



## Appendix D – Glare Study



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## Site Configuration: Full site

Project site configuration details and results.



Created Oct. 15, 2020 2:13 p.m.  
Updated Oct. 15, 2020 2:15 p.m.  
DNI varies and peaks at 1,000.0 W/m<sup>2</sup>  
Analyze every 1 minute(s)  
0.5 ocular transmission coefficient  
0.002 m pupil diameter  
0.017 m eye focal length  
9.3 mrad sun subtended angle  
Timezone UTC-5  
Site Configuration ID: 44509.8047

## Summary of Results No glare predicted!

| PV Name    | Tilt        | Orientation | "Green" Glare | "Yellow" Glare | Energy Produced |
|------------|-------------|-------------|---------------|----------------|-----------------|
|            | deg         | deg         | min           | min            | kWh             |
| PV array 1 | SA tracking | SA tracking | 0             | 0              | -               |

## Component Data

PV Array(s)

Name: PV array 1

Axis tracking: Single-axis rotation

Tracking axis orientation: 180.0 deg

Tracking axis tilt: 0.0 deg

Tracking axis panel offset: 0.0 deg

Maximum tracking angle: 60.0 deg

Resting angle: 60.0 deg

Rated power: -

Panel material: Smooth glass without AR coating

Vary reflectivity with sun position? Yes

Correlate slope error with surface type? Yes

Slope error: 6.55 mrad

Approx. area: 1,345,097 sq-ft

| Vertex | Latitude  | Longitude  | Ground elevation | Height above ground | Total elevation |
|--------|-----------|------------|------------------|---------------------|-----------------|
|        | deg       | deg        | ft               | ft                  | ft              |
| 1      | 43.022945 | -78.988251 | 593.68           | 0.00                | 593.68          |
| 2      | 43.028530 | -78.988422 | 592.12           | 0.00                | 592.12          |
| 3      | 43.028545 | -78.987156 | 592.95           | 0.00                | 592.95          |
| 4      | 43.028153 | -78.986620 | 594.58           | 0.00                | 594.58          |
| 5      | 43.028185 | -78.985890 | 594.10           | 0.00                | 594.10          |
| 6      | 43.023008 | -78.985676 | 594.39           | 0.00                | 594.39          |




## Discrete Observation Receptors

| Number | Latitude  | Longitude  | Ground elevation | Height above ground | Total Elevation |
|--------|-----------|------------|------------------|---------------------|-----------------|
|        | deg       | deg        | ft               | ft                  | ft              |
| OP 1   | 43.021722 | -78.987564 | 594.32           | 5.00                | 599.32          |
| OP 2   | 43.020851 | -78.987541 | 597.71           | 5.00                | 602.71          |
| OP 3   | 43.020643 | -78.988056 | 597.52           | 5.00                | 602.52          |
| OP 4   | 43.020674 | -78.988753 | 597.86           | 5.00                | 602.86          |
| OP 5   | 43.021913 | -78.991060 | 596.54           | 5.00                | 601.54          |
| OP 6   | 43.024517 | -78.990395 | 591.52           | 5.00                | 596.52          |
| OP 7   | 43.026847 | -78.990449 | 590.91           | 5.00                | 595.91          |
| OP 8   | 43.028290 | -78.990599 | 589.82           | 5.00                | 594.82          |
| OP 9   | 43.022419 | -78.984022 | 596.27           | 5.00                | 601.27          |
| OP 10  | 43.022419 | -78.985175 | 595.62           | 5.00                | 600.62          |
| OP 11  | 43.021663 | -78.985175 | 595.32           | 5.00                | 600.32          |

# PV Array Results

## Summary of PV Glare Analysis PV configuration and predicted glare

| PV Name    | Tilt        | Orientation | "Green" Glare | "Yellow" Glare | Energy Produced | Data File  |
|------------|-------------|-------------|---------------|----------------|-----------------|---|
|            | deg         | deg         | min           | min            | kWh             |   |
| PV array 1 | SA tracking | SA tracking | 0             | 0              | -               | -   |

*Click the name of the PV array to scroll to its results*

## PV & Receptor Analysis Results detailed results for each PV array and receptor

### PV array 1 no glare found



| Component | Green glare (min) | Yellow glare (min) |
|-----------|-------------------|--------------------|
| OP: OP 1  | 0                 | 0                  |
| OP: OP 2  | 0                 | 0                  |
| OP: OP 3  | 0                 | 0                  |
| OP: OP 4  | 0                 | 0                  |
| OP: OP 5  | 0                 | 0                  |
| OP: OP 6  | 0                 | 0                  |
| OP: OP 7  | 0                 | 0                  |
| OP: OP 8  | 0                 | 0                  |
| OP: OP 9  | 0                 | 0                  |
| OP: OP 10 | 0                 | 0                  |
| OP: OP 11 | 0                 | 0                  |

*No glare found*

## Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- 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.
- Several 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.
- 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.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
- Glare analysis methods used: OP V1, FP V1, Route V1
- Refer to the **Help page** for assumptions and limitations not listed here.