Natural Resources Assessment for:
E South Hero Co. LLC
Battery Energy Storage System

South Hero, Vermont

Prepared by:
Arrowwood Environmental, LLC

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I. Summary Findings

Arrowwood Environmental, LLC (AE) conducted a natural resources assessment for the proposed Battery Energy Storage System ("Project") located at 21 Eagle Camp Road in South Hero, Vermont. The field assessment was conducted July 13, 2021. The Project site consists of a small patch of forest within a landscape of mixed agricultural lands, forests and rural residential development. AE assessed natural resources criteria incorporated by the Public Utility Commission into the review of battery energy storage systems, including streams and headwaters, floodways, outstanding resource waters, shorelines, wetlands, rare and irreplaceable natural areas, necessary wildlife habitat, and rare, threatened, and endangered species.

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

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

II. Introduction and Project Description

Arrowwood Environmental, LLC (AE) performed a natural resources assessment for a proposed battery energy storage system located at 21 Eagle Camp Road, South Hero, Vermont ("Project)".

Project Area (7/13/21)

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

III. Site Characterization

Ecologically the site is within the Champlain Valley biophysical region of the state (Thompson, Sorenson and Zaino, 2019). The Project is located at approximately 200 feet above mean sea level according to U.S. Geologic Survey ("USGS") topographic data and is generally sloping to the west. The mapped bedrock that is underlying the site is of the sedimentary rock class with limestone rock types from the Glens Falls Limestone Formation. (Ratcliffe et al. 2011). The soils in the Project area are generally mapped as Amenia very stony silt loam, 0 to 3 percent slopes (NRCS Soil Survey). The Project site is located within a landscape of forests, agricultural lands and rural residential development.

Figure 1. Project Site and Nearby Natural Resources

IV. Criterion 1(A) Headwaters

The headwaters assessment involved both a remote review of the USGS topographic map, Vermont Hydrography Dataset (streams, rivers, and waterbodies), NRCS Soil Survey, ANR Atlas, and field investigation in July 2021. The Project is not located in a headwater as it is located within

a watershed with a drainage area greater than 20 square miles, is not characterized by steep slopes with shallow soils, and is not within a watershed of public water supplies designated by the Vermont Water Supply Division (ANR Atlas).

The Project is located approximately 1500' to the east of Lake Champlain. The Project will be constructed in accordance with the Vermont Standards & Specifications for Erosion and Prevention and Sediment Control, 2019. The proposed Project will not result in a reduction of the quality of ground or surface waters in the area. For these reasons, we conclude that the Project will have no adverse impact on headwater areas.

V. Criterion 1(D) Floodways

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

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

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

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

There are no stream resources within or in close proximity to the Project. The closest mapped stream resource is approximately 650' to the north of the Project. The Project will not result in any clearing of forest vegetation within the riparian buffer zone of this stream resource. For these reasons, we conclude that the Project will have no adverse impact on streams.

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

VII. Criterion 1(F) Shorelines

AE reviewed USGS topographic maps, the Vermont Hydrography Dataset (streams, rivers, and waterbodies), and digital orthophotography. The site of the proposed Project is not located on a shoreline of a river, lake, pond, or reservoir. The closest shoreline to the Project is that of Lake Champlain ~1480' to the west of the Project area. The Project area is not along the Lake and therefore will not result in any clearing of forest vegetation along the shores of the Lake. The proposed Project will result in no adverse impact to shorelines.

VIII. Criterion 1(G) Wetlands

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

AE field review confirmed the absence of wetland resources within or adjacent to the Project area. The closest mapped VSWI Class II wetland is approximately 450' to the north of the Project. The proposed Project will have no undue adverse impact on wetland resources.

IX. Criterion 8 Rare and Irreplaceable Natural Areas

The Rare and Irreplaceable Natural Areas assessment involved both a remote review of available digital maps for the Project area and a field review. AE reviewed digital orthophotography, the

NRCS Soil Survey, the 2011 Bedrock Geologic Map of Vermont, and the Wildlife Natural Heritage Inventory (NHI) Rare, Threatened and Endangered Species digital database.

The Project area is characterized as a disturbed forest dominated by northern white cedar (*Thuja occidentalis*) and white ash (*Fraxinus americana*). The understory of this forest is dominated by enchanter's nightshade (*Circaea canadensis*) and Virginia creeper (*Parthenocissus quinquefolia*) as well as various non-native invasive species including European buckthorn (*Rhamnus cathartica*), Oriental bittersweet (*Celastrus orbiculatus*) and dame's rocket (*Hesperis matronalis*).

This forest does not constitute a significant natural community or a Rare and Irreplaceable Natural Area (RINA).

No RINAs are present within the Project area, so there will be no adverse impacts on any Rare and Irreplaceable Natural Areas.

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

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

The site assessment was conducted on July 13, 2021 to assess wildlife, wildlife habitats, and threatened and endangered animal species.

A. Necessary Wildlife Habitats

1. White-tailed Deer Wintering Habitats

There are no mapped VT Fish and Wildlife Department white-tailed deer (*Odocoileus virginianus*) winter habitats in the Project area. Field investigation confirmed the absence of deer wintering habitat areas in the Project area. The Project will have no adverse impact on deer wintering habitat.

2. Black Bear Habitat

There is no bear habitat mapped by the Vermont Fish and Wildlife Department within the Project area and no observations of bear use or feeding (including bear claw scarring, bear dens, scat) were made during the field inventory of the forest in the Project area. The forest contained within the Project area is characterized as a disturbed forest dominated by northern white cedar (*Thuja occidentalis*) and white ash (*Fraxinus americana*). No potential black bear spring feeding wetlands were identified. The Project will therefore have no adverse impact on black bear feeding habitat.

3. Grassland Bird Habitat

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

B. Rare, Threatened and Endangered (RTE) Species

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

1. RTE Animal Species

The Northern Long Eared Bat (LEB) became a federally listed endangered species in May of 2015. Vermont Fish and Wildlife Department has issued guidance that project clearing constituting greater than 1% of the total forested area within a 1 square mile radius of a project triggers review for habitat loss of this endangered species. The tree clearing area for the Project is ~0.31 acres

constituting less than 0.10% of the total forested area within 1 square mile of the Project. The proposed clearing is minimal in nature and does not trigger additional conservation measures.

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

2. RTE Plant Species

There are no known records or occurrences of RTE plant species at the site. An RTE plant survey was conducted throughout the Project area on July 13, 2021 by Michael Lew-Smith. No RTE or uncommon plant species were discovered during this inventory. The plant species list for the survey is attached. The Project will have no adverse impact on RTE plant species.

XI. References

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Natural Resources Board. Vermont Wetland Rules. Effective January 21, 2020.

Natural Resources Conservation Service. Soil Survey Maps.

Ratcliffe, N.M., Stanley, R.S., Gale, M.H., Thompson, P.J., and Walsh, G.J., 2011, Bedrock geologic map of the Vermont: U. S. Geological Survey Scientific Investigations Map 3184, scale 1:100,000.

Thompson, Elizabeth H. and Eric R. Sorenson, and Robert J. Zaino. Wetland, Woodland, and Wildland: A Guide to the Natural Communities of Vermont. The Nature Conservancy of Vermont, 2019.

Vermont Center for Geographic Information (VCGI). EcologicHabitat_DEERWN GIS data layer. Provided by Vt. Dept. of Fish and Wildlife, release date April 1, 2011.

Vermont Fish and Wildlife Department Regulatory Review Guidance for Protecting Northern Long-eared Bats and Their Habitats. February 2017.

Vermont Fish and Wildlife Department. Guidance for Conducting Rare, Threatened, and Endangered Plant Inventories in Connection with Section 248 Projects, 2016.

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Rare, Threatened and Endangered Plant Inventory

Report Date: 7/14/2021

Project Name South Hero WEG

Botanist Michael Lew-Smith

Survey Date 7/13/2021

Description Early successional white cedar and white ash forest

Plant List

*note: plants with no listed S-Ranks are considered common in Vermont.

Plant Name	Common Name	S-Rank*	T/E	Plant Family
Convallaria majalis	lily-of-the-valley			Amaryllidaceae
Maianthemum racemosum	false Solomon's-seal			Amaryllidaceae
Rhus typhina	staghorn sumac			Anacardiaceae
Toxicodendron rydbergii	creeping poison-ivy			Anacardiaceae
Daucus carota	Queen Anne's lace			Apiaceae
Pastinaca sativa	parsnip			Apiaceae
Asclepias syriaca	common milkweed			Apocynaceae
Ambrosia artemisiifolia	common ragweed			Asteraceae
Arctium lappa	great burdock			Asteraceae
Cichorium intybus	chicory			Asteraceae
Cirsium vulgare	bull thistle			Asteraceae
Erigeron philadelphicus	Philadelphia fleabane			Asteraceae
Leucanthemum vulgare	common daisy			Asteraceae
Matricaria chamomilla	Chamomile			Asteraceae
Pilosella piloselloides	glaucous king-devil			Asteraceae
Solidago altissima	tall goldenrod			Asteraceae
Solidago canadensis	Canada goldenrod			Asteraceae
Solidago flexicaulis	zig-zag goldenrod			Asteraceae
Solidago gigantea	large goldenrod			Asteraceae
Sonchus arvensis	sow thistle			Asteraceae
Symphyotrichum cordifolium	heart-leaved aster			Asteraceae
Symphyotrichum lateriflorum	calico aster			Asteraceae
Symphyotrichum novae-angliae	New England aster			Asteraceae
Symphyotrichum puniceum	red-stemmed aster			Asteraceae
Taraxacum officinale	common dandelion			Asteraceae
Berberis thunbergii	Japanese barberry			Berberidaceae
Alliaria petiolata	garlic mustard			Brassicaceae
Brassica rapa	white turnip			Brassicaceae
Hesperis matronalis	dame's-rocket			Brassicaceae
Campanula rapunculoides	running bellflower			Campanulaceae

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Rare, Threatened and Endangered Plant Inventory

Report Date: 7/14/2021

Plant Name	Common Name	S-Rank*	T/E	Plant Family
Lonicera tatarica	Tartarian honeysuckle			Caprifoliaceae
Celastrus orbiculatus	Oriental bittersweet			Celastraceae
Cornus racemosa	gray dogwood			Cornaceae
Thuja occidentalis	northern white cedar			Cupressaceae
Carex blanda	woodland sedge			Cyperaceae
Carex gracillima	slender sedge			Cyperaceae
Carex granularis	meadow sedge			Cyperaceae
Carex pallescens	pale sedge			Cyperaceae
Carex radiata	stellate sedge			Cyperaceae
Carex rosea	rosy sedge			Cyperaceae
Dryopteris intermedia	intermediate woodfern			Dryopteridaceae
Medicago lupulina	black medick			Fabaceae
Melilotus albus	white sweet clover			Fabaceae
Melilotus officinalis	yellow sweet clover			Fabaceae
Securigera varia	crown vetch			Fabaceae
Trifolium repens	white clover			Fabaceae
Vicia cracca	cow vetch			Fabaceae
Geranium robertianum	herb robert			Geraniaceae
Hypericum perforatum	common St. John's-wort			Hypericaceae
Hemerocallis fulva	common daylily			Iridaceae
Ajuga reptans	carpet bugle			Lamiaceae
Clinopodium vulgare	wild basil			Lamiaceae
Nepeta cataria	catnip			Lamiaceae
Prunella vulgaris	self-heal			Lamiaceae
Thymus pulegioides	thyme			Lamiaceae
Streptopus lanceolatus	rosy twisted-stalk			Liliaceae
Tilia americana	basswood			Malvaceae
Fraxinus americana	white ash			Oleaceae
Syringa vulgaris	common lilac			Oleaceae
Circaea canadensis	tall enchanter's nightshade			Onagraceae
Oenothera biennis	common evening primrose			Onagraceae
Epipactis helleborine	helleborine			Orchidaceae
Oxalis stricta	tall yellow wood-sorrel			Oxalidaceae
Chaenorhinum minus	lesser toadflax			Plantaginaceae
Plantago major	plantain			Plantaginaceae
Veronica serpyllifolia	thyme-leaved speedwell			Plantaginaceae
Agrostis capillaris	colonial bent			Poaceae

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Rare, Threatened and Endangered Plant Inventory

Report Date: 7/14/2021

Plant Name	Common Name	S-Rank*	T/E	Plant Family
Bromus inermis	Hungarian brome			Poaceae
Dactylis glomerata	orchard grass			Poaceae
Elymus repens	witch grass			Poaceae
Eragrostis minor	little love-grass			Poaceae
Festuca trachyphylla	hard fescue			Poaceae
Phleum pratense	Herd's grass			Poaceae
Poa pratensis	Kentucky bluegrass			Poaceae
Persicaria pensylvanica	Pennsylvania smartweed			Polygonaceae
Polygonum aviculare	dooryard knotweed			Polygonaceae
Rumex triangulivalvis	willow-leaved dock			Polygonaceae
Actaea rubra	red baneberry			Ranunculaceae
Anemone virginiana	thimbleweed			Ranunculaceae
Ranunculus acris	common buttercup			Ranunculaceae
Rhamnus cathartica	buckthorn			Rhamnaceae
Geum canadense	white avens			Rosaceae
Prunus pensylvanica	fire cherry			Rosaceae
Prunus virginiana	choke cherry			Rosaceae
Rubus idaeus	red raspberry			Rosaceae
Galium mollugo	common bedstraw			Rubiaceae
Galium triflorum	sweet-scented bedstraw			Rubiaceae
Zanthoxylum americanum	prickly ash			Rutaceae
Acer negundo	box-elder			Sapindaceae
Verbascum thapsus	common mullein			Scrophulariaceae
Solanum dulcamara	bittersweet nightshade			Solanaceae
Ulmus americana	American elm			Ulmaceae
Viburnum opulus	guelder-rose			Viburnaceae
Viola sp.	violet			Violaceae
Parthenocissus quinquefolia	woodbine			Vitaceae
Vitis riparia	riverbank grape			Vitaceae