

**Natural Resources Assessment for:
500 kW Photovoltaic Electric Generation Facility
Norwich Upper Loveland Solar Project**

Norwich, Vermont

*Prepared by:
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Table of Contents

	Page #
I. Summary Findings.....	1
II. Introduction and Project Description.....	2
III. Site Characterization.....	3
IV. Criterion 1(A) Headwaters	4
V. Criterion 1(D) Floodways.....	5
VI. Criteria 1(E) Streams and Section 248(b)(8) Outstanding Resource Waters	5
VII. Criterion 1(F) Shorelines	6
VIII. Criterion 1(G) Wetlands.....	6
IX. Criterion 8 Rare and Irreplaceable Natural Areas	7
X. Criterion 8(A) Necessary Wildlife Habitat and Rare, Threatened and Endangered Species	7
XI. References.....	9

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I. Summary Findings

Arrowwood Environmental, LLC (AE) conducted a natural resources assessment for the proposed Norwich Upper Loveland Solar Project (“Project”) located at 201 Upper Loveland Road in Norwich, Vermont. The field assessments were conducted in the summer of 2021. The Project site is located within a wooded landscape, adjacent to the portion of the parcel hosting a telecommunications tower. AE assessed natural resources criteria incorporated by the Public Utility Commission into the review of solar projects, including streams and headwaters, floodways, outstanding resource waters, shorelines, wetlands, rare and irreplaceable natural areas, necessary wildlife habitat, and rare, threatened, and endangered species.

There are no floodways, outstanding resource waters, shorelines, rare and irreplaceable natural areas, necessary wildlife habitat, or rare, threatened, and endangered species at the Project site.

The Project is located in a headwater. The Project will obtain an Agency of Natural Resources, Department of Environmental Conservation construction stormwater permit prior to commencement of installation and be performed in accordance with the Vermont Standards & Specifications for Erosion and Prevention and Sediment Control, 2020. The Project site, including space between the solar panels, will remain vegetated and maintained. The Project will not involve the disposal of wastes and will not involve the injection of waste materials or any harmful toxic substances into groundwater or wells. In addition, the Project will use GMP pole-mounted transformers that will utilize mineral oil. The proposed Project will not result in a reduction of the quality of ground or surface waters in the area.

The existing gravel access road crosses a small tributary to the Connecticut River. The Project will utilize the existing road with no upgrades or clearing. The Project will have no impact on the stream or associated riparian buffer zone.

Field review confirmed the presence of two presumed Class 2 wetlands adjacent to the Project area. The Project array has been designed to avoid presumed Class 2 wetlands and associated 50' wetland buffer zones per the Vermont Wetland Rules. The southern wetland is characterized as a vernal pool and has been provided a total buffer width of 100'.

In summary, AE concludes that the Project has been sited and designed to avoid undue adverse impacts to natural resources including streams and headwaters, floodways, outstanding resource waters, shorelines, wetlands, rare and irreplaceable natural areas, necessary wildlife habitat, and rare, threatened, and endangered species.

II. Introduction and Project Description

Arrowwood Environmental, LLC (AE) performed a natural resources assessment for a proposed 500 kW photovoltaic electric generation facility located off Upper Loveland Road in Norwich, Vermont ("Project"). The Project site is located within a forested landscape.

Access to the Project will be off Upper Loveland Road. The electric power will travel to the inverters, an AC combiner panel and AC disconnect to interconnect to Green Mountain Power Corporations ("GMP") existing circuit via a GMP line extension at new GMP pole-mounted transformers adjacent to the array. These transformers are typical of what is used throughout GMP's distribution system.



Project Area (7/7/2021)

This report outlines AE's findings related to natural resources criteria incorporated by the Public Utility Commission into the review of solar projects, including streams and headwaters, floodways, outstanding resource waters, shorelines, wetlands, rare and irreplaceable natural areas, necessary wildlife habitat, and rare, threatened, and endangered species. The natural resources assessment involved both a remote review of available digital databases as well as field investigations at the Project site in June and July 2021.

III. Site Characterization

Ecologically the site is within the Southern Vermont Piedmont biophysical region of the state (Thompson, Sorenson and Zaino, 2019). The Project is located at approximately 700 feet above mean sea level according to U.S. Geologic Survey ("USGS") topographic data and is generally sloped to the east. The mapped bedrock that is underlying the site is of the metavolcanic rock class with metavolcanic rock types from the Ammonoosuc Volcanics Formation. (Ratcliffe et al. 2011). The soils are mapped as the Glover-Vershire complex with 15 to 35% slopes in the Project area (NRCS Soil Survey). The Project site is located within a wooded landscape.



Figure 1. Project Site and Nearby Natural Resources.

IV. Criterion 1(A) Headwaters

The headwaters assessment involved both a remote review of the USGS topographic map, Vermont Hydrography Dataset (streams, rivers, and waterbodies), NRCS Soil Survey, ANR Atlas, and field investigation in June 2021. The Project is located in a headwater as it is located within a watershed with a drainage area less than 20 square miles and is characterized by steep slopes.

The Project will be constructed in accordance with the Vermont Standards & Specifications for Erosion and Prevention and Sediment Control, 2020. The Project will apply for coverage under the Agency of Natural Resources Department of Environmental Conservation Construction General Permit. The Project site, including space between the solar panels, will remain vegetated and maintained. The Project has no onsite sanitary wastewater systems, and therefore no associated injection of sanitary wastewater into the ground. The Project will use GMP pole-mounted transformers that utilize mineral oil. The proposed Project will not result in a reduction of the quality of ground or surface waters in the area. For these reasons, we conclude that the Project will have no adverse impact on headwater areas.

V. Criterion 1(D) Floodways

AE reviewed the FEMA DFIRM (Digital Flood Insurance Rate Map Database) and the VT ANR's Flood Ready Atlas to identify floodways or flood fringes. AE also reviewed ANR's river corridor data layer on the VT ANR's Flood Ready Atlas.

The Project is not located within a 100-year Zone Area and will not restrict or divert the flow of floodwaters or significantly increase the peak discharge of a river or stream within or downstream from the area of development. The Project is not located within a river corridor. The closest mapped floodway and river corridor is for the Bloody Brook approximately 0.89 miles to the west of the Project. Therefore, the Project will not have any undue, adverse impacts on floodways or river corridors, nor will they endanger the health, safety, and welfare of the public or riparian owners as it relates to flood events or fluvial erosion.

VI. Criteria 1(E) Streams and Section 248(b)(8) Outstanding Resource Waters

The stream assessment involved both a remote review of the USGS topographic map, Vermont Hydrography Dataset (streams, rivers, and waterbodies), LiDAR derived topography, and field investigation in June 2021.

There are no surface waters within the Project area. The existing gravel access crosses a small tributary of the Connecticut River. The Project will utilize this existing road with no upgrades or

tree clearing within the riparian buffer zone of this stream resource. For these reasons, we conclude that the Project will have no adverse impact on streams.

The Agency of Natural Resources has listed four waterways as Outstanding Resource Waters (ORW): Batten Kill River in towns of East Dorset and Arlington; Pike's Falls/Ball Mountain in the town of Jamaica; Poultney River in the towns of Poultney and Fair Haven; and Great Falls, Ompompanoosuc in the town of Thetford. There are no waters which intersect the Project or are near the Project that have been designated as an ORW. Therefore, the Project will not result in any impact to ORWs.

VII. Criterion 1(F) Shorelines

AE reviewed USGS topographic maps, the Vermont Hydrography Dataset (streams, rivers, and waterbodies), and digital orthophotography. The site of the proposed Project is not located on a shoreline of a river, lake, pond, or reservoir. The closest shoreline to the Project is that of the Connecticut River approximately 0.37 miles to the east of the Project. The Project will not result in any clearing of forest vegetation along the shores of the River. The proposed Project will result in no adverse impact to shorelines.

VIII. Criterion 1(G) Wetlands

The wetland assessment involved both a remote review of available maps (including Vermont Significant Wetland Inventory Maps and the NRCS Soil Survey) and a field inventory component conducted on June 30, 2021. The protocols put forth in the USACE's *Corp of Engineers Wetlands Delineation Manual* (2009 Regional Supplement for the Northcentral and Northeast Region) were employed for delineating wetlands as is the standard practice in Vermont.

AE field review confirmed the presence of two presumed Class 2 wetlands adjacent to the Project area. Per the wetland survey protocol, AE flagged wetland boundaries in the field and subsequently located with a GPS unit capable of sub-meter accuracy.

The Project array has been designed to avoid the presumed Class 2 wetlands and associated 50' wetland buffer zone per the Vermont Wetland Rules. The southern wetland is characterized as a

vernal pool and has been provided a 100' undisturbed buffer. For these reasons, we conclude that the proposed Project will have no undue adverse impact on wetland resources.

IX. Criterion 8 Rare and Irreplaceable Natural Areas

The Rare and Irreplaceable Natural Areas assessment involved both a remote review of available digital maps for the Project area and a field review. AE reviewed digital orthophotography, the NRCS Soil Survey, the 2011 Bedrock Geologic Map of Vermont, and the Wildlife Natural Heritage Inventory (NHI) Rare, Threatened and Endangered Species digital database.

The Project area is characterized as a Hemlock-Northern Hardwood Forest, with pockets of dense hemlock in the eastern Project area. Canopy dominants include hemlock, red oak, sugar maple and white ash. This community type is common in the state (S4 rank). Given the size and condition of this community, this site does not constitute a state significant natural community or a Rare and Irreplaceable Natural Area (RINA). No RINAs are present within the Project area. Since there are not Rare and Irreplaceable Natural Areas in the Project area, there will be no adverse impacts on any Rare and Irreplaceable Natural Areas.

X. Criterion 8(A) Necessary Wildlife Habitat and Rare, Threatened and Endangered Species

The wildlife habitat assessment involved both a remote review of available digital maps for the Project area and a field inventory component. A remote review of available digital databases was conducted to identify and map necessary wildlife habitat (including State of Vermont Deeryard data layer, USGS Topographic map, "VT HYDRODEM" elevation data, and State of Vermont Bear Habitat data layers) in the Project area. The field inventory component involved characterizing vegetation natural communities and recording observations of wildlife signs or sightings during field surveys.

Site assessments were conducted in June and July 2021 to assess wildlife, wildlife habitats, and threatened and endangered species.

A. Necessary Wildlife Habitats

1. White-tailed Deer Wintering Habitats

There are no mapped VT Fish and Wildlife Department white-tailed deer (*Odocoileus virginianus*) winter habitats (DWA) in the Project area. The closest mapped DWA is located approximately 1.13 miles to the west of the Project area. AE confirmed the absence of recent deer wintering activity in the small hemlock pockets in the eastern Project area. The proposed Project will have no adverse impact on DWA resources.

2. Black Bear Habitat

There is no bear habitat identified by the Vermont Fish and Wildlife Department within the Project area and no observations of bear use or feeding (including bear claw scarring, bear dens, scat) were made during the field inventories of the forests and wetland within the Project area. The forest contained within the Project area do not contain beech or oak stands. No potential black bear spring feeding wetlands were identified. The Project will therefore have no adverse impact on black bear habitat.

3. Grassland Bird Habitat

The Vermont Fish and Wildlife Department considers grassland bird habitat to be easily identifiable, concentrated, and essential for the reproductive success and survival of a suite of birds. Grasslands used by many species of grassland birds consist of large expanses (minimum of 22 acres with a core breeding/nesting area of ~11 acres) of native grasses with little or no woody vegetation. The Project is located in a forested landscape and does not provide suitable habitat for grassland bird species. The Project will have no adverse impact on grassland bird habitat.

B. Rare, Threatened and Endangered (RTE) Species

The RTE species review involved both a remote review of available digital maps for the Project area as well as a field survey. AE reviewed digital orthophotography, the NRCS Soil Survey, the 2011 Bedrock Geologic Map of Vermont, and the Wildlife Natural Heritage Inventory (NHI) Rare, Threatened and Endangered Species digital database.

1. RTE Animal Species

The Northern Long Eared Bat (LEB) became a federally listed endangered species in May of 2015. Vermont Fish and Wildlife Department has issued guidance that project clearing constituting

greater than 1% of the total forested area within a 1 square mile radius of a project triggers review for habitat loss of this endangered species. The limits of disturbance for the Project are ~8.2 acres constituting less than 0.85 % of the total forested area within 1 square mile of the Project. The proposed clearing does not trigger additional conservation measures.

The Project is not in an area that potentially provides summer roosting habitat for Indiana bat, there are no old or abandoned buildings potentially providing roosting habitat for little brown bat proposed for demolition, and there are no known bat hibernacula or maternity roosts within 1 mile of the Project site. The Project will have no adverse impact on RTE animal species.

2. RTE Plant Species

There are no previous records or occurrences of RTE plant species at the site. An RTE plant survey was conducted throughout the Project area on July 7, 2021 by Michael Lew-Smith. RTE plant species were not identified during the field survey. The Project will have no adverse impact on RTE plant species.

XI. References

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