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Connecticut Department of Energy and Environmental Protection  
79 Elm Street  
Hartford, Connecticut 06106-5127  
*Via Email: Dawn.McKay@ct.gov*

**Re: DRAFT Sand Barren Conservation and Mitigation Plan / Collins Aerospace Solar Project,  
Hamilton Ave., Windsor Locks, CT / SWCA Project No.: 75258**

Dear Ms. McKay and Dr. Moorhead:

SWCA Environmental Consultants (SWCA) is pleased to provide you with this draft sand barren conservation and management plan for the Collins Aerospace Solar Project (the Project), located north of Route 20 (Bradley International Airport Connector) in Windsor Locks, Connecticut (Figure 1). Based on my site assessment in December of 2022, I believe there is no sand barren habitat present with the Project area, but the site of one of the three proposed solar arrays does contain a number of pitch pines. Please review this draft and contact me with any suggestions or additions you would like to have added to the plan.

If you have any questions or would like to discuss this conservation and management plan, please do not hesitate to contact me at (413) 658-2010 or at [stevejohnson@swca.com](mailto:stevejohnson@swca.com).

Sincerely,

Steve Johnson, Ph.D.

Lead Biologist

## **PROJECT BACKGROUND**

Collins Aerospace is proposing to install a ground mounted solar array system off Hamilton Avenue in Windsor Locks, Connecticut (the Project). Solar panels will be grouped into three areas: Area 1 is located over an existing parking lot and Areas 2 and 3 are located in areas that are currently wooded and undisturbed. SWCA estimates that approximately 3.5 acres of wooded habitat will be converted to solar fields. The Connecticut Department of Energy and Environmental Protection (DEEP) Natural Diversity Data Base (NDDDB) records indicate that there are state-listed species documented near the Project, as well as Sand Barren Critical Habitat, an imperiled community type in Connecticut. Sand Barrens are an important community type that can support complex insect-dominated and rare plant communities specializing in areas with dry, sandy soils left by glacial outwash. In their letter dated March 17, 2022 (NDDDB Determination Number 202201925), NDDDB recommended that a management plan be developed to promote native vegetation under the solar panels and suggested that the Project could increase the value of the habitat within the Project footprint for wildlife and state-listed species by encouraging native plant communities to grow under the solar panels.

On December 21, 2022, SWCA Lead Biologist Steve Johnson conducted a site assessment of the three array areas to determine what the current conditions are on site. Dr. Johnson created a plant list for each area based on his observations (Table 1). Because the assessment was conducted in December, several herbaceous species observed were only given a tentative identification. As described above, Area 1 consists primarily of an existing parking lot. The parking lot was surrounded by areas of sparse vegetation, with exposed fine sandy loam. One adult pitch pine (*Pinus rigida*) was located along the western edge of the parking lot. Area 2 is located approximately 235 feet southeast of Area 1. This area was wooded and dominated by deciduous tree species, with more herbaceous species along the southern edge. Many of the species along this southern edge were non-native and invasive species. Area 3 is located approximately 130 feet southeast of Area 2. This area was also wooded, with a mix of hardwoods and pitch pine. Approximately 50 pitch pine were observed scattered within or near Area 3. There was also a fringe of native herbaceous species along the southern edge of this area.

Vanasse Hangen Brustlin, Inc. (VHB) conducted soil tests at two locations on site. Test Pits 1A-1C were located along the southern edge of Array Area 1. Test Pits 2A – 2C were located along the eastern end of Array Area 3. At Test Pit Site 1, topsoil was observed from the surface down five to six inches. The second soil layer, composed of brown fine sandy loam, was eight to eleven inches thick, extending 14 to 16 inches below the surface. A third soil layer composed of gray sandy loam was 43 to 77 inches thick and extended 57 to 92 inches below the surface. In Test Pit 1A, where the third layer only extended 57 inches below the surface, a fourth layer, 29 inches thick, consisting of red-brown fine sandy loam, was observed to a depth of 86 inches.

At Test Pit Site 2, topsoil was observed from the surface down four to five inches. The second soil layer, composed of dark brown fine sandy loam, was eight to eleven inches thick, extending 12 to 15 inches below the surface. A third soil layer composed of red-brown fine sandy loam was 32 to 33 inches thick and extended 44 to 48 inches below the surface. A fourth layer, 31 to 33 inches thick, was observed in all three test pits. This layer consisted of gray coarse sand and extended 75 to 81 inches below the surface.

## **MITIGATION AND CONSERVATION PLAN**

### **Conservation Measures**

Based on the December site visit, it appears that no sand barren habitat is currently present within the Project work areas. However, it is possible that Area 3 may have the potential to support some sand barren plant species. At the time of the site assessment, there were several unidentified herbaceous species observed along the southern fringe of Area 3. Photos taken at this location are attached here for

DEEP/NDDDB review. If it appears that sand barren species may be present within Area 3, a second site assessment of this portion of Area 3 may be warranted, and if sand barren species are present, efforts should be made to protect the plants in this area, or these plants could be temporarily removed from the work area and replanted after the solar panels have been installed.

Test pits located on the eastern edge of Area 3 indicated coarse sand present at depths from 44 to 48 inches below the surface, and Percolation Test Data indicated that the pits were dry within four to ten minutes, compared to a drying time of eight to 19 minutes at Test Pit Site 1. In addition, numerous adult pitch pines were observed within or near Area 3. Six of the locations mapped with pitch pine appear to be north of the proposed array. SWCA recommends that these, and any other pitch pine that are outside the array, be protected and allowed to persist.

Our assessment of Areas 1 and 2 indicate that sand barren habitat is not present, and so no management plans, aside from general best practices for earthworks, are being suggested.

## **Management Measures**

If sand barren plant species are present within the southern portion of Area 3, or if discovered elsewhere within the Project footprint, these individual plants could be temporarily removed from the work zone and later replanted. Most sand barren species are low-growing and should not interfere with solar energy production. A supplement of sand may be added to the soils of the replanting location if the goal is to encourage a sand barren community. Depending on the configuration of species of interest on site, targeted plants could be relocated by hand if the individual plants are scattered or by transplantation of intact plots of existing dense plant beds (the so-called “sod box” method). The plants would be moved in sod blocks approximately three feet by four feet that incorporate the first 12 to 18 inches of soil. In addition, seeds from nearby sand barren habitat could be collected and sown within portions of the Project footprint where sand barren communities are being encouraged.

To provide habitat for state-protected species commonly found in sand barren or pine barren habitat, several native plant species known to provide shelter or forage could be planted between and under the solar panels. Table 2 provides a list of rare insects, primarily moths, and their host plants. Some of the more common host plants include *Quercus ilicifolia*, *Q. prinoides*, *Vaccinium angustifolium*, *V. pallidum*, and *Pinus rigida*. Other plant species that act as host plants and that grow well in sandy conditions are *Panicum virgatum*, *Comptonia peregrina*, and *Lupinus perennis*. Some of these species may be commercially available, but it may be more beneficial to collect seeds or seedlings with local genotypes from nearby areas.

As noted, most of the plant species being suggested planting within the array areas are low-growing and should not interfere with the production of solar energy; however, pitch pine and some other species may require occasional mowing to ensure plants do not grow above the solar panels or block access to panels or infrastructure. A mowing schedule should be developed that minimizes potential impacts to any rare animal species that may be present on site. The adult flight periods for most of the moth species listed in Table 2 are between May 1 and October 31. Typically, adults lay eggs during the flight period and eggs either hatch that year with larva pupating later in the season, or the eggs overwinter and hatch in the early summer and larvae pupate before the flight period. This means that rare moths could be present, in some form, throughout the year. [SWCA will work with NDDDB to determine optimal mowing period].

## **Mitigation Measures**

One possible form of mitigation for the potential impacts from the Project would be the relocation or transplanting of important plant species being removed from the project area. Species such as Late Lowbush Blueberry and Canadian Toadflax, as well as young pitch pine may be transplanted successfully

elsewhere within the Collins property or elsewhere on the airport property, to enhance other pitch pine or sand barren habitat.

**Table 1. Plant Species Observed During Site Assessment on December 21, 2022.**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Site 1</b>	<b>Site 2</b>	<b>Site 3</b>
<i>Alliaria petiolata</i>	Garlic Mustard		X	
<i>Artemisia vulgaris</i>	Mugwort		X	X
<i>Asclepias syriaca</i>	Common Milkweed			X
<i>Berberis thunbergii</i>	Japanese Barberry		X	X
<i>Betula populifolia</i>	Gray Birch		X	X
<i>Carya sp.</i>	Hickory	X		
<i>Celastrus occidentalis</i>	Oriental Bittersweet	X	X	X
<i>Centaurea sp.</i>	Knapweed	X	X	X
<i>Chimaphila maculata</i>	Striped Pipsissewa			X
<i>Comptonia peregrina</i>	Sweet Fern			X
<i>Dichanthelium clandestinum</i>	Deer Tongue			X
<i>Elaeagnus umbellata</i>	Autumn Olive	X		
<i>Fagus grandifolia</i>	American Beech			X
<i>Fragaria virginiana</i>	Wild Strawberry	X		X
<i>Juniperus communis</i>	Common Juniper	X		X
<i>Lespedeza sp.</i>	Bush Clover			X
<i>Lonicera sp.</i>	Shrub Honeysuckle	X	X	
<i>Minuartia michauxii</i>	Michaux's Sandwort*	X		X
<i>Oenothera sp.</i>	Primrose		X	X
<i>Panicum sp.</i>	Panic Grass			X
<i>Pinus rigida</i>	Pitch Pine	X		X
<i>Pinus strobus</i>	White Pine	X	X	X
<i>Populus deltoides</i>	Cottonwood		X	X
<i>Potentilla canadensis</i>	Dwarf Cinquefoil*			X
<i>Prunus virginiana</i>	Choke Cherry			X
<i>Pteridium aquilinum</i>	Bracken			X
<i>Quercus alba</i>	White Oak	X		X
<i>Quercus rubra</i>	Red Oak	X	X	X
<i>Quercus velutina</i>	Black Oak	X	X	X
<i>Rosa sp.</i>	Native Rose		X	
<i>Rubus sp.</i>	Raspberry	X	X	X
<i>Sassafras albidum</i>	Sassafras			X
<i>Schizachyrium scoparium</i>	Little Bluestem			X
<i>Solidago sp.</i>	Goldenrod		X	X
<i>Trifolium arvense</i>	Rabbit-foot Clover			X
<i>Turritis glabra</i>	Tower Mustard		X	
<i>Verbascum sp.</i>	Mullein		X	X
* = tentative species ID				

**Table 2. State-protected insects of sandy habitats and their known host plant species.**

<b>Common Name</b>	<b>Scientific Name</b>	<b>CT Status</b>	<b>Host Species</b>
Coastal Heathland Cutworm	<i>Abagrotis benjamini</i> or <i>A. nefascia benjamini</i>	T	Unknown, possibly <i>Amelanchier</i> and <i>Ribes</i>
Barrens Dagger Moth	<i>Acronicta albarufa</i>	SC	<i>Quercus ilicifolia</i>
Spotted Dart Moth	<i>Agrotis stigmosa</i>	SC	<i>Achillea</i> spp. but possibly generalists
Apamea Moth	<i>Apamea inordinata</i>	T	Thought to be grasses or sedges
New Jersey Tea Inchworm	<i>Apodrepanulatrix liberaria</i>	E	<i>Ceanothus americanus</i>
Henry's Elfin	<i>Callophrys henrici</i>	SC	possibly <i>Vaccinium</i> spp. and/or <i>Ilex</i> spp.
Frosted Elfin	<i>Callophrys irus</i>	T	<i>Baptisa tinctoria</i> , <i>Lupinus perennis</i>
Bay Underwing Moth	<i>Catocala badia badia</i>	SC	<i>Comptonia peregrina</i> , <i>Myrica gale</i> , <i>Myrica pensylvanica</i>
Herodias underwing	<i>Catocala herodias gerhardi</i>	E	<i>Quercus ilicifolia</i>
Waxed sallow	<i>Chaetagnaea cerata</i>	SC	<i>Quercus ilicifolia</i> , other <i>Quercus</i> spp. and <i>Vaccinium</i> Spp.
Barrens Chytonix	<i>Chytonix sensilis</i>	E	Leaf litter fungi, mostly off of dead wood
Pink streak	<i>Dargida rubripennis</i>	T	Grasses, including <i>Panicum virgatum</i>
Noctuid moth	<i>Dichagyris acclivis</i>	SC	<i>Panicum virgatum</i>
Equivocal looper	<i>Digrammia equivocata</i>	SC	<i>Tephrosia virginiana</i>
False heather underwing	<i>Drasteria graphica atlantica</i>	T	<i>Hudsonia tomentosa</i> , possibly <i>Crocianthemum</i>
Scrub Euchlaena	<i>Euchlaena madusaria</i>	T	<i>Vaccinium angustifolium</i> and <i>V. pallidum</i>
Fawn brown dart moth	<i>Euxoa pleurita</i>	SC	"Variety of low growing plants"
Violet dart moth	<i>Euxoa violaris</i>	SC	Possibly grasses and herbs
Blueberry gray moth	<i>Glena cognataria</i>	Extirpated	<i>Vaccinium angustifolium</i> and <i>V. pallidum</i> , <i>Prunus pumila</i> and <i>P. pensylvanica</i>
Phyllira tiger moth	<i>Grammia phyllira</i>	E	larvae are ground dwelling and polyphagous, feeding on a variety of low-growing forbs
Barrens buck moth	<i>Hemileuca maia maia</i>	E	<i>Quercus ilicifolia</i> , <i>Quercus prinoides</i>
Sandplain Heterocampa	<i>Heterocampa varia</i>		<i>Quercus ilicifolia</i> , <i>Quercus prinoides</i> , <i>Quercus stellata</i>
Pink prominent	<i>Hyparpax aurora</i>	SC	<i>Quercus</i> spp. and <i>Viburnum</i> spp.
Southern pine sphinx	<i>Lapara coniferarum</i>	T	<i>Pinus rigida</i>
Eastern cactus-boring moth	<i>Melitara prodenialis</i>	SC	<i>Opuntia</i> sp.
Barrens Metarranthis	<i>Metarranthis apiciaria</i>	SC	Unknown
Heath Metarranthis	<i>Metarranthis pilosaria</i>	NA	<i>Vaccinium</i> spp. and <i>Chamaedaphne calyculata</i>
Brick-red Borer Moth	<i>Papaipema marginidens</i>	E	<i>Dioscoria villosa</i>
Stinging Rose Caterpillar Moth	<i>Parasa indetermina</i>	SC	apple, dogwood, hickory, maples, oaks, poplars, and rose bushes
Pink Sallow Moth	<i>Psectraglaea carnosa</i>	T	<i>Vaccinium angustifolium</i> and <i>V. pallidum</i>
Northern Flower Moth	<i>Schinia septentrionalis</i>	T	Leaves of asters ( <i>Symphyotrichum</i> spp.)
Spinose Flower Moth	<i>Schinia spinosae</i>	SC	known to use plants in the genus <i>Polygonella</i> as host plants
Pine Barrens Speranza	<i>Speranza exonerata</i>	T	<i>Quercus ilicifolia</i>
Toothed Apharetra Moth	<i>Sympistis dentata</i>	T	<i>Kalmia polifolia</i> , <i>Vaccinium</i> sp., and possibly other low heaths.
Scribbled Sallow Moth	<i>Sympistis perscripta</i>	SC	<i>Scrophulariaceae</i> family, <i>Antirrhinum</i> spp., <i>Linaria</i> spp., and <i>Nuttallanthus</i> spp.
Black-eyed Zale	<i>Zale curema</i>	E	<i>Pinus rigida</i>
Pine Barrens Zale	<i>Zale lunifera</i>	NA	<i>Quercus ilicifolia</i>
Oblique Zale	<i>Zale obliqua</i>	SC	<i>Pinus rigida</i>
Pine Barren Zanclognatha	<i>Zanclognatha martha</i>	T	<i>Pinus rigida</i>



**AREA 1**

**AREA 2**

**AREA 3**

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Image Landsat / Copernicus