Memorandum

To: VT Real Estate Holdings 1 LLC - Shaftsbury Solar Project File

Date: May 1, 2023

Project #: 58071.01

From: Mitchell Jackman; Adam Crary, PWS, PWD

Re: Section 248 Natural Resources Assessment

Introduction / Overview

At the request of the Petitioner VT Real Estate Holdings 1 LLC (to be referred to as "Shaftsbury Solar"), VHB has prepared this technical memorandum concerning the Shaftsbury Solar Project ("Project"), a proposed solar electric generation facility that will occupy approximately 83 acres, within a perimeter fence, located on several parcels of land that total approximately 182 acres. The Project site is located off Holy Smoke Road in Shaftsbury, Vermont. The content of this technical memorandum presents the results of an assessment of the Project as it relates to the following criteria under 30 V.S.A. § 248(b)(5) and the Act 250 criteria referenced therein:

- Outstanding Resource Waters (10 V.S.A. § 1424a(d));
- Headwaters (§ 6086(a)(1)(A));
- Floodways (§ 6086(a)(1)(D));
- Streams (§ 6086(a)(1)(E));
- Shorelines (§ 6086(a)(1)(F));
- Wetlands (§ 6086(a)(1)(G));
- Rare and Irreplaceable Natural Areas ("RINA") (§ 6086(a)(8));
- Necessary Wildlife Habitat and Endangered Species (§ 6086 (a)(8)(A); and
- Natural Environment (other resources not otherwise covered).

The Vermont Public Utility Commission ("PUC") will apply these criteria in its review of Shaftsbury Solar's request for a Certificate of Public Good ("CPG").

VHB conducted various natural resources field assessments in May and July 2018; June and September 2021; and October 2022. In making assessments of potential Project impacts to natural resources, VHB relied on its own desktop review and on-site field work, agency reviews, Project information provided by the Petitioner, and Project site plans prepared by VHB and filed as Exhibit SS-RW-2 and Exhibit SS-SW-2 with the Project's petition.

VHB's methods, results, and impact assessments are described in more detail throughout this memorandum. The following is a broad summary of the resources that are present within the Study Area (an area substantially larger than the Project Site), and if present, how any Project-related impacts are being addressed.

- Outstanding Resource Waters:
  - Not present

- Headwaters:
  - Present, no undue adverse impacts. The Project's design measures will protect ground and surface waters, including Paran Creek which is over 2,000-feet beyond the Project.

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- Floodways:
  - Not present
- Streams:
  - Present. The Project siting avoids direct and indirect impacts to streams and respective riparian buffers.
- Shorelines:
  - Not Present
- Wetlands:
  - Present. The Project avoids all significant (Class II) wetlands and their buffers, except a small area of buffer to be temporarily impacted during construction of the temporary U.S. Route 7 (U.S.-7) access road. A Vermont Wetland permit will be obtained for this work in the buffer.
- Rare and Irreplaceable Natural Areas:
  - Not Present
- Necessary Wildlife Habitat:
  - Present for vernal pool habitat. The Project siting avoids the vernal pool and its upland buffer.
- Rare, Threatened, or Endangered ("RTE") Species:
  - Present for certain plant species. The Project siting avoids direct and indirect impacts to RTE plants.
  - Not present for animal species, including forest dwelling bats and thus conservation measures are not required.
- Natural Environment (other resources not otherwise covered):
  - Significant natural communities – Present for two forest community types. The Project's design has minimized direct impacts to the interior portion of each, 100-foot buffers have been utilized, construction practices will minimize degradation from non-native species spread, and Shaftsbury Solar will conserve comparable forest resources on the property beyond the Project footprint as mitigation.
  - Habitat Connectivity and Fragmentation – No high priority areas are present and no adverse impacts are proposed.
  - Non-native Invasive Plants – the Project will implement construction measures to prevent introduction and spread of Non-native invasive species.

Project Description

The proposed Shaftsbury Solar Project is further described in the pre-filed testimony of Mr. Reed Wills. In general summary, it is a proposed 20 MW (AC) solar electric generation facility to be located within an approximately 83-acre fenced footprint within the Project parcels. The parcels are located off Holy Smoke Road and U.S.-7 in Shaftsbury, Vermont (Refer to Exhibit SS-RW-2).

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The Project consists of ground-mounted, fixed-tilt solar modules mounted on metal racks arranged in rows running east to west in three distinct areas, or "sub-arrays." The entire Project will be enclosed by perimeter fencing.

In addition to the solar arrays, the Project will install electrical facilities, including a project substation that will step up power to 46 kV and then deliver to Green Mountain Power ("GMP") facilities which will utilize a newly constructed three-breaker ring bus to interconnect with the existing 46 kV transmission line that is located on the Project property. The Project will involve construction of new onsite graveled access roads, temporary laydown yards, operational stormwater treatment systems, and landscape berms and plantings.

Apart from the proposed solar Project, a segment of public waterline that is owned and operated by the North Bennington Water Department ("NBWD") bisects the Projects parcels. As the owner of the land, Shaftsbury Solar has proposed relocating and upgrading the waterline to facilitate the solar Project.

While the Project was sited to make the most use of existing cleared areas, tree clearing of field hedgerows and along some forest margins will be necessary to facilitate construction, provide sufficient areas for the solar arrays, reduce impacts from shading, and provide areas for stormwater treatment. The Project will involve earth disturbance from tree stumping and grubbing, as well as limited grading for construction of certain Project elements.

In order for heavy duty vehicles to access the Project site during construction, Shaftsbury Solar has received conceptual approval from the Vermont Agency of Transportation ("VTrans") for a temporary access from U.S.-7. Other passenger and light duty vehicles will utilize an existing access off Holy Smoke Road both during construction and ongoing operations.

Site Description

VHB's assessment encompassed approximately 150 acres, which includes both the area where the Project will be developed and where earth disturbance during construction will take place ("Project Area"), as well as surrounding areas to allow any potential nearby natural resources or their buffers to be identified (collectively, the "Study Area"). Much of the Study Area consists of existing fields, as well as wooded hedgerows and forested areas. The forested areas are in various states, including naturalized, managed for firewood production, regenerating forest, or abandoned orchard. The Study Area is situated between two forested knolls. According to U.S. Geologic Survey ("USGS") mapping, the knoll to the east of the Study Area and west of U.S.-7 is named Harrington Cobble. The knoll to the west of the Study Area is referred to as Hale Mountain.

The Study Area is in the Vermont Valley biophysical region, within the Batten Kill, Walloomsac-Hoosic River Watershed. The closest Vermont Hydrography Dataset ("VHD") mapped stream is Furnace Brook, approximately 1,000 feet to the east and separated by U.S.-7. Most of the waters of the site drain to the north via an unmapped intermittent tributary to Paran Creek, approximately over 2,000-feet from the Project site. The southern and southeastern portion of the site drain easterly to Furnace Brook via overland flow to culverts located off the parcel in the U.S.-7 right of way.

Dominant soil types are Georgia loams and Stockbridge loams, and according to USGS contour data, onsite topography varies from generally flat and gently sloping areas in the fields and adjacent forests, to steep areas beyond the Project footprint that are associated with Hale Mountain and Harrington Cobble slopes. Elevations range from approximately 1,124 to 1,446 feet above mean sea level. The underlying bedrock is mapped as dolostone and marble (ANR Atlas). There is an inactive rock quarry located west of the Project property, formerly known as the Hale

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Mountain Quarry. Representative photographs of onsite fields, forest, and identified resource conditions are included in Attachment 2. Results from VHB's assessments are described in the following sections of this memorandum.

Section 248 Natural Resources Criteria

Outstanding Resource Waters (10 V.S.A. § 1424a (d))

The Vermont Water Quality Standards (ANR 2022c), under section 29A-105(d), state that the Secretary of the Vermont Agency of Natural Resources ("ANR") may, under 10 V.S.A. § 1424(a), designate Outstanding Resource Waters ("ORW"). The following waterways have been designated ORWs:

1. Batten Kill River, Towns of East Dorset and Arlington;
2. Pike's Falls/Ball Mountain, Town of Jamaica;
3. Poultney River, Towns of Poultney and Fair Haven; and,
4. Great Falls, Ompompanoosuc River, Town of Thetford.

The Study Area was reviewed against this list to determine if it is located within the vicinity of any listed ORW. The Project site is situated within the Furnace Brook and Paran Creek drainage areas, both of which are tributaries to the Walloomsac River, which is not designated as an ORW. In addition, the Project Site is greater than seven miles from the Batten Kill River. There are no ORWs that intersect or are in the vicinity of the Study Area, and therefore, the Project would not involve any ORWs.

Headwaters (10 V.S.A. § 6086(a)(1)(A))

The Headwaters criterion under Act 250, as incorporated into Section 248 review, requires that if a project is located in a headwaters area, it must meet "any applicable health and environmental conservation department regulations regarding reduction of the quality of the ground or surface waters flowing through or upon lands that are not devoted to intensive development." The factors for determining whether a project is within a headwaters are as follows:

(i). Headwaters or watersheds characterized by steep slopes and shallow soils;
(ii). Drainage areas of 20 square miles or less;
(iii). Above 1,500 feet elevation;
(iv). Watersheds of public water supplies designated by ANR; or
(v). Areas supplying significant amounts of recharge waters to aquifers.

The Study Area is not located upon lands devoted to intensive development. VHB analyzed available information, including soils data, topographic maps, and state-mapped public water supply source protection areas, as well as field review, to determine if the Study Area is located on any lands that would be considered headwater locations. Soils and topography within some non-agricultural portions of the Study Area are characterized by steep slopes and shallow soils. As such, the Project meets subcategory (i). The Project also meets subcategory (ii) as the drainage area of the on-site waters, as measured from the point at which surface discharge from the Project's proposed stormwater management system enters receiving waters (an intermittent stream to Paran Creek), is less than 20 square miles. The Study Area does not meet the additional headwaters subcategories (iii-v) as it is located below 1,500 feet in elevation, is not in a watershed of a public water supply and is not located in an area that supplies a significant amount of recharge waters to aquifers. The Project site is thus within a headwaters location because it meets subcategories (i) and (ii).

The Project will comply with the applicable health and environmental regulations regarding ground and surface water protection. VHB has prepared a separate analysis of Project waste disposal and stormwater plans that provides further detail regarding pertinent aspects and regulations. See Exhibit SS-SW-3 and the pre-filed testimony of Stephanie Wyman. In summary, the Project will adhere to the requirements of the Vermont Department of Environmental Conservation ("DEC") for obtaining construction and operational stormwater discharge permits. The Project design also includes measures to protect water resources in the event of an inadvertent release of transformer oil, and will be required under federal regulations to develop and adhere to a site-specific Spill Prevention Control and Countermeasure ("SPCC") plan.

The Project's operational stormwater system is being designed to meet six standards in the Vermont Stormwater Management Manual (ANR 2017a) including: 1) soil depth/quality standard where ground is disturbed to avoid compaction/increasing runoff, 2) water quality where the one-inch storm is the standard, 3) groundwater recharge treatment standard for water quality, 4) channel protection where 12 hours detention is the standard for cold receiving waters, 5) overbank flood protection where pre- and post-runoff one-year storm volume match is the standard, and 6) extreme flood protection standard, where pre- and post- 100-year storm volume match is the standard. Exhibit SS-SW-3 in the pre-filed testimony of Stephanie Wyman provides further details related to the Project's operational stormwater considerations.

The Project will result in greater than one acre of earth disturbance and will therefore require an authorization from the DEC to discharge construction stormwater. Exhibit SS-SW-3 in the pre-filed testimony of Stephanie Wyman provides additional information on the measures to be taken for erosion prevention and sediment control in order to protect surface waters.

The receiving waters of the stormwater management system discharges are an intermittent stream channel within the Paran Creek watershed as well as a point in the Furnace Brook watershed. As shown on the Watershed Map (Exhibit SS-AC-4), the Project work limits occupy approximately 0.82% of the Paran Creek watershed, and approximately 0.07% of the Furnace Brook watershed. Paran Creek is a Class B cold water stream located approximately 2,120-feet north of the Project and adherence to the construction and stormwater discharge design and permit requirements will protect Paran Creek from being impacted from surface runoff from the Project. Further measures to protect water quality within the watersheds and the headwaters location include: establishing and avoiding onsite riparian buffers, discharging to intermittent surface waters, using bifacial solar panels which will increase solar radiation retention, installing native herbaceous cover within the array fields that will be managed as pollinator habitat (mowed less frequently than typical hayfields), and mitigating for forest cutting by conserving other forested areas outside the Project site but within the parcels. The pre-filed testimony of Reed Wills provides additional details regarding these measures.

As such, the Project will not adversely impact ground or surface water quality, and the Project will meet applicable health and DEC regulations regarding the quality of groundwater and surface waters.

Floodways (10 V.S.A. § 6086(a)(1)(D))

The Floodways criterion under Act 250, as incorporated into the PUC's Section 248 review, takes into consideration a project's effect on both floodways and floodway fringes. The term "floodway" is defined to mean "the channel of a watercourse which is expected to flood on an average of at least once every 100 years and the adjacent land areas which are required to carry and discharge the flood of the watercourse" (10 V.S.A. § 6001(6)). The term "floodway fringe" is defined as "an area which is outside of a floodway and is flooded with an average frequency of once or more

in each 100 years" (Id. § 6001(7)). A project's impacts are also considered with respect to both flood inundation and fluvial erosion hazards pursuant to *Flood Hazard Area and River Corridor Protection* ("FHARC") *Procedure* (ANR 2017b). These Procedures address both inundation risks as represented by Federal Emergency Management Agency ("FEMA")-mapped flood information and potential fluvial erosion risks associated with the geomorphic principles necessary to achieve stable fluvial processes.

For purposes of the FHARC Procedure, a River Corridor typically consists of the meander belt or fluvial erosion hazard area, which is defined as the lateral width of a stream corridor that may be subject to fluvial erosion from stream channel lateral migration as well as a 50-foot riparian buffer outside of this meander belt (ANR 2017b). The meander belt is typically determined by geomorphic assessments of channel bankfull width, meander centerline, confining lateral topography, channel type, and current channel adjustments, which is then translated into the channel-width-to-belt-width ratio, dependent on stream sensitivity type and adjacent landform.

VHB conducted a desktop review of the available FEMA data for the Town of Shaftsbury, to determine if the Study Area is in a FEMA-mapped floodway or floodway fringe area (FEMA Community Panel 50003C0410D) (FEMA 2018). VHB also reviewed the State of Vermont River Corridor Mapping. Review of the FEMA map indicates that the Study Area is not located within any 100-year floodplain. Additionally, there are no state-mapped River Corridors within the Study Area. Field assessments found no field-determined perennial streams that would be subject to the FHARC procedure. As such, the Project does not involve any areas that would be considered under the Floodways criterion.

Given the Project's siting outside of lands that meet the floodways criterion, the Project would not restrict or divert the flow of flood waters (floodway or floodway fringe), or endanger the health, safety, and welfare of the public, riparian, or downstream landowners during flooding or from potential erosion.

Streams (10 V.S.A. § 6086(a)(1)(E))

The Streams criterion under Act 250, as incorporated into the PUC's Section 248 review, requires that projects will, when feasible, maintain natural stream channel condition, and will not endanger the health, safety, or welfare of the public or adjoining landowners. VHB conducted detailed stream delineation and assessment work in May 2018.

When applicable, stream delineations are conducted pursuant to ANR's *Guidance for Agency Act 250 and Section 248 Comments regarding Riparian Buffers* ("ANR Riparian Buffer Guidance") (ANR 2005). Stream determinations and Ordinary High Water ("OHW") width determinations follows guidance provided in the United States Army Corps of Engineers ("USACE") *Regulatory Guidance Letter: Subject- Ordinary High-Water Identification* (USACE 2005). Stream Top of Bank ("TOB") and Top of Slope ("TOS") are flagged in the field per the ANR Riparian Buffer Guidance. Stream TOB and TOS are flagged on larger channels, while the stream centerline is flagged for smaller channels. Flags are labeled with the stream ID and flag number. OHW limits are flagged when applicable. Stream flow regimes are preliminarily classified as ephemeral, intermittent, or perennial based on qualitative observations of instream hydrology indicators at the time of observation, as well as geomorphic characteristics, subject to professional judgment. Stream features are located in the field using GPS equipment capable of sub-meter accuracy. Riparian buffers adjacent to streams and rivers, consistent with the ANR Riparian Buffer Guidance, are designated for natural perennial and intermittent stream channels when applicable. VHB also maps man-made ditches that may be USACE-jurisdictional as water conveyances/wetland connections (and therefore pose design constraints), even if such ditches would not be considered streams under Act 250 criterion 1(E).

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The Study Area has no VHD-mapped streams. The closest VHD-mapped stream is an unnamed tributary to Paran Creek, and is located adjacent to the northeastern corner of the Study Area. Project activities (including the Project footprint and construction Limits of Disturbance) will not impact this stream or its 50-foot riparian buffer. VHB identified an intermittent stream channel within the Study Area, an unnamed tributary to Paran Creek, delineated as feature 2018-SC-1 on the map in Attachment 1, and depicted in Photograph 1, in Attachment 2. It originates onsite from the coalescing of three small intermittent channels collecting runoff from a field in the northern portion of the Study Area. This stream has an approximately 0.03-square mile watershed where it occurs within the Study Area. More information about this stream can be found in the Summary of Delineated Streams (Attachment 3). A 50-foot riparian buffer from the channel or the adjacent riparian wetlands is incorporated into Project design. See Natural Resources Map (Attachment 1). Since there are no stream or buffer impacts, there is no jurisdiction/review by the U.S. Army Corps of Engineers ("USACE") or the Vermont Fish and Wildlife Department ("FWD").

Given the above, the Project will not result in adverse impacts to stream conditions or health.

Shorelines (10 V.S.A. § 6086(a)(1)(F))

Shorelines are defined under Act 250, and incorporated into the PUC's Section 248 review, as the land adjacent to the waters of lakes, ponds, reservoirs, and rivers. Shorelines shall include the land between the mean high-water mark and the mean low water mark of such surface waters (10 V.S.A. *§ 6001(17);* Argentine 2008). The Study Area was reviewed against these criteria to determine if it is located on or adjacent to any shoreline areas.

The Study Area does not include land adjacent to the waters of lakes, ponds, reservoirs, and rivers, as none are near the Project's Study Area (see the Natural Resources Map in Attachment 1). Therefore, the Project will have no impact on shorelines.

Wetlands (§ 6086(a)(1)(G))

The Wetlands criterion under Act 250, as incorporated into the PUC's Section 248 review, requires that a proposed project comply with the Vermont Wetland Rules ("VWR") (ANR 2023). The VWR apply to significant wetlands (Class I and Class II wetlands) and their buffers. Impacts to Class III wetlands are therefore not considered under Act 250 Criterion 1(G) but are generally reviewed under Section 248(b)(5) through the PUC's consideration of the potential for undue adverse impacts on the natural environment. Further, all wetlands may be regulated by the USACE under Section 404 of the Clean Water Act ("CWA") permit program, as well as the related DEC CWA Section 401 Water Quality Certification ("WQC") review process.

VHB's wetland delineations are made pursuant to applicable methodologies outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region Routine Determination Method* (USACE 2011). When applicable, wetlands are identified in the field with pink flagging and flags are labeled with the wetland ID and sequential flag number. Field notes are taken to record information such as potential wetland classifications, general characteristics, wetland functions and values, any unique qualities observed during the site assessment, along with other considerations relevant to support site findings. Wetlands are classified in accordance with the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). According to the VWR, the presence and significance of wetland functions and values are evaluated based on field notes and observations. When present, wetland features are mapped in the field using GPS equipment capable of sub-meter accuracy.

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A Class II wetland includes a 50-foot buffer zone, with any impacts to either the wetland or its buffer subject to VWR jurisdiction. Class II wetlands include those presumed to be significant under the VWR, as well as those determined to provide one or more functions at a significant level. Activities within the wetland or buffer that are not Allowed Uses under the VWR would need to be avoided or minimized/subject to Vermont Wetland Permit approval. The USACE would also regulate activities and cumulative impacts that are associated with placing fill within wetlands, including activities within vernal pool envelopes as applicable.

There are no Class I wetlands within the Project's Study Area. As shown on the map in Attachment 1, VHB completed wetland delineations during the 2018, 2021, and 2022 growing seasons and delineated four areas that meet the wetland parameters in the Study Area, three presumed Class II wetlands and one Class III. Further data characterizing on-site wetlands are presented in the Summary of Delineated Wetlands (Attachment 3), and the U.S. Army Corps of Engineers Wetland Determination data sheets (Attachment 4). A vernal pool was documented during the May 22, 2018 survey in wetland 2018-2, due to the presence of physical characteristics and vernal pool indicator species. This vernal pool contained egg masses from wood frogs, spotted salamander, and blue spotted salamander, as seen in photographs included in Attachment 2. The vernal pool is subject to a Class II wetland 50-foot buffer and is also further protected by a 100-foot buffer requested by the FWD to further protect the forest envelope surrounding the pool. No impacts are proposed to this pool or either buffer as it is outside the Project's LOW. The results of VHB's wetland delineations and classifications were reviewed and confirmed by DEC District Wetland Ecologist Rebecca Chalmers on October 19, 2021. On October 27, 2022, VHB expanded the study area to include the vicinity of the former quarry tote road to U.S.-7, determined to be located between wetlands 2022-3 and 2022-4, and VHB expanded the delineation of 2022-3 and 2022-4 to include the east boundary adjacent to U.S.-7.

The Project design avoids any permanent impacts to wetlands and buffers. It will require temporary impacts to the Class II wetland buffer of 2022-3, in order to re-create a section of what was a former tote road off U.S.-7 for Project construction, after which the wetland buffer will be restored. Approximately 4,232 square feet of the Class II wetland buffer would be temporarily converted for use as Project construction access. Shaftsbury Solar will apply for a Vermont Wetland Permit ("VWP") for the Project activities within this Class II wetland buffer.[1] Work will be conducted in accordance with permit conditions and best management practices associated with the VWP. After Project construction, the road will be deconstructed, and the wetland buffer will be returned to the previous condition and revegetated. Based upon VHB's experience applying for wetland permits under the VWR for comparable temporary impacts related to access roads where the impacts have been minimized, the Project has been designed to comply with the VWR, will obtain a VWP, and thus will not have an undue adverse impact on wetlands.

Rare and Irreplaceable Natural Areas (RINA) (10 V.S.A. § 6086(a)(8)), and Necessary Wildlife Habitat and Endangered Species (10 V.S.A. §6086(a)(8)(A))

Under Act 250, as incorporated into Section 248 review, a project must be shown to have no undue adverse effect on Rare and Irreplaceable Natural Areas ("RINA"). Additionally, a project must not destroy or significantly imperil Necessary Wildlife Habitat ("NWH") or any Endangered Species.

[1] In addition, as the owner of the land where a waterline crosses, Shaftsbury Solar is working with the NBWD on relocating and upgrading this section of waterline. The relocated line would need to connect to an existing waterline valve that is located within Class III wetland 2022-4, resulting in approximately 3,430 square feet of temporary impacts to the wetland. This work will likely fall within the Pre-Construction Notification of the USACE's General Permit #2 (NAE-2022-00024) for Repair or Maintenance of Existing Currently Serviceable Structures.

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RINA

Per the FWD, significant natural communities can be deemed RINA as part of the four-part test required by Act 250 Criterion 8. Determinations of "Significance" are made by applying a combination of community ranking, current condition (age, degree of disturbance), and landscape context (size, degree of fragmentation) to determine an "Element (or Community) Occurrence Ranking". Rare (S1 and S2) natural communities can be considered significant when quality-ranked A, B, or C. Uncommon (S3) and common (S4) types require a quality rank of A or B to be considered significant. Very common (S5) types require an A-rank to be considered significant (ANR 2016b). Additional considerations for RINA include the presence of rare, threatened, or endangered ("RTE") species in these communities, as well as overall natural community associations. Typically, significant natural communities that also may be considered RINA are those rare (S1 and S2) types.

To identify potential occurrences of known significant natural communities, VHB searched the Vermont Natural Heritage Inventory ("NHI") database for the presence of known Element Occurrences ("EOs") of significant natural community types within and adjacent to the Study Area. A one-mile radius was used when most recently querying the NHI database, last accessed on January 4, 2023 (see Vermont Potential Rare, Threatened, and Endangered Species and Natural Communities in the Project Region and Onsite Habitats Summary table, Attachment 5). Information specific to each EO, including habitat, was then identified. In addition to the database review, VHB utilized information gathered in the field to compile a list of onsite natural community and vegetative assemblage types. This methodology is used to characterize on-site community type and condition as well as identify any natural communities that might be considered RINA. The results are also used to define habitat characteristics and identify any target habitats for rare or sensitive species, as discussed below.

Based on VHB's review of the NHI database, no known significant natural community EOs were mapped within the Study Area. Within a one-mile radius of the Study Area there is one NHI-mapped significant natural community, a Rich Fen listed as rare (S2) occurrence, that is not within the Study Area. In addition to the NHI mapping, VHB identified and mapped two natural communities, Rich Northern Hardwood Forest ("RNHF") (S4) and Dry Oak Maple Limestone Forest ("DOMLF") (S3). More information on the onsite natural communities is given below in the Natural Environment section of this memo and in Attachment 5. Neither of these natural communities or other onsite areas are considered RINA. A further discussion of natural communities, which are not RINA but may be significant is provided below under the discussion of the Natural Environment.

Endangered Species

Endangered Species include those that are defined as, "threatened" or "endangered" on the Vermont endangered and threatened species lists, and thus protected under the Vermont Endangered Species Law (10 V.S.A. Chapter 123). Species protected under the federal Endangered Species Act are included as well. Rare species that are not listed and protected are often included under this criterion as part of a project's potential impacts to the natural environment. Taken together, they are referred to as rare, threatened, or endangered (RTE) species. State uncommon (S3) species are not included in this review.

RTE Plants

To identify the potential occurrence of RTE species, particularly those that are federal or Vermont-listed threatened or endangered, and to assess available onsite-habitat conditions relative to each, VHB queried the FWD NHI database on January 1, 2018 and again on March 4, 2023 for the presence of known EOs of RTE species within and adjacent to the Study Area. VHB used a one-mile radius from the Study Area to query for RTE species to identify EO records in surrounding habitats that may have similar conditions to those found in the Study Area. Details for all EOs identified in

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the database review, including species name, rarity rank and protection status, known habitat, and potential on-site habitat, are included in Attachment 5.

The 2018 RTE plant survey targets and follow up visits in 2021 were based on the results from the 2018 query. The 2023 updated NHI query included four new EOs within the one-mile radius: wood turtle (*Glyptemys insculpta*, S3), ashy clubtail (*Gomphus lividus*, S2S3), as well as the short-styled snakeroot (*Sanicula canadensis* var. *canadensis*, S2S3) that VHB found during the 2018 survey and had reported to the NHI, and early thimbleweed (*Anemone cylindrica*), described below. From the updated query, there was no need to reconduct RTE plant surveys in 2023 because no new targets were identified.

One plant EO was mapped by the NHI within the Study Area prior to VHB's plant surveys, the early thimbleweed (*Anemone cylindrica*). This species is an extremely rare/rare (S1/S2) plant which was mapped on a landform locally called Hale Mountain off the southern end of the Study Area but was not found during VHB's field investigations of the Study Area. The early thimbleweed EO map polygon is large and thus overlaps a small portion of the southwestern corner of the Study Area. VHB surmises that this population was found to occur beyond the Study Area, but the EO polygon mapping is coarse and overly broad.

Apart from the EO mapping, VHB's database review indicates that the site may provide suitable habitat for certain RTE plants known from the vicinity as well as those that could occur in natural or disturbed habitats over calcareous bedrock. As such, VHB Botanist (Fenner, formerly employed) conducted targeted surveys for the three plant EO's mapped within one mile and protected plants known to occur in calcareous habitats[2], as well as those RTE plants associated of DOMLF, and RNHF habitats on May 30 and July 22, 2018, over two general survey windows determined based on target species flowering times. This plant inventory followed ANR's *Guidance for Conducting Rare, Threatened, and Endangered Plant Inventories in Connection with Section 248 Projects* (ANR 2016a). Other onsite occurrences of RTE plants were identified and mapped coincident with other field surveys in September 2021 by VHB Ecologist (Jackman). During the surveys, a representative list of identified vascular flora was collected, as was representative photographs and RTE plant occurrence attribute information. From the field surveys, one population of autumn coralroot (*Corallorhiza odontorhiza,* S2, state-Threatened) one population of Richweed (*Collinsonia canadensis,* S2), and six sub-populations of short-styled snakeroot (S2S3) were observed. The locations and proposed 25-foot buffers are depicted on the Natural Resources Map (Attachment 1). A complete list of identified on-site vascular plants is included in Attachment 7. All plant species identified in the inventory were checked against the current *Rare and Uncommon Native Vascular Plants of Vermont* list (ANR 2022b), as well as the *Endangered and Threatened Plants of Vermont* (ANR 2022a), to determine their rarity rank and any potential protections under endangered species law. Three uncommon (S3) species were noted within the Study Area. The NHI-mapped *Anemone cylindrica* in the southwest portion of the Study Area was not found, and likely corresponds to an occurrence previously documented outside the Study Area.

Based upon the Project design, Project activities will avoid all identified RTE plant populations and subpopulations as well as their buffers. Therefore, the Project will not have an adverse impact on any RTE plants.

[2] VHB reviewed calcareous natural community types from *Wetland, Woodland, Wildland* (Thompson and Sorenson 2005) to compile a list of potential plants known to occur in such habitats.

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RTE Animals

There are no RTE animal EOs mapped within the Study Area. An uncommon snake (smooth greensnake [*Opheodrys vernalis*, S3)] has been documented along East Road, east of the Study Area, and the coarse mapping polygon overlaps the Study Area. As this is not a RTE species, it is not included in VHB's review. VHB last queried the U.S. Fish and Wildlife Service's ("USFWS") Information for Planning and Consultation ("IPaC") project review database in January 2023. Based on the IPaC review, the Study Area is located within the summer range of the monarch butterfly (*Danaus plexippus*), a species undergoing review by the USFWS for candidate listing under the federal Endangered Species Act, although no critical habitat has been designated for this species (USFWS 2023). The Study Area is also located within the summer range of the state and federally endangered northern long-eared bat (*Myotis septentrionalis*, or "MYSE") (USFWS 2023). The USFWS has not designated any critical habitat for MYSE (See Attachment 9); however, the FWD has designated Aeolus Cave, a hibernaculum located in Dorset, Vermont (approximately 20 miles away from the site), as critical habitat for this species (FWD 2023). No critical habitat occurs within or near the vicinity of the Study Area. Furthermore, from a January 2023 query of the ANR Natural Resources Atlas, MYSE maternity roost trees have not been documented within a one-mile radius of the Study Area.

VHB identified and mapped all potential roost trees ("PRT") for MYSE within the Study Area, as depicted on the Natural Resource Map (See Attachment 1). Approximately 45.5 acres of wooded habitat are proposed for removal, which represents approximately 2.85% of the surrounding forested land within a one-mile radius of the Project (which from ANR land cover mapping, VHB calculates to include approximately 1,600-acres). As a result of the PRT investigation, and in accordance with the Regulatory Review Guidance for The Northern Long-eared Bat and its Habitats (ANR 2017c) and the USFWS' Indiana Bat and Northern Long-eared Bat Survey Guidelines ("2022 Guidelines"), VHB conducted a passive acoustic survey following the PRT mapping. At the time the survey was conducted, MYSE was still listed as federally threatened and state endangered.[3] All high and low frequency, and unknown calls were manually vetted by qualified biologists [4], which surpassed the level of effort that was required in the 2022 Guidelines. The acoustic survey results are summarized in the USFWS Bat Reporting Spreadsheet that is provided in Attachment 9 (Acoustic Survey Table) and field forms are provided in Attachment 10. The acoustic survey resulted in a probable absence determination for the northern long-eared bat. No seasonal tree clearing restrictions are necessary or required based on the probable absence determination for the northern long-eared bat (ANR 2017c).

Although there are no regulatory requirements related to monarch butterfly habitat, Shaftsbury Solar intends to implement pollinator habitat plantings and vegetative management which will benefit this species as well as other pollinators. The pollinator habitat will be promoted and managed operationally within the array's perimeter fence. See Exhibit SS-SW-2 (Site Plans) for details regarding seeding and Exhibit SS-AC-5 for an outline of the overall pollinator habitat management plan.

Necessary Wildlife Habitat (NWH)

In Vermont, VHB understands the following to be NWH: deer wintering areas, vernal pools, black bear forage habitat (beech/oak mast or wetlands), black bear travel corridors, moose overwintering area, and potentially grassland bird habitat (see discussion below). If NWH is present, a Project should not unduly destroy or imperil such habitat.

[3] The northern long-eared bat was up-listed to federally endangered on March 31, 2023. Changes in federal regulations and Interim Consultation Framework are applicable from April 1, 2023 to April 4, 2024).

[4] Qualified acoustic surveyors have a working knowledge of the approved (and candidate) acoustic analysis programs, have attended at least one appropriate training and have experience in the analysis of acoustic recordings (USFWS 2023).

VHB researched available ANR mapping for deer wintering area ("DWA"), grassland bird habitat ("GBH"), bear mast stands, and bear wetland habitat to determine if the Study Area contains mapped NWH. There are no areas of NWH previously mapped by ANR within the Study Area. ANR-mapped DWA occurs approximately 400 feet on the east side of U.S.-7 (i.e., across the road from the site). This distance substantially exceeds the seasonally recommended 100-foot buffer of construction activities from active DWA (ANR 2015a).

VHB noted two bear-scarred beech (*Fagus grandifolia*) trees on one of the southwestern slopes. Due to the very low density and lack of abundance of scarred trees, they would not be considered as necessary black bear mast habitat (ANR 2006). The site also does not contain any unmapped DWA.

VHB identified one vernal pool in the forested portion of the Study Area; this pool is labeled 2018-2 in the attached Natural Resources Map (Attachment 1). The vernal pool was surveyed on May 22, 2018, VHB found it to contain vernal pool indicator species. This vernal pool contained egg masses from wood frogs, spotted salamander, and blue spotted salamander, as seen in photographs included in Attachment 2. The vernal pool is subject to a minimum Class II wetland 50-foot buffer; at FWD's request the buffer has been extended to 100-feet to further protect the forest envelope surrounding the pool. There is a segment of the existing NBWD waterline that clips the outer portion of the 100-foot envelope, but the Project array footprint and work limits are outside the vernal pool and its buffer.

In the past few years, grassland bird habitats have been considered during the review of solar energy projects in Vermont. VHB understands that FWD considers open fields greater than 20 acres to be potential nesting/foraging NWH for grassland bird species (ANR 2021). None of the existing fields at the Project site are greater than 20-acres each. One male bobolink (*Dolichonyx oryzivorus)*, a grassland habitat indicator bird, was anecdotally observed at the site during the May 22, 2018 site visit. Although this single observation, by itself, would not ordinarily warrant further onsite investigations, VHB (Jackman) elected to conduct a breeding bird survey for grassland birds on June 18, 2021 following methods accepted by the FWD at that time. No indicator species were observed. See the Grassland Bird Survey Data included as Attachment 11 for details. In addition, the Project fields are not suitable as grassland bird habitat ("GBH") given their size of less than 20-acres, the distance between hedgerows which separate the fields, and the rolling nature of the topography. Therefore, based both on the negative surveys for indicator species and the physical field characteristics, VHB concludes that the Project site does not contain grassland bird NWH.

Irrespective of the lack of NWH at the site, consistent with other solar project practice in Vermont, the Project will install perimeter fencing (for electrical code requirements) that also will serve to exclude large wildlife (to avoid entrapment of travelling wildlife within the fenced area), but will allow for small mammal passage (e.g., by installing game exclusion fence upside down with larger mesh at ground level).

VHB did a desktop review of the site with FWD's Noel Dodge and Bob Zaino in the fall of 2021 and a site visit with the same FWD staff on January 12, 2023 in order to review the results of VHB's surveys. Based on VHB's review and evaluation of available database information and habitat information gathered during field surveys for the Study Area, and the subsequent review with the FWD, VHB concludes that there will be no undue adverse impacts to RTE species, RINA, or NWH.

Natural Environment (30 V.S.A. Section 248(b)(5)

The following sections correlate with elements of the natural environment that are not specifically listed in section 248(b)(5), but when present, are often considered as part of a Project's impact on the natural environment. VHB has therefore included review of those that were noted during on-site assessments, below.

Memorandum

Significant Natural Communities

Natural Communities are landscape feature comprised of specific assemblages of biotic and abiotic features that interact to create a unique natural area. These communities make up the natural areas of the state and have been categorized and ranked based on their distribution and abundance in the landscape. Vermont can consider impacts to significant natural communities under *Rare and Irreplaceable Natural Areas* which is outlined above, or if not RINA, then under impacts to the natural environment. Descriptions found in *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (Thompson and Sorenson 2005) were used to define the natural community parameters as well as characterize the natural communities within the Study Area. Field observations and mapping data were used to identify onsite natural communities.

VHB identified two natural communities that are presumed to be considered state significant and are depicted on the Natural Resources Map (Attachment 1) as well as in the photographs included in Attachment 2. The Rich Northern Hardwood Forest ("RNHF") is common in Vermont (S4) and would be state significant as a proposed A-ranked example. Dry Oak Maple Limestone Forest ("DOMLF") is uncommon (S3) and would be considered significant as a proposed B-ranked example. More specific information pertaining to the natural communities can be found in Attachment 6, and metrics used in VHB's significance determinations in Attachment 11. VHB and the FWD have noted that the margins of mapped significant natural community where they occur adjacent to the fields and access roads are of less quality than more interior portions, due to an earlier successional structure and proliferation of invasive species. These areas were probably used more recently as pasture or cropland and are regenerating. Based upon VHB's experience at other projects, the Project design includes a 100' buffer onsite around these proposed significant natural communities. VHB's assessment were remotely reviewed with the FWD's Bob Zaino and Noel Dodge in fall 2021, and field reviewed with the same staff during a site visit on January 12, 2023.

The VHB Study Area contains approximately 45.1 acres of significant natural communities, consisting of 9.5 acres of DOMLF and 35.6 acres of RNHF. The Project, as designed, proposes approximately 34.6 acres of forest clearing, and an additional 8.35 acres of other tree clearing.[5] Of the overall forest clearing proposed, approximately 0.30 acres will be of the DOMLF occurrence (0.86% of the overall estimated occurrence size), and 17.6 acres of the RNHF (8.29% of the overall estimated occurrence size). A total of 7.8 acres of forested significant natural community buffer would be cleared. As depicted on the table in Attachment 12, the forest/tree clearing in the uncommon DOMLF type or the common RNHF, or the buffers, will not result in a reduction from existing community occurrence rankings for either type. Also noteworthy, the proposed clearing will occur within lower quality margins and portions of the mapped natural communities.

Notwithstanding these findings, Shaftsbury Solar has informed VHB that it will provide mitigation for the reduction in size of these natural communities. Shaftsbury Solar thus proposes that other designated forested areas outside of the Project footprint be conserved for the life of the Project (other than any tree cutting related to beneficial forest or wildlife enhancement, as approved by ANR). The area to be conserved would include the intact forestlands on the northwestern portion of the Project Parcel, and those that may serve as a contiguous connection to already conserved lands that are south of the Project parcels.

[5] Following recent ANR guidance related to defining forests for purposes of evaluating net-metered solar projects, forested areas are defined by VHB as those one-acre or greater in size but excluding areas less than 120-feet wide (ANR 2022d).

VHB conducted a cursory, reconnaissance-level review of the northwestern portion of the Project property on March 1, 2023. While resources are not mapped in detail beyond the area included in the Study Area, VHB's initial opinion is that the northwestern area does contain RNHF, DOMLF, and probably the common Northern Hardwood Forest (S5), as well. The limits of the proposed protected lands are shown on the Forest and Natural Community map included in the pre-filed testimony of Adam Crary (Exhibit SS-AC-3). Protection of this area would result in approximately 67 acres of forested area conserved that would offset the proposed Project natural community clearing of 18.0 acres at more than a 3.7:1 ratio.

Habitat Connectivity and Forest Fragmentation

Habitat connectivity and forest fragmentation involve potential landscape-level interruptions that have not been precisely defined or regulated, but given this Project's proposed cutting of forested areas, may be pertinent to the PUC's review. The parcel contains an Interior Forest Block with a four out of ten ranking for Statewide Priority (10 being highest priority) (Biofinder, last accessed 4/04/23). This lower-priority forest block is comprised of the forested area to the west of the parcel connecting via a wider hedgerow, and the northern forested portion of the Study Area to Harrington Cobble on the east side of the Study Area. There are no other habitat or landscape connectivity resources mapped by the Biofinder within the Project site. Given that there are no high priority forest blocks onsite, and the proposed on-site conservation of forested areas discussed above, the Project will not result in an undue adverse impact to the natural environment as it relates to landscape-level habitat.

Non-Native Invasive (Plant) Species

Non-native invasive plant species ("NNIS") are those deemed to have negative effects on human economy, environment or our health. NNIS are typically defined as those on the Vermont Quarantine #3 and Watch Lists (AAFM 2012, and VEIC 2017). Based on the vascular plants noted onsite during VHB's surveys, the hedgerows and early successional forest areas adjacent to the fields and access roads are inhabited by prevalent NNIS, as well as other areas throughout. As noted on the plant list in Attachment 7, 6 Class B and 3 Watch List species NNIS are present. The Project is largely sited outside of sensitive natural resource areas but does involve forest and tree cutting, some of which is within the 100' significant natural community buffers. As such, the Project will implement measures during construction to prevent the introduction of new NNIS and the spread of existing NNIS to onsite resources. Such measures would include:

- Contractor equipment to be used for tree cutting and soil disturbances to be cleaned of soil/plant material prior to being used for onsite work;
- Contractor equipment cleaning prior to initial clearing within significant natural communities or 100-foot forested buffers;
- Use of weed-free straw or other mulch for soil stabilization where within significant natural communities or 100-foot forested buffers; and
- Use of weed-free seed mixtures for temporary and permanent revegetation where within significant natural communities or 100-foot forested buffers.

Attachments

1. Natural Resources Map
2. Representative Site Photographs
3. Summary of On-Site Wetlands and Waters
4. Wetland Determination Data Forms

Memorandum

5. Potential Rare, Threatened, and Endangered Plant Species and Significant Natural Communities Summary in the Project Region and Onsite Habitats
6. Natural Community Forms
7. Partial Floristic Inventory – Species Checklist
8. USFWS IPaC Official Species List
9. USFWS Bat Spreadsheet
10. Bat Acoustic Field Forms
11. Grassland Bird Survey Summary
12. Natural Community Ranking Table

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Memorandum

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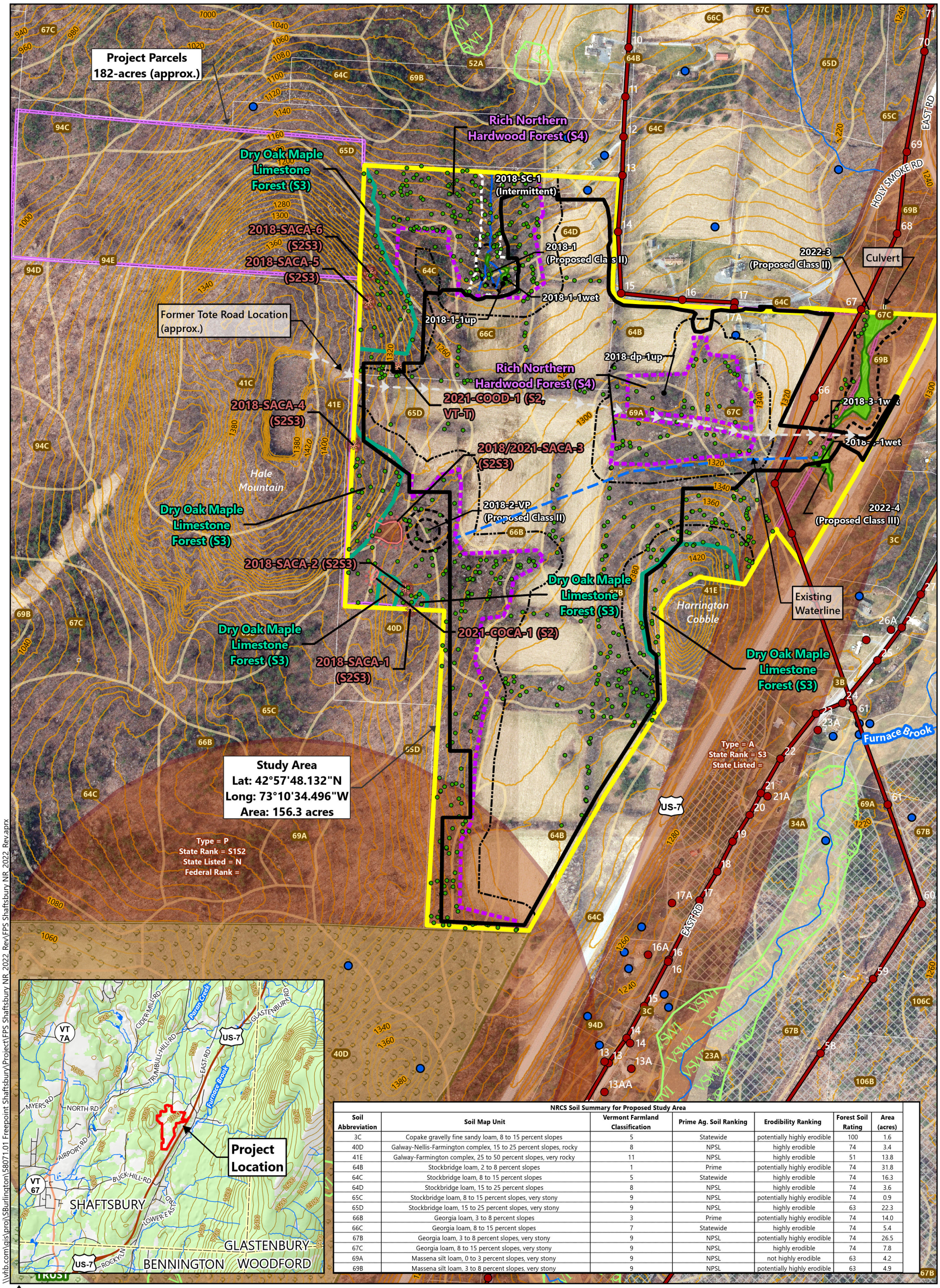
April 28, 2023



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NRCS Soil Summary for Proposed Study Area

Soil Abbreviation	Soil Map Unit	Vermont Farmland Classification	Prime Ag. Soil Ranking	Erodibility Ranking	Forest Soil Rating	Area (acres)
3C	Copake gravelly fine sandy loam, 8 to 15 percent slopes	5	Statewide	potentially highly erodible	100	1.6
40D	Galway-Nellis-Farmington complex, 15 to 25 percent slopes, rocky	8	NPSL	highly erodible	74	3.4
41E	Galway-Farmington complex, 25 to 50 percent slopes, very rocky	11	NPSL	highly erodible	51	13.8
64B	Stockbridge loam, 2 to 8 percent slopes	1	Prime	potentially highly erodible	74	31.8
64C	Stockbridge loam, 8 to 15 percent slopes	5	Statewide	highly erodible	74	16.3
64D	Stockbridge loam, 15 to 25 percent slopes	8	NPSL	highly erodible	74	3.6
65C	Stockbridge loam, 8 to 15 percent slopes, very stony	9	NPSL	potentially highly erodible	74	0.9
65D	Stockbridge loam, 15 to 25 percent slopes, very stony	9	NPSL	highly erodible	63	22.3
66B	Georgia loam, 3 to 8 percent slopes	3	Prime	potentially highly erodible	74	14.0
66C	Georgia loam, 8 to 15 percent slopes	7	Statewide	highly erodible	74	5.4
67B	Georgia loam, 3 to 8 percent slopes, very stony	9	NPSL	potentially highly erodible	74	26.5
67C	Georgia loam, 8 to 15 percent slopes, very stony	9	NPSL	highly erodible	74	7.8
69A	Massena silt loam, 0 to 3 percent slopes, very stony	9	NPSL	not highly erodible	63	4.2
69B	Massena silt loam, 3 to 8 percent slopes, very stony	9	NPSL	potentially highly erodible	63	4.9

VT Real Estate Holdings 1 LLC - Shaftsbury Solar | Shaftsbury, Vermont

- Proposed Limits of Work (LOW) (VHB, April 2023)
- Study Area (VHB)
- Found Culvert (Approx) (VHB)
- Former Tote Road (Approx.) (VHB)
- Existing Waterline Location (VHB)
- Existing GMP Structure (VCGI)
- Existing Overhead Electric GMP Line (VCGI)
- Observed Potential Roost Tree (VHB)
- Delineation Data Point (VHB)
- Delineated Wetland (VHB)
- Proposed Class II Wetland Buffer (VHB)
- Vernal Pool (VHB)
- Delineated Stream (VHB)
- Riparian Buffer (VHB)
- RTE Plant - Points (VHB)
- RTE Plant - Area (VHB)
- Rare Plant Buffer - 25 ft. (VHB)

Proposed Significant Natural Communities (VHB)

- Rich Northern Hardwood Forest
- Dry Oak Maple Limestone Forest
- Significant Natural Communities - 100-ft Buffer (VHB)
- Deer Wintering Area (ANR)
- NHI Element Occurrence (FWD)
- Parcel Boundary (VCGI)
- Project Parcels (VCGI)
- NRCS Soil Boundary (VCGI)
- Conserved Lands (VCGI)
- FEMA Floodway (VCGI)**
- FEMA 100 Year Flood Zone (VCGI)**
- River Corridor (ANR)
- VHD Waterbody (VCGI)
- 10 ft. Contour (VCGI)

* Feature not located within map extent
**FEMA Floodway and 100 Year Floodplain are not present in map extent according to FIRM 50003C0410D, effective December 2, 2015

Natural Resources Map

Wetland/Waters/RTE/Natural Communities identified and delineated by VHB between 2018 and 2022. (M. Jackman, C. Sheldon and C. Fenner). Potential Roost Trees and additional RTEs delineated by VHB between June and September 2021 (M. Jackman, K. Maines, and R. Scott).

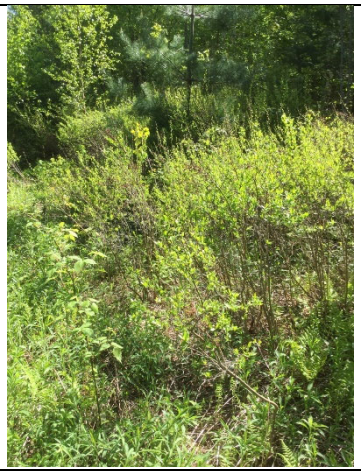
Sources:
Background Imagery by VCGI (Collected in 2022)
ANR (Vermont Agency of Natural Resources - Various Dates)
FWD (Vermont Fish and Wildlife Department - Various Dates)
VCGI (Vermont Center for Geographic Information - Various Dates)
VHB - 2018-2023

Representative Natural Resource Assessment Photographs
Shaftsbury Solar Project
Shaftsbury, Vermont

Photograph 1. Representative photo of intermittent Stream 2018-SC-1, looking south

Photograph 2. Representative view of Wetland 2018-3, looking west

Photograph 3. Representative view of Wetland 2018-4, looking west



Photograph 4. Representative view of abandon pasture in the northwestern section of the Study Area

Photograph 5. Representative view of the working forested area used for firewood production in the eastern section of the Study Area looking south

Photograph 6. Representative view of the hay field in the central portion of the Study Area looking north

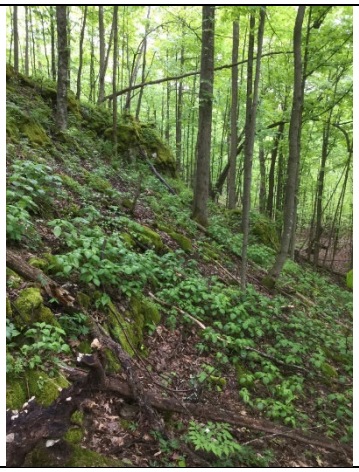
Photographs taken by VHB (C. Sheldon C. Fenner and M. Jackman) on various dates from May 18-July 24, 2018 March 1, 2023

Photograph 7. Representative view from the central portion of the Study Area looking west

Photograph 8. View from the central west portion of the Study Area looking east

Photograph 9. View from the northern portion of the Study Area looking south

Photograph 10. View from the northern most field looking south



Photograph 11. View from the western edge of the Study Area looking south

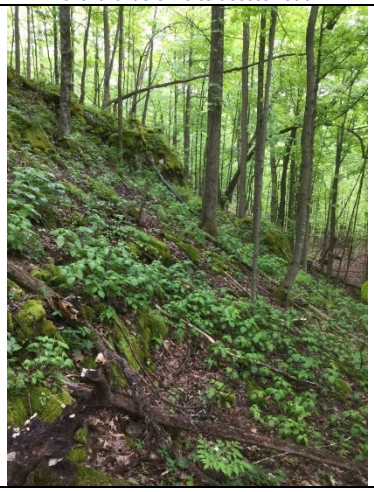
Photograph 12. View from the western edge of the Study Area looking north

Photographs taken by VHB (C. Sheldon C. Fenner and M. Jackman) on various dates from May 18-July 24, 2018 March 1, 2023

Photograph 13. Representative view of unmanaged orchard found south of the site access road

Photograph 14. Representative view of the regenerating forested area near the old orchard below site access road

Photograph 15. Representative image of the Dry Oak Maple Limestone Forest natural community



Photograph 16. Representative image of the Dry Oak Maple Limestone Forest natural community

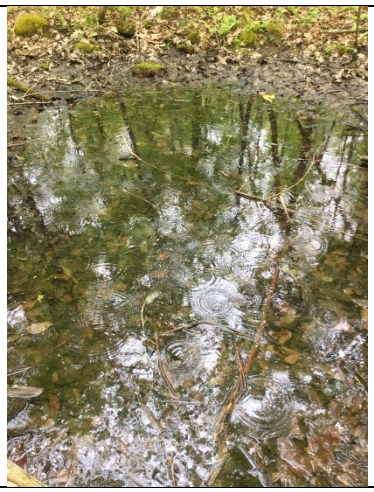
Photograph 17. Representative image of the Rich Northern Hardwood Forest natural community

Photograph 18. Representative image of the Rich Northern Hardwood Forest natural community

Photographs taken by VHB (C. Sheldon C. Fenner and M. Jackman) on various dates from May 18-July 24, 2018 March 1, 2023

Representative Natural Resource Assessment Photographs
Shaftsbury Solar Project
Shaftsbury, Vermont

Photograph 19. Spotted salamander egg mass found in vernal pool, mapped as 2018-3



Photograph 20. Representative image of Wetland 2018-3 and vernal pool area

Photograph 21. Representative habitat where S2S3, state threatened plants were identified by VHB

Photograph 22. Black bear scarred beech tree found on western forested slope of Study Area

Photograph 22. Representative image of S2S3 *Sanicula canadensis var. canadensis*

Photograph 23. Representative image of S2 *Collinsonia canadensis*

Photographs taken by VHB (C. Sheldon C. Fenner and M. Jackman) on various dates from May 18-July 24, 2018 March 1, 2023

Photograph 24. Representative photo of S2 Threatened *Collorhiza odontorhiza*

Photograph 25. Representative image S3 *Conopholis americana*

Photograph 26. Representative photo of the proposed Natural Community Mitigation Parcel.

Photograph 27. Representative photo of the proposed Natural Community Mitigation Parcel.

Summary of Delineated Streams

Project: Shaftsbury Solar

Client: VT Real Estate Holdings 1 LLC

Location: Shaftsbury, Vermont

Prepared by: VHB; April 28, 2023

Delineation Date(s): May 18, 22, 29-30 and July 18, 22, 2018; June 16-18 and September 1, 2021; and October 27, 2022

VHB Delineated Streams													
Stream ID	**Stream Name**	**Associated Wetlands**	**Average Ordinary High Water (OHW) Width (Feet)[1]**	**Dominant Substrate**	**Water Depth (Inches)**	**Bank Height (Feet)**	**Flow Regime (Ephemeral, Intermittent, or Perennial)[2]**	**Watershed Size (Square Miles) [3]**	**VWQS Classification (2022)[4]**	**ANR-Mapped Stream/River (Yes/No)**	**ANR-Mapped River Corridor? (Yes/No)[5]**	**VHB-Proposed River Corridor ? (Yes/No)[6]**	**Comments**
2018-SC-1	Un-named tributary to Paran Creek	2018-100	2.0	Gravel	1	1.5	Intermittent	<0.5	B	No	No	Yes	Small channel with one braided section, connected to Wetland 2018-100. Generally well-defined channel with particle sorting.

[1] U.S. Army Corps of Engineers. 2005. *Regulatory Guidance Letter. Subject: Ordinary High Water Mark Identification. No. 05-05.*

[2] Stream flow regime determined based on qualitative observations of in stream hydrology indicators and geomorphic characteristic and are subject to professional judgment.

[3] Watershed size determined from Vermont Agency of Natural Resources ("ANR") Stream Alteration Regulatory Program mapping.

[4] From ANR. 2022. *Vermont Water Quality Standards (Vt. Code R 12 004 052).*

[5] List of streams from the ANR. 2016. *303(d) Assessment of the Condition of Vermont Waters. Priority Listing of Vermont Waters.* . Vermont Department of Environmental Conservation.

[6] If no ANR mapped river corridor is present, VHB proposed river corridor is applied pursuant to the DEC Flood Hazard Area and River Corridor Protection Procedure (2017), as applicable.

Summary of Delineated Wetlands
Project: Shaftsbury Solar
Client: VT Real Estate Holdings 1 LLC
Location: Shaftsbury, Vermont
Prepared by: VHB; April 28, 2023
Delineation Date(s): May 18, 22, 29-30 and July 18, 22, 2018; June 16-18 and September 1, 2021; and October 27, 2022

VHB Delineated Wetlands												
Wetland ID	**Delineated Area (Square Feet)[1]**	**Cowardin Classification[2]**	**Hydrology Indicator**	**Hydric Soil Indicator**	**Vermont Wetland Rules Classification**						**Typical Vegetation**	**Comments**
					Contiguous to a VSWI-mapped Wetland?	**Riparian Wetland Contiguous to Stream Channel? (Flow Regime)[3]**	**VWR Section 4.6 Presumptions[4]**	**VWR Section 5 Functional Criteria Presence / Significance**		**VHB-Proposed VWR Classification[6]**		
								Type[5]	**VHB-Proposed Significant?**			
2018-1	9,770	PFO/PSS	Saturation (A3), Water-Stained Leaves (B9), Geomorphic Position (D2)	Depleted Matrix (F3)	No	Yes	a, b	5.1, 5.2, 5.4, 5.5, 5.6, 5.10	Yes	II	*Larix laricina, Onoclea sensibilis, Geum rivale*	Feature in slight depression drained by culvert to wetland outside Study Area.
2018-2	333	PFO	Saturation (A3), Water-Stained Leaves (B9), Geomorphic Position (D2)	Redox Dark Surface (F6)	No	No	d	5.1, 5.2, 5.4	Yes	II	Non vegitated pool	vernal pool
2022-3	9,433	PSS/PEM	Saturation (A3), Water-Stained Leaves (B9), Geomorphic Position (D2)	Depleted Matrix (F3)	No	No	-	5.1, 5.2	No	III	*Typha latifolia , Equsetum arvence*	Feature may be unnatural in oragin has drainage structure possibly associated with Rt. 7
2022-4	41,451	PFO	Saturation (A3), Water-Stained Leaves (B9), Drainage Patterns (B10), Geomorphic Position (D2)	Redox Dark Surface (F6)	No	No	a	5.1, 5.2	No	II	*Fraxinus pennsylvanica, Zizia aurea*	Narrow forested drainage in a topographic depression between Rt. 7 and field

[1]All wetlands field delineated per the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northeast and North Central Region. U.S. Army Corps of Engineers. 2011; Delineated Wetlands that extend outside the Study Area are denoted with **bold** text**.**

[2]Classification follows Cowardin, L.M., Carter, V., Golet, F.C. and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitat of the United States. U.S. Fish and Wildlife Service. FWS/OBD-79/31. 103pp.

[3]Wetland contiguity to streams as defined in the Vermont ANR (2005) *Guidance for Agency Act 250 and Section 248 Comments Regarding Riparian Buffers* and confirmed if a delineated perennial or intermittent stream channel inflows, through flows, and outflows from a delineated wetland (ephemeral channels not typically being subject to ANR Riparian Buffer Guidance). The vegetative assemblage or natural community type is used when determining riparian vegetation function. Flow regime determined based on qualitative observations of instream hydrology indicators and geomorphic characteristic and are subject to professional judgment (P=perennial, I=intermittent, E=ephemeral).

[4]Alpha-numeric codes correspond with Section 4.6 Presumptions of the 2023 Vermont Wetland Rules.

[5]VWR Section 5: Functional Criteria for Evaluating a Wetland's Significance: 5.1=Water Storage for Flood Water and Storm Runoff, 5.2=Surface and Groundwater Protection, 5.3=Fish Habitat, 5.4=Wildlife Habitat, 5.5=Exemplary Wetland Natural Community, 5.6=Rare, Threatened or Endangered Species Habitat, 5.7=Education and Research in Natural Sciences, 5.8=Recreational Value and Economic Benefits, 5.9=Open Space and Aesthetics, 5.10=Erosion Control Through Binding and Stabilizing the Soil. (P)= Present, (H)=High, (L)=Low; Correspond to observed level of functionality.

[6]VHB-Proposed VWR Classification is based on review and application of the VWR, particularly VHB's interpretation of Section 4.6 Presumptions and is subject to final determinations by the ANR-DEC.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2018-1-1up

Project Site:	Shaftsbury Solar	City/County:	Shaftsbury/Bennington	Samp. Date:	5/18/2018
Applicant/Owner:	VT Real Estate Holdings 1 LLC	State:	Vermont	Sampling Point:	2018-1-1up
Investigator(s):	MCJ	Section, Township, Range:	Shaftsbury		
Landform (hillslope, terrace, etc.):	Terace	Local relief (concave, convex, none):	Convex	Slope (%):	8 to 15%
Subregion (LRR or MLRA):	LRR R	Lat: 42.965364	Long: -73.173336	Datum:	NAD 83
Soil Map Unit:	Georgia Loam			NWI Class:	Upland

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	Is This Sample Area Within a Wetland? **NO**
Hydric Soil Present?	NO	
Wetland Hydrology Present?	NO	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?		Depth (inches):	
Water Table Present?		Depth (inches):	Wetland Hydrology Present? **NO**
Saturation Present?		Depth (inches):	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.10" of rain in 5 days prior in Rutland, VT (NWS 2018); PDSI 0.38 (Near Normal) for week ending 05/19/2018

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	100					SILT LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S9) (LRR K, L, M)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: **Rock**

Depth (inches): **10**

Hydric Soil Present? **NO**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **2018-1-1up**

Tree Stratum (Plot size: **30' RAD**)	Absolute % Cover	Dom. Sp?	Indicator Status
1. **Rhamnus cathartica**	**65**	**X**	**FAC**
2. **Fraxinus americana**	**15**		**FACU**
3. **Populus tremuloides**	**3**		**FACU**
4.			
5.			
6.			
7.			
	83	= Total Cover	
Sapling Stratum (Plot size: **15' RAD**)			
1. **Crataegus spp.**	**15**	**X**	**#N/A**
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Shrub Stratum (Plot size: **15' RAD**)			
1. **Lonicera morrowii**	**35**	**X**	**FACU**
2. **Rhamnus cathartica**	**15**	**X**	**FAC**
3. **Prunus serotina**	**3**		**FACU**
4. **Fraxinus americana**	**3**		**FACU**
5.			
6.			
7.			
	56	= Total Cover	
Herb Stratum (Plot size: **5' RAD**)			
1. **Impatiens capensis**	**63**	**X**	**FACW**
2. **Rosa multiflora**	**15**		**FACU**
3. **Polystichum acrostichoides**	**3**		**FACU**
4. **Onoclea sensibilis**	**3**		**FACW**
5. **Rubus hispidus**	**3**		**FACW**
6. **Ribes spp.**	**3**		**#N/A**
7. **Hylotelephium telephium**	**3**		**FAC**
8. **Berberis thunbergii**	**3**		**FACU**
9. **Geum rivale**	**1**		**OBL**
10.			
11.			
12.			
	97	= Total Cover	
Woody Vines (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **3** (A)

Dominants across all strata: **5** (B)

% Dominants OBL, FACW, FAC: **60%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	**1**	x 1 =	**1**
FACW	**69**	x 2 =	**138**
FAC	**83**	x 3 =	**249**
FACU	**80**	x 4 =	**320**
UPL		x 5 =	
Sum:	**233** (A)		**708** (B)

Prevalence Index = B/A = **3.04**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- ____ Prevalence Index is <= 3.0
- ____ Problematic Hydrophytic Vegetation[1] (explain)
- ____ Rapid Test for Hydrophytic Vegetation
- ____ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **YES**

Remarks: (If observed, list morphological adaptations below).

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2018-1-1wet

Project Site: **Shaftsbury Solar** City/County: **Shaftsbury/Bennington** Samp. Date: **5/18/2018**

Applicant/Owner: **VT Real Estate Holdings 1 LLC** State: **Vermont** Sampling Point: **2018-1-1wet**

Investigator(s): **MCJ** Section, Township, Range: **Shaftsbury**

Landform (hillslope, terrace, etc.): **Terace** Local relief (concave, convex, none): **Concave** Slope (%): **8 to 15%**

Subregion (LRR or MLRA): **LRR R** Lat: **42.965296** Long: **-73.173228** Datum: **NAD 83**

Soil Map Unit: **Georgia Loam** NWI Class: **PEM**

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**YES**	Is This Sample Area Within a Wetland? **YES**
Hydric Soil Present?	**YES**	
Wetland Hydrology Present?	**YES**	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)		Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required)
X	High Water Table (A2)		Aquatic Fauna (B13)	X	Surface Soil Cracks (B6)
X	Saturation (A3)		Marl Deposits (B13)		Drainage Patterns (B10)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)		Moss Trim Lines (B16)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		Dry-Season Water Table (C2)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)		Saturation Visible on Aerial (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)		Stunted or Stressed Plants (D1)
	Inundation Visible on Aerial (B7)		Other (Explain in Remarks)		Geomorphic Position (D2)
	Sparsely Vegetated Concave Surface (B8)				Shallow Aquitard (D3)
					Microtopographic Relief (D4)
					FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	**X**	Depth (inches):	**-**
Water Table Present?	**X**	Depth (inches):	**1**
Saturation Present?	**X**	Depth (inches):	**Surface**

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.10" of rain in 5 days prior in Rutland, VT (NWS 2018); PDSI 0.38 (Near Normal) for week ending 05/19/2019

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	**10YR 2/1**	**100**					**MUCKY LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)		Indicators for Problematic Hydric Soils[3]: 2 cm Muck (A10) (LRR K, L, MLRA 149B)
X	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)		Coast Prairie Redox (A16) (LRR K, L, R)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)		5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)		Dark Surface (S9) (LRR K, L, M)
	Stratified Layers (A5)		Depleted Matrix (F3)		Polyvalue Below Surface (S8) (LRR K, L)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Thin Dark Surface (S9) (LRR K, L)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Iron-Manganese Masses (F12) (LRR K, L, R)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Piedmont Floodplain Soils (F19) (MLRA 149B)
	Sandy Gleyed Matrix (S4)				Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Sandy Redox (S5)				Red Parent Material (F21)
	Stripped Matrix (S6)		[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		Very Shallow Dark Surface (TF12)
	Dark Surface (S7) (LRR R, MLRA 149B)				Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: **Rock**

Depth (inches): **8**

Hydric Soil Present? **YES**

Remarks:

(Adapted By: Douglas A. DeBerry, PhD, PWS, PWD)

VEGETATION - Use scientific names of plants.

Sampling Point: **2018-1-1wet**

Tree Stratum (Plot size: **30' RAD**)	Absolute % Cover	Dom. Sp?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling Stratum (Plot size: 15' RAD)			
1. **Salix bebbiana**	**3**	**X**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
	3 = Total Cover		
Shrub Stratum (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5' RAD)			
1. **Impatiens capensis**	**83**	**X**	**FACW**
2. **Alliaria petiolata**	**15**		**FACU**
3. **Euthamia graminifolia**	**15**		**FAC**
4. **Onoclea sensibilis**	**15**		**FACW**
5. **Ranunculus acris**	**3**		**FAC**
6. **Rosa multiflora**	**3**		**FACU**
7. **Peltandra virginica**	**3**		**OBL**
8.			
9.			
10.			
11.			
12.			
	137 = Total Cover		
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Dominance Test Worksheet:

# Dominants OBL, FACW, FAC:	**2**	(A)
# Dominants across all strata:	**2**	(B)
% Dominants OBL, FACW, FAC:	**100%**	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	**3**	x 1 = **3**
FACW	**101**	x 2 = **202**
FAC	**18**	x 3 = **54**
FACU	**18**	x 4 = **72**
UPL		x 5 =
Sum:	**140** (A)	**331** (B)

Prevalence Index = B/A = **2.36**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** Prevalence Index is <= 3.0
- ____ Problematic Hydrophytic Vegetation[1] (explain)
- ____ Rapid Test for Hydrophytic Vegetation
- ____ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **YES**

Remarks: (If observed, list morphological adaptations below).

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2018-DP-1Up

Project Site:	Shaftsbury Solar	City/County:	Shaftsbury/Bennington	Samp. Date:	5/18/2018
Applicant/Owner:	VT Real Estate Holdings 1 LLC	State:	Vermont	Sampling Point:	2018-DP-1Up
Investigator(s):	MCJ	Section, Township, Range:	Shaftsbury		
Landform (hillslope, terrace, etc.):	Terace	Local relief (concave, convex, none):	Concave	Slope (%):	8 to 15%
Subregion (LRR or MLRA):	LRR R	Lat: 42.961582	Long: -73.175614	Datum:	NAD 83
Soil Map Unit:	Stockbridge Loam			NWI Class:	Upland

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	NO	Is This Sample Area Within a Wetland? **NO**
Hydric Soil Present?	NO	
Wetland Hydrology Present?	NO	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?		Depth (inches):	
Water Table Present?		Depth (inches):	Wetland Hydrology Present? **NO**
Saturation Present?		Depth (inches):	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.10" of rain in 5 days prior in Rutland, VT (NWS 2018); PDSI 0.38 (Near Normal) for week ending 05/19/2020

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 3/2	100					SILT LOAM	
9-11	10YR 4/1	75	2.5y 4/3	25	C	M	SILT LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S9) (LRR K, L, M)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: **Rock**

Depth (inches): **11**

Hydric Soil Present? **NO**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **2018-DP-1Up**

Tree Stratum (Plot size: **30' RAD**)	Absolute % Cover	Dom. Sp?	Indicator Status
1. **Fraxinus americana**	**15**	**X**	**FACU**
2. **Acer saccharum**	**3**		**FACU**
3. **Pinus strobus**	**3**		**FACU**
4. **Ulmus americana**	**3**		**FACW**
5.			
6.			
7.			
	24	= Total Cover	
Sapling Stratum (Plot size: **15' RAD**)			
1. **Rhamnus cathartica**	**15**	**X**	**FAC**
2. **Fraxinus americana**	**15**	**X**	**FACU**
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Shrub Stratum (Plot size: **15' RAD**)			
1. **Lonicera morrowii**	**32**	**X**	**FACU**
2. **Rosa multiflora**	**15**	**X**	**FACU**
3.			
4.			
5.			
6.			
7.			
	47	= Total Cover	
Herb Stratum (Plot size: **5' RAD**)			
1. **Onoclea sensibilis**	**63**	**X**	**FACW**
2. **Rubus hispidus**	**15**		**FACW**
3. **Zizia aurea**	**15**		**FAC**
4. **Taraxacum officinale**	**3**		**FACU**
5. **Fragaria virginiana**	**3**		**FACU**
6. **Ranunculus acris**	**3**		**FAC**
7.			
8.			
9.			
10.			
11.			
12.			
	102	= Total Cover	
Woody Vines (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **2** (A)

Dominants across all strata: **6** (B)

% Dominants OBL, FACW, FAC: **33%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	x 1 =	
FACW **81**	x 2 =	**162**
FAC **33**	x 3 =	**99**
FACU **89**	x 4 =	**356**
UPL	x 5 =	
Sum: **203** (A)		**617** (B)

Prevalence Index = B/A = **3.04**

Hydrophytic Vegetation Indicators:

_____ Dominance Test is > 50%

_____ Prevalence Index is <= 3.0

_____ Problematic Hydrophytic Vegetation[1] (explain)

_____ Rapid Test for Hydrophytic Vegetation

_____ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **NO**

Remarks: (If observed, list morphological adaptations below).

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2018-4-1Wet

Project Site:	Shaftsbury Solar	City/County:	Shaftsbury/Bennington	Samp. Date:	5/18/2018
Applicant/Owner:	VT Real Estate Holdings 1 LLC	State:	Vermont	Sampling Point:	2018-4-1Wet
Investigator(s):	MCJ	Section, Township, Range:	Shaftsbury		
Landform (hillslope, terrace, etc.):	Depression	Local relief (concave, convex, none):	Concave	Slope (%):	3-8
Subregion (LRR or MLRA):	LRR R	Lat: 42.963707	Long: -73.166299	Datum:	NAD 83
Soil Map Unit:	Massena silt loam			NWI Class:	PFO

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	Is This Sample Area Within a Wetland? **YES**
Hydric Soil Present?	YES	
Wetland Hydrology Present?	YES	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	X	Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
X	Saturation (A3)		Marl Deposits (B13)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)
	Iron Deposits (B5)		Thin Muck Surface (C7)
	Inundation Visible on Aerial (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?		Depth (inches):	
Water Table Present?		Depth (inches):	
Saturation Present?	X	Depth (inches):	surface

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.10" of rain in 5 days prior in Rutland, VT (NWS 2018); PDSI 0.38 (Near Normal) for week ending 05/19/2021

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4		100					MUCK	
4-6	10YR 2/1	100					SANDY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)		Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)		
	Sandy Redox (S5)		
	Stripped Matrix (S6)		
	Dark Surface (S7) (LRR R, MLRA 149B)		

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10) (LRR K, L, MLRA 149B)
	Coast Prairie Redox (A16) (LRR K, L, R)
	5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Dark Surface (S9) (LRR K, L, M)
	Polyvalue Below Surface (S8) (LRR K, L)
	Thin Dark Surface (S9) (LRR K, L)
	Iron-Manganese Masses (F12) (LRR K, L, R)
	Piedmont Floodplain Soils (F19) (MLRA 149B)
	Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Red Parent Material (F21)
X	Very Shallow Dark Surface (TF12)
	Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: **rock**

Depth (inches): **6**

Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **2018-4-1Wet**

Tree Stratum (Plot size: **30' RAD**)	Absolute % Cover	Dom. Sp?	Indicator Status
1. **Populus tremuloides**	**3**	**X**	**FACU**
2. **Betula populifolia**	**3**	**X**	**FAC**
3.			
4.			
5.			
6.			
7.			
	6	= Total Cover	
Sapling Stratum (Plot size: **15' RAD**)			
1. **Salix nigra**	**38**	**X**	**OBL**
2. **Rhamnus cathartica**	**3**		**FAC**
3.			
4.			
5.			
6.			
7.			
	41	= Total Cover	
Shrub Stratum (Plot size: **15' RAD**)			
1. **Cornus sericea**	**15**	**X**	**FACW**
2. **Salix bebbiana**	**15**	**X**	**FACW**
3. **Dasiphora floribunda**	**3**		**FACW**
4. **Betula populifolia**	**3**		**FAC**
5. **Alnus incana**	**3**		**FACW**
6. **Pinus strobus**	**1**		**FACU**
7.			
	40	= Total Cover	
Herb Stratum (Plot size: **5' RAD**)			
1. **Equisetum arvense**	**85**	**X**	**FAC**
2. **Geum rivale**	**3**		**OBL**
3. **Spiraea alba**	**3**		**FACW**
4. **Ranunculus acris**	**3**		**FAC**
5. **Zizia aurea**	**3**		**FAC**
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	97	= Total Cover	
Woody Vines (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **5** (A)

Dominants across all strata: **6** (B)

% Dominants OBL, FACW, FAC: **83%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	**41**	x 1 =	**41**
FACW	**39**	x 2 =	**78**
FAC	**100**	x 3 =	**300**
FACU	**4**	x 4 =	**16**
UPL		x 5 =	
Sum:	**184** (A)		**435** (B)

Prevalence Index = B/A = **2.36**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** Prevalence Index is <= 3.0
- ___ Problematic Hydrophytic Vegetation[1] (explain)
- ___ Rapid Test for Hydrophytic Vegetation
- ___ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **YES**

Remarks: (If observed, list morphological adaptations below).

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2018-3-1Wet

Project Site: **Shaftsbury Solar** City/County: **Shaftsbury/Bennington** Samp. Date: **5/18/2018**

Applicant/Owner: **VT Real Estate Holdings 1 LLC** State: **Vermont** Sampling Point: **2018-3-1Wet**

Investigator(s): **MCJ** Section, Township, Range: **Shaftsbury**

Landform (hillslope, terrace, etc.): **Depression** Local relief (concave, convex, none): **Concave** Slope (%): **3-8**

Subregion (LRR or MLRA): **LRR R** Lat: **42.963707** Long: **-73.166299** Datum: **NAD 83**

Soil Map Unit: **Massena silt loam** NWI Class: **Upland**

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**YES**	Is This Sample Area Within a Wetland? **YES**
Hydric Soil Present?	**YES**	
Wetland Hydrology Present?	**YES**	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	**X**	Water-Stained Leaves (B9)
X	High Water Table (A2)		Aquatic Fauna (B13)
X	Saturation (A3)		Marl Deposits (B13)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)
	Iron Deposits (B5)		Thin Muck Surface (C7)
	Inundation Visible on Aerial (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?		Depth (inches):	
Water Table Present?	**X**	Depth (inches):	**8**
Saturation Present?	**X**	Depth (inches):	**surface**

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.10" of rain in 5 days prior in Rutland, VT (NWS 2018); PDSI 0.38 (Near Normal) for week ending 05/19/2022

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	**10YR 2/2**	**95**	**10YR 3/6**	**5**	**c**	**m**	**SILT LOAM**	
10-14	**10YR 4/1**	**100**					**SANDY LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)		Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)	**X**	Redox Dark Surface (F6)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)		
	Sandy Redox (S5)		
	Stripped Matrix (S6)		
	Dark Surface (S7) (LRR R, MLRA 149B)		

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10) (LRR K, L, MLRA 149B)
	Coast Prairie Redox (A16) (LRR K, L, R)
	5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Dark Surface (S9) (LRR K, L, M)
	Polyvalue Below Surface (S8) (LRR K, L)
	Thin Dark Surface (S9) (LRR K, L)
	Iron-Manganese Masses (F12) (LRR K, L, R)
	Piedmont Floodplain Soils (F19) (MLRA 149B)
	Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Red Parent Material (F21)
	Very Shallow Dark Surface (TF12)
	Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: **Rock**

Depth (inches): **14**

Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **2018-3-1Wet**

Tree Stratum (Plot size: **30' RAD**)	Absolute % Cover	Dom. Sp?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: **15' RAD**)			
1. **Fraxinus pennsylvanica**	**15**	**X**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Shrub Stratum (Plot size: **15' RAD**)			
1. **Cornus amomum**	**85**	**X**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
	85	= Total Cover	
Herb Stratum (Plot size: **5' RAD**)			
1. **Onoclea sensibilis**	**32**	**X**	**FACW**
2. **Taraxacum officinale**	**3**		**FACU**
3. **Geum rivale**	**3**		**OBL**
4. **Rubus hispidus**	**3**		**FACW**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	41	= Total Cover	
Woody Vines (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

# Dominants OBL, FACW, FAC:	**3**	(A)
# Dominants across all strata:	**3**	(B)
% Dominants OBL, FACW, FAC:	**100%**	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	**3**	x 1 = **3**
FACW	**135**	x 2 = **270**
FAC		x 3 =
FACU	**3**	x 4 = **12**
UPL		x 5 =
Sum:	**141** (A)	**285** (B)

Prevalence Index = B/A = **2.02**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** Prevalence Index is <= 3.0
- ___ Problematic Hydrophytic Vegetation[1] (explain)
- ___ Rapid Test for Hydrophytic Vegetation
- ___ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **YES**

Remarks: (If observed, list morphological adaptations below).

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2018-3-1Up

Project Site: **Shaftsbury Solar** City/County: **Shaftsbury/Bennington** Samp. Date: **5/18/2018**

Applicant/Owner: **VT Real Estate Holdings 1 LLC** State: **Vermont** Sampling Point: **2018-3-1Up**

Investigator(s): **MCJ** Section, Township, Range: **Shaftsbury**

Landform (hillslope, terrace, etc.): **Depression** Local relief (concave, convex, none): **Concave** Slope (%): **3-8**

Subregion (LRR or MLRA): **LRR R** Lat: **42.962522** Long: **-73.166749** Datum: **NAD 83**

Soil Map Unit: **Massena silt loam** NWI Class: **PEM/PSS**

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? **YES**

Hydric Soil Present? **NO**

Wetland Hydrology Present? **NO**

Is This Sample Area Within a Wetland? **NO**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? Depth (inches):

Wetland Hydrology Present? **NO**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.10" of rain in 5 days prior in Rutland, VT (NWS 2018); PDSI 0.38 (Near Normal) for week ending 05/19/2023

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	**10Yr 3/2**	**100**					**SILT LOAM**	
10-14	**2.5Y 5/3**	**95**	**2.5Y 5/6**	**5**	**c**	**m**	**SANDY LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR R, MLRA 149B)
- Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- Thin Dark Surface (S9) (LRR R, MLRA 149B)
- Loamy Mucky Mineral (F1) (LRR K, L)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

- 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- Coast Prairie Redox (A16) (LRR K, L, R)
- 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- Dark Surface (S9) (LRR K, L, M)
- Polyvalue Below Surface (S8) (LRR K, L)
- Thin Dark Surface (S9) (LRR K, L)
- Iron-Manganese Masses (F12) (LRR K, L, R)
- Piedmont Floodplain Soils (F19) (MLRA 149B)
- Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: **Rock**

Depth (inches): **14**

Hydric Soil Present? **NO**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **2018-3-1Up**

Tree Stratum (Plot size: **30' RAD**)	Absolute % Cover	Dom. Sp?	Indicator Status
1. **Malus spp.**	**63**	**X**	**#N/A**
2. **Populus tremuloides**	**15**		**FACU**
3. **Fraxinus americana**	**15**		**FACU**
4. **Prunus serotina**	**3**		**FACU**
5. **Caraegus spp.**	**3**		**#N/A**
6.			
7.			
	99	= Total Cover	
Sapling Stratum (Plot size: **15' RAD**)			
1. **Rhamnus cathartica**	**15**	**X**	**FAC**
2. **Ulmus americana**	**3**		**FACW**
3. **Fraxinus americana**	**3**		**FACU**
4.			
5.			
6.			
7.			
	21	= Total Cover	
Shrub Stratum (Plot size: **15' RAD**)			
1. **Populus tremuloides**	**15**	**X**	**FACU**
2. **Fraxinus americana**	**15**	**X**	**FACU**
3. **Prunus serotina**	**3**		**FACU**
4.			
5.			
6.			
7.			
	33	= Total Cover	
Herb Stratum (Plot size: **5' RAD**)			
1. **Impatiens capensis**	**85**	**X**	**FACW**
2. **Rubus hispidus**	**32**	**X**	**FACW**
3. **Solidago canadensis**	**32**	**X**	**FACU**
4. **Persicaria virginiana**	**32**	**X**	**FAC**
5. **Rubus idaeus**	**5**		**FACU**
6. **Geum canadense**	**3**		**FAC**
7.			
8.			
9.			
10.			
11.			
12.			
	189	= Total Cover	
Woody Vines (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **4** (A)

Dominants across all strata: **8** (B)

% Dominants OBL, FACW, FAC: **50%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL		x 1 =	
FACW	**120**	x 2 =	**240**
FAC	**50**	x 3 =	**150**
FACU	**106**	x 4 =	**424**
UPL		x 5 =	
Sum:	**276** (A)		**814** (B)

Prevalence Index = B/A = **2.95**

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is > 50%
- **X** Prevalence Index is <= 3.0
- ___ Problematic Hydrophytic Vegetation[1] (explain)
- ___ Rapid Test for Hydrophytic Vegetation
- ___ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **YES**

Remarks: (If observed, list morphological adaptations below).

Vermont Potential Rare, Threatened, and Endangered Species and Natural Communities in the Project Region and Onsite Habitats Summary
Client: VT Real Estate Holdings 1 LLC
Shaftsbury Solar
Field Survey Date(s): May 18, 22, 29-30 and July 18, 22, 2018; and October 27, 2022
Prepared by: VHB on April 28, 2023

Natural Heritage Element Occurrences, Uncommon Occurrences, and Significant Natural Communities (1 Mile Radius of Project)

Species	Common Name	Type	State Rank	Global Rank	VT Status	Federal Status	Last Observed Date	Habitat Description[1]	Occurrence Description [2]	Flowering/ Fruiting Time[3]	EO Mapped within Study Area (Yes/ No)	Potential for Habitat to Occur Onsite?	Survey Recommended	
													(Yes/No)	Comments
Anemone cylindrica	Long-headed Thimbleweed	Plant	S1S2	G5	-	-	1972	Dry open woods, prairies	Observed in a field in Buck Cobble, Shaftsbury	May-June	Yes	Yes	Yes	Species is mapped within the Study Area
Arigomphus villosipes	Unicorn Clubtail	Animal	S3	G5	-	-	2005	Ponds, lakes, and slow streams with muddy bottoms and little submerged vegetation	Shaftsbury	N/A	No	No	No	Not a listed species
Carex schweinitzii	Schweinitz's Sedge	Plant	S2	G3G4	-	-	2007	Fens, spring marshes, and wet meadows	Paran Creek Fen and west of Trumball Hill Road	June-July	No	Yes	No	Not a listed species
Euphyes conspicua	Black Dash	Animal	S1	G4	-	-	2004	Marshes, wet meadows, and marshy stream banks	Dailey gravel pit, Shaftsbury	N/A	No	Yes	No	Not a listed species
Euphyes dion	Dion Skipper	Animal	S2	G4	-	-	2004	Sedge meadows, including calcareous fens, riparian marshes, stream corridors, and wet meadows	Dailey gravel pit, Shaftsbury	N/A	No	Yes	No	Not a listed species
Glyptemys insculpta	Wood Turtle	Animal	S3	G3	-	-	2020	Breeds and hibernates in streams while forages in hardwood forests or meadows	Paran Creek	N/A	No	Yes	No	Not a listed species
Gomphus lividus	Ashy Clubtail	Animal	S2S3	G5	-	-	2008	Slow rivers, streams w/ mud bottom/in open areas	Still Water	N/A	No	No	No	Not a listed species
Lethe appalachia	Appalachian Brown	Animal	S1S2	G4	-	-	2004	Moist woodlands	Fen on unnamed tributary of Paran Creek.	N/A	No	Yes	No	Not a listed species
Lyonia ligustrina var. ligustrina	Maleberry	Plant	S3S4	G5T5	-	-	2007	shrubby or wooded swamps	Shaftsbury	June	No	Yes	No	Not a listed species
Opheodrys vernalis	Smooth Greensnake	Animal	S3	G5	-	-	2018	beaver meadows, overgrown fields, pastures, and sedge meadows	Cutover road off East Road	N/A	No	Yes	No	Not a listed species
Pantala hymenaea	Spot-winged Glider	Animal	S3S4B	G5	-	-	2008	Open, temporary and artificial ponds and pools	Shaftsbury	N/A	No	No	No	Not a listed species
Phanogomphus lividus	Ashy Clubtail	Animal	S2S3	G5	-	-	2008	Found primarily along rivers.	Dailey gravel pit, Shaftsbury	N/A	No	Yes	No	Not a listed species
Pieris virginiensis	West Virginia White	Animal	S3S4	G3	-	-	2003	Wooded habitats	West of Paran Creek Railroad	N/A	No	Yes	No	Not a listed species
Poanes massasoit	Mulberry Wing	Animal	S2	G4	-	-	2004	Sedges and grasslands	in the fen near Cider Mill Road	N/A	No	Yes	No	Not a listed species
Sanicula canadensis var. canadensis	Short-styled Snakeroot	Plant	S2S3	G5T5	-	-	2018	Moist or dry woodlands	Hale Mountain	Late-spring to mid-summer	No	Yes	No	Not a listed species
Rich Fen		Natural Community	S2	G3	-	-	2007	Rich fens in Vt are restricted to areas with calcium rich bed rock	Paran Creek	N/A	No	Yes	No	No occurences found in site boundary

[1]**Potential sources for habitat description listed below:**
EFloras.org. http://www.efloras.org/index.aspx
Gilman, Arthur V. 2015. *New Flora of Vermont*. New York Botanical Garden.
Haines, Arthur. 2011. *Flora Novae Angliae*. New England Wildflower Society/Yale University Press, New Haven, CT . 973 Pp.
Newcomb, Lawrence. 1977. *Newcomb's Wildflower Guide*. Little, Brown, and Company, Boston
Thompson, Elizabeth H. and Sorenson, Eric R. 2019. *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont*. Vermont Department of Fish and Wildlife and The Nature Conservancy.
Vermont Natural Resources Atlas, Accessed March 2018, last accessed 2023. Element Occurrence Reports

[2]**Sources for occurrence description listed below:**
Vermont Natural Heritage Inventory - Vermont Fish & Wildlife Department - Element Occurrence Reports. The database was queried by VHB initially in 2016 and updated periodically through March 2023.

[3]**Flowering Time:** Spring (April-May), Summer (June-July), Late Summer (August-September), Fall (October-November)

NATURAL COMMUNITY SURVEY FORM
Vermont Natural Heritage Inventory (VNHI)
Vermont Fish & Wildlife Department

Revised: May 12, 2017

Contact Eric Sorenson with questions about natural communities or this form: 802-476-0126 or Eric.Sorenson@vermont.gov

Natural Community Type: Dry Oak Maple Limestone Forest
Natural Community Variant Name (if applicable): N/A
Association Name (NHI office only): Click here to enter text.

Is this an update of an existing NHI record? (NHI office only) Yes ☐ No X
Site Name: FPS Shaftsbury Solar

Site Location Road Address: 1004 Holy Smoke Road
Town: Shaftsbury

Surveyor(s): VHB (Carla Fenner, Mitchell Jackman)
Mailing Address: 40 IDX Drive, Building 100 Suite 200, South Burlington VT 05403
Phone: (802) 497-7699
E-mail: cfenner@vhb.com, mjackman@vhb.com

Survey Date(s): Various dates 2018: May 28, July 18

Owner(s) of Natural Community: Name(s): Project Developer VT Real Estate Holdings 1 LLC. Shaftsbury Solar
Address: 58 Commerce Road, Stamford CT 06902
Phone: (203) 542-6000
E-mail: Click here to enter text.

GENERAL DESCRIPTION OF THE SITE

Briefly describe the natural and man-made features of the site and setting in which the natural community occurs, including topography, size of the contiguous forested area, other natural community types present, surface waters and drainage patterns, and land use history and land management.

The site occurs in three adjacent parcels which total approximately 191 acres and are located west of U.S. Route 7 ("US-7") and south of Holy Smoke Road in Shaftsbury, Vermont. The site is located in the Vermont Valley biophysical region, within the Walloomsac-Hoosic River watershed of the Hudson River drainage basin. Furnace Brook is mapped by the Vermont Hydrography Dataset approximately 1000 feet to the east. The underlying bedrock is mapped as dolostone and marble. The 191-acre site consists of numerous mowed hay fields and also includes wooded hedgerows in between some fields and forested areas. Of the forested portion of the site, some forest is in a mature closed canopy condition with no evidence of recent management or harvest as well as some areas consisting of more immature forest (younger and generally smaller trees) and some areas are regenerating forest or abandoned orchard. Dominant soil types are Georgia loams and Stockbridge loams, and according to U.S. Geologic Survey ("USGS") contour data, elevations range from approximately 1,124 to 1,446 feet above mean sea level. In general, the site has an eastern aspect with steep forested slopes in the western portion of the site and is flat or gently sloped on hayfields.
A detailed natural resources map depicting field delineation and assessments conducted by VHB is included as an attachment, including surface waters, wetlands, vernal pools, rare/threatened/endangered ("RTE") species, and certain wildlife habitat observations. VHB's delineation of Dry Oak Maple Limestone forest as well as the other on-site proposed significant Natural Community Rich Northern Hardwood Forest ("RNHF") is also shown on the map in the Attachment.
According to the Vermont Agency of Natural Resources ("ANR") BioFinder interactive webmap, the forested areas on site are part of an approximately 856.6-acre interior forest block considered to be Priority (ranking of 4) per the Vermont Conservation Design study. There are no significant natural communities mapped by ANR on site or within 1 mile of the site. The site includes other natural community types which would not be considered as Significant based on VHB's determinations (example: Vernal Pool, Northern Hardwood Forest, Seep, Red Maple-Green Ash Swamp) as well as one other community which VHB proposes would be considered a Significant occurrence: an occurrence of Rich Northern Hardwood Forest. VHB's proposed occurrence ranking for the RNHF is reported under a separate ranking sheet.

NATURAL COMMUNITY INFORMATION

Concisely describe the natural community, including canopy cover, dominant species, the physical setting, evidence of human and natural disturbance, forest community age, woody debris abundance, and presence of invasive species.

The identified DOMLF is found on very shallow steeply sloped areas of the site. the areas has some signs of fire wood harvest but it seems largely undisturbed, it has multiple age class overstory with many mature trees present, few shrubs and a dense herbaceous layer with few occurrences of invasives. There is standing dead trees and moderate course woody debris. The canopy is comprised of *Acer saccharum, Carya cordiformis, Ostrya virginiana, Quercus rubra, Fagus grandifolia, Fraxinus americana, Betula paperifera,* and *Tilia americana*.The shrub layer includes *Hamamelis virginiana, Viburnum acerifolium, Sambucus racemose*, the herbs layer was very dense and included Adiantum pedatum, cystopteris bulbifera, carex platyphylla, thalictrum dioicum, Asarum canadense, anemone acultiloba, conopholis americana, solidago flexicaulis.

Elevation (feet): minimum: 1258 **maximum**: 1370

Slope (degrees): 45

Aspect (degrees or cardinal direction): East

Bedrock geologic type (2012 VT bedrock geology map): Dolostone and Phyllite

Soil type (Natural Resources Conservation Service) or description: Galway Farmington complex 25-50 percent slopes very rocky

Vegetation Description: To be applied to a representative area of the community large enough to capture most species.

Total Canopy Cover: 5 Total Shrub Cover: 2

	Trees			Shrubs			
	T1Emergent	T2 Canopy	T3 Subcanopy	S1 Tall (> 4 ft.)	S2 Short (<4 ft.)		H Herb
Height (ft.)							
% Cover							

Dominant Species and their cover for each stratum (T1- emergent, T2-main canopy, T3-subcanopy, S1-tall shrub, S2-short shrub, H-herb, N-nonvascular, V-vine). Give average DBH (inches) for trees. For each species estimate actual percent cover or use one of the cover class categories below. Use the species list table below or attach a separate sheet.

Stratum	Species	DBH	Cover	Stratum	Species	Cover
T	Acer saccharum	3-25	4			
T	Fagus granifolia	3-20	3			
T	Quercus rubra	10-38	2			
T	Tilia americana	6-20	3			
T	Carya cordiformis	6-20	2			
T	Fraxinus americana	6-20	2			
T	Ostrya virginiana	3-8	3			
S	Hamamelis virginiana	-	2			
S	Viburnum acerifolium	-	3			
S	Sambucus racemose	-	1			
H	Cystopteris bulbifera	-	3			
H	Carex platyphylla		1			
H	Adiantum pedatum		3			
H	Asarum canadense		2			
H	thalictrum dioicum		2			
H	anemone acultiloba		1			
H	conopholis americana		1			
H	solidago flexicaulis		2			

Cover Classes	
r	< 1% rare
+	< 1% occs
1	1-5 %
2	6-25 %
3	26-50 %
4	51-75 %
5	76-100 %

OR

Cover Classes	
D	Dominant; cover > 50%
C	Common; 6 to 50 % or numerous individuals
O	Occasional; 1 to 5% or scattered individuals
R	Rare; < 1% or one to a few individuals

Provide ages for representative trees in the community (optional).

Tree Species	DBH	Age

Comments about the natural community that do not fit in another field:
Mapped in shallow soils areas found vegetative composition to be similar to RNHF. The Community shift corresponds with the soils and bedrock geological transition. RNHF *prunus serotina Laportea canadensis, hydrophyllum virginianium, and geranium robertianum* were more common.

NATURAL COMMUNITY MAPPING

Attach GIS shapefiles (preferred) or digital or paper map of the natural community boundaries with labeled polygons.

Estimate percent of mapped polygon occupied by the natural community: >95%☒; 80-95%☐; 20-80%☐; 0-20%☐
Explain if <95%, explain what other communities are present: Click here to enter text.

Indicate type and scale of Base Map used to map the natural community: Click here to enter text.

Confidence in the Extent of the Natural Community as Mapped (check one)

☐ Confident that the full extent is known and mapped:
☒ Full extent is not known:
☐ Uncertain if full extent is known:

Comments: (If the natural community extends off the subject property, explain, and estimate total area of community.)
Click here to enter text.

COMMUNITY OCCURRENCE RANKING: a range of ranks may be used (such as AB)

Using **VT NHI ranking specifications** (if available)*: OR Using **Generic ranking specifications** (provided below):

	Rank (A-D)	Comments
Current Condition		B rank
Landscape Context		B rank
Size (acres)		Community size and how determined: C uncertain how far the community extends of parcel
Overall Rank		B

* Available for some natural communities from Eric Sorenson (eric.sorenson@vermont.gov) or 802-476-0126.

Generic ranking specifications

Use the following guidelines to fill in the grid above if VT NHI ranking specifications are not yet available for the community type.

Current Condition
A: mature example of the community type (forests with trees generally >150 years old); natural processes intact; no exotics
B: some minor alteration of vegetation structure and composition, such as by selective logging; minor alterations in ecological processes; exotics species present in low abundance
C: significant alteration of vegetation structure and composition, such as by heavy logging; alteration of ecological processes are significant, but community recovery/restoration is likely; exotic species are abundant and control will take significant effort
D: ecological processes significantly altered to the point where vegetation composition and structure are very different from A-ranked condition and restoration/recovery is unlikely; exotic species are abundant or control will be difficult

Landscape Context
A: highly connected; area around EO (>1,000acres) is largely intact natural vegetation, with species interactions and natural processes occurring across communities; surrounding matrix forest meets at least B specifications for Condition.
B: moderately connected; area around EO (>1,000acres) is moderately intact natural vegetation, with species interactions and some natural processes occurring across many communities, although temporary disturbances such as logging have reduced condition of the landscape; surrounding matrix forest meets at least C specifications for Condition
C: moderately fragmented; area around EO is largely a combination of cultural and natural vegetation with barriers to species interactions and natural processes across communities; surrounding land is a mix of fragmented forest, agriculture, and rural development
D: highly fragmented; area around EO is entirely, or almost entirely, surrounded by agriculture or urban development

Size
No Generic ranking applicable. Please provide size of community in grid above.

Overall Rank (based on best judgment)
A: excellent estimated viability
B: good estimated viability
C: fair estimated viability
D: poor estimated viability

NATURAL COMMUNITY MANAGEMENT

Discuss management needs and plans for this natural community, including need for invasive species monitoring and control. If the natural community requires a buffer with specific management, describe and map the buffer width and specifically explain the ecological need for the buffer:
The community is flourishing in the current management any activity may cause increased invasive abundance. A 100' buffer was added to this community.

ADDITIONAL INFORMATION; (none required) (check those that are attached):
- ☐ Additional plant species list attached
- ☐ Plot form(s) attached
- ☐ Animal list attached

Please send completed form and GIS shapefiles to Eric Sorenson:
eric.sorenson@vermont.gov
or
Eric Sorenson
Natural Heritage Inventory
Vermont Fish and Wildlife Department
5 Perry Street, Suite 40
Barre, Vermont 05641

NATURAL COMMUNITY SURVEY FORM
Vermont Natural Heritage Inventory (VNHI)
Vermont Fish & Wildlife Department

Revised: May 12, 2017

Contact Eric Sorenson with questions about natural communities or this form: 802-476-0126 or Eric.Sorenson@vermont.gov

Natural Community Type: Rich Northern Hardwood Forest
Natural Community Variant Name (if applicable): N/A
Association Name (NHI office only): Click here to enter text.

Is this an update of an existing NHI record? (NHI office only) Yes ☐ No X☐
Site Name: FPS Shaftsbury Solar

Site Location Road Address: 1004 Holy Smoke Road
Town: Shaftsbury

Surveyor(s): VHB (Carla Fenner, Mitchell Jackman)
Mailing Address: 40 IDX Drive, Building 100 Suite 200, South Burlington VT 05403
Phone: (802) 497-7699
E-mail: cfenner@vhb.com, mjackman@vhb.com

Survey Date(s): Various dates: May 28, 2018; July 18, 2018; June 2021; September 2021

Owner(s) of Natural Community: Name(s): Project Developer VT Real Estate Holdings 1 LLC Shaftsbury Solar
Address: 58 Commerce Road, Stamford CT 06902
Phone: (203) 542-6000
E-mail: Click here to enter text.

GENERAL DESCRIPTION OF THE SITE

Briefly describe the natural and man-made features of the site and setting in which the natural community occurs, including topography, size of the contiguous forested area, other natural community types present, surface waters and drainage patterns, and land use history and land management.

The site occurs in three adjacent parcels which total approximately 191 acres and are located west of U.S. Route 7 ("US-7") and south of Holy Smoke Road in Shaftsbury, Vermont. The site is located in the Vermont Valley biophysical region, within the Walloomsac-Hoosic River watershed of the Hudson River drainage basin. Furnace Brook is mapped by the Vermont Hydrography Dataset approximately 1000 feet to the east. The underlying bedrock is mapped as dolostone and marble. The 191-acre site consists of numerous mowed hay fields and also includes wooded hedgerows in between some fields and forested areas. Of the forested portion of the site, some forest is in a mature closed canopy condition with no evidence of recent management or harvest as well as some areas consisting of more immature forest (younger and generally smaller trees) and some areas are regenerating forest or abandoned orchard. Dominant soil types are Georgia loams and Stockbridge loams, and according to U.S. Geologic Survey ("USGS") contour data, elevations range from approximately 1124 to 1,446 feet above mean sea level. In general, the site has a eastern aspect with steep forested slopes in the western portion of the site and is flat or gently sloped on hayfields.

A detailed natural resources map depicting field delineation and assessments conducted by VHB is included as an attachment, including surface waters, wetlands, vernal pools, rare/threatened/endangered ("RTE") species, and certain wildlife habitat observations. VHB's delineation of Rich Northern Hardwood Forest ("RNHF") as well as the other on-site proposed significant Natural Community Mesic Maple Ash Hickory Oak Forest is also shown on the map in the Attachment.

According to the Vermont Agency of Natural Resources ("ANR") BioFinder interactive webmap, the forested areas on site are part of an approximately 856.6-acre interior forest block considered to be Priority (ranking of 4) per the Vermont Conservation Design study. There are no significant natural communities mapped by ANR on site or within 1 mile of the site. The site includes other natural community types which would not be considered as Significant based on VHB's determinations (example: Vernal Pool, Northern Hardwood Forest, Seep, Red Maple-Green Ash Swamp) as well as one other community which VHB proposes would be considered a

Significant occurrence: an occurrence of Mesic Maple-Ash-Hickory-Oak Forest ("MMAHOF"). VHB's proposed occurence ranking for the MMAHOF is reported under a separate ranking sheet.

NATURAL COMMUNITY INFORMATION

Concisely describe the natural community, including canopy cover, dominant species, the physical setting, evidence of human and natural disturbance, forest community age, woody debris abundance, and presence of invasive species.

History of agricultural clearing stone piles and timber harvest. Forests less disturbed and more mature grading away from agricultural areas of site. Found in lower less sloped areas of site, very rocky shallow soils. Multi age class tree composition with some mature trees well developed sapling and shrub layers. Many invasives including barberry honeysuckle, bittersweet, and buckthorn. Tree and sapling species include; Acer saccharum, Carya cordiformis Fraxinus americana, Tilia americana Prunus serotina, Ostrya virginiana. Dominant herbs include Hydrophylum virginiana, Geranium robertianum, Actia pachypoda polystichum acrostichoides, Adiatum pedatum,crestopteris bulbifera, Laportia canadensis,

Elevation (feet): minimum: 1125 **maximum**: 1221

Slope (degrees): 3-8%

Aspect (degrees or cardinal direction): North

Bedrock geologic type (2012 VT bedrock geology map): Marble and Dolostone

Soil type (Natural Resources Conservation Service) or description: Stockbridge loam very stoney and Georgia loam , Falway Nellis Farmington Complex

Vegetation Description: To be applied to a representative area of the community large enough to capture most species.

Total Canopy Cover: 75 Total Shrub Cover: 15

	Trees			Shrubs				
	T1Emergent	T2 Canopy	T3 Subcanopy	S1 Tall (> 4 ft.)	S2 Short (<4 ft.)	H Herbaceous	N Nonvascular	V Vine
Height (ft.)								
% Cover								

Dominant Species and their cover for each stratum (T1- emergent, T2-main canopy, T3-subcanopy, S1-tall shrub, S2-short shrub, H-herb, N-nonvascular, V-vine). Give average DBH (inches) for trees. For each species estimate actual percent cover or use one of the cover class categories below. Use the species list table below or attach a separate sheet.

Stratum	Species	DBH	Cover	Stratum	Species	Cover
T	Acer saccharum,	3-30	4			
	Carya cordiformis	3-28	3			
	Fraxinus americana	3-20	2			
	Tilia americana	3-18	3			
	Prunus serotina	3-20	3			
	Ostrya virginiana	3-10	2			
	Fagus grandifolia	3-15	1			
	Hydrophylum virginiana		2			
	Laportia canadensis,		1			
	Adiatum pedatum		2			
	Geranium robertianum		2			
	Actia pachypoda		1			
	polystichum acrostichoides		2			
	crestopteris bulbifera		2			
	Dryopteris intermedia		2			
	Viburnum acerifolium \					

Cover Classes	
r	< 1% rare
+	< 1% occs
1	1-5 %
2	6-25 %
3	26-50 %
4	51-75 %
5	76-100 %

OR

Cover Classes	
D	Dominant; cover > 50%
C	Common; 6 to 50 % or numerous individuals
O	Occasional; 1 to 5% or scattered individuals
R	Rare; < 1% or one to a few individuals

Provide ages for representative trees in the community (optional).

Tree Species	DBH	Age

Comments about the natural community that do not fit in another field:
Click here to enter text.

NATURAL COMMUNITY MAPPING
Attach GIS shapefiles (preferred) or digital or paper map of the natural community boundaries with labeled polygons.

Estimate percent of mapped polygon occupied by the natural community: >95%☐; 80-95%☒; 20-80%☐; 0-20%☐
Explain if <95%, explain what other communities are present: Click here to enter text.

Indicate type and scale of Base Map used to map the natural community: Used aerial imagery to find areas of similar forest type and topo

Confidence in the Extent of the Natural Community as Mapped (check one)
☐ Confident that the full extent is known and mapped:
☒ Full extent is not known:
☐ Uncertain if full extent is known:

Comments: (If the natural community extends off the subject property, explain, and estimate total area of community.)
Click here to enter text.

COMMUNITY OCCURRENCE RANKING: a range of ranks may be used (such as AB)
Using **VT NHI ranking specifications** (if available)*: OR Using **Generic ranking specifications** (provided below):

	Rank (A-D)	Comments
Current Condition	B	Click here to enter text.
Landscape Context	B	Click here to enter text.
Size (acres)	A	Community size and how determined: Used aerial imagery and topo
Overall Rank	A	Click here to enter text.

* Available for some natural communities from Eric Sorenson (eric.sorenson@vermont.gov) or 802-476-0126.

Generic ranking specifications
Use the following guidelines to fill in the grid above if VT NHI ranking specifications are not yet available for the community type.

Current Condition
A: mature example of the community type (forests with trees generally >150 years old); natural processes intact; no exotics
B: some minor alteration of vegetation structure and composition, such as by selective logging; minor alterations in ecological processes; exotics species present in low abundance
C: significant alteration of vegetation structure and composition, such as by heavy logging; alteration of ecological processes are significant, but community recovery/restoration is likely; exotic species are abundant and control will take significant effort
D: ecological processes significantly altered to the point where vegetation composition and structure are very different from A-ranked condition and restoration/recovery is unlikely; exotic species are abundant or control will be difficult

Landscape Context
A: highly connected; area around EO (>1,000acres) is largely intact natural vegetation, with species interactions and natural processes occurring across communities; surrounding matrix forest meets at least B specifications for Condition.
B: moderately connected; area around EO (>1,000acres) is moderately intact natural vegetation, with species interactions and some natural processes occurring across many communities, although temporary disturbances such as logging have reduced condition of the landscape; surrounding matrix forest meets at least C specifications for Condition
C: moderately fragmented; area around EO is largely a combination of cultural and natural vegetation with barriers to species interactions and natural processes across communities; surrounding land is a mix of fragmented forest, agriculture, and rural development
D: highly fragmented; area around EO is entirely, or almost entirely, surrounded by agriculture or urban development

Size
No Generic ranking applicable. Please provide size of community in grid above.

Overall Rank (based on best judgment)
A: excellent estimated viability
B: good estimated viability
C: fair estimated viability
D: poor estimated viability

NATURAL COMMUNITY MANAGEMENT

Discuss management needs and plans for this natural community, including need for invasive species monitoring and control. If the natural community requires a buffer with specific management, describe and map the buffer width and specifically explain the ecological need for the buffer:

Click here to enter text.

ADDITIONAL INFORMATION; (none required) (check those that are attached):

- ☐ Additional plant species list attached
- ☐ Plot form(s) attached
- ☐ Animal list attached

Please send completed form and GIS shapefiles to Eric Sorenson:

eric.sorenson@vermont.gov
or
Eric Sorenson
Natural Heritage Inventory
Vermont Fish and Wildlife Department
5 Perry Street, Suite 40
Barre, Vermont 05641

Project: Shaftsbury Solar

Client: VT Real Estate Holdings 1 LLC

Survey Dates: May and July 2018; and May and September 2021, and October 2022 (VHB: Fenner, Jackman)

Prepared by: VHB; January 25, 2023

Scientific Name [1]	Common Name	Family	VT Rarity Rank[2]	Non-Native Invasive Species[3]
Acer negundo L.	boxelder	Aceraceae	-	-
Acer pensylvanicum L.	striped maple	Aceraceae	-	-
Acer saccharum Marshall	sugar maple	Aceraceae	-	-
Actaea pachypoda Elliott	white baneberry	Ranunculaceae	-	-
Adiantum pedatum L.	northern maidenhair	Pteridaceae	-	-
Ageratina altissima (L.) R.M. King & H. Rob.	white snakeroot	Asteraceae	-	-
Agrimonia striata Michx.	roadside agrimony	Rosaceae	-	-
Alliaria petiolata (M. Bieb.) Cavara & Grande	garlic mustard	Brassicaceae	-	B
Allium tricoccum Aiton	ramp	Liliaceae	-	-
Amelanchier laevis	Allegheny serviceberry	Rosaceae	-	-
Angelica atropurpurea L.	purplestem angelica	Apiaceae	-	-
Aquilegia canadensis L.	red columbine	Ranunculaceae	-	-
Aralia hispida Vent.	bristly sarsaparilla	Araliaceae	-	-
Arisaema triphyllum (L.) Schott	Jack in the pulpit	Araceae	-	-
Asarum canadense L.	Canadian wildginger	Aristolochiaceae	-	-
Asplenium platyneuron (L.) Britton, Sterns & Poggenb.	ebony spleenwort	Aspleniaceae	-	-
Athyrium filix-femina (L.) Roth	common ladyfern	Dryopteridaceae	-	-
Berberis thunbergii DC.	Japanese barberry	Berberidaceae	-	B
Betula alleghaniensis Britton	yellow birch	Betulaceae	-	-
Betula lenta L.	sweet birch	Betulaceae	-	-
Betula papyrifera Marshall	paper birch	Betulaceae	-	-
Botrychium dissectum Spreng.	cutleaf grapefern	Ophioglossaceae	-	-
Brachyelytrum aristosum (Michx.) Trel.	northern shorthusk	Poaceae	-	-
Bromus inermis Leyss.	smooth brome	Poaceae	-	-
Cardamine pensylvanica Muhl. ex Willd.	Pennsylvania bittercress	Brassicaceae	-	-
Carex gracillima Schwein.	graceful sedge	Cyperaceae	-	-
Carex pensylvanica Lam.	Pennsylvania sedge	Cyperaceae	-	-
Carex plantaginea Lam.	plantainleaf sedge	Cyperaceae	-	-
Carex radiata (Wahlenb.) Small	eastern star sedge	Cyperaceae	-	-
Carya cordiformis (Wangenh.) K. Koch	bitternut hickory	Juglandaceae	-	-
Caulophyllum giganteum (Farw.) Loconte & Blackwell	giant blue cohosh	Berberidaceae	-	-
Celastrus orbiculatus Thunb.	Oriental bittersweet	Celastraceae	-	B
Cinna arundinacea L.	sweet woodreed	Poaceae	-	-
Circaea ×intermedia Ehrh. (pro sp.) [alpina × lutetiana]	enchanter's nightshade	Onagraceae	-	-
Clematis virginiana L.	devil's darning needles	Ranunculaceae	-	-
Clinopodium vulgare L.	wild basil	Lamiaceae	-	-
Collinsonia canadensis L.	richweed	Lamiaceae	S2	-
Conopholis americana (L.) Wallr.	American cancer-root	Orobanchaceae	S3	-
Corallorhiza odontorhiza (Willd.) Poir.	autumn coralroot	Orchidaceae	S2 (T)	-
Cornus alternifolia L. f.	alternateleaf dogwood	Cornaceae	-	-
Cornus racemosa Lam.	gray dogwood	Cornaceae	-	-
Cornus sericea L.	redosier dogwood	Cornaceae	-	-
Crataegus L.	hawthorn	Rosaceae	-	-
Cryptotaenia canadensis (L.) DC.	Canadian honewort	Apiaceae	-	-
Dicentra canadensis (Goldie) Walp.	squirrel corn	Fumariaceae	-	-
Dirca palustris L.	eastern leatherwood	Thymelaeaceae	-	-
Dryopteris goldiana (Hook. ex Goldie) A. Gray	Goldie's woodfern	Dryopteridaceae	-	-
Dryopteris marginalis (L.) A. Gray	marginal woodfern	Dryopteridaceae	-	-
Epipactis helleborine (L.) Crantz	broadleaf helleborine	Orchidaceae	-	-
Equisetum sylvaticum L.	woodland horsetail	Equisetaceae	-	-
Erythronium americanum Ker Gawl.	dogtooth violet	Liliaceae	-	-
Fagus grandifolia Ehrh.	American beech	Fagaceae	-	-
Fragaria virginiana Duchesne	Virginia strawberry	Rosaceae	-	-
Frangula alnus Mill.	glossy buckthorn	Rhamnaceae	-	B
Fraxinus americana L.	white ash	Oleaceae	-	-
Fraxinus pennsylvanica Marshall	green ash	Oleaceae	-	-
Galium aparine L.	stickywilly	Rubiaceae	-	-

Project: Shaftsbury Solar

Client: VT Real Estate Holdings 1 LLC

Survey Dates: May and July 2018; and May and September 2021, and October 2022 (VHB: Fenner, Jackman)

Prepared by: VHB; January 25, 2023

Scientific Name [1]	Common Name	Family	VT Rarity Rank[2]	Non-Native Invasive Species[3]
Galium lanceolatum Torr.	lanceleaf wild licorice	Rubiaceae	-	-
Galium triflorum Michx.	fragrant bedstraw	Rubiaceae	-	-
Geranium robertianum L.	Robert geranium	Geraniaceae	-	-
Geum canadense Jacq.	white avens	Rosaceae	-	-
Geum rivale L.	purple avens	Rosaceae	-	-
Hamamelis virginiana L.	American witchhazel	Hamamelidaceae	-	-
Hepatica nobilis Schreb. var. acuta (Pursh) Steyerm.	sharplobe hepatica	Ranunculaceae	-	-
Hepatica nobilis Schreb. var. obtusa (Pursh) Steyerm.	roundlobe hepatica	Ranunculaceae	-	-
Hydrophyllum virginianum L.	eastern waterleaf	Hydrophyllaceae	-	-
Hylodesmum glutinosum (Muhl. ex Willd.) H. Ohashi & R.R. Mill	DEGL5	Fabaceae	-	-
Hylotelephium telephium (L.) H. Ohba	witch's moneybags	Crassulaceae	-	-
Impatiens pallida Nutt.	pale touch-me-not	Balsaminaceae	-	-
Juglans cinerea L.	butternut	Juglandaceae	-	-
Laportea canadensis (L.) Weddell	Canadian woodnettle	Urticaceae	-	-
Lapsana communis L.	common nipplewort	Asteraceae	-	-
Lonicera canadensis W. Bartram ex Marshall	American fly honeysuckle	Caprifoliaceae	-	-
Lonicera morrowii A. Gray	Morrow's honeysuckle	Caprifoliaceae	-	B
Luzula acuminata Raf.	hairy woodrush	Juncaceae	-	-
Lyonia ligustrina (L.) DC.	maleberry	Ericaceae	-	-
Lysimachia ciliata L.	fringed loosestrife	Primulaceae	-	-
Maianthemum racemosum (L.) Link	feathery false lily of the valley	Liliaceae	-	-
Malus Spp.	Apple Spp.	Rosaceae	-	-
Matteuccia struthiopteris (L.) Todaro	ostrich fern	Dryopteridaceae	-	-
Mitella diphylla L.	twoleaf miterwort	Saxifragaceae	-	-
Monarda fistulosa L.	wild bergamot	Lamiaceae	-	-
Mycelis muralis (L.) Dumort.	wall-lettuce	Asteraceae	-	WL
Onoclea sensibilis L.	sensitive fern	Dryopteridaceae	-	-
Osmorhiza claytonii (Michx.) C.B. Clarke	Clayton's sweetroot	Apiaceae	-	-
Osmunda claytoniana L.	interrupted fern	Osmundaceae	-	-
Ostrya virginiana (Mill.) K. Koch	hophornbeam	Betulaceae	-	-
Oxalis montana Raf.	mountain woodsorrel	Oxalidaceae	-	-
Packera obovata (Muhl. ex Willd.) W.A. Weber & Á. Löve	roundleaf ragwort	Asteraceae	-	-
Parthenocissus quinquefolia (L.) Planch.	Virginia creeper	Vitaceae	-	-
Pastinaca sativa L.	wild parsnip	Apiaceae	-	WL
Phryma leptostachya L.	American lopseed	Verbenaceae	-	-
Pinus strobus L.	eastern white pine	Pinaceae	-	-
Plantago lanceolata L.	narrowleaf plantain	Plantaginaceae	-	-
Polygonatum pubescens (Willd.) Pursh	hairy Solomon's seal	Liliaceae	-	-
Polystichum acrostichoides (Michx.) Schott	Christmas fern	Dryopteridaceae	-	-
Populus tremuloides Michx.	quaking aspen	Salicaceae	-	-
Portulaca oleracea L.	little hogweed	Portulacaceae	-	-
Potentilla simplex Michx.	common cinquefoil	Rosaceae	-	-
Prunus pensylvanica L. f.	pin cherry	Rosaceae	-	-
Prunus serotina Ehrh.	black cherry	Rosaceae	-	-
Prunus virginiana L.	chokecherry	Rosaceae	-	-
Quercus rubra L.	northern red oak	Fagaceae	-	-
Ranunculus abortivus L.	littleleaf buttercup	Ranunculaceae	-	-
Ranunculus acris L.	tall buttercup	Ranunculaceae	-	-
Rhamnus cathartica L.	common buckthorn	Rhamnaceae	-	B
Ribes hirtellum Michx.	hairystem gooseberry	Grossulariaceae	-	-
Rosa multiflora Thunb.	multiflora rose	Rosaceae	-	WL
Rubus idaeus L.	American red raspberry	Rosaceae	-	-
Rubus odoratus L.	purpleflowering raspberry	Rosaceae	-	-
Rumex crispus L.	curly dock	Polygonaceae	-	-
Salix bebbiana Sarg.	Bebb willow	Salicaceae	-	-
Salix eriocephala Michx.	Missouri River willow	Salicaceae	-	-
Sambucus racemosa L.	red elderberry	Caprifoliaceae	-	-

Project: Shaftsbury Solar

Client: VT Real Estate Holdings 1 LLC

Survey Dates: May and July 2018; and May and September 2021, and October 2022 (VHB: Fenner, Jackman)

Prepared by: VHB; January 25, 2023

Scientific Name [1]	Common Name	Family	VT Rarity Rank[2]	Non-Native Invasive Species[3]
Sanguinaria canadensis L.	bloodroot	Papaveraceae	-	-
Sanicula canadensis L. var. canadensis	Canadian blacksnakeroot	Apiaceae	S2S3	-
Sanicula marilandica L.	Maryland sanicle	Apiaceae	-	-
Spiraea alba Du Roi	white meadowsweet	Rosaceae	-	-
Taraxacum officinale F.H. Wigg.	common dandelion	Asteraceae	-	-
Thalictrum dioicum L.	early meadow-rue	Ranunculaceae	-	-
Thelypteris noveboracensis (L.) Nieuwl.	New York fern	Thelypteridaceae	-	-
Tiarella cordifolia L.	heartleaf foamflower	Saxifragaceae	-	-
Toxicodendron radicans (L.) Kuntze	eastern poison ivy	Anacardiaceae	-	-
Trillium cernuum L.	whip-poor-will flower	Liliaceae	S3	-
Trillium undulatum Willd.	painted trillium	Liliaceae	-	-
Triosteum aurantiacum E.P. Bicknell var. aurantiacum	orangefruit horse-gentian	Caprifoliaceae	S3	-
Ulmus americana L.	American elm	Ulmaceae	-	-
Urtica dioica L.	stinging nettle	Urticaceae	-	-
Uvularia sessilifolia L.	sessileleaf bellwort	Liliaceae	-	-
Verbena urticifolia L.	white vervain	Verbenaceae	-	-
Viburnum acerifolium L.	mapleleaf viburnum	Caprifoliaceae	-	-
Viola renifolia A. Gray	white violet	Violaceae	-	-
Viola sororia Willd.	common blue violet	Violaceae	-	-

[1] Nomenclature follows USDA, NRCS. 2022. The PLANTS Database (http://plants.usda.gov, 12/07/2022). National Plant Data Team, Greensboro, NC USA.

[2] The Vermont Rarity Rank from the "Rare and Uncommon Native Vascular Plants of Vermont - Vermont Natural Heritage Inventory - Vermont Fish & Wildlife Department", version dated May 4, 2022. The Vermont Rarity Rank from the "Endangered and Threatened Plants of Vermont - Vermont Natural Heritage Inventory - Vermont Fish & Wildlife Department", version dated February 10, 2022.

[3] **Class B Noxious Weeds Species (B)** from: Quarantine #3- Noxious Weeds (2012).
Watch List Species (WL) from: Vermont Invasive Exotic Plant Committee. 2017. Quarantine and Watch List Update.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To:
Project Code: 2023-0036076
Project Name: FPS Shaftsbury Solar

January 20, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Updated 12/27/2022 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat - (Updated 12/27/2022) Please visit our New England Field Office Project Review webpage at the link above for updated northern long-eared bat consultation guidance. The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule will go into effect on **January 30, 2023**. After that date, the current 4(d) rule for NLEB will no longer be in effect, and the 4(d) determination key will no longer be available. New compliance tools will be available by mid- to late-January, and information will be posted on our New England Field Office Project Review webpage in January, so please check this site often for updates.
Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project may result in incidental take of NLEB after the new listing goes into effect, this will need to be addressed in an updated consultation that includes an Incidental Take Statement. Many of these situations will be addressed through the new compliance tools. If your project may require re-initiation of consultation, please wait for information on the new tools to appear on our website or contact our office at **newengland@fws.gov** for additional guidance.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the

ESA. The species' occurrence on an official species list does not convey a requirement to consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

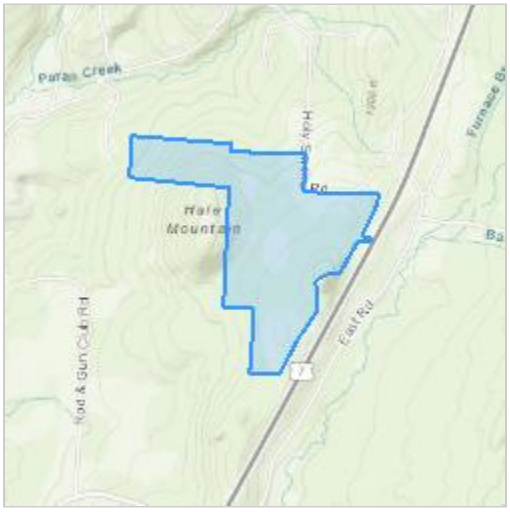
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Project Code: 2023-0036076
Project Name: FPS Shaftsbury Solar
Project Type: Power Gen - Solar
Project Description: An approximately 20-megawatt (“MW”) AC solar photovoltaic electric generation facility on three contiguous land parcels generally located south and east of Holy Smoke Road in Shaftsbury, Vermont

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.96171615,-73.17205113366187,14z



Counties: Bennington County, Vermont

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: VHB
Name: Melinda Squillace
Address: 100 State Street, Suite 600
City: Montpelier
State: VT
Zip: 05602
Email msquillace@vhb.com
Phone: 8023386180

Bat Acoustic Survey Table
Client: VT Real Estate Holdings 1 LLC
Shaftsbury Solar
Field Survey Date(s): July 22 2021 -July 20-2021
Prepared by: VHB on October 26, 2021

Species	Number of calls ID'ed for that species	Bat ID Software Program Used	Software Version Used	If calls were converted from Full Spectrum to Zero Cross, what program was used?	Maximum Likelihood Estimation (MLE) *P*-value	Number of Calls Confirmed through Qualitative ID (if conducted)	Name of Individual who Conducted Qualitative ID (if conducted)	Site ID (use drop-down menu)	Site check DO NOT ENTER DATA This cell should auto-populate with the project name. If it doesn't your value for SITE ID is invalid.
Eptesicus fuscus	11	BCID	2.8	Other	0.000001			FPS Shaftsbury site Site 1 8m 7/21/2021	FPS Shaftsbury
Lasionycteris noctivagans	7	BCID	2.8	Other	0.000001			FPS Shaftsbury site Site 1 8m 7/21/2021	FPS Shaftsbury
Lasiurus borealis	1	BCID	2.8	Other		1	Kaitlyn Torrey	FPS Shaftsbury site Site 1 8m 7/21/2021	FPS Shaftsbury
Myotis lucifugus	17	BCID	2.8	Other		17	Kaitlyn Torrey & John Chenger	FPS Shaftsbury site Site 1 8m 7/21/2021	FPS Shaftsbury
Eptesicus fuscus	60	BCID	2.8	Other	0.000001	1	Kaitlyn Torrey	FPS Shaftsbury site Site 1 8m 7/22/2021	FPS Shaftsbury
Lasionycteris noctivagans	19	BCID	2.8	Other	0.000001			FPS Shaftsbury site Site 1 8m 7/22/2021	FPS Shaftsbury
Lasiurus cinereus	2	BCID	2.8	Other	0.017979489			FPS Shaftsbury site Site 1 8m 7/22/2021	FPS Shaftsbury
Myotis lucifugus	46	BCID	2.8	Other		46	Kaitlyn Torrey & John Chenger	FPS Shaftsbury site Site 1 8m 7/22/2021	FPS Shaftsbury
Lasiurus borealis	6	BCID	2.8	Other		6	Kaitlyn Torrey	FPS Shaftsbury site Site 1 8m 7/22/2021	FPS Shaftsbury
Eptesicus fuscus	52	BCID	2.8	Other		1	Kaitlyn Torrey	FPS Shaftsbury site Site 2 8m 7/21/2021	FPS Shaftsbury
Lasiurus borealis	2	BCID	2.8	Other		2	Kaitlyn Torrey	FPS Shaftsbury site Site 2 8m 7/21/2021	FPS Shaftsbury
Myotis lucifugus	34	BCID	2.8	Other		34	Kaitlyn Torrey & John Chenger	FPS Shaftsbury site Site 2 8m 7/21/2021	FPS Shaftsbury
Myotis leibii	2	BCID	2.8	Other		2	John Chenger	FPS Shaftsbury site Site 2 8m 7/21/2021	FPS Shaftsbury
Eptesicus fuscus	58	BCID	2.8	Other		3	Kaitlyn Torrey & John Chenger	FPS Shaftsbury site Site 2 8m 7/22/2021	FPS Shaftsbury
Lasiurus borealis	3	BCID	2.8	Other		3	Kaitlyn Torrey & John Chenger	FPS Shaftsbury site Site 2 8m 7/22/2021	FPS Shaftsbury
Myotis lucifugus	148	BCID	2.8	Other		148	Kaitlyn Torrey & John Chenger	FPS Shaftsbury site Site 2 8m 7/22/2021	FPS Shaftsbury
Unknown Myotis	1	BCID	2.8	Other		1	John Chenger	FPS Shaftsbury site Site 2 8m 7/22/2021	FPS Shaftsbury
Eptesicus fuscus	79	BCID	2.8	Other		1	Kaitlyn Torrey	FPS Shaftsbury site Site 3 8m 7/21/2021	FPS Shaftsbury
Lasionycteris noctivagans	14	BCID	2.8	Other	0.000001			FPS Shaftsbury site Site 3 8m 7/21/2021	FPS Shaftsbury
Lasiurus borealis	7	BCID	2.8	Other		7	Kaitlyn Torrey	FPS Shaftsbury site Site 3 8m 7/21/2021	FPS Shaftsbury
Myotis lucifugus	8	BCID	2.8	Other		8	Kaitlyn Torrey	FPS Shaftsbury site Site 3 8m 7/21/2021	FPS Shaftsbury
Eptesicus fuscus	119	BCID	2.8	Other		5	John Chenger	FPS Shaftsbury site Site 3 8m 7/22/2021	FPS Shaftsbury
Lasionycteris noctivagans	42	BCID	2.8	Other	0.000001			FPS Shaftsbury site Site 3 8m 7/22/2021	FPS Shaftsbury
Lasiurus cinereus	3	BCID	2.8	Other	0.011357276			FPS Shaftsbury site Site 3 8m 7/22/2021	FPS Shaftsbury
Myotis lucifugus	5	BCID	2.8	Other		5	John Chenger	FPS Shaftsbury site Site 3 8m 7/22/2021	FPS Shaftsbury
Eptesicus fuscus	23	BCID	2.8	Other	0.000001			FPS Shaftsbury site Site 4 8m 7/21/2021	FPS Shaftsbury
Lasionycteris noctivagans	15	BCID	2.8	Other	0.000001			FPS Shaftsbury site Site 4 8m 7/21/2021	FPS Shaftsbury
Lasiurus borealis	1	BCID	2.8	Other		1	Kaitlyn Torrey	FPS Shaftsbury site Site 4 8m 7/21/2021	FPS Shaftsbury
Myotis lucifugus	9	BCID	2.8	Other			Kaitlyn Torrey & John Chenger	FPS Shaftsbury site Site 4 8m 7/21/2021	FPS Shaftsbury
Eptesicus fuscus	48	BCID	2.8	Other		2	John Chenger	FPS Shaftsbury site Site 4 8m 7/22/2021	FPS Shaftsbury
Lasionycteris noctivagans	37	BCID	2.8	Other	0.000001			FPS Shaftsbury site Site 4 8m 7/22/2021	FPS Shaftsbury
Lasiurus borealis	4	BCID	2.8	Other		4	Kaitlyn Torrey	FPS Shaftsbury site Site 4 8m 7/22/2021	FPS Shaftsbury
Lasiurus cinereus	8	BCID	2.8	Other	0.000001			FPS Shaftsbury site Site 4 8m 7/22/2021	FPS Shaftsbury
Myotis lucifugus	39	BCID	2.8	Other		39	Kaitlyn Torrey & John Chenger	FPS Shaftsbury site Site 4 8m 7/22/2021	FPS Shaftsbury
Unknown	2	BCID	2.8	Other		2	Kaitlyn Torrey	FPS Shaftsbury site Site 4 8m 7/22/2021	FPS Shaftsbury

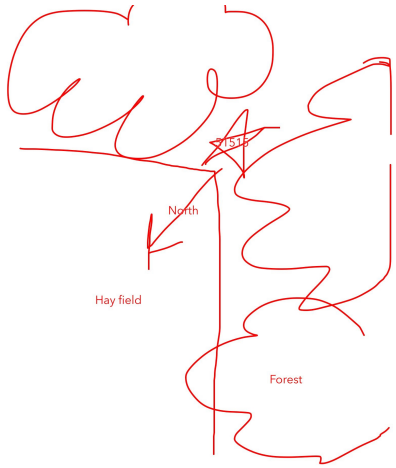
Bat Acoustic Monitoring Data Form

Project:	FPS Shaftsbury				**Site#:**	1	**Site Name:**	1	
Municipality:	Shaftsbury	**County:**	Bennington	**State:**	VT	**Survey Contact**	Jimmy Monfils		
Latitude:	42.96383017	**Longitude:**	-73.17312408		**Datum:**	WGS 84	**Elevation (meters):**	389.8	
Surveyed By:					**Setup**	07/21/2021 19:54	**Retrieval**	07/23/2021 06:05	
Land Use:	Cropland/Pasture	**Mic Test**	Setup	Yes	**Battery Capacity (v)**	Setup	5.8	**CF Card Capacity (GB)**	Setup	67.5
			Retrieval	Yes		Retrieval	5.1		Retrieval	65

BD #	Latitude	Longitude	Trigger Sensitivity	Mic	Mic Orientation	HT [1]	Clutter	Gain	Trigger	Interval	Recording Start Time	Recording End Time
51515	42.963830170	-73.173124080	High	External	N	8	EDGE	60	120	0	19:54	06:05

Site Description

Detector located on edge of forest adjacent to hayfield. Dominant vegetation includes green ash, honeysuckle, wrinkle leaf goldenrod, and oriental bittersweet



Site sketch

[1] *Height of microphone above ground level (in meters)*

1 – URBAN OR BUILT-UP		2 – AGRICULTURAL		3 – RANGELAND		4 – FOREST LAND		5 – WATER		6 – WETLAND		7 – BARREN LAND	
11	Residential	21	Cropland/Pasture	31	Herbaceous	41	Deciduous	51	Streams / Canals	61	Forested	71	Dry Salt Flats
12	Commercial Services	22	Orchards, Groves	32	Shrub and Brush	42	Evergreen	52	Lakes	62	Non-forested	72	Beaches
13	Industrial	23	CFO's	33	Mixed	43	Mixed	53	Reservoirs			73	Non-beach Dunes
14	Transport, Utilities	24	Other					54	Bays / Estuaries			74	Bare Exposed Rock
15	Industrial Complex											75	Quarries / Gravel Pits
16	Mixed Urban/Built-up											76	Transitional Areas
17	Other Urban/Built-up											77	Mixed Barren

Bat Acoustic Monitoring Data Form

Cone of detection

Microphone facing north targeting flyway over hayfield

Microphone setup

Detector positioned on forested edge of hayfield

Bat Acoustic Monitoring Data Form

Existing habitat

Existing habitat consists of maintained hayfield surrounded by upland deciduous forest

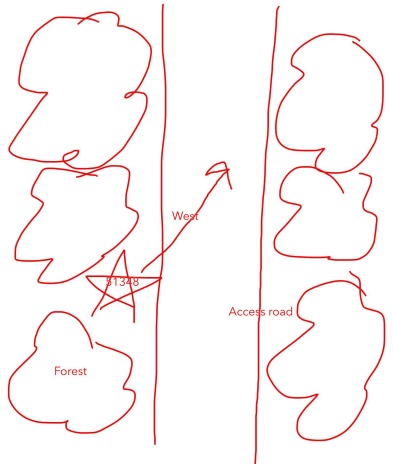
Bat Acoustic Monitoring Data Form

Project:	FPS Shaftsbury					Site#:	2	Site Name:	2		
Municipality:	Shaftsbury	County:	Bennington	State:	VT	Survey Contact	Jimmy Monfils				
Latitude:	42.963215	Longitude:	-73.16937383			Datum:	WGS 84	Elevation (meters):	410.6		
Surveyed By:	Jimmy Monfils and Ryan Scott					Setup	07/21/2021 19:54	Retrieval	07/23/2021 06:05		
Land Use:		Mic Test	Setup	Yes	Battery Capacity (v)	Setup	5.9	CF Card Capacity (GB)	Setup	37.5	
			Retrieval	Yes		Retrieval	5.1		Retrieval	35	

BD #	Latitude	Longitude	Trigger Sensitivity	Mic	Mic Orientation	HT [1]	Clutter	Gain	Trigger	Interval	Recording Start Time	Recording End Time
51348	42.963215000	-73.169373830	High	External	W	8	LOW	60	120	0	19:54	06:05

Site Description

Detector located on edge of acces road within upland deciduous forest targeting flyway created by access road. Dominant vegetation includes paper birch, eastern cottonwood, morrows honeysuckle, stag horn sumac, wood fern, and Virginia creeper



Site sketch

[1] Height of microphone above ground level (in meters)

1 – URBAN OR BUILT-UP		2 – AGRICULTURAL		3 – RANGELAND		4 – FOREST LAND		5 – WATER		6 – WETLAND		7 – BARREN LAND	
11	Residential	21	Cropland/Pasture	31	Herbaceous	41	Deciduous	51	Streams / Canals	61	Forested	71	Dry Salt Flats
12	Commercial Services	22	Orchards, Groves	32	Shrub and Brush	42	Evergreen	52	Lakes	62	Non-forested	72	Beaches
13	Industrial	23	CFO's	33	Mixed	43	Mixed	53	Reservoirs			73	Non-beach Dunes
14	Transport, Utilities	24	Other					54	Bays / Estuaries			74	Bare Exposed Rock
15	Industrial Complex											75	Quarries / Gravel Pits
16	Mixed Urban/Built-up											76	Transitional Areas
17	Other Urban/Built-up											77	Mixed Barren

Bat Acoustic Monitoring Data Form

Cone of detection

Microphone facing west targeting flyway over access road

Microphone setup

Detector positioned on edge of access road within upland deciduous forest

Bat Acoustic Monitoring Data Form

Existing habitat

Existing habitat consists of maintained gravel access road within upland deciduous forest

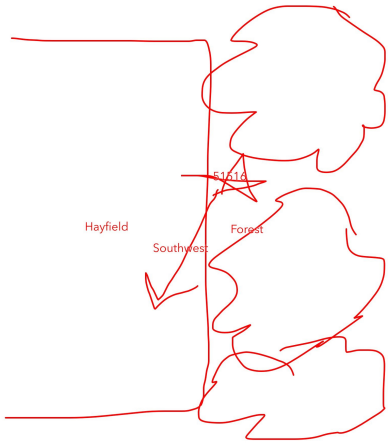
Bat Acoustic Monitoring Data Form

Project:	FPS Shaftsbury					Site#:	3	Site Name:	3		
Municipality:	Shaftsbury	County:	Bennington	State:	VT	Survey Contact	Jimmy Monfils				
Latitude:	42.96144508	Longitude:	-73.17130345		Datum:	WGS 84	Elevation (meters):	419.5			
Surveyed By:	Jimmy Monfils and Ryan Scott				Setup	07/21/2021	19:54	Retrieval	07/23/2021	06:05	
Land Use:	Cropland/Pasture			Mic Test	Setup	Yes	Battery Capacity (v)	Setup	5.9	CF Card Capacity (GB)	Setup	37.5
					Retrieval	Yes		Retrieval	5.4		Retrieval	35.5

BD #	Latitude	Longitude	Trigger Sensitivity	Mic	Mic Orientation	HT [1]	Clutter	Gain	Trigger	Interval	Recording Start Time	Recording End Time
51516	42.961445080	-73.171303450	High	External	SW	8	EDGE	60	120	0	19:54	06:05

Site Description

Detector located on edge of upland deciduous forest adjacent to maintained hayfield. Dominant vegetation includes quaking aspen, green ash, raspberry, Timothy grass, and summer grape



Site sketch

[1] Height of microphone above ground level (in meters)

1 – URBAN OR BUILT-UP		2 – AGRICULTURAL		3 – RANGELAND		4 – FOREST LAND		5 – WATER		6 – WETLAND		7 – BARREN LAND	
11	Residential	21	Cropland/Pasture	31	Herbaceous	41	Deciduous	51	Streams / Canals	61	Forested	71	Dry Salt Flats
12	Commercial Services	22	Orchards, Groves	32	Shrub and Brush	42	Evergreen	52	Lakes	62	Non-forested	72	Beaches
13	Industrial	23	CFO's	33	Mixed	43	Mixed	53	Reservoirs			73	Non-beach Dunes
14	Transport, Utilities	24	Other					54	Bays / Estuaries			74	Bare Exposed Rock
15	Industrial Complex											75	Quarries / Gravel Pits
16	Mixed Urban/Built-up											76	Transitional Areas
17	Other Urban/Built-up											77	Mixed Barren

Bat Acoustic Monitoring Data Form

Cone of detection

Microphone facing southwest positioned to target the flyway over the hayfield

Detector setup

Detector located on edge of maintained hayfield adjacent to upland forest

Bat Acoustic Monitoring Data Form

Existing Habitat

Existing habitat is composed of upland forest edge and maintained hayfield

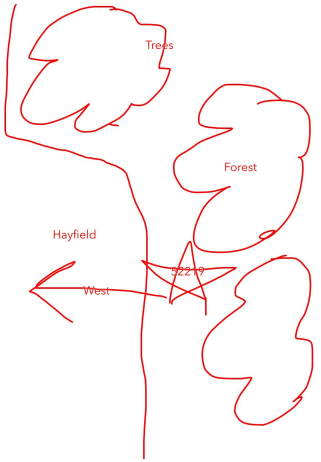
Bat Acoustic Monitoring Data Form

Project:	FPS Shaftsbury				Site#:	4	Site Name:	4			
Municipality:	Shaftsbury	County:	Bennington	State:	VT	Survey Contact	Jimmy Monfils				
Latitude:	42.95796957	Longitude:	-73.1716252		Datum:	WGS 84	Elevation (meters):	415.0			
Surveyed By:	Jimmy Monfils and Ryan Scott				Setup	07/21/2021	19:54	Retrieval	07/23/2021	06:05	
Land Use:	Cropland/Pasture			Mic Test	Setup	Yes	Battery Capacity (v)	Setup	5.9	CF Card Capacity (GB)	Setup	67.5
					Retrieval	Yes		Retrieval	5.1		Retrieval	64.5

BD #	Latitude	Longitude	Trigger Sensitivity	Mic	Mic Orientation	HT [1]	Clutter	Gain	Trigger	Interval	Recording Start Time	Recording End Time
52219	42.957969570	-73.171625200	High	External	W	8	EDGE	60	120	0	19:54	06:05

Site Description

Detector located on edge of maintained hayfield adjacent to upland forest. Dominant vegetation includes quaking aspen, northern red oak, morrows honeysuckle, wrinkle leaf goldenrod, and Timothy grass.



Site sketch

[1] Height of microphone above ground level (in meters)

1 – URBAN OR BUILT-UP		2 – AGRICULTURAL		3 – RANGELAND		4 – FOREST LAND		5 – WATER		6 – WETLAND		7 – BARREN LAND	
11	Residential	21	Cropland/Pasture	31	Herbaceous	41	Deciduous	51	Streams / Canals	61	Forested	71	Dry Salt Flats
12	Commercial Services	22	Orchards, Groves	32	Shrub and Brush	42	Evergreen	52	Lakes	62	Non-forested	72	Beaches
13	Industrial	23	CFO's	33	Mixed	43	Mixed	53	Reservoirs			73	Non-beach Dunes
14	Transport, Utilities	24	Other					54	Bays / Estuaries			74	Bare Exposed Rock
15	Industrial Complex											75	Quarries / Gravel Pits
16	Mixed Urban/Built-up											76	Transitional Areas
17	Other Urban/Built-up											77	Mixed Barren

Bat Acoustic Monitoring Data Form

Cone of detection

Microphone facing west positioned to target the flyway over the mainland hayfield

Microphone setup

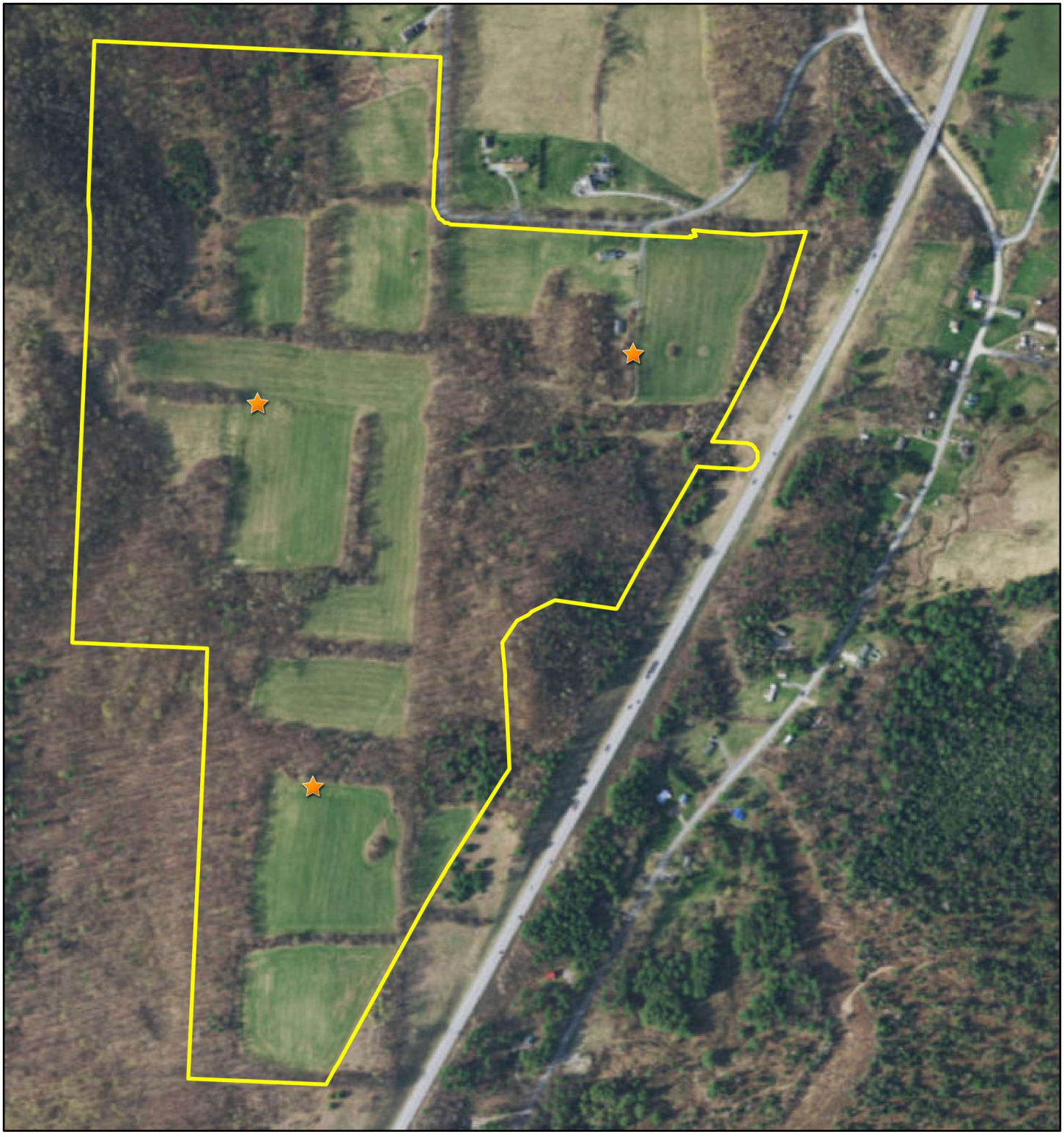
Detector located on edge of maintained hayfield adjacent to upland forest

Bat Acoustic Monitoring Data Form

Existing habitat

Existing Habitat consists of maintained hayfield and upland deciduous forest

Freepoint Solar - Shaftsbury (58071.01)



October 11, 2021

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

Grassland Bird Survey Location

Project Area

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Alexis Coplin

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

VHB Grassland Bird Survey

Submitted by: MJackman@vhb.com

Submitted time: Jun 25, 2021, 5:27:06 AM

Grassland Bird Presence/Absence Survey - Page 1

Survey Point ID:

2021-GBS-1

Project Number:

58071.01

Town:

Shaftsbury

Survey Date:

Start Time:

07:00:00

Surveyor(s):

- **Mitch Jackman**

Temperature:

51

Wind Speed:

Calm - <1 mph

Weather Condition:

Clear (<12% Cover)

Habitat Conditions:

Hay

Evidence of Management:

- **Mowing**

Noise Conditions:

Heavy traffic on 7 beagles barking near by

Grassland Bird Presence/Absence Survey - Page 2

Henslow's Sparrow observed?

No

Grasshopper Sparrow observed?

No

Short-eared Owl observed?

No

Upland Sandpiper observed?

No

Northern Harrier observed?

No

Sedge Wren observed?

No

Bobolink observed?

No

Horned Lark observed?

No

Swamp Sparrow observed?

No

Song Sparrow observed?

No

Savannah Sparrow observed?

No

Vesper Sparrow observed?

No

Clay-colored Sparrow observed?

No

Field Sparrow observed?

No

Eastern Meadowlark observed?

No

American Kestrel observed?

No

Grassland Bird Presence/Absence Survey - Page 3

Overall Survey Notes:

Grass short 10” recently cut

> End Time:
>
> **07:10:00**

VHB Grassland Bird Survey

Submitted by: MJackman@vhb.com

Submitted time: Jun 25, 2021, 5:27:06 AM

Grassland Bird Presence/Absence Survey - Page 1

Survey Point ID:

2021-GBS-2

Project Number:

58071.01

Town:

Shaftsbury

Survey Date:

Surveyor(s):

- **Mitch Jackman**

Temperature:

46

Wind Speed:

Calm - <1 mph

Weather Condition:

Clear (<12% Cover)

Habitat Conditions:

Hay

Evidence of Management:

- **Mowing**

Noise Conditions:

Car noise from rt 7

Grassland Bird Presence/Absence Survey - Page 2

Henslow's Sparrow observed?

No

Grasshopper Sparrow observed?

No

Short-eared Owl observed?

No

Upland Sandpiper observed?

No

Northern Harrier observed?

No

Sedge Wren observed?

No

Bobolink observed?

No

Horned Lark observed?

No

Swamp Sparrow observed?

No

Song Sparrow observed?

No

Savannah Sparrow observed?

No

Vesper Sparrow observed?

No

Clay-colored Sparrow observed?

No

Field Sparrow observed?

No

Eastern Meadowlark observed?

No

American Kestrel observed?

No

Grassland Bird Presence/Absence Survey - Page 3

Overall Survey Notes:

No birds seen in field only on edges grass about 10” tall

VHB Grassland Bird Survey

Submitted by: MJackman@vhb.com

Submitted time: Jun 25, 2021, 5:27:06 AM

Grassland Bird Presence/Absence Survey - Page 1

Survey Point ID:

2021-GBS-3

Project Number:

58071.01

Town:

Shaftsbury

Survey Date:

Start Time:

05:40:00

Surveyor(s):

- **Mitch Jackman**

Temperature:

43

Wind Speed:

Calm - <1 mph

Weather Condition:

Clear (<12% Cover)

Habitat Conditions:

Hay

Evidence of Management:

- **Mowing**

Noise Conditions:

Road noise and beagle barking non stop for survey

Grassland Bird Presence/Absence Survey - Page 2

Henslow's Sparrow observed?

No

Grasshopper Sparrow observed?

No

Short-eared Owl observed?

No

Upland Sandpiper observed?

No

Northern Harrier observed?

No

Sedge Wren observed?

No

Bobolink observed?

No

Horned Lark observed?

No

Swamp Sparrow observed?

No

Song Sparrow observed?

No

Savannah Sparrow observed?

No

Vesper Sparrow observed?

No

Clay-colored Sparrow observed?

No

Field Sparrow observed?

No

Eastern Meadowlark observed?

No

American Kestrel observed?

No

Grassland Bird Presence/Absence Survey - Page 3

Overall Survey Notes:

No birds seen in field mostly on edges and heard from forest interiors

> End Time:
>
> **05:50:00**

Shaftsbury Solar
Shaftsbury, Vermont
Natural Community Ranking Table
Prepared by: VHB (M. Jackman)
April 26, 2023

	Proposed Natural Community	State Rank[1]	EO Condition[3]	EO Landscape Context[3]	EO Size[3]	Approx. Size of EO[4] (acres)	Proposed Condition Rank[5]	Approx. Percent of EO Impacted	State Significant
Existing Condition Ranking	Rich Northern Hardwood Forest	S4	B	B (Moderately well connected)	A (>100 acres)	230	A	-	Yes
	Dry Oak Maple Limestone Forest	S3	B	B (Moderately well connected)	C (5-50 acres)	35	B	-	Yes
Proposed Condition Ranking	Rich Northern Hardwood Forest	S4	B	B (Moderately well connected)	A (>100 acres)	212	A	8.29%	Yes
	Dry Oak Maple Limestone Forest	S3	B	B (Moderately well connected)	C (5-50 acres)	34.5	B	0.87%	Yes

1 Natural community, natural resources and wildlife features were not field mapped for the entirety of the project parcels. Totals presented in this table reflect the limits of the natural resources study area only.

2 Natural community's were assessed using; Thompson, Elizabeth H., et al. *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont.* Published by Vermont Fish and Wildlife Department, The Nature Conservancy, and Vermont Land Trust, 2019.

3 Natural Communities were ranked using; *Vermont Natural Community Ranking Specifications.* Vermont Fish and Wildlife Department *2014*

4 Element Occurrence Size was estimated using areal imagery and topo to evaluated areas of similar forest composition aspect and topography

5 Proposed EO Condition based on approximated calculations of potential forest/tree clearing by VHB using the Project LOW limit of work available on 4/25/23, subject to change with detailed design iterations