STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Petition of Davenport Solar, LLC for a certificate of public good, pursuant to 30 V.S.A. § 248, authorizing the installation and operation of a 15 MW solar electric generation facility in Brandon, Vermont	)))))	Case No. 18-3709-PET

PREFILED TESTIMONY OF ERIC SORENSON

On Behalf of the Vermont Agency of Natural Resources, Fish and Wildlife Department

Summary of Testimony

Mr. Sorenson is a natural community ecologist with the Fish and Wildlife Department of the Vermont Agency of Natural Resources. The purpose of his testimony is to discuss the significance of the Project site and surrounding area, the natural resource values associated with this area, and the modifications which have been made to the Project in order to reduce its impacts on the natural environment, in particular on ecological landscape connectivity.

Introduction of Witness, Qualifications, and Purpose of Testimony

Q1. Please state your name, place of employment, and your occupation.

A1. My name is Eric Sorenson. I am a natural community ecologist with the Vermont Fish and Wildlife Department (VFWD) of the Vermont Agency of Natural Resources (VANR) and work from the Barre district office.

Q2. How long have you held your current position?

A2. I have been in this position since 1996.

Q3. What are your responsibilities in your current position?

A3. In my position as ecologist with the VFWD, I am responsible for the identification and classification of Vermont's upland and wetland natural communities. I am the co-author of a book on Vermont's natural communities.[1] The majority of my work is to inventory, map, and evaluate significant natural communities across Vermont and to work with landowners on appropriate management and conservation. Both working with the VFWD and in my previous position with the Vermont Department of Environmental Conservation (VDEC), I have been responsible for evaluating the significance of wetland and upland natural communities associated with the regulatory

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[1] Thompson, E.H., Sorenson, E.R., and Zaino, R.J. *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (2nd ed.). 2019. Published by Vermont Fish and Wildlife Department, The Nature Conservancy, and Vermont Land Trust. Distributed by Chelsea Green Publishing.

process, including the Vermont Wetland Rules, wetland reclassification, Act 250, Section 248, and 401 Water Quality Certification. I have developed the VANR's position and testified before District Environmental Commissions, the Environmental Board, the Natural Resources Board (former Water Resources Board) in civil court settings, and I have provided testimony to the Public Utility Commission (formerly Public Service Board). Typically, the goal of my work in the regulatory arena is to identify significant natural communities, important forest blocks, and ecological landscape connectivity, and to work with applicants to avoid and/or minimize adverse effects on these natural areas.

Q4. Please describe your educational background and relevant work experience.

A4. I have a B.S. degree from the University of Michigan in Natural Resources and Wildlife Ecology. I have an M.S. degree from the University of Maine in Botany and Plant Ecology. Prior to my current position I worked from 1989 until 1996 as a wetland ecologist with VDEC implementing the Vermont Wetland Rules. I also worked as a wetland consultant in Massachusetts for two years and as an ecologist in Maine for one year. I have included a copy of my resume with my testimony (**Exhibit ANR-ES-1**).

Q5. Have you previously provided testimony to the Public Utility Commission?

A5. Yes, I provided written testimony on behalf of VFWD regarding Docket 7373, the VELCO Southern Loop project. I also provided written and oral testimony regarding Docket 7508 Georgia Mountain Community Wind, LLC; Docket 7628 Kingdom Community Wind in Lowell; Docket 7970 Addison County Natural Gas in Chittenden and Addison Counties; and Docket 8601 Verizon RSA Limited Partnership and Cellco Partnership.

Q6. What is the purpose of your testimony in this proceeding?

A6. The purpose of my testimony is to identify and discuss natural resource features associated with the site of the proposed Davenport Solar project, located on Carver Street in Brandon ("Project"). Specifically, I will discuss the importance of these features at the Project site and their functions related to the site itself and the broader topic of **ecological landscape connectivity**. The Project site is part of a regionally significant landscape and wildlife connection between the Adirondack Mountains and the Green Mountains. I will address the potential fragmenting effects of the Project as originally proposed as they relate to structural and functional landscape connectivity. I will then discuss the modifications made to the Project and the terms and conditions of the April 1, 2020 memorandum of agreement ("MOU") between Davenport Solar and the Agency. Finally, I will explain why those modifications are necessary in order to reduce the Project's fragmenting affects and impacts on ecological landscape connectivity to a level which is acceptable and which meets the standard of no undue adverse effect on the natural environment contained in 30 V.S.A. § 248(b)(5).

<u>Materials Reviewed</u>

Q7. What materials have you reviewed that have been submitted to the Commission as part of this proceeding?

A7. I have reviewed the following:

i. Petition for a Certificate of Public Good dated October 26, 2018.

ii. The prefiled testimony of Ian Jewkes, dated October 26, 2018.

iii. The site plans prepared by Krebs and Lansing Consulting Engineers titled "Davenport Solar, LLC; Proposed Solar Array", dated 10/9/18, Sheets C-100 through C-109. (Exhibit Petitioner IAJ-2)

iv. The site plan prepared by Krebs and Lansing Consulting Engineers titled "Davenport Solar, LLC; Proposed Solar Array", dated 10/9/18, Sheets C-100, revised 1-28-19 (update tree clearing)

v. The prefiled testimony of Daniel Herzlinger, dated October 26, 2018.

vi. The Natural Resources Assessment Report: Davenport Solar, LLC, prepared by TRC, dated October 2018. (Exhibit Petitioner DJH-2)

vii. The Response of Petitioner to Agency of Natural Resources' Information Requests on Petitioner, dated February 8, February 14, and March 22, 2019.

viii. The amended and restated prefiled testimony of Ian Jewkes, dated April 10, 2020.

ix. The revised site plans prepared by Krebs and Lansing Consulting Engineers titled "Davenport Solar, LLC, Carver Street, Brandon, Vermont", dated 10/9/18, latest revision 3/18/2020, 14 Sheets, C-100 is the Site Plan, C-100A is the Detail of Southern Cobble. (Exhibit Petitioner IAJ-2 Revised)

x. The amended and restated prefiled testimony of Daniel Herzlinger, dated April 10, 2020.

xi. The Natural Resources Assessment Report: Davenport Solar, LLC, prepared by TRC, dated October 2018, revised April 2020. (Exhibit Petitioner DJH-2 Revised)

xii. The supplemental prefiled testimony of Jeremy Owens, dated April 10, 2020.

xiii. The Active Restoration Plan prepared by T.J. Boyle Associates, LLC, dated 3/11/2020. (Exhibit Petitioner JBO-6)

Q8. Have you conducted site visits to evaluate the Project site and surrounding areas?

A8. I have visited the Project site on two dates: June 15, 2017 and May 15, 2019. My site visits were concentrated on observations of natural community type, vegetation composition, forest condition, fields, wetlands, and wildlife signs on the Project site. I also walked and made observations of similar features along approximately 1.8 miles of Carver Street and in the Otter Creek riparian area adjacent to and near the Project site. From the open fields on the Project site, I also observed the greater landscape setting, including the Southern Green Mountains to the east and the Taconic Mountains to the west.

Q9. Are there other tools that you have used to evaluate the Project site and its significance for ecological landscape connectivity?

A9. Yes, I have used and viewed data layers in ArcMAP (ESRI Geographic Information Systems software) that are generally available from the Vermont Center for Geographic Information (http://vcgi.vermont.gov/) or the VANR. These include: existing records of state-significant natural communities and rare species (VFWD, Natural

Heritage Database); soils maps by the Natural Resources Conservation Service; wetland maps; connectivity blocks, interior forest blocks, riparian areas, and wildlife road crossings as mapped by the VFWD; and aerial photographs from various dates that show land cover and land use. I have also used other available landscape analyses that I will describe in more detail later in my testimony. These tools help to provide a broader understanding of the landscape connectivity functions of the Project site and the Project's potential effects on these functions and on the natural environment.

Background and Terminology

Q10. Your introduction contains several words and phrases, for example "natural communities," "connectivity blocks," "interior forest blocks," "riparian areas," and "ecological landscape connectivity," which may not be commonly understood. Would you please elaborate on the meaning of these in the context of the work you do and your testimony in this case?

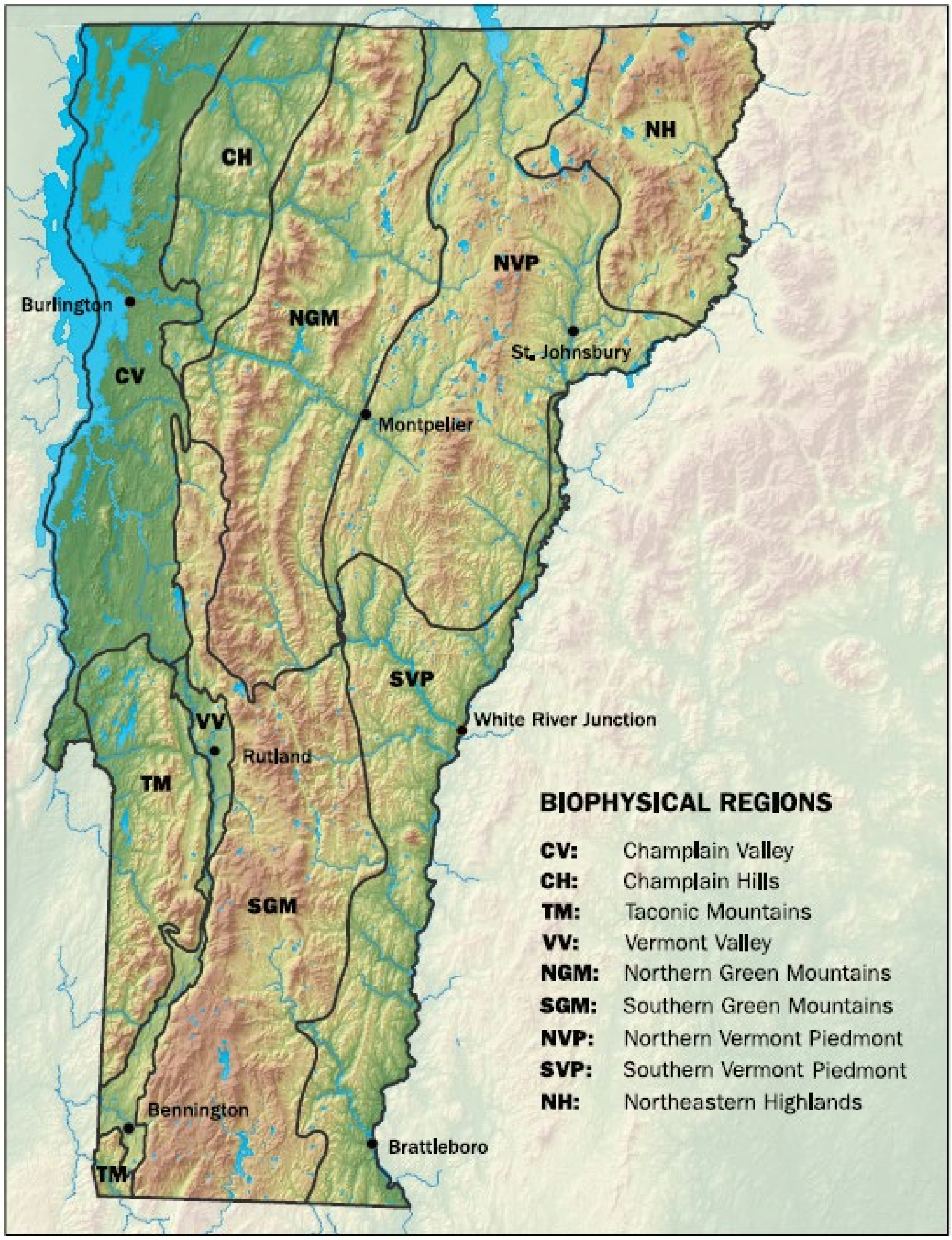
A10. Yes. As previously mentioned, much of my work as an ecologist is focused on the appropriate management and conservation of Vermont's natural communities and the ecological and physical landscape. It is important to understand both large landscape scale features and more local scale features, such as natural communities and habitat, in order to make informed land management and conservation decisions. There are many important components at the landscape and natural community scales. In order to help identify these components and understand their ecological functions in the landscape, both individually and collectively, ecologists and other scientists working in related fields use terms which have certain meaning in this type of work. A good place to start is with the term **natural community**. A natural community is an interacting assemblage of plants and animals, their physical environment, and the natural processes that affect them.

These interacting assemblages of plants and animals repeat across the landscape wherever similar environmental conditions (such as bedrock, soils, slope, aspect, and hydrology) exist. As a result, it is possible to describe these repeating assemblages as distinct natural community types. In Vermont, we currently recognize 97 upland and wetland natural community types. 47 of these are upland natural communities and 50 are wetland natural communities. Natural communities provide ecologists and conservation planners with a powerful tool for understanding and describing the landscape, developing sound land management plans, identifying conservation priorities, and increasing our understanding of the natural world.

Each natural community type is assigned a State Rank that describes the rarity of that community type in Vermont. State Ranks range from S1 (extremely rare) to S5 (common and widespread) and are assigned based on the number of known occurrences of the type, the total area occupied by the type, and the degree of threat to the type. The VFWD conducts statewide inventories and maintains a database of natural communities that are considered state significant. State-significant natural communities are those that meet VFWD standards based on assessment of the size, current condition, and landscape context in which the community occurs relative to other examples of that natural community type in Vermont.

Vermont is separated into nine biophysical regions. A **biophysical region** is an area of the state that has similar climate, geology, topography, soils, natural communities, and human land use history, compared to other regions. Vermont's nine biophysical regions are shown on the following map.[2] The Project site is located at the very northern end of the Vermont Valley, at a narrow section of the Vermont Valley, with the Southern and Northern Green Mountains biophysical regions to the east and the Taconic Mountains biophysical region to the west.

[2] Thompson, E.H., Sorenson, E.R., and Zaino, R.J. *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (2nd ed.). 2019. Published by Vermont Fish and Wildlife Department, The Nature Conservancy, and Vermont Land Trust. Distributed by Chelsea Green Publishing.



A **forest block** (also called habitat block) is an area of contiguous forest and other natural habitats that are unfragmented by roads, development, or agriculture. Vermont's forest blocks are primarily forests, but also include wetlands, rivers and streams, lakes and ponds, cliffs, and rock outcrops. Forests included in blocks may be young, early-successional stands, actively managed forests, or mature forests with little or no recent logging activity. The defining factor is that there is little or no permanent habitat fragmentation from roads, agricultural lands, and other forms of development within a forest block. Vermont's forest blocks were identified and ranked for ecological values in a study by VFWD and partners.[3]

A **connectivity block** is a forest block that has been identified in the Vermont Conservation Design because it provides a significant contribution in maintaining ecological landscape connectivity in Vermont. Collectively, connectivity blocks are the network of forest blocks that together provide terrestrial connectivity at the regional scale (across Vermont and to adjacent states and Québec) and connectivity between all Vermont biophysical regions. The proximity of one forest block to another, the presence of riparian areas, and the characteristics of the intervening roads, agricultural lands, or development determine the effectiveness of the network of connectivity blocks in a particular area.[4]

Interior forest blocks are a set of forest blocks that have been identified in the Vermont Conservation Design as the best for providing and maintaining interior forest habitat. These are the largest and/or highest ranked forest blocks from all biophysical

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[3] Sorenson, E. and J. Osborne. 2014. Vermont Habitat Blocks and Habitat Connectivity: An Analysis using Geographic Information Systems. Vermont Fish and Wildlife Department, Montpelier, Vermont. 48 pp.

[4] Sorenson, E., R. Zaino, J. Hilke, and E. Thompson. 2015. Vermont Conservation Design: Maintaining and Enhancing an Ecologically Functional Landscape. Part 1: Landscape Features Technical Report. Vermont Fish and Wildlife Department and Vermont Land Trust. Montpelier, Vermont. 24 pp.

regions that provide the foundation for interior forest habitat and associated ecological functions.[5]

Riparian corridors are the naturally vegetated areas along rivers, streams, lakes, and ponds that that support geomorphic river processes and provide many important ecological functions, such as shoreline stabilization, water quality protection, wildlife habitat, wildlife movement corridors, and biological diversity.

Ecological landscape connectivity is the degree to which blocks of suitable habitat are connected to each other across the landscape. In areas with high ecological landscape connectivity, wildlife can move about freely to satisfy their habitat needs, plants and animals can migrate in response to climate change, and ecological processes such as predator-prey relations and genetic exchange between populations. In areas of low ecological landscape connectivity, the movement of species is restricted, and many ecological processes do not occur.

[5] Sorenson, E., R. Zaino, J. Hilke, and E. Thompson. 2015. Vermont Conservation Design: Maintaining and Enhancing an Ecologically Functional Landscape. Part 1: Landscape Features Technical Report. Vermont Fish and Wildlife Department and Vermont Land Trust. Montpelier, Vermont. 24 pp.

<u>Discussion of Vermont Conservation Design and the Ecological Landscape Connectivity Functions of the Project Site.</u>

Q11. Are you familiar with the VFWD's Vermont Conservation Design and the three reports that describe the Vermont Conservation Design? Exhibit ANR-ES-2, Exhibit ANR-ES-3, and Exhibit ANR-ES-4.

A11. Yes, I am the lead author of two of these reports[6] and I organized and led the Vermont Conservation Design project, which was a collaborative effort between the VFWD and many partner organizations, including the Vermont Land Trust, Vermont Department of Forests, Parks and Recreation, The Nature Conservancy, and the Northwoods Stewardship Center.

Q12. Please describe what the Vermont Conservation Design is?

A12. The Vermont Conservation Design is an analysis and mapping of the Vermont landscape to identify what features are most important in order to maintain and enhance an **ecologically functional landscape** into the future. Ecological function is the ability of

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[6] Sorenson, E. and R. Zaino. 2018. Vermont Conservation Design: Maintaining and Enhancing an Ecologically Functional Landscape. Summary Report for Landscapes, Natural Communities, Habitats, and Species. Vermont Fish and Wildlife Department and Vermont Land Trust. Montpelier, Vermont. 38 pp.

Zaino, R., E. Sorenson, Morin, D., J. Hilke, and K. Thompson. 2018. Vermont Conservation Design. Part 2: Natural Communities and Habitats Technical Report. Vermont Fish and Wildlife Department and Vermont Land Trust. Montpelier, Vermont. 72 pp.

Sorenson, E., R. Zaino, J. Hilke, and E. Thompson. 2015. Vermont Conservation Design: Maintaining and Enhancing an Ecologically Functional Landscape. Part 1: Landscape Features Technical Report. Vermont Fish and Wildlife Department and Vermont Land Trust. Montpelier, Vermont. 24 pp.

plants and animals to thrive, reproduce, migrate, and move as climate changes and the ability of natural ecosystems to function under natural processes. Maintaining and enhancing ecological function across the landscape is fundamental to conserving biological diversity.

The ecologically functional landscape is one that includes a connected network of large and intact forested habitat, healthy aquatic and riparian systems, and the full range of physical features (bedrock, soils, elevation, slope, and aspect) on which plant and animal natural communities depend.

The ecologically functional landscape also includes full representation of Vermont's natural community types, all wetlands, grasslands, and old and young forests. The alternative to an ecologically functional landscape is one in which fragmentation of forests and the loss of landscape connectivity severely limit and restrict the ability of plant and animal species to move across the landscape.

Maintaining landscape connectivity within and between forest blocks, and along riparian areas is a key aspect of the ecologically functional landscape. Maintenance and enhancement of this functional landscape will conserve much of Vermont's biological diversity and the ability of most species to shift location in response to climate and land-use changes over time.

In the past, conservation and management efforts have largely focused on protecting the habitat needs of individual species. Although these protections have had important benefits and it will always be necessary to address the specific habitat needs of certain species that are especially vulnerable or rare, this traditional approach will not be effective given the vast number of species (on the order of 40,000 in Vermont), the scale of landscape alteration from climate and land use changes, and the limited resources we have as a society to conduct conservation actions. Still, land acquisition efforts focused on individual species have resulted in the protection of thousands of acres of plant and wildlife habitat and helped secure the needs of many species.

Q13. Please discuss the concept of ecological landscape connectivity and how it is used in the context of the Vermont Conservation Design.

A13. Ecological landscape connectivity (or more simply called landscape connectivity) can be defined as the degree to which patches of suitable habitat are connected to each other, and the degree to which these connections allow the movement of species among and between suitable patches. Landscape connectivity occurs at many scales.

Within an unfragmented wetland, for example, connectivity for all resident species is very high. Similarly, within an unfragmented stretch of naturally vegetated riparian area or within an unfragmented forest block, landscape connectivity is also high. Landscape connectivity within small wetlands or large forest blocks is facilitated by natural vegetation and the lack of obstacles or barriers to movement. But features on the landscape may also impede landscape connectivity. Features that are well-recognized as impeding landscape connectivity include roads, residential and industrial development, railroad tracks, and agricultural fields. These features are commonly referred to as fragmenting features because they fragment the natural landscape, create interruptions in landscape connectivity, and limit the ability of species to move between suitable habitat patches.

However, the degree to which these fragmenting features impede or restrict landscape connectivity varies considerably. For example, a small gravel road with little traffic is much less of an impediment to the movement of species than is a four-lane interstate highway with heavy traffic. The presence of wetlands or natural forest cover on both sides of a road allows for better connectivity than a road with forest on one side and agricultural land on the other. And the presence of a single house and yard adjacent to a road creates an additional impediment to landscape connectivity, but not nearly as much as multiple houses along the road, or larger developments that eliminate natural vegetative cover and represent a physical barrier for many species. Landscape connectivity may be entirely lost for most species in areas of dense development.

Landscape connectivity is a key component of the Vermont Conservation Design and critical to maintaining an ecologically functional landscape. Landscape connectivity is addressed by three features that are described and mapped in the Vermont Conservation Design.

First, **Highest Priority Connectivity Blocks** are the network of forest blocks that together provide terrestrial connectivity at the regional scale (across Vermont and to adjacent states and Québec) and connectivity between all nine Vermont biophysical regions. There is a high level of connectivity within individual forest blocks. The proximity of one forest block to another, the presence of riparian areas, and the characteristics of the intervening roads, agricultural lands, or development determine the effectiveness of the network of forest blocks to provide landscape connectivity functions in a particular area. The proximate forest blocks which form this network are referred to as Connectivity Blocks, many of the larger of which are also identified and function as Interior Forest Blocks. The Connectivity Blocks which are located at critical linkage areas, such as “pinch points” in the network, as well as those Interior Forest Blocks which form the core or backbone of the connected network are identified as Highest Priority Connectivity Blocks.

Second, **Surface Waters and Riparian Areas** are the network of all lakes, ponds, rivers, and streams, their associated riparian areas and river corridors in which geophysical processes occur. Rivers, streams, lakes, and ponds provide vital habitat for a rich assemblage of aquatic species. Naturally vegetated riparian areas adjacent to these waters provide many significant ecological functions, including stabilizing shorelines against erosion, storage of flood waters, filtration and assimilation of sediments and nutrients, shading of adjacent surface waters that moderate water temperatures, and direct contribution of organic matter to the surface water as food and habitat structure. Riparian areas are also essential habitat for many species of wildlife that are closely associated with the terrestrial and aquatic interface. The shorelines and riparian areas of rivers and lakes support floodplain forests, several other rare and uncommon natural communities, and many species of rare plants and animals. In addition to these ecological functions that are tied to aquatic systems, the linear network of riparian areas provides a crucial element of landscape connectivity for plant and animal movement in response to climate change.

A subset of the mapped Surface Waters and Riparian areas, **Wildlife Riparian Corridors** are portions of the connected riparian network in which natural vegetation occurs, providing natural cover for wildlife movement and plant migration. Maintaining and restoring Wildlife Riparian Corridors are especially important for landscape connectivity in the Champlain Valley and the Vermont Valley, biophysical regions in Vermont which are both highly fragmented.

The Project site is located directly east of Otter Creek and at the northern end of the narrow Vermont Valley, near where the Vermont Valley meets the broader Champlain Valley extending to the north. Both of these biophysical regions are relatively flat and have been mostly cleared for agricultural uses in the past. In contrast, the Taconic Mountains biophysical region to the west of the Project site and the biophysical regions of both the Southern and Northern Green Mountains to the east are mostly forested and much less fragmented. At the Project site, the Vermont Valley is only 1.5 miles wide. Areas where there is a combination of Wildlife Riparian Areas and Highest Priority Connectivity Blocks provide the best available paths for landscape connectivity, especially in highly fragmented regions such as the Vermont Valley and Champlain Valley.

Wildlife Road Crossings are a third element of landscape connectivity identified in the Vermont Conservation Design. Wildlife Road Crossings are sections of roads located adjacent to forest blocks or within Surface Waters and Riparian Areas that have suitable habitat on both sides and are more likely to allow wildlife movement and dispersal of other species. Therefore, these sections of roads are critical components of maintaining or enhancing an interconnected, ecologically functional landscape. The landscape connectivity functions of these road segments can best be maintained by protecting or restoring natural vegetation on both sides of the road and by avoiding or minimizing roadside development that further impede wildlife movement and landscape connectivity.

Q14. Please explain the difference between what you have described as ecological landscape connectivity and areas which are typically referred to as wildlife corridors.

A14. These two concepts are closely related. Wildlife corridors are lands and waters that connect larger patches of habitat together within a landscape and allow the movement, migration, and dispersal of animals. Wildlife corridors describe specific paths along which animals move and migrate, usually providing connections between blocks of suitable habitat across a dissimilar landscape matrix. Wildlife corridors are best identified and described for the individual species that use them. For example, the expansive network of wildlife corridors through forest blocks and across roads that may be used by black bears are very different from the restricted wildlife corridors that may be used by spotted salamanders to migrate from upland forests to vernal pools for breeding.

Ecological landscape connectivity is a broader concept that describes both the permeability and the resistance of the landscape to the movement of plant and animal species over time. Ecological landscape connectivity also incorporates the importance of sustaining ecological processes, like predator-prey relations, genetic exchange among populations, and shifting species ranges in response to climate change. Wildlife corridors and wildlife movement are important aspects of landscape connectivity. The degree to which wildlife can move across the landscape is one of the most visible components of landscape connectivity. Being mobile, animals are also one of the important vectors for carrying and moving plant seeds and other small biota across the landscape.

Q15. Describe the features mapped in the Vermont Conservation Design that identify the ecological landscape connectivity functions of the Project site.

A15. The Vermont Conservation Design, and other regional conservation planning tools I will describe later, all identify the Project site and nearby areas as being exceptionally important for ecological landscape connectivity, both from a local and especially a regional perspective. The three landscape-scale features of the Vermont Conservation Design that identify the Project site's importance are the Highest Priority Connectivity Blocks, the Highest Priority Surface Waters and Riparian Areas/Wildlife Riparian Areas, and the Wildlife Road Crossings. I will discuss each of these features separately, but first want to put the Project site in a regional perspective.

In Vermont, there is generally very good landscape connectivity between the forest blocks that occur within the Taconic Mountains biophysical region. Similarly, there is generally very good landscape connectivity between the forest blocks that occur within both the Southern and Northern Green Mountains biophysical regions. This is because, in Vermont, these three biophysical regions have many large forest blocks and are relatively unfragmented by roads and development. In contrast, there is generally much weaker landscape connectivity between forest blocks that occur within the fragmented Champlain Valley and Vermont Valley (the Project is located at the northern end of the Vermont Valley).This is because within these two biophysical regions there has been much more development, more land converted to agricultural uses, and only smaller forest blocks remain.

In order to maintain functional landscape connectivity across the state, it is critical to maintain or restore connectivity both *within* biophysical regions and *between* biophysical regions. The Project is proposed to be built in the best remaining landscape connection in the Vermont Valley *between* the northern Taconic Mountains and the Southern Green Mountains biophysical regions. The east-west oriented landscape connection at this location is only approximately 2.45 miles long north to south, with the proposed north-south oriented Project footprint located near its center. The exceptional importance of the landscape connectivity functions of the Project site are due to this site's location between two Highest Priority Connectivity Blocks, one located directly west of Carver Street and one just east of the railroad tracks which border the eastern edge of the Project site. The Project site relative to this regionally significant landscape connection between the Taconic Mountains and Green Mountains is shown on attached maps (**Exhibit ANR-ES-5 and Exhibit ANR-ES-6**).

Highest Priority Connectivity Blocks: The Project site is located directly between two Highest Priority Connectivity Blocks. To the west of the Project site and Carver Street is a 905-acre Highest Priority Connectivity Block that includes Otter Creek and its riparian forests and wetlands and several limy cobbles. This forest block, in turn, is connected to the 18,588-acre Blueberry Hill block, a Highest Priority Interior Forest Block and Highest Priority Connectivity Block, that is one of the largest and most significant forest blocks in the Taconic Mountains.

To the east of the Project site and the railroad tracks is a 1,056-acre Highest Priority Connectivity Block that is mostly forested hills and some wetlands. This forest block is connected to a 2,948-acre Highest Priority Connectivity Block, which, in turn, is connected to the 77,101-acre Mount Carmel block, a Highest Priority Interior Forest Block and Highest Priority Connectivity Block, that is one of the largest and most significant forest blocks in the Green Mountains.

There are no forest blocks identified on the Project site by the Vermont Conservation Design because the statewide forest block analysis conducted by Vermont Fish and Wildlife Department[7] used a practical cutoff of 20-acres for identifying and ranking forest blocks. But it is the presence of Highest Priority Connectivity Blocks adjacent to the Project site, and the existing features of the Project site, including the two limy cobble forests, wetlands, Otter Creek riparian areas, and hayfields that make the site so important for landscape connectivity.

Highest Priority Surface Waters and Riparian Areas/Wildlife Riparian Areas: The Project site is directly east of Otter Creek, Vermont's longest river. The Highest Priority Surface Water and Riparian Areas identified in Vermont Conservation Design include almost all the Project site, based on the proximity of this area to Otter

[7] Sorenson, E. and J. Osborne, 2014. Vermont Habitat Blocks and Habitat Connectivity: An Analysis using Geographic Information Systems. Vermont Fish and Wildlife Department.

Creek and the predominance of valley-bottom soils (alluvial and glacial-lacustrine deposits). Only the two forested cobbles are not part of the Highest Priority Surface Water and Riparian Areas, because these small hills are made of up marble and dolostone bedrock, not water-deposited sediments. The Wildlife Riparian Area is the portion of Highest Priority Surface Water and Riparian Areas that is naturally vegetated, and these areas are especially important for their connectivity functions. On the Project site, this includes all the wetlands and all forested areas near the river. Otter Creek and its associated Wildlife Riparian Area/Highest Priority Surface Water and Riparian Areas are exceptionally important for landscape connectivity in that they provide a linear, riparian connection for approximately 30 miles through the Vermont Valley and Champlain Valley (from Rutland north to Middlebury). This 30-mile section of Otter Creek and its riparian areas includes Vermont's largest forested swamp system – Otter Creek Swamps occupy approximately 9,000 acres and are biologically rich and regionally significant. The Project site is near the southern end of the Otter Creek Swamps and near the middle of the approximately 30-mile Wildlife Riparian Area. In addition to this north-south connectivity function of the Otter Creek riparian area, on the Project site, all the wetlands contribute to the regionally significant east-west connectivity across the narrow Vermont Valley between the northern Taconic Mountains and Southern Green Mountains.

Wildlife Road Crossings: Highest Priority Wildlife Road Crossings are identified for Carver Street along the entire west side of the Project's 1.0-mile north-south extent. This 1.0-mile road segment and additional segments to the north and south of the Project site are identified in the Vermont Conservation Design as Highest Priority

Wildlife Road Crossings because Highest Priority Connectivity Blocks, Wildlife Riparian Areas, wetlands, and hayfields are adjacent to Carver Street in these areas. Although the forests and wetlands adjacent to Carver Street in these segments provide the best wildlife cover, Vermont Conservation Design also identifies hayfields as important for connectivity.

Q16. Are there other important features on the Project site that contribute to the ecological landscape connectivity functions of this area?

A16. Yes. I have observed the following features during my sites visits.

There are two forested, limy (calcium-rich marble and dolostone bedrock) cobbles on the property. These two forested hills both support Dry Oak-Maple Limestone Forests, which is considered an uncommon natural community type in Vermont by VFWD[8]. The **northern cobble** supports a small, but state-significant example of Dry Oak-Maple Limestone Forest, based on the natural community ranking specifications developed by VFWD. This approximately 10-acre forest is dominated by sugar maple, white ash, basswood, white oak, red oak, bitternut hickory, shagbark hickory, bur oak, slippery elm, black cherry, hackberry, northern white cedar, and ironwood.

Due to the calcium-rich limestone bedrock, which is commonly exposed as small cliffs and outcrops in the forest, the herbaceous vegetation is very diverse and includes many spring ephemerals indicative of the limy conditions. These include maidenhair fern,

[8] The Dry Oak-Maple Limestone Forest natural community type was formerly called Transition Hardwood Limestone Forest.

bloodroot, round-lobed hepatica, sharp-lobed hepatica, sweet cicely, and white snakeroot. Ferns are abundant, including the lime-loving bulblet fern, walking fern, and maidenhair spleenwort. I have also observed two uncommon plants in this forest: yellow oak and purple clematis, both plants associated with calcium-rich bedrock. The Dry Oak-Maple Limestone Forest on the northern cobble is in good condition, with little recent human disturbance, some older trees, some downed trees that provide habitat and contribute to soil development, and very few non-native invasive species.

In addition to its importance as a state-significant natural community, this Dry Oak-Maple Limestone Forest on the northern cobble is important for landscape connectivity in two ways. First, simply by being forest, it provides cover for wildlife moving across the site. Although it is an island of forest cover surrounded by hayfields, the hayfields are easily crossed in their current undeveloped state by many wildlife species, and the forest cobble provides a "stepping-stone" of protective cover between the Otter Creek wetlands and floodplain forests to the west and forests to the east of the railroad tracks. Second, small, topographically and geologically diverse (especially calcium-rich) forests have been identified as important stepping stones for plant migrations between larger intact forest blocks.[9] The good ecological condition of the Dry Oak-Maple Limestone Forest on the northern cobble contributes to its function as a stepping stone for plants shifting their ranges in response to climate change.

[9] Beier, P. 2012. Conceptualizing and designing corridors for climate change. Ecological Restoration 30(4): 312-319.

The **southern cobble** also supports Dry Oak-Maple Limestone Forest, although the forest on the southern cobble has mostly been cleared in the past and most of this forest is young. This young forest supports many of the same species as on the northern cobble, but also has many more non-native invasive species, especially common buckthorn, bush honeysuckles, and barberries. The uncommon fern, blunt-lobed woodsia, is present on dolostone outcrops on the southern cobble. On the western side of the southern cobble is a small but **mature hackberry forest stand**. Hackberry is a tree found in warmer regions of Vermont, typically associated with calcareous soils and river shores. The small stand on the southern cobble has large trees, indicating a more mature forest, and a diverse understory of calcium-loving plants. This mature hackberry forest stand is part of the Dry Oak-Maple Limestone Forest but is in better ecological condition than much of the southern cobble forest.

The forested southern cobble contributes to the landscape connectivity functions of the site in similar ways as the northern cobble. It may provide better wildlife connectivity functions than the northern cobble, as the forest on the southern cobble extends to the edge of Carver Street for a length of approximately 800 feet, and there is floodplain forest on the west side of Carver street for much of this distance. The southern cobble likely also serves as a steppingstone for plant migration over time, but this function is likely reduced by the young forest condition and abundance of non-native invasive species in this forest. If left to mature without being cleared, I would expect the forest condition to improve over time.

There are four **Otter Creek floodplain wetlands** on the Project site. All these wetlands are hydrologically connected to Otter Creek by annual flooding of the river and/or culverts under Carver Street. I will describe each of these wetlands briefly, beginning at the northern end of the Project site. The northern wetland (north of the Project's proposed northern array) includes both seasonally flooded hayfield with scattered willow and buttonbush in the deepest water areas, and at the very north edge of the Project property, Silver Maple-Sensitive Fern Floodplain Forest. The north-central wetland (between the Project's proposed northern array and central array) is a mix of Buttonbush Swamp (a rare natural community type in Vermont) closest to Otter Creek and Carver Street and Maple-Green Ash Swamp (an uncommon natural community type) to the northeast. The south-central wetland (between the Project's proposed central and southern arrays) is a shrub swamp and sedge meadow dominated by willows, lake sedge, and common cattail. The southern wetland (south of the Project's proposed southern array) is mostly open water, but includes patches of willows, buttonbush, sedges, and scattered maples.

These four Otter Creek floodplain wetlands all contribute to the landscape connectivity function of the Project site, because they are primarily naturally vegetated, extend from Carver Street across the Project site to the railroad bed and beyond, and provide cover for wildlife movement. In addition, these wetlands provide spawning and juvenile rearing habitat for fish that inhabit Otter Creek. Mowed hayfields currently extend to the edge or into these wetlands. Restoring naturally vegetated buffers along the edges of all these wetlands would both increase the ecological integrity of the wetlands and improve the landscape and wildlife connectivity functions of the wetlands.

Hayfields occupy most of the Project site and are where the majority of the proposed Project arrays would be located. Hayfields are not natural ecological systems, but they do provide important habitat values, including flowering plants for many insects, and grassland bird habitat. But hayfields also provide a wildlife connectivity function, especially hayfields like those on the Project site that are surrounded by forests, wetlands, and riparian areas. Many species of wildlife will move through hayfields, especially if they are moving between areas of more secure cover habitat.

The Project site is directly adjacent to **Otter Creek and its floodplain forests, wetlands, and riparian areas**. Riparian areas are well recognized as movement corridors for many species of wildlife and the Otter Creek riparian areas from Rutland north to Middlebury are exceptionally important, as described above. In addition, riparian areas are recognized as corridors supporting plant species shifts in response to climate change.[10]

Finally, although roads contribute to landscape fragmentation, **Carver Street** is a relatively minor fragmenting feature compared to many larger and more travelled roads. In the vicinity of the Project site, Carver Street is a narrow gravel road, it has little traffic, it is seasonally flooded by Otter Creek, and it is surrounded by forests, Otter Creek,

[10] Anderson, M.G., Barnett, A., Clark, M., Prince, J., Olivero Sheldon, A. and Vickery B. 2016. Resilient and Connected Landscapes for Terrestrial Conservation. The Nature Conservancy, Eastern Conservation Science, Eastern Regional Office. Boston, MA.

riparian areas, wetlands, and hayfields. There are currently no houses or other residential or industrial development for 2.2 miles along Carver Street, including the 1.1-mile length of the proposed Project. These attributes, along with the nearby Highest Priority Connectivity Blocks, are why these sections of Carver Street are identified as Highest Priority Wildlife Road Crossings in the Vermont Conservation Design.

Q17. Elaborate on why there are no Highest Priority Connectivity Blocks mapped on the Project site.

A17. There are no forest blocks identified on the Project site because the statewide forest block analysis conducted by Vermont Fish and Wildlife Department[11] used a practical cutoff of 20-acres for identifying and ranking forest blocks. Forest blocks under 20 acres may provide wildlife, biological diversity, or connectivity functions, depending on their location in the landscape, but they provide little interior forest habitat, and interior forest habitat was a focus of the referenced statewide analysis. Removing forest blocks under 20 acres also made it possible to focus this statewide analysis on the largest and most significant interior forest blocks in all biophysical regions. The Project site is one of those locations where small patches of forests, not mapped as forest blocks, provide important functions. As stated above, it is the presence of Highest Priority Connectivity Blocks adjacent to the Project site, and the existing features of the Project

[11] Sorenson, E. and J. Osborne, 2014. Vermont Habitat Blocks and Habitat Connectivity: An Analysis using Geographic Information Systems. Vermont Fish and Wildlife Department.

site, including the two limy cobble forests, wetlands, Otter Creek riparian areas, and hayfields that make the site so important for landscape connectivity.

Q18. What recommendations are made in the Vermont Conservation Design for maintaining ecological landscape connectivity function at places like the Project site?

A18. There are two Highest Priority Connectivity Blocks identified by Vermont Conservation Design directly adjacent to the Project site. The Vermont Conservation Design provides "guidelines for maintaining ecological function" for Connectivity Blocks that apply to the Project site. The report states:

> "Similar to Interior Forest Blocks, it is important to maintain the interior forest conditions in Connectivity Blocks by avoiding permanent interior forest fragmentation resulting from development. Connectivity within forest blocks will remain high if they remain unfragmented. For Connectivity Blocks it is also critically important to maintain or enhance the structural and functional connectivity that occurs on the margins of these blocks where they border other blocks. This can be accomplished by **maintaining forest cover along the margins and by limiting development in these areas of block-to-block connectivity**." (emphasis added)[12]

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[12] Sorenson, E., R. Zaino, J. Hilke, and E. Thompson. 2015. Vermont Conservation Design: Maintaining and Enhancing an Ecologically Functional Landscape. Part 1: Landscape Features Technical Report. Vermont Fish and Wildlife Department and Vermont Land Trust. Montpelier, Vermont. 24 pp, see page 7.

The implications of this for the Project site are, that in order to maintain the landscape connectivity functions of Connectivity Blocks, it is important to both maintain forest cover along the road edges of the adjacent forest blocks and to limit development at these forest edges and in the intervening area between the Connectivity Blocks.

The Vermont Conservation Design report also provides suggestions on how to prioritize conservation for Connectivity Blocks, including the importance of prioritizing "pinch points or bottle-necks in the connectivity network where animal movement or connectivity is narrowed due to adjacent development or fragmentation."[13] As explained above, the Project site is a *regionally important pinch point* for connectivity between the Taconic Mountains and the Southern Green Mountains biophysical regions.

Q19. Are there other studies or analyses that you relied on in forming your opinions and which identify the state and regional importance of the Project site?

A19. Yes, there are several analyses and studies that I have used. The Staying Connected Initiative is a partnership of 59 organizations across New York, Vermont, Massachusetts, New Hampshire, Maine, and Canadian provinces working to restore and enhance landscape connectivity for the benefit of people and wildlife across the Northern Appalachian/Acadian region of the eastern U.S. and Canada. The Staying Connected partners include the state fish and wildlife and transportation agencies from the five

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[13] Sorenson, E., R. Zaino, J. Hilke, and E. Thompson. 2015. Vermont Conservation Design: Maintaining and Enhancing an Ecologically Functional Landscape. Part 1: Landscape Features Technical Report. Vermont Fish and Wildlife Department and Vermont Land Trust. Montpelier, Vermont. 24 pp, see page 8.

states, chapters of The Nature Conservancy for all five states, as well as the Vermont Land Trust, University of Vermont, the National Wildlife Federation, and U.S. Fish and Wildlife Service, and the Green Mountain National Forest of the U.S. Forest Service. Information about the Staying Connected Initiative can be seen on their webpage: http://stayingconnectedinitiative.org/.

The Staying Connected Initiative maps the Project site as part of the "Adirondack Mountains to the Green Mountains Linkage" area. Linkage areas are defined by the Staying Connected Initiative as "geographically defined places where—if landscape connectivity is lost—bear, moose, bobcat and other wide-ranging mammals will be limited in their ability to move between core habitat areas and across the region." Nine linkage areas are identified across the five state, three Canadian province Northern Appalachian ecoregion, and six of these linkage areas are within Vermont, emphasizing the high regional importance of maintaining landscape connectivity in Vermont. Two maps showing the Staying Connected Initiative's nine linkage areas and the Adirondack Mountains to the Green Mountains Linkage area that includes the Project area are attached (**Exhibits ANR-ES-7** and **ANR-ES-8**).

I added a small red circle identifying the Project site to the Staying Connected Initiative's Adirondack Mountains to the Green Mountains Linkage area map attached as **Exhibit ANR-ES-8**. This map shows the Project site to be near the center of the northern landscape connection linking the Adirondack Mountains and the Green Mountains. While the Staying Connected Initiative maps provide important regional perspective on the importance of the Project site for landscape connectivity functions, it is my opinion that the maps in Vermont Conservation Design provide more detailed characteristics of the features on and adjacent to the Project site which are more useful for evaluating Project impacts.

Landscape permeability mapping is another useful tool for evaluating the importance of the Project site. Landscape permeability is the capacity of a landscape to facilitate range shifts of terrestrial plant and animal species. The Nature Conservancy, led by Mark Anderson of the Eastern Conservation Science office in Boston, has completed several landscape analyses of Eastern North America that have made significant contributions to our understanding of conservation in a fragmented landscape with climate change pressure underway. Their work, most recently updated with a report and data in 2016, identifies key landscape areas that are resilient to climate change and that are important for landscape connectivity.[14] One specific tool of interest is their modeling of landscape permeability, which is described in a 2012 report[15] as well as in the 2016 report.

The 2012 report defines landscape permeability more precisely as "the degree to which regional landscapes, encompassing a variety of natural, semi-natural and developed land cover types, will sustain ecological processes and are conducive to the movement of many types of organisms." One of the methods used in this work to identify areas of landscape permeability is regional flow patterns, which models how

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[14] Anderson, M.G., Barnett, A., Clark, M., Prince, J., Olivero Sheldon, A. and Vickery B, Resilient and Connected Landscapes for Terrestrial Conservation (The Nature Conservancy, Eastern Conservation Science, Eastern Regional Office) (2016).
[15] Anderson, M. and M. Clark, Modeling Landscape Permeability: A Description of Two Methods to Model Landscape Permeability (The Nature Conservancy, Eastern Conservation Science, Eastern Regional Office) (2012).

species will move across the landscape based on the spatial arrangements of cities, towns, farms, roads, and natural lands. This model identifies areas of concentrated flow (potential for species movement) in key linkages where flow accumulates or is channeled through a pinch point. The Project site is identified as the best remaining area of regional flow between the Taconic Mountains and the Southern Green Mountains. A map showing the regional flow pathway between the Taconic Mountains and the Southern Green Mountains in relation to the Project Site is attached (**Exhibit ANR-ES-9**).

<u>Discussion of the Project's Impacts and Measures to Avoid, Minimize and Mitigate Such Impacts</u>

Q20. Please describe aspects of the October 28, 2018 version of the Project you considered in order to evaluate its potential fragmenting affects and impacts on ecological landscape connectivity.

A20. My first consideration was understanding the location of the proposed Project in an area of regional significance for landscape connectivity. I have explained the importance of Project site for landscape connectivity functions above, based on the Vermont Conservation Design, the Staying Connected Initiative, The Nature Conservancy's regional flow modeling, observations I have made using GIS tools and layers, and my observations during site visits.

A second aspect is the sheer size of the Project developed area. The Project components, including solar arrays, access roads, and ancillary facilities will occupy approximately 65 acres. This is a very large area of industrial solar development in a sensitive landscape connectivity area.

A third aspect of the Project site is its length from north to south. Mr. Jewkes, in his response to the Agency's discovery requests, identified the north to south length of the Project as 5,432 feet (1.03 miles). This 1.03-mile length of the Project represents a fragmenting feature which will occupy approximately 42% of the 2.45-mile long (north to south) regionally significant landscape connectivity area identified by the Vermont Conservation Design connecting the Taconic Mountains and the Southern Green Mountains. The Project is proposed near the center of this 2.45 mile stretch of regional connectivity features.

A fourth aspect of the proposed Project that I considered relative to impacts to the natural environment was the proposal to clear the forest on most of the southern cobble and to clear or manage the height of trees on a significant portion of the northern cobble. As previously indicated, the northern cobble supports a state-significant Dry Oak-Maple Limestone Forest (an uncommon natural community type) which would have been degraded by the proposed tree clearing. The loss of forest would both reduce the wildlife connectivity function of the site and the landscape connectivity function of the site, as explained above. The degree to which the forests are altered will greatly affect their capacity to provide landscape connectivity functions. Mature forests operating under natural disturbance processes will best support native species and landscape connectivity now and in the future. In contrast, forests that are cleared of vegetation and soils, and the underlying bedrock broken and smoothed will not provide landscape connectivity functions, and long-term recovery of forests on these highly manipulated sites is uncertain.

A fifth aspect of the Project is the proposal to fence and convert approximately 65 acres of hayfields to solar arrays and infrastructure. This fencing and conversion will reduce and restrict the ability of wildlife to move across the Project site between the forest blocks located east and west of the project. As explained above, wildlife corridors and wildlife movement are important aspects of landscape connectivity.

Q21. Do you have an opinion as to whether the Project which was proposed on October 28, 2018 would result in an undue adverse effect on the natural environment?

A21. Yes. It is my professional opinion that the Project as proposed on October 28, 2018 would have resulted in an undue adverse effect on the natural environment due to its fragmenting affects and impacts on ecological landscape connectivity. This conclusion is based on several factors. First, and foremost, the existence of a large, industrial-scale solar development in the central portion of a regionally significant landscape connection between the Taconic Mountains and the Southern Green Mountains creates a fragmenting feature. The aspects of the Project referenced above show that the Project, as originally proposed, would have resulted in many changes to the Project site that would have significantly reduced the ecological landscape connectivity functions of the site and the regional landscape connection, of which the Project site is an integral part. Landscape connectivity is a critical element of the ecologically functional landscape upon which the biological diversity of Vermont and the region depend as climate changes.

Undue adverse impacts would have resulted not just from the construction and operation of the then proposed Project during its lifetime, but also from the long-term effects of the Project on the site, especially from the extensive forest clearing and grading. Areas of forest that are cleared with the underlying bedrock significantly disturbed would not recover intact forested natural communities for decades or centuries, compromising the ecological landscape connectivity function over the long term.

The footprint of the proposed project is large and its long orientation from north to south maximizes fragmentation of the regional landscape connection identified by Vermont Conservation Design and other regional studies. Loss and degradation of forests as originally proposed on the two cobbles would have reduced ecological function, both in the short term and long term. Loss of ecological function on the cobbles would mean that current and future biological diversity (plant and animal species and ecological processes) would be compromised. This would have also restricted the ability of plant and animal species to move across the landscape, during the life of the Project and well into the future.

Alteration of the forest on the northern cobble and nearly surrounding the northern cobble with Project infrastructure, as originally proposed, would have reduced the quality of the state-significant Dry Oak-Maple Limestone Forest. In addition to the negative impact to the state-significant natural community, this would also reduce the function of this limy cobble as a steppingstone for plants shifting their ranges in response to climate change, both during the life of the Project and into the future as the site slowly recovered some degree of ecological integrity.

Finally, the site disturbance, especially forest clearing and management on the northern and southern cobbles, without measures to prevent introduction of, and monitor and control over the life of the Project, non-native invasive species, would be expected to increase the abundance of non-native invasive species on the site. Increased abundance of non-native invasive species on these cobbles, and especially in the state-significant Dry Oak-Maple Limestone Forest on the northern cobble will reduce the ecological integrity of this forest and its function as a landscape connectivity steppingstone.

All of these aspects of the version of the Project that was proposed on October 28, 2018 would have resulted in additional fragmentation of the Project site and the regionally significant landscape connection. Fragmentation of the landscape has been shown to slow species dispersal and reduce successful colonization of new habitat by creating resistance to species' movements across the landscape. Given the uncertainty over the specific pressures on biological diversity from climate change, but acknowledging the scientifically agreed-upon importance of landscape connectivity for allowing plants and animals to shift their ranges over time, requires that we take a precautionary and protective stance on a clearly identified, regionally-recognized linchpin in the landscape connectivity network such as exists on the Project site and the rest of this regional connection between the Taconic and Green Mountains.

Q22. Are you familiar with the April 1, 2020 Memorandum of Understanding ("MOU") between Davenport Solar, LLC and the Agency?

A22. Yes. I was very much involved in developing the terms and conditions which are contained in the MOU, and I have read and understand them.

Q23. Have you reviewed the modifications to the Project which are depicted and described in the testimony and exhibits which Davenport Solar, LLC filed with the Commission on April 10, 2020.?

A23. Yes. I have reviewed the revised Project site plan along with the testimony of Mr. Jewkes, Mr. Herzlinger, and Mr. Owens.

Q24. Please identify and discuss the terms and conditions of the MOU and the Project modifications which have been made to address the Project's impact on the natural environment, specifically its fragmenting affects and impacts on ecological landscape connectivity.

A24. As originally proposed, the Project would have resulted in an undue adverse impact to the natural environment. However, the following steps have been taken to avoid, minimize, and mitigate impacts to reduce them to a level which, while still adverse, is acceptable and meets the Section 248(b)(5) standard as it applies to the natural environment.

1. **Avoiding impacts to the forested northern cobble**. Under Section 1.1 of the MOU, alteration of the forests on the northern cobble have been minimized so that this forest will be left in its natural state and condition. The only exception is that hazard tree management will allow for cutting trees that threaten the Project area in a narrow strip

along the south and southwest side of the northern cobble. This hazard tree management area is shown on the Project site plan. Hazard trees that are felled will be left in the hazard tree management zone so that their decay contributes to the forest soils on the northern cobble.

2. **Minimizing and mitigating impacts to the forested southern cobble**. Under Section 1.3 of the MOU, several steps have been taken to reduce Project impacts on the southern cobble forest. The reduction in impacts to the southern cobble and forest are identified as specific zones of vegetation removal and site preparation ("VRSP"), with details of what activities will occur in each. By this approach, the extent of the potentially most damaging practices, such as rock-ripping and grubbing, are minimized within VRSP 1. In VRSP 2, large trees and shrubs will be removed, but small shrubs, herbs, and native soil will be left in place. Similarly, in VRSP 3, small shrubs, herbs, and native soil will be left in place, as will smaller cut tree limbs so that their decay contributes to the forest soils. Native shrubs and brush will be allowed to regrow in VRSP 3 to a height of 10 feet during project operation. The locations of the three VRSPs are identified on the Detail of the Southern Cobble site plan. The combination of these steps minimizes the severity of alteration to the southern cobble during the life of the Project and will facilitate ecological restoration of the site after decommissioning.

3. **Avoiding impacts to the mature hackberry forest on the southern cobble.** Under Section 1.2.2 of the MOU, alteration of the hackberry forest on the southern cobble have been minimized so that this forest will be left in its natural state and condition. The only exception is that hazard tree management will allow for cutting trees

that threaten the Project area along the edge of the hackberry forest. This hazard tree management area is shown on the on the Detail of the Southern Cobble site plan. Hazard trees that are felled will be left in the hazard tree management zone so that their decay contributes to the forest soils of the southern cobble.

4. **Wetland and buffer zone restoration.** Under Section 2 of the MOU, with only a few exceptions for locations in which there is project infrastructure, passive restoration of native vegetation will be encouraged on all the 50-foot wetland buffers and upland hayfield outside the Project fence. Passive restoration is allowing natural succession to occur through growth of trees, shrubs, and herbs from the existing seed sources at the site. In addition, active restoration of native trees and shrubs will occur in six locations of wetland buffer and upland field to the east and south of the southern cobble. The locations of the passive and active restoration areas are shown on the project site plans, and details of the active restoration, including the native trees and shrubs to be planted, are shown on the Active Restoration Plan prepared by T.J. Boyle Associates, LLC (Exhibit Petitioner JBO-6). Together, these passive and active restoration actions will help mitigate impacts to wildlife movement across the site, by increasing vegetation cover and will facilitate overall site restoration over the long term.

5. **Non-native invasive species monitoring and control.** Under Section 4 of the MOU, Davenport Solar will develop best management practices to reduce the introduction of non-native invasive species (NNIS) during Project construction and operation. Davenport Solar will also develop and implement a NNIS Monitoring and Control Plan to be used during the operational life of the Project. The MOU identifies

which NNIS will be addressed, the Resource Mitigation Areas (RMAs) in which NNIS monitoring and control will be implemented, and the timing and reporting for the monitoring and control efforts. These long-term steps to control non-native invasive species on the project site will help to maintain the ecological integrity of the site during its operation and will facilitate restoration efforts after Project decommissioning.

6. **Project decommissioning and site restoration.** Under Section 5 of the MOU, the Project will be decommissioned no later than 40 years from the date at which the Project commences operation. As part of decommissioning, an approved site restoration plan will be implemented to restore the site to pre-development conditions to the extent that is practical (fields restored to fields, forest allowed to regenerate). Establishing a set date for decommissioning and site restoration is a critical element for ensuring that ecological landscape connectivity functions can be restored to the site in the future.

7. **Permanent land conservation.** Under Section 6 of the MOU, the two parcels on which the Project is located, totaling 316 acres, will be acquired in fee simple by Davenport Solar prior to commencement of Project site preparation or construction. Most importantly, permanent conservation will be accomplished by conveyance of the two parcels in fee simple interest to the VFWD within 180 days of Project decommissioning. Fee ownership is necessary to ensure that the most appropriate management of the properties can be determined by VFWD based on current conditions and scientific understanding at the time of Project decommissioning. In addition to permanent conservation, Section 6.1.2. of the MOU specifies that the remainder of the two parcels shall remain in their natural state with natural ecological processes predominating and

driving successional direction during the operational life of the Project, except for those portions of the 316 acres that contain the Project infrastructure, are subject to active and passive restoration plans, or subject to grassland bird management regimes. This provision for permanent land conservation is one of the most important in mitigating impacts of the Project. Ecological landscape connectivity is a function that is critical for conserving biological diversity over long time periods – decades, centuries, and millennia. Although the Project will have an adverse impact on ecological landscape connectivity during its operational life, the permanent conservation of these two parcels and conveyance to VFWD for ecological and wildlife management in perpetuity means that ecological landscape connectivity and other functions of these lands can be restored and enhanced over the long term.

In summary, the combination of all the steps described above and specified in the MOU and on current Project site plans will avoid, minimize, and mitigate the originally proposed Project's undue adverse impacts to the natural environment to the extent that the impacts are simply adverse. It is my professional opinion that although all of the above steps are important in mitigating the Project's impacts on the natural environment, it is the provision requiring long term conservation of the 316 acres, and future management of these lands by VFWD for ecological goals, that provides me with greatest confidence that the regionally significant ecological landscape connection between the Taconic Mountains and Green Mountains will be maintained over the long term.

For these reasons, it is my recommendation that the Commission condition any approval of the Project on compliance with all the terms and conditions of the April 1, 2020 MOU between Davenport Solar, LLC and the Agency.

Q25. Does this conclude your testimony?

A25. Yes, it does.