



Memorandum

To: Connecticut Siting Council

From: Gordon Perkins, Associate/Visualization Services Leader, Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, DPC. (EDR)
Jacob Loughlin, Visualization Project Manager, EDR

Date: June 6, 2025

Reference: Visibility Assessment Memorandum
Old Maids Lane Solar Project, Town of Portland, Middlesex County, Connecticut

List of Attachments

Attachment A: Photosimulation and Wireframe Rendering

Introduction

On behalf of Greenskies Clean Energy, LLC (the Petitioner), Environmental Design and Research, Landscape Architecture, Engineering & Environmental Services, DPC (EDR) conducted a Visibility Assessment for the Old Maids Lane Solar Project (the Project), which is proposed to be located in the Town of Portland, Middlesex County, Connecticut. This Visibility Assessment was prepared in support of a Petition for Declaratory Ruling to the Connecticut Siting Council. The information included in this memorandum is intended to assist state agencies, interested stakeholders, and the public in their review of the proposed Project. The purpose of this assessment is to identify areas where the proposed photovoltaic (PV) array may be visible and to illustrate the potential visual change resulting from the installation of the Project. Areas of potential Project visibility were identified by conducting a viewshed analysis. Photographic simulation (photosimulation) was prepared to show what the Project would look like in a representative open view and a wireframe rendering was prepared from a representative viewpoint where the Project is screened from view. The methodology employed and results of these analyses are described in the following sections.

Project Visibility

To identify areas where the proposed PV panels may be visible, a digital surface model (DSM) viewshed analysis was conducted. The DSM is a representation of topography as well as natural and built features on the land (e.g., buildings, 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 would not accurately represent areas of potential Project 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. The DSM viewshed analysis was prepared using the following data and parameters:

- A 2-foot resolution DSM derived from the 2023 Connecticut Statewide Lidar dataset;

- A 2-mile radius study area surrounding the proposed Project fence line;
- A total of 104 sample points representing the proposed PV panels, each spaced approximately 100 feet apart in a grid pattern throughout the proposed PV array;
- A maximum height of 12 feet applied to each of the 104 PV panel sample points;
- 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 are incorrectly interpreted as solid features with the potential to screen views. In order to correct this inaccuracy, all above-ground surface features within transmission line and road corridors (defined as areas within 50 feet of transmission line and state highway centerlines, and areas within 30 feet of local road centerlines) were removed using bare earth (DEM) elevation values within these corridors. It is important to note that this removal of surface features (such as vegetation and 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 within and adjacent to road and transmission line corridors. All surface features (vegetation) within the Project'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.

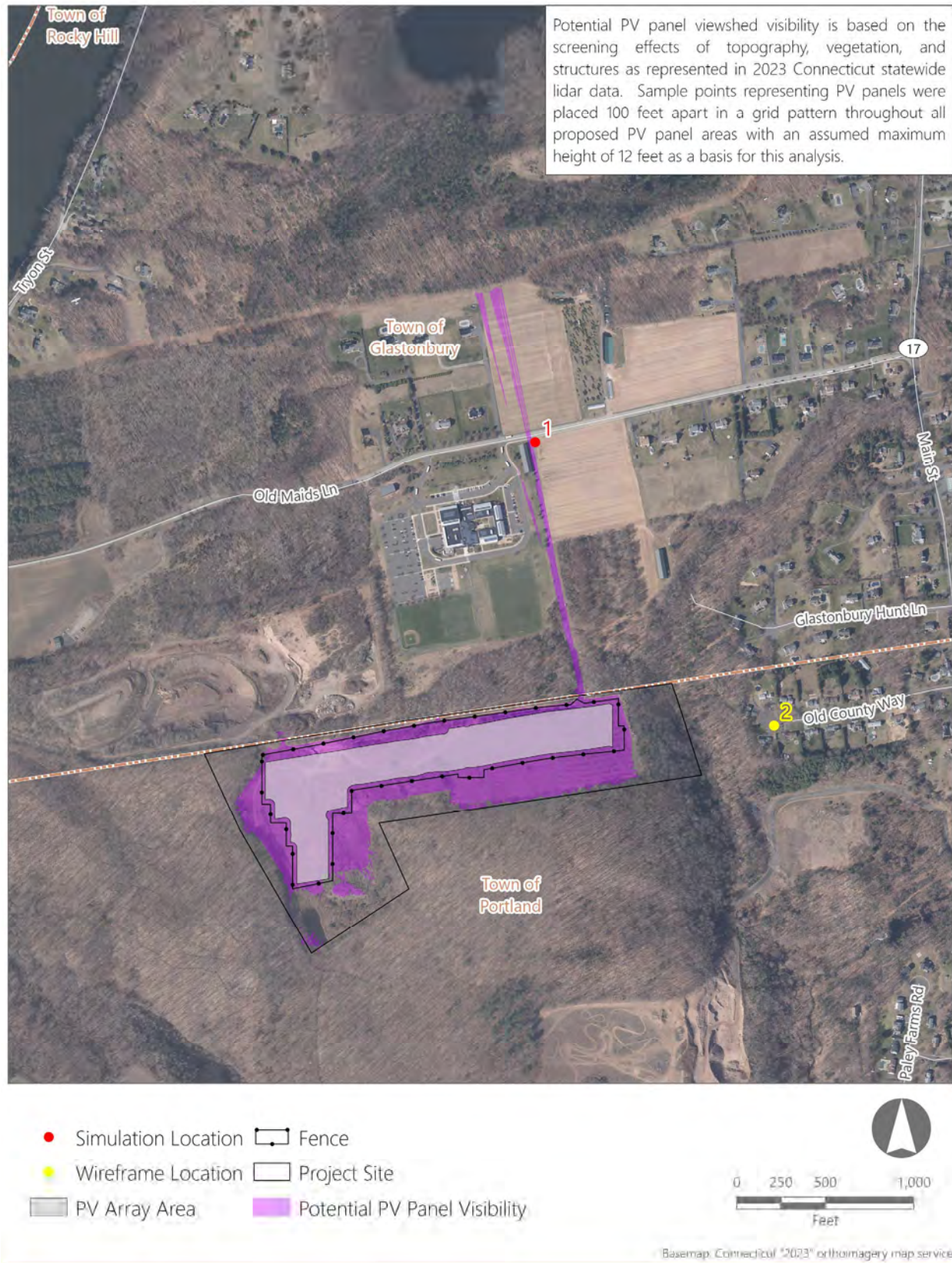
Because it accounts for screening provided by topography, vegetation, and structures, DSM viewshed analysis is the best available representation of potential visibility of the proposed PV panels. However, because certain characteristics of the Project and the study area that may serve to limit visibility (e.g., color, atmospheric/weather conditions, distance from the viewer) are not taken into consideration in the analysis, being located in an area indicated to have potential PV panel visibility does not necessarily equate to actual Project visibility, nor does it indicate that adverse visual impacts will occur within these geographic locations. There is also the possibility of the DSM overstating screening, and therefore underestimating actual visibility, in locations where views are available through trees during the dormant season. However, even in a "leaf-off" condition, such views will typically be significantly screened by bare tree branches and trunks.

The PV panel viewshed analysis results are shown in Figure 1. As indicated in this figure, due to the screening provided by forest vegetation on all sides of the Project site, potential PV panel visibility would be limited to the Project site, a single location on Old Maids Lane in the Town of Glastonbury near the entrance drive

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to the Nayaug Elementary School and an agricultural field to the north of Old Maids Lane. This area of potential Project visibility represents 0.3 percent of the 2-Mile radius study area.

Figure 1. PV Panel DSM Viewshed Analysis Results



Photosimulations

EDR personnel conducted field review on April 15, 2025 to document potential Project visibility and obtain photographs from public vantage points to document representative views for subsequent development of photosimulations. The determination of potential Project visibility was based on the proposed location and dimensions of Project components, viewshed analysis results, and other prominent landscape features 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. 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. Single-frame photographs included in the photolog and used for photosimulations were obtained with 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 location of the two viewpoints documented during field review is illustrated in Figure 1.

To show anticipated visual changes associated with the proposed Project, three-dimensional (3D) modeling software was used to create a photosimulation of the proposed Project from Viewpoint 1 located on Old Maids Lane. The photosimulation was developed by using Autodesk 3ds Max Design® to create a simulated perspective (3D camera view) to match the location, bearing, and focal length of the 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 panels system) 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 Project components in the simulation will be accurate.

Computer models of the PV panels/racking system and perimeter fence were prepared based on layout information and specifications provided by the Petitioner. 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 the photograph for each view. 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. Once complete, the modeled Project was 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 Project components were rendered in a separate “shadow pass” and placed over the terrain with the proper fall-off and transparency using Photoshop®.

For Viewpoint 2 located on Old County Way in the Town of Portland, the Project components were determined to be substantially screened during field review. Therefore, a wireframe rendering was prepared to illustrate the degree of screening provided by existing structures and vegetation in the landscape. In this wireframe rendering, the 3D computer model of the proposed Project components (shown in bright green for illustrative purposes) is overlaid on top of the photograph that is oriented toward the proposed Project.

The photosimulations, along with existing view photographs and additional contextual information for each viewpoint are included in Attachment A.

Attachments

Attachment A

Photosimulation and Wireframe Rendering

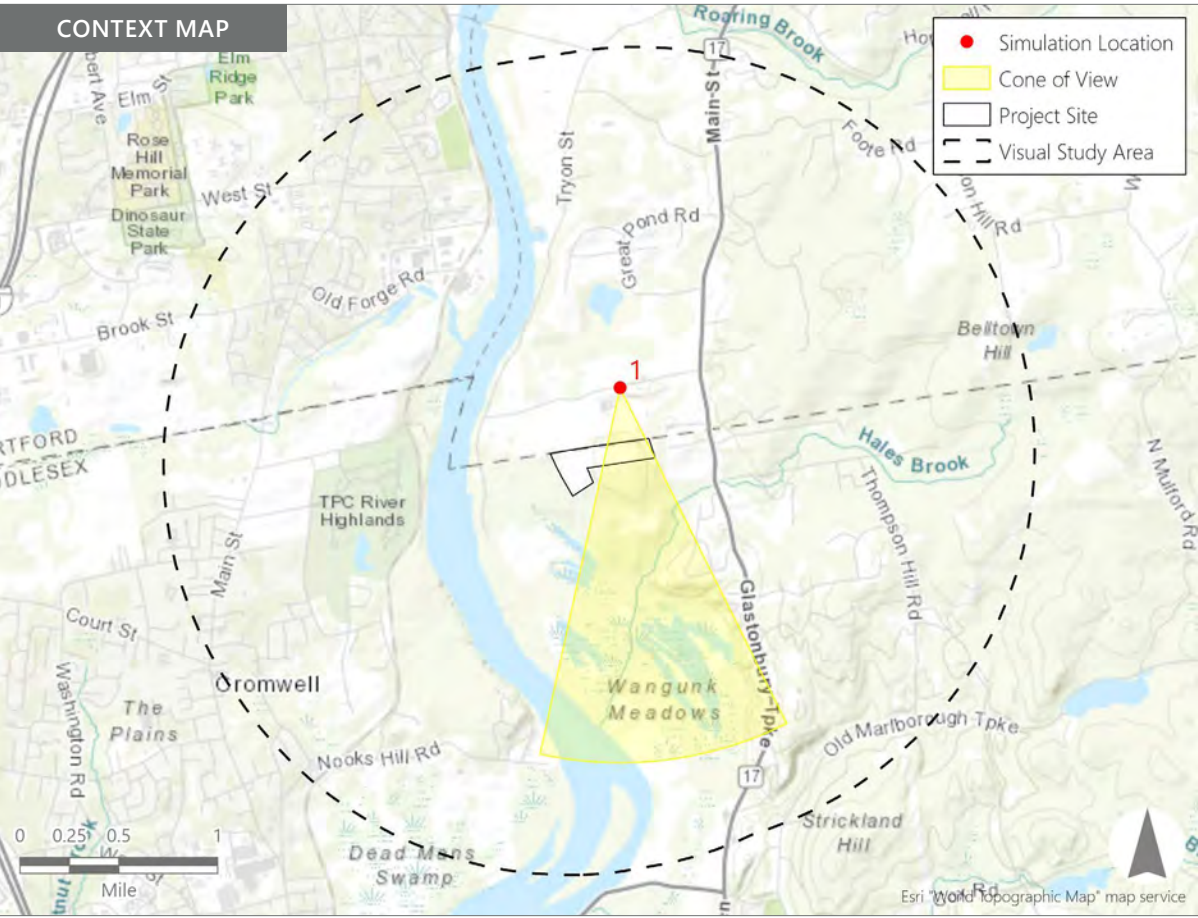
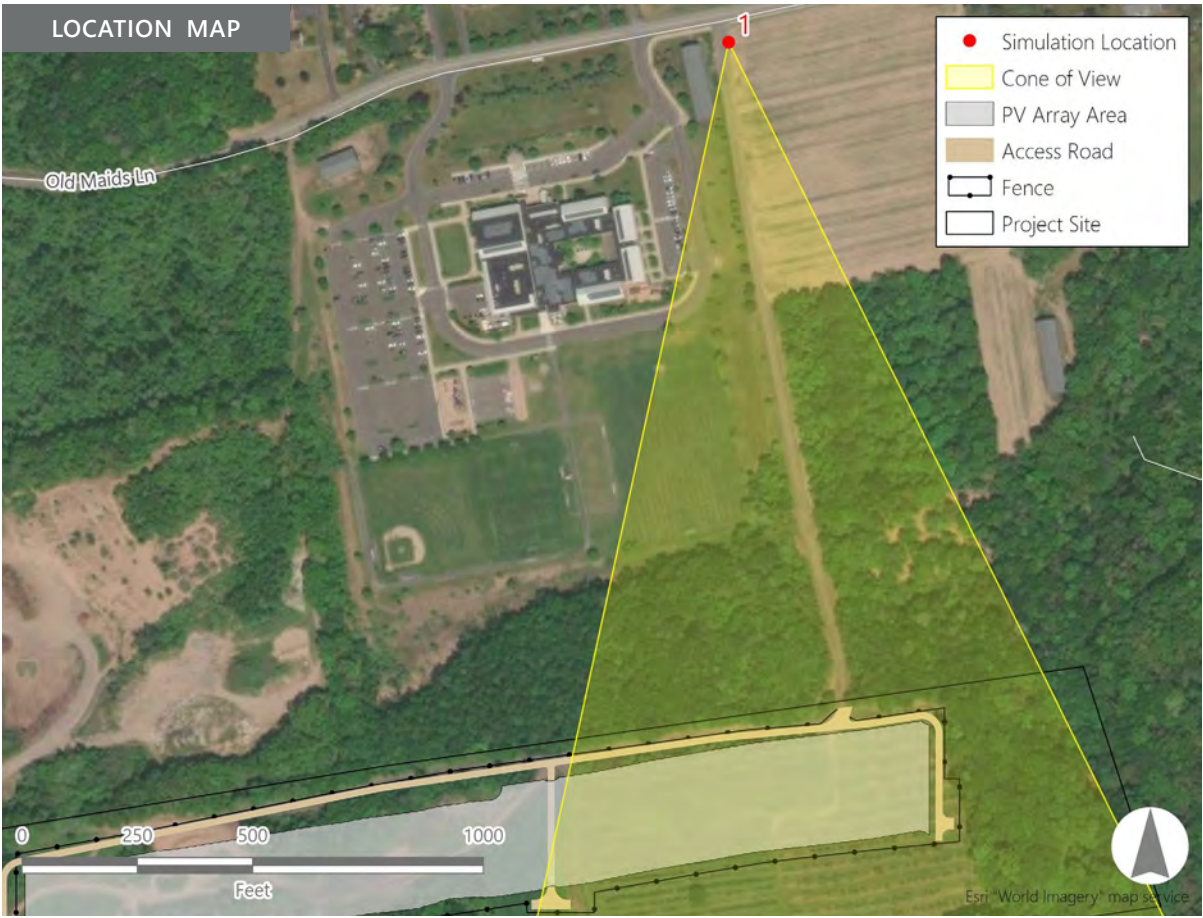


Note: The image above is a panorama composition panning clockwise from east (left) to west (right).

VIEWPOINT 1
Old Maids Lane

LOCATION INFORMATION

Municipality:	Glastonbury
County:	Hartford
Latitude:	41.63908° N
Longitude:	72.61376° W
Project Distance*:	1,513 feet



PHOTOGRAPH INFORMATION

Date:	April 15, 2025
Time:	11:48 AM
Camera:	Canon EOS 5D Mark IV
Camera Resolution:	30.4 Megapixels
Lens Focal Length (35 mm sensor equivalent):	51 mm
Camera Elevation:	175 feet
Field of View:	39 degrees
Direction of View:	South
Printed Size:	10 inches x 15 inches
Viewing Distance**:	21 inches

NOTES

*Distance as measured from the viewpoint to the nearest PV panels within the simulated photograph's field of view

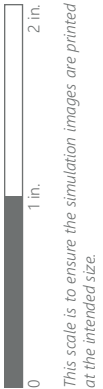
**The simulation is at the correct perspective when printed on an 11-by-17 sheet at full scale, and viewed approximately 21 inches from the eye of the viewer.

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EXISTING VIEW



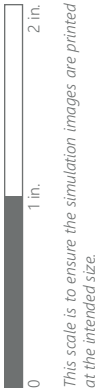
VIEWPOINT 1
Old Maids Lane

Note: Printed at actual size, the existing view image is 15 inches wide by 10 inches high. At this size and focal length, the existing view should be viewed from a distance 21 inches from the eye of the viewer.

PROPOSED VIEW FOLLOWING INSTALLATION



Note: Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.



VIEWPOINT 1
Old Maids Lane

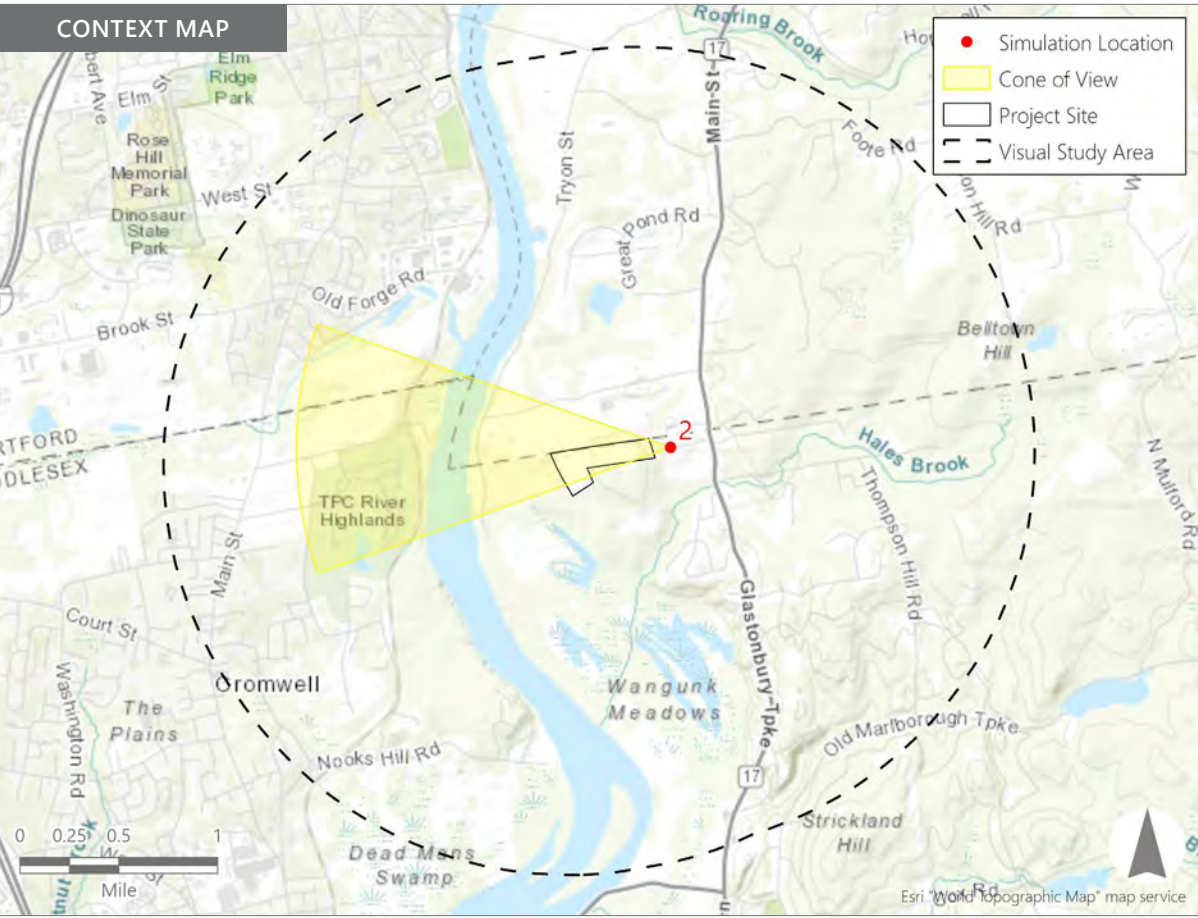


Note: The image above is a panorama composition panning clockwise from south (left) to north (right).

VIEWPOINT 2
Old County Way

LOCATION INFORMATION

Municipality:	Portland
County:	Middlesex
Latitude:	41.43468° N
Longitude:	72.60883° W
Project Distance*:	914 feet



PHOTOGRAPH INFORMATION

Date:	April 15, 2025
Time:	11:48 AM
Camera:	Canon EOS 5D Mark IV
Camera Resolution:	30.4 Megapixels
Lens Focal Length (35 mm sensor equivalent):	51 mm
Camera Elevation:	171 feet
Field of View:	39 degrees
Direction of View:	West
Printed Size:	10 inches x 15 inches
Viewing Distance**:	21 inches

NOTES

*Distance as measured from the viewpoint to the nearest PV panels within the simulated photograph's field of view

**The simulation is at the correct perspective when printed on an 11-by-17 sheet at full scale, and viewed approximately 21 inches from the eye of the viewer.

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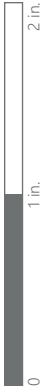
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EXISTING VIEW

Note: Printed at actual size, the existing view image is 15 inches wide by 10 inches high. At this size and focal length, the existing view should be viewed from a distance 21 inches from the eye of the viewer.



This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2
Old Country Way

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Note: Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.

0 1 in. 2 in.
This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2
Old Country Way



WIREFRAME RENDERING

Note: Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.

0 1 in. 2 in.
This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2
Old Country Way

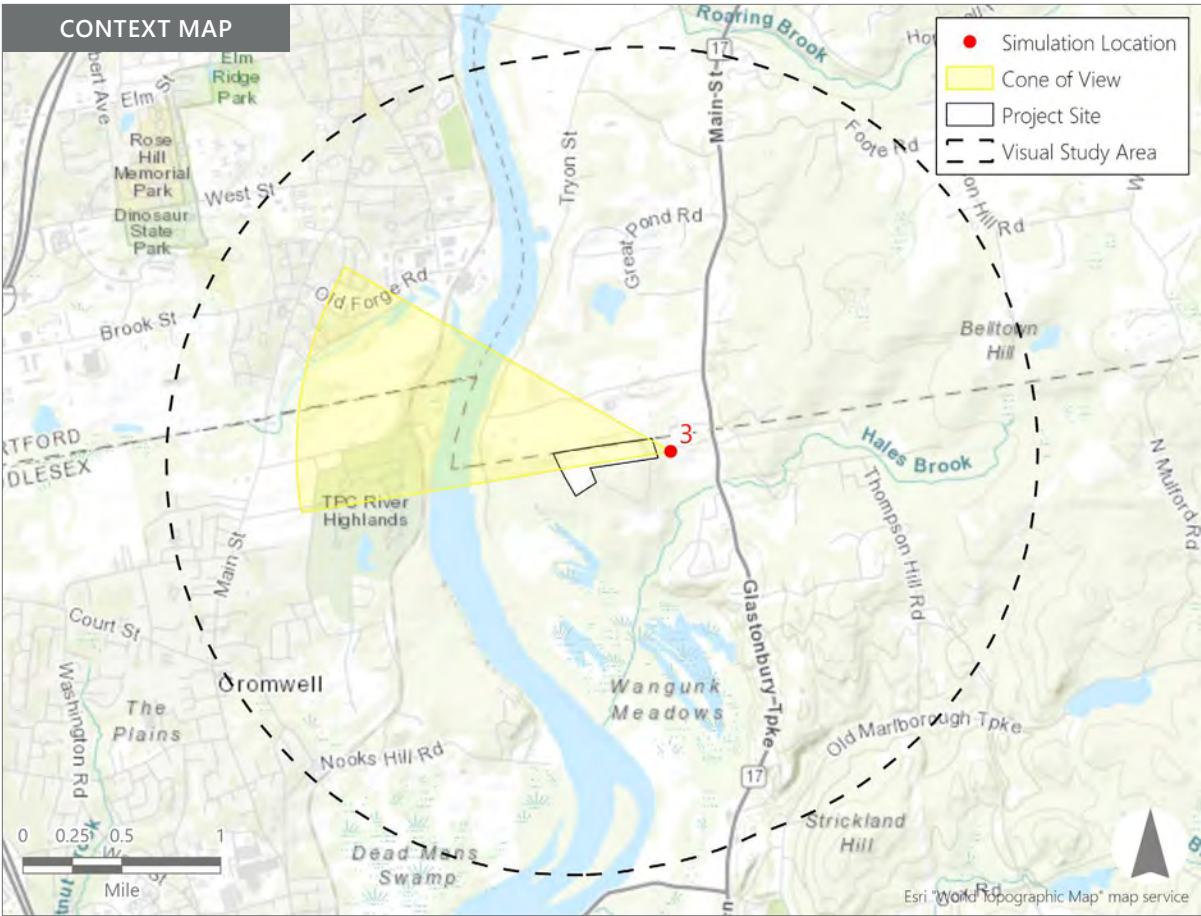


Note: The image above is a panorama composition panning clockwise from southwest (left) to north (right).

VIEWPOINT 3
Private Residence (Old County Way)

LOCATION INFORMATION

Municipality:	Portland
County:	Middlesex
Latitude:	41.63439° N
Longitude:	72.60910° W
Project Distance*:	838 feet



PHOTOGRAPH INFORMATION

Date:	April 15, 2025
Time:	11:48 AM
Camera:	Canon EOS 5D Mark IV
Camera Resolution:	30.4 Megapixels
Lens Focal Length (35 mm sensor equivalent):	51 mm
Camera Elevation:	169 feet
Field of View:	39 degrees
Direction of View:	West
Printed Size:	10 inches x 15 inches
Viewing Distance**:	21 inches

NOTES

*Distance as measured from the viewpoint to the nearest PV panels within the simulated photograph's field of view

**The simulation is at the correct perspective when printed on an 11-by-17 sheet at full scale, and viewed approximately 21 inches from the eye of the viewer.

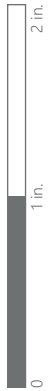
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EXISTING VIEW

Note: Printed at actual size, the existing view image is 15 inches wide by 10 inches high. At this size and focal length, the existing view should be viewed from a distance 21 inches from the eye of the viewer.



This scale is to ensure the simulation images are printed at the intended size.

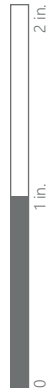
VIEWPOINT 3
Private Residence (Old County Way)

Old Maids Lane Solar



PROPOSED VIEW FOLLOWING INSTALLATION (PROJECT NOT VISIBLE)

Note: Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.



This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 3
Private Residence (Old County Way)

Old Maids Lane Solar



WIREFRAME RENDERING

Note: Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 3
Private Residence (Old County Way)

Old Maids Lane Solar

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