbance, with any displaced soils to be temporary and recovered and returned after penetration and trenching work is completed. No concrete or asphalt in the mounting area other than ballasts or other code required surfaces, such as transformer or electric gear pads.

No more than 50-percent of the total project area proposed for the solar electric field may be occupied by the solar panels, with the remainder of the land remaining as undeveloped open space left in its natural state.

13. Drainage - The design shall minimize the use of concrete and other impervious materials to the greatest extent possible, to minimize erosion and transport of sediment, and prevent contamination of surface water and groundwater from operations on the premises involving the use, storage, handling, or containment of hazardous substances. A permit in accordance with the Spencer Stormwater Management Bylaw and Spencer Stormwater Regulations shall be required and can be run concurrent with the approval process under this section.

14. Projects shall be designed to:

(a) minimize the volume of cut and fill, the number of removed trees 10" caliper or larger, the length of removed stone walls, the area of wetland vegetation displaced, soil erosion, and threat of air and water pollution

(b) eliminate stormwater flow from the site:

(c) maximize pedestrian and vehicular safety both on the site and entering and exiting the site;

(d) minimize obstruction of scenic views from publicly accessible locations;

(e) minimize visual intrusion by controlling the visibility of parking, storage, or other outdoor service areas viewed from public ways or premises residentially used or zoned;

(f) minimize glare from headlights and light trespass;

(g) Ensure adequate access to each structure for fire and service equipment and adequate

provision for utilities and stormwater drainage.

15. Emergency Services - The Ground-Mounted Solar Energy Installation's owner or operator shall provide a copy of the project summary, electrical schematic, and site plan to the local Fire Chief. Upon request the owner or operator shall cooperate with local emergency services in developing an emergency response plan. All means of shutting down the Ground-Mounted Solar Energy Installation shall be clearly marked. The owner or operator shall identify a responsible person for public inquiries throughout the life of the installation.

16. No topsoil shall be removed from the project area under consideration for Ground-Mounted Solar Energy Installations. If earthworks operations are required, topsoil shall be stockpiled within the property bounds and protected against erosion until such time earthwork operations are completed and topsoil can be re- spread over parcel. Earthworks shall be planned to limit export of soil material (non-topsoil) to 1000 cubic yards per acre affected by installation. A detailed earthworks estimate is a required submittal component proving this quantity is maintained.

I. Waivers - The Planning Board may, upon the prior written request of the applicant, waive any of the requirements of this sub-section, but must state their reasons for doing so in writing as part of their decision. No waivers shall allow work on slopes greater than 15% or soils designated as Prime Agricultural Soils. No waivers shall be allowed for any of the decommissioning requirements.

J. Severability – The provisions of this bylaw are severable, and the invalidity of any section, subdivision, subsection, paragraph or other part of this bylaw shall not affect the validity or effectiveness of the remainder of this bylaw. For any provision of this bylaw that conflicts with another state or local bylaw, the most restrictive provision shall apply.

APPENDIX

SBAC REPORT

Part 2

Exhibit A. Listening Session on Feb. 21, 2019. Oral and written comments by Spencer residents *(Prepared by Tatyana McAuley)*

Exhibit B. Attorney General's letter to Barre T/A

Exhibit C. Chart: Decommissioning of Panels; Decommissioning surety based on MW *(Prepared by Paula Orcutt)*

Exhibit D. *Solar Panel Waste: A Disposal Problem*

Exhibit E. An image of a battery

Exhibit F. *Arizona fire highlights challenges for energy storage*

Part 3

Exhibit G. Assorted pages from several PILOT Agreements *(Prepared by Matt DeFosse)*

Exhibit H. Two articles: *Solar Panels could Make Saltwater Safe for Farming; Saudi Arabia Pushes to Use Solar Power for Desalination Plants*

Exhibit I. A Document written by Selectman Dan Bigda of West Brookfield. This paper is a summary of his team research on solar panels.

Exhibit J. Two Documents, *Courtesy of the Planning Board, Warren, MA*

Exhibit K. An Excel sheet that depicts solar facilities situations in Spencer, late Spring 2019 *(Prepared by Paul Dell'Aquila at SBAC request)*

Written Record of the Proceedings– SBAC Listening Session

February 21, 2019

Preliminaries:

The Spencer Solar Bylaws Advisory Committee (henceforth SBAC) called a town-wide listening session for February 21, 2019. The purpose was to hear from our citizens-at-large about their views on the commercial solar development in our town.

Marketing:

SBAC advertised the meeting in the following manner:

a) We produced an eye-catching poster - a copy enclosed that was distributed in town's businesses.
b) A large map of current and future commercial solar farms was created and was displayed at the Spencer Library since November 2018 and then again in February 2019.
c) A flyer / a copy of the poster was delivered to the office of the *New Leader*- a regional free newspaper with the Spencer circulation of ca. 3, 700. The flyer was inserted in the publication and delivered the week before the meeting.
d) Further, Ms. Nancy Tame wrote an advertising article about SBAC and the listening session that was printed on p. 3 in the *New Leader*. A copy of the solar farm maps was reproduced next to the article. She also prepared a PP for the session.
e) Mr. Matt DeFosse distributed flyers and posters at many locations within the town. He also visited several but not all homeowners close to solar farms and invited them to the meeting.
f) Ms. Paula Orcutt advertised the event on the Open Board electronic forum for Spencerites.
g) Ms. Tatyana McAuley invited her neighbors via letter.
h) The Town Clerk, Ms. Torti, agreed to advertise the event on the town hall marquee, two days before the event.
i) The Town Administrator, Thomas Gregory, graciously agreed to contribute $185.60 toward advertising costs. Anonymous donors paid for the rest of the sums and provided supplies for the meeting.

Venue:
SBAC members did not wish to use the main meeting hall due to its woefully poor acoustics. The McCourt social Hall was utilized.
Mr. DeFosse prepared the room in the AM hours, cleaned it, and brought in more chairs for total 55+.
People started arriving at 6:00PM, though the start of the meeting was announced for 6:30PM. We put up our nametags on the semi-oval desk, distributed visual posters of solar farm segments such as swales, inverters, panels, construction screws that are driven 8 ft. into the ground, etc. Blue boxes with note cards we strewed throughout the room for those who did not wish to speak but would prefer to leave their comments in a written form. (9 cards were received, their contents is included).
The Spencer Cable Access Gabriel arrived to tape the meeting for posterity.

The Event/Impressions:
Dr. Ralph Hicks, the Liaison of the BOS to SBAC was our MC. He wore a nice necktie with a picture of a sun on it. Dr. Hicks welcomed all, introduced members of SBAC, explained the format of the event to the audience, and made general comments about SBAC formation, the reason behind it, and the SBAC charge.

Mr. Matt DeFosse then welcomed the audience and made an oral presentation of the Spencer solar farms map. He explained how many solar farms were constructed and are operating (7), how many were approved for future construction, and how many are in various stages of permitting process (10).

Ms. Nancy Tame prepared a short PowerPoint presentation that she presented. Unfortunately, the monitors in the hall are too small to make more of a visual impact we desired.

Dr. Hicks opened the event to public comments. The total of 24 citizens spoke, albeit a few took the microphone and the floor twice. The atmosphere was congenial; people were respectful, articulate and very concerned. Many had their remarks prepared. Dr. Hick fended most of the comments with his inimitable bravado and humor, but SBAC members also chimed in. Several persons in the

audience thanked SBAC for working on these issues; SBAC even got applause.

SBAC members felt very gratified that they organized the event. It was also definitely very positive for those in attendance as they shared with us their concerns. They wanted to be heard and be able to ask questions.

NB. Two BOS members, Mr. Gary Woodbury, Chairman of the BOS and Mr. Warren Monet attended, and even spoke up to specific issues. Mr. Monet stayed for about a half of the event; Mr. Woodbury for the entire event.

MINUTES FROM THE EVENT:

Intro	**Dr. Ralph Hicks opens the event at 6:00pm**. He welcomes about 80 people in the audience and thanks them for attending. Then introduces the SBAC members, all liaisons and outlines how the committee came into existence, tells that SBAC meets weekly, that it reviews current bylaws, compares them to those from surrounding communities, debates each and modifies them. We seek the public's input. RH tells audience that solar energy is considered "green" and that there are pros and cons: creating lower house value of abutting properties and homes; issues with taxes; solar farms have no need for town's services safe fire and police; it offers income to retired farmers who sell or lease their land; offer some temporary jobs. But it is plar farms make noise; it colonizes open spaces; derails wild animal corridors; causes glar; takes prime agricultural land; is located in Spencer Rural Residential areas, and there are many unknowns related to their future decommissioning.

	Matt DeFosse presentation focuses on the map of commercial solar development in Spencer. Seven are operating and 8 permitted, a few in the pipeline. Matt also thanks the audience for coming and invites them to join our weekly meetings and get involved.
	Nancy Tame presents her Power Point including Ms. Emerson's photos from the Abbey's solar farms.
	Dr. Hicks invites public to share their views, ideas, comments and questions. RH requests each speaker would speak into the microphones; the event is taped by the Spencer Cable Access. Each speaker is limited to 3 minutes.
Speakers	
#1	**Brian Herholz**
	Sf are not our iconic farms because there do not live any live critters on them. Has 3Qs: 1) Panels are not very efficient; 1 square acre produces minimal electricity. How many panels are needed to make it valuable? 2) Will the town put a cap on the number of solar farms? 3) End of life for panels: panels contain many chemicals, silicone, etc…lists about 7. About 40 lithium-related toxic waste- how will you figure this out, he asks us? The same issue happened with the atomic energy- nobody thought how would they dispose of it in the future. –What is the rush to bring in solar farms? And get minimal electricity? Mr. Herholz encourages SBAC to suggest using roofs for solar installations.
#2	**Stan Ramashevsky, East Brookfield Rd.**
	It is economic opportunity for farmers, land rented/sold at $20K per field; they use land and get money. There should be support design to support use of land- land is useless unless utilized, say, for grazing. Use of idle land shifted now to corporations. You should create guidelines how to better utilize the ground under the panels, or use canopy style panels. That is a good idea!
#3	**Gary Nelson, North Spencer Road**
	Tax to be returned on decommissioning bonds. Ask what is the revenue, RH answers that Spencer has PILOT agreements, only one solar farm pays regular taxes and

	RH hopes that abatement is not possible. Mr. Nelson asks about disposal of panels. RH relates the Charlton issues with taxes, non-profit as a customer results in no taxes to town.- Mr. Nelson further asks why no electric chargers are placed along Main Str. RH explain the placement of one at the Town Hall.
#4	**Dan Maloche**
	Consider the risk benefit. Agric. Land> benefit> wild life protection-Wild life displaced. Electric rates- who benefits from the panels? Solar farm creates cleaner energy indirectly "green"- compare the revenue to costs to our town. RH: Higher KW rate- if all energy is green, it will cost us more. There is an indirect benefit- our town will help produce clean energy. -
#5	**Nancy Richardson**
	She attended a presentation in Leicester about solar farming that includes cows and wild life. Farms decrease; farmers have larger machinery and are not interested in farming small landholdings. Whom do we give our fields? Do we let our fields overgrow or what? She saw a film about farming in New England and suggest: We should watch it at Town Hall. Mrs. R. thanks the committee for their work and for inviting citizens to this meeting.
#6	**Peter Sieles, GH Wilson Rd.**
	A member of the Snowbirds, a local Snowmobiling Club. Reminds us that the recreational trails are also used by hikers, bikers. Begs: Don't squeeze us out! Solar farms squeeze out trails that the Snowbirds were maintaining. Can you guarantee that the trails retain its right-of-way, keep it restricted? Paul Orcutt- Please have a discussion with the solar developers about this issue, that trails do not get squeezed out. Paul Dell'Aquil, T/P, shares that the PB reached out to the Snowbirds but there was no reply, no one returned his calls. It is difficult to locate handshake agreement, these need to be located and recorded so that trails could be accommodated.
#7	**Phil Brennan, West Brookfield**
	It is a major error to call them solar farms, they are solar power plants. And they are heavily subsidized with tax

	money. The main beneficiaries are the solar developers. Are there solar panels or farms on the Boston Commons? They should be placed on commercial land.- Are we producing solar power for our kids? Jimmy Carter put panels on the White House and Ronald Reagan came and took them off. **The solar developers are developing future toxic site that will lead to future disasters. Our Town will be stuck with toxic sites.**
#8	**Mr. Herholz**
	Solar sites are single-use power sites. He talks about housing development. Are there guidelines per site - for a solar field, guidelines for wild life, guidelines for trails, guidelines for type and elevations of panels? What is the role of SBAC reviews? RH clarifies – a fact finding tour and focus on improving the bylaws, and what is the solar farms' impact on quality of life.- No solar farms is located in Spencer commercial zone, said RH, that he, too was surprised by it. Mr. Herholz: Remember the Quabbin activity- this is similar situation, land is taken and given to those with power.
#9	**William Dobson, McCormick Rd**
	a) Solar farms are more attractive then coal or nuclear power locations-- b) The efficiency of panels is improving- the decommissioning will not really happen; panels will be replaced with better panels -- c) How to handle the loss of land? **From the PILOT revenue, set aside %$ for land preservation.** RH promises to look into that and calls it **a novel idea.** b) Qs: focus on the siting of solar farms . WD reports that he asked the Town Administrator how to put aside monies to protect land, and the TA answered that he did not know how to do that. RH also says that he is not ware if any solar farms are located close to Boston, but solar farms impact us.
#10	**Heidi Brenke-Malone**
	States that she likes solar power but is concerned about regulations that land will be taken; she is a proponent of dual use; wonders if farm land is subject to lower tax rate. Shares that the Town should offer something to the

	farmers- suggests that different usage should be considered for the land.
#11	Dennis Burghof
	ATV uses? a) Learns that solar farms operators maintain the solar farms—b) views from the road – planting- RH mentions native species of planting.
#12	**Richard Kirk**
	Retells his experiences with solar farm on Holmes St. States that the runoff has been at least 30% higher than originally estimated. He says the construction took one year and it was not pretty. It took another year for an engineer to look into all the issues, esp. erosion and water runoff. Recommends that building of solar farms should have one person from TH present during construction, esp. during grading. Current bylaws use weak words like "minimizes", inverters make noise; he experienced much struggle to resolve the issue by the solar developers. Decommissioning: Is it specified who, when how? Is there a bond plan? Manage the solar farm right to avoid all the issues. Mr. Kirk recommends that there would be a manager monitoring the construction, manage it right! Suggests a very detailed decommissioning plan. Jon Viner explains that that is in place. – Mr. Kirk does not expect decommissioning as such, because panels will be improved and replaced. – Mr. Monet speaks: There was a lot of water, and it was not only aesthetics.
Town Planner	Interjection by the Town Planner: Mr. Kirk was in touch with us. That solar farm on his street was build under the old bylaws that had issues. Holmes would not happen under the current bylaws.
#13	**Dan Meloche:** 1700acres/4000 arrays is not even close to run NYC using solar.
	"The Town Planner used the word "unfortunately" – if the present solar farm is already in existence what will 'unfortunately' do for us?" -- Remove such words in the new bylaws.
#14	**Gary Nelson.** Relates a story from his factory when the Germans came to purchase solar panels, but bought only

	three because the 18% efficiency was not worth it**.** Q: How are the solar farms monitored? – TM- Virtually, cameras and monitors are used.
#15	**Earlson? -** We are forced by the politicians, actors and singer into various schemes. In the West there are miles upon miles of dead—not removed---wind turbines. And so it will be here with the solar farms.
#16	**Kirk Mainvile:** "I was offered 10K per acre for 10 acres. In ten years that would be $$$$. I told them I would not tear up my land. Why not put it on businesses/roofs, parking lots., Big Y and Walmart- they could sell to NGrid. Trees are removed for solar farms, trees remove CO2. Solar farms should be placed over parking lots. Nuclear power would be less environmentally offensive. Research solar farms and look at the fields
#17	**Gary Woodbury, BOS**, reacts to Mr. Kirk's report. "These solar farms were built before any bylaws. Now they have to adhere to ConsComm rules. I followed up, WE DID NOT WALK AWAY if there are issues, he emphasizes. Suggests to look at the solar canopy at Smith and Wesson in W. Springfield have their parking lot covered with panels.
#18	**Mike Dow, N. Spencer Road**
	Bonds represent zero, nothing, don't rely on them for decommissioning. It is a loss. Solar developers ask for extension upon extension. Solar developers are cheap; Bonds are useless, as are insurance bond- look at the example of Sutton schools; –Solar farms are ugly plants and they are hazardous as to waste not to mention the decommissioning, the cost, bonds will be useless. Solar farms are placed in RR districts, and not next to businesses. – Jon Viner shares that the decommissioning bond is revisited with the solar owners every 5 years and is updated. – **But can it be raised, Mr. Dow asks, can Town ask to increase the bonds? We need somebody to watch the actual decommissioning and not only because of hazardous materials.** – The best bond is money in the bank. What would happen if the solar developers declare bankruptcy? Do you know how the bond is structured?

	Slow them down, declare a moratorium. -Does the Town have a model for decommissioning- J. Viner- building permits is required.
#19	**Ellen Sousa from The Common Ground Land Trust**
	Shares that her home will be surrounded on at least two sides by a new farm on Paxton Road. –The Town Planner, PD, objects and says there are no plans to build a solar farm on Paxton Road. -TM states that she has the info about a solar plant from him. He replies: Only in the pipeline. - Ms. Sousa states how the Wilson farm obstructed the original trails, and now there is much tree clearing to accommodate the new solar farm and there is so much run off. **Recommends that the new bylaws are specific as to where the solar farms DO NOT BELONG. -**TM states that that is difficult because we are dealing with private property owners. – Consider green energy vs. deforestation. Cutting causes erosion. Mentions clear cutting next to her property on wire Village/Paxton Rd. ES states that Leicester was able to put in place a moratorium. -RH states that the state law encourages the solar farms and that we cannot stop it and the Town is interested in the revenue.- TM shares the 3M laundry list provided by RH—services that the Town would like to implement and the budget is short by 3M. Ms. Sousa informs us, that Leicester instituted **a cap on solar farms.** **Town Planner** comes to the mic: We need to expand the commercial area along Rt 31 North. TP states there is no proposed solar farm approval on Paxton Rd.
#20	**Ed Bemis**
	Thanks the committee for its work and asks for an applause for SBAC. Recommends dual use, higher placed panels. –**J. Viner explains that height is dictated by snow and wind impact, too**. –More philosophical statements and agricultural land does not provide enough income for farmers. Solar farms are only temporary, after decommissioning land can be returned to farming. There is

	no demand for farm land. ---Rt 31 is a single use special permit area. Certain business are allowed there. **Town Planner: Solar farms are not active commercial entities.**
#21	**Mary Baker-Wood**
	Land that is no longer farmed is in 61B. Can we find other solutions? We saved the Sibley Farm, the Small Farm. The decision about McCormick Road was made by BOS. – We need an environmental team---- safe and local food. **Master Plan is clear- and now our town is losing its rural character.** In 1953 there were in Spencer 153 dairy farms- all are gone! **We have to get to a decision- what does the town want to be or become? It is not only about money! Solar $$ won't be the solution.- People come here for the open spaces, rural character. The issues are endemic and solar farms will not solve them.**
#22	**Al Atchue**
	Did you approach Durant, Gobi what re: the state plans?—MD responds that he spoke with each. ---TM adds that the committee is a part of Central Mass forum on solar farms.
#23	**Heidi Brenke-Malone:** Reiterates the cap idea and setting aside money from solar farms tax revenue to protect land. – RH: SBAC has nothing planned; we look at the issues and have to be ready for the October Town Meeting.
#24	**Roger Witt, Wire Village Road:** Solar works, wind failed. It will destroy oxygen because trees are being removed. Nobody wants to update coal power plants. There are the green credits; every municipal building should have solar panels. California is doing it. Nancy Tame suggests that we should tell DOER to subsidize parking lots. <u>RH: Does not know if a cap on number of solar farms would be legal.</u> RH lists all services that the Town is short on… RH is optimistic that with the new bylaws things will be better. Mr. Witt: Mentions the financial incentives for solar developers? **Make them use the improved panels, those less toxic. – Trees create oxygen. If you pollute you lose "green credits' as per Governor Baker.**

	Matt DeFosse: Thanks the audience for attending and encourages them to come to our meetings, write to us, talk to us. Dr. Hicks closes the meetings shortly after 8:30PM.

Written record of participants' notes left in our blue boxes, Feb. 21, 2019, Listening session

1.	No name: Spencer Snowbirds Facebook.com-can be contacted anytime
2.	No name: Yes to roof and parking lots solar panels 1) Town survey showed open space recreational space very important. NO panels near trails or visible to scenic roadways. Visual impact should be taken into consideration. 2) Technology is likely improve solar panels to be smaller and more efficient- less ugly. Don't we want hold back? Not against solar power- cap and moratorium
3.	Michael Girardy, Jenny Pratt, 508-356-5878 Credit energy panels for business, municipal buildings, homes, place on or as close as possible? Create Spencer credits for the use of panels and credit Spencer businesses and homeowners. Money on their bills. Ambit Energy- clean
4. Q	David Milgate, 10 Lakeshore Dr: a) Currently it costs a solar company $14/MW/hr to produce electricity b) By comparison, it costs a coal plant #36/MW/hr to produce electricity. c) Is there anything that the town can do to secure those savings? For the citizens of Spencer?
5. !	Recommend a town vote on a moratorium to solar farms until bylaws can be updated ***urgent**
6. Q	Peter Sielis, 508-989-3922, Assistant Trail chief, Spencer Snowbirds;

	risingsmoke22000@msn.com Concerns of snowmobile trails that exist that we will continue to have access to our trails as these trails are used by not only us but snowshoe cross country ski, biking and hiking year around.
7. Q	No name: Are these environmental studies completed prior to issuing a permit
8.	No name; a printed text attached "For instance, living near solar power plants could have negative effects to people who suffer from *electromagnetic hypersensitivity.* This is a condition where the person affected **easily gets sick** even though very small amounts of electromagnetic radiation like the ones that come from our cellular phones and other electronic appliances. **People who suffer from this may experience headaches and restlessness.** In Truth, some people who experience this may not even be aware that those symptoms have something to do with the solar power plant.
9. Q	David McLaughlin (2 Norcross Rd) , sales@revisedesigns.com I would appreciate an answer! How many panels? How many acres? Are being taken on Norcross Rd on Gaucher Farm? How far from houses will it be?

THE COMMONWEALTH OF MASSACHUSETTS
OFFICE OF THE ATTORNEY GENERAL
CENTRAL MASSACHUSETTS DIVISION
10 MECHANIC STREET, SUITE 301
WORCESTER, MA 01608

MAURA HEALEY
ATTORNEY GENERAL

(508) 792-7600
(508) 795-1991 fax
www.mass.gov/ago

April 10, 2019

Ellen M. Glidden, Town Clerk
Town of Barre
P.O. Box 418
Barre, MA 01005

Re: Barre Special Town Meeting of December 11, 2018 – Case # 9291
Warrant Articles # 10, 12 and 13 (Zoning)

Dear Ms. Glidden:

Articles 10 and 13 - We approve Articles 10 and 13 from the December 11, 2018 Barre Special Town Meeting. Our comments on Article 10 are provided below.

Article 12 - The Attorney General's deadline for a decision on Article 12 is extended for an additional 90 days under the authority conferred by G.L. c. 40, § 32, as amended by Chapter 299 of the Acts of 2000. The agreement with Town Counsel for a 90-day extension is attached hereto. We will issue our decision on Article 12 on or before **July 14, 2019.**

Article 10 - Article 10 amends the Town's zoning by-laws, by amending Section 140-10.1, "Solar Energy Facilities Special Permit and Site Plan Review," as set forth in the Finance Committee Booklet as Appendix B. As amended, the by-law allows certain solar installations by right and certain installations by special permit. Specifically, an agricultural solar facility and a residential roof-mounted solar facility, as defined in the bylaw, are allowed by right in all zoning districts. *See* Section C. A commercial roof-mounted solar facility, as defined in the by-law, is allowed by right in the Limited Business (B-L), Business and Commercial (B-C) and Industrial (Ind) districts. *See* Section C. A commercial large-scale ground-mounted solar facility and a commercial small-scale ground-mounted solar facility, as defined in the by-law, are allowed by special permit in the B-L, B-C, and Ind districts; and a residential ground-mounted solar facility requires a special permit in all districts. *See* Section C. Lastly, a commercial large-scale ground mounted solar facility is allowed by special permit "on agricultural lands which are zoned R-80" with certain conditions as set forth in Sections D and E of the bylaw. *See* Section C.

I. The Attorney General's Standard of Review

Pursuant to G.L. c. 40, § 32, the Attorney General has a "limited power of disapproval," and "[i]t is fundamental that every presumption is to be made in favor of the validity of municipal by-laws." Amherst v. Attorney General, 398 Mass. 793, 795-96 (1986). The Attorney

General does not review the policy arguments for or against the enactment. Id. at 798-99 ("Neither we nor the Attorney General may comment on the wisdom of the town's by-law.") Rather, in order to disapprove a by-law (or any portion thereof), the Attorney General must cite an inconsistency between the by-law and the state Constitution or laws. Id. at 796. "As a general proposition the cases dealing with the repugnancy or inconsistency of local regulations with State statutes have given considerable latitude to municipalities, requiring a sharp conflict between the local and State provisions before the local regulation has been held invalid." Bloom v. Worcester, 363 Mass. 136, 154 (1973). "The legislative intent to preclude local action must be clear." Id. at 155. Massachusetts has the "strongest type of home rule and municipal action is presumed to be valid." Connors v. City of Boston, 430 Mass. 31, 35 (1999) (internal quotations and citations omitted).

Article 10, as an amendment to the Town's zoning by-laws, must be accorded deference. W.R. Grace & Co. v. Cambridge City Council, 56 Mass. App. Ct. 559, 566 (2002) ("With respect to the exercise of their powers under the Zoning Act, we accord municipalities deference as to their legislative choices and their exercise of discretion regarding zoning orders."). When reviewing zoning by-laws for consistency with the Constitution or laws of the Commonwealth, the Attorney General's standard of review is equivalent to that of a court. "[T]he proper focus of review of a zoning enactment is whether it violates State law or constitutional provisions, is arbitrary or unreasonable, or is substantially unrelated to the public health, safety or general welfare." Durand v. IDC Bellingham, LLC, 440 Mass. 45, 57 (2003). Because the adoption of a zoning by-law by the voters at Town Meeting is both the exercise of the Town's police power and a legislative act, the vote carries a "strong presumption of validity." Id. at 51. "Zoning has always been treated as a local matter and much weight must be accorded to the judgment of the local legislative body, since it is familiar with local conditions." Concord v. Attorney General, 336 Mass. 17, 25 (1957) (*quoting* Burnham v. Board of Appeals of Gloucester, 333 Mass. 114, 117 (1955)). "If the reasonableness of a zoning bylaw is even 'fairly debatable, the judgment of the local legislative body responsible for the enactment must be sustained.'" Durand, 440 Mass. at 51 (*quoting* Crall v. City of Leominster, 362 Mass. 95, 101 (1972)). In general, a municipality "is given broad authority to establish zoning districts regulating the use and improvement of the land within its borders." Andrews v. Amherst, 68 Mass. App. Ct. 365, 367-368 (2007). However, a municipality has no power to adopt a zoning by-law that is "inconsistent with the constitution or laws enacted by the [Legislature]." Home Rule Amendment, Mass. Const. amend. art. 2, § 6.

II. Article 10 Must be Applied Consistent with G.L. c. 40A, § 3.

General Laws Chapter 40A, Section 3, protects solar energy systems and the building of structures that facilitate the collection of solar energy, and provides in pertinent part as follows:

> No zoning ordinance or bylaw shall prohibit or unreasonably regulate the installation of solar energy systems or the building of structures that facilitate the collection of solar energy, except where necessary to protect the public health, safety or welfare.

There are no appellate level judicial decisions to guide the Town or this Office in determining what qualifies as an unreasonable regulation of solar uses under G.L. c. 40A, § 3. However, a Land Court decision provides some guidance. In Briggs v. Zoning Board of Appeals

of Marion, 2014 WL 471951 * 5 (2014), the Land Court determined that a zoning board of appeals' decision maintaining a division between commercial solar energy and residential accessory solar energy was reasonable and did not violate G.L. c. 40A, 3. In addition, as a general principle, we recognize that the Town may utilize its zoning power to impose reasonable regulations on solar uses based upon the community's unique local needs. *See* Burnham v. Board of Appeals of Gloucester, 333 Mass. 114, 116-117 (1955) ("Zoning has always been treated as a local matter and much weight must be accorded to the judgment of the local legislative body, since it is familiar with local conditions."). The reasonableness of a regulation is a fact-dependent determination that includes a consideration whether a regulation substantively diminishes or detracts from a project's usefulness or imposes an excessive cost that outweighs legitimate municipal concerns *See e.g.*, Duseau v. Szawlowski Realty Inc., 2015 WL 59500, * 8 (2015) (solar project proponent failed to demonstrate that restricting a solar energy project to the Town's Industrial Districts was an unreasonable regulation and not necessary to protect the public health and welfare).

In applying the amendments adopted under Article 10 the Town should consult closely with Town Counsel to ensure that the Town does not run afoul of the solar use protections in G.L. c. 40A, § 3.

III. Specific Comments on Section 140-10.1

Although the Town has adopted a new Section 140-10.1, as set forth in the Finance Committee Booklet as Appendix B, many of the provisions of Section 140-10.1 remain unchanged from the Town's original adoption of Section 140-10.1 at the June 21, 2016 Annual Town Meeting. (*See* Attorney General's Decision issued in Case # 8112). As such, we incorporate our prior comments as set forth in our decision dated November 15, 2016 in Case # 8112. We also offer the following additional comments for the Town's consideration.

A. Section F - Site Plan Review Procedure

Section F requires site plan review to be conducted as part of the special permit process. Section F (4) requires additional abutter notifications for commercial large-scale ground-mounted solar facilities. Specifically, Section F (4) requires that the applicant notify all property owners located within a ½ mile of the boundaries of the proposed solar facility of the pending special permit application. General Laws Chapter 40A, Section 11 requires notice of the special permit hearing to "parties in interest" which includes abutters (and abutters to abutters) within 300 feet of the project. Section F (4) would increase that notification to 2,640 feet (½ mile). Section F (4) further requires the applicant to mail this notice via certified mail, return receipt.

In addition, Section F (4) requires the property owner to erect a sign beside the major frontage road within 30 days of submitting an application for a special permit for a solar facility and requires that the sign include specific information, including the name of the solar contractor, the size in acres of the solar facility and the total megawatt output of the facility. Further, the sign must include "a site plan showing the location and extent of the solar facility and all nearby roads and highways. The sign lettering shall be of sufficient size to be read by someone driving along the road."

Given this Office's limited review of zoning by-laws, we are not in a position to conclude that these requirements constitute an unreasonable regulation of solar energy in contravention of G.L. c. 40A, § 3. However, the Town should consult closely with Town Counsel during the site plan/special permit process to avoid any conflict with G.L. c. 40A, § 3.

B. Section H - Waiver of Requirements

Section H, pertaining to waiver of requirements, provides:

> The Planning Board may waive any requirements or conditions as specified in this Bylaw if they determine that the requirements and/or conditions are not necessary. The waiver of any requirement or condition shall be made at the sole discretion of the Planning Board.

The by-law does not identify any standards or criteria that the Planning Board will utilize in making its determination whether to waive a requirement or condition of the by-law. Without standards and criteria to guide the Planning Board in their decision-making process, Section H may grant undue discretion to the Planning Board in determining whether to grant a waiver. *See e.g.* MacGibbon v. Board of Appeals of Duxbury, 356 Mass. 635, 638 (1970) (the zoning bylaw must "provide adequate standards for the guidance of the board in deciding whether to grant or to withhold special permits…"). The Town must ensure that the by-law is not applied in an arbitrary or discriminatory manner. To avoid a challenge, the Town may wish to amend the by-law at a future Town Meeting to establish a waiver process, as well as identify any standards and criteria that will guide the Planning Board's decision. The Town should consult with Town Counsel with any questions on these issues during the special permit and site plan review process.

C. Section O - Decommissioning, Removal, Restoration, Abandonment

Section O (3), provides that in the event of abandonment, if the solar owner and operator have not completed the removal of the solar facility within 90 days from the date of the Town's written notice to remove the facility, then "the Town may proceed, without taking any legal action, to enter the property to decommission, physically remove the facility and restore the property." (emphasis added). Municipal officials do not have the authority to conduct non-emergency warrantless searches of private property without permission of the owner. Commonwealth v. John G. Grant & Sons Co., Inc., 403 Mass. 151, 159-60 (1988). The U.S. Supreme Court has held that warrants are required for non-emergency administrative inspections. Camara v. Municipal Court of San Francisco, 387 U.S. 523 (1966) (requiring warrant for health inspector non-emergency entry); See v. City of Seattle, 387 U.S. 541 (1966) (requiring warrant for non-emergency inspection by fire chief). "[A]dministrative entry, without consent, upon the portions of commercial premises which are not open to the public may only be compelled through prosecution or physical force within the framework of a warrant procedure." See, 387 U.S. at 545. Massachusetts courts have similarly recognized that "statutes can no longer convey blanket powers of warrantless entries." Commonwealth v. Hurd, 51 Mass. App. Ct. 12, 17 (2001) (holding that G.L. c. 129, § 7, does not authorize warrantless searches for animal inspection).

The Town should consult with Town Counsel to ensure that the Section O (3) is applied in a manner that is consistent with state law and applicable constitutional requirements.

Note: Pursuant to G.L. c. 40, § 32, neither general nor zoning by-laws take effect unless the Town has first satisfied the posting/publishing requirements of that statute. Once this statutory duty is fulfilled, (1) general by-laws and amendments take effect on the date these posting and publishing requirements are satisfied unless a later effective date is prescribed in the by-law, and (2) zoning by-laws and amendments are deemed to have taken effect from the date they were approved by the Town Meeting, unless a later effective date is prescribed in the by-law.

Very truly yours,

MAURA HEALEY
ATTORNEY GENERAL
Nicole B. Caprioli

By: Nicole B. Caprioli
Assistant Attorney General
Municipal Law Unit
10 Mechanic Street, Suite 301
Worcester, MA 01608
(508) 792-7600 ext. 4418
nicole.caprioli@mass.gov

cc: Town Counsel James Baird

DECOMMISSIONING of PANELS
and DECOMNISSIONING CASH BASED ON MW

NAME	PROJECT IN ACRES	PROJECT IN MW	NUMBER OF PANELS	CURRENT DECOMMISSIONING BOND	CASH projected $350,000.00 PER 1MW	Removal of panels @$25/panel
Wilson	21.71	3.70	9, 815.00	NONE	$ 1, 295,000.00	$ 245,000.00
St. Joseph's Abbey	59.40	22.00	63, 702.00	$230,000.00	$ 7, 700.000.00	$1, 592, 550.00
Treadwell	25.19	2.60	unknown	$134. 564.00		
Paxton	6.00	1.00	unknown	$ 46. 774.30	$ 350.000.00	
Woodchuck	5.00	1.00	unknown	$ 46, 751.00	$ 350,000.00	
Holmes	6.00	1.40	unknown	$ 46, 774.00	$ 490,000.00	
Meadow	18.26	3.00		$176, 600.00	$1, 050,000.00	
SunpinSolar /N.Brookfield Rd	10.50	1.98	unknown	TBD	$ 693, 000.00	
104 N. Spencer	4.40	2.00	unknown	N/A	$ 700,000.00	
Cranberry Meadow	3.30	1.29	unknown	$148,685.00	$ 451,000.00	
20 McCormick	20.00	4.94	unknown	TBD	$ 1, 729,000.00	
32 McCormick	10.75	2.99	unknown	TBD	$ 1, 046,500.00	
GH Wilson	11.4	2.00	unknown	TBD	$ 700,000.00	
369 Main St.	7.10	2.00	unknown	TBD	$ 700,000.00	

---Prepared by Paula Orcutt

Paula Orcutt

NB. Number of panels per solar facility was only known for two (2) of the projects (Provided to SBAC by the Town Planner), so I could only estimate cost of panel removal for the two facilities (Wilson and Abbey). These numbers are for **the removal of panels only at the current rate of $25.00 per panel.** The size of the panels is unknown/varies.

PLEASE, further consider the costs for labor, transportation and recycling for the following items:

- metal racks
- all below- and above-ground conduits and wiring
- removal of inverters
- removal of transformers
- removal of power lines,
- removal of appurtenant buildings and storage constructions
- removal of fences and gates
- removal of utility poles
- removal of huge battery storage units
- removal of wiring from utility poles and from solar-related equipment
- restoration of property to pre-construction state
- Plus ancillary unforeseen costs: legal costs, supervisory services, third-party consultants, soil and water testing

Impossible to predict these cost in 20/25 years.

Dear People of the Town of West Brookfield,
10 March 2018

I am writing with concern for the construction of Solar Panels in the town of West Brookfield and all other towns who are not equipped with the knowledge of how these Solar Companies operate.

Solar Panel Developers ("The Developer") seeks out towns like ours (In this case, West Brookfield) knowing that we are always seeking ways to find income. With decreasing populations in our areas, plus the need to attract business and the potential of lost business and the taxes that it provides, leaves small towns cash starved.

The Developers will come with a fast paced presentation and use key words/phrases as,

- "We will give your town money up front."
- "Annuities over the life of the solar field."
- "Just hold this money in escrow and when the panel field is decommissioned, you will have enough money for clean up."
- "We do all the work. We are the "developers."
- "Solar Panels are biodegradable. Just throw them in the dump." WRONG!
- "We only get Solar Panel Credits at the beginning of the year, so we have to move now to get them." (In reality, the solar credits are always there.)
- "When decommissioning, we will have a bond that will cover this."

This is all great in the front end. It's the back end where towns get in trouble. In our research, we can up with these items that towns are not told from solar panel companies when it comes to decommissioning.

1) Solar Panels are hazardous. They ALL come from China. The main "*ingredients*" are;

- S**ilicon Tetrachloride** This chemical, if not handled and disposed of properly, can lead to burns on your skin, harmful air pollutants that increase lung disease, and if exposed to water can release hydrochloric acid, which is a corrosive substance bad for human and environmental health.
    1. *This is also the chemical that is viscous. Thus creates a fluid that leaks.*
    2. *The other issue with this chemical and others listed below is that the solar panel off-gases. Which means these gases bubble or accumulate in and around the solar fields daily. Then a wind blows, blows these gases into surrounding neighborhoods. We breathe this in.*
    3. *One instance found that during a forest fire, a solar field caught fire and released toxic air into the atmosphere. (what if a dump catches fire with panels disposed of in them? This may smolder for days and release toxic chemicals into the air like listed above and further in this document.)*

- **Amorphous silicon** (a-Si) *(Both forms of SiC were highly toxic at concentrations greater than 0.1 mg/ml)*
- **Cadmium telluride** (CdTe) *(Highly Toxic)*
- **Copper indium gallium selenide** (CIS/CIGS) *(tests only Toxic to animals lungs.)*
- **Toluene** /ˈtɒljuːiːn/, also known as **toluol** /ˈtɒljuːɒl/, *is an aromatic hydrocarbon. It is a colorless, water-insoluble liquid with the smell associated with paint thinners. It is a mono-substituted benzene derivative, consisting of a* CH_3 *group attached to a phenyl group. As such, its IUPAC systematic name is* ***methylbenzene****. Toluene is predominantly used as an industrial feedstock and a solvent.*
- **Tetralin** (**1,2,3,4-tetrahydronaphthalene**) is a hydrocarbon having the chemical formula $C_{10}H_{12}$. This molecule is similar to the naphthalenechemical structure except that one ring is saturated.
- **Lead,** which can damage the nervous system,
- **Teratogenic**: A **teratogen** is an agent that can disturb the development of the embryo or fetus. **Teratogens** halt the pregnancy or produce a congenital malformation (a birth defect). Classes of **teratogens** include radiation, maternal infections, chemicals, and drugs.

"You're heartsick about global warming, so you've just paid $25,000 to put a solar system on the roof of your home. How do you respond to news that it was manufactured with a chemical that is 17,000 times stronger than carbon dioxide as a cause of global warming?"

Solar Fields require land. Which in turn a farmer, town, land-owner sells or leases to them. Which when developed, takes away from Nature. Meaning, the fields displace many things.

- land to grow crops / hay on
- displaces animals from that area.
- trees might have to be removed which takes away from oxygen replenishment. Check out the eye sore coming out of Ware on Rt. 9 on the hill to the left. How many animals were displaced from there? Trees, etc. We wonder why wildlife invades our downtowns?
- I'll add, they are ugly.

2) 25 years — the average lifespan of a solar panel.

The life expectancy chosen by the researchers is, well, just an expectation. It's true that most manufacturers give warranties of (20) to (25) years, so technologically speaking a life expectancy of 30 years is not implausible. However, there are other than technological reasons that may lead to a significantly lower life expectancy. The scientists note that the environmental score of solar panels will improve, because they are becoming more efficient each year.

Which means, the life of a solar panel use today decreases because of new technologies. Then this reaction to the solar field occurs;

- Makes existing solar fields inefficient.
- Which means, it costs more to produce electricity out of this field.
- Thus making the electricity more expensive.
- Thus then creating a higher costing green credits which no trader can trade.
- Since the solar field then becomes inefficient, the owner walks away from the field.
- Then leaving it to a small town like and old factory for the town to worry about.

While the majority of solar panels fall in the 14% to 18% efficiency range, New Technology Solar Panels developed in 2017 are much more efficient – between 19.1% and 22.2%. What we don't know in our research because the information I just think hasn't reached a time when one field should be shut down due to inefficiency and when a new one should be developed? So what happens in 2020 when new panels are cheaper to produce and are 20% more efficient then todays? We do not know this yet. I bet it isn't going to be good.

3) Who owns the Solar Power Generation Certificates?

The developing companies (For Solar Power) put certain parts of a Solar Field into LLC's. They do this to protect the developing company and its stock holders etc.

Usually there are these LLC's created.

- The land that the panels rest on.
- A leasing company that leases from the Land LLC.
- Solar Panel LLC. (this holds the solar panels.)
- A company that holds the Generation License/Certificate/Permit.
- A company that collects the money from the sale of the electricity.

So who owns the Power Generation Certificates? THE TOWN OF WEST BROOKFIELD SHOULD!

The developing company retains these certificates if and when they can. This gives them control of the entire process and also allows them to charge the grid a cost to purchase the power and the developing company collects all monies and credits from the sale of the power to the grid.

As most towns do not have the resources to check into these items. They towns usually get stuck without more revenue from the panel farm and because the developing company has the farm in many different LLCs, they will walk away from them come time of decommissioning and they will let the LLC's go bankrupt. They will also bankrupt the LLC which holds the bond the day before the bond expires. This doesn't give a town enough time to file and because again, small towns do not have the resources, it is missed because the information is filed away in a cabinet from (20) years ago or more.

The attempt here is three fold,

- One, to have all Solar Field Proposals, Documents, leases, all handled by some committee or person(s) or myself.
- Two, for our town to adopt a decommissioning contract with all Solar Companies coming into town on both private and town held lands that will be signed before any action starts on any solar field built in West Brookfield.
- Three, for the town to own all Energy Generation Licenses/Certificates/Permits.

As the author of this document, I will still investigate the above actions and present a plan to the Board of Selectmen and potentially give a presentation at Town Meeting if so required.

My caveat here is; I am not apposed to the town making money. I am apposed to the town getting caught with the issues and costs reported in this document and the research we have done that has exposed other towns.

4) Decommissioning a Solar Field and Costing

This chart does not include, depending on the type of Solar Panel is in the field, the Hazardous Waste Removal.

This Charts costing is approximate 'per acre' on ground mounted Solar Panels.

Tasks	Estimated Cost ($)
Remove Rack Wiring	$2,459
Remove Panels	$2,450
Dismantle Racks	$12,350
Remove Electrical Equipment	$1,850
Breakup and Remove Concrete Pads or Ballasts	$1,500
Remove Racks	$7,800
Remove Cable	$6,500
Remove Ground Screws and Power Poles	$13,850
Remove Fence	$4,950
Grading	$4,000
Seed Disturbed Areas	$250
Truck to Recycling Center	$2,250
Current Total	**$60,200**
Total After 20 Years (2.5% in ation rate)	**$98,900**

How can decommissioning be ensured?

Landowners and local governments can ensure appropriate decommissioning and reclamation by using Financial and regulatory mechanisms. However, these mechanisms come with tradeoffs. Including decommissioning costs in the upfront price of solar projects increases overall project costs, which could discourage solar development. As a result, solar developers are sometimes hesitant to provide or require financial surety for decommissioning costs.

It is also important to note that many local governments choose to require a financial mechanism for decommissioning. Although similar to telecommunications installations, there is no specific authority to do so as part of a land use approval for solar projects (see Table 2). Therefore, a local government should consult their municipal attorney when evaluating financial mechanisms.

Financial mechanisms action plans for decommissioning of a solar field.

- Decommissioning Provisions in Land-Lease Agreements.
- Decommissioning Trusts or Escrow Accounts.
- Removal or Surety Bonds.
- Letters of credit
- Abandonment and Removal Clause. Local governments can include in their zoning code an abandonment and removal clause for solar panel systems.
- Special Permit Application. A local government may also mandate through its zoning code that a decommissioning plan be submitted by the solar developer as part of a site plan or special permit application. Having such a plan in place allows the local government, in cases of noncompliance, to place a lien on the property to pay for the costs of removal and remediation.

ZONING

https://www.mass.gov/files/documents/2017/10/16/model-solar-zoning.pdf

Department of Energy Resources
Massachusetts Executive Office of Energy and Environmental Affairs December 2014

This model zoning and accompanying Guidance were prepared to assist Massachusetts cities and towns in establishing reasonable standards to facilitate development of solar energy systems. These systems include small-, medium- and large-scale as well as both here is not intended for adoption precisely as it is written. Communities will need to carefully consider how this language may be modified to suit local conditions and where it should be inserted into an existing Zoning Bylaw/Ordinance. Further, it is highly recommended that any language adapted from this model be reviewed by municipal counsel prior to adoption.

As small-, medium-, and large-scale ground-mounted and roof-mounted solar energy systems become more prevalent in Massachusetts, many communities are attempting to regulate the installation of these systems through their Zoning Bylaw/Ordinance.

Developing these regulations has been particularly challenging for a number of reasons. Most notably, the Massachusetts General Laws contains several provisions that specifically address the ability of local governments to regulate solar energy systems and/or to protect solar access from development or vegetation (shading) on adjacent properties. While the language within Chapter 40A Section 3 states that a local government may not prohibit these uses, it does say they cannot be "unreasonably regulated" without providing guidance on what that particular phrase means. The Solar Energy Systems Policy Guidance, which accompanies this model zoning and succeeding sections of this document provide more explanation regarding the implications of the statutes on this issue and its significance to local zoning.

Unlike model bylaws/ordinances typically developed by the Commonwealth, the regulatory language provided here is not packaged as a "stand-alone" section of a Zoning Bylaw/Ordinance. With ground-mounted and roof-mounted solar energy systems, the statutory framework and "accessory" nature of some of these installations lend themselves to a different approach. This model zoning therefore assumes that municipalities will have many "typical" sections within their Zoning Bylaw/Ordinance and that several of these sections would be amended to address this issue. For the purposes of this model zoning, the Bylaw/Ordinance sections that are amended include:

5) Just how big of a problem is solar waste?

Environmental Progress investigated the problem to see how the problem compared to the much more high-profile issue of nuclear waste.

Research I found:

- Solar panels create 300 times more toxic waste per unit of energy than do nuclear power plants.
- If solar and nuclear produce the same amount of electricity over the next 25 years that nuclear produced in 2016, and the wastes are stacked on football fields, the nuclear waste would reach the height of the Leaning Tower of Pisa (52 meters), while the solar waste would reach the height of two Mt. Everest's (16 km).
- In countries like China, India, and Ghana, communities living near e-waste dumps often burn the waste in order to salvage the valuable copper wires for resale. Since this process requires burning off the plastic, the resulting smoke contains toxic fumes that are carcinogenic and teratogenic (birth defect-causing) when inhaled.
- ***Definition: Teratogenic** drugs: A **teratogen** is an agent that can disturb the development of the embryo or fetus. **Teratogens** halt the pregnancy or produce a congenital malformation (a birth defect). Classes of **teratogens** include radiation, maternal infections, chemicals, and drugs.*

The SVTC warns that solar panel production creates many of the same toxic byproducts as those found in semiconductor production, including silicon tetrachloride, dusts, and greenhouse gases like sulfur hexafluoride. These byproducts aren't anything to scoff at—silicon tetrachloride, for example, makes land unsuitable for growing crops.

There are steps that the solar industry can take to minimize toxic risks, however. The SVTC recommends that manufacturers test materials for toxicity before using them. Additionally, the group asks manufacturers to ramp up take-back programs.

The only way manufacturers will aggressively pursue recycling and anti-toxicity campaigns is if **we stop giving the solar industry a free pass and start demanding accountability.**

Right now, solar panel recycling suffers from a chicken-or-egg problem: There aren't enough places to recycle old solar panels, and there aren't enough defunct solar panels to make recycling them economically attractive.

Last November, 2017, Japan's Environment Ministry issued a stark warning: the amount of solar panel waste Japan produces every year will rise from 10,000 to 800,000 tons by 2040, and the nation has no plan for safely disposing of it.

Neither does California, a world leader in deploying solar panels. Only Europe requires solar panel makers to collect and dispose of solar waste at the end of their lives.

6) Fire Fighting Community

The other issue is solar panels on roofs. 1st of all, my concern with these applications is our fire fighters. "If you're driving down the road with a firefighter, more than likely, they're looking at the next building saying, 'If we needed to save this building, how would we do it?'" he says. But it's hard to evaluate a solar-paneled house from the ground. Panels can get in the way of cutting ventilation holes. First responders also rely on the ability to turn off the electricity pulsing through a structure—but photovoltaic panels can make their own power. Electrified panels can cause firefighters to get electrocuted and receive burns. While the firefighting community has started to recognize and plan for the risks of electrified roofs, they still don't have all the necessary rules and tools to work around them.

Other concerns. Firefighters may breathe some of these toxins in while battling blazes.

When I asked Brian Charron from the West Brookfield Fire Department who is our Hazmat Coordinator about his thoughts and the safety of the Fire Department regarding Solar Panels.

Mr. Charron had these additional comments.

- They do impede ventilation during a structure fire.
- They can be a hazard for firefighters!
- With education of firefighters, some risk can be mitigated, but never eliminated!
- Ideally a permitting process would allow FD input for installation and placement of panels. That would assist in pre-planning on particular structures.
- The added roof load is also a factor, especially on truss roof construction causing another concern for firefighters.
- Flame impingement on panels is a hazard to neighboring residents and is also a big concern.
- There are many hazards in firefighting, but again with education, awareness, and proper pre-planning at least some of these hazards can be minimized!

RESEARCH DATA.

http://pubs.rsc.org/-/content/articlehtml/2013/ee/c3ee42653j

https://en.wikipedia.org/wiki/Solar_cell

https://www.ncbi.nlm.nih.gov/pubmed/23718969

https://en.wikipedia.org/wiki/Toluene

https://content.iospress.com/articles/bio-medical-materials-and-engineering/bme5-3-02

https://en.wikipedia.org/wiki/Tetralin

https://cleantechnica.com/2009/01/14/danger-solar-panels-can-be-hazardous-to-your-health/

http://www.lowtechmagazine.com/2008/03/the-ugly-side-o.html

https://news.nationalgeographic.com/news/energy/2014/11/141111-solar-panel-manufacturing-sustainability-ranking/

http://environmentalprogress.org/big-news/2017/6/21/are-we-headed-for-a-solar-waste-crisis

https://news.energysage.com/solar-panels-toxic-environment/

https://www.boconline.co.uk/internet.lg.lg.gbr/en/images/silicon_tetrachloride_sg_154_released410_81720.pdf?v=3.0

https://news.energysage.com/sunpower-solar-panels-complete-review/

https://howtostartanllc.com/business-ideas/solar-panel

Decommissioning-Solar-Systems.pdf

https://www.wired.com/2017/05/rooftop-solar-panels-great-planet-terrible-firefighters/

Payment Draws

Draw 1

- All permits in place including DEP, Town of Warren demolition permits, and any other permits required at the time of decommissioning/deconstructing;
- Erosion control in place;
- Staging/lay down area and any roads required in place;
- Job site trailers, port-a-johns in place;
- Panels only removed from racking system. No equipment can be taken off of access roads to the panels. No rutting or disturbing land. Once the environmental tests have been returned and are clean, equipment can be driven off of the access roads to move panels to staging.
- 10% draw.

Draw2

- Phase I Environmental Site Assessment (ESA) and subsurface sampling tests performed and reports submitted.
    - No earth work in the field around panels may take place until test results are returned, clean, and approved by the Town.
- Receipt from recycle center where solar panels have been delivered. Receipt's must match the number of panels listed on the as built plan.
- Removal of racking systems once clean environmental test has been returned clean.
- Receipt from recycle center for recycled racking systems.
- Removal of inverters.
- Receipt from recycle center for recycled inverters.
- 25% draw

Draw 3

- Removal of Battery Arrays/containers/associated racking systems
- Receipt from recycle centers for Batteries, containers and racking systems
- Removal of all underground wire from conduits to the panels.
- Excavation of electrical and removal of all schedule-40 conduit below ground that are shown on the as-built electrical plans
- All electrical trenching backfilled according to plan.
- Dress the top 6" of all trenches with screened loam according to plan.
- Receipt's from recycle center for all underground conduit and wiring.
- Removal of all foundations, ballast and any other concrete structures buried underground and removed from site.
- Receipt from where concrete has been delivered.
- All excavated concrete above shall be backfilled according to plans.
- Dress the top 6" of all disturbed areas with screened loam according to plan.
- 25% draw

Draw 4

- Removal of all rip rap swales and storm water controls.
- Removal of all structures in basins
- Receipts from recycle center for all structures and broken up concrete from basins
- Filling of all basins back to original grades on original plans.
- Final grading of site to original grades based on originally submitted plans
- Dress the top 6” of all disturbed areas with screened loam according to plan.
- Seed/plant
- Draw 35%

Draw 5

- 5% retained for two years to insure a minimum of 75% approved vegetated cover

April 17,2019

PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA) AND SUBSURFACE SAMPLING

Requirements for Solar Site Removal

INTRODUCTION AND SCOPE OF WORK

At completion of photovoltaic panels (solar panels) removal, and prior to any earth/site work or equipment removal, the Owners of the Facility (Owners) shall conduct a Phase I ESA, with subsurface sampling, of the Subject Property (Subject Property, Property, or Site).

ASTM PHASE I ESA

The Phase I ESA shall be conducted utilizing industry standards and guidelines for conducting Environmental Site Assessments established by the American Society for Testing and Materials (ASTM), in general accordance with ASTM's Standard Practice for Environmental Site Assessments E 1527-13 (ASTM, November 2013) and the All Appropriate Inquiry requirements specified in 40 CR$ Part 312 and is intended to identify the presence of recognized environmental conditions (RECs) at the Subject Property.

The ASTM defines a REC as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release or a material threat of a release of hazardous substances or petroleum products in structures on the property or into the ground's groundwater, or surface water of the property."

The ASTM notes that the definition of a REC" is not intended to include *de minimis* conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis* are not recognized environmental conditions."

The terms "oil", "petroleum", "hazardous materials", "hazardous wastes", and "hazardous substances" are defined in the Comprehensive Environmental Response, Compensation, and Liability Act of CERCLA, 42 United States Code (USC) 42 Section 9601(14) and Section 9602; the Resource Conservation and Recovery Act (RCRA), 42 USC Section 9621, Subpart C; and the Commonwealth of Massachusetts Hazardous Waste Regulations (310 CMR 30.000), as well as ASTM E 1527-13 1.1.2 and 3.2.65.

ENVIRONMENTAL PROFESSIONAL

The Phase I ESA shall be conducted under the direction and supervision of an Environmental Professional as defined in ASTM # 1527-13. The Environmental Professional shall possess sufficient specific education, training, and relevant experience necessary to exercise professional judgement to develop opinions and conclusions regarding conditions indicative of releases or threatened releases (see #312.1©) on, at, in, or to a property, sufficient to meet the objectives and performance factors in #312.20(e) and (f).

TIMING OF WORK

Except as stated otherwise, this Phase I ESA shall be completed following the removal of all photovoltaic panels from the site, but **PRIOR TO the** removal of any other photovoltaic-related equipment (racking systems, conduit, etc) from the Site and any related earthwork. No Equipment can be driven off the access roads to the panels. No rutting or land disturbance shall take place until test results have returned, clean. Inspection of the Battery Storage System, if present, will be conducted **PRIOR TO** removal of said equipment from the Site.

BACKGROUND RESEARCH

As part of this Phase I ESA, the Owner shall provide all appropriate information inclusive of:

1. Current site and area characteristics including wetland information

2. Site and surrounding area history

3. Site regulatory information

4. Interviews

5. User provided information

6. All available database information.

SUBSURFACE SAMPLING

In performance of this ESA, the Owners will conduct subsurface soil sampling to evaluate the potential presence of RECs as a result of the Owner's operation of the property as a solar photovoltaic site.

a) Sampling Procedures

Sampling shall be conducted beneath the foot print of the solar array, surface and subsurface equipment, utilities, equipment staging areas, and from all retention basins constructed on the property. Samples will be collected on a grid basis of one composite sample per acre beneath the solar array and all associated equipment and utilities. Five sample portions will be collected per acre and consolidated into the one composite sample for analysis. Care should be taken to collect samples beneath any damaged or fractured solar panels. Individual grab samples will also be collected from each retention basin and equipment staging areas. All samples will be collected using hand auger equipment to a depth of 6-9 inches. Screening of all composite and grab soil samples will be conducted using a portable Photoionization Detector (PID) using Massachusetts Department of Environmental Protection (DEP) methodology.

Locations of all samples shall be incorporated into a site plan and included in the final report of this Phase I ESA.

b) Soil Analytical Methods

All soil samples shall be transported on ice under Chain of Custody documentation to a Massachusetts-certified laboratory for the following analyses:

1) Resource Recovery and Conservation Act (RCRA) 8 Metals

2) US EPA Method 8260 for Volatile Organic Compounds

3) US EPA method 8015M for Total Petroleum Hydrocarbons

All analytical results will be tabulated and incorporated as part of the final report. Comparison of analytical results with applicable Department of Environmental Protection (DEP) soil and groundwater standards will be included.

BATTERY STORAGE SYSTEMS

In the event of a battery storage system being utilized at the Site, the Owner's Environmental Professional will conduct a detailed visual inspection as to the condition of all individual battery components contained in the system.

Particular attention should be made to the presence of damaged or fractured components and staining or corrosion that may be present within the containment system or beneath the containment system.

FINAL REPORT

Six (6) copies of the Final Report shall be submitted by the Owner to the Town of Warren that will fully describe the objectives, methodology, field observations, analytical results and conclusions of all work completed under the Phase I ESA. Attached exhibits shall include but not be limited to a Site plan, soil sampling location plan, tabulated analytical results and comparison to applicable DEP standards, environmental data base information, copies of laboratory analytical reports, and all related information as required under ASTM #1527-13 in preparation of a Phase I Environmental Assessment. The Environmental Professional shall render an opinion as to the presence or likely presence of recognized environmental conditions (RECs) at the Subject Property and recommend additional investigation at the property as appropriate.