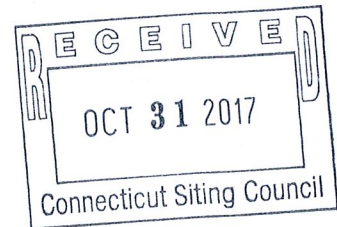


October 27, 2017

Connecticut Department of Energy & Environmental Protection
Natural Diversity Data Base
79 Elm Street
Hartford, CT 06106-5127
Attn: Ms. Dawn McKay



**Re: Candlewood Solar LLC
20 MW Solar Photovoltaic Project
New Milford Assessor Map parcels 26/67.1, 9/6, and 34/31.1
Candlewood Mountain Road, New Milford, Connecticut
NDDB Preliminary Assessment No.: 201703524**



Dear Ms. McKay:

This letter and associated attachments are being filed with Connecticut Department of Energy & Environmental Protection (CT DEEP) Natural Diversity Data Base (NDDB) in response to NDDB's letter dated July 10, 2017 regarding review of the above referenced project. Specifically, this letter and associated attachments address the additional information requested by NDDB along with information on further project developments.

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), Candlewood Solar LLC's (Candlewood Solar) environmental consultant subcontracted with Oxbow Associates, Inc. (Oxbow) to assist with the assessment of potential impacts to state-listed species, including conducting field survey activities for the slimy salamander, habitat assessments for the Golden-winged warbler and other species, and development of protection plans. **Attachment A** contains Oxbow's Statement of Qualifications and resumes of the lead biologists who performed work on the Project.

Vernal Pools

During a site visit on September 26, 2017, as part of the Connecticut Siting Council (CSC) proceedings, a review of Wetland complex 1 was conducted by Mr. Brian O. Butler, M.S. of Oxbow and Dr. Michael Klemens. During the subsequent CSC evidentiary hearings, it was concluded that a cryptic vernal pool is located within Wetland complex 1 based on this site visit.

On September 30, 2017, Mr. Butler of Oxbow completed a delineation of the cryptic vernal pool within Wetland 1 (see **Attachment B**). The delineation resulted in the identification of two (2) cryptic vernal pools within Wetland 1. Figure 1 included in **Attachment B** shows the location and boundaries of the cryptic vernal pool depressions, 100 foot envelopes and 750-foot critical terrestrial habitat (CTH).

In response to this new information and to minimize potential impacts on vernal pools and slimy salamander habitat (see below), Candlewood Solar has revised the site plan layout. The revised

Amec Foster Wheeler
Environment & Infrastructure, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
+1 978-692-9090
amecfw.com

overall site plan (Drawing E-100) and detailed site plan (Drawing E-101) are included in **Attachment C**. Maps of wetlands 1 and V showing the revised site plan, location of the vernal pools, 100 foot envelopes, and 750 foot CTHs are included in **Attachment D**. The revised layout avoids direct impacts to the vernal pools and 100 foot envelopes.

As noted above, the two cryptic vernal pools are part of a single wetland system (Wetland 1). As such, we have evaluated potential impacts to them together, as a single system and not in isolation. The CTH (area within 100-750 feet of the pool's edge, Calhoun and Klemens (2002) page 16) covers an area of approximately 63.08 acres. Development within the CTH (tree clearing area and solar array development) will cover approximately 26.14 acres or 41.4 percent of the CTH projected by the Wetland 1 vernal pools ("CVP" and "CVPx"). However, with the reduction of alteration of CTH projected by Wetland 5 vernal pool (17.3%), the aggregate alteration of CTH for the pools on the Site is 31.6%. It should be noted that approximately two (2) percent of the CTH associated with Wetland 1 vernal pools (1.36 acres) is currently altered field area and the proposed condition will largely mimic the existing condition in that area in that it will remain field.

As a result of revisions to the facility layout, there have been changes to the proposed impacts to CTH associated with the previously identified vernal pool associated with Wetland V. The proposed limits of disturbance completely avoid Wetland V, including the vernal pool depression and the 100-foot vernal pool envelope. The CTH covers an area of approximately 43.45 acres. Development under the reduced footprint design now under consideration within the CTH (tree clearing area and solar array development) will cover approximately 7.5 acres or 17.3 percent of the CTH. As depicted on Figures 1 - 3 in **Attachment D**, the CTH associated with the vernal pool in Wetland V overlaps with the CTH associated with the cryptic vernal pools in Wetland 1 (approximately 11.94 acres of overlap). Based on the overlapping, continuous, unfragmented system between the CTHs, these areas likely function as a single, mutually supportive system and therefore, should be assessed together. As a single system, the CTH totals approximately 94.57 acres and the development area (tree clearing area and solar array development) within the single combined CTH system totals approximately 29.91 acres or 31.6 percent.

While the post-development condition of the cryptic vernal pool in Wetland 1 exceeds the recommended less than 25% developed area guideline set forth in Table 3 on page 18 of Calhoun and Klemens (2002), nonetheless, the net impact to the aggregate, overlapping CTH associated with the three pools is 31.6% and, unlike more conventional development (commercial, residential) when completed, the array field will not have many of the legacy mortality sources (to vernal pool wildlife) that result from conventional projects built in close proximity to vernal pools. Specifically, there will be no ongoing road mortality to frogs, toads or salamanders. Similarly, no animals will be captured in storm gutters and deep sump catch basins. Although the array field will not provide terrestrial habitat, it will impede, but not prevent movement by salamander species and will do little to impede nocturnal migration by wood frogs.

The Project will adhere to the following recommended measures prescribed for Tier I vernal pools identified by Calhoun and Klemens (2002) to the extent practicable as follows:

- No impacts will occur to the vernal pool depression or 100-foot envelope (see **Attachment D**).
- The total length of roads within the 750-foot critical terrestrial habitat (CTH) will be the minimum required to access the northern and eastern portions of the array for maintenance or emergency activities.

- Any ruts or artificial depressions created as part of the Project will be refilled to grade to avoid creation of decoy vernal pools.
- Erosion and sediment control Best Management Practices (BMPs) will be implemented per the required Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities.
- Impervious surfaces will be minimized within vernal pool habitat.
- No lighting will be required for the Project.

Tree Roosting Bats and Bat Protection

Tree clearing will be completed during the hibernation or winter range period (Hoary, Red and Silver-haired) for bats and tree clearing will be limited to November 1 through March 30. The implementation of this measure would be protective of those species of bats identified as well as other bat species.

Additionally, large diameter coniferous and deciduous trees and wooded buffers adjacent to wetland areas will be maintained whenever possible. Based on the revised site plan layout, forested buffer areas vary by wetland.

Finally, as noted in NDDB's July 10, 2017 letter, "Bat houses installed in the area where trees will be removed will help in the conservation of tree roosting bats." As a conservation measure, Candlewood Solar will mount between 20 and 30 bat houses on east facing, mature tree trunks, not less than 12 feet from the ground in areas where trees are removed.

Eastern Box Turtle

Oxbow performed site examinations of the Project area for the eastern box turtle. As noted in Oxbow's report (see **Attachment E**), Oxbow "had no direct observations of the species during multiple days of suitable field conditions on the property. Similarly, no persistent indicators, such as carapaces or other durable indicators of the species' presence that are often encountered in areas of moderate or high-density habitation by box turtles were observed." However, Oxbow identified two areas of potential box turtle habitation that warrant some degree of protection related to construction. These two areas are Area 1. approximately 1,500 linear feet along the electrical interconnect route, east of Rocky River and northwest of the reservoir on a mesic forested slope that has well developed soils, leaf litter and understory vegetation and Area 2. the solar array field. See **Attachment E**, Eastern Box Turtle, *Terrapene c. carolina*: State Special Concern, for additional information.

In order to minimize potential impacts to turtles, Candlewood Solar, will commit to implementing the following best management practices (BMPs), protection measures, and mitigation:

- After tree clearing activities, but prior to April 15th, a perimeter of standard silt fence and haybales will be installed along the limit of work (LOW) to enclose the solar array field and active construction areas. A perimeter of standard silt fence and haybales will also be installed to enclose the 30-foot work corridor from Rocky River near the Candlewood Reservoir Dam east, and northeast to the intersection with the paved service road (approximately 1,500 feet) during construction and installation of the electric interconnection route. The perimeter, exclusionary barrier will be a minimum of 20 inches tall and will be secured to and remain in contact with the ground. The exclusion barrier will be maintained, and inspected weekly through the construction period to

secure any gaps or openings at ground level to exclude any box turtles that may seek the disturbed soils for nesting substrate, or random wanderings of extant mountain turtles. Plastic web or netted silt-fence will not be used. Silt fencing that is used for exclusion will be removed as soon as the area is stable to allow for reptile and amphibian passage to resume.

- Any turtles encountered within the immediate work area will be carefully moved to an adjacent area outside of the excluded area and fencing inspected to identify and remove access point.
- Any sightings of box, wood or spotted turtles will be reported and documented with the NDDDB (nddbrequestdep@ct.gov) on the appropriate special animal form found at (http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&depNav_GID=1641).
- No heavy machinery or vehicles will be parked beyond the LOW and exclusion barrier.
- If felling of trees adjacent to brooks and streams is required, they will be cut to fall away from the waterway and will not be dragged across the waterway and stumps will not be removed from banks.
- To the extent practicable, usage of equipment within 50 feet of streams and brooks will be avoided and limited.
- A qualified herpetologist will be hired to periodically be on site to ensure these protection guidelines remain in effect and prevent turtles from accessing the work area and incidental mortality. This is especially important in the month of June when turtles are selecting nesting sites.
- A designee of the Site Contractor will search the day's work area each morning prior to any work being done during the active season (Apr. 15 – Oct. 31).
- All staging and storage areas, outside of previously paved locations, regardless of the duration of time they will be utilized, will be reviewed to remove individuals and exclude them from re- entry.
- All construction personnel will be trained on the potential presence of listed threatened and endangered species likely to occur in the Project area. Training will include species descriptions, agency and project contacts if a species is identified, reporting and notification requirements, and instructions for relocation if a species is found inside work areas. Additionally, laminated, instructional posters will be placed at the construction trailer(s).

The solar array facility will be completely surrounded by a 7-foot high chain link fence. Box turtles will be excluded from the fenced in array field by a counter-sunk fence. The secured fence is intended to avoid the potential for mowing mortality to turtles that would access the array with a raised fence configuration. However, the shade aprons, outside the fence, that will be maintained not more than twice annually and only between November 1 and April 15, will be available for feeding, thermoregulation, and possibly nesting.

Finally, an approximate 100-acre contiguous, steep slope, mature forest perpetual conservation parcel will be created to preserve slimy salamander habitat, conserve existing unfragmented forest, and protect existing wetlands and vernal pools.

Wood Turtle

Based on Oxbow's site examinations and examination of orthophotography and USGS topographic mapping of the Project area, Oxbow concluded that protective measures beyond contractor education are not applicable to this species relative to this Site. See **Attachment E**, Eastern Box Turtle, *Terrapene c. carolina*: State Special Concern, for additional information.

State Endangered *Vermivora chrysoptera* (golden-winged warbler):

A habitat assessment of the four (4) existing pastures located within the array parcel was conducted on September 12 and 22, 2017 by Mr. Butler of Oxbow. The four (4) existing pastures / fields both within the proposed Solar Array area and adjacent to Candlewood Mountain Road were examined for characters potentially compatible with golden-winged warbler breeding habitat. A report summarizing the results of the habitat assessment is included in **Attachment E** (Species Account Responses to NDDDB Preliminary Comment Letter (7/10/17); (non-Chiropteran species), dated October 20, 2017).

Based on Oxbow's examination of the fields, Oxbow concluded that suitable breeding habitat for golden-winged warbler is wholly absent from the premises due to a lack of open canopy habitat in a suitable early to mid-successional seral stage to support the species, and no protective measures are provided.

Candlewood Solar does not propose any BMPs to avoid or mitigate potential impacts to the species from the Project, however, as discussed above regarding bat protection measures, tree clearing will be conducted between November 1 and March 30. Following tree cutting, the Site will continue to be an active construction area through Project completion, which will deter birds seeking nest sites from locating within the Project Site.

State Threatened *Plethodon glutinosus* (slimy salamander):

Site surveys dedicated to assessing habitat and documenting individual salamanders were undertaken on September 12, 22, 30 and October 4, 2017. A report summarizing the results of the site surveys is included in **Attachment E** (Species Account Responses to NDDDB Preliminary Comment Letter (7/10/17); (non-Chiropteran species), dated October 20, 2017).

It should be noted, that while the results of the site surveys conducted on September 12, 22, 30 and October 4, 2017 did not identify any individuals, a dark, blackish salamander was observed when a decaying log was turned during a site visit on September 26th as part of the Connecticut Siting Council (CSC) proceedings. The individual exhibited rapid movements and in consultation with Dr. Michael Klemens, the individual is thought to have been either a lead-back salamander or potentially a juvenile slimy salamander. As noted, the specimen escaped capture and as such, the species was not confirmed.

Despite the absence of direct observation at the Site, the habitat quality, dimensions and adjacency to other occurrences suggests the species is likely to persist at this locus, and particularly in the higher quality, older growth, steep, rocky forested sections. These areas, exhibiting a 35% grade, rocky limestone slopes and mature, predominantly deciduous forest were

mapped via a raster analysis by Dr. Tigran Tadevosyan, Oxbow Associate Scientist. These zones match the documented habitat preferences by this species at the extreme of its currently documented eastern range (excepting historic occurrence in southern New Hampshire). On October 4, 2017, Mr. Smyers and Oxbow Environmental Scientist, Kyle Cormier (B.S.) examined the site to collaborate slope raster analysis conducted by Dr. Tadevosyan. A map of the raster analysis along with a log of documentary ground photos is included in **Attachment F**.

Attachment F to these responses contains maps of all areas identified as prime or preferred slimy salamander habitat on the Site. These areas of prime habitat were determined based on the presence of mature deciduous woodland with slopes greater than 35%. However, the entire site is potential habitat for the slimy salamander. Photographs documenting these findings keyed to the maps included in **Attachment F** are also included in **Attachment F**.

The solar array site totals approximately 163.5 acres. Of this approximately 20.9 acres (12%) are pasture land that is unsuitable habitat for slimy salamander. Oxbow mapped 32 acres (19.5%) of steeply sloped, high quality habitat for *P. glutinosus* in the northerly portion of the site, including areas east of the cryptic vernal pools (Wetland 1). An additional 15.6+/- acres (9.5%) of similar, high-quality habitat is southeast of the cryptic pools and bisected by Wetland 1 and its outfall stream to Rocky River. Finally, an area of qualitatively suitable high-quality habitat in the southwestern portion of the property is 2.8+/- acres (1.7%). In total, 50.4+/- acres (30%) of high quality slimy salamander habitat has been mapped for the property. See **Attachment E**, Appendices A and B.

Approximately 0.45+/- acre of high quality habitat will be altered by the realigned interconnection route. However, whereas the alignment is thirty (30) feet wide there will be secondary habitat effects, but this narrow cut is unlikely to preempt long-term movement by slimy salamander or other herpetozoan species.

The following table summarizes the previously identified high quality (HQ) slimy salamander habitat that will be lost through the proposed tree clearing and solar array development.

Habitat Zone	Steep Forest	0 - 100 foot buffer	100 - 200 foot buffer	200 - 300-foot buffer
Acres	1.0 (1.4)*	2.9	6.4	7.1
% of HQ Habitat Impact	2 (2.8)*	0	0	0
% HQ Habitat Impact inclusive of additional approximate 27 acres	1 (1.8)*	0	0	0

(X.X)* Includes work within the interconnection corridor.

Based upon the tabular data above, 2% of on-site high quality slimy salamander habitat will be directly altered. Using a denominator value inclusive of the additional, out-of-property land to be conserved, 1% of the available high-quality habitat will be altered. The values derived inclusive of the interconnection corridor are included parenthetically.

The currently proposed limit of work will, in large part avoid the encumbrance of steeply sloped forested habitat, with a concentration of the condensed solar array occupying the less significant,

low-slope mesic forest and pasture land habitats. Additionally, the reduced panel field footprint will result in a concomitant reduction in tree clearing north and east of the array; contributing to the protection of potential or actual habitat for slimy salamander and other species.

Work within steep rocky forest for the interconnection alignment has been modified to take advantage of a relict haul road feature therein, thus reducing the number of trees to be cut and the ground surface disturbance necessary for pole installation.

A total or one (1) acre of steeply sloped woodland will be occupied within the limit of work for the arrays. Approximately 0.45 acre will be altered within the revised interconnection alignment.

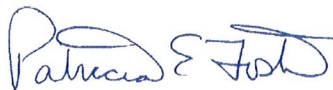
The conservation of 100 acres of contiguous forested habitat, approximately 75% of which is steeply sloped, mature forest will preserve slimy salamander habitat in perpetuity. Any direct loss of habitat cannot readily be mitigated against, with the exception of additional land protection as proposed. However, whereas there are numerous literature citations relating the quality and quantity of downed coarse woody debris (DCWD) to the density of plethodontid and other terrestrial salamanders, the careful distribution of small bore (< 6" diameter) logs cut from the site into the 35m/115 ft. zone between array activity and steeply sloped woodland may provide a mitigating effect against buffer impacts to forested salamander habitat.

Finally, proposed protective measures targeting other species including the installation of a perimeter siltation fence exclusion barrier may reduce incidental mortality to slimy salamanders wandering from intact woodland to the array project area.

Should you have any questions regarding the information presented in this letter or its attachments, please do not hesitate to contact Ms. Tricia Foster at (978) 761-2450; tricia.foster@woodplc.com or Mr. Rob Bukowski at (978) 392-5307; rob.bukowski@woodplc.com.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.



Tricia Foster
Senior 2 Planner



Rob Bukowski, PE
Project Manager

Attachments

- Attachment A: Oxbow Associates, Inc. Statement of Qualifications and Resumes
- Attachment B: Oxbow Associates, Inc., Site Visit Summary – Cryptic Vernal Pool Delineation – September 30, 2017
- Attachment C: Revised Overall Site Plan Layout and Revised Detailed Site Plan Layout
- Attachment D: Vernal Pool Mapping
- Attachment E: Oxbow Associates, Inc., Species Account Responses to NDDB Preliminary Comment Letter (7/10/17); (non-Chiropteran species), October 20, 2017
- Attachment F: Oxbow Associates, Inc., Log of Documentary Ground Photos

cc: J. Lindsay, Candlewood Solar LLC
B. Butler, Oxbow Associates, Inc.

Attachment A

Oxbow Associates, Inc.
Statement of Qualifications and Resumes

Attachment B

Oxbow Associates, Inc.
Site Visit Summary – Cryptic Vernal Pool Delineation –
September 30, 2017

Attachment C

Revised Overall Site Plan and Revised Detailed Site Plan

Attachment D

Vernal Pool Mapping

Attachment E

Oxbow Associates, Inc.
Species Account Responses to NDDB Preliminary
Comment Letter (7/10/17); (non-Chiropteran species),
October 20, 2017

Attachment F

Oxbow Associates, Inc.
Log of Documentary Ground Photos