



## Memorandum

**Project:** Northland Solar Project (PUC Case Number 25-2346-PET)  
**Date:** March 20, 2026  
**Title:** Attachment C. Technical Methodology Memorandum

### Introduction

Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) has prepared this technical memorandum to supplement the Aesthetics Analysis and Orderly Review report prepared for the proposed Northland Solar Project (the Project) that is proposed in the Town of Lowell, Orleans County, Vermont. The purpose of this technical memorandum is to provide a detailed description of the methodology and data employed for the various visibility and aesthetic assessment techniques utilized for the report.

### Viewshed Analysis

A digital surface model (DSM) viewshed analysis was conducted to identify areas where the proposed photovoltaic (PV) panels may be visible within the 2-mile radius visual study area (VSA). This viewshed analysis is based upon the height of PV panels in their most upright position and therefore represents the greatest extent of potential PV panel visibility that is possible.

The DSM is a representation of topography as well as natural and built features on the ground (e.g., trees, powerlines). By comparison, a digital elevation model (DEM) is a representation of a bare earth topographic surface only. Because it is based on bare earth topography only, a DEM viewshed analysis does not accurately represent areas of potential Facility visibility because it does not consider the screening effects of existing vegetation or structures. Therefore, only a DSM viewshed analysis, which considers the height and location of all surface features, was conducted. Because it accounts for screening provided by topography, vegetation, and structures, DSM viewshed analysis is the best available representation of potential visibility of the proposed PV panels. The DSM viewshed analysis was prepared using the following data and parameters:

- A 1-meter resolution DSM derived from United States Geological Survey (USGS) lidar<sup>1</sup> data for the state of Vermont;

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<sup>1</sup> Lidar, or light detection and ranging, is a remote sensing system that is used to determine height ranges of landscape features across large areas and is used to make three-dimensional (3D) representations of areas on Earth's surface.

- 135 sample points representing the proposed PV panels, spaced approximately 100 feet apart in a grid pattern throughout all proposed PV panel areas;
- A maximum height of 10 feet applied to each PV panel sample point;
- An assumed eye-level viewer height of 6 feet;
- ESRI ArcGIS Pro® software with the Spatial Analyst extension.

To avoid misleading results, some modifications to the DSM were made prior to conducting the viewshed analysis. Existing overhead transmission lines and roadside utility lines are generally misrepresented in the DSM as solid structures that extend from the top of these lines to the ground surface and therefore will be incorrectly interpreted as solid features with the potential to screen views. In order to correct this inaccuracy, all above-ground surface features within 50 feet of state highways and within 30 feet of transmission line and local road centerlines were removed using bare earth (DEM) elevation values within these corridors. Several sparsely vegetated hedgerows within or surrounding the Project Site that will remain in a place were also removed and replaced with bare earth elevation values because they would be incorrectly interpreted as solid features with the potential to screen views. It is important to note that this removal of hedgerows and vegetation/structures within road and transmission corridors may also eliminate legitimate screening features which occur in these areas. This has the potential to result in an overstatement of proposed PV panel visibility through hedgerows (particularly during leaf-on conditions) and within or adjacent to road and transmission line corridors. All above-ground surface features (vegetation) within the Facility's limit of disturbance were also removed and replaced with bare earth elevation values to account for proposed clearing.

Once the viewshed analysis was complete, PV panel visibility was set to zero in locations where existing surface features exceed the bare earth elevation value by 6 feet or more, indicating the presence of vegetation or structures that exceed the assumed viewer height. This was done for two reasons: 1) in locations where trees or structures are present in the DSM, the viewshed results would reflect visibility from treetops or building roofs, which is not the intent of this analysis, and 2) to reflect the fact that the PV panels will generally be screened from view at ground-level vantage points within buildings or areas of vegetation that exceed viewer height.

### **Field Review**

EDR personnel conducted field review within the VSA on February 27, 2026. During field review, EDR staff members visited public and private vantage points surrounding the Project Site to confirm the results of the viewshed analysis, document existing scenic quality and visual character, and obtain photographs for subsequent development of photosimulations from representative viewpoints. The determination of potential Project visibility was based on the proposed location and dimensions of Project components, viewshed analysis results, and prominent landscape features near within or near the Project Site that served as location and scale references. To assist with viewer orientation and determination of potential Project visibility in the field, global positioning system (GPS) units were combined with live mapping in ESRI Collector®. The data contained in the Collector unit included Project components, viewshed analysis results, a topographic and aerial base map, and the current viewer location. At each viewpoint, the GPS unit was used to document the location, time, and observations regarding potential Project visibility.

Field review resulted in documentation of potential Project visibility from 25 representative viewpoints. At each viewpoint, multiple photographs were taken to capture the full extent of the Project and the surrounding landscape context. These photographs were taken using a digital SLR camera with a resolution of 30 megapixels and full-frame (35 mm) camera sensor and a lens setting (focal length) of 50 millimeters (mm). A 50 mm focal length (35 mm camera sensor equivalent) is typically used in visual studies because it is generally agreed amongst visual professionals that it provides accurate scale and perspective between close and distant elements in a view. The viewpoint photolog (Attachment A of the Aesthetics Analysis and Orderly Development Review report) includes a panorama composition illustrating the view context and single-frame photograph illustrating the most open, unobstructed view available toward the proposed Project for each documented viewpoint.

### **Photosimulation Development**

To show anticipated visual changes associated with the proposed Project, three-dimensional (3D) modeling and photo editing software was used to create realistic photographic simulations (photosimulations) of the proposed Project. The photosimulations were developed by using Autodesk 3ds Max Design® to create a simulated perspective (3D camera view) to match the location, bearing, and focal length of each existing conditions photograph. A 3D model of the lidar data (point cloud) used to generate the DSM was created to represent existing landscape features, such as roads, buildings, terrain, and vegetation. The 3D camera's orientation, location, roll, and focal length were then adjusted to match the modeled landscape features in the lidar data with the corresponding landscape features in the photograph. This ensures that any elements introduced to the model space (e.g., the PV panel arrays) will be shown in proper proportion, perspective, and relation to the existing landscape features in the view. Consequently, the alignment, elevations, dimensions, and locations of the proposed Facility structures in the simulations will be accurate.

Computer models of the PV panels and racking systems, fencing, inverter stations, and access roads, and generation tie-line conductors and structures were prepared based on layout information and specifications provided by the Project Applicant. The modeled Project components were imported into the landscape model space described above and set at the proper geographic location. The PV panels were then rotated to accurately represent their orientation as it would be on the date and time of each simulated photograph. With the proposed Project in place, a daylight system was created based on the date, time, and location of each photograph in order to accurately represent light reflection, highlights, color casting, and shadows. Proposed mitigation plantings were also incorporated into the simulations where they would be visible. To accomplish this, 3D models representing each of the proposed plant species were prepared based on the installation sizes for the plants specified in the Applicant's Landscape Mitigation Plan (Exhibit NS-JO-2) and assumed plant growth rates. The simulations that depict the plantings following five to seven years of growth in order to illustrate the plantings at their established size and intended screening effectiveness.

Once completed, the modeled Project and plantings were rendered and superimposed over the existing photograph in Adobe Photoshop®. Using lidar data and the proposed limits of disturbance as guides, portions of the Project that would fall behind vegetation, structures, or topography were then masked out and any vegetation that is proposed to be cleared was removed from the photograph. Finally, any shadows cast on the ground by the proposed Facility components and plantings were rendered in a separate "shadow pass" and placed over the terrain with the proper fall-off and transparency.