



Glint and Glare Analysis Report

Flat Creek Solar Project

August 2024

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Attachments

Attachment 1 – Forge Solar Printouts

1.0 Introduction

Flat Creek Solar NY LLC is proposing to construct and operate the Flat Creek Solar Project (Facility). The Facility includes development of a 300-megawatt (MW) alternating current (AC) ground-mounted photovoltaic solar generation facility covering a total area of approximately 1,100 acres. The Facility is located south of US Interstate 90 to approximately County Highway 92/County Highway 93, and east of County Highway 94 (Old Sharon Road) to Darrow Road within Montgomery County, New York. The array areas will be secured via security fences that will be installed in proximity to the final panel array locations.

1.1 Permitting and Regulatory Requirements

1.1.1 Article VIII Submittal Requirements

This report was developed to support Exhibit 8 Visual Impacts of the Article VIII (formerly Section 94-c) application for the Facility. As required by Section 1100-2.9(d)(7), the Visual Impacts Minimization and Mitigation Plan (VIMMP) shall include a glare analysis using Sandia National Laboratories Solar Glare Hazard Analysis Tool (SGHAT) methodology or equivalent. The glare analysis assesses the glare potential from the Facility at nearby non-participating residences, airports, and public roadways.

1.1.2 Federal Aviation Administration Policy

In May 2021, the Federal Aviation Administration (FAA) issued a policy in 86 Federal Register 25801 for the development of solar projects on federally-obligated airports (FAA 2021a). The policy is typically adopted by the industry for solar projects off airport property but within proximity of airports.

Within this policy, the FAA identified project criteria where the policy requirements do not apply. These include:

1. Solar energy systems on airports that do not have an air traffic control tower (ATCT);
2. Airports that are not federally obligated; or
3. Solar energy systems not located on airport property.

This Facility is located over 5 miles from an airport based on the FAA's Circle Search for Airports Tool (FAA 2024). Because the Facility is located off-site and a significant distance from the airport property, evaluation is not necessary according to the FAA guidance.

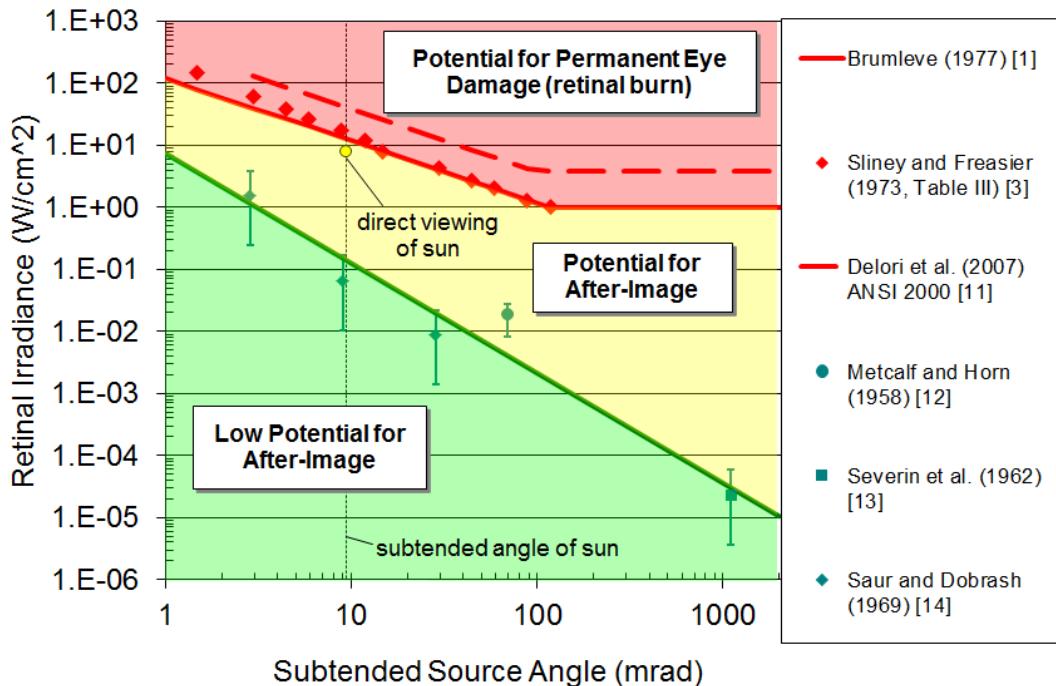
2.0 Approach/Methods

2.1 Glare Hazard Analysis Tool

To conduct the glint and glare analysis, TRC used methods developed by Sandia National Laboratories and described in the SGHAT User's Manual (Ho and Sims 2016). The SGHAT-compliant software used in this analysis is under license to TRC by ForgeSolar. Glare is defined as a continuous source of bright light, whereas glint is defined as a momentary flash of bright light. Both are common in the natural environment.

The SGHAT analyzes the potential for glare over the entire calendar year from when the sun rises above the horizon until the sun sets below the horizon. The magnitude of glint and glare depends on several factors such as the sun's position, the location of the observer, and characteristics of the solar PV array including location, orientation, tilt, and optical properties of the modules used. Glare visibility from an observer's location was analyzed once array characteristics were determined. Ocular hazard potential was estimated based on the retinal irradiance and subtended angle (size/distance) of the predicted glare (Ho et al, 2011). Potential ocular hazards range from temporary after-image to retinal burn depending on the retinal irradiance and subtended angle, as shown in **Figure 2-1**. The SGHAT classifies solar glare into three categories, denoted as "green," "yellow," or "red" glare.

- Green glare is the mildest of the classifications and has low potential to cause after-image and no potential to cause retinal burn.
- Yellow glare is a moderate level of glare and has some potential for temporary after-image and no potential to cause retinal burn.
- Red glare is a serious and significant form of glare with potential to cause retinal burn and/or permanent eye damage. Flat-plate photovoltaic systems, such as the ones proposed, do not produce the retinal irradiance levels necessary to result in permanent retinal damage.



Source Ho et al, 2011

Figure 2-1. Potential Glare Impacts

In general, modern solar modules are designed to absorb the sun's energy to produce electricity. Solar modules are constructed from high transmission, low iron glass and are typically covered with anti-reflective coatings. Solar modules produce specular reflections, as the sun is reflecting off the generally smooth surface of the solar module. This reflection bounces off the solar module at specific angles, dependent on the sun's position and module angle, and can be observed as glint or glare by an observer that intersects the reflective angle. Modern solar modules, on average, reflect approximately 10 percent of total irradiance but can be as low as 1 to 2 percent with anti-reflective coatings and depending on the sun's incident angle (Ho and Sims, 2013).

Studies have been conducted comparing the intensity of glare and reflectance from solar modules with respect to common surfaces and materials (**Figure 2-2**). These studies have shown that reflections from solar modules (with anti-reflective coatings) are considerably lower than reflections from steel and common glass and tend to be similar to reflections from smooth water (**Figure 2-3**). The reflectivity of solar modules compared to common materials is shown in **Figures 2-2 and 2-3**.

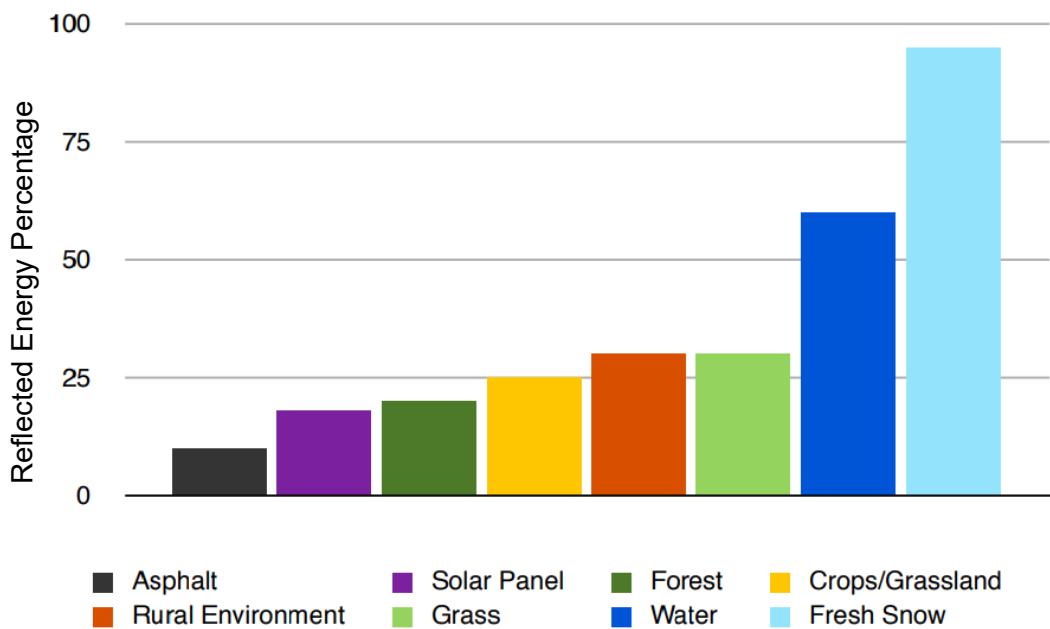


Figure 2-2. Comparative Reflective Analysis (Capital Source Farm, 2010)

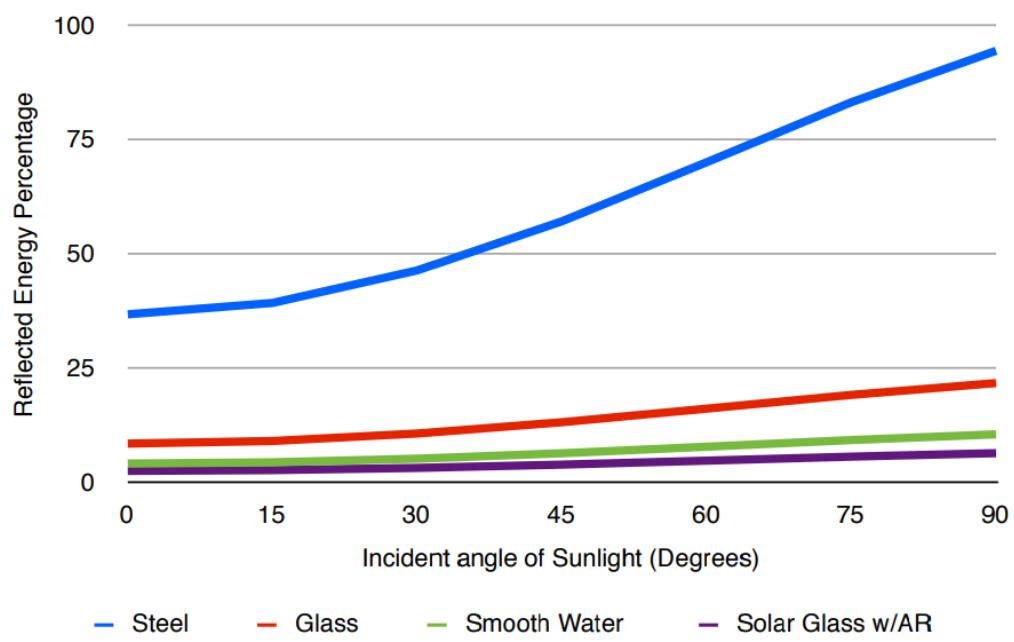


Figure 2-3. Analysis of Typical Material Reflectance (Capital Source Farm, 2010)

ForgeSolar suite of tools provides a quantified assessment of:

- when and where glare may occur throughout the year from solar installations, and
- the potential effects on the human eye when glare does occur.

However, the application of this tool in determining the occurrence, duration, and intensity of glare ensures a conservative analysis since it is based on a clear, sunny skies all year round, does not consider obstacles/obstructions (trees, buildings, hills), does not account for atmospheric conditions that scatter or reduce incoming solar radiation or cloud cover. Accordingly, SGHAT outputs represent the worst-case scenario.

Assumptions of the SGHAT are as follows. Additional assumptions noted by ForgeSolar are provided in **Attachment 1**.

- The SGHAT does not rigorously represent the detailed geometry of a solar panel array; detailed features such as gaps between modules, variable heights of the PV array, and support structures may impact actual glare results. This can be evident in non-planar footprints (such as multiple sides of a hill) in which the system would smooth the footprint to place the vertex elevations on a single planar surface.
- The glare spot is constrained by the PV array footprint size. Partitioning large arrays into smaller sections may reduce the maximum potential subtended angle (glare spot), potentially impacting results if actual glare spots are larger than the sub-array size.
- The variable direct normal irradiance (DNI) feature scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This DNI is indicative for the amount of solar radiation received on a surface normal to the sun within a 60-minute period. This variable profile provides a lower DNI in the mornings and evenings and a maximum (1,000 watts per square meter [W/m^2] as recommended by ForgeSolar) at solar noon. The scaling uses a clear-day irradiance profile all year round. However, the actual DNI on any given day can be reduced by many factors, such as atmospheric conditions like overcast skies or atmospheric attenuation from humidity and particulates (Ho and Sims 2013). Therefore, modeling results are more conservative than what may be anticipated on a specific day.
- The modeling does not automatically consider obstacles (either natural or artificial, existing, or proposed) between the observation points and panel arrays. To view glare, there must be a clear line of site from the panels to the receptor location. Therefore, obstructions such as trees, hills, buildings, etc., may limit instances of glare.

-
- The ocular (visual) hazard, as shown in **Figure 2-1**, predicted by the tool is also dependent on several environmental, optical, and human factors, which can be uncertain. This may minimize the true ocular (visual) impact for an individual.

In general, default values given by the SGHAT in this analysis reflect the worst-case scenario. As such, the actual glare created by the Facility is likely to be less than that predicted by the model.

The following additional assumptions have been used for the analysis:

- Time zone for the Facility was set at UTC-5 (Eastern Standard Time).
- Subtended angle of the sun of 9.3 milliradian, as recommended by the SGHAT. This is the average angle of the sun as viewed from earth as it moves throughout the course of the day.
- The time interval for the analysis was set to run at 1-minute increments.

Inputs, outputs, and other assumptions used in the analysis are documented in the solar glare hazard analysis reports (**Attachment 1**).

2.2 Facility Specifications

2.2.1 Array Area Specifications

The Facility was split into 59 separate array areas to be modeled for glare. Due to the number of separate array areas, and the overall size of the Facility and the area in which it covers, the array areas were grouped into the following six “modeling areas”:

- Group A: Array 1 through 11
- Group B: Array 12 through 17
- Group C: Array 18 through 23
- Group D: Array 24 through 38
- Group E: Array 39 through 48
- Group F: Array 49 through 59

The array areas are proposed to be mounted on a single-axis tracking system with axes that are positioned in a north-south orientation (180°), and an east-west tilt angle ranging from 60° to -60°. The resting angle, which is defined as the angle at which backtracking of the panels starts and ends at the beginning and end of the day respectively (i.e., the shallowest angle outside the range of rotation), was modeled starting at 10° and adjusted to 15° at Arrays 38 and 39 to further minimize potential glare.

Single-axis tracking systems are programmed for the panels to remain perpendicular to the sun's location as the sun moves across the sky throughout the day via solar data from ephemeris tables, which predict the sun's path across the sky. The tracking system begins when the sun's location is perpendicular with the maximum tracking angle of the system and continues until the sun enters a range where the panel can no longer remain perpendicular with the sun. When the sun is outside the tracking range of the system (when the panels no longer can remain perpendicular with the sun), the trackers remain at their resting angle until the sun sets below the horizon.

The Facility will utilize backtracking at the site to reduce the impacts from shading during the morning and evening hours of the day. ForgeSolar utilizes four methods to model backtracking which include "shade-slope," "shade," "interval," and "instant." A "shade-slope" method was utilized in this model. "Shade-slope" is a slope aware method design to accommodate the modules placed on arbitrarily oriented slopes and reduce shading. For the backtracking analysis, a ground coverage ratio of 39.7 percent was used.

The panels are proposed to be mounted to the single axis tracking system at a typical height above ground surface, approximate midpoint of the panel, of 6.92 feet. This allows for a maximum top of panel height of 10 feet above ground level. Panels are proposed to have a smooth-textured surface and have anti-reflective coating on the panel surface. Ground elevations reported in the ForgeSolar program were updated to reflect available topographic data within the array areas.

Figures 2-4 through 2-9 depict the locations of each array area.

2.2.2 Visual Obstructions

Landscaping is proposed to be installed in several locations throughout the Facility Site as shown on the Landscaping Plan (Appendix 5-2). In addition, several locations within the Facility Site contain existing vegetation which will assist in mitigating visual impacts of the Facility components . Proposed landscaping and existing vegetation serve dual purpose: (1) general screening of the solar arrays and (2) provides visual obstructions that assist in minimizing glare that may be potentially perceived at a receptor.

As noted in **Section 2.1**, natural or man-made obstructions are not automatically included in the ForgeSolar model; however, simplistic obstruction modeling can be included into the analysis manually. In ForgeSolar, obstruction modeling is treated as an opaque parallelogram which would block incoming sunlight or emanating glare reflections if they intersect the obstruction face. This obstruction modeling was included in areas where potential glare impacts may occur to show potential mitigating impact of the existing and proposed vegetation. The approximate locations of the modeled obstructions are shown on **Figures 2-7 and 2-8**.

Proposed landscaping vegetation was modeled at a height of 5 to 10 feet above ground surface. Existing vegetation was modeled at varying heights across the Facility from 20 to 40 feet tall. On **Figures 2-7 and 2-8**, areas of proposed landscaping that were included in the model are shown in blue and existing landscaping included in the model are shown in green.

These modeled obstructions do not account for all obstructions potentially seen within the Facility, only the array areas identified in **Figures 2-7 and 2-8** are included in the model. The presented visual obstruction modeling herein estimates the potential effects of proposed landscaping and existing vegetation, however, it should be noted that visibility through modeled vegetation may occur, as vegetation is not always an opaque wall all year round.

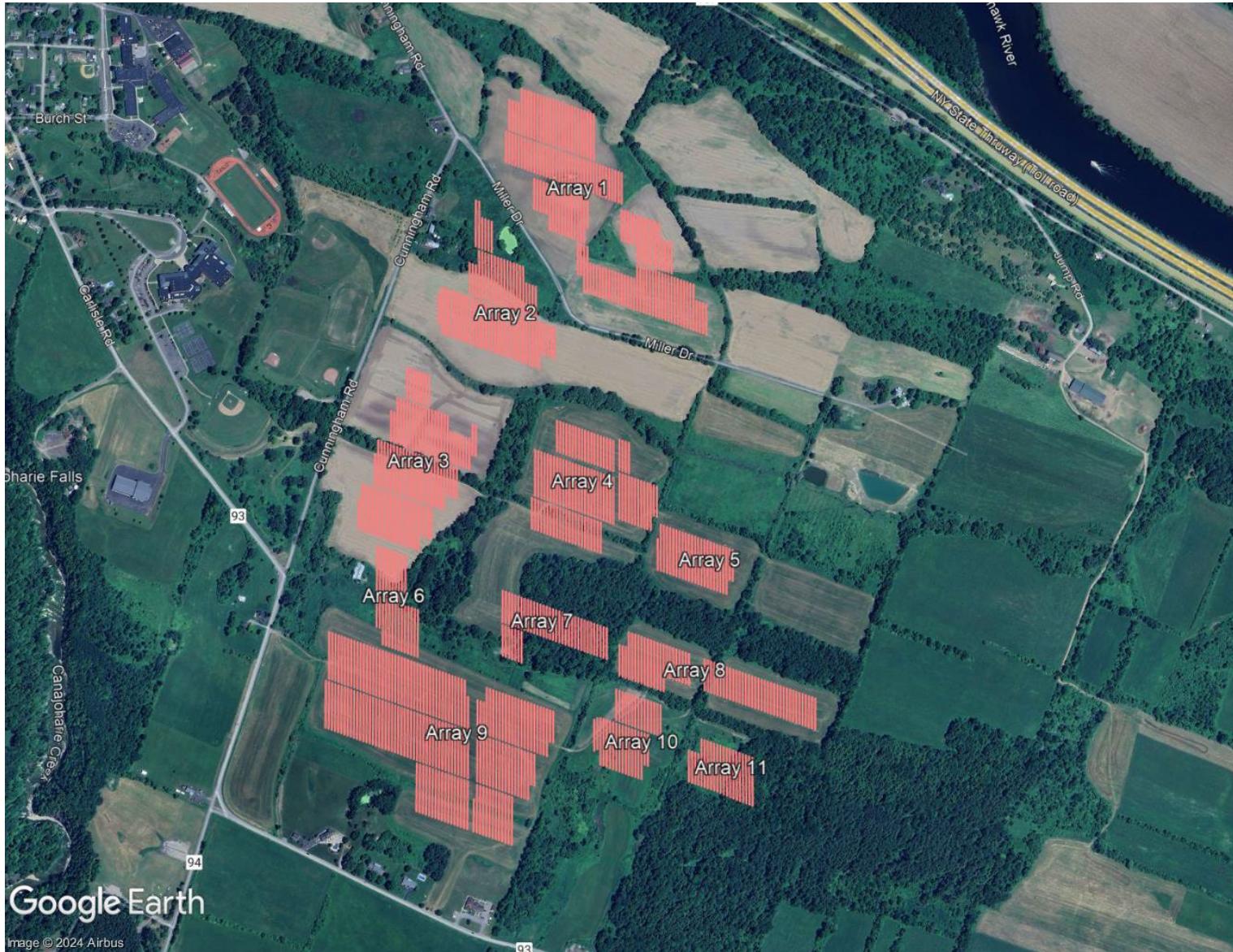


Figure 2-4. Preliminary Array Locations and Labels (Group A)



Figure 2-5. Preliminary Array Locations and Labels (Group B)



Figure 2-6. Preliminary Array Locations and Labels (Group C)

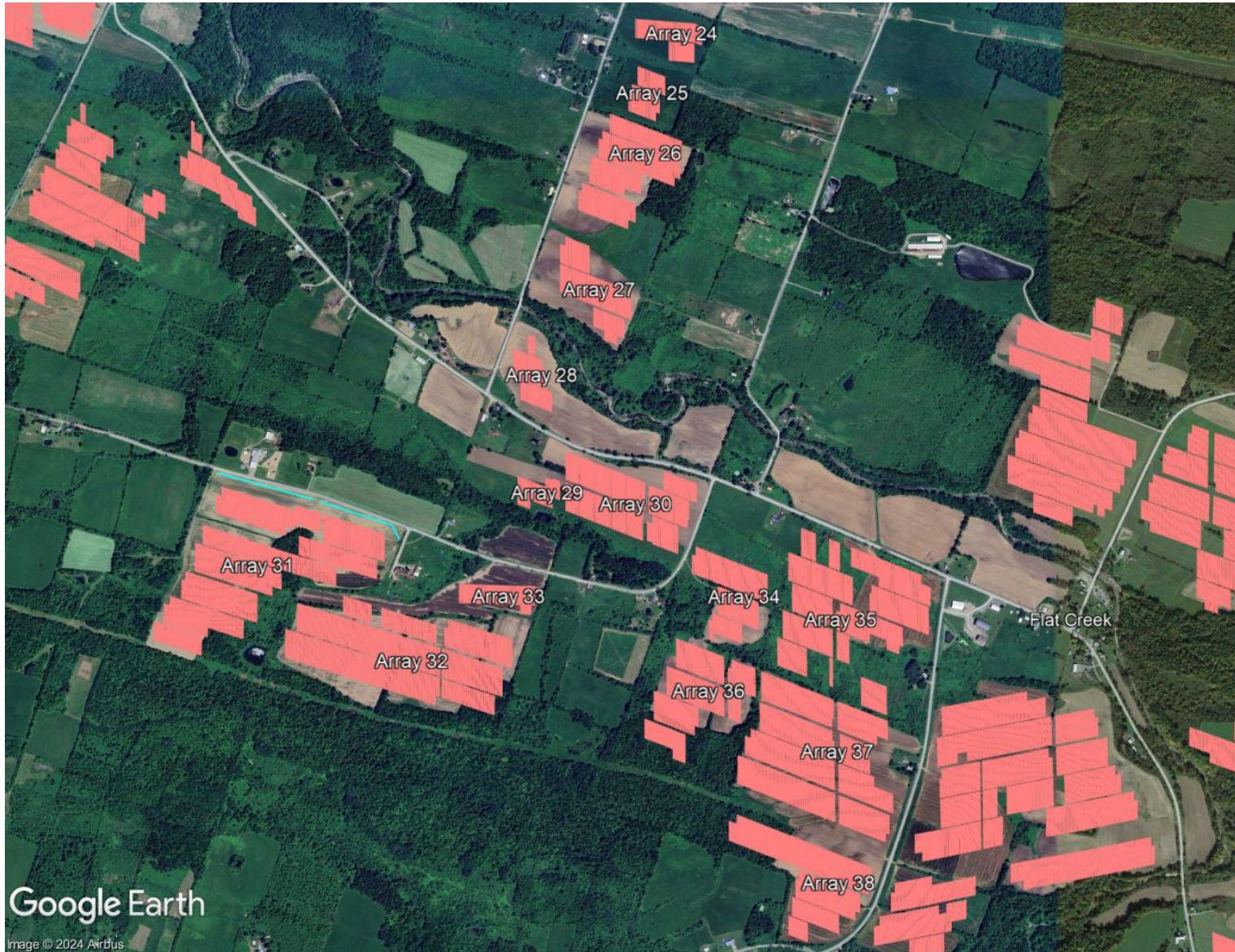


Figure 2-7. Preliminary Array Locations and Labels (Group D)

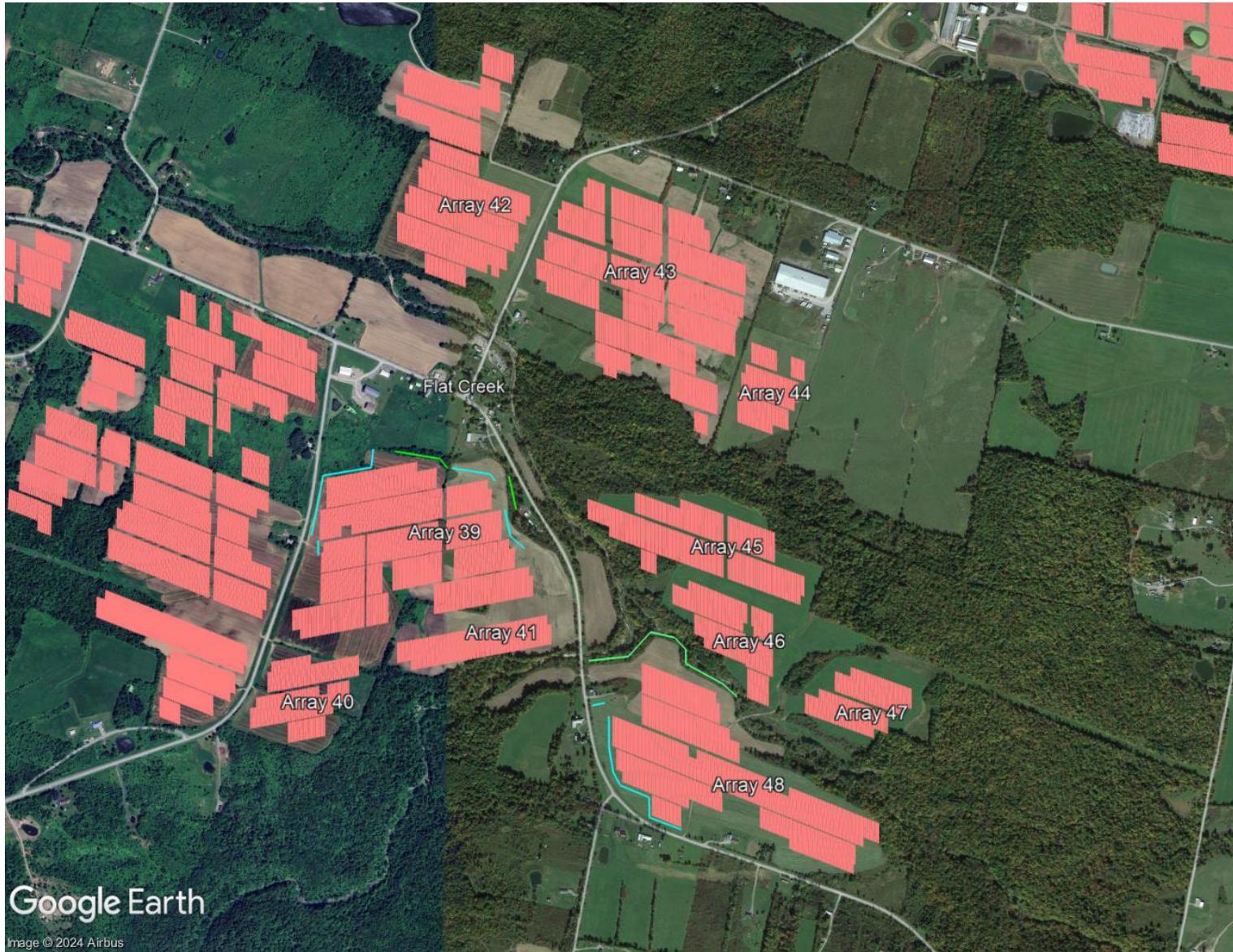


Figure 2-8. Preliminary Array Locations and Labels (Group E)



Figure 2-9. Preliminary Array Locations and Labels (Group F)

2.3 Observer Parameters

2.3.1 Residential Locations

There are no consistent standards or guidance for determining the study area when assessing solar glare. Town solar ordinances may require that glare at adjacent or neighboring residences be evaluated; however, adjacent and neighboring are generally not defined. Title 16, Chapter 18, Section 1100-2.9(d)(7) of the New York Code, Rules, and Regulations, indicates that glare exposure to non-participating residence, airport, or public roadways will be avoided and minimized. For the Town of Root and Town of Canajoharie, which the Facility is in, neighboring/adjacent buildings properties and roadways are noted in their ordinances.

To account for this inconsistency between requirements for the Towns and State, residences located generally within 1,000 feet of an array grouping (see groupings in **Section 2.2**) were included in the model for glare evaluation. Due to the layout of these array groupings and the size of these groupings, this resulted some receptors being evaluated for arrays, that are within the same array group, but located well over 1,000 feet away. In these instances, array groupings and residential receptors were subdivided so that receptors would generally be evaluated against the arrays located closest to the residence.

The occupied residences were identified via aerial imagery and Google “Street View” photos (Google Earth Pro 2021, Bing). The analysis was conducted using ForgeSolar’s Observation Point (OP) tool to model glare visible from single locations. A height of 6 feet was used to represent an observer in the window of a single-story building, and 16 feet was used to represent an observer in the window on the second floor of a two-story building.

A total of 109 unique buildings were identified in proximity to the proposed solar power system, which were split into each of the modeling areas based on their proximity to array groupings.

Tables 2-1 through 2-6 summarize the modeled characteristics of the evaluated OPs and their corresponding labels for each array group. **Figures 2-10 through 2-15** detail the approximate locations of the observation points for each group.

Table 2-1. Observation Points (Group A)

Observation Point Label	Height (ft)
OP1 through OP3	6
OP4/OP5	6/16
OP6	6
OP7/OP18	6/16
OP9	6
OP10/OP11	6/16
OP12/OP13	6/16
OP14 through OP15	6
OP16/OP17	6/16
OP18 through OP19	6

Table 2-2. Observation Points (Group B)

Observation Point Label	Height (ft)
OP1/OP2	6/16
OP3/OP4	6/16
OP5/OP6	6/16
OP7/OP8	6/16

Table 2-3. Observation Points (Group C)

Observation Point Label	Height (ft)
OP1/OP2	6/16
OP3/OP4	6/16
OP5/OP6	6/16
OP7/OP8	6/16
OP9/OP10	6/16
OP11/OP12	6/16
OP13/OP14	6/16
OP15/OP16	6/16
OP17/OP18	6/16
OP19/OP20	6/16
OP21	6
OP22/OP23	6/16
OP24/OP25	6/16
OP26/OP27	6/16

Table 2-4. Observation Points (Group D)

Observation Point Label	Height (ft)
OP1/OP2	6/16
OP3 through OP4	6
OP5/OP6	6/16
OP7	6
OP8/OP9	6/16
OP10 through OP12	6
OP13/OP14	6/16
OP15	6
OP16/OP17	6/16
OP18 through OP19	6
OP20/OP21	6/16
OP22	6
OP23/OP24	6/16
OP25/OP26	6/16
OP27 through OP30	6
OP31/OP32	6/16
OP33	6
OP34/OP35	6/16
OP36	6
OP37/OP38	6/16
OP39/OP40	6/16
OP41/OP42	6/16
OP43/OP44	6/16

Table 2-5. Observation Points (Group E)

Observation Point Label	Height (ft)
OP1	6
OP2/OP3	6/16
OP4 through OP8	6
OP9/OP10	6/16
OP11 through OP12	6
OP13/OP14	6/16
OP15/OP16	6/16
OP17 through OP18	6
OP19/OP20	6/16
OP21/OP22	6/16
OP23/OP24	6/16
OP25/OP26	6/16
OP27	6
OP28/OP29	6/16
OP30 through OP35	6

Table 2-6. Observation Points (Group F)

Observation Point Label	Height (ft)
OP1/OP2	6/16
OP3/OP4	6/16
OP5	6
OP6/OP7	6/16
OP8/OP9	6/16
OP10/OP11	6/16
OP12/OP13	6/16
OP14/OP15	6/16
OP16	6
OP17/OP18	6/16
OP19	6
OP20/OP21	6/16
OP22 through OP24	6
OP25/OP26	6/16
OP27 through OP29	6
OP30/OP31	6/16
OP32/OP33	6/16
OP34	6
OP35/OP36	6/16
OP37 through OP38	6



Figure 2-10. Observation Point Locations (Group A)

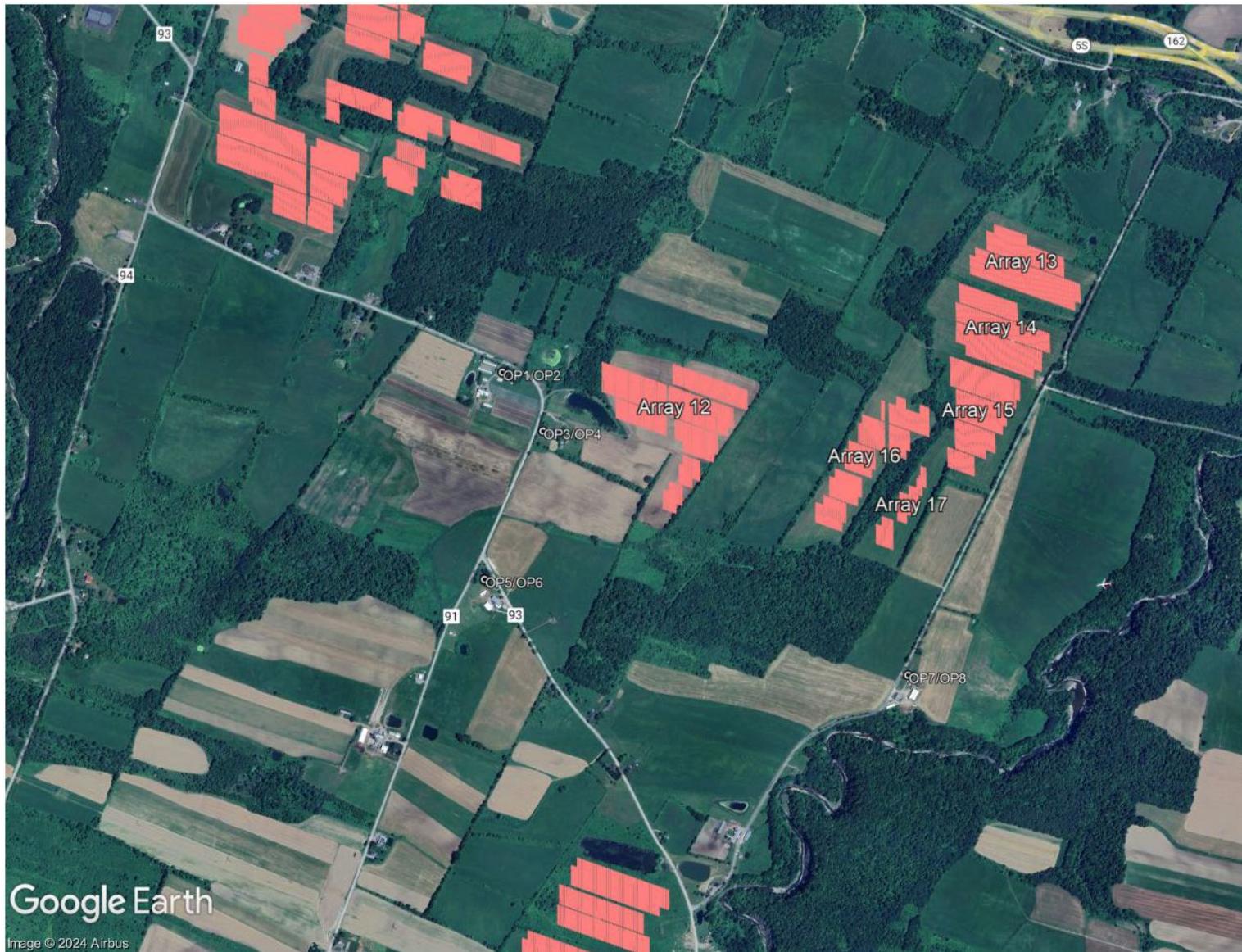


Figure 2-11. Observation Point Locations (Group B)



Figure 2-12. Observation Point Locations (Group C)

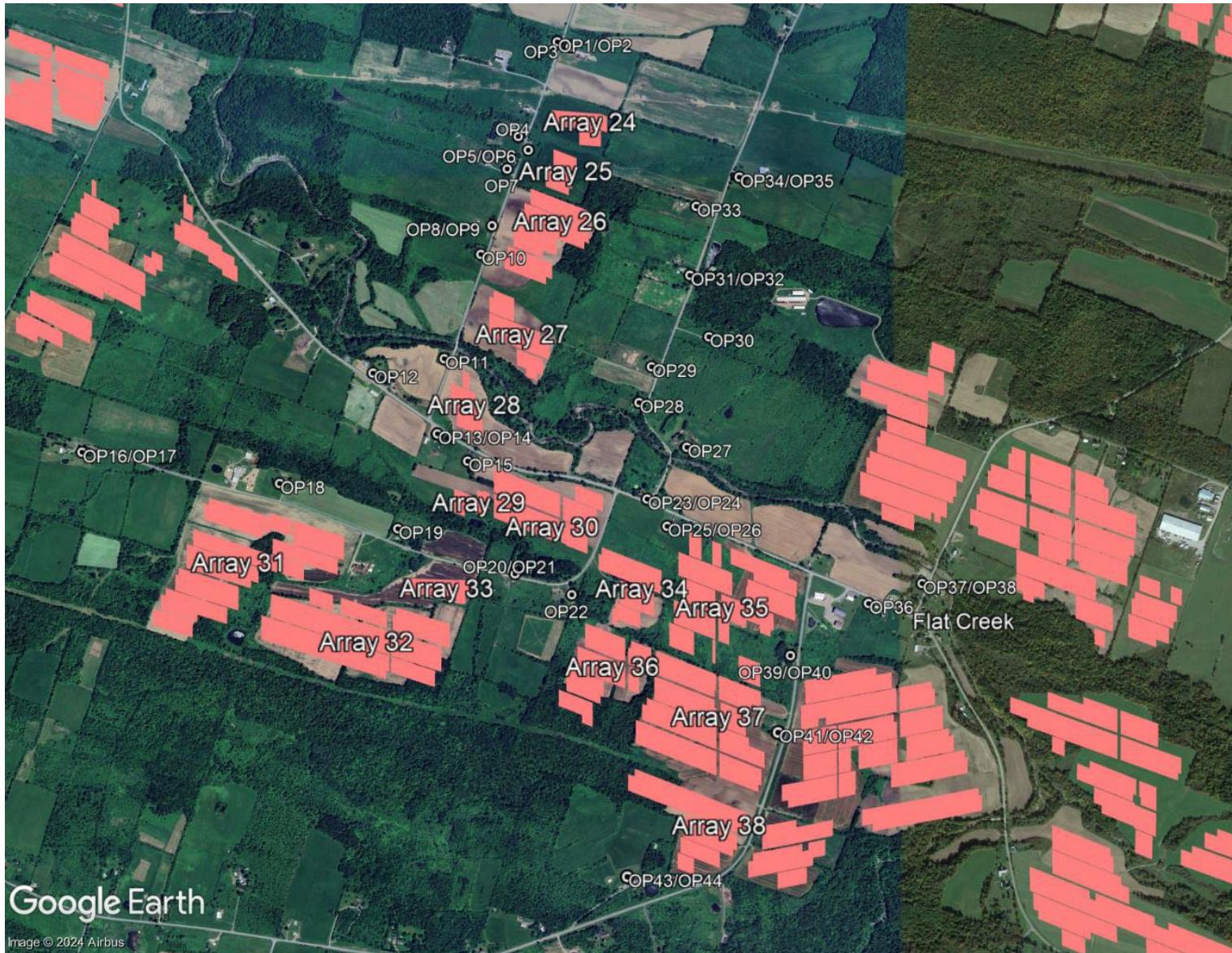


Figure 2-13. Observation Point Locations (Group D)

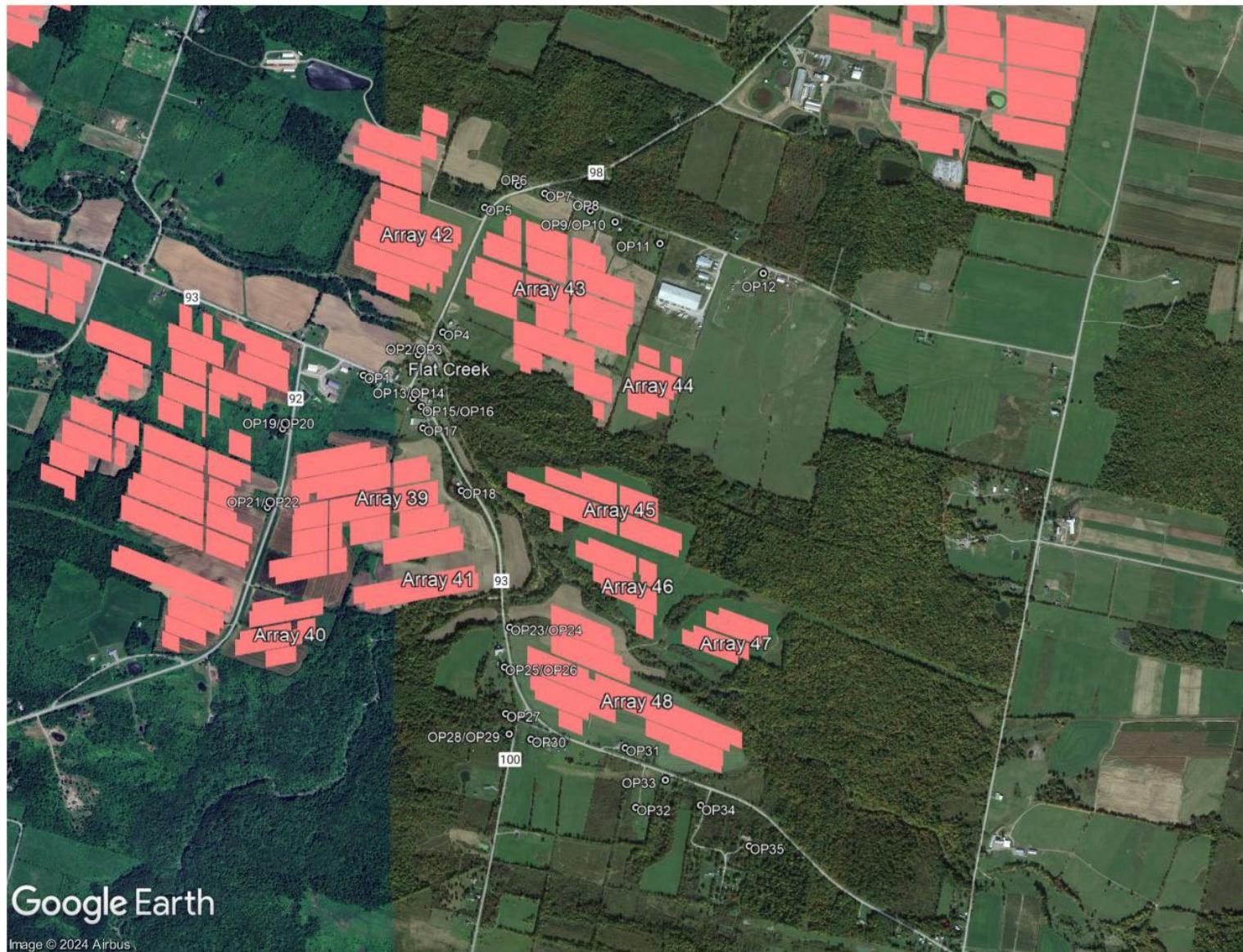


Figure 2-14. Observation Point Locations (Group E)



Figure 2-15. Observation Point Locations (Group F)

2.3.2 Route Parameters

The public roadways generally within 1,000 feet of the proposed Facility array areas within an array grouping were included in this analysis. The roadways were identified via aerial imagery and Google Maps. Analysis for the roadways was conducted utilizing the Route Receptor tool in ForgeSolar. The Route Receptor tool provides a multi-line representation that simulates observers traveling along continuous paths such as roads, railways, helicopter paths, and multi-segment flight tracks. Segments of the following roadways were identified in proximity to the Facility:

- Blaine Road
- Canyon Road/Lookout Road
- Carlisle Road
- Conway Road
- Cunningham Road
- Darrow Road
- Flat Creek Road
- Hilltop Road
- Hwy 162
- King Road
- Lincoln Road
- Mahr Road
- Mapletown Road
- Miller Drive
- Moyer Road
- Old Sharon Road
- Rappa Road

Figures 2-16 through 2-21 illustrate the locations of the evaluated routes.

The viewing angle for observers traveling along the roadways was presumed to be a -50 to 50° field of view (total viewing angle of 100°), which represents that the observer can view glare in all directions. The height for observers traveling along the roadway was assumed to be 5 feet for passenger cars.

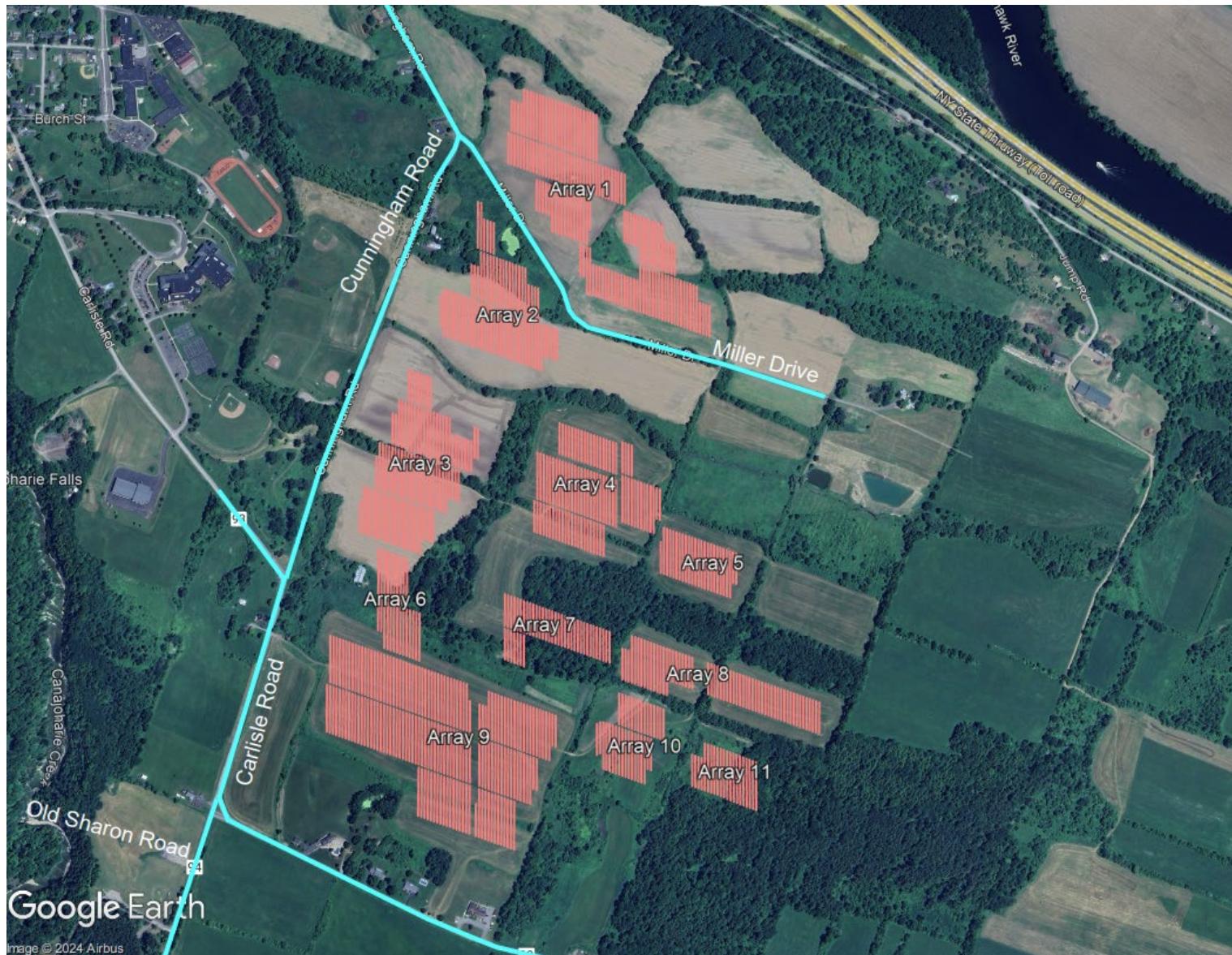


Figure 2-16. Route Receptor Locations (Group A)

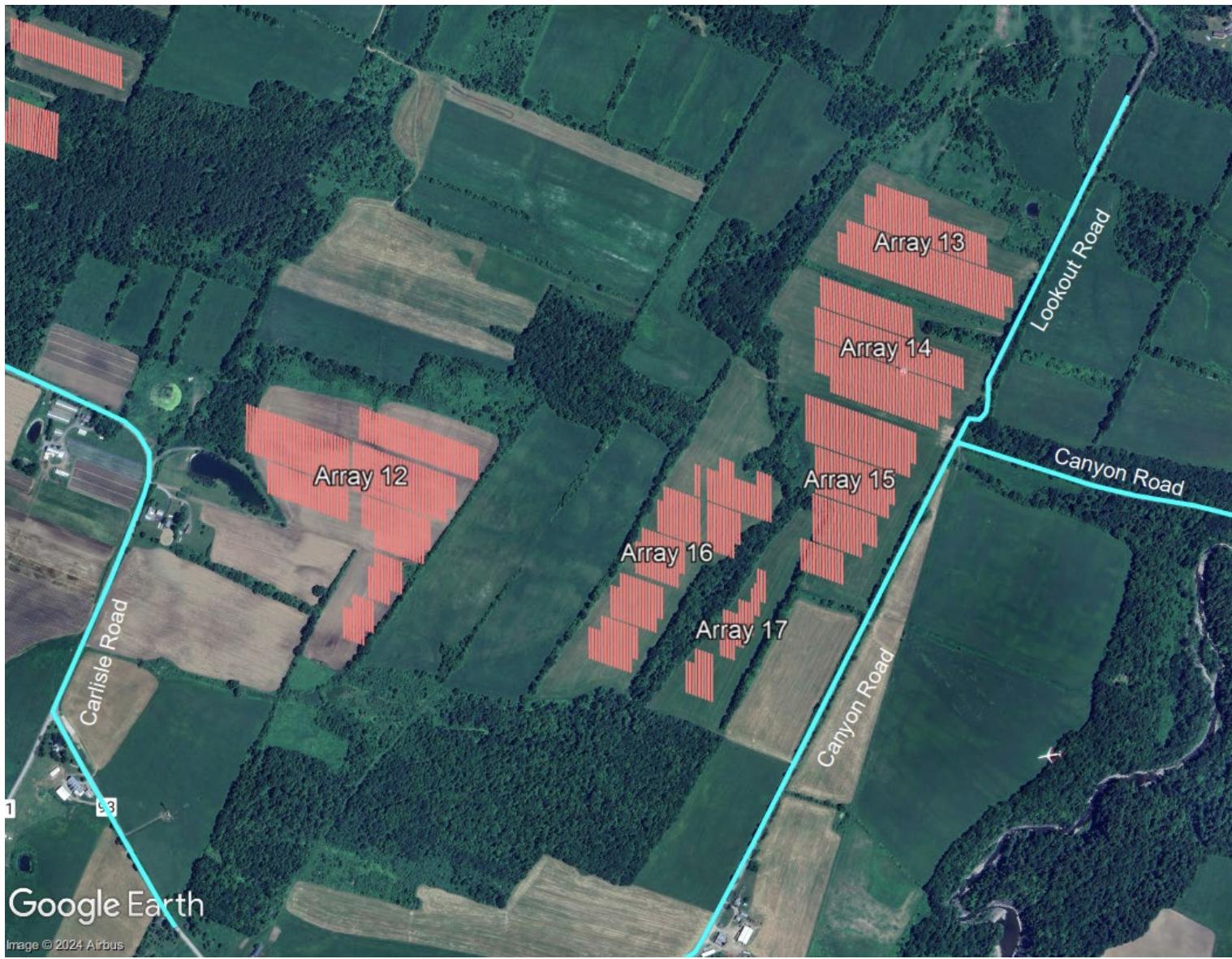


Figure 2-17. Route Receptor Locations (Group B)



Figure 2-18. Route Receptor Locations (Group C)

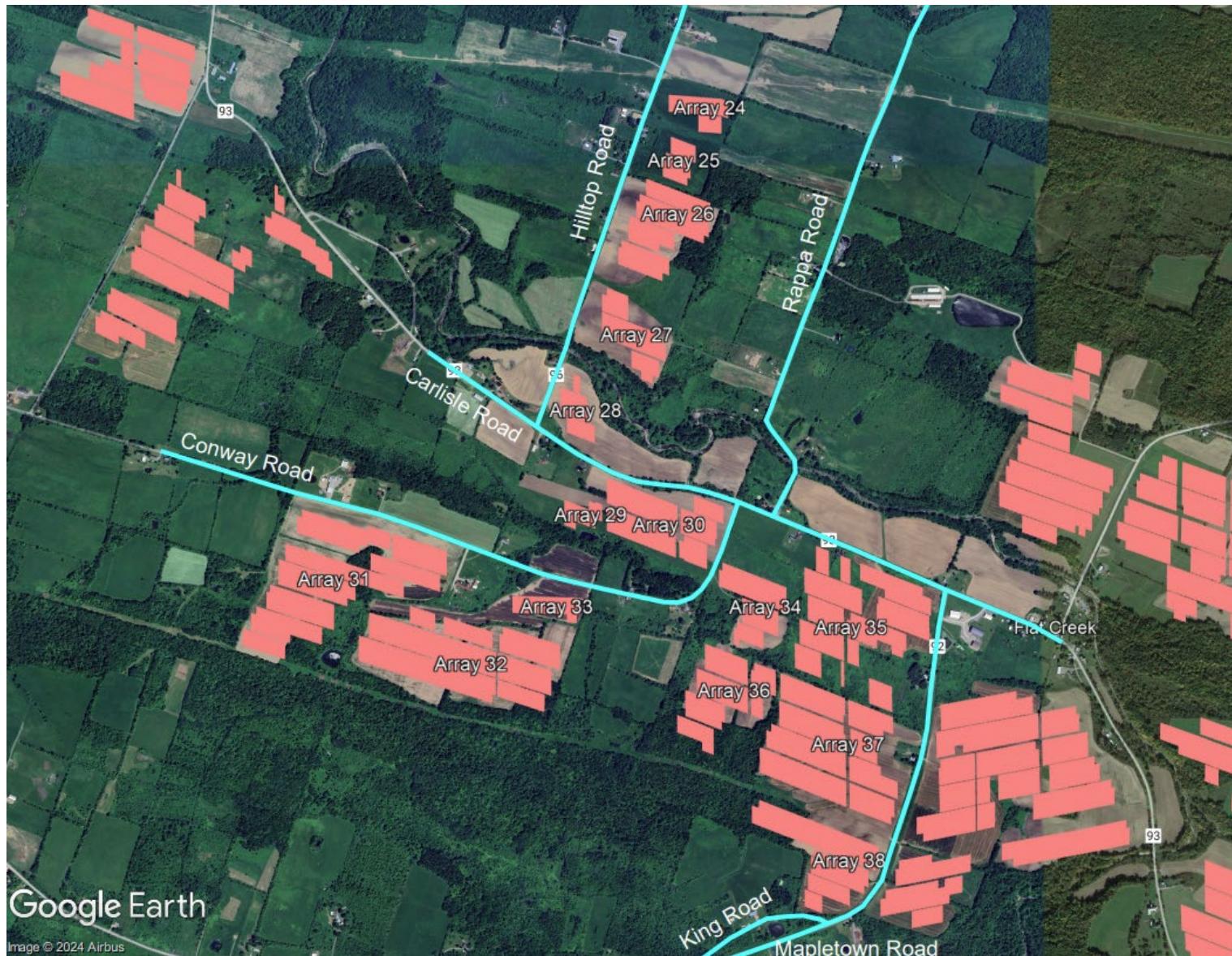


Figure 2-19. Route Receptor Locations (Group D)

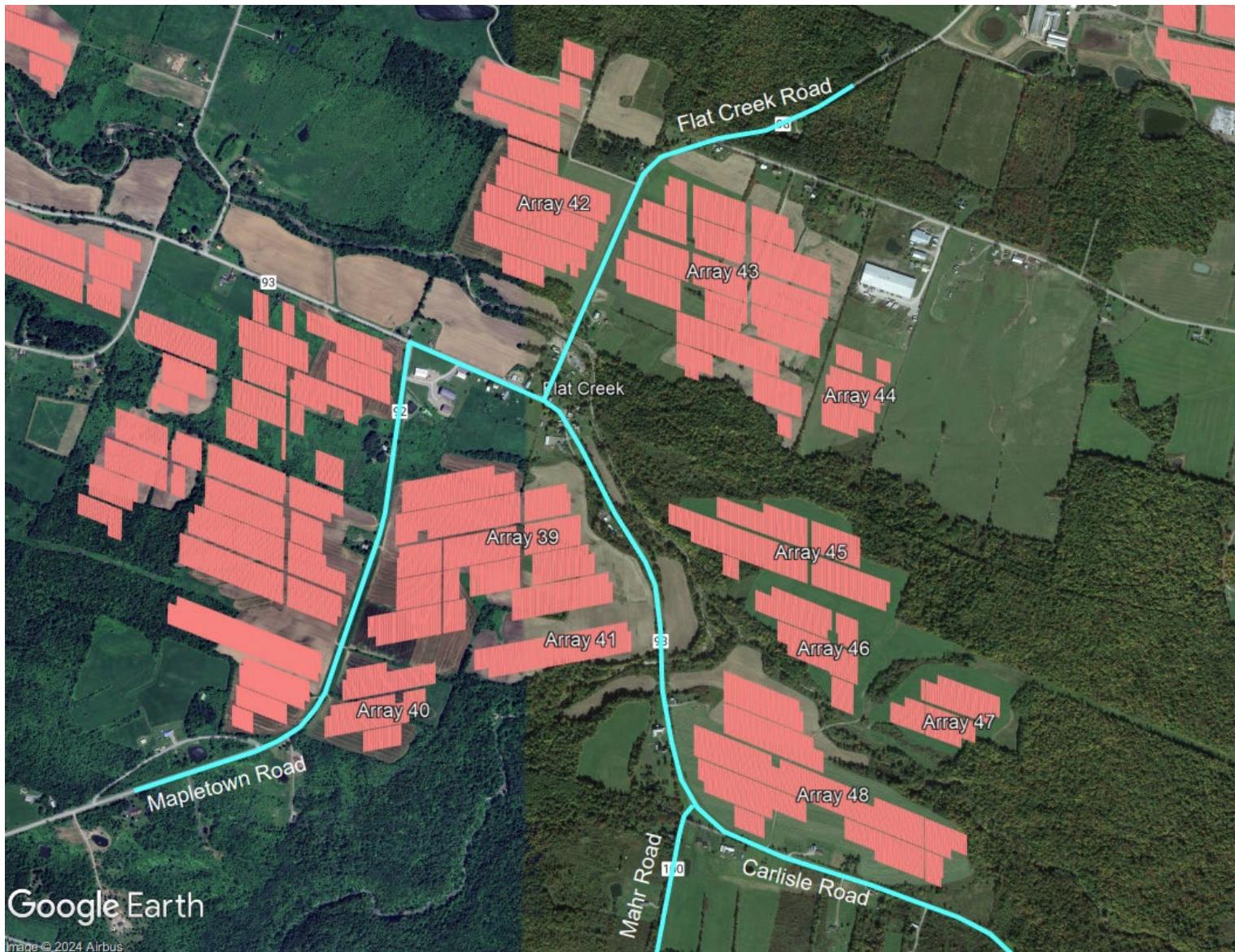


Figure 2-20. Route Receptor Locations (Group E)



Figure 2-21. Route Receptor Locations (Group F)

3.0 Results

TRC conducted the solar glare hazard analysis using the SGHAT tool, licensed by ForgeSolar, to evaluate potential glare impacts of the proposed Facility on the selected receptors detailed in **Section 2.0**. TRC evaluated the potential solar glare impact of the proposed PV panels using the project specifications detailed in **Section 2.2.1**. In general, single axis tracking systems are more effective in minimizing potential glare from receptors close to the ground (residences and vehicular traffic from nearby roadways). This is because the system is designed for the panel to be perpendicular to the sun as it moves across the sky during the day. Therefore, a majority of unabsorbed light is reflected towards the sun, and not toward a receptor near the ground.

The primary factor in the model for the observation of glare in a single-axis tracking system is the resting angle. This is an angle at which the panels start and stop tracking. Because the panels do not remain perpendicular to the sun at the beginning (around sunrise) or end (around sunset) of the day, this low angle of the sun can cause low angle reflections (glare) toward ground receptors. This is more likely to be visible near ground level (e.g., from residences or roadways) when resting angles are low (0° or flat). In addition, the resting angle, the elevation at which the receptor (residential or roadway) is located at may result in glare especially near the middle of the day. Initially the analysis was conducted with no visual obstructions being accounted for in the model.

It should be noted that limitations of the modeling software may impact the results of this analysis. As noted in **Section 2.1**, the model assumes a clear day with limited radiative scattering. However, atmospheric conditions such as humidity, overcast skies, and particulates would reduce the solar irradiance at the Earth (Ho 2013). Due to this site's location in the northeastern United States, where humidity and overcast skies are more likely throughout the year, this assumption can lead to an overestimation of glare occurrence, duration, intensity as irradiance and glare are directly related.

According to the National Oceanic and Atmospheric Administration (NOAA), on average this area of the New York, between Syracuse and Albany has an average annual percent of possible sunshine between 44-50%. The average annual percent of possible sunshine is the total time that sunshine reaches the surface of the Earth expressed as the percentage of the maximum amount possible from sunrise to sunset with clear sky conditions. **Table 3-1** provides a breakdown from each weather station by month. In addition, according to NOAA, based on this

area of New York typically experiences between 98-111 partly cloudy days and 185-205 cloudy days over the course of a year. **Table 3-2** provides a breakdown of the mean number of cloudy/partly cloudy days a month from each weather station. This high occurrence of overcast skies is expected to result in lower glare occurrence, duration, and intensity in the real world when compared to the model outputs.

Table 3-1. Average Percent of Possible Sunshine

Month	Average Percent of Possible Sunshine	
	Albany, NY	Syracuse, NY
January	46	34
February	52	39
March	51	46
April	55	53
May	53	53
June	55	54
July	62	60
August	58	57
September	54	51
October	46	40
November	33	25
December	36	23
Average:	50	44

Note: NOAA, 2024

Table 3-2. Mean Number of Days of Cloudiness

Month	Mean Number of Day of Cloudiness					
	Albany, NY			Syracuse, NY		
	Clear	Partly Cloudy	Cloudy	Clear	Partly Cloudy	Cloudy
January	5	8	18	3	7	22
February	6	7	15	3	6	19
March	6	8	17	5	7	19
April	5	8	16	6	7	17
May	5	9	16	6	10	15
June	5	11	13	7	11	12
July	6	13	12	8	12	11
August	7	12	13	7	11	13
September	8	10	12	7	10	13
October	8	9	14	6	8	17
November	4	8	18	2	6	22
December	5	7	19	2	5	24

Note: NOAA, 2024

In addition, the model also does not innately account for natural screening (e.g., existing vegetation, topography, or proposed landscaping) that may limit view of the array area. While

ForgeSolar can model obstructions, they are seen as opaque parallelograms, which may inflate the benefit of the proposed or existing obstruction. Even so, existing and proposed vegetation would limit the visibility of the solar arrays by either blocking it or disrupting the potential view by breaking the view in sections instead of the entire array area being visible and uninterrupted. This provides a reduction in the overall glare seen in the real world, as the panel, and specially the glare spot of the panel area needs to be visible for potential glare to be seen.

The following subsections will summarize the results for modelling groups that specify glare. Detailed results are provided in **Attachment 1**. These results are subject to the limitations/assumption of the model as detailed in **Section 2.1** of this report.

3.1 Group D Results

Estimated results for Array 31 are summarized in **Table 3-3**, the remaining nearby residential properties or roadways did not observe glare. No glare was estimated to be observed from the remaining arrays in this grouping at the nearby residential properties or roadways. Residential properties evaluated are noted in **Table 2-4**. Refer to **Figures 2-13 and 2-19** for residential and roadway receptor locations, respectively.

The results from Array 31 are summarized below.

Table 3-3. Glare Study Results

Receptor	Approx. Distance to Impacting Array (ft)	Green Glare (min/yr) ⁽¹⁾	Yellow Glare (min/yr) ⁽¹⁾	Red Glare (min/yr) ⁽¹⁾
Conway Road ⁽²⁾	180	983	--	--

Footnotes

(1) Glare has the potential within a 3 month period (November through January).

(2) Approximate distance is to the portion of the roadway with the potential to receive glare.

As shown, green glare has the potential to occur along a portion of Conway Road from Array 31. Glare may be observed in the early afternoon (between 1:00 - 2:00 pm) from November through January for approximately 20 or fewer minutes per day.

The landscaping proposed along the northern boundary of Array 31 (refer to VP 16 of Attachment 4 of Appendix 8-1 to review a photo-simulation near OP18), which would minimize view of the array area from Conway Road and residential receptors to the north. A targeted viewshed analysis was conducted for Array 31 accounting for the proposed landscaping vegetation. This

viewshed showed that the proposed vegetation assisted in screening the roadway and residence to the north with the only potential visibility occurring at the break in the landscaping located at the entrance to Array 31 from Conway Road; however, the discrete location of visibility between the glare model and viewshed study do not appear to completely overlap, which suggests that the estimated glare may not actually be visible from the roadway.

In addition, as noted in **Table 3-1**, November through January historically have the lowest percentages of available sunlight during the year (33-46 percent) due to overcast conditions (approximately 26 cloudy/partly cloudy days per month; see **Table 3-2**). This would continue to lessen the potential impacts from glare.

3.2 Group E Results

The estimated results from Array 39 are summarized in **Table 3-4**. The remaining nearby residential properties or roadways did not observe glare. No glare was estimated to be observed from the remaining arrays in this grouping at the nearby residential properties or roadways. Residential properties evaluated are noted in **Table 2-5**. Refer to **Figures 2-14** and **2-20** for residential and roadway receptor locations, respectively. The results are summarized below.

Table 3-4. Glare Study Results

Receptor	Distance to Impacting Array (ft)	Green Glare (min/yr)	Yellow Glare (min/yr)	Red Glare (min/yr)
OP13 ⁽¹⁾	680	122 ⁽⁵⁾	--	--
OP14 ⁽¹⁾	680	552 ⁽⁵⁾	--	--
OP21 ⁽²⁾	275	1,596 ⁽⁵⁾	--	--
OP22 ⁽²⁾	275	3,209 ⁽⁵⁾	--	--
Carlisle Road ⁽²⁾⁽⁴⁾	300	986 ⁽⁵⁾	--	--
Mapletown Road ⁽³⁾⁽⁴⁾	135	8,007	4,695	--

Footnotes:

- (1) Glare has the potential to occur between December and January.
- (2) Glare has the potential to occur between November and January.
- (3) Glare has the potential to occur between October and early March.
- (4) Distance is to the portion of the roadway with the potential to receive glare.
- (5) No visibility to observer based on a targeted viewshed analysis.

- **Residence OP13/OP14:** The limitations of the SGHAT indicated that green glare has the potential to be visible at both receptors of the two-story residence OP13/OP14 for a maximum in a day of 10 (first floor) to 20 (second floor) minutes from December to January between 10:00 to 11:00 am.

Following the glare study, this location was looked at further through a targeted viewshed analysis to determine the potential visibility of the array area producing glare, as shown in the ForgeSolar graphics in **Attachment 1**. The Applicant evaluated the existence of current vegetation within the viewshed as well as proposed landscaping to determine if the receptors at the residence would have the ability to see the arrays indicating glare in the model.

This targeted viewshed analysis indicated that the array area producing glare is not visible from receptors at Residence OP13/OP14 and, therefore, that the results of the glare study are an overestimation of what would be seen at the residence, as the proposed landscaping and existing vegetation would further mitigate the view of the array area than indicated in the SGHAT model.

- **Residence OP21/OP22:** The limitations of the SGHAT indicated that green glare has the potential to be visible at both receptors of the two-story residence OP21/OP22 for a potential maximum of 60 (first floor) to 95 minutes (second floor) in a day; however, based on the information presented in **Attachment 1** potential daily maximums vary during the estimated glare period. The estimated glare period is from November through January from approximately 12:00 to 2:00 pm.

As the Applicant evaluated this location further, existing vegetation which is located along the southern and eastern boundary of this residence was identified and reviewed in a targeted viewshed. Accounting for this vegetation would make this portion of the array not fully visible from the residence. This shows that the existing vegetation is likely to mitigate the potential of glare at this residence.

- **Carlisle Road:** The limitations of the SGHAT indicated that green glare has the potential to occur along a portion of Carlisle Road for a potential maximum of 30 minutes a day; however, based on the information presented in **Attachment 1** potential daily maximums vary during the estimated glare period. The estimated glare period is from November through January between 10:00 and 11:00 am.

Existing vegetation and proposed vegetation are located along the eastern boundary of the array area between the array and roadway which would assist in minimizing view of this array area from the observer. A targeted viewshed analysis was conducted from the impacting portion of this array (shown in **Attachment 1**) and Carlisle Road. Based on this

targeted viewshed, visibility of the impacted array area along the impacted section roadway was not noted. This shows that the existing vegetation is likely to mitigate the potential of glare along this roadway.

- **Mapletown Road:** The limitations of the SGHAT indicated that green and yellow glare have the potential to occur along a portion of Mapletown Road for a potential maximum of 100 minutes a day; however, based on the information presented in **Attachment 1**, potential daily maximums vary during the estimated glare period. The glare was estimated to occur from October to early March between 11:00 am and 3:00 pm. However, the limitations of the model may be overestimating potential glare from this array.

As noted above, the array is located on variable topography, which would cause variability in heights of panels and simplification of the array's planar footprint in the model, which may impact the glare results. In addition, the typical weather conditions apparent during this period of the year (October to March) would also impact the results in the real world. This is further described below.

In addition to the discussion above, the potential glare occurrences are anticipated to occur from October to early March, which most potential locations occurring during November through January. As detailed in **Table 3-1** and **Table 3-2**, the average available sunshine (clear sky conditions) is between 33-52 percent (using the higher percentage from Albany), with November through January being the lowest with 33-46 percent, meaning sunshine may not be available 54-67 percent of the time during November to January. In addition, the mean (average) number of days of either partly cloudy or cloudy is approximately 26 days for each month (November, December, and January from Albany, NY station). Therefore, any real-life glare impacts may be further reduced.

4.0 Conclusions

The SGHAT tool utilized the design specifications identified above and receptors to quantify potential glint and glare at various receptors as described in **Section 2.3**. The analysis described herein, in conjunction with the targeted viewshed analysis, indicated that the glint or glare identified would not likely impact the nearby residences or along Carlisle Road and potentially Conway Road. Potential glare was estimated to occur along a portion of Mapletown Road.

The results of this analysis are subject to the limitations of both the modeling and viewshed analysis. Due to the following limitations of this study, it is considered a conservative approach for glare, but real-life observances, if any, will be highly reduced.

- The model uses large, continuous array areas; however, the true array areas will be more segmented than the model. Array areas include spacing between rows of panels and for access into the area, this segmentation can impact the modeled glare spot, reducing it as noted in assumptions in **Section 2.1**.
- The analysis assumes clear, sunny days, all year round for the glare generation; however, as noted in **Table 3-1** and **Table 3-2**, during the periods of the year where glare was being estimated to be observed, it is unlikely that this would occur. The high percentage of non-clear sky days would provide an overall reduction of the estimated results as the amount of sunshine is directly related to the amount of glare potentially generated.
- As noted in **Section 2.1**, the model does not innately account for visual obstructions. These can include buildings, topography between the receptor and array area, or vegetation (existing or proposed). As noted in **Section 2.2.2**, the Applicant applied existing and proposed vegetation to the model to account for obstructions. SGHAT models obstruction as opaque parallelograms, which may not be consistent with real life instances. However, existing and proposed vegetation would limit visibility of solar arrays through either completely blocking the view or disrupting the view by breaking the view area into sections. These would assist in minimizing or mitigating glare.

As described herein, the results of the model indicate limited potential for glare in a real-world situation as a result of the Facility. In the unlikely occurrence that glint or glare is experienced as a result of the Facility, the Applicant will evaluate further mitigation tools through the use of additional landscaping or operational adjustments.

5.0 References

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Attachment 1 – Forge Solar Printouts

Group A Results

FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Solar

Site configuration: Flat Creek Solar A_rest

Created 10 Jul, 2024

Updated 16 Jul, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 10 MW to 100 MW

Site ID 123882.20753

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2



Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
			min	hr	min	hr	
Array 01	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 02	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 03	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 04	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 05	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 06	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 07	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 08	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 09	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 11	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 01
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.899427	-74.553386	485.17	6.92	492.09
2	42.898973	-74.551614	489.57	6.92	496.48
3	42.898108	-74.551630	497.35	6.92	504.27
4	42.897932	-74.550937	496.00	6.92	502.92
5	42.897360	-74.550944	498.71	6.92	505.63
6	42.897057	-74.550063	500.39	6.92	507.31
7	42.896769	-74.550024	504.14	6.92	511.06
8	42.896693	-74.549746	503.56	6.92	510.48
9	42.896128	-74.549743	502.43	6.92	509.35
10	42.895962	-74.549226	501.12	6.92	508.04
11	42.895700	-74.549200	506.00	6.92	512.92
12	42.895616	-74.548915	505.05	6.92	511.97
13	42.895052	-74.548916	522.32	6.92	529.24
14	42.895817	-74.551914	517.42	6.92	524.34
15	42.896125	-74.552043	515.84	6.92	522.75
16	42.896703	-74.552059	514.45	6.92	521.36
17	42.896893	-74.552722	522.68	6.92	529.59
18	42.897173	-74.552725	514.10	6.92	521.02
19	42.897261	-74.553086	518.22	6.92	525.14
20	42.897909	-74.553069	506.21	6.92	513.13
21	42.898085	-74.553766	512.72	6.92	519.64
22	42.898647	-74.553756	503.11	6.92	510.02
23	42.899229	-74.553687	489.50	6.92	496.42
24	42.899145	-74.553390	490.36	6.92	497.27

Name: Array 02
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.897427	-74.554479	543.17	6.92	550.09
2	42.897395	-74.554346	540.70	6.92	547.62
3	42.897121	-74.554349	543.00	6.92	549.92
4	42.897055	-74.554040	538.85	6.92	545.77
5	42.896449	-74.554044	541.23	6.92	548.15
6	42.896265	-74.553303	531.37	6.92	538.29
7	42.895986	-74.553289	527.41	6.92	534.33
8	42.895914	-74.552992	525.81	6.92	532.73
9	42.895330	-74.552987	511.02	6.92	517.93
10	42.895211	-74.552541	511.69	6.92	518.61
11	42.894639	-74.552548	503.58	6.92	510.49
12	42.894719	-74.552919	503.42	6.92	510.33
13	42.894467	-74.552927	496.60	6.92	503.52
14	42.895061	-74.555291	504.42	6.92	511.34
15	42.895223	-74.555285	507.20	6.92	514.12
16	42.895235	-74.555352	507.26	6.92	514.18
17	42.895799	-74.555364	524.65	6.92	531.57
18	42.895769	-74.555282	524.47	6.92	531.38
19	42.895910	-74.555304	529.31	6.92	536.22
20	42.895744	-74.554622	522.41	6.92	529.33
21	42.896320	-74.554611	545.65	6.92	552.56
22	42.896278	-74.554394	542.45	6.92	549.37
23	42.896538	-74.554403	550.96	6.92	557.88
24	42.896586	-74.554479	553.31	6.92	560.23

Name: Array 03
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.893983	-74.556360	514.85	6.92	521.77
2	42.893943	-74.556142	513.85	6.92	520.77
3	42.894512	-74.556135	506.69	6.92	513.61
4	42.894368	-74.555561	503.37	6.92	510.29
5	42.893799	-74.555542	510.01	6.92	516.93
6	42.893665	-74.555101	507.85	6.92	514.77
7	42.893390	-74.555088	518.11	6.92	525.02
8	42.893261	-74.554556	516.91	6.92	523.82
9	42.893512	-74.554543	507.76	6.92	514.68
10	42.893487	-74.554430	507.38	6.92	514.30
11	42.892942	-74.554434	521.45	6.92	528.37
12	42.892671	-74.554607	527.04	6.92	533.96
13	42.892745	-74.554884	529.06	6.92	535.98
14	42.892173	-74.554877	533.52	6.92	540.44
15	42.892240	-74.555175	537.36	6.92	544.28
16	42.891980	-74.555183	539.55	6.92	546.47
17	42.892040	-74.555460	543.61	6.92	550.53
18	42.891462	-74.555479	552.59	6.92	559.50
19	42.891515	-74.555752	559.84	6.92	566.75
20	42.891279	-74.555777	566.90	6.92	573.82
21	42.891650	-74.557258	565.14	6.92	572.06
22	42.892213	-74.557245	554.05	6.92	560.97
23	42.892465	-74.557176	550.55	6.92	557.47
24	42.892384	-74.556873	548.19	6.92	555.10
25	42.892977	-74.556882	538.12	6.92	545.04
26	42.893230	-74.556806	533.00	6.92	539.92
27	42.893155	-74.556491	531.73	6.92	538.65
28	42.893748	-74.556502	519.94	6.92	526.86

Name: Array 04
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.893591	-74.552548	495.68	6.92	502.60
2	42.893250	-74.551038	490.45	6.92	497.37
3	42.893186	-74.550772	488.92	6.92	495.84
4	42.892623	-74.550778	492.63	6.92	499.55
5	42.892421	-74.550094	491.74	6.92	498.66
6	42.891853	-74.550095	498.73	6.92	505.65
7	42.891618	-74.550246	506.00	6.92	512.92
8	42.891824	-74.551028	507.52	6.92	514.44
9	42.891734	-74.551170	510.00	6.92	516.92
10	42.891801	-74.551436	513.16	6.92	520.08
11	42.891224	-74.551444	525.75	6.92	532.67
12	42.891659	-74.553145	534.25	6.92	541.17
13	42.892226	-74.553136	521.28	6.92	528.20
14	42.893068	-74.553048	506.47	6.92	513.39
15	42.892935	-74.552544	503.58	6.92	510.50

Name: Array 05
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.891755	-74.550057	502.92	6.92	509.84
2	42.891308	-74.548298	502.00	6.92	508.92
3	42.890741	-74.548277	518.31	6.92	525.23
4	42.890752	-74.548429	519.77	6.92	526.69
5	42.890507	-74.548441	529.95	6.92	536.87
6	42.890918	-74.550124	526.23	6.92	533.14
7	42.891509	-74.550127	509.56	6.92	516.48

Name: Array 06
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.891392	-74.556820	572.75	6.92	579.66
2	42.891210	-74.556074	575.14	6.92	582.05
3	42.890359	-74.556077	585.27	6.92	592.19
4	42.890271	-74.555782	567.50	6.92	574.42
5	42.889429	-74.555777	604.69	6.92	611.61
6	42.889641	-74.556642	603.93	6.92	610.85
7	42.889948	-74.556800	598.32	6.92	605.23

Name: Array 07
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.890611	-74.553817	598.00	6.92	604.92
2	42.889965	-74.551297	612.51	6.92	619.42
3	42.889409	-74.551302	618.73	6.92	625.65
4	42.889896	-74.553279	613.03	6.92	619.95
5	42.889331	-74.553308	598.73	6.92	605.65
6	42.889438	-74.553811	597.10	6.92	604.01

Name: Array 08
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.889896	-74.550814	612.00	6.92	618.92
2	42.888736	-74.546353	609.54	6.92	616.46
3	42.888169	-74.546346	603.50	6.92	610.41
4	42.889085	-74.549930	619.95	6.92	626.87
5	42.888834	-74.549942	609.40	6.92	616.32
6	42.889125	-74.551058	607.99	6.92	614.91
7	42.889682	-74.551029	618.30	6.92	625.21
8	42.889641	-74.550816	617.47	6.92	624.39

Name: Array 09
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.889899	-74.557914	602.89	6.92	609.81
2	42.889031	-74.554579	605.07	6.92	611.98
3	42.888765	-74.554572	604.75	6.92	611.66
4	42.888665	-74.554184	603.50	6.92	610.42
5	42.888921	-74.554169	604.76	6.92	611.67
6	42.888502	-74.552550	605.72	6.92	612.63
7	42.887945	-74.552564	610.23	6.92	617.15
8	42.887712	-74.552708	610.44	6.92	617.36
9	42.887776	-74.552984	608.61	6.92	615.53
10	42.887208	-74.553024	611.98	6.92	618.90
11	42.886964	-74.553162	617.50	6.92	624.42
12	42.887036	-74.553513	619.84	6.92	626.76
13	42.886198	-74.553539	647.59	6.92	654.51
14	42.886801	-74.555830	652.52	6.92	659.44
15	42.887629	-74.555833	622.68	6.92	629.60
16	42.888207	-74.558005	620.00	6.92	626.92
17	42.889041	-74.557985	606.14	6.92	613.06

Name: Array 10
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.888899	-74.551109	603.20	6.92	610.12
2	42.888624	-74.550015	601.63	6.92	608.55
3	42.888057	-74.550010	599.94	6.92	606.86
4	42.888109	-74.550319	601.65	6.92	608.57
5	42.887541	-74.550314	607.83	6.92	614.75
6	42.887574	-74.550473	610.64	6.92	617.56
7	42.887308	-74.550464	608.43	6.92	615.34
8	42.887565	-74.551494	607.52	6.92	614.44
9	42.887812	-74.551634	607.41	6.92	614.33
10	42.888375	-74.551649	606.00	6.92	612.92
11	42.888402	-74.551484	605.07	6.92	611.98
12	42.888329	-74.551130	604.81	6.92	611.73

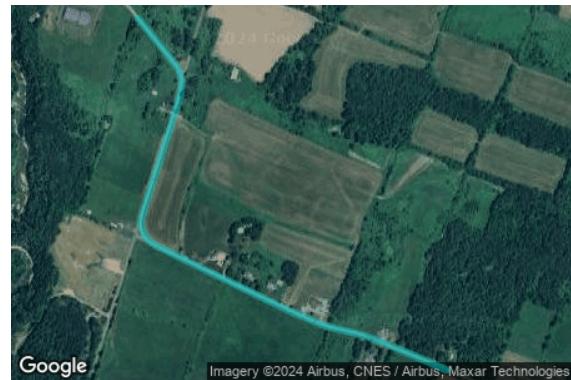
Name: Array 11
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.888031	-74.549095	596.06	6.92	602.98
2	42.887717	-74.547843	592.13	6.92	599.04
3	42.886889	-74.547859	608.51	6.92	615.43
4	42.887287	-74.549400	606.66	6.92	613.57
5	42.887845	-74.549387	598.86	6.92	605.78
6	42.887780	-74.549108	598.65	6.92	605.57

Route Receptors

Name: Carlisle Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.892339	-74.560538	558.92	5.00	563.92
2	42.891455	-74.559557	580.26	5.00	585.26
3	42.891054	-74.559144	585.39	5.00	590.39
4	42.890783	-74.559042	588.92	5.00	593.92
5	42.890460	-74.559079	597.61	5.00	602.61
6	42.889600	-74.559444	605.26	5.00	610.26
7	42.887737	-74.560259	641.01	5.00	646.01
8	42.887282	-74.560442	650.79	5.00	655.79
9	42.887101	-74.560442	656.95	5.00	661.95
10	42.886818	-74.560265	663.69	5.00	668.69
11	42.886645	-74.559959	667.22	5.00	672.22
12	42.886315	-74.559036	673.68	5.00	678.68
13	42.885010	-74.555368	692.86	5.00	697.86
14	42.884640	-74.554183	688.73	5.00	693.73
15	42.884550	-74.553700	687.84	5.00	692.84
16	42.884400	-74.552847	686.66	5.00	691.66
17	42.884208	-74.552134	691.47	5.00	696.47
18	42.883524	-74.549945	712.26	5.00	717.26

Name: Cunningham Road
Path type: Two-way
Observer view angle: 50.0°



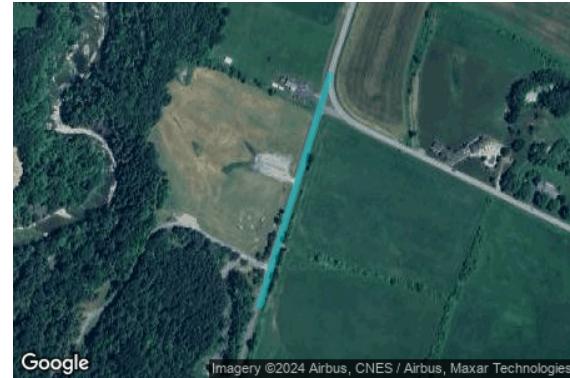
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.901347	-74.556945	441.37	5.00	446.37
2	42.900031	-74.556028	470.56	5.00	475.56
3	42.898640	-74.554960	520.53	5.00	525.53
4	42.898424	-74.554923	523.24	5.00	528.24
5	42.898015	-74.555170	536.22	5.00	541.22
6	42.897127	-74.555899	569.80	5.00	574.80
7	42.894867	-74.557036	507.31	5.00	512.31
8	42.893191	-74.557964	540.09	5.00	545.09
9	42.892150	-74.558420	548.77	5.00	553.77
10	42.891007	-74.558898	583.80	5.00	588.80
11	42.890739	-74.559005	589.30	5.00	594.30

Name: Miller Drive
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.898534	-74.554894	521.93	5.00	526.93
2	42.898486	-74.554720	518.53	5.00	523.53
3	42.898023	-74.554264	515.54	5.00	520.54
4	42.896774	-74.553179	524.31	5.00	529.31
5	42.895998	-74.552489	518.22	5.00	523.22
6	42.895681	-74.552331	519.76	5.00	524.76
7	42.895426	-74.552205	515.32	5.00	520.32
8	42.895265	-74.551918	515.27	5.00	520.27
9	42.895153	-74.551460	517.10	5.00	522.10
10	42.894373	-74.547616	521.37	5.00	526.37
11	42.894092	-74.546485	522.72	5.00	527.72

Name: Old Sharon Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.887282	-74.560466	651.02	5.00	656.02
2	42.885560	-74.561191	674.31	5.00	679.31
3	42.884404	-74.561673	696.92	5.00	701.92

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	42.900716	-74.556876	460.78	6.00
OP 2	2	42.899729	-74.556119	486.77	6.00
OP 3	3	42.898688	-74.555352	524.45	6.00
OP 4	4	42.897198	-74.555524	564.66	6.00
OP 5	5	42.897198	-74.555524	564.66	16.00
OP 6	6	42.894998	-74.558195	510.41	6.00
OP 7	7	42.890180	-74.559467	606.46	6.00
OP 8	8	42.890180	-74.559467	606.46	16.00
OP 9	9	42.887181	-74.561121	660.09	6.00
OP 10	10	42.886413	-74.557856	677.82	6.00
OP 11	11	42.886413	-74.557856	677.82	16.00
OP 12	12	42.885866	-74.556693	692.17	6.00
OP 13	13	42.885866	-74.556693	692.17	16.00
OP 14	14	42.885591	-74.555936	692.72	6.00
OP 15	15	42.885182	-74.554367	689.33	6.00
OP 16	16	42.885182	-74.554367	689.33	16.00
OP 17	17	42.883934	-74.552393	706.11	6.00
OP 18	18	42.883934	-74.552393	706.11	16.00

Glare Analysis Results

Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
Array 01	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 02	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 03	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 04	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 05	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 06	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 07	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 08	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 09	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 11	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

PV: Array 01 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 01 and Route: Carlisle Road

No glare found

Array 01 and Route: Cunningham Road

No glare found

Array 01 and Route: Miller Drive

No glare found

Array 01 and Route: Old Sharon Road

No glare found

Array 01 and OP 1

No glare found

Array 01 and OP 2

No glare found

Array 01 and OP 3

No glare found

Array 01 and OP 4

No glare found

Array 01 and OP 5

No glare found

Array 01 and OP 6

No glare found

Array 01 and OP 7

No glare found

Array 01 and OP 8

No glare found

Array 01 and OP 9

No glare found

Array 01 and OP 10

No glare found

Array 01 and OP 11

No glare found

Array 01 and OP 12

No glare found

Array 01 and OP 13

No glare found

Array 01 and OP 14

No glare found

Array 01 and OP 15

No glare found

Array 01 and OP 16

No glare found

Array 01 and OP 17

No glare found

Array 01 and OP 18

No glare found

PV: Array 02 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 02 and Route: Carlisle Road

No glare found

Array 02 and Route: Cunningham Road

No glare found

Array 02 and Route: Miller Drive

No glare found

Array 02 and Route: Old Sharon Road

No glare found

Array 02 and OP 1

No glare found

Array 02 and OP 2

No glare found

Array 02 and OP 3

No glare found

Array 02 and OP 4

No glare found

Array 02 and OP 5

No glare found

Array 02 and OP 6

No glare found

Array 02 and OP 7

No glare found

Array 02 and OP 8

No glare found

Array 02 and OP 9

No glare found

Array 02 and OP 10

No glare found

Array 02 and OP 11

No glare found

Array 02 and OP 12

No glare found

Array 02 and OP 13

No glare found

Array 02 and OP 14

No glare found

Array 02 and OP 15

No glare found

Array 02 and OP 16

No glare found

Array 02 and OP 17

No glare found

Array 02 and OP 18

No glare found

PV: Array 03 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 03 and Route: Carlisle Road

No glare found

Array 03 and Route: Cunningham Road

No glare found

Array 03 and Route: Miller Drive

No glare found

Array 03 and Route: Old Sharon Road

No glare found

Array 03 and OP 1

No glare found

Array 03 and OP 2

No glare found

Array 03 and OP 3

No glare found

Array 03 and OP 4

No glare found

Array 03 and OP 5

No glare found

Array 03 and OP 6

No glare found

Array 03 and OP 7

No glare found

Array 03 and OP 8

No glare found

Array 03 and OP 9

No glare found

Array 03 and OP 10

No glare found

Array 03 and OP 11

No glare found

Array 03 and OP 12

No glare found

Array 03 and OP 13

No glare found

Array 03 and OP 14

No glare found

Array 03 and OP 15

No glare found

Array 03 and OP 16

No glare found

Array 03 and OP 17

No glare found

Array 03 and OP 18

No glare found

PV: Array 04 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 04 and Route: Carlisle Road

No glare found

Array 04 and Route: Cunningham Road

No glare found

Array 04 and Route: Miller Drive

No glare found

Array 04 and Route: Old Sharon Road

No glare found

Array 04 and OP 1

No glare found

Array 04 and OP 2

No glare found

Array 04 and OP 3

No glare found

Array 04 and OP 4

No glare found

Array 04 and OP 5

No glare found

Array 04 and OP 6

No glare found

Array 04 and OP 7

No glare found

Array 04 and OP 8

No glare found

Array 04 and OP 9

No glare found

Array 04 and OP 10

No glare found

Array 04 and OP 11

No glare found

Array 04 and OP 12

No glare found

Array 04 and OP 13

No glare found

Array 04 and OP 14

No glare found

Array 04 and OP 15

No glare found

Array 04 and OP 16

No glare found

Array 04 and OP 17

No glare found

Array 04 and OP 18

No glare found

PV: Array 05 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 05 and Route: Carlisle Road

No glare found

Array 05 and Route: Cunningham Road

No glare found

Array 05 and Route: Miller Drive

No glare found

Array 05 and Route: Old Sharon Road

No glare found

Array 05 and OP 1

No glare found

Array 05 and OP 2

No glare found

Array 05 and OP 3

No glare found

Array 05 and OP 4

No glare found

Array 05 and OP 5

No glare found

Array 05 and OP 6

No glare found

Array 05 and OP 7

No glare found

Array 05 and OP 8

No glare found

Array 05 and OP 9

No glare found

Array 05 and OP 10

No glare found

Array 05 and OP 11

No glare found

Array 05 and OP 12

No glare found

Array 05 and OP 13

No glare found

Array 05 and OP 14

No glare found

Array 05 and OP 15

No glare found

Array 05 and OP 16

No glare found

Array 05 and OP 17

No glare found

Array 05 and OP 18

No glare found

PV: Array 06 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 06 and Route: Carlisle Road

No glare found

Array 06 and Route: Cunningham Road

No glare found

Array 06 and Route: Miller Drive

No glare found

Array 06 and Route: Old Sharon Road

No glare found

Array 06 and OP 1

No glare found

Array 06 and OP 2

No glare found

Array 06 and OP 3

No glare found

Array 06 and OP 4

No glare found

Array 06 and OP 5

No glare found

Array 06 and OP 6

No glare found

Array 06 and OP 7

No glare found

Array 06 and OP 8

No glare found

Array 06 and OP 9

No glare found

Array 06 and OP 10

No glare found

Array 06 and OP 11

No glare found

Array 06 and OP 12

No glare found

Array 06 and OP 13

No glare found

Array 06 and OP 14

No glare found

Array 06 and OP 15

No glare found

Array 06 and OP 16

No glare found

Array 06 and OP 17

No glare found

Array 06 and OP 18

No glare found

PV: Array 07 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 07 and Route: Carlisle Road

No glare found

Array 07 and Route: Cunningham Road

No glare found

Array 07 and Route: Miller Drive

No glare found

Array 07 and Route: Old Sharon Road

No glare found

Array 07 and OP 1

No glare found

Array 07 and OP 2

No glare found

Array 07 and OP 3

No glare found

Array 07 and OP 4

No glare found

Array 07 and OP 5

No glare found

Array 07 and OP 6

No glare found

Array 07 and OP 7

No glare found

Array 07 and OP 8

No glare found

Array 07 and OP 9

No glare found

Array 07 and OP 10

No glare found

Array 07 and OP 11

No glare found

Array 07 and OP 12

No glare found

Array 07 and OP 13

No glare found

Array 07 and OP 14

No glare found

Array 07 and OP 15

No glare found

Array 07 and OP 16

No glare found

Array 07 and OP 17

No glare found

Array 07 and OP 18

No glare found

PV: Array 08 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 08 and Route: Carlisle Road

No glare found

Array 08 and Route: Cunningham Road

No glare found

Array 08 and Route: Miller Drive

No glare found

Array 08 and Route: Old Sharon Road

No glare found

Array 08 and OP 1

No glare found

Array 08 and OP 2

No glare found

Array 08 and OP 3

No glare found

Array 08 and OP 4

No glare found

Array 08 and OP 5

No glare found

Array 08 and OP 6

No glare found

Array 08 and OP 7

No glare found

Array 08 and OP 8

No glare found

Array 08 and OP 9

No glare found

Array 08 and OP 10

No glare found

Array 08 and OP 11

No glare found

Array 08 and OP 12

No glare found

Array 08 and OP 13

No glare found

Array 08 and OP 14

No glare found

Array 08 and OP 15

No glare found

Array 08 and OP 16

No glare found

Array 08 and OP 17

No glare found

Array 08 and OP 18

No glare found

PV: Array 09 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 09 and Route: Carlisle Road

No glare found

Array 09 and Route: Cunningham Road

No glare found

Array 09 and Route: Miller Drive

No glare found

Array 09 and Route: Old Sharon Road

No glare found

Array 09 and OP 1

No glare found

Array 09 and OP 2

No glare found

Array 09 and OP 3

No glare found

Array 09 and OP 4

No glare found

Array 09 and OP 5

No glare found

Array 09 and OP 6

No glare found

Array 09 and OP 7

No glare found

Array 09 and OP 8

No glare found

Array 09 and OP 9

No glare found

Array 09 and OP 10

No glare found

Array 09 and OP 11

No glare found

Array 09 and OP 12

No glare found

Array 09 and OP 13

No glare found

Array 09 and OP 14

No glare found

Array 09 and OP 15

No glare found

Array 09 and OP 16

No glare found

Array 09 and OP 17

No glare found

Array 09 and OP 18

No glare found

PV: Array 10 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 10 and Route: Carlisle Road

No glare found

Array 10 and Route: Cunningham Road

No glare found

Array 10 and Route: Miller Drive

No glare found

Array 10 and Route: Old Sharon Road

No glare found

Array 10 and OP 1

No glare found

Array 10 and OP 2

No glare found

Array 10 and OP 3

No glare found

Array 10 and OP 4

No glare found

Array 10 and OP 5

No glare found

Array 10 and OP 6

No glare found

Array 10 and OP 7

No glare found

Array 10 and OP 8

No glare found

Array 10 and OP 9

No glare found

Array 10 and OP 10

No glare found

Array 10 and OP 11

No glare found

Array 10 and OP 12

No glare found

Array 10 and OP 13

No glare found

Array 10 and OP 14

No glare found

Array 10 and OP 15

No glare found

Array 10 and OP 16

No glare found

Array 10 and OP 17

No glare found

Array 10 and OP 18

No glare found

PV: Array 11 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Cunningham Road	0	0.0	0	0.0
Miller Drive	0	0.0	0	0.0
Old Sharon Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 11 and Route: Carlisle Road

No glare found

Array 11 and Route: Cunningham Road

No glare found

Array 11 and Route: Miller Drive

No glare found

Array 11 and Route: Old Sharon Road

No glare found

Array 11 and OP 1

No glare found

Array 11 and OP 2

No glare found

Array 11 and OP 3

No glare found

Array 11 and OP 4

No glare found

Array 11 and OP 5

No glare found

Array 11 and OP 6

No glare found

Array 11 and OP 7

No glare found

Array 11 and OP 8

No glare found

Array 11 and OP 9

No glare found

Array 11 and OP 10

No glare found

Array 11 and OP 11

No glare found

Array 11 and OP 12

No glare found

Array 11 and OP 13

No glare found

Array 11 and OP 14

No glare found

Array 11 and OP 15

No glare found

Array 11 and OP 16

No glare found

Array 11 and OP 17

No glare found

Array 11 and OP 18

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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Group B Results

FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Solar

Site configuration: Flat Creek Solar B

Created 04 Jul, 2024

Updated 16 Jul, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 10 MW to 100 MW

Site ID 123458.20753

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2



Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	Annual Green Glare hr	Annual Yellow Glare min	Annual Yellow Glare hr	Energy kWh
Array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 13	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 16	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 17	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Canyon Road	0	0.0	0	0.0
Canyon Road_Lookout Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 12
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.882569	-74.543193	726.00	6.92	732.92
2	42.881883	-74.540514	748.59	6.92	755.50
3	42.882520	-74.540511	729.55	6.92	736.47
4	42.881797	-74.537668	737.22	6.92	744.14
5	42.881216	-74.537668	750.00	6.92	756.92
6	42.881325	-74.538183	753.98	6.92	760.89
7	42.880700	-74.538195	758.81	6.92	765.73
8	42.880491	-74.538428	760.08	6.92	767.00
9	42.880575	-74.538781	760.54	6.92	767.46
10	42.880003	-74.538806	758.43	6.92	765.34
11	42.879764	-74.538953	758.04	6.92	764.96
12	42.879867	-74.539439	757.69	6.92	764.60
13	42.879261	-74.539485	757.20	6.92	764.12
14	42.879057	-74.539768	753.95	6.92	760.87
15	42.879131	-74.540148	757.41	6.92	764.33
16	42.878570	-74.540152	746.01	6.92	752.93
17	42.878351	-74.540365	737.95	6.92	744.87
18	42.878476	-74.540855	742.90	6.92	749.82
19	42.879035	-74.540864	756.27	6.92	763.19
20	42.879250	-74.540640	760.00	6.92	766.92
21	42.879170	-74.540271	758.22	6.92	765.14
22	42.879745	-74.540263	762.16	6.92	769.08
23	42.879724	-74.540122	762.05	6.92	768.97
24	42.880340	-74.540134	763.91	6.92	770.82
25	42.880995	-74.542680	752.25	6.92	759.17
26	42.881591	-74.542734	749.10	6.92	756.02
27	42.881720	-74.543199	747.61	6.92	754.52

Name: Array 13
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.886589	-74.527988	485.78	6.92	492.70
2	42.886252	-74.526759	488.87	6.92	495.78
3	42.885974	-74.526734	492.54	6.92	499.46
4	42.885613	-74.525330	499.07	6.92	505.98
5	42.885053	-74.525323	514.45	6.92	521.36
6	42.884869	-74.524710	519.48	6.92	526.40
7	42.884307	-74.524732	544.81	6.92	551.72
8	42.884081	-74.524959	553.92	6.92	560.84
9	42.885125	-74.528998	534.54	6.92	541.46
10	42.885685	-74.528997	513.94	6.92	520.86
11	42.885909	-74.528758	505.23	6.92	512.15
12	42.885805	-74.528302	505.17	6.92	512.09
13	42.886374	-74.528310	489.75	6.92	496.67

Name: Array 14
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.884871	-74.529425	547.43	6.92	554.34
2	42.884309	-74.527209	561.88	6.92	568.80
3	42.883726	-74.527207	594.25	6.92	601.17
4	42.883396	-74.526012	604.95	6.92	611.87
5	42.882833	-74.526001	621.82	6.92	628.73
6	42.882886	-74.526289	620.32	6.92	627.24
7	42.882325	-74.526311	598.58	6.92	605.49
8	42.882126	-74.526620	588.72	6.92	595.64
9	42.882789	-74.529209	582.66	6.92	589.57
10	42.883065	-74.529237	591.28	6.92	598.20
11	42.883153	-74.529581	584.58	6.92	591.50
12	42.884315	-74.529568	580.07	6.92	586.98

Name: Array 15
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.882773	-74.529810	575.26	6.92	582.18
2	42.882081	-74.527130	585.95	6.92	592.87
3	42.881514	-74.527129	585.10	6.92	592.01
4	42.881274	-74.527273	587.44	6.92	594.35
5	42.881344	-74.527629	592.86	6.92	599.77
6	42.880782	-74.527654	596.21	6.92	603.13
7	42.880552	-74.527805	603.15	6.92	610.06
8	42.880608	-74.528101	608.45	6.92	615.36
9	42.880034	-74.528114	618.90	6.92	625.82
10	42.880104	-74.528481	622.51	6.92	629.42
11	42.879862	-74.528473	625.28	6.92	632.20
12	42.879938	-74.528893	628.09	6.92	635.01
13	42.879390	-74.528936	641.08	6.92	647.99
14	42.879653	-74.529979	641.50	6.92	648.42
15	42.880209	-74.529941	629.54	6.92	636.46
16	42.880150	-74.529658	629.17	6.92	636.09
17	42.880990	-74.529652	601.83	6.92	608.75
18	42.881843	-74.529570	587.93	6.92	594.85
19	42.881925	-74.529830	583.96	6.92	590.88

Name: Array 16
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.881114	-74.533238	669.18	6.92	676.10
2	42.880950	-74.532502	648.43	6.92	655.34
3	42.881515	-74.532500	648.32	6.92	655.23
4	42.881378	-74.531909	633.02	6.92	639.94
5	42.881633	-74.531899	629.05	6.92	635.97
6	42.881322	-74.530645	611.74	6.92	618.66
7	42.880482	-74.530660	626.30	6.92	633.22
8	42.880662	-74.531360	635.50	6.92	642.42
9	42.880083	-74.531392	640.83	6.92	647.75
10	42.879847	-74.531559	641.12	6.92	648.03
11	42.880120	-74.532710	663.22	6.92	670.13
12	42.879578	-74.532763	665.56	6.92	672.48
13	42.879332	-74.532889	667.94	6.92	674.86
14	42.879394	-74.533287	674.93	6.92	681.85
15	42.878796	-74.533284	676.52	6.92	683.43
16	42.878556	-74.533422	677.54	6.92	684.46
17	42.878639	-74.533856	682.00	6.92	688.92
18	42.878073	-74.533872	674.81	6.92	681.73
19	42.877850	-74.534036	672.46	6.92	679.38
20	42.878104	-74.535052	686.15	6.92	693.06
21	42.878662	-74.535048	706.45	6.92	713.37
22	42.878864	-74.534751	709.25	6.92	716.17
23	42.878802	-74.534516	694.94	6.92	701.86
24	42.879398	-74.534524	700.44	6.92	707.35
25	42.879606	-74.534284	692.89	6.92	699.81
26	42.879548	-74.533927	685.56	6.92	692.48
27	42.880166	-74.533928	688.05	6.92	694.97
28	42.880394	-74.533780	682.89	6.92	689.81
29	42.880335	-74.533415	674.24	6.92	681.15
30	42.880888	-74.533407	671.90	6.92	678.82

Name: Array 17
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.878278	-74.532488	667.70	6.92	674.61
2	42.878186	-74.532075	672.72	6.92	679.64
3	42.878714	-74.531905	666.47	6.92	673.39
4	42.878956	-74.531805	660.14	6.92	667.06
5	42.878887	-74.531472	661.44	6.92	668.35
6	42.879143	-74.531443	655.34	6.92	662.26
7	42.879420	-74.531054	648.99	6.92	655.91
8	42.879668	-74.530999	642.32	6.92	649.23
9	42.879644	-74.530793	646.74	6.92	653.65
10	42.879069	-74.530792	655.24	6.92	662.16
11	42.878830	-74.530942	662.15	6.92	669.07
12	42.878487	-74.531100	667.95	6.92	674.87
13	42.878271	-74.531342	670.40	6.92	677.32
14	42.878061	-74.531558	672.40	6.92	679.32
15	42.878140	-74.531922	672.61	6.92	679.53
16	42.877351	-74.532086	680.71	6.92	687.63
17	42.877510	-74.532738	674.40	6.92	681.32
18	42.878073	-74.532725	671.25	6.92	678.17

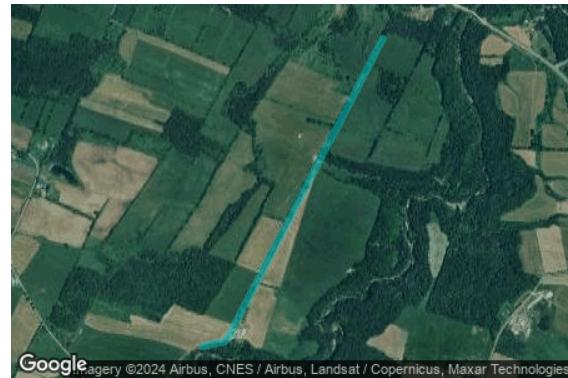
Route Receptors

Name: Canyon Road
Path type: Two-way
Observer view angle: 50.0°



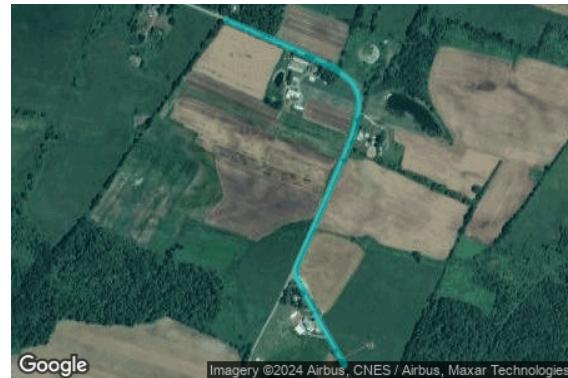
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.881935	-74.526170	587.49	5.00	592.49
2	42.881660	-74.525215	589.99	5.00	594.99
3	42.881251	-74.523423	580.66	5.00	585.66
4	42.880997	-74.521921	571.97	5.00	576.97

Name: Canyon Road_Lookout Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.888098	-74.521789	459.77	5.00	464.77
2	42.884608	-74.524225	532.57	5.00	537.57
3	42.881896	-74.526188	585.95	5.00	590.95
4	42.878861	-74.528301	652.95	5.00	657.95
5	42.875441	-74.530737	694.26	5.00	699.26
6	42.873114	-74.532378	711.81	5.00	716.81
7	42.872831	-74.532679	682.93	5.00	687.93
8	42.872721	-74.533526	673.50	5.00	678.50
9	42.872587	-74.534170	667.77	5.00	672.77

Name: Carlisle Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.883555	-74.550031	711.63	5.00	716.63
2	42.882856	-74.547789	718.66	5.00	723.66
3	42.882337	-74.546276	733.00	5.00	738.00
4	42.881991	-74.545697	733.74	5.00	738.74
5	42.881623	-74.545493	741.03	5.00	746.03
6	42.881183	-74.545525	751.15	5.00	756.15
7	42.880664	-74.545707	765.45	5.00	770.45
8	42.878714	-74.546834	758.94	5.00	763.94
9	42.877330	-74.547660	752.35	5.00	757.35
10	42.877118	-74.547639	754.65	5.00	759.65
11	42.876002	-74.546845	749.70	5.00	754.70
12	42.874925	-74.545997	746.33	5.00	751.33

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	42.882347	-74.546980	738.43	6.00
OP 2	2	42.882347	-74.546980	738.43	16.00
OP 3	3	42.880656	-74.545424	768.39	6.00
OP 4	4	42.880660	-74.545420	768.39	16.00
OP 5	5	42.876586	-74.547663	760.01	6.00
OP 6	6	42.876586	-74.547663	760.01	16.00
OP 7	7	42.873886	-74.531507	717.01	6.00
OP 8	8	42.873886	-74.531507	717.01	16.00

Glare Analysis Results

Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
Array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 13	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 16	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 17	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Canyon Road	0	0.0	0	0.0
Canyon Road_Lookout Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0

PV: Array 12 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Canyon Road	0	0.0	0	0.0
Canyon Road_Lookout Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0

Array 12 and Route: Canyon Road

No glare found

Array 12 and Route: Canyon Road_Lookout Road

No glare found

Array 12 and Route: Carlisle Road

No glare found

Array 12 and OP 1

No glare found

Array 12 and OP 2

No glare found

Array 12 and OP 3

No glare found

Array 12 and OP 4

No glare found

Array 12 and OP 5

No glare found

Array 12 and OP 6

No glare found

Array 12 and OP 7

No glare found

Array 12 and OP 8

No glare found

PV: Array 13 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Canyon Road	0	0.0	0	0.0
Canyon Road_Lookout Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0

Array 13 and Route: Canyon Road

No glare found

Array 13 and Route: Canyon Road_Lookout Road

No glare found

Array 13 and Route: Carlisle Road

No glare found

Array 13 and OP 1

No glare found

Array 13 and OP 2

No glare found

Array 13 and OP 3

No glare found

Array 13 and OP 4

No glare found

Array 13 and OP 5

No glare found

Array 13 and OP 6

No glare found

Array 13 and OP 7

No glare found

Array 13 and OP 8

No glare found

PV: Array 14 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Canyon Road	0	0.0	0	0.0
Canyon Road_Lookout Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0

Array 14 and Route: Canyon Road

No glare found

Array 14 and Route: Canyon Road_Lookout Road

No glare found

Array 14 and Route: Carlisle Road

No glare found

Array 14 and OP 1

No glare found

Array 14 and OP 2

No glare found

Array 14 and OP 3

No glare found

Array 14 and OP 4

No glare found

Array 14 and OP 5

No glare found

Array 14 and OP 6

No glare found

Array 14 and OP 7

No glare found

Array 14 and OP 8

No glare found

PV: Array 15 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Canyon Road	0	0.0	0	0.0
Canyon Road_Lookout Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0

Array 15 and Route: Canyon Road

No glare found

Array 15 and Route: Canyon Road_Lookout Road

No glare found

Array 15 and Route: Carlisle Road

No glare found

Array 15 and OP 1

No glare found

Array 15 and OP 2

No glare found

Array 15 and OP 3

No glare found

Array 15 and OP 4

No glare found

Array 15 and OP 5

No glare found

Array 15 and OP 6

No glare found

Array 15 and OP 7

No glare found

Array 15 and OP 8

No glare found

PV: Array 16 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Canyon Road	0	0.0	0	0.0
Canyon Road_Lookout Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0

Array 16 and Route: Canyon Road

No glare found

Array 16 and Route: Canyon Road_Lookout Road

No glare found

Array 16 and Route: Carlisle Road

No glare found

Array 16 and OP 1

No glare found

Array 16 and OP 2

No glare found

Array 16 and OP 3

No glare found

Array 16 and OP 4

No glare found

Array 16 and OP 5

No glare found

Array 16 and OP 6

No glare found

Array 16 and OP 7

No glare found

Array 16 and OP 8

No glare found

PV: Array 17 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Canyon Road	0	0.0	0	0.0
Canyon Road_Lookout Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0

Array 17 and Route: Canyon Road

No glare found

Array 17 and Route: Canyon Road_Lookout Road

No glare found

Array 17 and Route: Carlisle Road

No glare found

Array 17 and OP 1

No glare found

Array 17 and OP 2

No glare found

Array 17 and OP 3

No glare found

Array 17 and OP 4

No glare found

Array 17 and OP 5

No glare found

Array 17 and OP 6

No glare found

Array 17 and OP 7

No glare found

Array 17 and OP 8

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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Group C Results

FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Solar

Site configuration: Flat Creek Solar C_rest

Created 10 Jul, 2024

Updated 16 Jul, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 10 MW to 100 MW

Site ID 123884.20753

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2



Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	Annual Green Glare hr	Annual Yellow Glare min	Annual Yellow Glare hr	Energy kWh
Array 18	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 19	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 20	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 21	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 22	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 23	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Blaine Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
Lincoln Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 18
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.868762	-74.544125	718.25	6.92	725.17
2	42.867857	-74.540601	718.26	6.92	725.18
3	42.867291	-74.540645	718.31	6.92	725.23
4	42.867106	-74.541000	718.04	6.92	724.95
5	42.867239	-74.541583	718.11	6.92	725.03
6	42.866614	-74.541630	716.11	6.92	723.02
7	42.866533	-74.541369	716.81	6.92	723.72
8	42.865966	-74.541384	712.62	6.92	719.54
9	42.866839	-74.544891	704.24	6.92	711.16
10	42.867436	-74.544879	706.09	6.92	713.01
11	42.868017	-74.544813	714.80	6.92	721.72
12	42.867904	-74.544356	716.13	6.92	723.04
13	42.868546	-74.544358	720.49	6.92	727.41

Name: Array 19
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.866720	-74.546002	704.13	6.92	711.05
2	42.865566	-74.541523	712.75	6.92	719.67
3	42.865278	-74.541500	714.33	6.92	721.25
4	42.865101	-74.540779	715.03	6.92	721.95
5	42.865375	-74.540789	713.45	6.92	720.37
6	42.865179	-74.539953	714.66	6.92	721.58
7	42.864319	-74.539967	716.21	6.92	723.12
8	42.865949	-74.546229	717.06	6.92	723.98
9	42.866509	-74.546299	706.28	6.92	713.20

Name: Array 20
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.863528	-74.545493	722.75	6.92	729.67
2	42.862276	-74.540622	719.79	6.92	726.71
3	42.861703	-74.540644	715.37	6.92	722.29
4	42.861757	-74.540879	715.42	6.92	722.33
5	42.860847	-74.540876	710.44	6.92	717.36
6	42.860867	-74.541023	710.80	6.92	717.72
7	42.860297	-74.541019	714.14	6.92	721.06
8	42.860089	-74.541229	713.50	6.92	720.42
9	42.860511	-74.542968	719.60	6.92	726.52
10	42.860819	-74.543120	718.80	6.92	725.72
11	42.861399	-74.543069	716.66	6.92	723.58
12	42.861499	-74.543420	716.10	6.92	723.02
13	42.859785	-74.543415	722.52	6.92	729.44
14	42.860649	-74.546806	712.38	6.92	719.30
15	42.861485	-74.546749	707.60	6.92	714.52
16	42.861163	-74.545453	713.70	6.92	720.62
17	42.861715	-74.545405	708.21	6.92	715.12
18	42.861822	-74.544749	711.75	6.92	718.67
19	42.861656	-74.544015	714.53	6.92	721.44
20	42.862539	-74.543978	715.59	6.92	722.50
21	42.862955	-74.545504	713.47	6.92	720.39

Name: Array 21
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.857614	-74.536835	707.19	6.92	714.11
2	42.857350	-74.536833	708.34	6.92	715.26
3	42.857232	-74.536556	709.70	6.92	716.62
4	42.856576	-74.536597	709.06	6.92	715.98
5	42.856278	-74.535831	710.47	6.92	717.38
6	42.856066	-74.535795	709.83	6.92	716.74
7	42.855811	-74.535159	710.45	6.92	717.37
8	42.855621	-74.535152	707.50	6.92	714.42
9	42.855418	-74.534543	708.22	6.92	715.14
10	42.855086	-74.534397	704.65	6.92	711.57
11	42.854496	-74.534414	699.06	6.92	705.98
12	42.854760	-74.535136	700.36	6.92	707.27
13	42.854957	-74.535136	702.74	6.92	709.66
14	42.855234	-74.535806	704.40	6.92	711.32
15	42.855433	-74.535826	705.62	6.92	712.54
16	42.856025	-74.537460	709.63	6.92	716.54
17	42.856599	-74.537444	708.16	6.92	715.08
18	42.856768	-74.537167	707.55	6.92	714.47
19	42.857641	-74.537039	704.56	6.92	711.47

Name: Array 22
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.857725	-74.541849	718.42	6.92	725.34
2	42.857621	-74.541506	717.18	6.92	724.10
3	42.858178	-74.541503	716.17	6.92	723.08
4	42.858113	-74.541282	715.15	6.92	722.07
5	42.857541	-74.541270	716.20	6.92	723.11
6	42.857094	-74.540143	715.16	6.92	722.07
7	42.856529	-74.540169	715.76	6.92	722.68
8	42.856362	-74.540439	715.45	6.92	722.37
9	42.855549	-74.540700	714.87	6.92	721.78
10	42.854890	-74.538997	708.60	6.92	715.52
11	42.855480	-74.538935	710.07	6.92	716.98
12	42.855622	-74.538559	708.70	6.92	715.62
13	42.855451	-74.538037	707.36	6.92	714.28
14	42.854864	-74.538062	704.34	6.92	711.25
15	42.854719	-74.538365	704.69	6.92	711.61
16	42.854823	-74.538865	707.32	6.92	714.24
17	42.853985	-74.538878	712.42	6.92	719.34
18	42.853474	-74.539118	718.05	6.92	724.97
19	42.854106	-74.540885	731.38	6.92	738.30
20	42.853862	-74.540872	732.74	6.92	739.66
21	42.854813	-74.543533	736.55	6.92	743.47
22	42.855383	-74.543483	731.47	6.92	738.38
23	42.855610	-74.543341	730.72	6.92	737.64
24	42.855527	-74.543063	727.65	6.92	734.57
25	42.856084	-74.543050	733.64	6.92	740.56
26	42.856319	-74.542918	730.57	6.92	737.48
27	42.856163	-74.542498	725.55	6.92	732.47
28	42.856790	-74.542456	729.91	6.92	736.83
29	42.857024	-74.542289	728.07	6.92	734.99
30	42.856927	-74.542017	726.64	6.92	733.56
31	42.857502	-74.542010	722.77	6.92	729.69

Name: Array 23
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.854198	-74.544389	759.11	6.92	766.03
2	42.853092	-74.541445	761.22	6.92	768.13
3	42.852535	-74.541420	762.83	6.92	769.75
4	42.852291	-74.541505	766.31	6.92	773.23
5	42.852761	-74.542800	772.80	6.92	779.71
6	42.852131	-74.542840	773.48	6.92	780.40
7	42.852550	-74.544022	779.65	6.92	786.57
8	42.852315	-74.544021	779.29	6.92	786.20
9	42.852682	-74.545062	780.49	6.92	787.40
10	42.853252	-74.545064	778.56	6.92	785.47
11	42.853440	-74.544853	775.39	6.92	782.31
12	42.853362	-74.544559	775.88	6.92	782.79
13	42.853972	-74.544553	766.77	6.92	773.69

Route Receptors

Name: Blaine Road
Path type: Two-way
Observer view angle: 50.0°



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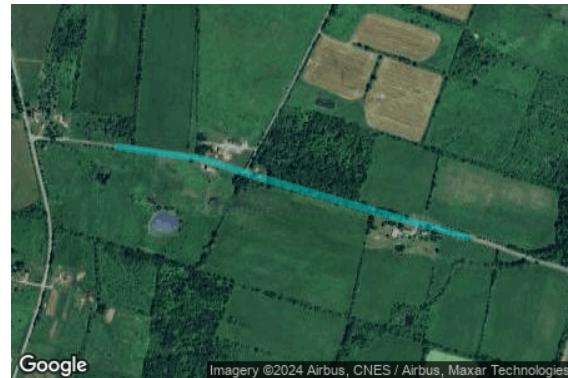
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.873640	-74.549960	714.22	5.00	719.22
2	42.870667	-74.551312	691.87	5.00	696.87
3	42.868065	-74.552642	699.13	5.00	704.13
4	42.865674	-74.553812	713.90	5.00	718.90
5	42.864613	-74.554337	695.41	5.00	700.41
6	42.864219	-74.554434	701.63	5.00	706.63
7	42.863527	-74.554423	715.13	5.00	720.13
8	42.862371	-74.554402	739.52	5.00	744.52
9	42.861451	-74.554616	727.94	5.00	732.94
10	42.859167	-74.554932	710.84	5.00	715.84
11	42.858270	-74.555082	721.48	5.00	726.48

Name: Carlisle Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.873250	-74.544609	737.23	5.00	742.23
2	42.872472	-74.543750	727.75	5.00	732.75
3	42.872024	-74.543192	719.69	5.00	724.69
4	42.871803	-74.542924	723.92	5.00	728.92
5	42.871481	-74.542645	726.32	5.00	731.32
6	42.870451	-74.541969	717.41	5.00	722.41
7	42.869397	-74.541261	722.45	5.00	727.45
8	42.869012	-74.540918	716.57	5.00	721.57
9	42.868438	-74.540424	712.12	5.00	717.12
10	42.867361	-74.539845	715.84	5.00	720.84
11	42.866535	-74.539641	715.75	5.00	720.75
12	42.865702	-74.539598	709.00	5.00	714.00
13	42.864365	-74.539684	714.07	5.00	719.07
14	42.862815	-74.539877	710.01	5.00	715.01
15	42.861533	-74.540070	709.62	5.00	714.62
16	42.860982	-74.540102	706.71	5.00	711.71
17	42.860660	-74.540081	706.57	5.00	711.57
18	42.860408	-74.539791	706.37	5.00	711.37
19	42.860141	-74.539351	708.52	5.00	713.52
20	42.859756	-74.538397	700.95	5.00	705.95
21	42.859496	-74.537957	697.18	5.00	702.18
22	42.859095	-74.537452	700.53	5.00	705.53
23	42.858489	-74.537066	711.07	5.00	716.07
24	42.857019	-74.536025	712.01	5.00	717.01
25	42.856311	-74.535274	707.40	5.00	712.40
26	42.854872	-74.533504	696.73	5.00	701.73
27	42.852512	-74.530693	690.27	5.00	695.27
28	42.851969	-74.529856	690.28	5.00	695.28
29	42.851568	-74.529052	693.63	5.00	698.63

Name: Conway Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.850661	-74.552366	809.21	5.00	814.21
2	42.850480	-74.550671	812.98	5.00	817.98
3	42.850370	-74.549512	825.17	5.00	830.17
4	42.849914	-74.547602	837.62	5.00	842.62
5	42.848819	-74.542484	820.37	5.00	825.37
6	42.848630	-74.541465	808.40	5.00	813.40
7	42.848386	-74.540349	800.37	5.00	805.37

Name: Lincoln Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.861324	-74.540135	707.53	5.00	712.53
2	42.860986	-74.540403	705.57	5.00	710.57
3	42.857620	-74.542592	726.16	5.00	731.16
4	42.854907	-74.544502	741.76	5.00	746.76
5	42.851572	-74.546798	787.09	5.00	792.09
6	42.851226	-74.547077	792.98	5.00	797.98

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	42.872700	-74.543595	731.76	6.00
OP 2	2	42.872700	-74.543595	731.76	16.00
OP 3	3	42.871301	-74.542748	732.36	6.00
OP 4	4	42.871301	-74.542748	732.36	16.00
OP 5	5	42.871204	-74.542094	729.13	6.00
OP 6	6	42.871204	-74.542094	729.13	16.00
OP 7	7	42.869318	-74.540979	725.96	6.00
OP 8	8	42.869318	-74.540979	725.96	16.00
OP 9	9	42.868796	-74.537897	711.65	6.00
OP 10	10	42.868796	-74.537897	711.65	16.00
OP 11	11	42.867807	-74.539069	685.26	6.00
OP 12	12	42.867807	-74.539069	685.26	16.00
OP 13	13	42.866498	-74.539202	694.55	6.00
OP 14	14	42.866498	-74.539202	694.55	16.00
OP 15	15	42.861801	-74.539488	718.50	6.00
OP 16	16	42.861801	-74.539488	718.50	16.00
OP 17	17	42.850522	-74.548785	816.72	6.00
OP 18	18	42.850522	-74.548785	816.72	16.00
OP 19	19	42.856631	-74.533674	715.70	6.00
OP 20	20	42.856631	-74.533674	715.70	16.00
OP 21	21	42.853901	-74.532708	700.54	6.00
OP 22	22	42.848481	-74.541798	813.60	6.00
OP 23	23	42.848481	-74.541798	813.60	16.00
OP 24	24	42.866433	-74.553135	724.88	6.00
OP 25	25	42.866433	-74.553135	724.88	16.00
OP 26	26	42.868882	-74.551980	696.37	6.00
OP 27	27	42.868882	-74.551980	696.37	16.00

Glare Analysis Results

Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
			min	hr	min	hr	
Array 18	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 19	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 20	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 21	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 22	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 23	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Blaine Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
Lincoln Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0

PV: Array 18 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Blaine Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
Lincoln Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0

Array 18 and Route: Blaine Road

No glare found

Array 18 and Route: Carlisle Road

No glare found

Array 18 and Route: Conway Road

No glare found

Array 18 and Route: Lincoln Road

No glare found

Array 18 and OP 1

No glare found

Array 18 and OP 2

No glare found

Array 18 and OP 3

No glare found

Array 18 and OP 4

No glare found

Array 18 and OP 5

No glare found

Array 18 and OP 6

No glare found

Array 18 and OP 7

No glare found

Array 18 and OP 8

No glare found

Array 18 and OP 9

No glare found

Array 18 and OP 10

No glare found

Array 18 and OP 11

No glare found

Array 18 and OP 12

No glare found

Array 18 and OP 13

No glare found

Array 18 and OP 14

No glare found

Array 18 and OP 15

No glare found

Array 18 and OP 16

No glare found

Array 18 and OP 17

No glare found

Array 18 and OP 18

No glare found

Array 18 and OP 19

No glare found

Array 18 and OP 20

No glare found

Array 18 and OP 21

No glare found

Array 18 and OP 22

No glare found

Array 18 and OP 23

No glare found

Array 18 and OP 24

No glare found

Array 18 and OP 25

No glare found

Array 18 and OP 26

No glare found

Array 18 and OP 27

No glare found

PV: Array 19 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Blaine Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
Lincoln Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0

Array 19 and Route: Blaine Road

No glare found

Array 19 and Route: Carlisle Road

No glare found

Array 19 and Route: Conway Road

No glare found

Array 19 and Route: Lincoln Road

No glare found

Array 19 and OP 1

No glare found

Array 19 and OP 2

No glare found

Array 19 and OP 3

No glare found

Array 19 and OP 4

No glare found

Array 19 and OP 5

No glare found

Array 19 and OP 6

No glare found

Array 19 and OP 7

No glare found

Array 19 and OP 8

No glare found

Array 19 and OP 9

No glare found

Array 19 and OP 10

No glare found

Array 19 and OP 11

No glare found

Array 19 and OP 12

No glare found

Array 19 and OP 13

No glare found

Array 19 and OP 14

No glare found

Array 19 and OP 15

No glare found

Array 19 and OP 16

No glare found

Array 19 and OP 17

No glare found

Array 19 and OP 18

No glare found

Array 19 and OP 19

No glare found

Array 19 and OP 20

No glare found

Array 19 and OP 21

No glare found

Array 19 and OP 22

No glare found

Array 19 and OP 23

No glare found

Array 19 and OP 24

No glare found

Array 19 and OP 25

No glare found

Array 19 and OP 26

No glare found

Array 19 and OP 27

No glare found

PV: Array 20 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Blaine Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
Lincoln Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0

Array 20 and Route: Blaine Road

No glare found

Array 20 and Route: Carlisle Road

No glare found

Array 20 and Route: Conway Road

No glare found

Array 20 and Route: Lincoln Road

No glare found

Array 20 and OP 1

No glare found

Array 20 and OP 2

No glare found

Array 20 and OP 3

No glare found

Array 20 and OP 4

No glare found

Array 20 and OP 5

No glare found

Array 20 and OP 6

No glare found

Array 20 and OP 7

No glare found

Array 20 and OP 8

No glare found

Array 20 and OP 9

No glare found

Array 20 and OP 10

No glare found

Array 20 and OP 11

No glare found

Array 20 and OP 12

No glare found

Array 20 and OP 13

No glare found

Array 20 and OP 14

No glare found

Array 20 and OP 15

No glare found

Array 20 and OP 16

No glare found

Array 20 and OP 17

No glare found

Array 20 and OP 18

No glare found

Array 20 and OP 19

No glare found

Array 20 and OP 20

No glare found

Array 20 and OP 21

No glare found

Array 20 and OP 22

No glare found

Array 20 and OP 23

No glare found

Array 20 and OP 24

No glare found

Array 20 and OP 25

No glare found

Array 20 and OP 26

No glare found

Array 20 and OP 27

No glare found

PV: Array 21 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Blaine Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
Lincoln Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0

Array 21 and Route: Blaine Road

No glare found

Array 21 and Route: Carlisle Road

No glare found

Array 21 and Route: Conway Road

No glare found

Array 21 and Route: Lincoln Road

No glare found

Array 21 and OP 1

No glare found

Array 21 and OP 2

No glare found

Array 21 and OP 3

No glare found

Array 21 and OP 4

No glare found

Array 21 and OP 5

No glare found

Array 21 and OP 6

No glare found

Array 21 and OP 7

No glare found

Array 21 and OP 8

No glare found

Array 21 and OP 9

No glare found

Array 21 and OP 10

No glare found

Array 21 and OP 11

No glare found

Array 21 and OP 12

No glare found

Array 21 and OP 13

No glare found

Array 21 and OP 14

No glare found

Array 21 and OP 15

No glare found

Array 21 and OP 16

No glare found

Array 21 and OP 17

No glare found

Array 21 and OP 18

No glare found

Array 21 and OP 19

No glare found

Array 21 and OP 20

No glare found

Array 21 and OP 21

No glare found

Array 21 and OP 22

No glare found

Array 21 and OP 23

No glare found

Array 21 and OP 24

No glare found

Array 21 and OP 25

No glare found

Array 21 and OP 26

No glare found

Array 21 and OP 27

No glare found

PV: Array 22 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Blaine Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
Lincoln Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0

Array 22 and Route: Blaine Road

No glare found

Array 22 and Route: Carlisle Road

No glare found

Array 22 and Route: Conway Road

No glare found

Array 22 and Route: Lincoln Road

No glare found

Array 22 and OP 1

No glare found

Array 22 and OP 2

No glare found

Array 22 and OP 3

No glare found

Array 22 and OP 4

No glare found

Array 22 and OP 5

No glare found

Array 22 and OP 6

No glare found

Array 22 and OP 7

No glare found

Array 22 and OP 8

No glare found

Array 22 and OP 9

No glare found

Array 22 and OP 10

No glare found

Array 22 and OP 11

No glare found

Array 22 and OP 12

No glare found

Array 22 and OP 13

No glare found

Array 22 and OP 14

No glare found

Array 22 and OP 15

No glare found

Array 22 and OP 16

No glare found

Array 22 and OP 17

No glare found

Array 22 and OP 18

No glare found

Array 22 and OP 19

No glare found

Array 22 and OP 20

No glare found

Array 22 and OP 21

No glare found

Array 22 and OP 22

No glare found

Array 22 and OP 23

No glare found

Array 22 and OP 24

No glare found

Array 22 and OP 25

No glare found

Array 22 and OP 26

No glare found

Array 22 and OP 27

No glare found

PV: Array 23 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Blaine Road	0	0.0	0	0.0
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
Lincoln Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0

Array 23 and Route: Blaine Road

No glare found

Array 23 and Route: Carlisle Road

No glare found

Array 23 and Route: Conway Road

No glare found

Array 23 and Route: Lincoln Road

No glare found

Array 23 and OP 1

No glare found

Array 23 and OP 2

No glare found

Array 23 and OP 3

No glare found

Array 23 and OP 4

No glare found

Array 23 and OP 5

No glare found

Array 23 and OP 6

No glare found

Array 23 and OP 7

No glare found

Array 23 and OP 8

No glare found

Array 23 and OP 9

No glare found

Array 23 and OP 10

No glare found

Array 23 and OP 11

No glare found

Array 23 and OP 12

No glare found

Array 23 and OP 13

No glare found

Array 23 and OP 14

No glare found

Array 23 and OP 15

No glare found

Array 23 and OP 16

No glare found

Array 23 and OP 17

No glare found

Array 23 and OP 18

No glare found

Array 23 and OP 19

No glare found

Array 23 and OP 20

No glare found

Array 23 and OP 21

No glare found

Array 23 and OP 22

No glare found

Array 23 and OP 23

No glare found

Array 23 and OP 24

No glare found

Array 23 and OP 25

No glare found

Array 23 and OP 26

No glare found

Array 23 and OP 27

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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Group D Results

FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Part 2

Site configuration: ~~Flat Creek Solar D1_revised~~

Created 23 Aug, 2024

Updated 23 Aug, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 100 MW to 1 GW

Site ID 127569.21223

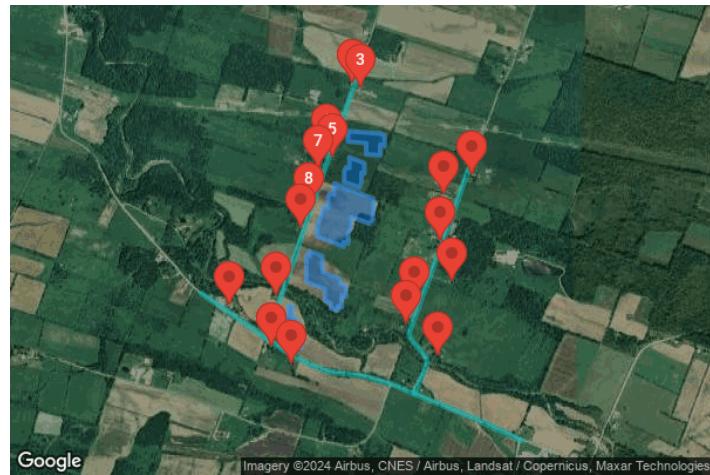
Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2



Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	Annual Green Glare hr	Annual Yellow Glare min	Annual Yellow Glare hr	Energy kWh
Array 24	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 25	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 26	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 27	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 28	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Hilltop Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 24
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.860628	-74.519049	737.05	6.92	743.97
2	42.860498	-74.516706	743.62	6.92	750.54
3	42.860403	-74.516375	744.96	6.92	751.87
4	42.859832	-74.516375	746.16	6.92	753.08
5	42.859909	-74.516682	744.37	6.92	751.29
6	42.859326	-74.516688	746.38	6.92	753.29
7	42.859387	-74.517749	742.44	6.92	749.36
8	42.859969	-74.517725	741.92	6.92	748.84
9	42.860068	-74.519079	738.24	6.92	745.16

Name: Array 25
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.859230	-74.518968	739.95	6.92	746.87
2	42.858919	-74.517866	744.25	6.92	751.17
3	42.858354	-74.517862	746.21	6.92	753.13
4	42.858401	-74.518062	744.00	6.92	750.92
5	42.857826	-74.518087	744.45	6.92	751.37
6	42.857601	-74.518228	744.36	6.92	751.28
7	42.857900	-74.519355	739.00	6.92	745.92
8	42.858471	-74.519342	739.10	6.92	746.02
9	42.858697	-74.519195	738.49	6.92	745.41
10	42.858648	-74.518967	739.01	6.92	745.92

Name: Array 26
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.857826	-74.520085	736.35	6.92	743.27
2	42.857016	-74.517181	754.00	6.92	760.92
3	42.856450	-74.517172	754.87	6.92	761.79
4	42.855871	-74.517254	759.77	6.92	766.68
5	42.855667	-74.517494	755.56	6.92	762.48
6	42.856022	-74.518824	744.33	6.92	751.25
7	42.855471	-74.518829	733.06	6.92	739.98
8	42.855180	-74.519054	727.91	6.92	734.83
9	42.854611	-74.519053	719.00	6.92	725.92
10	42.854672	-74.519354	716.70	6.92	723.62
11	42.854426	-74.519376	714.26	6.92	721.18
12	42.854991	-74.521345	711.33	6.92	718.24
13	42.855558	-74.521357	720.79	6.92	727.71
14	42.855778	-74.521214	722.62	6.92	729.54
15	42.856587	-74.520839	736.17	6.92	743.08
16	42.856503	-74.520532	736.84	6.92	743.75
17	42.857093	-74.520533	732.75	6.92	739.67
18	42.857323	-74.520382	732.82	6.92	739.73
19	42.857246	-74.520090	733.93	6.92	740.84

Name: Array 27
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.854208	-74.521878	705.37	6.92	712.29
2	42.853942	-74.520939	706.61	6.92	713.53
3	42.853081	-74.520919	706.81	6.92	713.73
4	42.852710	-74.519638	709.39	6.92	716.30
5	42.852454	-74.519632	710.91	6.92	717.83
6	42.852316	-74.519226	711.64	6.92	718.55
7	42.851746	-74.519206	707.00	6.92	713.92
8	42.851834	-74.519525	707.72	6.92	714.64
9	42.851192	-74.519506	698.34	6.92	705.25
10	42.851243	-74.519796	698.22	6.92	705.14
11	42.851008	-74.519804	697.73	6.92	704.64
12	42.851137	-74.520317	697.95	6.92	704.87
13	42.851418	-74.520316	698.33	6.92	705.24
14	42.851543	-74.520763	698.43	6.92	705.35
15	42.852164	-74.520750	705.74	6.92	712.66
16	42.852552	-74.522106	702.47	6.92	709.38
17	42.853994	-74.522107	705.06	6.92	711.97
18	42.853937	-74.521878	705.71	6.92	712.63

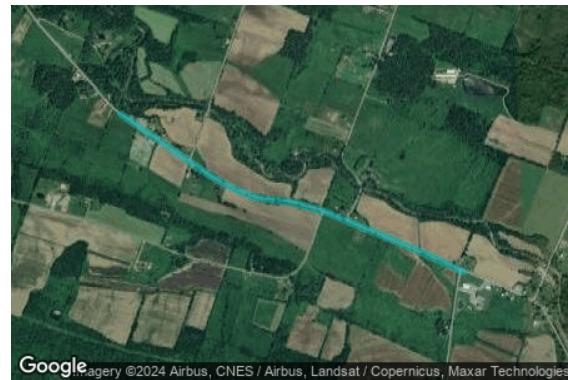
Name: Array 28
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.850886	-74.523991	690.05	6.92	696.97
2	42.850750	-74.523437	690.38	6.92	697.30
3	42.851314	-74.523406	688.86	6.92	695.77
4	42.851236	-74.523136	688.58	6.92	695.50
5	42.850658	-74.523115	690.41	6.92	697.33
6	42.850561	-74.522826	689.90	6.92	696.81
7	42.850248	-74.522678	690.02	6.92	696.94
8	42.849671	-74.522687	691.77	6.92	698.69
9	42.849593	-74.522442	692.33	6.92	699.25
10	42.849022	-74.522461	694.59	6.92	701.51
11	42.849357	-74.523693	691.63	6.92	698.55
12	42.849948	-74.523705	690.89	6.92	697.80
13	42.850047	-74.523993	689.41	6.92	696.32

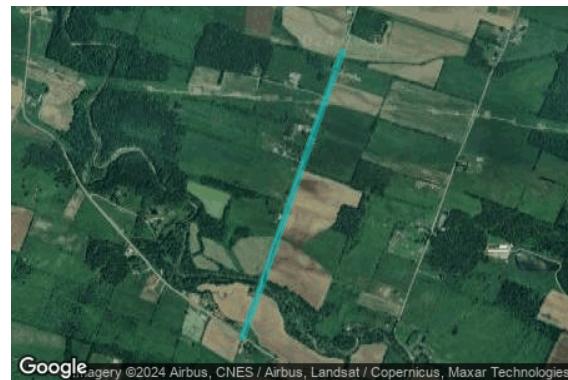
Route Receptors

Name: Carlisle Road
Path type: Two-way
Observer view angle: 50.0°



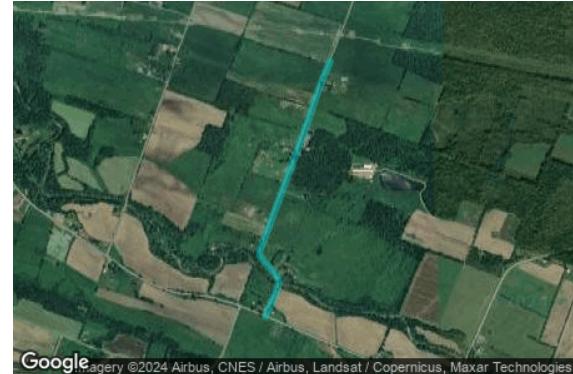
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.844045	-74.506321	725.07	5.00	730.07
2	42.844505	-74.507641	721.92	5.00	726.92
3	42.845145	-74.509560	717.26	5.00	722.26
4	42.845623	-74.511108	715.98	5.00	720.98
5	42.846086	-74.512654	714.35	5.00	719.35
6	42.847051	-74.515781	707.86	5.00	712.86
7	42.847482	-74.517790	702.32	5.00	707.32
8	42.847608	-74.518890	702.54	5.00	707.54
9	42.847683	-74.519829	701.09	5.00	706.09
10	42.847813	-74.520762	703.39	5.00	708.39
11	42.848147	-74.521900	701.10	5.00	706.10
12	42.848343	-74.522436	701.42	5.00	706.42
13	42.848882	-74.523755	696.04	5.00	701.04
14	42.850101	-74.526142	696.92	5.00	701.92
15	42.850963	-74.527856	693.23	5.00	698.23
16	42.851938	-74.529819	690.30	5.00	695.30

Name: Hilltop Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.863864	-74.518226	729.51	5.00	734.51
2	42.860026	-74.520082	735.65	5.00	740.65
3	42.856624	-74.521691	732.01	5.00	737.01
4	42.852204	-74.523748	681.56	5.00	686.56
5	42.849555	-74.525082	695.31	5.00	700.31

Name: Rappa Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.846587	-74.514187	711.88	5.00	716.88
2	42.847338	-74.513742	703.05	5.00	708.05
3	42.847924	-74.513414	703.99	5.00	708.99
4	42.848249	-74.513286	704.03	5.00	709.03
5	42.848390	-74.513283	705.35	5.00	710.35
6	42.848479	-74.513313	704.71	5.00	709.71
7	42.849194	-74.514145	701.79	5.00	706.79
8	42.849566	-74.514536	701.50	5.00	706.50
9	42.849733	-74.514577	705.55	5.00	710.55
10	42.849904	-74.514569	708.53	5.00	713.53
11	42.850868	-74.514064	713.16	5.00	718.16
12	42.852843	-74.513063	733.23	5.00	738.23
13	42.855661	-74.511628	781.06	5.00	786.06
14	42.856506	-74.511224	784.47	5.00	789.47
15	42.858156	-74.510449	799.78	5.00	804.78
16	42.858830	-74.510068	796.75	5.00	801.75
17	42.859351	-74.509757	800.78	5.00	805.78

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	42.863170	-74.518738	733.70	6.00
OP 2	2	42.863170	-74.518738	733.70	16.00
OP 3	3	42.862946	-74.518111	735.65	6.00
OP 4	4	42.859726	-74.520616	733.79	6.00
OP 5	5	42.859262	-74.520197	738.50	6.00
OP 6	6	42.859262	-74.520197	738.50	16.00
OP 7	7	42.858585	-74.521190	735.26	6.00
OP 8	8	42.856567	-74.521933	733.32	6.00
OP 9	9	42.856567	-74.521933	733.32	16.00
OP 10	10	42.855485	-74.522512	719.89	6.00
OP 11	11	42.851820	-74.524277	694.35	6.00
OP 12	12	42.851297	-74.527742	695.28	6.00
OP 13	13	42.849118	-74.524620	699.03	6.00
OP 14	14	42.849118	-74.524620	699.03	16.00
OP 15	15	42.848162	-74.523145	704.28	6.00
OP 27	27	42.848615	-74.512472	718.13	6.00
OP 28	28	42.850275	-74.514762	715.19	6.00
OP 29	29	42.851541	-74.514162	719.81	6.00
OP 30	30	42.852552	-74.511388	748.17	6.00
OP 31	31	42.854778	-74.512322	788.36	6.00
OP 32	32	42.854778	-74.512322	788.36	16.00
OP 33	33	42.857204	-74.512010	775.20	6.00
OP 34	34	42.858274	-74.509929	811.81	6.00
OP 35	35	42.858274	-74.509929	811.81	16.00

Glare Analysis Results

Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
Array 24	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 25	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 26	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 27	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 28	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Hilltop Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

PV: Array 24 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Hilltop Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Array 24 and Route: Carlisle Road

No glare found

Array 24 and Route: Hilltop Road

No glare found

Array 24 and Route: Rappa Road

No glare found

Array 24 and OP 1

No glare found

Array 24 and OP 2

No glare found

Array 24 and OP 3

No glare found

Array 24 and OP 4

No glare found

Array 24 and OP 5

No glare found

Array 24 and OP 6

No glare found

Array 24 and OP 7

No glare found

Array 24 and OP 8

No glare found

Array 24 and OP 9

No glare found

Array 24 and OP 10

No glare found

Array 24 and OP 11

No glare found

Array 24 and OP 12

No glare found

Array 24 and OP 13

No glare found

Array 24 and OP 14

No glare found

Array 24 and OP 15

No glare found

Array 24 and OP 27

No glare found

Array 24 and OP 28

No glare found

Array 24 and OP 29

No glare found

Array 24 and OP 30

No glare found

Array 24 and OP 31

No glare found

Array 24 and OP 32

No glare found

Array 24 and OP 33

No glare found

Array 24 and OP 34

No glare found

Array 24 and OP 35

No glare found

PV: Array 25 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Hilltop Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Array 25 and Route: Carlisle Road

No glare found

Array 25 and Route: Hilltop Road

No glare found

Array 25 and Route: Rappa Road

No glare found

Array 25 and OP 1

No glare found

Array 25 and OP 2

No glare found

Array 25 and OP 3

No glare found

Array 25 and OP 4

No glare found

Array 25 and OP 5

No glare found

Array 25 and OP 6

No glare found

Array 25 and OP 7

No glare found

Array 25 and OP 8

No glare found

Array 25 and OP 9

No glare found

Array 25 and OP 10

No glare found

Array 25 and OP 11

No glare found

Array 25 and OP 12

No glare found

Array 25 and OP 13

No glare found

Array 25 and OP 14

No glare found

Array 25 and OP 15

No glare found

Array 25 and OP 27

No glare found

Array 25 and OP 28

No glare found

Array 25 and OP 29

No glare found

Array 25 and OP 30

No glare found

Array 25 and OP 31

No glare found

Array 25 and OP 32

No glare found

Array 25 and OP 33

No glare found

Array 25 and OP 34

No glare found

Array 25 and OP 35

No glare found

PV: Array 26 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Hilltop Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Array 26 and Route: Carlisle Road

No glare found

Array 26 and Route: Hilltop Road

No glare found

Array 26 and Route: Rappa Road

No glare found

Array 26 and OP 1

No glare found

Array 26 and OP 2

No glare found

Array 26 and OP 3

No glare found

Array 26 and OP 4

No glare found

Array 26 and OP 5

No glare found

Array 26 and OP 6

No glare found

Array 26 and OP 7

No glare found

Array 26 and OP 8

No glare found

Array 26 and OP 9

No glare found

Array 26 and OP 10

No glare found

Array 26 and OP 11

No glare found

Array 26 and OP 12

No glare found

Array 26 and OP 13

No glare found

Array 26 and OP 14

No glare found

Array 26 and OP 15

No glare found

Array 26 and OP 27

No glare found

Array 26 and OP 28

No glare found

Array 26 and OP 29

No glare found

Array 26 and OP 30

No glare found

Array 26 and OP 31

No glare found

Array 26 and OP 32

No glare found

Array 26 and OP 33

No glare found

Array 26 and OP 34

No glare found

Array 26 and OP 35

No glare found

PV: Array 27 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Hilltop Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Array 27 and Route: Carlisle Road

No glare found

Array 27 and Route: Hilltop Road

No glare found

Array 27 and Route: Rappa Road

No glare found

Array 27 and OP 1

No glare found

Array 27 and OP 2

No glare found

Array 27 and OP 3

No glare found

Array 27 and OP 4

No glare found

Array 27 and OP 5

No glare found

Array 27 and OP 6

No glare found

Array 27 and OP 7

No glare found

Array 27 and OP 8

No glare found

Array 27 and OP 9

No glare found

Array 27 and OP 10

No glare found

Array 27 and OP 11

No glare found

Array 27 and OP 12

No glare found

Array 27 and OP 13

No glare found

Array 27 and OP 14

No glare found

Array 27 and OP 15

No glare found

Array 27 and OP 27

No glare found

Array 27 and OP 28

No glare found

Array 27 and OP 29

No glare found

Array 27 and OP 30

No glare found

Array 27 and OP 31

No glare found

Array 27 and OP 32

No glare found

Array 27 and OP 33

No glare found

Array 27 and OP 34

No glare found

Array 27 and OP 35

No glare found

PV: Array 28 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Hilltop Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Array 28 and Route: Carlisle Road

No glare found

Array 28 and Route: Hilltop Road

No glare found

Array 28 and Route: Rappa Road

No glare found

Array 28 and OP 1

No glare found

Array 28 and OP 2

No glare found

Array 28 and OP 3

No glare found

Array 28 and OP 4

No glare found

Array 28 and OP 5

No glare found

Array 28 and OP 6

No glare found

Array 28 and OP 7

No glare found

Array 28 and OP 8

No glare found

Array 28 and OP 9

No glare found

Array 28 and OP 10

No glare found

Array 28 and OP 11

No glare found

Array 28 and OP 12

No glare found

Array 28 and OP 13

No glare found

Array 28 and OP 14

No glare found

Array 28 and OP 15

No glare found

Array 28 and OP 27

No glare found

Array 28 and OP 28

No glare found

Array 28 and OP 29

No glare found

Array 28 and OP 30

No glare found

Array 28 and OP 31

No glare found

Array 28 and OP 32

No glare found

Array 28 and OP 33

No glare found

Array 28 and OP 34

No glare found

Array 28 and OP 35

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Part 2

Site configuration: Flat Creek Solar D2_revised

Created 23 Aug, 2024

Updated 23 Aug, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 100 MW to 1 GW

Site ID 127572.21223

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2

Summary of Results Glare with low potential for temporary after-image predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
Array 29	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 30	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 31	SA tracking	SA tracking	983	16.4	0	0.0	-
Array 32	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 33	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 34	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 35	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 36	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 37	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 38	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Carlisle Road	0	0.0	0	0.0
Conway Road	983	16.4	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 29
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.847109	-74.523823	706.94	6.92	713.86
2	42.846805	-74.522696	704.71	6.92	711.62
3	42.847071	-74.522683	703.89	6.92	710.80
4	42.846976	-74.522106	703.44	6.92	710.35
5	42.846403	-74.522126	710.00	6.92	716.92
6	42.846162	-74.522409	716.78	6.92	723.70
7	42.846379	-74.523332	713.48	6.92	720.39
8	42.846141	-74.523325	716.00	6.92	722.91
9	42.846274	-74.523816	715.84	6.92	722.75

Name: Array 30
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.847844	-74.521877	703.75	6.92	710.67
2	42.846778	-74.517916	708.75	6.92	715.67
3	42.847261	-74.517920	704.24	6.92	711.16
4	42.846885	-74.516579	706.97	6.92	713.89
5	42.846323	-74.516583	710.02	6.92	716.94
6	42.845567	-74.516965	712.96	6.92	719.88
7	42.845654	-74.517328	712.10	6.92	719.02
8	42.844808	-74.517327	717.77	6.92	724.69
9	42.846061	-74.521877	716.69	6.92	723.61

Name: Array 31
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.846797	-74.535703	777.53	6.92	784.45
2	42.846115	-74.532722	787.82	6.92	794.74
3	42.846255	-74.532713	786.91	6.92	793.82
4	42.845431	-74.529144	794.56	6.92	801.48
5	42.844593	-74.529138	795.34	6.92	802.25
6	42.844655	-74.529437	795.73	6.92	802.65
7	42.844076	-74.529459	802.78	6.92	809.70
8	42.844436	-74.531058	805.57	6.92	812.48
9	42.843852	-74.531074	800.13	6.92	807.05
10	42.844340	-74.533242	806.28	6.92	813.20
11	42.843774	-74.533246	811.93	6.92	818.85
12	42.843583	-74.533654	816.51	6.92	823.43
13	42.843721	-74.534223	819.71	6.92	826.62
14	42.842808	-74.534227	836.00	6.92	842.92
15	42.842915	-74.534758	839.71	6.92	846.63
16	42.842338	-74.534743	857.20	6.92	864.12
17	42.842655	-74.536150	862.21	6.92	869.13
18	42.842385	-74.536143	870.93	6.92	877.85
19	42.841856	-74.536384	890.10	6.92	897.02
20	42.842313	-74.538349	883.54	6.92	890.46
21	42.842869	-74.538315	884.30	6.92	891.22
22	42.842803	-74.537958	862.56	6.92	869.48
23	42.843372	-74.537934	845.12	6.92	852.04
24	42.843597	-74.537694	834.41	6.92	841.32
25	42.843499	-74.537255	836.10	6.92	843.02
26	42.844076	-74.537260	821.94	6.92	828.86
27	42.844316	-74.537101	817.18	6.92	824.10
28	42.844269	-74.536785	816.04	6.92	822.96
29	42.845152	-74.536741	795.10	6.92	802.02
30	42.845076	-74.536417	795.02	6.92	801.94
31	42.845675	-74.536445	784.65	6.92	791.57
32	42.844799	-74.532558	808.33	6.92	815.25
33	42.845357	-74.532558	797.27	6.92	804.19
34	42.845203	-74.531630	797.50	6.92	804.42
35	42.845413	-74.531647	797.00	6.92	803.92
36	42.845539	-74.532682	795.00	6.92	801.92
37	42.845344	-74.533089	793.00	6.92	799.92
38	42.846007	-74.535938	782.05	6.92	788.97
39	42.846582	-74.535923	778.39	6.92	785.30

Name: Array 32
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.843602	-74.530781	797.16	6.92	804.07
2	42.842668	-74.526599	793.43	6.92	800.34
3	42.842902	-74.526596	792.00	6.92	798.92
4	42.842308	-74.524014	792.27	6.92	799.19
5	42.841468	-74.523971	809.57	6.92	816.48
6	42.841525	-74.524415	809.67	6.92	816.59
7	42.840640	-74.524401	830.95	6.92	837.87
8	42.840705	-74.524710	830.57	6.92	837.48
9	42.840110	-74.524700	843.43	6.92	850.35
10	42.840628	-74.527022	841.24	6.92	848.16
11	42.840392	-74.527041	847.89	6.92	854.80
12	42.841779	-74.533082	850.15	6.92	857.07
13	42.842625	-74.533086	829.63	6.92	836.55
14	42.843381	-74.532627	810.12	6.92	817.04
15	42.842982	-74.530780	805.83	6.92	812.74

Name: Array 33
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.843937	-74.526154	795.41	6.92	802.32
2	42.843857	-74.523120	787.93	6.92	794.85
3	42.843308	-74.523071	781.07	6.92	787.99
4	42.843277	-74.523238	781.68	6.92	788.59
5	42.843022	-74.523273	779.21	6.92	786.12
6	42.843039	-74.523685	780.96	6.92	787.88
7	42.843299	-74.523689	786.10	6.92	793.02
8	42.843356	-74.526141	790.23	6.92	797.15

Name: Array 34
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.845023	-74.516625	716.34	6.92	723.25
2	42.844199	-74.513743	719.76	6.92	726.67
3	42.843361	-74.513722	729.63	6.92	736.54
4	42.843458	-74.514112	732.56	6.92	739.48
5	42.842566	-74.514122	741.43	6.92	748.35
6	42.842714	-74.514757	746.51	6.92	753.43
7	42.842159	-74.514782	746.33	6.92	753.25
8	42.842457	-74.515876	755.18	6.92	762.09
9	42.842256	-74.515905	759.17	6.92	766.08
10	42.842303	-74.516109	759.97	6.92	766.89
11	42.842867	-74.516090	743.27	6.92	750.18
12	42.843089	-74.515946	744.02	6.92	750.94
13	42.843045	-74.515748	745.79	6.92	752.71
14	42.843929	-74.515715	723.20	6.92	730.12
15	42.844230	-74.516765	720.79	6.92	727.71
16	42.844779	-74.516774	717.91	6.92	724.83

Name: Array 35
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.845589	-74.512361	716.86	6.92	723.77
2	42.845437	-74.511782	716.96	6.92	723.88
3	42.844588	-74.511807	719.96	6.92	726.88
4	42.844408	-74.511273	719.47	6.92	726.39
5	42.845261	-74.511235	716.63	6.92	723.55
6	42.845138	-74.510823	717.89	6.92	724.81
7	42.844300	-74.510819	720.70	6.92	727.62
8	42.844133	-74.510279	720.83	6.92	727.75
9	42.843264	-74.510265	723.64	6.92	730.56
10	42.843124	-74.509654	724.00	6.92	730.92
11	42.843668	-74.509631	723.00	6.92	729.92
12	42.843905	-74.509542	722.60	6.92	729.52
13	42.843861	-74.509262	722.60	6.92	729.52
14	42.844106	-74.509270	721.73	6.92	728.65
15	42.844417	-74.510353	720.35	6.92	727.27
16	42.845001	-74.510353	719.39	6.92	726.31
17	42.844197	-74.507509	724.12	6.92	731.04
18	42.843912	-74.507518	727.41	6.92	734.33
19	42.843813	-74.507115	728.06	6.92	734.98
20	42.843260	-74.507145	726.17	6.92	733.09
21	42.842417	-74.507211	727.92	6.92	734.83
22	42.842694	-74.508245	726.81	6.92	733.73
23	42.842085	-74.508275	727.81	6.92	734.73
24	42.841843	-74.508423	729.00	6.92	735.92
25	42.841972	-74.508927	727.56	6.92	734.48
26	42.842252	-74.508926	726.35	6.92	733.26
27	42.842445	-74.509593	726.30	6.92	733.21
28	42.842187	-74.509630	728.13	6.92	735.04
29	42.842391	-74.510436	736.55	6.92	743.47
30	42.841560	-74.510444	743.69	6.92	750.60
31	42.841718	-74.511111	744.15	6.92	751.07
32	42.840885	-74.511089	756.00	6.92	762.92
33	42.840904	-74.511249	755.65	6.92	762.57
34	42.841757	-74.511233	744.06	6.92	750.98
35	42.842027	-74.512153	741.13	6.92	748.05
36	42.841169	-74.512160	757.68	6.92	764.59
37	42.841504	-74.513333	751.10	6.92	758.02
38	42.842355	-74.513329	737.42	6.92	744.33
39	42.843152	-74.513121	734.01	6.92	740.93
40	42.843089	-74.512762	729.56	6.92	736.48
41	42.843955	-74.512742	721.41	6.92	728.33
42	42.844041	-74.512901	721.47	6.92	728.39
43	42.844868	-74.512876	717.17	6.92	724.08
44	42.844746	-74.512367	719.97	6.92	726.88

Name: Array 36
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.842330	-74.517427	764.88	6.92	771.80
2	42.841779	-74.515488	754.47	6.92	761.38
3	42.841463	-74.515338	763.00	6.92	769.92
4	42.841419	-74.515180	760.41	6.92	767.33
5	42.841687	-74.515199	754.50	6.92	761.42
6	42.841423	-74.514221	754.85	6.92	761.76
7	42.840578	-74.514217	772.45	6.92	779.37
8	42.840723	-74.514808	777.81	6.92	784.72
9	42.839845	-74.514848	798.93	6.92	805.85
10	42.840294	-74.516508	804.96	6.92	811.88
11	42.839752	-74.516546	816.92	6.92	823.83
12	42.839509	-74.516702	824.06	6.92	830.97
13	42.839573	-74.517022	825.20	6.92	832.12
14	42.838705	-74.517062	840.00	6.92	846.92
15	42.838843	-74.517554	840.64	6.92	847.56
16	42.839112	-74.517591	837.22	6.92	844.14
17	42.839410	-74.518684	839.43	6.92	846.35
18	42.839997	-74.518691	825.02	6.92	831.94
19	42.839897	-74.518323	825.75	6.92	832.66
20	42.840803	-74.518335	804.72	6.92	811.64
21	42.840657	-74.517807	803.88	6.92	810.80
22	42.841516	-74.517795	783.96	6.92	790.88
23	42.841419	-74.517419	782.62	6.92	789.54

Name: Array 37
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.841345	-74.513990	755.46	6.92	762.38
2	42.840196	-74.509949	772.65	6.92	779.57
3	42.841181	-74.509968	748.45	6.92	755.37
4	42.840900	-74.508963	750.98	6.92	757.89
5	42.839341	-74.508924	805.00	6.92	811.92
6	42.839435	-74.509385	801.85	6.92	808.77
7	42.839201	-74.509364	812.00	6.92	818.92
8	42.839190	-74.509672	814.82	6.92	821.73
9	42.838344	-74.509706	848.76	6.92	855.68
10	42.838288	-74.509518	853.16	6.92	860.07
11	42.838018	-74.509539	860.84	6.92	867.75
12	42.837799	-74.508766	868.30	6.92	875.22
13	42.837236	-74.508769	882.23	6.92	889.15
14	42.836627	-74.508920	892.00	6.92	898.91
15	42.836402	-74.509084	896.08	6.92	903.00
16	42.838074	-74.514990	837.72	6.92	844.64
17	42.838912	-74.514959	825.77	6.92	832.69
18	42.838822	-74.514653	826.45	6.92	833.37
19	42.839476	-74.514654	810.00	6.92	816.92
20	42.839692	-74.514469	803.00	6.92	809.92
21	42.839575	-74.514057	804.46	6.92	811.38
22	42.840440	-74.514050	778.80	6.92	785.72

Name: Array 38
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 15.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.837197	-74.515016	848.85	6.92	855.77
2	42.835662	-74.509650	901.52	6.92	908.44
3	42.835112	-74.509655	898.75	6.92	905.67
4	42.834875	-74.509797	895.47	6.92	902.38
5	42.834929	-74.510117	894.05	6.92	900.96
6	42.834316	-74.510066	885.54	6.92	892.45
7	42.834112	-74.510309	884.33	6.92	891.25
8	42.834277	-74.510944	885.25	6.92	892.17
9	42.833708	-74.510923	883.79	6.92	890.71
10	42.834032	-74.512187	887.39	6.92	894.30
11	42.833480	-74.512201	888.08	6.92	895.00
12	42.833686	-74.512957	889.58	6.92	896.49
13	42.834248	-74.512950	890.06	6.92	896.98
14	42.834804	-74.512822	893.88	6.92	900.80
15	42.835351	-74.512682	896.99	6.92	903.91
16	42.835614	-74.512540	896.24	6.92	903.16
17	42.836454	-74.515334	863.45	6.92	870.37
18	42.837017	-74.515340	853.65	6.92	860.57
19	42.836933	-74.515011	854.99	6.92	861.91

Route Receptors

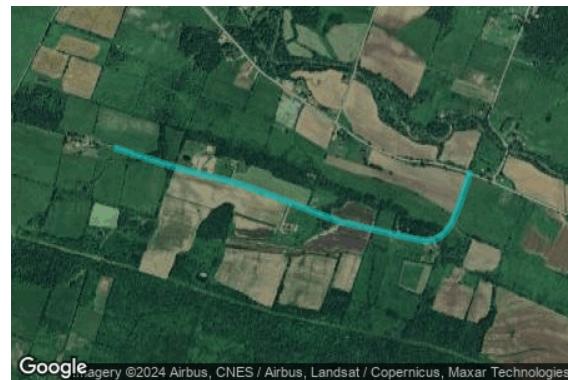
Name: Carlisle Road
Path type: Two-way
Observer view angle: 50.0°



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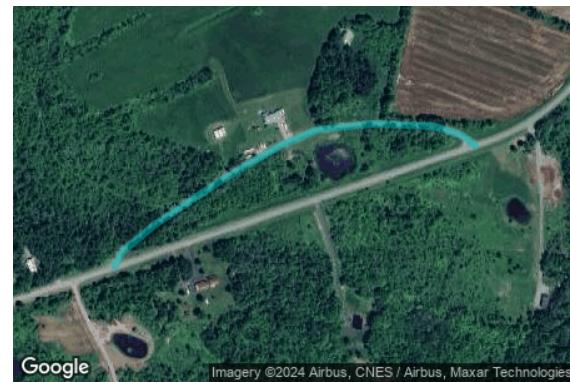
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.842534	-74.501515	740.19	5.00	745.19
2	42.843089	-74.503006	734.89	5.00	739.89
3	42.843950	-74.505826	726.59	5.00	731.59
4	42.844931	-74.508962	717.77	5.00	722.77
5	42.846086	-74.512654	714.35	5.00	719.35
6	42.847051	-74.515781	707.86	5.00	712.86
7	42.847482	-74.517790	702.32	5.00	707.32
8	42.847608	-74.518890	702.54	5.00	707.54
9	42.847683	-74.519829	701.09	5.00	706.09
10	42.847813	-74.520762	703.39	5.00	708.39
11	42.848147	-74.521900	701.10	5.00	706.10
12	42.848343	-74.522436	701.42	5.00	706.42
13	42.848882	-74.523755	696.04	5.00	701.04
14	42.850101	-74.526142	696.92	5.00	701.92
15	42.850963	-74.527856	693.23	5.00	698.23
16	42.851938	-74.529819	690.30	5.00	695.30

Name: Conway Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.847071	-74.515917	707.63	5.00	712.63
2	42.846765	-74.516040	707.15	5.00	712.15
3	42.845345	-74.516684	707.55	5.00	712.55
4	42.844578	-74.517151	716.19	5.00	721.19
5	42.844106	-74.517601	733.89	5.00	738.89
6	42.843933	-74.517902	743.87	5.00	748.87
7	42.843752	-74.518363	757.84	5.00	762.84
8	42.843689	-74.518969	770.13	5.00	775.13
9	42.843823	-74.519897	775.68	5.00	780.68
10	42.844137	-74.521732	778.94	5.00	783.94
11	42.844637	-74.524720	785.84	5.00	790.84
12	42.845026	-74.526190	777.01	5.00	782.01
13	42.845907	-74.529280	797.42	5.00	802.42
14	42.846415	-74.531163	794.09	5.00	799.09
15	42.846733	-74.532643	789.52	5.00	794.52
16	42.847249	-74.535481	782.38	5.00	787.38
17	42.847572	-74.536951	775.26	5.00	780.26
18	42.848340	-74.540190	797.00	5.00	802.00

Name: King Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.831599	-74.518057	937.82	5.00	942.82
2	42.831780	-74.517928	938.51	5.00	943.51
3	42.832127	-74.517359	923.13	5.00	928.13
4	42.832662	-74.516260	903.05	5.00	908.05
5	42.833127	-74.515178	892.21	5.00	897.21
6	42.833316	-74.514561	891.29	5.00	896.29
7	42.833391	-74.513622	892.19	5.00	897.19
8	42.833359	-74.512573	891.15	5.00	896.15
9	42.833245	-74.512080	887.53	5.00	892.53
10	42.833111	-74.511860	886.25	5.00	891.25

Name: Mapletown Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.844123	-74.506431	726.40	5.00	731.40
2	42.842802	-74.506769	724.27	5.00	729.27
3	42.840955	-74.507096	751.72	5.00	756.72
4	42.839294	-74.507396	801.69	5.00	806.69
5	42.838609	-74.507643	832.51	5.00	837.51
6	42.837506	-74.508144	873.05	5.00	878.05
7	42.835868	-74.508916	898.39	5.00	903.39
8	42.834541	-74.509555	891.30	5.00	896.30
9	42.834147	-74.509850	887.18	5.00	892.18
10	42.833762	-74.510311	883.34	5.00	888.34
11	42.833431	-74.510815	884.85	5.00	889.85
12	42.833262	-74.511293	883.88	5.00	888.88
13	42.833046	-74.512092	887.20	5.00	892.20
14	42.832449	-74.514602	893.20	5.00	898.20
15	42.831580	-74.518110	938.54	5.00	943.54

Name: Rappa Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.846602	-74.514322	714.23	5.00	719.23
2	42.847971	-74.513292	704.79	5.00	709.79
3	42.848427	-74.513292	705.17	5.00	710.17
4	42.849591	-74.514537	701.78	5.00	706.78

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 16	16	42.848482	-74.541804	813.60	6.00
OP 17	17	42.848482	-74.541804	813.60	16.00
OP 18	18	42.847362	-74.532189	786.68	6.00
OP 19	19	42.845726	-74.526425	791.35	6.00
OP 20	20	42.844143	-74.520842	780.48	6.00
OP 21	21	42.844143	-74.520842	780.48	16.00
OP 22	22	42.843372	-74.518042	764.51	6.00
OP 23	23	42.846810	-74.514360	716.93	6.00
OP 24	24	42.846810	-74.514360	716.93	16.00
OP 25	25	42.845823	-74.513421	715.35	6.00
OP 26	26	42.845823	-74.513421	715.35	16.00
OP 36	36	42.843088	-74.503628	738.10	6.00
OP 37	37	42.843686	-74.501069	732.24	6.00
OP 38	38	42.843686	-74.501069	732.24	16.00
OP 39	39	42.841216	-74.507402	752.82	6.00
OP 40	40	42.841216	-74.507402	752.82	16.00
OP 41	41	42.838544	-74.508084	841.60	6.00
OP 42	42	42.838544	-74.508084	841.60	16.00
OP 43	43	42.833469	-74.515326	892.55	6.00
OP 44	44	42.833469	-74.515326	892.55	16.00

Obstruction Components

Name: Proposed Vegetation
Top height: 10.0 ft



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Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.845274	-74.528556	789.13
2	42.845683	-74.528845	793.73
3	42.846383	-74.531774	791.86

Name: Proposed Vegetation
Top height: 10.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.846446	-74.532021	790.71
2	42.847217	-74.535873	780.00

Glare Analysis Results

Summary of Results Glare with low potential for temporary after-image predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	Annual Green Glare hr	Annual Yellow Glare min	Annual Yellow Glare hr	Energy kWh
Array 29	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 30	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 31	SA tracking	SA tracking	983	16.4	0	0.0	-
Array 32	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 33	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 34	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 35	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 36	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 37	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 38	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	983	16.4	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

PV: Array 29 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 29 and Route: Carlisle Road

No glare found

Array 29 and Route: Conway Road

No glare found

Array 29 and Route: King Road

No glare found

Array 29 and Route: Mapletown Road

No glare found

Array 29 and Route: Rappa Road

No glare found

Array 29 and OP 16

No glare found

Array 29 and OP 17

No glare found

Array 29 and OP 18

No glare found

Array 29 and OP 19

No glare found

Array 29 and OP 20

No glare found

Array 29 and OP 21

No glare found

Array 29 and OP 22

No glare found

Array 29 and OP 23

No glare found

Array 29 and OP 24

No glare found

Array 29 and OP 25

No glare found

Array 29 and OP 26

No glare found

Array 29 and OP 36

No glare found

Array 29 and OP 37

No glare found

Array 29 and OP 38

No glare found

Array 29 and OP 39

No glare found

Array 29 and OP 40

No glare found

Array 29 and OP 41

No glare found

Array 29 and OP 42

No glare found

Array 29 and OP 43

No glare found

Array 29 and OP 44

No glare found

PV: Array 30 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 30 and Route: Carlisle Road

No glare found

Array 30 and Route: Conway Road

No glare found

Array 30 and Route: King Road

No glare found

Array 30 and Route: Mapletown Road

No glare found

Array 30 and Route: Rappa Road

No glare found

Array 30 and OP 16

No glare found

Array 30 and OP 17

No glare found

Array 30 and OP 18

No glare found

Array 30 and OP 19

No glare found

Array 30 and OP 20

No glare found

Array 30 and OP 21

No glare found

Array 30 and OP 22

No glare found

Array 30 and OP 23

No glare found

Array 30 and OP 24

No glare found

Array 30 and OP 25

No glare found

Array 30 and OP 26

No glare found

Array 30 and OP 36

No glare found

Array 30 and OP 37

No glare found

Array 30 and OP 38

No glare found

Array 30 and OP 39

No glare found

Array 30 and OP 40

No glare found

Array 30 and OP 41

No glare found

Array 30 and OP 42

No glare found

Array 30 and OP 43

No glare found

Array 30 and OP 44

No glare found

PV: Array 31 [low potential for temporary after-image]

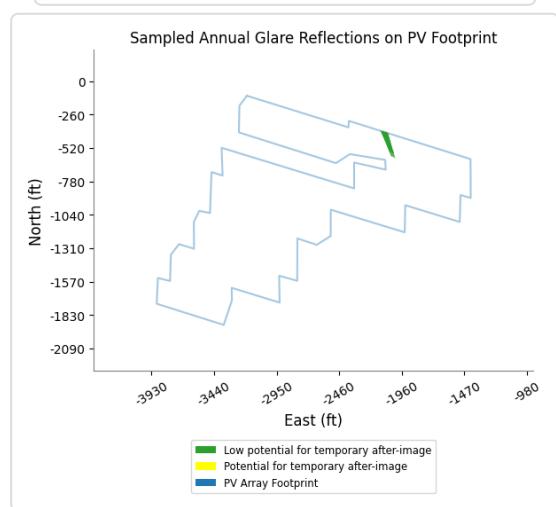
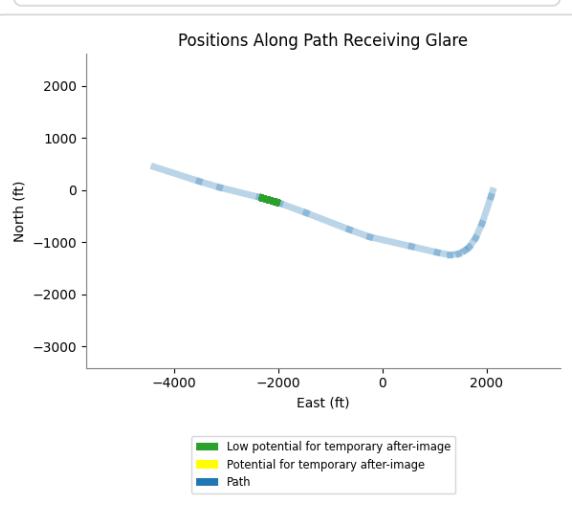
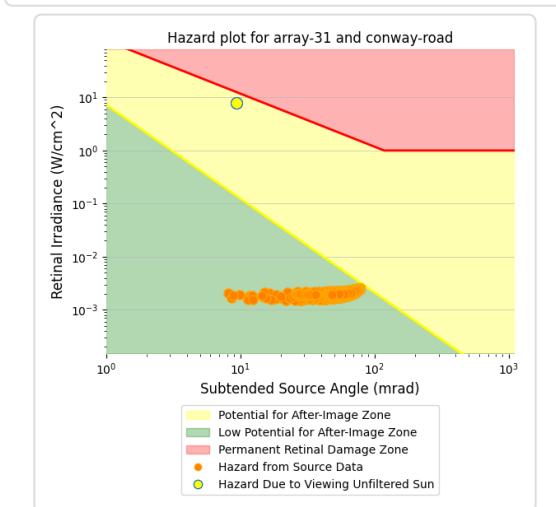
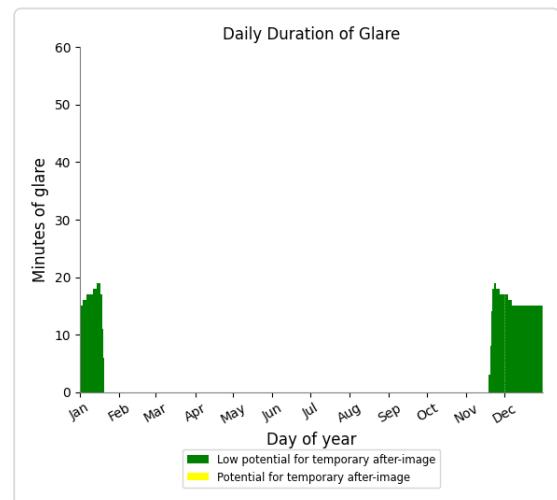
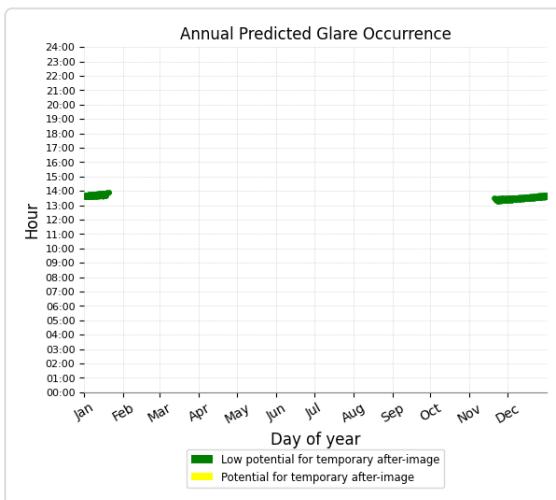
Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Conway Road	983	16.4	0	0.0
Carlisle Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 31 and Route: Conway Road

Yellow glare: none

Green glare: 983 min.



Array 31 and Route: Carlisle Road

No glare found

Array 31 and Route: King Road

No glare found

Array 31 and Route: Mapletown Road

No glare found

Array 31 and Route: Rappa Road

No glare found

Array 31 and OP 16

No glare found

Array 31 and OP 17

No glare found

Array 31 and OP 18

No glare found

Array 31 and OP 19

No glare found

Array 31 and OP 20

No glare found

Array 31 and OP 21

No glare found

Array 31 and OP 22

No glare found

Array 31 and OP 23

No glare found

Array 31 and OP 24

No glare found

Array 31 and OP 25

No glare found

Array 31 and OP 26

No glare found

Array 31 and OP 36

No glare found

Array 31 and OP 37

No glare found

Array 31 and OP 38

No glare found

Array 31 and OP 39

No glare found

Array 31 and OP 40

No glare found

Array 31 and OP 41

No glare found

Array 31 and OP 42

No glare found

Array 31 and OP 43

No glare found

Array 31 and OP 44

No glare found

PV: Array 32 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 32 and Route: Carlisle Road

No glare found

Array 32 and Route: Conway Road

No glare found

Array 32 and Route: King Road

No glare found

Array 32 and Route: Mapletown Road

No glare found

Array 32 and Route: Rappa Road

No glare found

Array 32 and OP 16

No glare found

Array 32 and OP 17

No glare found

Array 32 and OP 18

No glare found

Array 32 and OP 19

No glare found

Array 32 and OP 20

No glare found

Array 32 and OP 21

No glare found

Array 32 and OP 22

No glare found

Array 32 and OP 23

No glare found

Array 32 and OP 24

No glare found

Array 32 and OP 25

No glare found

Array 32 and OP 26

No glare found

Array 32 and OP 36

No glare found

Array 32 and OP 37

No glare found

Array 32 and OP 38

No glare found

Array 32 and OP 39

No glare found

Array 32 and OP 40

No glare found

Array 32 and OP 41

No glare found

Array 32 and OP 42

No glare found

Array 32 and OP 43

No glare found

Array 32 and OP 44

No glare found

PV: Array 33 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 33 and Route: Carlisle Road

No glare found

Array 33 and Route: Conway Road

No glare found

Array 33 and Route: King Road

No glare found

Array 33 and Route: Mapletown Road

No glare found

Array 33 and Route: Rappa Road

No glare found

Array 33 and OP 16

No glare found

Array 33 and OP 17

No glare found

Array 33 and OP 18

No glare found

Array 33 and OP 19

No glare found

Array 33 and OP 20

No glare found

Array 33 and OP 21

No glare found

Array 33 and OP 22

No glare found

Array 33 and OP 23

No glare found

Array 33 and OP 24

No glare found

Array 33 and OP 25

No glare found

Array 33 and OP 26

No glare found

Array 33 and OP 36

No glare found

Array 33 and OP 37

No glare found

Array 33 and OP 38

No glare found

Array 33 and OP 39

No glare found

Array 33 and OP 40

No glare found

Array 33 and OP 41

No glare found

Array 33 and OP 42

No glare found

Array 33 and OP 43

No glare found

Array 33 and OP 44

No glare found

PV: Array 34 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 34 and Route: Carlisle Road

No glare found

Array 34 and Route: Conway Road

No glare found

Array 34 and Route: King Road

No glare found

Array 34 and Route: Mapletown Road

No glare found

Array 34 and Route: Rappa Road

No glare found

Array 34 and OP 16

No glare found

Array 34 and OP 17

No glare found

Array 34 and OP 18

No glare found

Array 34 and OP 19

No glare found

Array 34 and OP 20

No glare found

Array 34 and OP 21

No glare found

Array 34 and OP 22

No glare found

Array 34 and OP 23

No glare found

Array 34 and OP 24

No glare found

Array 34 and OP 25

No glare found

Array 34 and OP 26

No glare found

Array 34 and OP 36

No glare found

Array 34 and OP 37

No glare found

Array 34 and OP 38

No glare found

Array 34 and OP 39

No glare found

Array 34 and OP 40

No glare found

Array 34 and OP 41

No glare found

Array 34 and OP 42

No glare found

Array 34 and OP 43

No glare found

Array 34 and OP 44

No glare found

PV: Array 35 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 35 and Route: Carlisle Road

No glare found

Array 35 and Route: Conway Road

No glare found

Array 35 and Route: King Road

No glare found

Array 35 and Route: Mapletown Road

No glare found

Array 35 and Route: Rappa Road

No glare found

Array 35 and OP 16

No glare found

Array 35 and OP 17

No glare found

Array 35 and OP 18

No glare found

Array 35 and OP 19

No glare found

Array 35 and OP 20

No glare found

Array 35 and OP 21

No glare found

Array 35 and OP 22

No glare found

Array 35 and OP 23

No glare found

Array 35 and OP 24

No glare found

Array 35 and OP 25

No glare found

Array 35 and OP 26

No glare found

Array 35 and OP 36

No glare found

Array 35 and OP 37

No glare found

Array 35 and OP 38

No glare found

Array 35 and OP 39

No glare found

Array 35 and OP 40

No glare found

Array 35 and OP 41

No glare found

Array 35 and OP 42

No glare found

Array 35 and OP 43

No glare found

Array 35 and OP 44

No glare found

PV: Array 36 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 36 and Route: Carlisle Road

No glare found

Array 36 and Route: Conway Road

No glare found

Array 36 and Route: King Road

No glare found

Array 36 and Route: Mapletown Road

No glare found

Array 36 and Route: Rappa Road

No glare found

Array 36 and OP 16

No glare found

Array 36 and OP 17

No glare found

Array 36 and OP 18

No glare found

Array 36 and OP 19

No glare found

Array 36 and OP 20

No glare found

Array 36 and OP 21

No glare found

Array 36 and OP 22

No glare found

Array 36 and OP 23

No glare found

Array 36 and OP 24

No glare found

Array 36 and OP 25

No glare found

Array 36 and OP 26

No glare found

Array 36 and OP 36

No glare found

Array 36 and OP 37

No glare found

Array 36 and OP 38

No glare found

Array 36 and OP 39

No glare found

Array 36 and OP 40

No glare found

Array 36 and OP 41

No glare found

Array 36 and OP 42

No glare found

Array 36 and OP 43

No glare found

Array 36 and OP 44

No glare found

PV: Array 37 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 37 and Route: Carlisle Road

No glare found

Array 37 and Route: Conway Road

No glare found

Array 37 and Route: King Road

No glare found

Array 37 and Route: Mapletown Road

No glare found

Array 37 and Route: Rappa Road

No glare found

Array 37 and OP 16

No glare found

Array 37 and OP 17

No glare found

Array 37 and OP 18

No glare found

Array 37 and OP 19

No glare found

Array 37 and OP 20

No glare found

Array 37 and OP 21

No glare found

Array 37 and OP 22

No glare found

Array 37 and OP 23

No glare found

Array 37 and OP 24

No glare found

Array 37 and OP 25

No glare found

Array 37 and OP 26

No glare found

Array 37 and OP 36

No glare found

Array 37 and OP 37

No glare found

Array 37 and OP 38

No glare found

Array 37 and OP 39

No glare found

Array 37 and OP 40

No glare found

Array 37 and OP 41

No glare found

Array 37 and OP 42

No glare found

Array 37 and OP 43

No glare found

Array 37 and OP 44

No glare found

PV: Array 38 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Conway Road	0	0.0	0	0.0
King Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
Rappa Road	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0

Array 38 and Route: Carlisle Road

No glare found

Array 38 and Route: Conway Road

No glare found

Array 38 and Route: King Road

No glare found

Array 38 and Route: Mapletown Road

No glare found

Array 38 and Route: Rappa Road

No glare found

Array 38 and OP 16

No glare found

Array 38 and OP 17

No glare found

Array 38 and OP 18

No glare found

Array 38 and OP 19

No glare found

Array 38 and OP 20

No glare found

Array 38 and OP 21

No glare found

Array 38 and OP 22

No glare found

Array 38 and OP 23

No glare found

Array 38 and OP 24

No glare found

Array 38 and OP 25

No glare found

Array 38 and OP 26

No glare found

Array 38 and OP 36

No glare found

Array 38 and OP 37

No glare found

Array 38 and OP 38

No glare found

Array 38 and OP 39

No glare found

Array 38 and OP 40

No glare found

Array 38 and OP 41

No glare found

Array 38 and OP 42

No glare found

Array 38 and OP 43

No glare found

Array 38 and OP 44

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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Group E Results

FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Part 2

Site configuration: Flat Creek Solar E_revised

Created 11 Jul, 2024

Updated 23 Aug, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 100 MW to 1 GW

Site ID 123925.21223

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2



Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	Annual Green Glare hr	Annual Yellow Glare min	Annual Yellow Glare hr	Energy kWh
Array 42	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 43	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 44	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Flat Creek Road	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 42
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.851787	-74.503630	850.25	6.92	857.17
2	42.851077	-74.500856	867.92	6.92	874.84
3	42.851429	-74.500828	865.58	6.92	872.50
4	42.852060	-74.500781	863.90	6.92	870.82
5	42.852316	-74.500690	865.21	6.92	872.12
6	42.852042	-74.499577	871.64	6.92	878.56
7	42.851482	-74.499559	872.70	6.92	879.61
8	42.851199	-74.499675	876.97	6.92	883.88
9	42.851231	-74.500112	874.05	6.92	880.96
10	42.850429	-74.500094	871.90	6.92	878.82
11	42.850574	-74.500823	865.58	6.92	872.49
12	42.848647	-74.500924	801.49	6.92	808.41
13	42.848148	-74.498961	819.61	6.92	826.53
14	42.847570	-74.498997	814.61	6.92	821.52
15	42.847340	-74.499143	808.46	6.92	815.38
16	42.847378	-74.499447	806.20	6.92	813.12
17	42.846825	-74.499432	794.89	6.92	801.81
18	42.846611	-74.499571	787.36	6.92	794.28
19	42.846646	-74.499857	788.65	6.92	795.56
20	42.846103	-74.499880	775.19	6.92	782.11
21	42.845870	-74.500191	769.68	6.92	776.59
22	42.846193	-74.501449	759.80	6.92	766.72
23	42.845640	-74.501464	745.00	6.92	751.92
24	42.846048	-74.503019	746.21	6.92	753.12
25	42.846594	-74.503013	752.00	6.92	758.92
26	42.846883	-74.504050	750.88	6.92	757.80
27	42.847735	-74.504055	759.53	6.92	766.45
28	42.847670	-74.503788	761.51	6.92	768.43
29	42.848244	-74.503750	764.97	6.92	771.89
30	42.848485	-74.503602	766.71	6.92	773.63
31	42.848401	-74.503239	769.83	6.92	776.75
32	42.848976	-74.503237	774.00	6.92	780.92
33	42.849209	-74.503082	779.62	6.92	786.54
34	42.849158	-74.502804	781.46	6.92	788.38
35	42.850073	-74.502786	802.65	6.92	809.56
36	42.850380	-74.504057	793.02	6.92	799.94
37	42.850975	-74.504087	818.67	6.92	825.59
38	42.850896	-74.503775	819.88	6.92	826.80
39	42.851548	-74.503766	841.00	6.92	847.92

Name: Array 43
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.848605	-74.496801	864.20	6.92	871.12
2	42.847455	-74.492396	892.68	6.92	899.60
3	42.847133	-74.492156	889.25	6.92	896.17
4	42.846561	-74.492208	877.96	6.92	884.88
5	42.846194	-74.490829	887.75	6.92	894.67
6	42.845352	-74.490792	870.26	6.92	877.18
7	42.844728	-74.490903	857.66	6.92	864.57
8	42.844511	-74.491141	851.06	6.92	857.98
9	42.843659	-74.491221	837.92	6.92	844.84
10	42.844005	-74.492703	829.57	6.92	836.49
11	42.843135	-74.492686	821.14	6.92	828.06
12	42.842897	-74.491869	822.00	6.92	828.92
13	42.842040	-74.491882	818.61	6.92	825.52
14	42.842011	-74.492252	817.04	6.92	823.96
15	42.841474	-74.492217	815.13	6.92	822.05
16	42.841583	-74.492757	812.72	6.92	819.64
17	42.842119	-74.492743	812.90	6.92	819.81
18	42.842510	-74.493660	812.58	6.92	819.50
19	42.843341	-74.493649	816.32	6.92	823.24
20	42.843746	-74.495147	803.78	6.92	810.69
21	42.843192	-74.495161	799.00	6.92	805.92
22	42.843287	-74.495692	795.51	6.92	802.43
23	42.843061	-74.495699	792.00	6.92	798.92
24	42.843188	-74.496229	788.01	6.92	794.92
25	42.843519	-74.496495	786.83	6.92	793.75
26	42.844974	-74.496525	799.84	6.92	806.76
27	42.845478	-74.498365	785.84	6.92	792.76
28	42.845771	-74.498359	791.26	6.92	798.17
29	42.845851	-74.498739	786.67	6.92	793.58
30	42.846413	-74.498736	795.83	6.92	802.74
31	42.846361	-74.498454	799.86	6.92	806.78
32	42.846927	-74.498441	812.00	6.92	818.92
33	42.847157	-74.498290	816.57	6.92	823.49
34	42.847055	-74.497915	820.29	6.92	827.20
35	42.847775	-74.497918	830.55	6.92	837.47
36	42.847999	-74.497767	837.00	6.92	843.91
37	42.847797	-74.496940	838.71	6.92	845.63
38	42.848374	-74.496934	856.97	6.92	863.88

Name: Array 44
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.844057	-74.490588	849.00	6.92	855.92
2	42.843814	-74.489649	853.01	6.92	859.93
3	42.843159	-74.489634	845.15	6.92	852.07
4	42.843053	-74.489081	848.22	6.92	855.13
5	42.843671	-74.489089	857.01	6.92	863.93
6	42.843545	-74.488583	859.65	6.92	866.57
7	42.842954	-74.488592	850.91	6.92	857.83
8	42.842935	-74.488805	848.92	6.92	855.84
9	42.842388	-74.488802	841.48	6.92	848.40
10	42.842154	-74.488971	838.17	6.92	845.09
11	42.842187	-74.489186	836.35	6.92	843.27
12	42.841627	-74.489191	831.72	6.92	838.64
13	42.841728	-74.489756	826.40	6.92	833.32
14	42.841503	-74.489757	821.24	6.92	828.15
15	42.841840	-74.491124	822.00	6.92	828.92
16	42.842690	-74.491125	829.00	6.92	835.92
17	42.843237	-74.490970	834.00	6.92	840.92
18	42.843465	-74.490805	839.00	6.92	845.92
19	42.843466	-74.490593	841.39	6.92	848.30

Route Receptors

Name: Flat Creek Road

Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.842534	-74.501528	739.94	5.00	744.94
2	42.844383	-74.500343	739.39	5.00	744.39
3	42.847594	-74.498438	813.52	5.00	818.52
4	42.848700	-74.497687	852.44	5.00	857.44
5	42.849089	-74.497097	869.24	5.00	874.24
6	42.849297	-74.496470	884.80	5.00	889.80
7	42.849620	-74.494667	918.45	5.00	923.45
8	42.849934	-74.492729	924.98	5.00	929.98
9	42.850261	-74.491677	913.75	5.00	918.75

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 2	2	42.843689	-74.501052	732.19	6.00
OP 3	3	42.843689	-74.501052	732.19	16.00
OP 4	4	42.844559	-74.499866	759.11	6.00
OP 5	5	42.848829	-74.497827	859.15	6.00
OP 6	6	42.849572	-74.496234	899.36	6.00
OP 7	7	42.849297	-74.495000	910.44	6.00
OP 8	8	42.848687	-74.492860	927.17	6.00
OP 9	9	42.848302	-74.491701	930.67	6.00
OP 10	10	42.848302	-74.491701	930.67	16.00
OP 11	11	42.847563	-74.489582	930.94	6.00
OP 12	12	42.846540	-74.484781	951.00	6.00

Glare Analysis Results

Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
			min	hr	min	hr	
Array 42	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 43	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 44	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Flat Creek Road	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0

PV: Array 42 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Flat Creek Road	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0

Array 42 and Route: Flat Creek Road

No glare found

Array 42 and OP 2

No glare found

Array 42 and OP 3

No glare found

Array 42 and OP 4

No glare found

Array 42 and OP 5

No glare found

Array 42 and OP 6

No glare found

Array 42 and OP 7

No glare found

Array 42 and OP 8

No glare found

Array 42 and OP 9

No glare found

Array 42 and OP 10

No glare found

Array 42 and OP 11

No glare found

Array 42 and OP 12

No glare found

PV: Array 43 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Flat Creek Road	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0

Array 43 and Route: Flat Creek Road

No glare found

Array 43 and OP 2

No glare found

Array 43 and OP 3

No glare found

Array 43 and OP 4

No glare found

Array 43 and OP 5

No glare found

Array 43 and OP 6

No glare found

Array 43 and OP 7

No glare found

Array 43 and OP 8

No glare found

Array 43 and OP 9

No glare found

Array 43 and OP 10

No glare found

Array 43 and OP 11

No glare found

Array 43 and OP 12

No glare found

PV: Array 44 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Flat Creek Road	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0

Array 44 and Route: Flat Creek Road

No glare found

Array 44 and OP 2

No glare found

Array 44 and OP 3

No glare found

Array 44 and OP 4

No glare found

Array 44 and OP 5

No glare found

Array 44 and OP 6

No glare found

Array 44 and OP 7

No glare found

Array 44 and OP 8

No glare found

Array 44 and OP 9

No glare found

Array 44 and OP 10

No glare found

Array 44 and OP 11

No glare found

Array 44 and OP 12

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Part 2

Site configuration: Flat Creek Solar E2_Revised

Created 23 Aug, 2024

Updated 23 Aug, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 100 MW to 1 GW

Site ID 127574.21223

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2



Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
			min	hr	min	hr	
Array 39	SA tracking	SA tracking	14,472	241.2	4,695	78.2	-
Array 40	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 41	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	986	16.4	0	0.0
Flat Creek Road	0	0.0	0	0.0
Mapletown Road	8,007	133.4	4,695	78.2
OP 1	0	0.0	0	0.0
OP 13	122	2.0	0	0.0
OP 14	552	9.2	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 21	1,596	26.6	0	0.0
OP 22	3,209	53.5	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 39
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 15.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.840300	-74.506737	760.87	6.92	767.79
2	42.840752	-74.503309	765.85	6.92	772.77
3	42.840489	-74.503303	769.54	6.92	776.46
4	42.840586	-74.502561	759.63	6.92	766.55
5	42.840008	-74.502572	772.18	6.92	779.10
6	42.840253	-74.500616	770.19	6.92	777.10
7	42.840000	-74.500465	773.45	6.92	780.37
8	42.839443	-74.500476	781.14	6.92	788.05
9	42.839409	-74.500087	781.54	6.92	788.46
10	42.838581	-74.500091	796.50	6.92	803.41
11	42.838590	-74.499796	793.48	6.92	800.40
12	42.838346	-74.499558	797.47	6.92	804.39
13	42.837775	-74.499531	803.14	6.92	810.06
14	42.837812	-74.499048	797.62	6.92	804.54
15	42.837547	-74.498891	796.49	6.92	803.40
16	42.837012	-74.498881	794.00	6.92	800.92
17	42.836521	-74.502611	836.33	6.92	843.25
18	42.837353	-74.502594	848.76	6.92	855.67
19	42.837112	-74.504330	837.97	6.92	844.88
20	42.836272	-74.504344	840.16	6.92	847.07
21	42.835842	-74.507626	903.38	6.92	910.30
22	42.836105	-74.507642	904.87	6.92	911.79
23	42.836073	-74.507934	903.18	6.92	910.10
24	42.836652	-74.507927	900.77	6.92	907.68
25	42.836789	-74.506902	903.16	6.92	910.08
26	42.838564	-74.506956	831.68	6.92	838.60
27	42.839407	-74.506964	797.43	6.92	804.35
28	42.839433	-74.506718	795.45	6.92	802.37

Name: Array 40
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.835238	-74.508706	908.38	6.92	915.30
2	42.835414	-74.507253	897.33	6.92	904.24
3	42.835166	-74.507239	893.17	6.92	900.08
4	42.835388	-74.505467	857.49	6.92	864.41
5	42.834814	-74.505440	846.53	6.92	853.45
6	42.834677	-74.505844	852.98	6.92	859.90
7	42.834115	-74.505813	847.68	6.92	854.60
8	42.834043	-74.506440	858.13	6.92	865.05
9	42.833778	-74.506414	857.02	6.92	863.94
10	42.833734	-74.506746	860.47	6.92	867.38
11	42.833150	-74.506709	859.78	6.92	866.70
12	42.832956	-74.508113	870.52	6.92	877.43
13	42.833545	-74.508113	874.56	6.92	881.47
14	42.833362	-74.509541	882.87	6.92	889.79
15	42.833925	-74.509532	883.55	6.92	890.47
16	42.834224	-74.509302	888.10	6.92	895.01
17	42.834292	-74.508873	889.00	6.92	895.92
18	42.834936	-74.508870	904.02	6.92	910.94

Name: Array 41
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.835726	-74.504006	834.95	6.92	841.87
2	42.836474	-74.498340	788.73	6.92	795.64
3	42.836203	-74.498195	788.30	6.92	795.22
4	42.835664	-74.498195	780.72	6.92	787.64
5	42.834961	-74.503491	822.44	6.92	829.35
6	42.835223	-74.503489	826.67	6.92	833.59
7	42.835160	-74.504011	829.24	6.92	836.16

Route Receptors

Name: Carlisle Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.844981	-74.509066	717.71	5.00	722.71
2	42.842841	-74.502292	737.12	5.00	742.12
3	42.842408	-74.501262	741.81	5.00	746.81
4	42.842125	-74.500822	743.46	5.00	748.46
5	42.841582	-74.500350	740.03	5.00	745.03
6	42.839183	-74.498601	756.64	5.00	761.64
7	42.838460	-74.497893	758.91	5.00	763.91
8	42.837830	-74.497539	765.08	5.00	770.08
9	42.837162	-74.497228	763.61	5.00	768.61
10	42.835454	-74.497046	765.83	5.00	770.83
11	42.834447	-74.496981	774.34	5.00	779.34
12	42.832945	-74.496649	807.66	5.00	812.66
13	42.832378	-74.496413	824.70	5.00	829.70
14	42.831867	-74.496123	836.18	5.00	841.18
15	42.831387	-74.495683	851.38	5.00	856.38

Name: Flat Creek Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.842536	-74.501554	739.68	5.00	744.68
2	42.844401	-74.500331	740.56	5.00	745.56

Name: Mapletown Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.844115	-74.506422	726.40	5.00	731.40
2	42.842892	-74.506744	724.19	5.00	729.19
3	42.841625	-74.506964	738.15	5.00	743.15
4	42.840433	-74.507184	761.28	5.00	766.28
5	42.839151	-74.507452	808.22	5.00	813.22
6	42.838617	-74.507651	832.08	5.00	837.08
7	42.837382	-74.508219	876.36	5.00	881.36
8	42.835845	-74.508911	898.86	5.00	903.86
9	42.834731	-74.509443	893.42	5.00	898.42
10	42.834334	-74.509689	888.32	5.00	893.32
11	42.833972	-74.510027	883.94	5.00	888.94
12	42.833685	-74.510392	883.82	5.00	888.82
13	42.833410	-74.510875	884.34	5.00	889.34
14	42.833172	-74.511558	884.35	5.00	889.35
15	42.832858	-74.512824	887.59	5.00	892.59
16	42.832562	-74.514031	891.08	5.00	896.08

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	42.843103	-74.503627	737.69	6.00
OP 13	13	42.842256	-74.501286	746.47	6.00
OP 14	14	42.842255	-74.501286	746.47	16.00
OP 15	15	42.841977	-74.500884	746.67	6.00
OP 16	16	42.841977	-74.500884	746.67	16.00
OP 17	17	42.841247	-74.500814	744.60	6.00
OP 18	18	42.839088	-74.498986	761.31	6.00
OP 19	19	42.841227	-74.507382	752.58	6.00
OP 20	20	42.841227	-74.507382	752.58	16.00
OP 21	21	42.838521	-74.508018	842.38	6.00
OP 22	22	42.838521	-74.508018	842.38	16.00
OP 23	23	42.834373	-74.496669	773.40	6.00
OP 24	24	42.834373	-74.496669	773.40	16.00

Obstruction Components

Name: Existing Vegetation

Top height: 30.0 ft



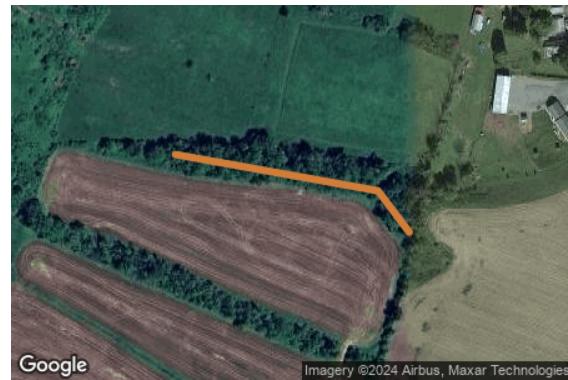
Google

Imagery ©2024 Airbus, Maxar Technologies

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.840358	-74.499820	758.08
2	42.839420	-74.499531	765.32

Name: Existing Vegetation

Top height: 20.0 ft

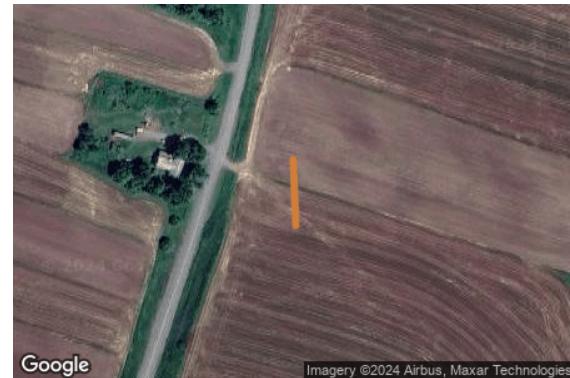


Google

Imagery ©2024 Airbus, Maxar Technologies

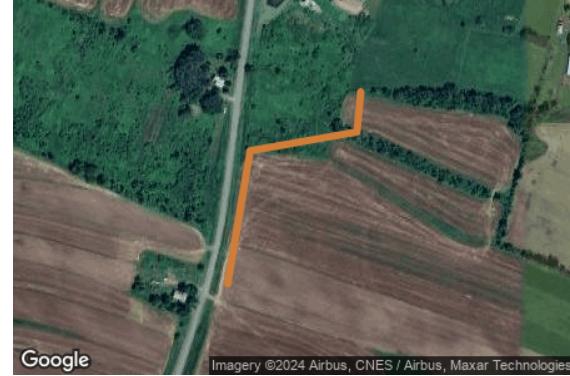
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.841060	-74.504156	746.25
2	42.840832	-74.502418	757.70
3	42.840572	-74.502150	762.34

Name: Proposed Vegetation
Top height: 10.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.838574	-74.507025	826.00
2	42.838161	-74.507004	846.00

Name: Proposed Vegetation
Top height: 10.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.838707	-74.507272	831.00
2	42.840375	-74.506886	760.07
3	42.840611	-74.505051	756.00
4	42.841115	-74.504987	742.00

Name: Proposed Vegetation
Top height: 10.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.840226	-74.500330	765.19
2	42.840414	-74.500518	769.00
3	42.840576	-74.501993	768.00

Name: Proposed Vegetation
Top height: 10.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.839427	-74.499949	780.00
2	42.838672	-74.499751	793.00
3	42.838330	-74.499204	797.00

Glare Analysis Results

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
Array 39	SA tracking	SA tracking	14,472	241.2	4,695	78.2	-
Array 40	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 41	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	986	16.4	0	0.0
Flat Creek Road	0	0.0	0	0.0
Mapletown Road	8,007	133.4	4,695	78.2
OP 1	0	0.0	0	0.0
OP 13	122	2.0	0	0.0
OP 14	552	9.2	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	1,596	26.6	0	0.0
OP 22	3,209	53.5	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0

PV: Array 39 potential temporary after-image

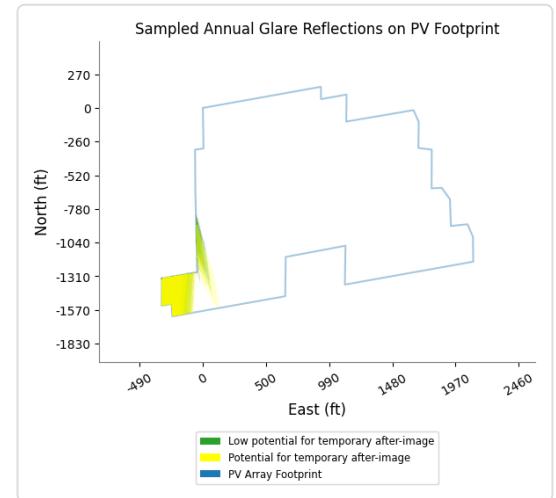
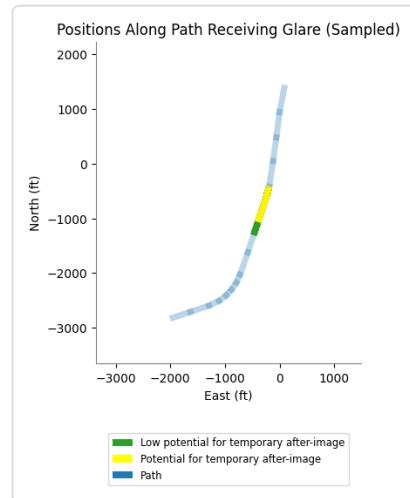
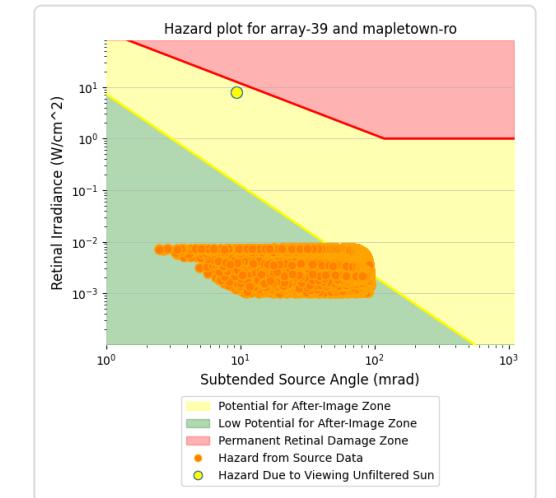
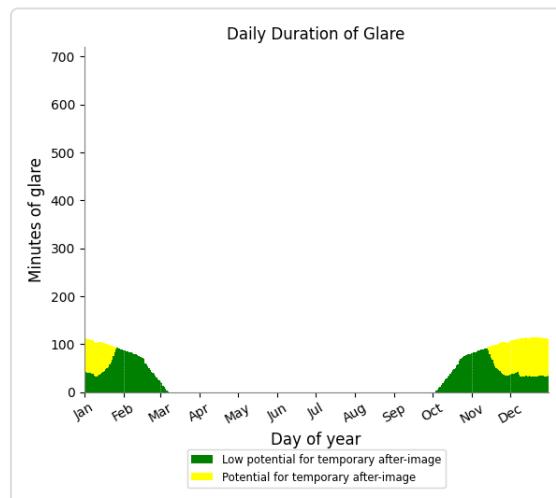
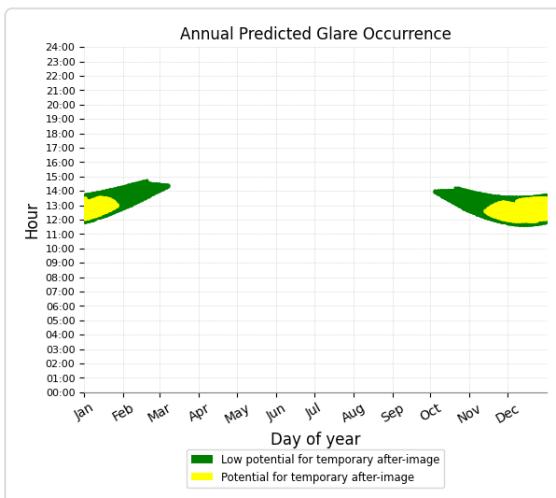
Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Mapletown Road	8,007	133.4	4,695	78.2
Carlisle Road	986	16.4	0	0.0
Flat Creek Road	0	0.0	0	0.0
OP 13	122	2.0	0	0.0
OP 14	552	9.2	0	0.0
OP 21	1,596	26.6	0	0.0
OP 22	3,209	53.5	0	0.0
OP 1	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0

Array 39 and Route: Mapletown Road

Yellow glare: 4,695 min.

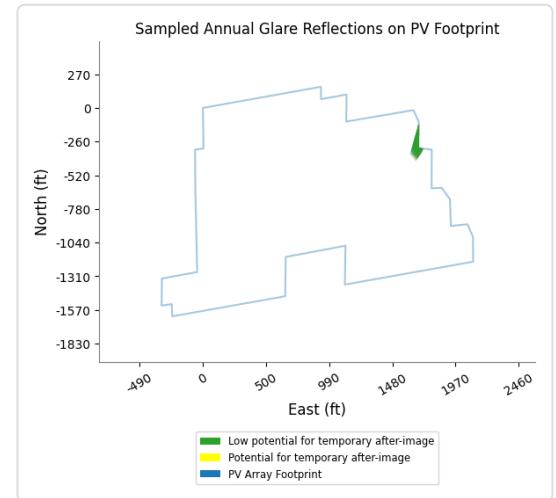
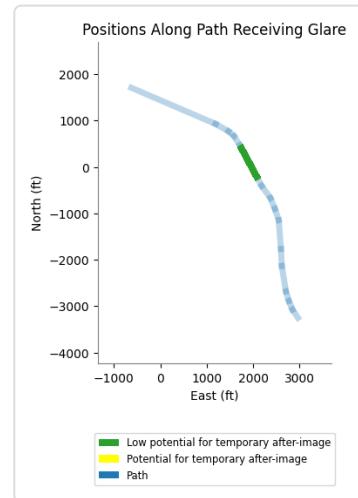
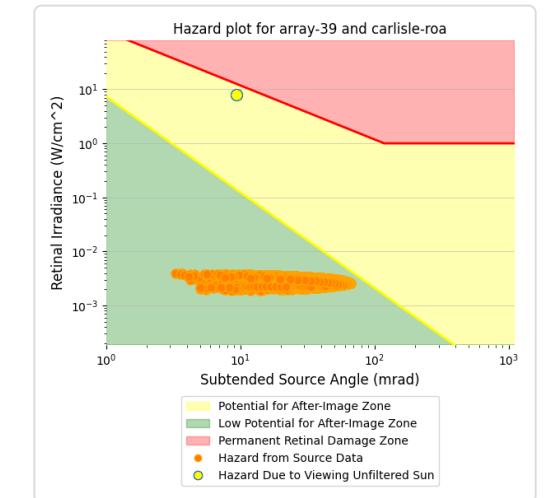
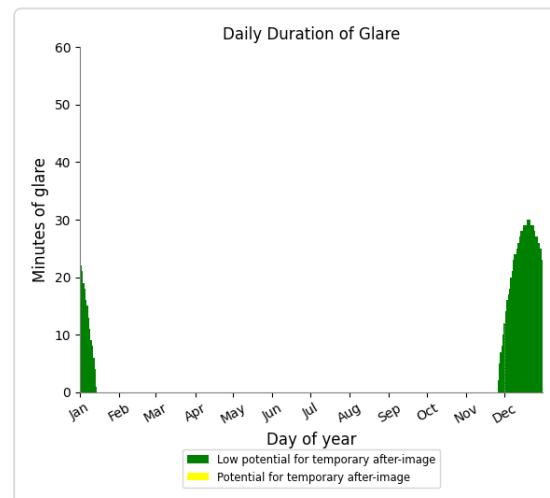
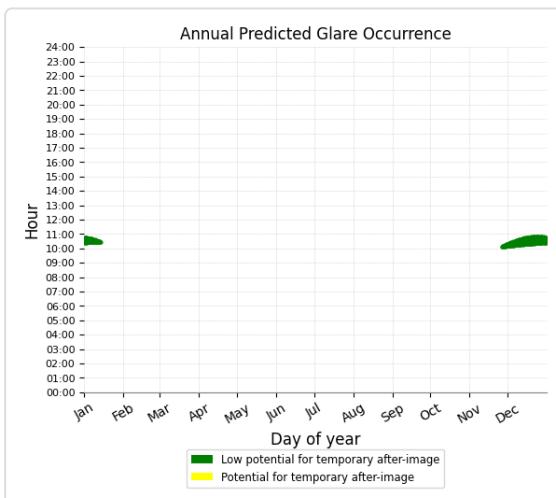
Green glare: 8,007 min.



Array 39 and Route: Carlisle Road

Yellow glare: none

Green glare: 986 min.



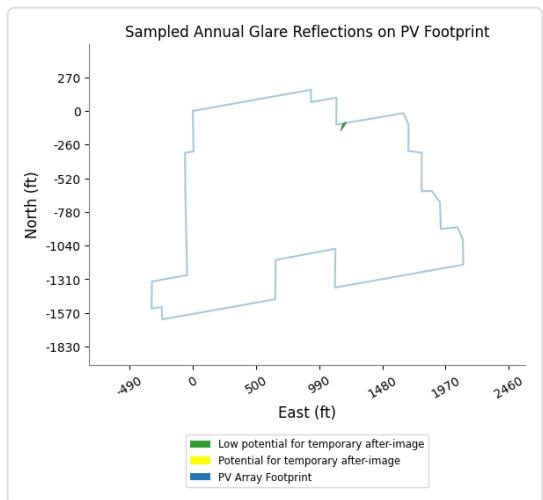
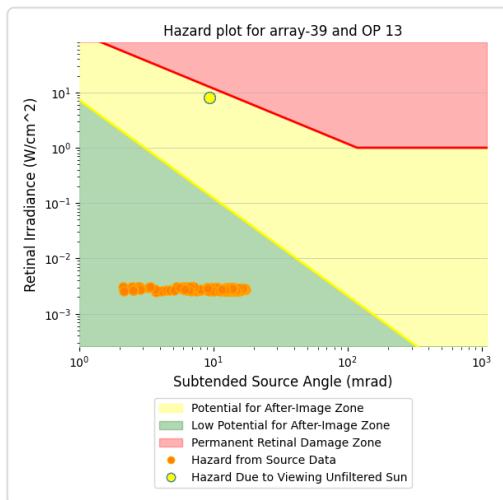
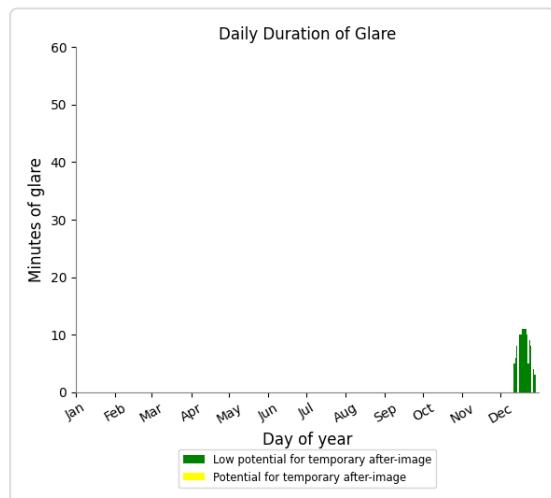
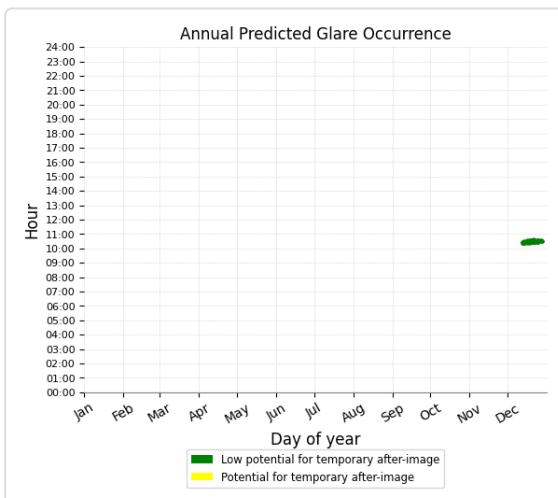
Array 39 and Route: Flat Creek Road

No glare found

Array 39 and OP 13

Yellow glare: none

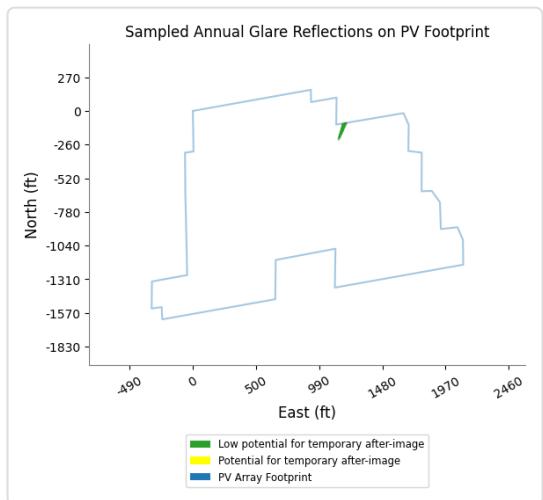
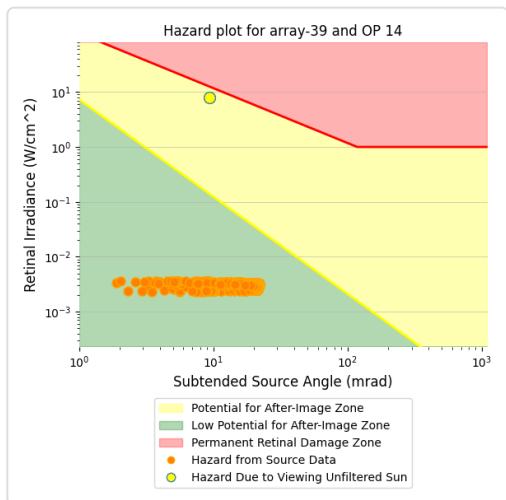
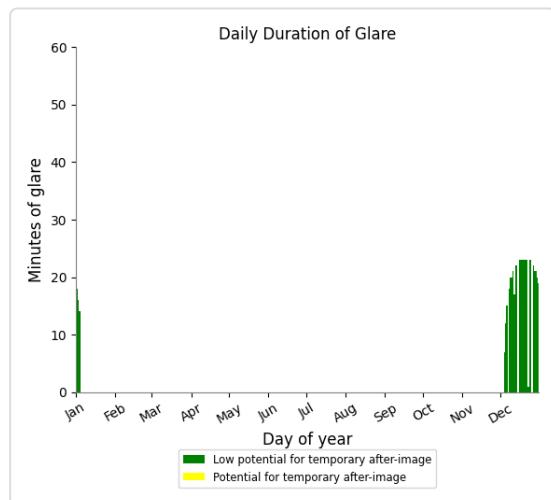
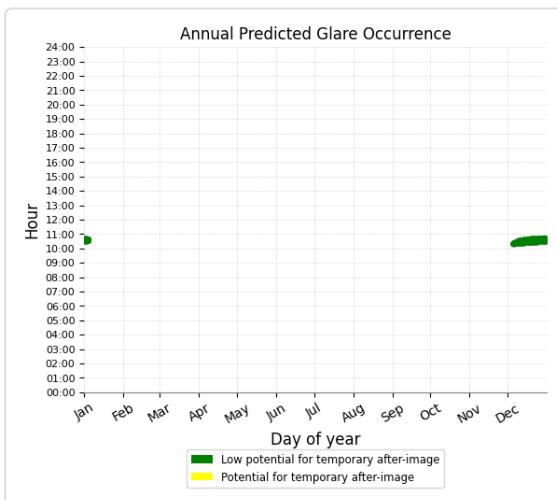
Green glare: 122 min.



Array 39 and OP 14

Yellow glare: none

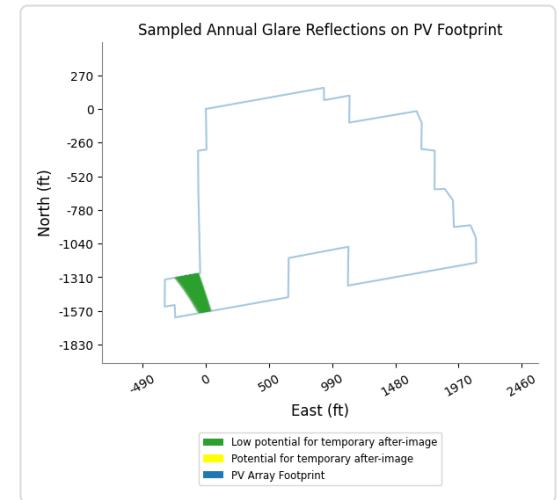
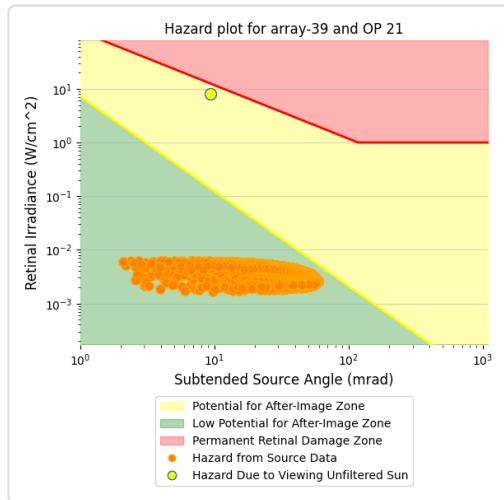
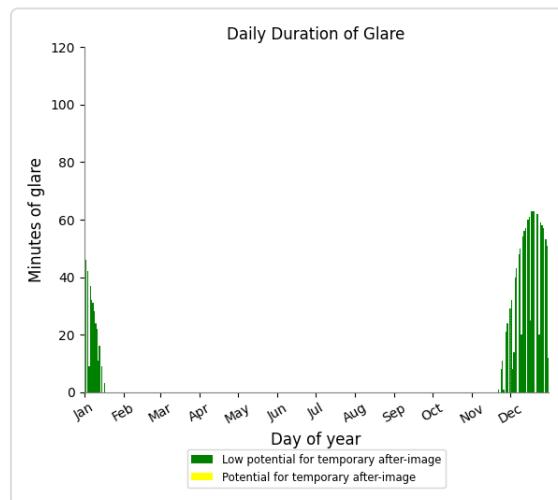
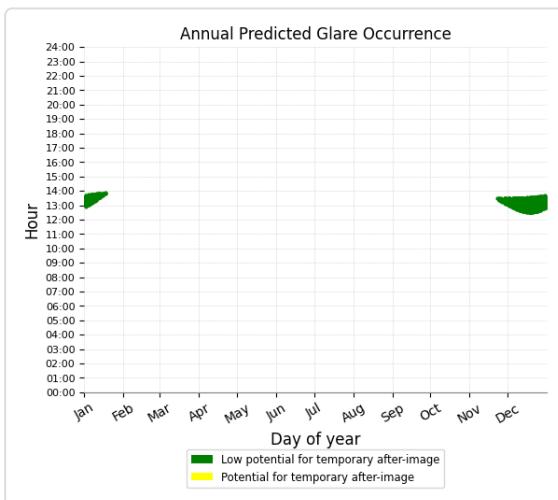
Green glare: 552 min.



Array 39 and OP 21

Yellow glare: none

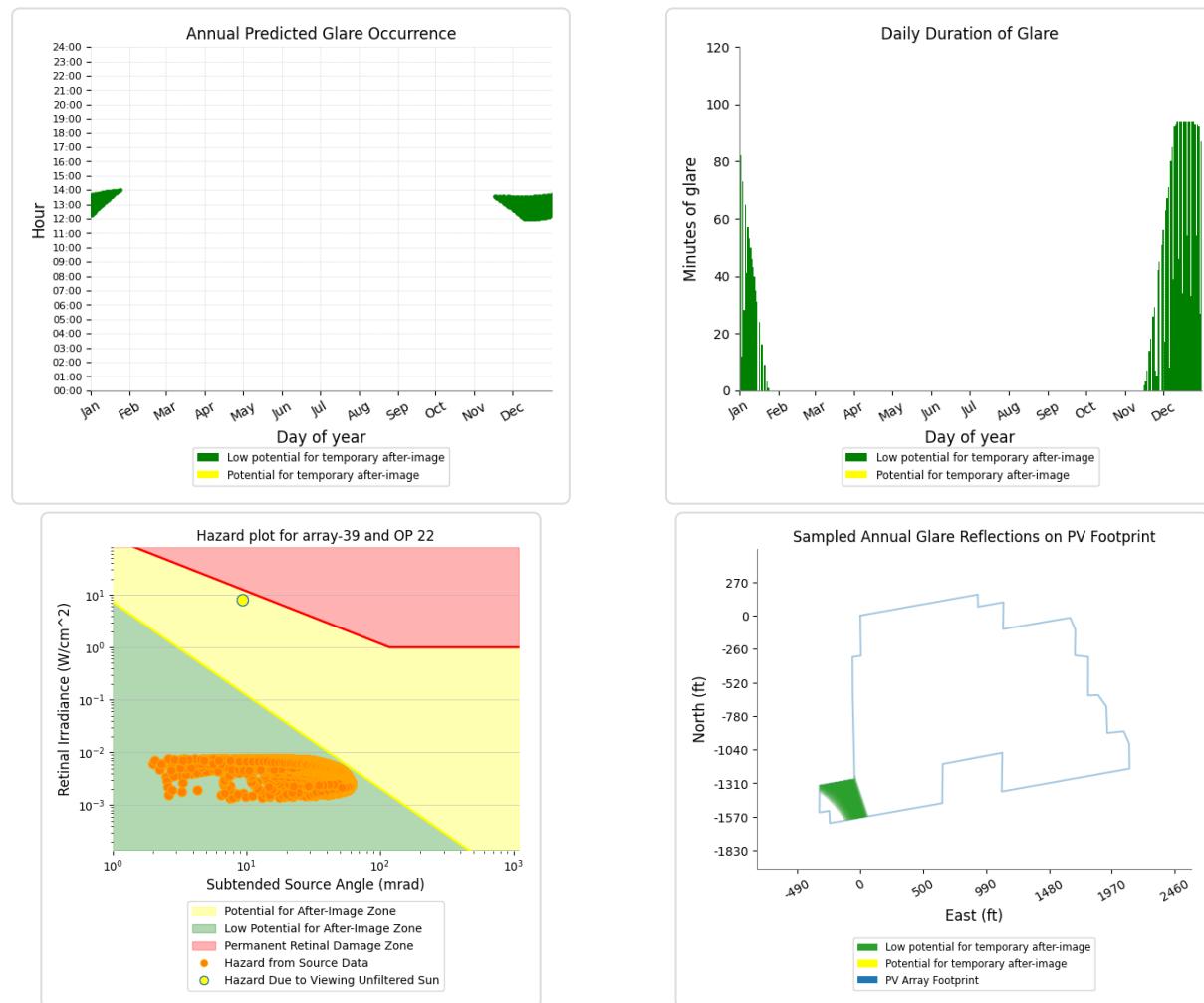
Green glare: 1,596 min.



Array 39 and OP 22

Yellow glare: none

Green glare: 3,209 min.



Array 39 and OP 1

No glare found

Array 39 and OP 15

No glare found

Array 39 and OP 16

No glare found

Array 39 and OP 17

No glare found

Array 39 and OP 18

No glare found

Array 39 and OP 19

No glare found

Array 39 and OP 20

No glare found

Array 39 and OP 23

No glare found

Array 39 and OP 24

No glare found

PV: Array 40 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0

Array 40 and Route: Carlisle Road

No glare found

Array 40 and Route: Flat Creek Road

No glare found

Array 40 and Route: Mapletown Road

No glare found

Array 40 and OP 1

No glare found

Array 40 and OP 13

No glare found

Array 40 and OP 14

No glare found

Array 40 and OP 15

No glare found

Array 40 and OP 16

No glare found

Array 40 and OP 17

No glare found

Array 40 and OP 18

No glare found

Array 40 and OP 19

No glare found

Array 40 and OP 20

No glare found

Array 40 and OP 21

No glare found

Array 40 and OP 22

No glare found

Array 40 and OP 23

No glare found

Array 40 and OP 24

No glare found

PV: Array 41 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Mapletown Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0

Array 41 and Route: Carlisle Road

No glare found

Array 41 and Route: Flat Creek Road

No glare found

Array 41 and Route: Mapletown Road

No glare found

Array 41 and OP 1

No glare found

Array 41 and OP 13

No glare found

Array 41 and OP 14

No glare found

Array 41 and OP 15

No glare found

Array 41 and OP 16

No glare found

Array 41 and OP 17

No glare found

Array 41 and OP 18

No glare found

Array 41 and OP 19

No glare found

Array 41 and OP 20

No glare found

Array 41 and OP 21

No glare found

Array 41 and OP 22

No glare found

Array 41 and OP 23

No glare found

Array 41 and OP 24

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Part 2

Site configuration: Flat Creek Solar E3_revised

Created 23 Aug, 2024

Updated 23 Aug, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 100 MW to 1 GW

Site ID 127587.21223

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2



Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	Annual Green Glare hr	Annual Yellow Glare min	Annual Yellow Glare hr	Energy kWh
Array 45	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 46	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 47	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 45
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.838667	-74.495962	798.74	6.92	805.66
2	42.838942	-74.495979	796.85	6.92	803.77
3	42.839151	-74.496824	794.58	6.92	801.49
4	42.839706	-74.496793	788.00	6.92	794.92
5	42.839262	-74.495011	803.29	6.92	810.21
6	42.839896	-74.495004	796.50	6.92	803.42
7	42.839464	-74.493282	811.68	6.92	818.59
8	42.839711	-74.493278	809.81	6.92	816.73
9	42.838785	-74.489704	828.00	6.92	834.92
10	42.837870	-74.489729	830.11	6.92	837.03
11	42.837570	-74.488597	835.42	6.92	842.34
12	42.837017	-74.488597	833.73	6.92	840.64
13	42.836775	-74.488740	831.98	6.92	838.90
14	42.838173	-74.494185	808.50	6.92	815.42
15	42.837622	-74.494221	804.92	6.92	811.83
16	42.837753	-74.494790	802.00	6.92	808.92
17	42.838338	-74.494769	803.01	6.92	809.92

Name: Array 46
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.837349	-74.493564	808.30	6.92	815.22
2	42.837189	-74.492968	809.37	6.92	816.29
3	42.837441	-74.492965	811.88	6.92	818.80
4	42.836515	-74.489773	824.00	6.92	830.92
5	42.834758	-74.489770	801.79	6.92	808.71
6	42.834776	-74.489922	800.42	6.92	807.34
7	42.833937	-74.489930	781.79	6.92	788.71
8	42.834163	-74.490734	775.72	6.92	782.63
9	42.835051	-74.490770	797.72	6.92	804.64
10	42.835570	-74.492366	792.49	6.92	799.41
11	42.835851	-74.492366	797.74	6.92	804.66
12	42.835959	-74.492779	794.53	6.92	801.45
13	42.836528	-74.492779	801.88	6.92	808.80
14	42.836773	-74.493571	796.21	6.92	803.13

Name: Array 47
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.835039	-74.486826	837.00	6.92	843.92
2	42.834442	-74.484542	846.12	6.92	853.03
3	42.833883	-74.484549	842.03	6.92	848.95
4	42.833695	-74.484849	835.22	6.92	842.13
5	42.833764	-74.485434	833.95	6.92	840.87
6	42.833197	-74.485438	826.00	6.92	832.92
7	42.833302	-74.485953	820.28	6.92	827.19
8	42.833045	-74.485959	818.44	6.92	825.36
9	42.833731	-74.488556	797.32	6.92	804.24
10	42.834302	-74.488567	808.78	6.92	815.70
11	42.834190	-74.488039	815.03	6.92	821.95
12	42.834432	-74.488033	818.34	6.92	825.26
13	42.834281	-74.487425	823.00	6.92	829.92
14	42.834924	-74.487423	834.63	6.92	841.55
15	42.834791	-74.486845	834.92	6.92	841.84

Route Receptors

Name: Carlisle Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.842448	-74.501314	741.85	5.00	746.85
2	42.842133	-74.500756	742.88	5.00	747.88
3	42.841567	-74.500327	739.99	5.00	744.99
4	42.840104	-74.499254	749.54	5.00	754.54
5	42.838782	-74.498267	759.74	5.00	764.74
6	42.838184	-74.497709	759.93	5.00	764.93
7	42.837130	-74.497151	764.40	5.00	769.40
8	42.835132	-74.496980	766.47	5.00	771.47
9	42.834219	-74.496915	773.94	5.00	778.94
10	42.832944	-74.496658	807.98	5.00	812.98

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 17	17	42.841247	-74.500814	744.60	6.00
OP 18	18	42.839088	-74.498986	761.31	6.00

Glare Analysis Results

Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	hr	Annual Yellow Glare min	hr	Energy kWh
Array 45	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 46	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 47	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

PV: Array 45

[no glare found](#)

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 45 and Route: Carlisle Road

No glare found

Array 45 and OP 17

No glare found

Array 45 and OP 18

No glare found

PV: Array 46 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 46 and Route: Carlisle Road

No glare found

Array 46 and OP 17

No glare found

Array 46 and OP 18

No glare found

PV: Array 47 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0

Array 47 and Route: Carlisle Road

No glare found

Array 47 and OP 17

No glare found

Array 47 and OP 18

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

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The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

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Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Part 2

Site configuration: Flat Creek Solar E4_revised

Created 23 Aug, 2024

Updated 23 Aug, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 100 MW to 1 GW

Site ID 127589.21223

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2



Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	Annual Green Glare hr	Annual Yellow Glare min	Annual Yellow Glare hr	Energy kWh
Array 48	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Mahr Road	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 48
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.835112	-74.494724	761.77	6.92	768.69
2	42.834310	-74.491936	761.94	6.92	768.86
3	42.833983	-74.491781	762.48	6.92	769.39
4	42.833412	-74.491786	766.85	6.92	773.77
5	42.833289	-74.491416	765.15	6.92	772.07
6	42.833008	-74.491419	770.00	6.92	776.92
7	42.832906	-74.491042	771.16	6.92	778.07
8	42.832252	-74.491067	790.12	6.92	797.04
9	42.831898	-74.489842	800.81	6.92	807.73
10	42.831625	-74.489853	810.93	6.92	817.85
11	42.831441	-74.489149	814.69	6.92	821.60
12	42.831686	-74.489152	807.15	6.92	814.07
13	42.830700	-74.485739	818.55	6.92	825.47
14	42.830132	-74.485763	822.17	6.92	829.08
15	42.830285	-74.486338	824.27	6.92	831.18
16	42.830043	-74.486349	822.67	6.92	829.59
17	42.830081	-74.486646	824.13	6.92	831.05
18	42.829530	-74.486630	804.80	6.92	811.72
19	42.829286	-74.486720	802.31	6.92	809.23
20	42.829984	-74.489154	837.44	6.92	844.35
21	42.830270	-74.489156	843.83	6.92	850.75
22	42.830583	-74.490271	848.98	6.92	855.90
23	42.831159	-74.490272	832.64	6.92	839.56
24	42.831592	-74.491703	820.79	6.92	827.71
25	42.831023	-74.491714	848.77	6.92	855.69
26	42.831372	-74.492958	842.27	6.92	849.18
27	42.831126	-74.492981	850.00	6.92	856.92
28	42.831185	-74.493276	851.45	6.92	858.36
29	42.830616	-74.493262	866.15	6.92	873.07
30	42.830929	-74.494373	864.09	6.92	871.01
31	42.831494	-74.494367	847.52	6.92	854.44
32	42.831842	-74.495481	837.07	6.92	843.99
33	42.832190	-74.495699	826.00	6.92	832.92
34	42.832759	-74.495701	805.63	6.92	812.55
35	42.832826	-74.495862	804.80	6.92	811.72
36	42.833686	-74.495907	778.51	6.92	785.42
37	42.833366	-74.494756	775.55	6.92	782.47

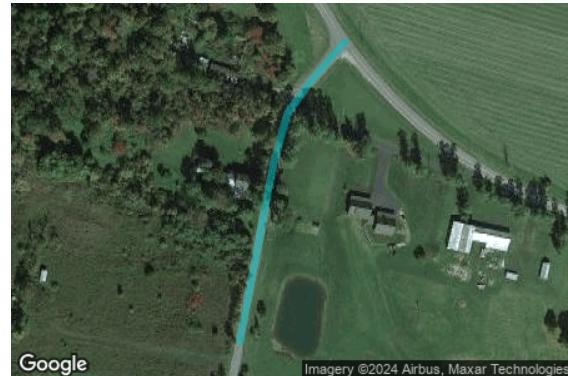
Route Receptors

Name: Carlisle Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.837156	-74.497217	763.73	5.00	768.73
2	42.835457	-74.497077	766.89	5.00	771.89
3	42.834478	-74.497002	774.66	5.00	779.66
4	42.832984	-74.496648	805.64	5.00	810.64
5	42.832378	-74.496401	824.57	5.00	829.57
6	42.831874	-74.496101	836.16	5.00	841.16
7	42.831544	-74.495790	847.50	5.00	852.50
8	42.831245	-74.495479	854.53	5.00	859.53
9	42.830702	-74.494545	868.00	5.00	873.00
10	42.830025	-74.492099	859.47	5.00	864.47
11	42.828483	-74.486168	816.91	5.00	821.91
12	42.828090	-74.485128	829.39	5.00	834.39
13	42.827610	-74.484280	841.77	5.00	846.77
14	42.827216	-74.483776	857.24	5.00	862.24

Name: Mahr Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.829687	-74.496719	876.84	5.00	881.84
2	42.830799	-74.496430	868.90	5.00	873.90
3	42.831121	-74.496306	861.93	5.00	866.93
4	42.831326	-74.496103	854.49	5.00	859.49
5	42.831568	-74.495816	846.35	5.00	851.35

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 23	23	42.834373	-74.496669	773.40	6.00
OP 24	24	42.834373	-74.496669	773.40	16.00
OP 25	25	42.832965	-74.496922	813.23	6.00
OP 26	26	42.832969	-74.496922	812.94	16.00
OP 27	27	42.831373	-74.496847	863.25	6.00
OP 28	28	42.830681	-74.496680	872.75	6.00
OP 29	29	42.830681	-74.496680	872.75	16.00
OP 30	30	42.830524	-74.495672	872.15	6.00
OP 31	31	42.830209	-74.491208	858.54	6.00
OP 32	32	42.828162	-74.490723	857.50	6.00
OP 33	33	42.829083	-74.489339	820.98	6.00
OP 34	34	42.828237	-74.487692	841.87	6.00
OP 35	35	42.826844	-74.485476	869.79	6.00

Obstruction Components

Name: Existing Tree line Top height: 40.0 ft																																					
<table border="1"> <thead> <tr> <th>Vertex</th><th>Latitude (°)</th><th>Longitude (°)</th><th>Ground elevation (ft)</th></tr> </thead> <tbody> <tr> <td>1</td><td>42.835203</td><td>-74.496765</td><td>760.56</td></tr> <tr> <td>2</td><td>42.835313</td><td>-74.495274</td><td>759.00</td></tr> <tr> <td>3</td><td>42.835998</td><td>-74.494405</td><td>758.10</td></tr> <tr> <td>4</td><td>42.835848</td><td>-74.493450</td><td>760.98</td></tr> <tr> <td>5</td><td>42.835510</td><td>-74.493064</td><td>766.77</td></tr> <tr> <td>6</td><td>42.835124</td><td>-74.493064</td><td>761.34</td></tr> <tr> <td>7</td><td>42.834542</td><td>-74.491615</td><td>759.65</td></tr> <tr> <td>8</td><td>42.834204</td><td>-74.491111</td><td>763.90</td></tr> </tbody> </table>		Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	1	42.835203	-74.496765	760.56	2	42.835313	-74.495274	759.00	3	42.835998	-74.494405	758.10	4	42.835848	-74.493450	760.98	5	42.835510	-74.493064	766.77	6	42.835124	-74.493064	761.34	7	42.834542	-74.491615	759.65	8	42.834204	-74.491111	763.90
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)																																		
1	42.835203	-74.496765	760.56																																		
2	42.835313	-74.495274	759.00																																		
3	42.835998	-74.494405	758.10																																		
4	42.835848	-74.493450	760.98																																		
5	42.835510	-74.493064	766.77																																		
6	42.835124	-74.493064	761.34																																		
7	42.834542	-74.491615	759.65																																		
8	42.834204	-74.491111	763.90																																		

Name: Proposed Landscaping
Top height: 5.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.833948	-74.496643	775.17
2	42.834027	-74.496134	767.23

Name: Proposed Landscaping
Top height: 5.0 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	42.833685	-74.496005	782.00
2	42.832812	-74.495978	804.00
3	42.832166	-74.495839	826.00
4	42.831789	-74.495565	840.00
5	42.831446	-74.494466	848.00
6	42.830892	-74.494460	866.00
7	42.830561	-74.493248	866.50

Glare Analysis Results

Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	Annual Green Glare hr	Annual Yellow Glare min	Annual Yellow Glare hr	Energy kWh
Array 48	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Mahr Road	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

PV: Array 48 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Carlisle Road	0	0.0	0	0.0
Mahr Road	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Array 48 and Route: Carlisle Road

No glare found

Array 48 and Route: Mahr Road

No glare found

Array 48 and OP 23

No glare found

Array 48 and OP 24

No glare found

Array 48 and OP 25

No glare found

Array 48 and OP 26

No glare found

Array 48 and OP 27

No glare found

Array 48 and OP 28

No glare found

Array 48 and OP 29

No glare found

Array 48 and OP 30

No glare found

Array 48 and OP 31

No glare found

Array 48 and OP 32

No glare found

Array 48 and OP 33

No glare found

Array 48 and OP 34

No glare found

Array 48 and OP 35

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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Group F Results

FORGESOLAR GLARE ANALYSIS

Project: Flat Creek Part 2

Site configuration: Flat Creek Solar F_rest

Created 11 Jul, 2024

Updated 23 Jul, 2024

Time-step 1 minute

Timezone offset UTC-5

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 100 MW to 1 GW

Site ID 123969.21223

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2

Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare min	Annual Green Glare hr	Annual Yellow Glare min	Annual Yellow Glare hr	Energy kWh
Array 49	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 50	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 51	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 52	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 53	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 54	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 55	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 56	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 57	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 58	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 59	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Component Data

PV Arrays

Name: Array 49
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.851797	-74.478813	906.66	6.92	913.57
2	42.852378	-74.478805	902.67	6.92	909.58
3	42.852641	-74.478740	901.47	6.92	908.39
4	42.852582	-74.478383	901.62	6.92	908.54
5	42.852312	-74.478329	902.93	6.92	909.84
6	42.851926	-74.475588	905.90	6.92	912.82
7	42.851336	-74.475621	914.43	6.92	921.34
8	42.851319	-74.475390	916.03	6.92	922.95
9	42.850755	-74.475398	924.00	6.92	930.92
10	42.850491	-74.475468	927.00	6.92	933.92
11	42.850496	-74.475589	926.23	6.92	933.15
12	42.850783	-74.475621	922.42	6.92	929.34
13	42.850806	-74.475901	920.26	6.92	927.17
14	42.850549	-74.475913	923.86	6.92	930.77
15	42.850756	-74.477549	917.99	6.92	924.90
16	42.851038	-74.477556	914.31	6.92	921.22
17	42.851153	-74.478288	912.67	6.92	919.59
18	42.851719	-74.478306	909.11	6.92	916.03

Name: Array 50
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.850385	-74.475252	933.82	6.92	940.74
2	42.850025	-74.472686	951.00	6.92	957.92
3	42.849759	-74.472678	959.42	6.92	966.34
4	42.849672	-74.472085	962.36	6.92	969.27
5	42.849925	-74.472086	954.88	6.92	961.80
6	42.849828	-74.471283	960.49	6.92	967.41
7	42.848978	-74.471278	970.64	6.92	977.56
8	42.848978	-74.471434	970.22	6.92	977.13
9	42.848428	-74.471427	978.00	6.92	984.92
10	42.848961	-74.475358	952.90	6.92	959.81
11	42.849537	-74.475363	943.44	6.92	950.35

Name: Array 51
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.855817	-74.476107	868.92	6.92	875.83
2	42.854950	-74.469700	887.84	6.92	894.76
3	42.854383	-74.469681	896.62	6.92	903.53
4	42.854112	-74.469771	900.80	6.92	907.72
5	42.854125	-74.469951	902.46	6.92	909.38
6	42.853545	-74.469933	912.03	6.92	918.95
7	42.853287	-74.470005	916.05	6.92	922.97
8	42.853221	-74.470154	917.49	6.92	924.41
9	42.852660	-74.470151	931.97	6.92	938.89
10	42.852400	-74.470233	936.12	6.92	943.04
11	42.852388	-74.470389	936.49	6.92	943.41
12	42.851832	-74.470379	942.45	6.92	949.37
13	42.851583	-74.470439	944.97	6.92	951.89
14	42.851509	-74.470685	945.80	6.92	952.72
15	42.850963	-74.470690	952.00	6.92	958.92
16	42.850699	-74.470757	958.00	6.92	964.92
17	42.851101	-74.473729	935.00	6.92	941.92
18	42.851375	-74.473727	930.61	6.92	937.53
19	42.851417	-74.474026	925.00	6.92	931.92
20	42.851982	-74.474020	921.95	6.92	928.87
21	42.851969	-74.473339	926.68	6.92	933.60
22	42.852802	-74.473347	918.47	6.92	925.39
23	42.852928	-74.474316	907.45	6.92	914.37
24	42.852108	-74.474347	914.24	6.92	921.16
25	42.852454	-74.476919	896.88	6.92	903.79
26	42.853893	-74.476942	886.25	6.92	893.17
27	42.854142	-74.476738	884.66	6.92	891.57
28	42.854052	-74.476115	887.13	6.92	894.04

Name: Array 52
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.854021	-74.479732	890.55	6.92	897.47
2	42.854301	-74.481644	888.51	6.92	895.42
3	42.855458	-74.481652	890.00	6.92	896.92
4	42.855180	-74.479722	893.24	6.92	900.16
5	42.854797	-74.479696	893.46	6.92	900.38
6	42.854648	-74.478520	890.48	6.92	897.40
7	42.854378	-74.478521	890.04	6.92	896.95
8	42.854350	-74.478222	888.00	6.92	894.92
9	42.855244	-74.478199	889.25	6.92	896.17
10	42.855240	-74.478007	888.00	6.92	894.92
11	42.856075	-74.477993	885.83	6.92	892.75
12	42.855915	-74.476815	868.48	6.92	875.40
13	42.855080	-74.476818	880.03	6.92	886.95
14	42.855164	-74.477775	886.93	6.92	893.85
15	42.854275	-74.477769	887.07	6.92	893.99
16	42.854207	-74.477258	887.39	6.92	894.30
17	42.853366	-74.477263	890.00	6.92	896.92
18	42.852524	-74.477328	895.80	6.92	902.72
19	42.852679	-74.478499	901.21	6.92	908.13
20	42.853807	-74.478510	891.63	6.92	898.55
21	42.853936	-74.479473	891.43	6.92	898.34

Name: Array 53
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.859878	-74.475951	847.23	6.92	854.15
2	42.859581	-74.474047	855.13	6.92	862.04
3	42.859315	-74.474045	856.51	6.92	863.43
4	42.859261	-74.473722	856.30	6.92	863.22
5	42.859530	-74.473726	854.61	6.92	861.52
6	42.859041	-74.470771	837.70	6.92	844.62
7	42.858759	-74.470773	841.52	6.92	848.44
8	42.858670	-74.470169	840.33	6.92	847.24
9	42.858081	-74.470161	854.34	6.92	861.26
10	42.857956	-74.469266	847.89	6.92	854.81
11	42.857641	-74.469054	848.89	6.92	855.81
12	42.856488	-74.469029	865.04	6.92	871.95
13	42.856485	-74.469185	866.63	6.92	873.55
14	42.855919	-74.469202	872.23	6.92	879.15
15	42.856965	-74.475667	866.66	6.92	873.58
16	42.857545	-74.475730	858.59	6.92	865.50
17	42.858125	-74.475744	856.31	6.92	863.22
18	42.858178	-74.476107	854.14	6.92	861.06
19	42.858473	-74.476126	854.00	6.92	860.92
20	42.858526	-74.476422	851.07	6.92	857.98
21	42.859093	-74.476413	850.00	6.92	856.92
22	42.859037	-74.476028	851.63	6.92	858.55
23	42.859614	-74.476036	850.21	6.92	857.13

Name: Array 54
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.861998	-74.480219	800.18	6.92	807.09
2	42.861344	-74.477729	808.86	6.92	815.78
3	42.860780	-74.477716	822.29	6.92	829.21
4	42.860952	-74.478442	822.00	6.92	828.92
5	42.860384	-74.478482	831.41	6.92	838.32
6	42.860865	-74.480313	824.38	6.92	831.30
7	42.861420	-74.480294	813.00	6.92	819.92

Name: Array 55
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.864086	-74.480079	802.55	6.92	809.46
2	42.863995	-74.479625	805.98	6.92	812.90
3	42.864232	-74.479621	806.38	6.92	813.30
4	42.864094	-74.479075	808.27	6.92	815.19
5	42.863810	-74.479062	805.68	6.92	812.60
6	42.863613	-74.478243	810.44	6.92	817.36
7	42.863016	-74.478229	808.72	6.92	815.64
8	42.862679	-74.476976	814.72	6.92	821.64
9	42.862123	-74.476989	813.35	6.92	820.26
10	42.861892	-74.477108	808.97	6.92	815.89
11	42.862043	-74.477762	806.22	6.92	813.14
12	42.862330	-74.477761	809.27	6.92	816.19
13	42.862381	-74.478063	809.44	6.92	816.36
14	42.862139	-74.478088	805.48	6.92	812.39
15	42.862817	-74.480669	797.29	6.92	804.21
16	42.862923	-74.480671	797.21	6.92	804.13
17	42.862992	-74.481047	796.30	6.92	803.22
18	42.863570	-74.481055	795.36	6.92	802.28
19	42.863478	-74.480664	797.50	6.92	804.42
20	42.863649	-74.480666	796.79	6.92	803.71
21	42.863503	-74.480074	800.46	6.92	807.38

Name: Array 56
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.863344	-74.482988	794.54	6.92	801.45
2	42.863166	-74.482272	793.28	6.92	800.19
3	42.862892	-74.482267	794.69	6.92	801.61
4	42.862674	-74.481449	795.33	6.92	802.25
5	42.862086	-74.481444	799.18	6.92	806.10
6	42.862011	-74.481205	800.95	6.92	807.86
7	42.861186	-74.481224	815.61	6.92	822.53
8	42.861588	-74.482759	804.64	6.92	811.56
9	42.862448	-74.482757	797.85	6.92	804.77
10	42.862492	-74.483003	797.71	6.92	804.63

Name: Array 57
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.864487	-74.486107	786.26	6.92	793.17
2	42.864150	-74.484823	788.49	6.92	795.41
3	42.863558	-74.484744	792.42	6.92	799.34
4	42.862968	-74.484746	795.93	6.92	802.85
5	42.862739	-74.483974	796.56	6.92	803.48
6	42.862172	-74.483977	799.45	6.92	806.37
7	42.862225	-74.484271	800.42	6.92	807.33
8	42.861974	-74.484280	802.05	6.92	808.97
9	42.862649	-74.486860	808.36	6.92	815.27
10	42.863216	-74.486855	802.53	6.92	809.44
11	42.863196	-74.486718	803.80	6.92	810.72
12	42.863454	-74.486716	801.75	6.92	808.67
13	42.863386	-74.486423	801.15	6.92	808.07
14	42.863978	-74.486410	791.00	6.92	797.92
15	42.863923	-74.486130	792.00	6.92	798.92

Name: Array 58
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.865292	-74.488158	788.92	6.92	795.84
2	42.864985	-74.487001	788.47	6.92	795.39
3	42.863840	-74.487005	794.72	6.92	801.63
4	42.863608	-74.487144	796.82	6.92	803.74
5	42.863738	-74.487731	800.80	6.92	807.72
6	42.862907	-74.487740	809.24	6.92	816.15
7	42.863103	-74.488538	810.20	6.92	817.12
8	42.863381	-74.488539	807.65	6.92	814.57
9	42.863524	-74.489140	814.34	6.92	821.25
10	42.864097	-74.489144	815.27	6.92	822.18
11	42.864051	-74.488950	814.00	6.92	820.92
12	42.864629	-74.488907	796.00	6.92	802.92
13	42.864527	-74.488533	795.82	6.92	802.73
14	42.864802	-74.488536	792.90	6.92	799.82
15	42.864703	-74.488172	794.64	6.92	801.56

Name: Array 59
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 10.0°
Ground Coverage Ratio: 0.397
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.870414	-74.477932	804.77	6.92	811.68
2	42.869836	-74.475490	798.18	6.92	805.09
3	42.869565	-74.475490	803.04	6.92	809.96
4	42.869440	-74.474985	805.40	6.92	812.31
5	42.868861	-74.474962	811.84	6.92	818.76
6	42.868866	-74.475105	814.19	6.92	821.11
7	42.868305	-74.475131	820.79	6.92	827.71
8	42.868056	-74.475183	823.94	6.92	830.86
9	42.868095	-74.475442	823.90	6.92	830.82
10	42.867462	-74.475400	827.75	6.92	834.67
11	42.867215	-74.475505	830.77	6.92	837.69
12	42.866620	-74.475568	834.03	6.92	840.94
13	42.866390	-74.475716	834.91	6.92	841.83
14	42.866418	-74.475866	834.41	6.92	841.32
15	42.865810	-74.475837	836.77	6.92	843.69
16	42.865537	-74.475962	834.09	6.92	841.01
17	42.866297	-74.479211	819.80	6.92	826.72
18	42.866888	-74.479201	816.14	6.92	823.06
19	42.867144	-74.479124	814.89	6.92	821.81
20	42.867041	-74.478745	822.00	6.92	828.92
21	42.867962	-74.478748	811.00	6.92	817.92
22	42.867951	-74.478656	814.00	6.92	820.92
23	42.868515	-74.478604	808.61	6.92	815.53
24	42.868775	-74.478533	808.50	6.92	815.42
25	42.868737	-74.478311	807.34	6.92	814.26
26	42.869366	-74.478306	802.68	6.92	809.59
27	42.869605	-74.478172	804.25	6.92	811.17
28	42.869572	-74.478000	805.17	6.92	812.08
29	42.870145	-74.478024	803.60	6.92	810.52

Route Receptors

Name: Darrow Road
Path type: Two-way
Observer view angle: 50.0°



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Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.858400	-74.465564	879.76	5.00	884.76
2	42.857739	-74.465767	876.26	5.00	881.26
3	42.856865	-74.466025	869.85	5.00	874.85
4	42.855508	-74.466384	877.86	5.00	882.86
5	42.852682	-74.467237	912.34	5.00	917.34
6	42.849919	-74.468063	964.00	5.00	969.00
7	42.847866	-74.468690	971.74	5.00	976.74
8	42.847524	-74.468841	974.31	5.00	979.31
9	42.846847	-74.469222	974.02	5.00	979.02
10	42.846218	-74.469500	977.93	5.00	982.93
11	42.845474	-74.469735	981.03	5.00	986.03

Name: Flat Creek Road
Path type: Two-way
Observer view angle: 50.0°



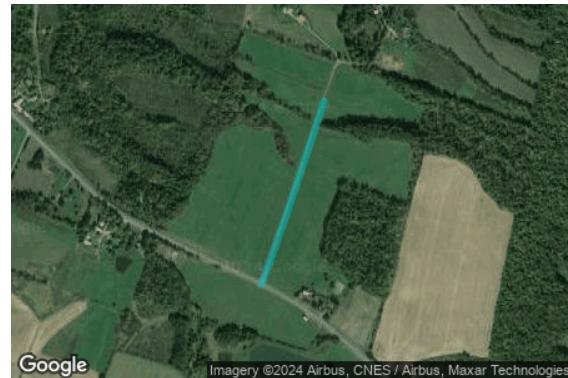
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.861235	-74.473555	833.51	5.00	838.51
2	42.861019	-74.473997	828.31	5.00	833.31
3	42.860148	-74.476146	842.46	5.00	847.46
4	42.859889	-74.476647	847.40	5.00	852.40
5	42.859466	-74.477312	849.51	5.00	854.51
6	42.859010	-74.477868	843.81	5.00	848.81
7	42.857687	-74.479445	860.79	5.00	865.79
8	42.857067	-74.480195	879.71	5.00	884.71
9	42.856794	-74.480567	890.59	5.00	895.59
10	42.856407	-74.481164	894.09	5.00	899.09
11	42.855561	-74.482465	882.02	5.00	887.02
12	42.852973	-74.485990	871.64	5.00	876.64
13	42.852468	-74.486736	875.59	5.00	880.59
14	42.852095	-74.487501	888.47	5.00	893.47
15	42.851596	-74.488695	901.59	5.00	906.59

Name: Hwy 162
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.868652	-74.487638	760.76	5.00	765.76
2	42.868137	-74.486254	775.18	5.00	780.18
3	42.867622	-74.484693	789.97	5.00	794.97
4	42.867465	-74.484237	792.45	5.00	797.45
5	42.867306	-74.483775	794.36	5.00	799.36
6	42.867023	-74.483024	800.08	5.00	805.08
7	42.866544	-74.481980	809.44	5.00	814.44
8	42.866080	-74.481148	809.83	5.00	814.83
9	42.865545	-74.480312	809.25	5.00	814.25
10	42.863745	-74.477543	815.37	5.00	820.37
11	42.861488	-74.474051	831.73	5.00	836.73
12	42.860980	-74.473063	836.31	5.00	841.31
13	42.860122	-74.471159	838.68	5.00	843.68
14	42.859312	-74.469283	849.49	5.00	854.49
15	42.859065	-74.468682	853.45	5.00	858.45
16	42.858856	-74.467963	859.55	5.00	864.55
17	42.858671	-74.467094	867.80	5.00	872.80
18	42.858416	-74.465651	878.50	5.00	883.50
19	42.857873	-74.462366	904.86	5.00	909.86
20	42.857621	-74.460639	919.85	5.00	924.85

Name: Moyer Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.867240	-74.483614	795.10	5.00	800.10
2	42.867810	-74.483329	789.74	5.00	794.74
3	42.868539	-74.482985	786.22	5.00	791.22
4	42.868901	-74.482797	779.82	5.00	784.82
5	42.871842	-74.481456	740.89	5.00	745.89

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	42.866641	-74.481560	812.69	6.00
OP 2	2	42.866641	-74.481560	812.69	16.00
OP 3	3	42.864388	-74.477963	824.51	6.00
OP 4	4	42.864388	-74.477963	824.51	16.00
OP 5	5	42.863766	-74.476944	828.81	6.00
OP 6	6	42.862956	-74.475935	830.38	6.00
OP 7	7	42.862956	-74.475935	830.38	16.00
OP 8	8	42.860589	-74.472867	840.68	6.00
OP 9	9	42.860589	-74.472867	840.68	16.00
OP 10	10	42.860739	-74.471665	843.88	6.00
OP 11	11	42.860739	-74.471665	843.88	16.00
OP 12	12	42.859050	-74.469220	851.67	6.00
OP 13	13	42.859050	-74.469220	851.67	16.00
OP 14	14	42.858503	-74.467428	866.50	6.00
OP 15	15	42.858503	-74.467428	866.50	16.00
OP 16	16	42.858944	-74.467093	869.22	6.00
OP 17	17	42.858836	-74.466725	873.72	6.00
OP 18	18	42.858836	-74.466725	873.72	16.00
OP 19	19	42.858667	-74.465540	888.00	6.00
OP 20	20	42.858287	-74.466133	872.85	6.00
OP 21	21	42.858287	-74.466130	872.85	16.00
OP 22	22	42.857656	-74.466197	874.51	6.00
OP 23	23	42.858606	-74.465194	892.92	6.00
OP 24	24	42.858132	-74.465323	882.10	6.00
OP 25	25	42.857366	-74.465720	878.07	6.00
OP 26	26	42.857366	-74.465720	878.07	16.00
OP 27	27	42.856837	-74.466334	874.38	6.00
OP 28	28	42.856399	-74.466682	877.05	6.00
OP 29	29	42.859944	-74.476977	847.91	6.00
OP 30	30	42.859703	-74.477588	849.43	6.00
OP 31	31	42.859703	-74.477588	849.43	16.00
OP 32	32	42.859119	-74.480582	843.72	6.00
OP 33	33	42.859119	-74.480582	843.72	16.00
OP 34	34	42.857833	-74.478801	860.59	6.00
OP 35	35	42.857420	-74.480552	873.84	6.00
OP 36	36	42.857420	-74.480552	873.84	16.00
OP 37	37	42.854677	-74.482894	880.32	6.00
OP 38	38	42.853928	-74.483688	876.43	6.00

Glare Analysis Results

Summary of Results

No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
Array 49	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 50	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 51	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 52	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 53	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 54	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 55	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 56	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 57	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 58	SA tracking	SA tracking	0	0.0	0	0.0	-
Array 59	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

PV: Array 49 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 49 and Route: Darrow Road

No glare found

Array 49 and Route: Flat Creek Road

No glare found

Array 49 and Route: Hwy 162

No glare found

Array 49 and Route: Moyer Road

No glare found

Array 49 and OP 1

No glare found

Array 49 and OP 2

No glare found

Array 49 and OP 3

No glare found

Array 49 and OP 4

No glare found

Array 49 and OP 5

No glare found

Array 49 and OP 6

No glare found

Array 49 and OP 7

No glare found

Array 49 and OP 8

No glare found

Array 49 and OP 9

No glare found

Array 49 and OP 10

No glare found

Array 49 and OP 11

No glare found

Array 49 and OP 12

No glare found

Array 49 and OP 13

No glare found

Array 49 and OP 14

No glare found

Array 49 and OP 15

No glare found

Array 49 and OP 16

No glare found

Array 49 and OP 17

No glare found

Array 49 and OP 18

No glare found

Array 49 and OP 19

No glare found

Array 49 and OP 20

No glare found

Array 49 and OP 21

No glare found

Array 49 and OP 22

No glare found

Array 49 and OP 23

No glare found

Array 49 and OP 24

No glare found

Array 49 and OP 25

No glare found

Array 49 and OP 26

No glare found

Array 49 and OP 27

No glare found

Array 49 and OP 28

No glare found

Array 49 and OP 29

No glare found

Array 49 and OP 30

No glare found

Array 49 and OP 31

No glare found

Array 49 and OP 32

No glare found

Array 49 and OP 33

No glare found

Array 49 and OP 34

No glare found

Array 49 and OP 35

No glare found

Array 49 and OP 36

No glare found

Array 49 and OP 37

No glare found

Array 49 and OP 38

No glare found

PV: Array 50 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 50 and Route: Darrow Road

No glare found

Array 50 and Route: Flat Creek Road

No glare found

Array 50 and Route: Hwy 162

No glare found

Array 50 and Route: Moyer Road

No glare found

Array 50 and OP 1

No glare found

Array 50 and OP 2

No glare found

Array 50 and OP 3

No glare found

Array 50 and OP 4

No glare found

Array 50 and OP 5

No glare found

Array 50 and OP 6

No glare found

Array 50 and OP 7

No glare found

Array 50 and OP 8

No glare found

Array 50 and OP 9

No glare found

Array 50 and OP 10

No glare found

Array 50 and OP 11

No glare found

Array 50 and OP 12

No glare found

Array 50 and OP 13

No glare found

Array 50 and OP 14

No glare found

Array 50 and OP 15

No glare found

Array 50 and OP 16

No glare found

Array 50 and OP 17

No glare found

Array 50 and OP 18

No glare found

Array 50 and OP 19

No glare found

Array 50 and OP 20

No glare found

Array 50 and OP 21

No glare found

Array 50 and OP 22

No glare found

Array 50 and OP 23

No glare found

Array 50 and OP 24

No glare found

Array 50 and OP 25

No glare found

Array 50 and OP 26

No glare found

Array 50 and OP 27

No glare found

Array 50 and OP 28

No glare found

Array 50 and OP 29

No glare found

Array 50 and OP 30

No glare found

Array 50 and OP 31

No glare found

Array 50 and OP 32

No glare found

Array 50 and OP 33

No glare found

Array 50 and OP 34

No glare found

Array 50 and OP 35

No glare found

Array 50 and OP 36

No glare found

Array 50 and OP 37

No glare found

Array 50 and OP 38

No glare found

PV: Array 51 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 51 and Route: Darrow Road

No glare found

Array 51 and Route: Flat Creek Road

No glare found

Array 51 and Route: Hwy 162

No glare found

Array 51 and Route: Moyer Road

No glare found

Array 51 and OP 1

No glare found

Array 51 and OP 2

No glare found

Array 51 and OP 3

No glare found

Array 51 and OP 4

No glare found

Array 51 and OP 5

No glare found

Array 51 and OP 6

No glare found

Array 51 and OP 7

No glare found

Array 51 and OP 8

No glare found

Array 51 and OP 9

No glare found

Array 51 and OP 10

No glare found

Array 51 and OP 11

No glare found

Array 51 and OP 12

No glare found

Array 51 and OP 13

No glare found

Array 51 and OP 14

No glare found

Array 51 and OP 15

No glare found

Array 51 and OP 16

No glare found

Array 51 and OP 17

No glare found

Array 51 and OP 18

No glare found

Array 51 and OP 19

No glare found

Array 51 and OP 20

No glare found

Array 51 and OP 21

No glare found

Array 51 and OP 22

No glare found

Array 51 and OP 23

No glare found

Array 51 and OP 24

No glare found

Array 51 and OP 25

No glare found

Array 51 and OP 26

No glare found

Array 51 and OP 27

No glare found

Array 51 and OP 28

No glare found

Array 51 and OP 29

No glare found

Array 51 and OP 30

No glare found

Array 51 and OP 31

No glare found

Array 51 and OP 32

No glare found

Array 51 and OP 33

No glare found

Array 51 and OP 34

No glare found

Array 51 and OP 35

No glare found

Array 51 and OP 36

No glare found

Array 51 and OP 37

No glare found

Array 51 and OP 38

No glare found

PV: Array 52 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 52 and Route: Darrow Road

No glare found

Array 52 and Route: Flat Creek Road

No glare found

Array 52 and Route: Hwy 162

No glare found

Array 52 and Route: Moyer Road

No glare found

Array 52 and OP 1

No glare found

Array 52 and OP 2

No glare found

Array 52 and OP 3

No glare found

Array 52 and OP 4

No glare found

Array 52 and OP 5

No glare found

Array 52 and OP 6

No glare found

Array 52 and OP 7

No glare found

Array 52 and OP 8

No glare found

Array 52 and OP 9

No glare found

Array 52 and OP 10

No glare found

Array 52 and OP 11

No glare found

Array 52 and OP 12

No glare found

Array 52 and OP 13

No glare found

Array 52 and OP 14

No glare found

Array 52 and OP 15

No glare found

Array 52 and OP 16

No glare found

Array 52 and OP 17

No glare found

Array 52 and OP 18

No glare found

Array 52 and OP 19

No glare found

Array 52 and OP 20

No glare found

Array 52 and OP 21

No glare found

Array 52 and OP 22

No glare found

Array 52 and OP 23

No glare found

Array 52 and OP 24

No glare found

Array 52 and OP 25

No glare found

Array 52 and OP 26

No glare found

Array 52 and OP 27

No glare found

Array 52 and OP 28

No glare found

Array 52 and OP 29

No glare found

Array 52 and OP 30

No glare found

Array 52 and OP 31

No glare found

Array 52 and OP 32

No glare found

Array 52 and OP 33

No glare found

Array 52 and OP 34

No glare found

Array 52 and OP 35

No glare found

Array 52 and OP 36

No glare found

Array 52 and OP 37

No glare found

Array 52 and OP 38

No glare found

PV: Array 53 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 53 and Route: Darrow Road

No glare found

Array 53 and Route: Flat Creek Road

No glare found

Array 53 and Route: Hwy 162

No glare found

Array 53 and Route: Moyer Road

No glare found

Array 53 and OP 1

No glare found

Array 53 and OP 2

No glare found

Array 53 and OP 3

No glare found

Array 53 and OP 4

No glare found

Array 53 and OP 5

No glare found

Array 53 and OP 6

No glare found

Array 53 and OP 7

No glare found

Array 53 and OP 8

No glare found

Array 53 and OP 9

No glare found

Array 53 and OP 10

No glare found

Array 53 and OP 11

No glare found

Array 53 and OP 12

No glare found

Array 53 and OP 13

No glare found

Array 53 and OP 14

No glare found

Array 53 and OP 15

No glare found

Array 53 and OP 16

No glare found

Array 53 and OP 17

No glare found

Array 53 and OP 18

No glare found

Array 53 and OP 19

No glare found

Array 53 and OP 20

No glare found

Array 53 and OP 21

No glare found

Array 53 and OP 22

No glare found

Array 53 and OP 23

No glare found

Array 53 and OP 24

No glare found

Array 53 and OP 25

No glare found

Array 53 and OP 26

No glare found

Array 53 and OP 27

No glare found

Array 53 and OP 28

No glare found

Array 53 and OP 29

No glare found

Array 53 and OP 30

No glare found

Array 53 and OP 31

No glare found

Array 53 and OP 32

No glare found

Array 53 and OP 33

No glare found

Array 53 and OP 34

No glare found

Array 53 and OP 35

No glare found

Array 53 and OP 36

No glare found

Array 53 and OP 37

No glare found

Array 53 and OP 38

No glare found

PV: Array 54 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 54 and Route: Darrow Road

No glare found

Array 54 and Route: Flat Creek Road

No glare found

Array 54 and Route: Hwy 162

No glare found

Array 54 and Route: Moyer Road

No glare found

Array 54 and OP 1

No glare found

Array 54 and OP 2

No glare found

Array 54 and OP 3

No glare found

Array 54 and OP 4

No glare found

Array 54 and OP 5

No glare found

Array 54 and OP 6

No glare found

Array 54 and OP 7

No glare found

Array 54 and OP 8

No glare found

Array 54 and OP 9

No glare found

Array 54 and OP 10

No glare found

Array 54 and OP 11

No glare found

Array 54 and OP 12

No glare found

Array 54 and OP 13

No glare found

Array 54 and OP 14

No glare found

Array 54 and OP 15

No glare found

Array 54 and OP 16

No glare found

Array 54 and OP 17

No glare found

Array 54 and OP 18

No glare found

Array 54 and OP 19

No glare found

Array 54 and OP 20

No glare found

Array 54 and OP 21

No glare found

Array 54 and OP 22

No glare found

Array 54 and OP 23

No glare found

Array 54 and OP 24

No glare found

Array 54 and OP 25

No glare found

Array 54 and OP 26

No glare found

Array 54 and OP 27

No glare found

Array 54 and OP 28

No glare found

Array 54 and OP 29

No glare found

Array 54 and OP 30

No glare found

Array 54 and OP 31

No glare found

Array 54 and OP 32

No glare found

Array 54 and OP 33

No glare found

Array 54 and OP 34

No glare found

Array 54 and OP 35

No glare found

Array 54 and OP 36

No glare found

Array 54 and OP 37

No glare found

Array 54 and OP 38

No glare found

PV: Array 55 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 55 and Route: Darrow Road

No glare found

Array 55 and Route: Flat Creek Road

No glare found

Array 55 and Route: Hwy 162

No glare found

Array 55 and Route: Moyer Road

No glare found

Array 55 and OP 1

No glare found

Array 55 and OP 2

No glare found

Array 55 and OP 3

No glare found

Array 55 and OP 4

No glare found

Array 55 and OP 5

No glare found

Array 55 and OP 6

No glare found

Array 55 and OP 7

No glare found

Array 55 and OP 8

No glare found

Array 55 and OP 9

No glare found

Array 55 and OP 10

No glare found

Array 55 and OP 11

No glare found

Array 55 and OP 12

No glare found

Array 55 and OP 13

No glare found

Array 55 and OP 14

No glare found

Array 55 and OP 15

No glare found

Array 55 and OP 16

No glare found

Array 55 and OP 17

No glare found

Array 55 and OP 18

No glare found

Array 55 and OP 19

No glare found

Array 55 and OP 20

No glare found

Array 55 and OP 21

No glare found

Array 55 and OP 22

No glare found

Array 55 and OP 23

No glare found

Array 55 and OP 24

No glare found

Array 55 and OP 25

No glare found

Array 55 and OP 26

No glare found

Array 55 and OP 27

No glare found

Array 55 and OP 28

No glare found

Array 55 and OP 29

No glare found

Array 55 and OP 30

No glare found

Array 55 and OP 31

No glare found

Array 55 and OP 32

No glare found

Array 55 and OP 33

No glare found

Array 55 and OP 34

No glare found

Array 55 and OP 35

No glare found

Array 55 and OP 36

No glare found

Array 55 and OP 37

No glare found

Array 55 and OP 38

No glare found

PV: Array 56 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 56 and Route: Darrow Road

No glare found

Array 56 and Route: Flat Creek Road

No glare found

Array 56 and Route: Hwy 162

No glare found

Array 56 and Route: Moyer Road

No glare found

Array 56 and OP 1

No glare found

Array 56 and OP 2

No glare found

Array 56 and OP 3

No glare found

Array 56 and OP 4

No glare found

Array 56 and OP 5

No glare found

Array 56 and OP 6

No glare found

Array 56 and OP 7

No glare found

Array 56 and OP 8

No glare found

Array 56 and OP 9

No glare found

Array 56 and OP 10

No glare found

Array 56 and OP 11

No glare found

Array 56 and OP 12

No glare found

Array 56 and OP 13

No glare found

Array 56 and OP 14

No glare found

Array 56 and OP 15

No glare found

Array 56 and OP 16

No glare found

Array 56 and OP 17

No glare found

Array 56 and OP 18

No glare found

Array 56 and OP 19

No glare found

Array 56 and OP 20

No glare found

Array 56 and OP 21

No glare found

Array 56 and OP 22

No glare found

Array 56 and OP 23

No glare found

Array 56 and OP 24

No glare found

Array 56 and OP 25

No glare found

Array 56 and OP 26

No glare found

Array 56 and OP 27

No glare found

Array 56 and OP 28

No glare found

Array 56 and OP 29

No glare found

Array 56 and OP 30

No glare found

Array 56 and OP 31

No glare found

Array 56 and OP 32

No glare found

Array 56 and OP 33

No glare found

Array 56 and OP 34

No glare found

Array 56 and OP 35

No glare found

Array 56 and OP 36

No glare found

Array 56 and OP 37

No glare found

Array 56 and OP 38

No glare found

PV: Array 57 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 57 and Route: Darrow Road

No glare found

Array 57 and Route: Flat Creek Road

No glare found

Array 57 and Route: Hwy 162

No glare found

Array 57 and Route: Moyer Road

No glare found

Array 57 and OP 1

No glare found

Array 57 and OP 2

No glare found

Array 57 and OP 3

No glare found

Array 57 and OP 4

No glare found

Array 57 and OP 5

No glare found

Array 57 and OP 6

No glare found

Array 57 and OP 7

No glare found

Array 57 and OP 8

No glare found

Array 57 and OP 9

No glare found

Array 57 and OP 10

No glare found

Array 57 and OP 11

No glare found

Array 57 and OP 12

No glare found

Array 57 and OP 13

No glare found

Array 57 and OP 14

No glare found

Array 57 and OP 15

No glare found

Array 57 and OP 16

No glare found

Array 57 and OP 17

No glare found

Array 57 and OP 18

No glare found

Array 57 and OP 19

No glare found

Array 57 and OP 20

No glare found

Array 57 and OP 21

No glare found

Array 57 and OP 22

No glare found

Array 57 and OP 23

No glare found

Array 57 and OP 24

No glare found

Array 57 and OP 25

No glare found

Array 57 and OP 26

No glare found

Array 57 and OP 27

No glare found

Array 57 and OP 28

No glare found

Array 57 and OP 29

No glare found

Array 57 and OP 30

No glare found

Array 57 and OP 31

No glare found

Array 57 and OP 32

No glare found

Array 57 and OP 33

No glare found

Array 57 and OP 34

No glare found

Array 57 and OP 35

No glare found

Array 57 and OP 36

No glare found

Array 57 and OP 37

No glare found

Array 57 and OP 38

No glare found

PV: Array 58 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 58 and Route: Darrow Road

No glare found

Array 58 and Route: Flat Creek Road

No glare found

Array 58 and Route: Hwy 162

No glare found

Array 58 and Route: Moyer Road

No glare found

Array 58 and OP 1

No glare found

Array 58 and OP 2

No glare found

Array 58 and OP 3

No glare found

Array 58 and OP 4

No glare found

Array 58 and OP 5

No glare found

Array 58 and OP 6

No glare found

Array 58 and OP 7

No glare found

Array 58 and OP 8

No glare found

Array 58 and OP 9

No glare found

Array 58 and OP 10

No glare found

Array 58 and OP 11

No glare found

Array 58 and OP 12

No glare found

Array 58 and OP 13

No glare found

Array 58 and OP 14

No glare found

Array 58 and OP 15

No glare found

Array 58 and OP 16

No glare found

Array 58 and OP 17

No glare found

Array 58 and OP 18

No glare found

Array 58 and OP 19

No glare found

Array 58 and OP 20

No glare found

Array 58 and OP 21

No glare found

Array 58 and OP 22

No glare found

Array 58 and OP 23

No glare found

Array 58 and OP 24

No glare found

Array 58 and OP 25

No glare found

Array 58 and OP 26

No glare found

Array 58 and OP 27

No glare found

Array 58 and OP 28

No glare found

Array 58 and OP 29

No glare found

Array 58 and OP 30

No glare found

Array 58 and OP 31

No glare found

Array 58 and OP 32

No glare found

Array 58 and OP 33

No glare found

Array 58 and OP 34

No glare found

Array 58 and OP 35

No glare found

Array 58 and OP 36

No glare found

Array 58 and OP 37

No glare found

Array 58 and OP 38

No glare found

PV: Array 59 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Darrow Road	0	0.0	0	0.0
Flat Creek Road	0	0.0	0	0.0
Hwy 162	0	0.0	0	0.0
Moyer Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0

Array 59 and Route: Darrow Road

No glare found

Array 59 and Route: Flat Creek Road

No glare found

Array 59 and Route: Hwy 162

No glare found

Array 59 and Route: Moyer Road

No glare found

Array 59 and OP 1

No glare found

Array 59 and OP 2

No glare found

Array 59 and OP 3

No glare found

Array 59 and OP 4

No glare found

Array 59 and OP 5

No glare found

Array 59 and OP 6

No glare found

Array 59 and OP 7

No glare found

Array 59 and OP 8

No glare found

Array 59 and OP 9

No glare found

Array 59 and OP 10

No glare found

Array 59 and OP 11

No glare found

Array 59 and OP 12

No glare found

Array 59 and OP 13

No glare found

Array 59 and OP 14

No glare found

Array 59 and OP 15

No glare found

Array 59 and OP 16

No glare found

Array 59 and OP 17

No glare found

Array 59 and OP 18

No glare found

Array 59 and OP 19

No glare found

Array 59 and OP 20

No glare found

Array 59 and OP 21

No glare found

Array 59 and OP 22

No glare found

Array 59 and OP 23

No glare found

Array 59 and OP 24

No glare found

Array 59 and OP 25

No glare found

Array 59 and OP 26

No glare found

Array 59 and OP 27

No glare found

Array 59 and OP 28

No glare found

Array 59 and OP 29

No glare found

Array 59 and OP 30

No glare found

Array 59 and OP 31

No glare found

Array 59 and OP 32

No glare found

Array 59 and OP 33

No glare found

Array 59 and OP 34

No glare found

Array 59 and OP 35

No glare found

Array 59 and OP 36

No glare found

Array 59 and OP 37

No glare found

Array 59 and OP 38

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

