



**Cape Cod Commission Staff Report
Development of Regional Impact Review**

Draft Date:	February 21, 2019
Project:	AMP Energy (Cape Cod Commission File No. 19034)
Project Applicant:	ASD Cotuit MA Solar, LLC, Sandwich
Property/ Site:	180 Cotuit Road, Sandwich, MA 02563 (Assessors Map 13, Parcel 44)
Public Hearing:	February 27 at 5:00 p.m., Sand Hill School Community Center, 16 Dewey Ave., Sandwich, MA 02563
Subcommittee:	Harold Mitchell (Chair), Richard Roy, Richard Elkin, Fred Chirigotis, and Charles McCaffrey

Project Description and Context

- The Applicant proposes to develop an 18.8-acre +/- undeveloped wooded parcel (“Property” or “Site”) by installing an approximately 5 MWdc solar photovoltaic array (“Project”). The Applicant has legal standing to pursue the Project under an option to purchase it has entered into with the Property owner (Andrew E. DeGraw, Jr. and Ann DeGraw Swaim, Trustees of the Cotuit Road Realty Trust). As proposed, the development and installation of the solar photovoltaic array would consist of:
 - Clearing all trees and vegetation on the interior 10.85 acres +/- of the Site;
 - Seeding the soils in the cleared area and installing a fence and stormwater management swales along the perimeter of the cleared area;
 - Installing a gated gravel driveway and a concrete equipment pad, which would be set back 50 feet from the frontage along Cotuit Road; and
 - Installing piles, racks, and solar modules, which will be connected by underground wire to a battery bank and central inverter located on the equipment pad.
- The surrounding development is primarily single family residential, apart from an RV Park abutting the Property to the East. The Property is in a Wellhead Protection Area (WHPA) but is not mapped for other sensitive resources identified in the Regional Policy Plan (“RPP”) such as priority habitat, natural landscapes, or undeveloped areas subject to flooding. The Property is subject to a 60-foot wide easement, granted to The Southern Massachusetts Telephone Company in 1913, for the purpose of maintaining telephone lines and poles on the northern side of the Property. According to the Application, the Property’s historical use was as farmland.

- The Site is labeled in the RPP Data Viewer as a “Natural Area” because it is undeveloped land in a WHPA. Commission staff suggest that, given the surrounding uses and development patterns and the type of development being proposed, the Site is best represented by the “Rural Development Area” Placetype. Rural Development Areas are characterized by a high percentage of open lands and sparse building development patterns that contribute to the unique rural and scenic character of the region. These include large agricultural areas and significant tracts of wooded areas without identified special habitat. The Site is consistent with this Placetype considering the surrounding residential developments, past agricultural use, and the absence of special habitat. Staff’s RPP analysis herein treats the Property as a Rural Development Area Placetype. As necessary, the subcommittee may want to discuss this Placetype mapping and determination further.
- Rural Development Area strategies include protecting agricultural lands and natural cover to preserve existing natural functions; ensuring development respects the surrounding landscape by using existing topography to guide the development layout; clustering development on the site; and preserving wooded buffers. The Applicant proposes to preserve the Prime Farmland Soils (by retaining them on-site), and plant native grasses and/or wildflowers to preserve natural functions. While the Project involves clearing approximately 10.85 acres of the Property, the Project does not require grading and the solar array is being clustered in the center of the Site to preserve deep wooded buffers on all sides. For these reasons, staff recommends that the Project is consistent with the Rural Development Area strategies.
- The Applicant is proposing to address a portion of the open space mitigation required by the RPP through a partnership with the Town of Sandwich (“Town”) whereby (1) the Applicant will acquire and then donate the Property to the Town; (2) the Property will be leased back to the Applicant to develop and operate the Project; and (3) at the end of the lease, the development will be removed and the land restored. The Applicant and Town have entered into a Memorandum of Understanding for this arrangement. The lease is proposed with an initial term of 20 years with the potential for five additional terms of five years for a total potential term of 45 years. The Applicant will make rent payments to the Town for the duration of the lease under this agreement. The entire Property is ultimately proposed to be held by the Town and restricted in perpetuity for conservation and open space purposes.
- Ongoing operations and activity at the Property would be minimal as cleaning, snow removal, and maintenance mowing are infrequent, equipment is inspected once or twice annually, and the proposed array and electrical components have a projected lifespan of 20+ years. Due to the minimal ongoing operations, the Project does not involve regionally significant or sustained effects on the transportation network or employment.

DRI Jurisdiction

The Project requires mandatory DRI review pursuant to Section 3 of the Commission’s *Chapter A: Enabling Regulations Governing Review of Developments of Regional Impact (“Enabling Regulations”)* (revised April 2018) as an Outdoor Use with Total Project Area of 40,000 sq ft or greater.

The Commission received a mandatory Development of Regional Impact referral for the Project from the Town on November 25, 2019. The Applicant submitted a DRI application to the Commission on December 12, 2019. The hearing period was opened procedurally on January 24, 2020.

DRI Review Standards

- Section 7(c)(viii) of the Commission’s *Enabling Regulations* contains the standards to be met for DRI approval, which include, as applicable, consistency with the Cape Cod Regional Policy Plan,

municipal development bylaws, District of Critical Planning Concern (DCPC) implementing regulations and Commission-certified Local Comprehensive Plans. The Commission must also find that the probable benefit from the Project is greater than its probable detriment.

- DRI review of the Project is subject to the 2018 RPP, which is the version of the RPP in effect at the time of the Commission's first substantive public hearing on the Project. The Commission determines the Project's consistency with the Act and 2018 RPP by determining whether the Project is consistent with the Goals and Objectives in Section 6 of the 2018 RPP, as particular goals and objectives are deemed applicable and material to the Project.

Cape Cod Regional Policy Plan

Applicable and Material RPP Goals and Objectives

Commission staff reviewed the details of the DRI Application Materials and suggest that the following RPP Goals are applicable, material, and regionally significant and are thus subject to RPP consistency review: Water Resources, Wildlife and Plant Habitat, Open Space, Community Design, Capital Facilities and Infrastructure, Energy, and Waste Management. Commission staff make the following recommendations relative to the Project's consistency with these RPP Goals and relevant Objectives and Technical Bulletin guidance.

Water Resources

The Water Resources Goal of the RPP is to maintain a sustainable supply of high-quality untreated drinking water and protect, preserve, or restore the ecological integrity of Cape Cod's fresh and marine surface water resources. The following Water Resources Objectives are applicable and material to the Project:

- protect and preserve groundwater quality (WR1);
 - protect, preserve, and restore freshwater resources (WR2); and
 - manage and treat stormwater to protect and preserve water quality (WR4).
- Nitrogen loading from the Project will be generated only by stormwater runoff from the impervious areas (in terms of other sources of nitrogen loading, no wastewater generation or turf fertilization is proposed or anticipated). The impervious areas on the Site are the driveway and equipment pads which comprise approximately one-half acre. The applicant has designed a stormwater system consisting of drainage swales and subsurface infiltration to manage runoff generated from the vegetated meadow and impervious areas. The anticipated nitrogen loading concentration from the site is approximately 0.05 ppm, which is materially below the 5-ppm standard under the RPP.
 - The Site is located on a landform providing over sixty feet (60') separation to the groundwater system, substantially exceeding the minimum recommendation of two feet (2') for stormwater infiltration systems.
 - Projects in Wellhead Protection Areas must observe quantity limits on substances that would pose a contaminant threat to groundwater and drinking water supplies. The Applicant has proposed oil-cooled transformers but did not provide proposed quantities. However, the Applicant has offered to utilize biodegradable fluid or dry cooled transformers to mitigate the potential for hazardous materials release, which staff recommends as a condition of any DRI approval.
 - Objective WR1 - protect and preserve groundwater quality

Given the low nitrogen loading and long distances from any downgradient wells, and provided that the Applicant uses transformers that do not have the potential for hazardous materials release, staff recommends that the Project is consistent with Objective WR1.

- Objective WR2 - protect, preserve, and restore freshwater resources
Although the Project is located within a Fresh Water Recharge Area, any potential impacts to freshwater resources are expected to be minimal because the Project manages stormwater for water quality treatment, maintains vegetated buffers around the Site, and is located over 1000 feet from the closest pond. Therefore, staff recommends that the Project is consistent with Objective WR2.
- Objective WR4 - manage and treat stormwater to protect and preserve water quality
The system has been designed to exceed the required 1-inch water quality volume for the driveway and concrete pads, and to ensure that offsite runoff from the rest of the site is equal to or improved from current conditions. Therefore, staff recommends that the Project is consistent with Objective WR4.

Wildlife and Plant Habitat

The Wildlife and Plant Habitat Goal of the RPP is to protect, preserve, or restore wildlife and plant habitat to maintain the region's natural diversity. The following Wildlife and Plant Habitat Objectives are applicable and material to the Project:

- maintain existing plant and wildlife populations and species diversity (WPH1);
 - restore degraded habitats through use of native plant communities (WPH2);
 - manage invasive species (WPH4); and
 - promote best management practices to protect wildlife and plant habitat from the adverse impacts of development (WPH5).
- The Site is not in Natural Heritage and Endangered Species Program priority habitat for rare species, BioMap2 core habitat, or critical natural landscapes. The Natural Resources Inventory ("NRI") notes that the Property hosts no unique species or species of special concern and is dominated by forested upland habitat. There are four specimen trees on the Property, outside of the Project footprint. There is evidence of former use and development on the Site including walking trails, an old dirt road, and a wire fence around the Property.
 - The Project proposes alteration of 10.85 acres +/- of the existing habitat type by converting forested upland to developed grassland. The Project proposes to separate the forested buffers from the array area by installing a wood fence, which would be held off the ground several inches. The proposed alteration would change the existing plant and wildlife species assemblage and result in some habitat fragmentation and loss of forested habitat on Cape Cod. While some smaller species of wildlife will be able to fit under the proposed fence and move through the array, larger species will need to move around the fenced array (where some corridors are retained in the forested perimeter of the Site). However, according to the NRI, significant long-term impacts to local wildlife populations that are typically associated with habitat fragmentation are not anticipated with the proposed Project.
 - Large solar photovoltaic (PV) arrays can be planted with native vegetation to provide habitat for pollinators and other wildlife species. According to the NRI, the Applicant's proposed revegetation of the array area with a native seed mix will provide a permanent herbaceous cover to provide site stabilization and wildlife habitat value for various grassland-dependent birds and small mammals. The Applicant proposes use of best management practices and indicated willingness to consider

further methods to improve the ecological value of the cleared acreage. Staff recommends that the Applicant provide additional details relative to plans for vegetation establishment and maintenance throughout the life of the Project. Staff notes the University of Massachusetts Clean Energy Extension has developed a pollinator-friendly certification program for solar photovoltaic facilities (See program information sheet, Exhibit A attached hereto). The program sets out requirements for developing, certifying, and maintaining a pollinator-friendly solar PV array, and provides resources to aid in that process. Under the program, there are three levels of certification that the Applicant could pursue. The criteria for certification include, but are not limited to, the following: maintaining a specified percentage (depending on the level of certification) of the array footprint dominated by flowering plants; use of program approved seed mixes; creation of on-site nesting cavities for bees; limitations and procedures for site maintenance and invasive species management; and a requirement that perimeter fencing has a 6-12 inch gap at the bottom for safe passage of wildlife (as currently proposed, the gap is 6 inches). Periodic third-party monitoring is required to maintain certification. Staff recommends that the subcommittee discuss this potential certification and related issues further with the Applicant.

- Objective WPH1 - *maintain existing plant and wildlife populations and species diversity*
The Project would minimize impact on existing plant and wildlife populations and would not impact priority or rare species habitat. However, the Applicant's specific plans for site revegetation, maintenance, decommissioning and fencing, not discussed in the application, could impact the extent to which the Project is consistent with Objective WPH1. Therefore, assessment of the Project's consistency with this Objective would benefit from further discussion with the Applicant.
- Objective WPH2 - *restore degraded habitats through use of native plant communities*
Although the staff does not consider the Site to be degraded, there is an opportunity to increase consistency with WPH2 by improving the undeveloped area of the Site by removing the wire fencing and replanting trails and roads that exist in the buffer area.
- Objective WPH4 - *manage invasive species*
Several invasive plant species were recorded on the Site including invasive shrubs that can grow > 10-feet tall. These species' seeds will be present in the soils surrounding the infestations and, if unmanaged, they could proliferate throughout the proposed development. Staff suggest that the Project is consistent with WPH4, subject to following the invasive species management plan included in the NRI. The plan includes a proposal to conduct site evaluations following the first and second growing seasons post-work commencement to document the presence/absence of invasive species. Staff recommends that site evaluations for invasive species be conducted throughout the life of the Project (which could also be administered as term in the lease between the Town and Applicant) and strongly discourage the use of herbicides to control invasive species unless mechanical control proves ineffective.
- Objective WPH5 - *promote best management practices to protect wildlife and plant habitat from the adverse impacts of development*
The Project proposes to install a fence and temporary stormwater systems during the first phase of development to prevent offsite migration of construction materials and insulate the surrounding wooded acreage and wildlife from the impacts of the development. In addition, Staff would recommend that the Applicant avoid tree removal during the spring/summer bird breeding and bat roosting seasons and adopt a protocol for maintenance mowing to avoid adverse impacts to wildlife when conducting the same.

Open Space

The Open Space Goal of the RPP is to conserve, preserve, or enhance a network of open space that contributes to the region's natural and community resources and systems. The following Open Space Objectives are applicable and material to the Project:

- protect and preserve natural, cultural, and recreational resources (OS1); and
 - protect or provide open space appropriate to context (OS3).
- The Applicant proposes to meet the RPP open space requirements through both on-site and off-site conservation. According to the DRI Application, the Site is 18.8 acres and the area cleared for the array is 10.85 acres. Based on Commission staff calculations, the Area of Development Impact for purposes of the required open space mitigation, subtracting previously cleared acreage and acreage used for naturalized elements of the stormwater management systems, is 10.5 acres.
 - Projects in Rural Development Areas are required to provide high-quality open space in a ratio of 2:1 on-site or in a Natural Area off-site. A 2:1 ratio requires permanent protection of 21 acres of open space.
 - As discussed in the Project Description, the Applicant proposes to donate the entire Property to the Town.
 - Objective OS1 - protect and preserve natural, cultural, and recreational resources
The Site is in a WHPA and contains Prime Farmland Soils. Wellhead Protection Areas and agricultural lands are priorities for open space protection. As discussed relative to the Water Resources Goal, the Project would not have a significant impact on water resources. The conservation restriction would ensure that the protection of water resources is permanent, which could be significant in an area that is otherwise zoned for residential development. Further, the Applicant proposes to screen and redistribute existing topsoil throughout the Project footprint to maintain the Prime Farmland Soils onsite. Maintaining soils on-site would aid in site stabilization and preserve the potential for future agricultural use, especially given the impermanence of the solar installation. Therefore, staff recommends that the Project is consistent with OS1.
 - Objective OS3 - protect or provide open space appropriate to context
Provided that there is a legal conservation restriction in place, the 18.8-acre Property could appropriately contribute toward the open space requirement. The Applicant has provided a decommissioning plan with a commitment to a performance bond for decommissioning (which is otherwise required under local zoning), though Commission staff requests further information from and discussion with the Applicant to assess the probable conservation value of the land during and after the development/ lease term, and the timing of the imposition of the conservation restriction (pre- or post-development/ lease term). Given the term of the development and potential uncertainties regarding the specifics of future decommissioning and restoration, the subcommittee may wish to consider how the Site would be maintained and restored relative to the proposed array in determining whether this relatively novel approach to on-site mitigation is appropriate to address Objective OS3. In addition to DRI or local permitting considerations and requirements, staff recommends that these issues be addressed and detailed in the eventual lease between the Applicant and Town.

To the extent that the Subcommittee accepts the Applicant's proposal to provide on-site open space, the Applicant will need to restrict additional open space off-site. More specific information and discussion about the Applicant's proposal to address Objective OS3 is expected.

Community Design

The Community Design Goal of the RPP is to protect and enhance the unique character of the region's built and natural environment based on the local context. The following Community Design Objectives are applicable and material to the Project:

- promote context sensitive building and site design (CD1); and
- minimize the amount of newly disturbed land and impervious surfaces (CD2).
- The Project proposes to fit in with the surrounding context by maintaining significant vegetated buffers around the site that will screen the development from adjacent sites and roadways. The buffers would be 100' deep along the sides and rear of the property and 50' along Cotuit Road.
- There are two curb cuts proposed along the Site's Cotuit Road frontage, however given the width of the vegetated buffer, the location and angle of the curb cuts, and the proposed installation of a wooden fence parallel to Cotuit Road, it appears the Project will be screened from the roadway and passing traffic.
- Objective CD1 and CD3 - promote context sensitive building and site design & avoid adverse visual impacts from infrastructure on scenic resources
Given the vegetative buffers and the location and angle of the curb cuts, staff recommends that the Project is consistent with CD1 and CD3 as it would be screened from the roadway and passing traffic and is sited away from scenic resources. The two curb cuts allow for better access for occasional maintenance trips to the Site.
- Objective CD2 - minimize the amount of newly disturbed land and impervious surfaces
Although the Project will clear approximately 10.85 acres, the vegetated buffer surrounding the Site will leave significant amounts of natural vegetation intact around the perimeter. Additional impervious surface has also been minimized out of discussions between staff and the Applicant, with about 1/2 an acre proposed to be impervious. Therefore, staff recommends that the Project protects the unique character of the region's natural environment for purposes of CD2.

Energy

The Energy goal of the RPP is to provide an adequate, reliable, and diverse supply of energy to serve the communities and economies of Cape Cod. The following Energy Objectives are applicable and material to the Project:

- support renewable energy development that is context-sensitive (EN1); and
- increase resiliency of energy generation and delivery (EN2).
- This Project has energy generation, distribution, and storage as a primary purpose. The proposed solar array would have a generation capacity of approximately 5MWdc and would include a Lithium-ion battery storage system. As part of the Solar Massachusetts Renewable Target (SMART) program, the Project will contribute to the statewide goal of reducing reliance on non-renewable energy sources.
- The Project is expected to sell its power through the Community Solar program, which allows households and businesses with the same electrical utility to lease a portion of the array. This will allow the Project to Cape Cod residents who do not have access to solar because they rent, live in multi-tenant buildings, or are otherwise unable to host a private solar system, to participate in the renewable energy market. The Community Solar program would require the Project to lease to small customers needing 25kW or less.
- Objective EN1 - support renewable energy development that is context-sensitive

The area surrounding the Site is mostly residential development and is in the Sandwich R-2 zoning district where large scale ground-mounted solar energy systems are allowed by Special Permit. With the residential style wood fence screening the array along Cotuit Road and naturally wooded buffers that extend at least 100-feet from all residential parcels the Project would avoid detrimental visual impacts. Further, the Project adequately manages stormwater and minimizes clearing to the extent it is feasible. The Applicant could increase consistency with EN1 by using a non-toxic transformer fluid as discussed throughout this report.

- **Objective EN2 - increase resiliency of energy generation and delivery**
The Project would increase diversification of the local electrical network and manage periods of peak demand that come with the highest electricity prices. These periods are typically the later afternoon to early evening hours, when the battery system and array work in tandem to maintain the system's maximum output. This furthers Massachusetts Energy Storage Initiative, which aims to achieve the benefits of incorporating advanced storage technologies into Massachusetts' energy portfolio by establishing an energy storage market structure, and to support storage projects at the electric wholesale system, utility distribution system, and customer side scale.

Capital Facilities & Infrastructure

The Capital Facilities & Infrastructure Goal of the RPP is to guide the development of capital facilities and infrastructure necessary to meet the region's needs while protecting regional resources. The following Capital Facilities & Infrastructure Objectives are applicable and material to the Project:

- ensure capital facilities and infrastructure promote long-term sustainability and resiliency (CAP1); and
- coordinate the siting of capital facilities and infrastructure to enhance the efficient provision of services and facilities that respond to the needs of the region (CAP2).
- The Project will improve the quality and availability of electrical service. Equipped with a battery, the array is required to dispatch power at the times of higher system demand. The solar and battery together can handle both large and small output adjustments, tweaking its output nearly instantaneously to stabilize the frequency of the local distribution network in the event of a spike or sudden dip in demand.
- **Objective CAP1 - ensure capital facilities and infrastructure promote long-term sustainability and resiliency**
As a geographically isolated region, Cape Cod is particularly vulnerable to natural gas shortages or supply disruptions. The array is designed with wind and snow loading appropriate to Cape Cod, is not under threat from falling adjacent trees, and is designed as compactly as is feasible. The Property is not in a flood prone or high hazard area. The battery equipped array is designed to be sustainable in all weather conditions and is required to operate in a manner that reduces energy prices and supports the grid during human or natural disasters. Therefore, staff recommends that the Project is consistent with CAP1.
- **Objective CAP2 - coordinate the siting of capital facilities and infrastructure to enhance the efficient provision of services and facilities that respond to the needs of the region**
The Applicant sized the interconnection (in consultation with Eversource) to avoid needing additional upgrades or infrastructure along the distribution network. No easements or rights of way are required. Therefore, staff recommends that the Project is consistent with CAP2.

Waste Management

The Waste Management Goal of the RPP is to promote a sustainable solid waste management system for the region that protects public health, safety, and the environment and supports the economy. The following Waste Management Objectives are applicable and material to the Project:

- reduce waste and waste disposal by promoting waste diversion and other Zero Waste initiatives (WM1); and
- support an integrated solid waste management system (WM2).
- **Objective WM1** - *reduce waste and waste disposal by promoting waste diversion and other Zero Waste initiatives*
The Project proposes to employ Best Management Practices during construction such as chipping and reusing cleared trees to incorporate as biomass back into the site to the extent that it is feasible and responsible. Because construction naturally stockpiles topsoil, the Applicant proposes to stabilize the topsoil with wood chips, and to redistribute it on the Site. The Applicant also proposes to use chips in a similar manner as straw bales for minor stormwater management, as needed.
- **Objective WM2** - *support an integrated solid waste management system*
The modules would be delivered on wooden pallets in heavy cardboard boxes. The Applicant proposes to reuse or recycle the pallets, utilizing local recycling services to the extent possible.

Other DRI Standards of Review

Consistency with applicable Municipal Development Ordinances/Bylaws (including DCPC implementing regulations)

The Site is within a Ground Mounted Solar Overlay District, as established by the Sandwich Zoning By-law (“Bylaw”). Section 4180 of the Bylaw, titled “Large Scale Ground Mounted Solar Photovoltaic Installations” was implemented to promote the creation of new large-scale ground-mounted solar photovoltaic installations by providing requirements for their placement, design, construction, operation, monitoring, and decommissioning. Pursuant to the bylaw, because this Project is proposed in an R-2 District, the Applicant will be required to obtain a Special Permit issued by the Sandwich Planning Board. The Special Permit requires a minimum lot size of 15 acres and a minimum side and rear set back of 100 feet for industrial-type development abutting residential development (as in the current case). The proposed Project has a lot size of 18.80 acres and meets the minimum setback requirement. As such, the Project meets the use and dimensional requirement for a special permit within the R-2 district, subject to obtaining the permit. No DCPC implementing regulations apply to the Project.

Consistency with CCC-certified Sandwich LCP

The Sandwich LCP Goals section encourages the Town to integrate Solar Design into Local Regulation through a revision to zoning regulations. The Sandwich LCP Community Sustainability section identifies solar power under Energy Conservation and Alternative Source Development, stating Sandwich has an excellent opportunity to expand the use and development of solar power.

Probable Project Benefits vs. Probable Project Detriments

In addition to consistency with other DRI review and approval standards, the Subcommittee should identify and weigh the probable benefits of the Project relative to the probable detriments, from a regional perspective.

The primary policy considerations in this Project (and in the context of other “greenfield development,” ground-mounted solar projects) is the tension between renewable energy generation

and loss of natural forest cover. These competing policy concerns largely frame the 'benefits/detriments' analysis.

Probable benefits which might be recognized by the Subcommittee, as suggested by staff in its review of the application, include that the: use and development scheme for the Property is less impactful than viable development alternatives such as a residential subdivision, which could be permitted and developed at the Property without regional review; Project proposes an innovative agreement with the Town to advance conservation, open space and renewable energy goals while providing added municipal revenue; and the Project provides opportunity for participation in the Community Solar Program.

Probable detriments which might be recognized by the Subcommittee as suggested by staff in its review of the Application include that the Project proposes: significant clearing of a currently undeveloped, wooded site located in a Wellhead Protection Area; and development which would contribute to habitat fragmentation, negatively impacting native plants and wildlife.

Topics for Further Discussion

As discussed above, staff recommends that the Subcommittee discuss the following items with the Applicant:

- Requirement that the Applicant use biodegradable fluid or dry cooled transformers
- Certification under the UMASS Clean Energy Extension Pollinator-friendly PV Program. This discussion might also involve available program features such as:
 - Limiting herbicide use, specifics of invasive species management, and specifics of fencing gap to allow wildlife movement;
 - Avoiding tree removal during the spring/summer bird breeding and bat roosting seasons;
 - Adopting a protocol for maintenance mowing to avoid adverse impacts to wildlife when conducting the same
- Applicant's proposal to meet the Open Space requirements of the RPP on-site, through the proposed agreement with the Town, and off-site by identifying additional land for acquisition/restriction
- Applicant's specific plans for site revegetation, maintenance, and decommissioning, which could involve discussion about anticipated lease terms and the UMass Extension Certification program, to assess the probable conservation value of the land during and after the development/ lease term.
- The form and timing of the imposition of the on-site conservation restriction (pre- or post-development/ lease term).

EXHIBIT A
UMASS EXTENSION POLLINATOR PROGRAM CERTIFICATION PROGRAM
INFORMATION SHEET

DRAFT

Pollinator–Friendly Solar PV for Massachusetts

Large solar photovoltaic (PV) arrays can be planted with native vegetation to provide habitat for pollinators and other wildlife species. A number of states have established voluntary "pollinator–friendly" certification programs to help solar developers implement, maintain, and promote native meadow habitats under and around solar panels. In consultation with state and federal agencies, pollinator experts, and stakeholders in the agriculture, wildlife biology, and solar energy communities, CEE has developed a pollinator–friendly certification program for solar PV facilities in Massachusetts.

Developing and Certifying a Pollinator–Friendly Solar PV Array

The following documents lay out the requirements for developing, certifying, and maintaining a pollinator–friendly solar PV array, and provide resources to aid in that process.

Note that it is **HIGHLY** recommended that you submit an Application to CEE for review prior to carrying out any work at a proposed pollinator–friendly solar facility. This is necessary to ensure that the development plan and activities are in line with certification criteria, and that the site will ultimately be able to obtain certification.

Certification Criteria:  [Certified](#)  [Silver](#)  [Gold and Platinum](#)

Best Management Practices:  [PDF](#)

Recommended Plant Species List:  [Spreadsheet](#)

Application Form:  [PDF](#)  [Fillable PDF](#)  [Seed Mix and Planting Tables](#)

Certification Procedure and Fees:  [PDF](#)

Annual Maintenance Log:  [PDF](#)  [Spreadsheet](#)

Why pollinator–friendly solar?

[Pollinator–Friendly Solar Fact Sheet](#)

It's Good for Native Wildlife and Plants: Native flowering herbs and shrubs provide habitat and food to pollinators and other species. Grassland habitats support over 70 animals and plants designated as Species of Greatest Conservation Need in Massachusetts.

It's Cost-Effective: Establishing native plants under solar PV arrays may require higher upfront costs, but these practices can result in lower maintenance costs over time, due to reduced mowing schedules, and reduced needs for watering and herbicide application.

It's Prettier: Wildflower meadows and vegetation screens of native shrub species are aesthetically more appealing than grass or gravel. They may make solar PV facilities more acceptable to neighbors and visitors.

What is UMass Clean Energy Extension doing to develop pollinator-friendly solar PV in Massachusetts?

- Working with [experts and stakeholders](#) to define Pollinator-Friendly Certification Criteria for Massachusetts solar arrays.
- Working with state wildlife and native plant organizations to determine best management practices for establishing and maintaining native plant and animal communities under solar arrays.
- Working with agricultural organizations and beekeepers to help support pollinators important to farming.
- Working with solar PV developers to ensure designation standards are economically feasible and compatible with solar PV array operation and maintenance.

What have other states done?

- Created voluntary designation programs for solar PV facilities to establish habitats friendly to pollinators and native grassland birds
- Developed best management practices, as well as establishment, maintenance, and monitoring guidance.
- Check out what's happening in other states: [Vermont](#) [Maryland](#) [Minnesota](#)

Have questions about the project, or interested in becoming involved? Contact Zara Dowling (zdowling@umass.edu; 413-545-8516).

**POLLINATOR-FRIENDLY CERTIFICATION CRITERIA FOR MASSACHUSETTS
2019/2020****CERTIFICATION LEVEL: SILVER****ESTABLISHMENT**

- Completed *Application Form*, including site establishment and maintenance plan.
- Seed mix(es) to be used on-site not pre-treated with insecticide or fungicide.
- Seed mix(es) include only native species.
(In general, this refers to species native to Massachusetts. Species native to the Northeast may be acceptable for inclusion if there is a justifiable reason for doing so.)
- Seed mix(es) appropriate for local conditions (soil type, hydrology, etc.).
- At least 50% of array footprint and perimeter are planned to have flowering plants.
- Seed mix(es) contain at least 15 flowering species comprising 2% or more of seed mix, by seed count. **See note (page 4) regarding 2% rule.*
- Seed mix(es) contain at least 3 blooming species per season, comprising 2% or more of seed mix, by seed count, for 3 of 4 seasons (April, May/June, July/August, September/October).
**See note (page 4) regarding 2% rule.*
- Seed mix(es) contain no more than 25% grass and sedge species, by seed count.
- Amount of seed to be planted is determined according to the seed provider's recommendation and the proposed planting density in the target area.
- Trim zone, stormwater basin, and other site plantings include only native species.
(As above, this refers to species native to Massachusetts. Species native to the Northeast may be acceptable for inclusion if there is a justifiable reason for doing so.)
- Trim zone and other plantings are appropriate for local conditions (soil type, hydrology, etc.).
- Trim zone plantings include at least 50% flowering plants.
- Vegetation screen, if present, includes only native species, unless specified otherwise by municipal permitting authorities.
(As above, this refers to species native to Massachusetts. Species native to the Northeast may be acceptable for inclusion if there is a justifiable reason for doing so.)
- Vegetation screen, if present, includes only plants appropriate for local conditions (soil type, hydrology, etc.), unless specified otherwise by municipal permitting authorities.
- At least 33% of species selected for seeding or planting support specialist bees or are host plants for rare or uncommon butterfly and moth species.
- Fencing:
 - New arrays: A 6-12 inch gap should be left at the bottom of the fence for wildlife passage
 - Existing arrays: A hole at least 6 inches high and 18 inches wide should be cut in each corner of the array fencing to allow wildlife passage through the array.
- Creation of nesting sites for bees, either ground or cavity type. *See Best Management Practices document for guidance on creation of nesting sites.*

MANAGEMENT

In general, all management activities should be conducted in accordance with the site management plan submitted as part of the Application Form. Any major changes to management deemed necessary should be explained and described in a letter submitted with the Annual Maintenance Log.

- After three growing seasons, mowing should be conducted no more than once per year in the array footprint and array perimeter.
Mowing only once per year management to be followed after 3 years of establishment. We recognize that in the first 3 years, multiple mowing treatments may be required to reduce growth of invasive or other weed plants.
- Limit trim zone management to encourage growth of native shrub and tree species, while addressing shading of panels, security concerns, and invasive plant control.
- Conduct invasive plant management as described in the site management plan, limiting use of herbicide to the greatest extent possible.
- During the establishment period (first 3 growing seasons), an environmental professional with vetted plant identification skills should visit the site to flag invasive plants for removal. Spot treatment of invasive species with herbicide or a weed-whacker is acceptable throughout the year.
- No insecticide or fungicide use.
(Exceptions are allowed for use of Bti to control mosquitoes in the stormwater basin, if required by health officials.)
- Maintain bee nesting habitat established on-site.
- Maintain and submit Annual Maintenance Log of vegetation management and other relevant activities occurring on site.
(See Annual Maintenance Log form.)
- If applicable, submit annual request for exclusion from spraying for mosquitoes and maintain “No Spray” signage. (<http://www.mass.gov/eea/agencies/agr/pesticides/mosquito/pesticide-application-exclusions.html>)
- If applicable, maintain any additional special features present on-site, including educational signage, perennial water sources, or wildlife habitat.

Additional Recommendations

- Set mower height at 7-12 inches
- Mow only 1/3 of array perimeter per year
- Mow in early spring (April/early May), to avoid cutting blooming plants, and to allow for overwintering habitat for pollinators in uncut vegetation.

MONITORING

Monitoring will be conducted in the 4th growing season, and every third growing season thereafter. UMass Clean Energy Extension will contact the facility owner in January of the monitoring year to arrange access for staff or a UMass-contracted vendor to conduct monitoring. Three one-day visits will be conducted in 3 of 4 seasons (April, May/June, July/August, September/October), at least two weeks apart. The monitoring procedure will include the following:

- Assessment of array footprint and perimeter, including:
 - plant diversity, listing species that comprise more than 2% cover
 - % of area dominated by native plants
 - % of area dominated by invasive plants
 - % of area with currently blooming species
 - list of currently blooming species

- Assessment of trim zone, including:
 - plant diversity in trim zone, listing species that comprise at least 5% of trim zone
 - % of trim zone comprised of native plants
 - % of trim zone comprised of invasive plants
 - % of trim zone with currently blooming species
 - list of currently blooming species

- Assessment of vegetation screen, including:
 - plant diversity in vegetation screen, listing species that comprise at least 5% of screen
 - % of vegetation screen comprised of native plants
 - % of vegetation screen comprised of invasive plants
 - % of vegetation screen with currently blooming species
 - list of currently blooming species

- Documentation and description of any ground nesting sites for bees on the property
- Documentation and description of any cavity nesting sites for bees on the property
- Documentation and description of any perennial water sources on the property
- Documentation and description of any bird boxes or other wildlife habitat features established on the property
- Documentation of any “No Spray” signage
- Documentation and description of any other special features, such as pollinator-friendly signage or displays, or benches
- Documentation of any bird species observed nesting on property
- Documentation of any wildlife observed on the property during monitoring
- Preparation of report

EVALUATION

- At least 50% of array footprint and perimeter dominated by flowering plants
- At least 15 species comprise 2% or more of array footprint and perimeter
- At least 50% of array footprint and perimeter is dominated by native species
- 10% or less of array footprint and perimeter is dominated by invasive species
- At least 3 blooming species present per season, for 3 of 4 seasons (April, May/June, July/August, September/October), comprising 2% or more of site
- Trim zone includes at least 50% native species
- Plantings within trim zone have successfully established
- 10% or less of trim zone is invasive species
- Vegetation screen, if present, includes at least 50% native species
- Vegetation screen, if present, is less than 10% invasive species
- At least 33% of species present on-site support specialist bees or are host plants for rare or uncommon butterfly and moth species.
- Bee cavity nesting sites present and maintained on-site, OR ground nesting sites present and maintained on site.
- If applicable, “No Spray” signage is well-maintained and legible.
- Clear and complete *Annual Maintenance Log* has been maintained and submitted annually throughout the establishment period.
- Management activities are in line with Management Criteria and site management plan.

EVALUATION AND RE-CERTIFICATION PROCESS

Please refer to the *Certification Procedure and Fees* document.

EXCEPTIONS TO 2% RULE FOR SEED MIXES

In general, a species must comprise at least 2% of the seed mix by seed count to be counted towards the total number of flowering species, or the total number of blooming species per season. However, certain species and genera establish well, and may not need a high seeding rate to establish well.

Accordingly, these species may still count towards the number of species, if they comprise 1% or more of the seed mix. Based on pollinator expert guidance, this list currently includes the following genera and species. This list will be updated as more information becomes available.

Chamaecrista fasciculata, *Eupatoriadelphus maculatus*, *Eupatorium hyssopifolium*, *Eupatorium perfoliatum*, *Eupatorium purpureum*, *Helianthus helianthoides*, *Monarda fistulosa*, *Monarda media*, *Packera aurea*, *Pycnanthemum* spp., *Solidago* spp., *Verbena alternifolia*