Environmental Assessment for Coventry Solar Project
New England Waste Services of Vermont, Inc.
Coventry, Vermont

Prepared by:
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October 23, 2012

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Environmental Assessment for a Coventry Solar Project
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I. Summary Findings

Arrowwood Environmental, LLC (AE) conducted an environmental assessment for the proposed Coventry Solar Project ("Project") during the summer of 2012. AE concludes that the Project has been sited and designed to avoid adverse impacts to environmental resources including shorelines, streams and headwaters, wetlands, rare and irreplaceable natural areas, necessary wildlife habitat and rare, threatened and endangered species.

In summary, there are no shorelines, headwaters, rare and irreplaceable natural areas, necessary wildlife habitat, or rare, threatened and endangered animal habitat or plant species at the Project site. Thus, there will be no adverse impact on these resources. The closest stream is approximately 50' south of the Project site. The Project incorporates an undisturbed 50' buffer to the stream resource, preventing any adverse impact on streams.

The Project involves approximately 39.4 sq.ft of impact to Class 2 wetland resources and 2308 sq.ft of impact to wetland buffer resources. The applicant has worked in collaboration with the Vermont Wetlands Office to design a project which results in no adverse impacts to protected wetland functions and values. The applicant filed a Vermont Wetland Permit on September 28, 2012 and expects to receive a Wetlands Permit for the proposed project in support of Criterion 1(G). For this reason, the proposed Project will have no adverse impact on wetlands.

II. Introduction and Project Description

Arrowwood Environmental, LLC (AE) was retained by New England Waste Services of Vermont, Inc. (hereinafter "NEWSVT" or the "Applicant") to perform an environmental assessment for a proposed 2.2 megawatt photovoltaic (solar) electric generation facility located on a portion of an undeveloped parcel of land owned by NEWSVT on the easterly side of Airport Road in Coventry, Vermont (hereinafter referred to as the "Coventry Solar Project" or the "Project").

The proposed Coventry Solar Project will be located on an approximately 12.2 acre portion of an approximately 57.3 acre parcel of undeveloped land that NEWSVT owns along the easterly side of Airport Road which is across the street from the existing Coventry Landfill. The Project will be comprised of approximately 11,000 photovoltaic panels, secured in a ground-mounted racking system that will be fixed at a 20-degree angle. A new access road will be built on the westerly portion of the Project parcel to accommodate construction and post-construction inspections and maintenance.

This report outlines AE's findings related to environmental criteria incorporated by the Public Service Board into the review of solar projects, including: streams and headwaters, outstanding resource waters, shorelines, wetlands, rare and irreplaceable natural areas, necessary wildlife habitat, and rare, threatened and endangered plant and animal species.

The environmental assessment involved both a remote review of available digital databases as well as field investigations in the Project Area and vicinity. Field visits were made to the Project Area in July and August of 2012. The following map indicates the approximate study area included in this assessment.

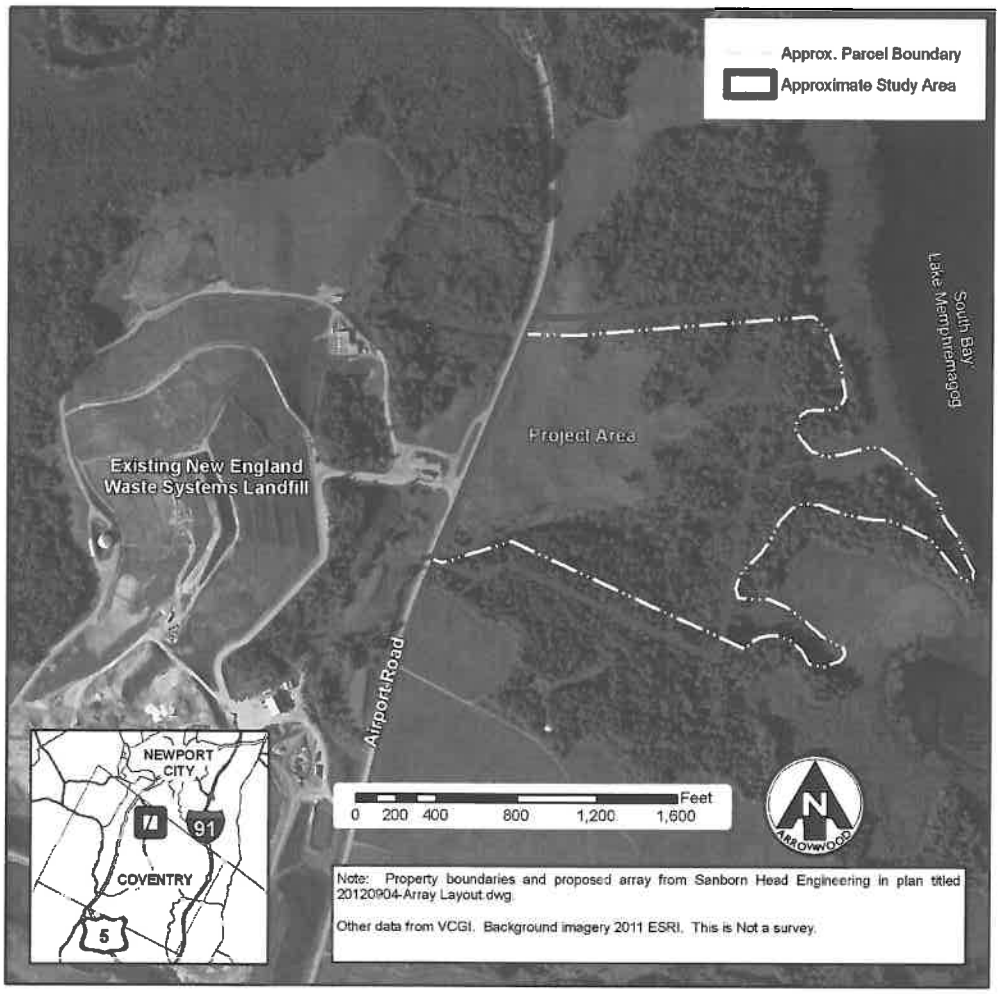

Figure 1: Resource Assessment Area Map

III. Site Characterization

The Project Area is located in the town of Coventry, Vermont, on Airport Road. Ecologically the Site is within the Northern Vermont Piedmont biophysical region of the state (Thompson and Sorenson, 2000). The Site is located at approximately 720'-790' in elevation and slopes generally eastward toward the South Bay of Lake Memphremagog ("South Bay"). The Site is approximately 1200' to the west of South Bay, and 2,500' to the east of the Black River. The bedrock geology of the Site is mapped as the Waits River formation with carbonaceous

limestone and phyllites (Bedrock Geologic Map, 2011). The soils are mapped as Lamoine and Scantic soil series (NRCS Orleans County Soil Survey), which are silt loams. The Project Site is characterized as a hay field with slopes generally ranging from 3 to 22 percent. The Site is bound by the extensive South Bay wetlands complex to the north, east and west. There are areas of wetland meadow within the northern portion of the Project Area.

IV. Criterion 1(F) Shorelines

AE reviewed USGS topographic maps, the 2008 Vermont Hydrography Dataset (streams, rivers, and waterbodies), and digital orthophotography (Vermont 1:5000 orthophoto program: VCGI. 1994, 2006, 2011 color infrared, and ESRI's Bing Maps Aerial, 2011). The Site of the proposed Project is not located on a shoreline. The Project is approximately 1200' from the shoreline of South Bay. The Project will not result in any clearing of forest vegetation along the shore of South Bay. The proposed Project will result in no adverse impact to shorelines.

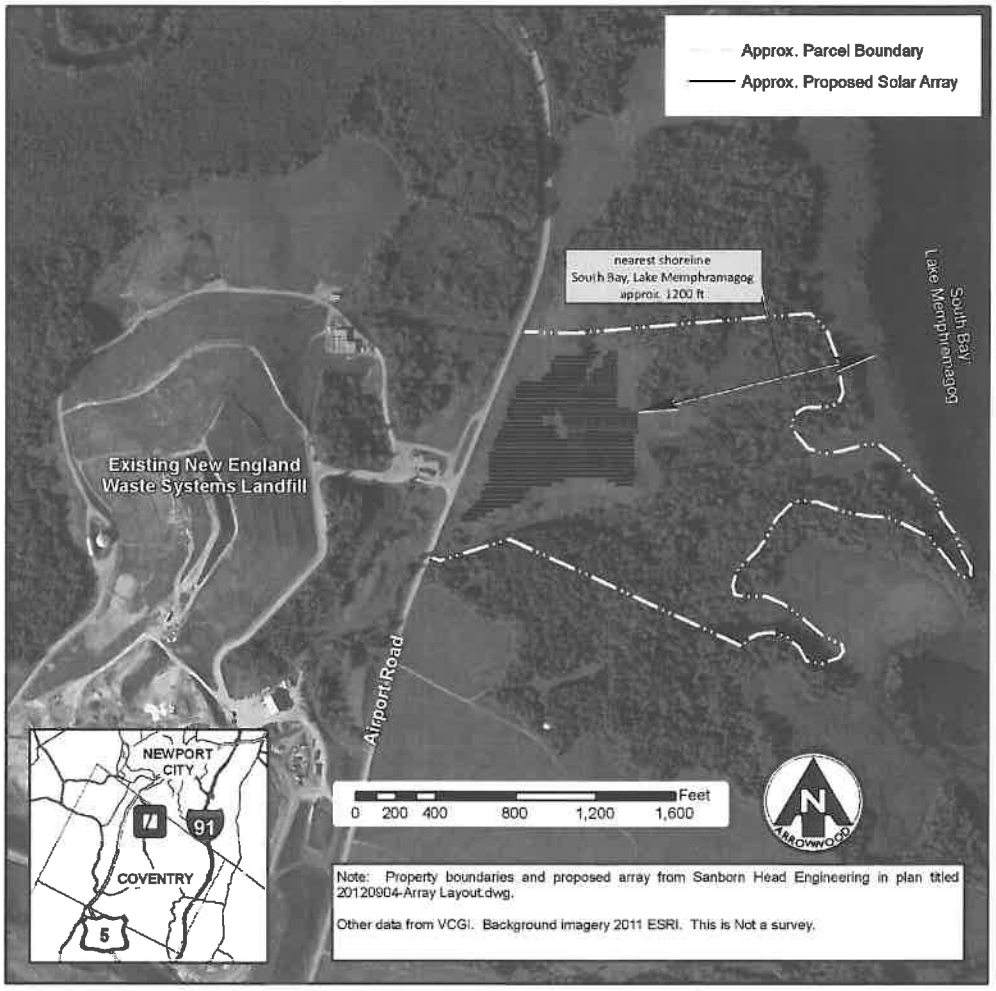

Figure 2: Shorelines Map

V. Criterion 1(A) Headwaters and Criterion 1(E) Streams

The headwaters and stream assessment involved both a remote of the USGS topographic map and 2008 Vermont Hydrography Dataset (streams, rivers, and waterbodies) and a field investigation on June 19 and July 26, 2012. The Project Area is located below an elevation of 1500'. There are no surface waters within the Project Area. The closest mapped stream is approximately 50' south of the Project area. This stream originates from a manmade pond on the west side of Airport Road. The drainage area of this stream is less than 20 square miles. This stream is culverted under Airport Road before reaching the subject Site. The stream flows to the

south of the Project Area and eventually into South Bay, which is not a public water supply. The stream as it flows through the site south of the Project Area, is not a headwater. Thus, there will be no adverse impacts on headwaters.

The Project has been designed to maintain a 50' undisturbed riparian buffer to this intermittent stream to the south of the Project Area. The Project will result in no clearing on the banks of this stream. Stormwater conveyance swales for treatment will convey stormwater from the proposed array area to the north, outside the watershed for this small stream. For these reasons, there will be no adverse impacts on streams.

The Water Resources Panel has listed four waterways as Outstanding Resource Waters: 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 Outstanding Resources in the Project Area.

VI. Criterion 1(G) Wetlands

The wetland assessment involved both a remote review of available maps (including Vermont Significant Wetland Inventory Maps (VSWI 2010) and the NRCS Soil Survey) and a field inventory component conducted on June 19 and July 26, 2012. Remote review of the VSWI maps for the area indicates that there are Class II wetlands associated with the Black River and South Bay Wildlife Management Areas to the north, east and south of the Project Area. The wetlands identified in this assessment are contiguous to these mapped wetlands and therefore considered Class II wetlands per the Vermont Wetland Rules (Natural Resources Board, 2010).

Wetlands within and in the vicinity of the Project Area were delineated and surveyed within the Project Area. The two wetlands identified within the Project Area are ultimately connected (off property) to the South Bay wetland complex. Wetland boundaries were surveyed with professional grade GPS on June 19, 2012 and are shown on the following map (Figure 3).

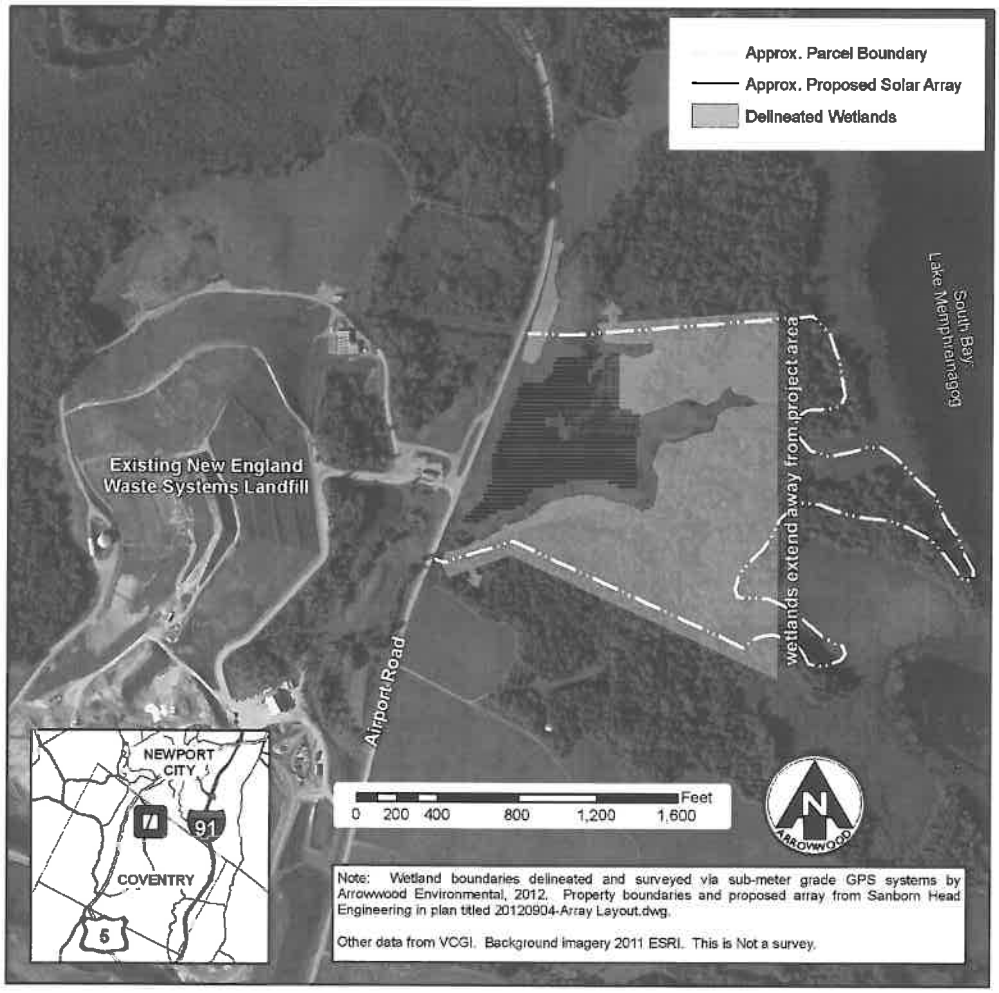

Figure 3. Wetlands Map

While the South Bay forested and emergent marsh wetlands, located to the north, east and south of the Project Area, are likely significant for many of the ten functions and values as outlined in the Vermont Wetland Rules, the wetland meadows in the Project Area are only minimally significant for flood storage and water quality.

Figure 4. Wetland Meadow in Eastern Portion of Project Site (7/26/2012)

The proposed Project will involve the installation of solar arrays within approximately 1.1 acres of wetland meadow and 1.2 acres of the associated 50' buffer of this wetland (hay field). Direct wetland impacts will total approximately 38.5 sq.ft for the pilings of the solar arrays and 0.9 sq.ft for the posts for the perimeter fencing. Direct impacts to the wetland buffer involve approximately 36 sq.ft for pilings, 0.4 sq.ft for perimeter fence posts, 172 sq.ft for plunge pools and level spreaders, and 2,100 sq.ft, of temporary disturbance for conduit trenching. There is a total of 2,308 sq.ft of buffer impact associated with the Project. While approximately 8 acres of the Project area will be graded to 7 percent slopes, there shall be no grading within the wetlands or wetland buffer zone.

The Applicant has worked in collaboration with the Vermont Wetlands Office to design a project which results in no adverse impacts to protected wetland functions and values. Upon project completion, the wetland and wetland buffer will be maintained as mown meadow, similar to the existing site condition. The physical and vegetative characteristics that provide for the functions of flood storage and water quality will be unaffected by the proposed Project.

Stormwater quantity and quality shall be controled in the Project Area. The Project will require several stormwater related permits and modifications to the NEWSVT Landfill Facility's Stormwater Pollution Prevention Plan. The NEWSVT Landfill Facility currently has a Stormwater Discharge (SWD) Permit for treatment of stormwater associated with their landfill operations (Permit No. 3160-9015A, dated November 9, 2009). The SWD Permit will be amended to include the stormwater conveyance and treatment system features for the Coventry Solar Project. Stormwater runoff will be controlled on-site with stormwater management components that have been designed to remove potential pollutants based on guidance in the State of Vermont Stormwater Management Manuals (Volumes I and II dated April 2002). Stormwater management components include grass-lined swales, rock-lined swales, level spreaders, and check dams. Stormwater runoff from impervious surfaces created during this project will be conveyed through one of two grass-lined open channel swales and level spreaders before being discharged off-site.

An Erosion Prevention and Sediment Control (EPSC) Plan was prepared as part of the Individual Construction Stormwater Discharge (ICSD) Permit Application. The EPSC Plan includes erosion control measures, including silt fencing with staked hay bale support, stone check dams, interceptor swales, and a stabilized construction entrance that will be used to limit the likelihood of sediment leaving the site during construction. The EPSC Plan was prepared for the construction phases of the Project using the State of Vermont Handbook for Erosion Prevention and Sediment Control (dated 2006 with 2008 amendments) to limit soil erosion. For these reasons, the proposed Project will not have an adverse impact on water quality in the wetlands within and adjacent to the Project area.

The Applicant filed a Vermont Wetland Permit on September 28, 2012 and expects to receive an Individual Wetlands Permit for the proposed Project in support of Criterion 1(G). For this and the reasons outlined above, the proposed Project will have no adverse impact on wetlands.

VII. Criterion 8 Rare or Irreplaceable Natural Areas

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

the Orleans County Soil Survey, the 2011 Bedrock Geologic Map of Vermont and the Wildlife Nongame and Natural Project (NNHP) Rare, Threatened and Endangered Species digital database. Michael Lew-Smith, AE botanist, reviewed the site on August 2, 2012. The Project Area consists of an actively managed agricultural field. No Rare or Irreplaceable Natural Areas are present within the Project Area. Since there are not Rare or Irreplaceable Natural Areas in the Project Area, there will be no adverse impacts on any Rare or Irreplaceable Natural Areas.

VIII. Criterion 8(A) 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, Vermont Dept. of Fish and Wildlife bear point's database, USGS Topographic map, "VT HYDRODEM" elevation data) within the Project Area and within the vicinity of the Project Area.

A Site visit was conducted on August 13, 2012 by Jeffrey Parsons of Arrowwood Environmental to assess wildlife, wildlife habitats, and rare, threatened, and endangered animal species.

A. General Environment and General Wildlife Habitat

As mentioned above, The Project Area consists of open hay fields dominated by various planted species (see Table 1). There are some field apple trees on the edge of the fields. The agricultural fields show evidence of use by white-tailed deer, groundhogs, skunk, red fox (and perhaps grey fox), small mice and voles, and birds. Apple trees located on the edge of fields exhibit signs of use by white-tailed deer and fox. It is expected that the Eastern coyote, raccoon, and various hawks also feed in the Project Area.

B. 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 area. The nearest State mapped deer wintering area is over 3 miles away from the Project site. Field investigation confirmed that there are no deer wintering habitats in the Project Area.

2. Black Bear Habitat

The open field comprising the Project Area does not provide habitat for the black bear (*Ursus americanus*) and no sign of black bear was found at the proposed Site. The nearest "productive" black bear habitat mapped by the Vermont Fish and Wildlife Department is over 2 miles away and separated from the Site by well-traveled paved roads.

It is likely that black bear occasionally utilize the emergent marsh habitat that immediately borders the South Bay for feeding. The proposed Project Area is approximately 800' from the emergent marsh wetland. It is our opinion that any black bear use of the South Bay emergent marsh wetlands will continue unhindered by the operation of the proposed facility, and most likely, during the construction of the Project. Noise impacts from the Project will be minimal. The Applicant seeking permission for extended construction hours so the Project can be built and commissioned by the end of 2012. The vegetative buffer between the proposed Project and the marsh wetland consists of dense multilayered trees and shrubs and will provide a good auditory and visual buffer to the marsh area.

C. Rare, Threatened, and Endangered Animal Species

1. Grassland Birds

The open fields of the Project Area were investigated by AE for the presence of two species of grassland birds, the upland sandpiper (*Bartramia longicauda*), and the grasshopper sparrow (*Ammodramus savannarum*) during 2 separate occasions in July 2001-2002. Breeding songs of the grasshopper sparrow and the upland sandpiper were telecast in the fields before 6:00 am in the morning. Neither the upland sandpiper nor the grasshopper sparrow was recorded. The agricultural field in question is relatively small (under 25 acres) and probably could not support a breeding population of either bird. On one of the site visits, Mr. Doug Bruce from the Vermont Audubon Society accompanied AE personnel. Mr. Bruce concurred with AE's position that

monitoring in this particular field be discontinued because it was too small to harbor a population of either species. Monitoring of this field was discontinued in 2002.

2. Bald Eagle

Vermont Fish and Wildlife Department officials have reported that a bald eagle (*Haliaeetus leucocephalus*) was nesting within the South Bay Wildlife Management Area at a distance of approximately 1500' from the proposed Project Area. The exact location was not revealed by Vermont Fish and Wildlife officials. AE concludes that given the nature of the proposed Project and the distance from the nest, that the proposed Project will not impact the nest. Vermont Fish and Wildlife Technician Tim Appleton has stated in a telephone conversation that the Vermont Fish and Wildlife Department is also not concerned about the proposed Project because they feel the undisturbed buffer distance is adequate to protect the nest (telephone conversation, August 2012).

D. Rare, Threatened and Endangered Plant Species

An inventory of rare, threatened and endangered plant species was undertaken by AE botanist Michael Lew-Smith at the Project site on August 2, 2012. A complete list of species encountered during this survey is presented in Table 1. No state or federal rare, threatened or endangered species were discovered during this survey.

The Site does not contain necessary wildlife habitat, and is not in close proximity to any necessary wildlife habitat. The Site does not harbor any rare, threatened or endangered plant or animal species and is not in close proximity to any recorded observations of such resources. Thus, there will be no adverse impacts to necessary wildlife habitat, or rare, threatened or endangered plant or animal species as a result of the proposed Project.

IX. References

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Argentine, Cindy Corlett. Vermont Act 250 Handbook. Putney Press. 2008.

Bruce, Doug. Vermont Audubon Society. Personal communication with Jeffrey Parsons. 2002.

Natural Resources Board. Vermont Wetland Rules. Effective August 1, 2010.

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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. Wetland, Woodland, and Wildland: A Guide to the Natural Communities of Vermont. The Nature Conservancy of Vermont, 2000.

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

Table 1: List of Plant Species at the Proposed Coventry Solar Site

LATIN NAME	COMMON NAME	FAMILY
Acer rubrum	Red Maple	Aceraceae
Apocynum androsaemifolium	Spreading Dogbane	Apocynaceae
Ilex verticillata	Winterberry Holly	Aquifoliaceae
Asclepias syriaca	Common Milkweed	Asclepiadaceae
Achillea millefolium	Common Yarrow	Asteraceae
Arcticum lappa	Great Burdock	Asteraceae
Aster puniceus	Purple Stemmed Aster	Asteraceae
Centaurea nigrescens	Dark Knapweed	Asteraceae
Cirsium vulgare	Common Thistle	Asteraceae
Eupatorium maculatum	Common Joe-pye Weed	Asteraceae
Eupatorium perfoliatum	White Boneset	Asteraceae
Euthamia graminifolia	Grass-leaved Goldenrod	Asteraceae
Hieracium sp.	Hawkweed	Asteraceae
Solidago gigantea	Giant Goldenrod	Asteraceae
Solidago rugosa	Rough-stemmed Goldenrod	Asteraceae
Sonchus arvensis	Field Sow-thistle	Asteraceae
Tanacetum vulgare	Tansy	Asteraceae
Taraxacum officinale	Common Dandelion	Asteraceae
Tragopogon pratensis	Yellow Goat's-beard	Asteraceae
Impatiens capensis	Orange Jewelweed	Balsaminaceae
Alnus incana	Speckled Alder	Betulaceae
Betula populifolia	Gray Birch	Betulaceae
Myosotis scorpioides	Common Forget-me-not	Boraginaceae
Brassica cf nigra	Black Mustard	Brassicaceae
Stellaria graminea	Grass-leaved Chickweed	Caryophyllaceae
Cornus sericea	Red-Osier Dogwood	Cornaceae
Carex cf scoparia	Pointed Broom Sedge	Cyperaceae
Carex cf vesicaria	Bladder Sedge (III)	Cyperaceae
Carex gynandra	Gynandrous Sedge	Cyperaceae
Carex lurida	Garish Sedge	Cyperaceae
Carex pallescens	Pale Sedge	Cyperaceae
Carex stipata	Stipitate Sedge	Cyperaceae
Carex vulpinoidea	Foxtail Sedge (II)	Cyperaceae
Scirpus atrovirens sens. lat.	Black-green Bulrush	Cyperaceae
Scirpus microcarpus	Small-fruited Bulrush	Cyperaceae
Athyrium filix-femina	Lady Fern	Dryopteridaceae
Onoclea sensibilis	Sensitive Fern	Dryopteridaceae
Equisetum arvense	Common Horsetail	Equisetaceae
Lotus corniculatus	Bird's-foot Trefoil	Fabaceae

Trifolium hybridum	Alsike Clover	Fabaceae
Trifolium repens	White Clover	Fabaceae
Vicia cracca	Cow-vetch	Fabaceae
Juncus effusus	Common Rush	Juncaceae
Luzula multiflora	Common Woodrush	Juncaceae
Lycopus uniflorus	Common Water-horehound	Lamiaceae
Mentha spicata	Spearmint	Lamiaceae
Mentha spicata	Spearmint	Lamiaceae
Prunella vulgaris	Self-heal	Lamiaceae
Oxalis acetosella	Common Wood-Sorrel	Oxalidaceae
Picea rubens	Red Spruce	Pinaceae
Plantago lanceolata	English Plantain	Plantaginaceae
Agrostis capillaris	Rhode Island Bent	Poaceae
Anthoxanthum odoratum	Sweet Vernal Grass	Poaceae
Bromus inermis	Smooth Brome	Poaceae
Dactylis glomerata	Orchard Grass	Poaceae
Elytrigia repens	Quackgrass	Poaceae
Festuca sp.	Fescue	Poaceae
Glyceria grandis	Great Mannagrass	Poaceae
Phalaris arundinacea	Reed Canary Grass	Poaceae
Phleum pratense	Timothy	Poaceae
Poa pratensis	Common Bluegrass	Poaceae
Polygonum cf persicaria	Lady's Thumb	Polygonaceae
Polygonum sagittatum	Arrow-leaved Tearthumb	Polygonaceae
Rumex cf orbiculatus	Great Water Dock	Polygonaceae
Rumex crispus	Curly Dock	Polygonaceae
Ranunculus acris	Common Buttercup	Ranunculaceae
Fragaria vesca	Wood Strawberry	Rosaceae
Potentilla simplex	Common Cinquefoil	Rosaceae
Prunus serotina	Black Cherry	Rosaceae
Pyrus malus	Apple	Rosaceae
Rosa eglanteria	Eglantine Rose	Rosaceae
Rubus allegheniensis	Common Blackberry	Rosaceae
Spiraea alba	Meadow-sweet	Rosaceae
Spiraea tomentosa	Steeplebush	Rosaceae
Galium mollugo	European Bedstraw	Rubiaceae
Salix cf discolor	Common Pussy Willow	Salicaceae
Salix petiolaris	Slender Willow	Salicaceae
Rhinanthus crista-galli	Yellow Rattle	Scrophulariaceae
Thelypteris palustris	Marsh Fern	Thelypteridaceae
Typha latifolia	Broad-leaved Cattail	Typhaceae
Parthenocissus quinquefolia	Common Woodbine	Vitaceae