

Appendix B

Glare Analysis Report

E-Group PS Solar Project

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Glare Analysis Report

E-Group PS Solar Project

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APPENDIX

A Detailed Modeling Results

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
APN	Assessor Parcel Number
CEQA	California Environmental Quality Act
FAA	Federal Aviation Administration
gen-tie	generation tie
MW	megawatt
NXP	Twentynine Palms SELF Marine Corps Airfield
Project	E-Group PS Solar Project
PV	Photovoltaic
report	Glare Analysis Report
TNP	Twentynine Palms Airport
SCE	Southern California Edison

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1 Introduction

1.1 Purpose and Scope

The purpose of this Glare Analysis Report (report) is to assess the potential glare impacts associated with implementation of the E-Group PS Solar Project (Project) in order to comply with policies described in San Bernardino County's General Plan and Development Code (see Section 3, Regulations and Regulatory Requirements).

The Project is not located on federally obligated airport property; hence it does not need approval from the U.S. Federal Aviation Administration (FAA). Nevertheless, the analysis was conducted per FAA's recommended procedures described in the Technical Guidance for Evaluating Selected Solar Technologies on Airports (FAA 2018); the geometric glare modeling software used adheres to FAA policy regarding solar energy system projects on federally obligated airports (86 FR 25801–25803).

This report focuses on the potential for glare on sensitive receptors within a 1-mile glare study area as well as the two runway approach paths associated with the Twentynine Palms SELF Marine Corps Airfield (NXP), and four runway approach paths associated with Twentynine Palms Airport (TNP) the latter of which is a federally obligated public-use airport with approximately 18,000 annual aircraft operations (FAA, 2023).

This report includes an introduction to the photovoltaic (PV) technologies proposed for the Project and their potential to result in glare. Section 2, Project Description, provides a description of the Project and the Project location; Section 3, Regulations and Regulatory Requirements, describes the criteria that must be met by solar energy systems on airport property and relevant glare policies or standards adopted by San Bernardino County; and Section 4, Glare Impacts, describes the methodology used to perform the glare analysis and provides a summary of the analysis results. Section 5, References Reviewed, provides a list of the references cited in this report, and Section 6, Document Preparers, provides a list of those involved in the preparation of this report. Lastly, the complete detailed glare results generated by the modeling software are provided in Appendix A, Detailed Modeling Results.

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2 Project Description

2.1 Project Characteristics

The Project proposes to develop a PV solar facility and associated infrastructure necessary to generate 50 megawatts (MW) of renewable electrical energy on approximately 184 acres.

The project site includes a 184-acre solar facility site that is located on Assessor's Parcel Numbers (APNs) 0612-201-01-0000 and 0612-201-05-0000 and includes approximately 3.3-acres of off-site areas that are associated with a proposed site driveway constructed off Two Mile Road and gen-tie alignment from the proposed solar facility to the existing Southern California Edison (SCE) Carodean Substation, and 11.7 acres of road dedications for Amboy Road, Samarkand Drive and Noels Knoll Road. The Project site is surrounded by predominantly vacant and undeveloped rural land with a mix of rural residential properties in the surrounding areas. Figure 1, Project Location and Study Area, shows the Project boundary, off-site gen-tie/road alignment, glare study area, and Twentynine Palms city limit.

The Project would be constructed within the northern portion (approximately half) of the two parcels identified above, with the generation-tie lines running north-south through the southern portion of the two parcels toward Two Mile Road, then along Two Mile Road to connect to the existing SCE transmission network at the Carodean Substation, located approximately 1.50 miles south of the Project site, on the south side of Two Mile Road. The Project would primarily include PV panels that are placed on fixed tilt foundations, inverters and transformers, electrical cabling and communication lines, on-site switchgear, generation-tie lines access roads, and a security fence. Construction is anticipated to start in January 2026 with commercial operation anticipated to start in January 2027. This report considers the PV solar arrays and their potential to generate glare on nearby sensitive receptors within a 1-mile glare study area. The Project includes other components that do not have potential for significant glare and are therefore not analyzed in this report, including:

- PV panel mounting structures and foundations
- Inverters and transformers
- Electrical cabling and communication lines
- Internal roads and access roads
- Gen-tie lines
- Site security, fencing, and lighting

All of the Project components are located off airport property; outside of navigable airspace; and outside of the Runway Protection Zone, Runway Safety Area, Object Free Area, and Clearway as defined by FAA (FAA 2018).

3 Regulations and Regulatory Requirements

3.1 Federal

U.S. Federal Aviation Administration

To understand and model glare, Dudek used FAA standards, which has approved the use of Sandia National Laboratories' Solar Glare Hazard Analysis Tool. With the Solar Glare Hazard Analysis Tool, standardized safety metrics define the anticipated glare intensity that would cause unwanted visual impacts to air traffic control towers and airplane pilots. Glare intensity is described according to potential for after-image and is illustrated on FAA's Solar Glare Ocular Hazard Plot. Low potential for after-image is referred to as "green" glare, and potential for after-image is referred to as "yellow" glare. "Red" glare is representative of glare conditions with potential for permanent eye damage.

The Solar Glare Hazard Analysis Tool and ForgeSolar (ForgeSolar 2019) are also able to evaluate the potential of a particular PV array to produce glare intensity, predicting when and where glare would occur from a proposed PV array at discrete observation points (e.g., from the air traffic control tower or runway approach). In instances where glare may be a concern, the tools can prescribe minor adjustments to the tilt, direction, and location of the panels to alleviate issues.

For this analysis, Dudek staff used the industry standard ForgeSolar 3D geometric glare analysis software tool to disclose potential glare impacts associated with operation of the Project. See Section 4.2.3, Geometric Glare Analysis, and Section 4.2.4, Limitations of the Geometric Analysis, for more information about the modeling parameters and limitations.

FAA has crafted a policy regarding the ocular hazards posed by solar projects to federally obligated airports. Initially, it was assumed that solar energy systems might generate new glint and glare effects for pilots during the final approach. However, FAA has since concluded that in most instances, the glint and glare from solar energy systems experienced by pilots during final approach are comparable to those routinely encountered from water bodies, glass facade buildings, parking lots, and similar features. Therefore, FAA has retracted its prior interim guidance, which mandated airports to analyze potential glint and glare effects for pilots on final approach (86 FR 25801–25803). Instead, FAA has determined that its policy should primarily focus on the impact of on-airport solar energy systems on federally obligated towered airports, especially the airport's air traffic control tower cab (86 FR 25801–25803).

Per FAA Policy 86 FR 25801–25803, the following criteria must be met for solar energy systems on airport property:

- No glare of any kind for air traffic control tower(s) at cab height

This policy only applies to proposed solar energy systems on federally obligated airport property and only those airports with control towers. Though TNP is a federally obligated airport, the Project does not fall on airport property.

For that reason, this policy does not apply to the Project; however, it was included in this reporting to describe the standard methodologies used to assess solar glare near operating airports.

3.2 State

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires an analysis of aesthetic impacts when an agency or individual proposes an activity that may cause either a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment. In Appendix G, Environmental Checklist Form, the 2023 CEQA Statute and Guidelines contains the follow impact threshold related to glare:

- Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Other than the CEQA Guidelines, there are no state regulations pertaining to potential glare effects associated with the operation of solar facilities.

3.3 County of San Bernardino

General Plan Renewable Energy and Conservation Element: Policy RE-4.4

Encourage siting, construction and screening of renewable energy generation facilities to avoid, minimize or mitigate significant changes to the visual environment including minimizing light and glare.

- RE 4.4.1: Reduce visual impacts through a combination of minimized reflective surfaces, context sensitive color treatments, nature-oriented geometry, minimized vegetation clearing under and around arrays, conservation of pre-existing native plants, replanting of native plants as appropriate, maintenance of natural landscapes around the edges of facility complexes, and lighting design to minimize night-sky impacts, including attraction of and impact to nocturnal migratory birds

Development Code, Section 84.29.040. Renewable Energy Generation Facilities

(b) Glare. Solar energy facilities shall be designed to preclude daytime glare on any abutting residential land use zoning district, residential parcel, or public right-of-way.

4 Glare Impacts

4.1 General Concepts of Solar Technologies and Glare

The Project includes the installation of PV panels to convert the sun's light into electrical energy. To increase the efficiency of this conversion process, designers of solar systems strive to maximize the amount of solar energy that can be absorbed by solar cells. This work towards increasing efficiency has the added benefit of reducing the amount of light that could potentially reflect off the solar panels. Reflected light can cause glint (a quick reflection) and glare (reflection that lasts for a longer duration), which can create hazards for air-traffic-control personnel, motorists, and other potential receptors. For the purpose of this report, any light reflected off of the solar panels or any other reflective surface is referred to as "glare."

There are several key design considerations that can reduce glare from solar panels. One of the main factors of reflectance is the position of the PV modules relative to the sun. A panel that has been designed to absorb 90% of the sunlight that directly meets the face of the panels (perpendicular to the sun's rays) may have that absorption significantly reduced if the panel is not directly facing the sun (ForgeSolar 2019). Because the sun tracks across the sky over the course of a day, fixed-mount stationary panels can only maximize its efficiency for a few minutes out of the day when the sunlight is directly perpendicular to the face of the panel.

In addition to panel orientation, the materials used in the panel construction play an important role in reducing glare and maximizing efficiency. For example, different glass textures can be used to absorb light beams into the solar array, and anti-reflective coatings can be added to the glass to further reduce reflectivity at high-incidence angles (the angle at which the light hits the solar array).

The Project is anticipated to employ fixed mount PV arrays, as illustrated in Figure 2, Project Site Layout and Figure 3, Representative Image of PV Module Arrays. The orientation of the panels will be 180°, or due south, and the panels will be tilted at 21°. The surface of the panels would be constructed out of smooth glass and would include an anti-reflective coating, as further described in Section 4.2.3.

Glare can result in visual hazards and temporary loss of vision (also known as flash blindness). The hazard level of glare depends on the ocular impact to the observer. Generally, an ocular impact is calculated as a function of the size of the glare spot and the intensity of the light. For the purpose of this report, an ocular impact is classified in one of three categories, as follows:

- **Green:** Low potential for the glare to cause an after-image
- **Yellow:** Potential to cause a temporary after-image
- **Red:** Potential to cause retinal burn and permanent eye damage

4.2 Methodology

In order to determine where and when glare might occur as a result of development of the Project, Dudek staff utilized a multistep process that included a combination of spatial analysis, 3D geometric modeling, and aerial imagery interpolation. A one-mile study radius was determined to be adequate for this analysis because of the Project's size and location in the surrounding gently-sloping valley.

Dudek performed a detailed visibility analysis on the surrounding terrain to predict where the Project would be visible at any location within the study area. Using publicly available light detection and ranging (LiDAR) data, Dudek staff created a detailed elevation model that covered the study area. Because the geometric glare software utilized in this analysis does not take into consideration the terrain between the receptors and the Project's PV arrays, the visibility analysis is needed to reduce the possibility of a false-positive glare result. Figure 4, Glare Analysis Groups and Receptors, illustrates the results of the visibility analysis, with light-blue areas are predicted to have a more obscured view of the Project and dark-blue areas predicted to have a less obscured view of the Project. Locations in the study area with no coloring are predicted to have no view of the Project. Based on the visibility analysis, Dudek determined the location of potential receptors within the study area. All six runway approach path receptors associated with NXP and KTN were included in this analysis regardless of visibility or distance. See Figure 5, Locations of Airport Receptors, for the locations of the airport receptors, and Section 4.2.1 describes their precise modeling parameters. See Figure 4 for the locations of the ground-based receptors, and Section 4.2.2 describes their selection process in more detail. Receptors within the glare study area that were not predicted to have a direct line of site view of the Project were not included in the glare analysis. A geometric glare analysis was then conducted for the identified potential receptors to determine where and when glare might be encountered. Upon completion of the geometric analysis, Dudek reviewed the results for potential glare hazards.

For compatibility with the modeling software, the Project's PV arrays had to be grouped together to create 16 analysis groups, labeled "PV01" through "PV16." The sixteen analysis groups are shown on Figure 4, and the detailed modeling results are presented in the appendices according to these groups.

4.2.1 Airport Receptor Identification

Each modeled airport receptor type shown in Figure 5 is described in the following list, and the receptor's precise modeling parameters can be found in Appendix A:

- Air Traffic Control Tower (ATCT) Receptor – There are currently no operating ATCT's at either NXP or KTN.
- Two-Mile Runway Approach Observation Route – Six flight approach observation routes were selected to simulate an aircraft following a straight-line approach toward each runway at NXP and KTN. Flight approach routes use glide slopes and elevation parameters, as well as cockpit visibility angles. Modeled flight approaches extended out two miles from each runway threshold.

Table 1 shows the flight approach parameters used for NXP and KTN. The locations of the flight approach paths are depicted on Figure 5, Airport Receptor Locations.

Table 1. Flight Path Receptor Parameters

Runway Name	Threshold Crossing Height	Glide Slope	Direction (True Course)
NXP Runway 10	50 feet	3.0 degrees	112 degrees
NXP Runway 28	50 feet	3.0 degrees	292 degrees
TNP Runway 08	40 feet	3.0 degrees	90 degrees
TNP Runway 17	40 feet	3.0 degrees	180 degrees
TNP Runway 26	40 feet	3.1 degrees	270 degrees
TNP Runway 35	40 feet	3.0 degrees	0 degrees

4.2.2 Point and Route Receptor Identification

Using the visibility analysis results in conjunction with aerial imagery, road centerline data, and land use data, Dudek staff selected potential receptors based on their distance from the Project and the percentage of the Project visible from the receptor's location. To avoid false positives in the glare results, only receptors that were likely able to see the Project from their location were selected for the analysis. Figure 4 shows the locations of analyzed receptors as well as the modeled array locations. Each modeled receptor type shown on Figure 4 is described below, and the receptor's precise modeling parameters can be found in Appendix A:

- **Observation Point** – Analysis of the Project included 20 existing potentially sensitive residential dwelling point receptors that were located in the vicinity of the Project. The eye-level height of all point observers was set to 5.5 feet.
- **Route** – Analysis included a one route receptor representing the only paved road within the study area with direct line of sight to the Project, a half-mile portion of Two Mile Road directly south of the Project. Per the American Association of State Highway and Transportation Officials, the eye-level height of observers on highway routes was set to 7.6 feet, the average height for observers in large trucks.

4.2.3 Geometric Glare Analysis

Dudek staff used an industry standard 3D geometric glare analysis software tool developed by Sandia National Laboratories and licensed by ForgeSolar. Though initially developed for solar projects on airports, this software has been validated as effective for projects that are not located on airports. By inputting the solar panel locations and characteristics, as well as the locations and elevations of the receptors, the software is able to simulate the sun's progression across the sky over the course of a year and model the potential glare caused by the proposed solar arrays. If glare is detected, the software can quantify the level of ocular impact hazard (green, yellow, or red) and pinpoint the exact time of year the glare would occur. This analysis is automatically performed for every minute of the calendar year for each PV array analysis group and for each potential receptor defined in the model.

Dudek staff consulted the applicant to obtain the precise characteristics of the proposed solar array system. Data gathered included the physical location, orientation, build material, tilt angle, and tracking technology. All of these characteristics were entered into the modeling software, as provided in Table 2.

Table 2. Solar Array Model Inputs

Solar Array Characteristics	Project Configuration
Tracking method	Fixed-mount (no tracking)
Module surface material	Smooth glass with anti-reflective coating
Module orientation	South (180 degrees)
Module tilt angle	21 degrees
Module height	6.7 feet

4.2.4 Limitations of the Geometric Analysis

The following are known limitations in the glare analysis software:

- The geometric modeling algorithm uses bounding polygons to represent PV array groups and therefore does not rigorously represent the detailed geometry of a PV array. Detailed features such as gaps between modules, variable height of the PV arrays within the bounding polygons, and support structures are not represented in the model and therefore could vary from real-life conditions.
- The geometric modeling algorithm does not account for intervening terrain, structures, or vegetation between the PV arrays and the receptors. Though this limitation was mitigated using a visibility study, this limitation could result in more minutes of glare being predicted towards a receptor than is realistic.

4.3 Glare Analysis Results

This glare analysis was conducted per FAA's recommended procedures described in the Technical Guidance for Evaluating Selected Solar Technologies on Airports (FAA 2018), and the geometric glare modeling software used adheres to FAA policy regarding solar energy system projects on federally obligated airports (86 FR 25801–25803). This policy does not apply to the Project but was included in this reporting to describe the standard methodologies used to assess solar glare near operating airports. Specifically, the glare analysis and software quantify the level of ocular impact hazard (reported as green or yellow glare) and pinpoint the time of year the glare is likely to occur.

4.3.1 Results for Airport Receptors

The results of the analysis indicate that, under the parameters described in Section 4.2.3, the Project could result in green glare (low potential to cause after-image) towards the two-mile approach to runway 26 at TNP. No glare of any hazard level was predicted towards any of the other airport receptors analyzed.

The modeling predicts that the approach to runway 26 at TNP will receive 1,231 discrete annual minutes of green glare. The glare is predicted to occur in the late afternoon hours during the months of April, August, and September for approximately 20 minutes per day, on average. Given the runway's location at approximately 10.5 miles to the east of the Project, as well as the glare's low potential to cause an afterimage, it is not anticipated that this glare would significantly affect operations at TNP. See Table 3, Results for Airport Receptors, for the results of the glare analysis. Please refer to Appendix A for the detailed modeling parameters and results.

Table 3. Results for Airport Receptors

Airport Receptor	Green Glare (annual minutes)	Yellow Glare (annual minutes)	Red Glare (annual minutes)
NXP Runway 10	No Glare	No Glare	No Glare
NXP Runway 28	No Glare	No Glare	No Glare
TNP Runway 08	No Glare	No Glare	No Glare
TNP Runway 17	No Glare	No Glare	No Glare
TNP Runway 26	1,231 minutes	No Glare	No Glare
TNP Runway 35	No Glare	No Glare	No Glare

4.3.2 Results for Point and Route Receptors

The results of the analysis indicate that, under the parameters described in Section 4.2.3, the Project could result in glare in the Green and Yellow ocular impact categories for some of the point receptors analyzed. The single route receptor at Two Mile Road was not predicted to receive glare at any hazard level.

Of the 20 dwelling point receptors analyzed, the 5 points labeled OP13 through OP17 on Figure 4 and located approximately one-third of a mile east of the proposed solar arrays, were predicted to receive glare from the Project. According to the geometric modeling results, these 5 dwelling points could receive between 5 and 40 minutes of Green glare (low potential to cause an after-image) per day, on average, during the spring and summer months. Observation points labeled OP14 through OP17 were also predicted to receive between 5 and 20 minutes of Yellow glare (potential to cause an after image) during those same time periods. All glare predicted to be received by these observation points will occur in the late afternoon as the sun is setting over the Project to the west of the dwelling locations. Please refer to Table 4 for the modeling results for point and route receptors and Appendix A for the detailed modeling parameters and results.

Table 4. Results for Point and Route Receptors

Receptor	Green Glare (annual minutes)	Yellow Glare (annual minutes)	Red Glare (annual minutes)
Route1 (Two Mile Road)	No Glare	No Glare	No Glare
OP1	No Glare	No Glare	No Glare
OP2	No Glare	No Glare	No Glare
OP3	No Glare	No Glare	No Glare
OP4	No Glare	No Glare	No Glare
OP5	No Glare	No Glare	No Glare
OP6	No Glare	No Glare	No Glare
OP7	No Glare	No Glare	No Glare
OP8	No Glare	No Glare	No Glare
OP9	No Glare	No Glare	No Glare
OP10	No Glare	No Glare	No Glare
OP11	No Glare	No Glare	No Glare
OP12	No Glare	No Glare	No Glare

Table 4. Results for Point and Route Receptors

Receptor	Green Glare (annual minutes)	Yellow Glare (annual minutes)	Red Glare (annual minutes)
OP13	4,843 minutes	No Glare	No Glare
OP14	5,409 minutes	741 minutes	No Glare
OP15	6,003 minutes	1,757 minutes	No Glare
OP16	6,337 minutes	2,633 minutes	No Glare
OP17	6,629 minutes	2,403 minutes	No Glare
OP18	No Glare	No Glare	No Glare
OP19	No Glare	No Glare	No Glare
OP20	No Glare	No Glare	No Glare

4.3.3 Comparison of Results to Other Sources of Glare

Figure 6, Comparison of Results to Other Sources of Glare, shows samples of results from the analysis compared to the following two other sources of glare:

- Hazard due to viewing unfiltered sun (ForgeSolar, 2019)
- Smooth water body under conservative assumptions (Riley, 2011)

In Figure 6, polygons are shown to represent the approximate maximum predicted glare from the Project's panel groups. The graph indicates that the glare produced by solar development on the Project will result in less ocular impact than a smooth water body under conservative assumptions and will result in significantly less impact than the hazards posed due to viewing the unfiltered sun.

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5 References Reviewed

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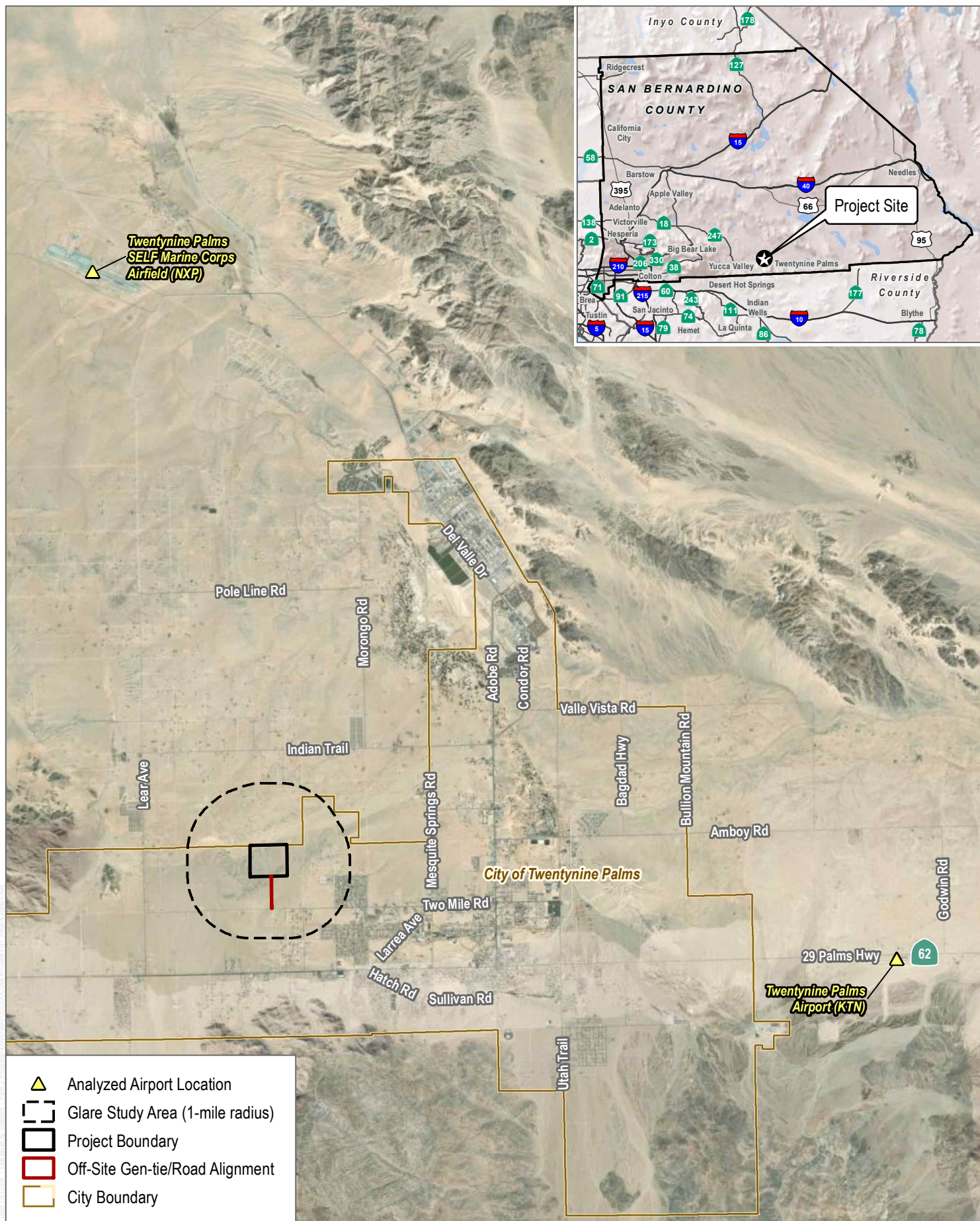
San Bernardino County (San Bernardino County Planning Department). 1992. *Airport Comprehensive Land Use Plan, Twentynine Palms Airport*. May, 1992.

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6 Document Preparers

This report was prepared by Christopher Starbird.

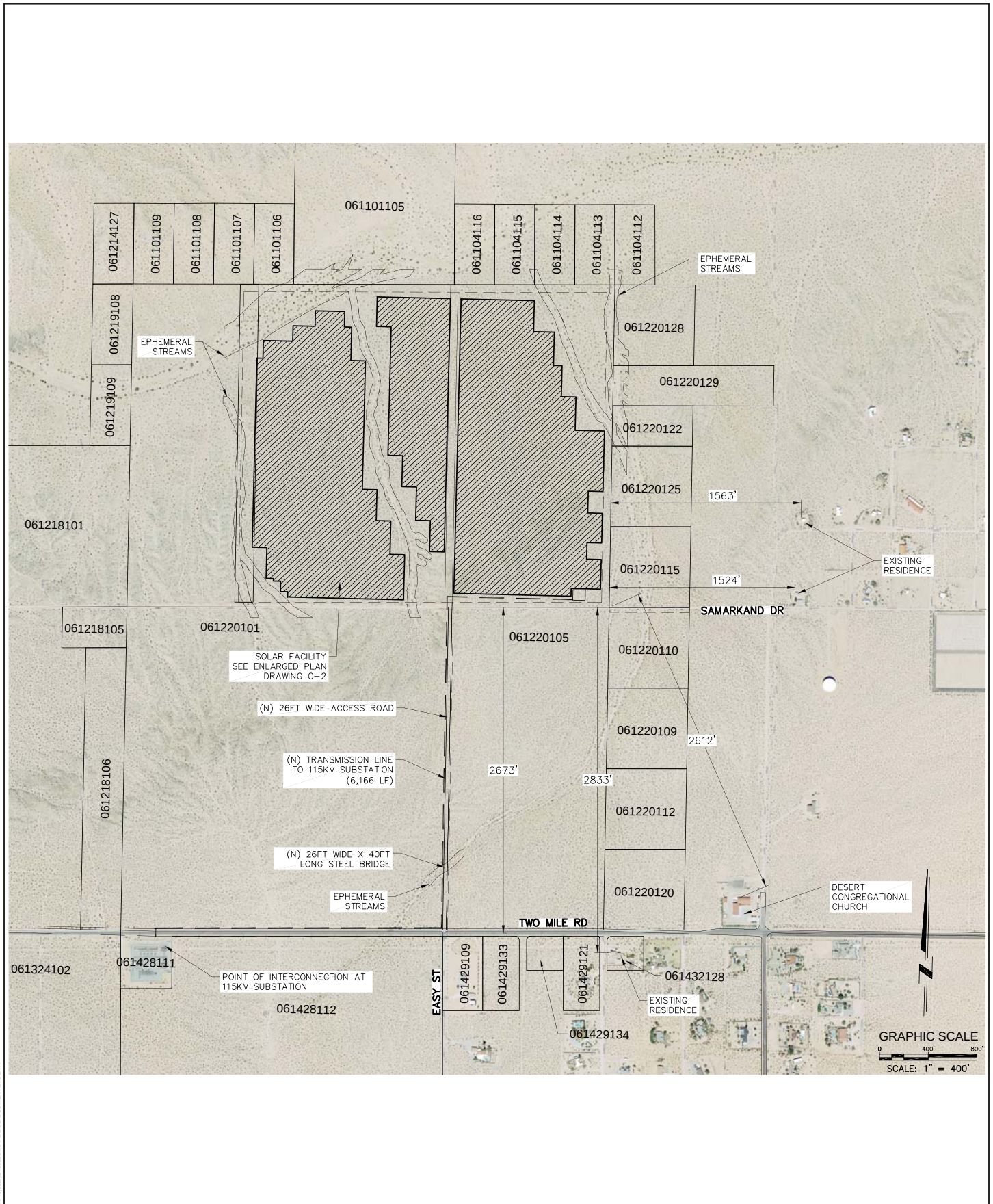
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SOURCE: Bing Maps Aerial (accessed 2023)

FIGURE 1

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SOURCE: E-Group PS LLC, 2024

FIGURE 2

Project Site Layout

E-Group PS Solar Project

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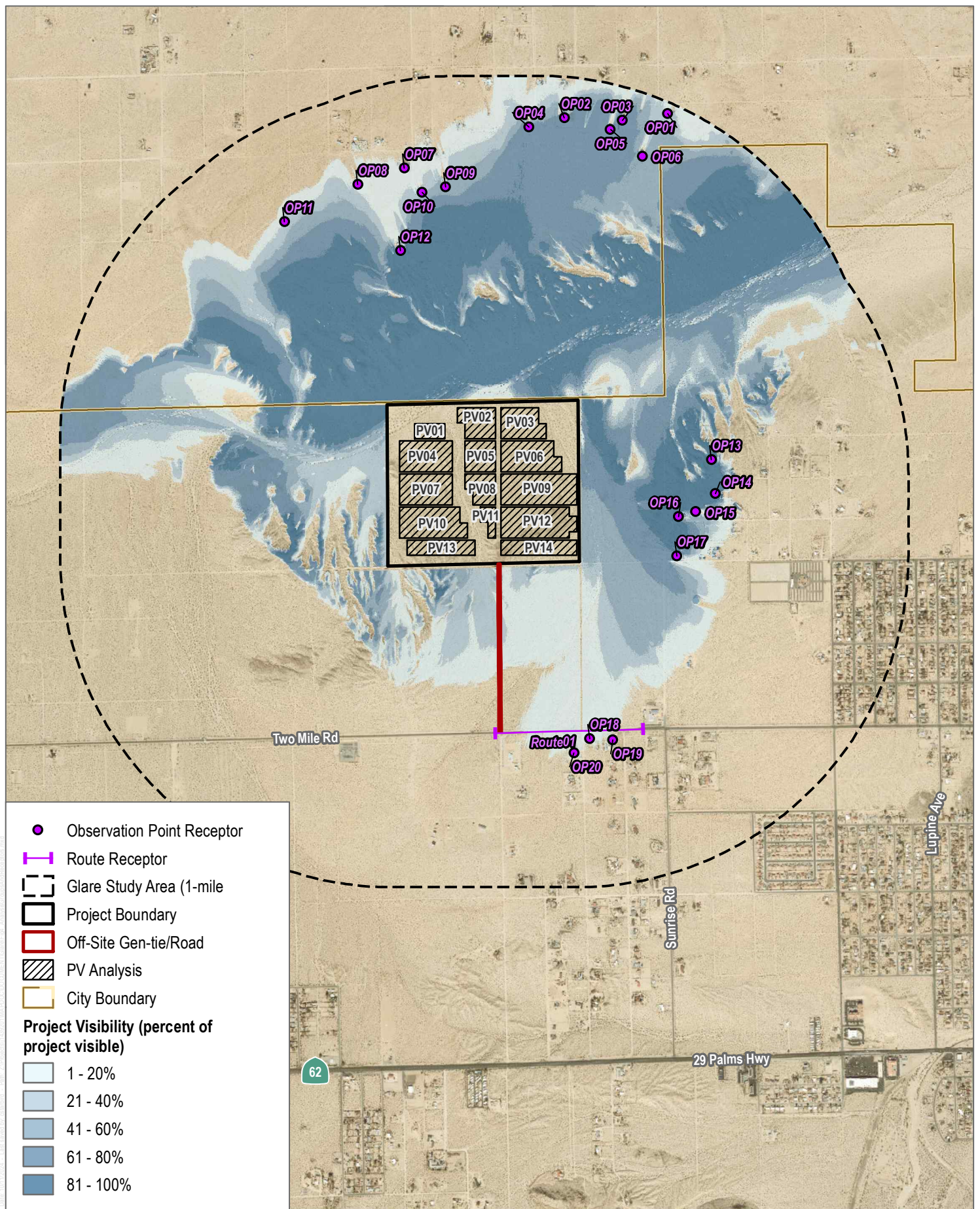
Representative Image of PV Module Arrays

SOURCE: E-GROUPS PS 2024

DUDEK

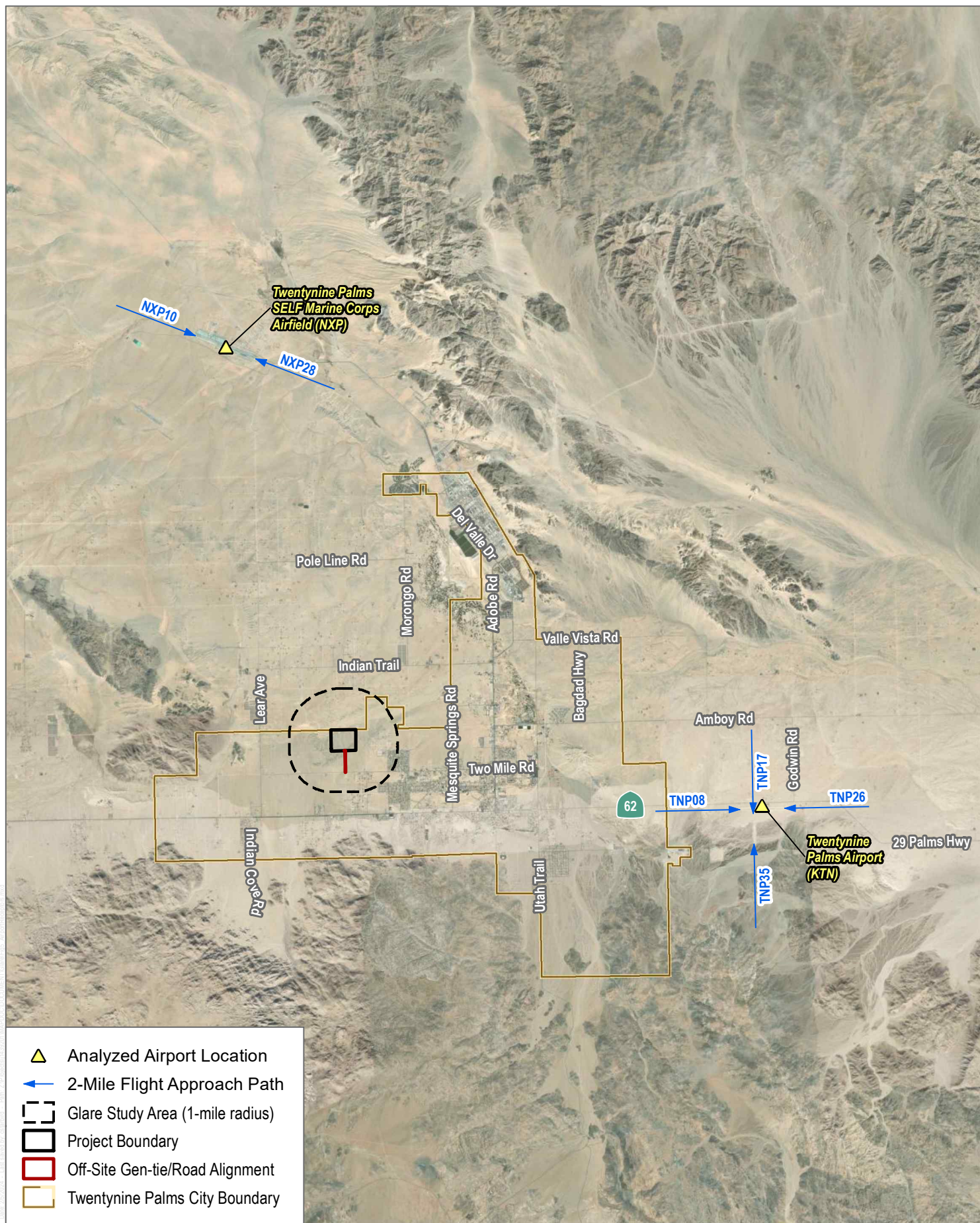
FIGURE 3
Representative Image of PV Module Arrays
E-Group PS Solar Project

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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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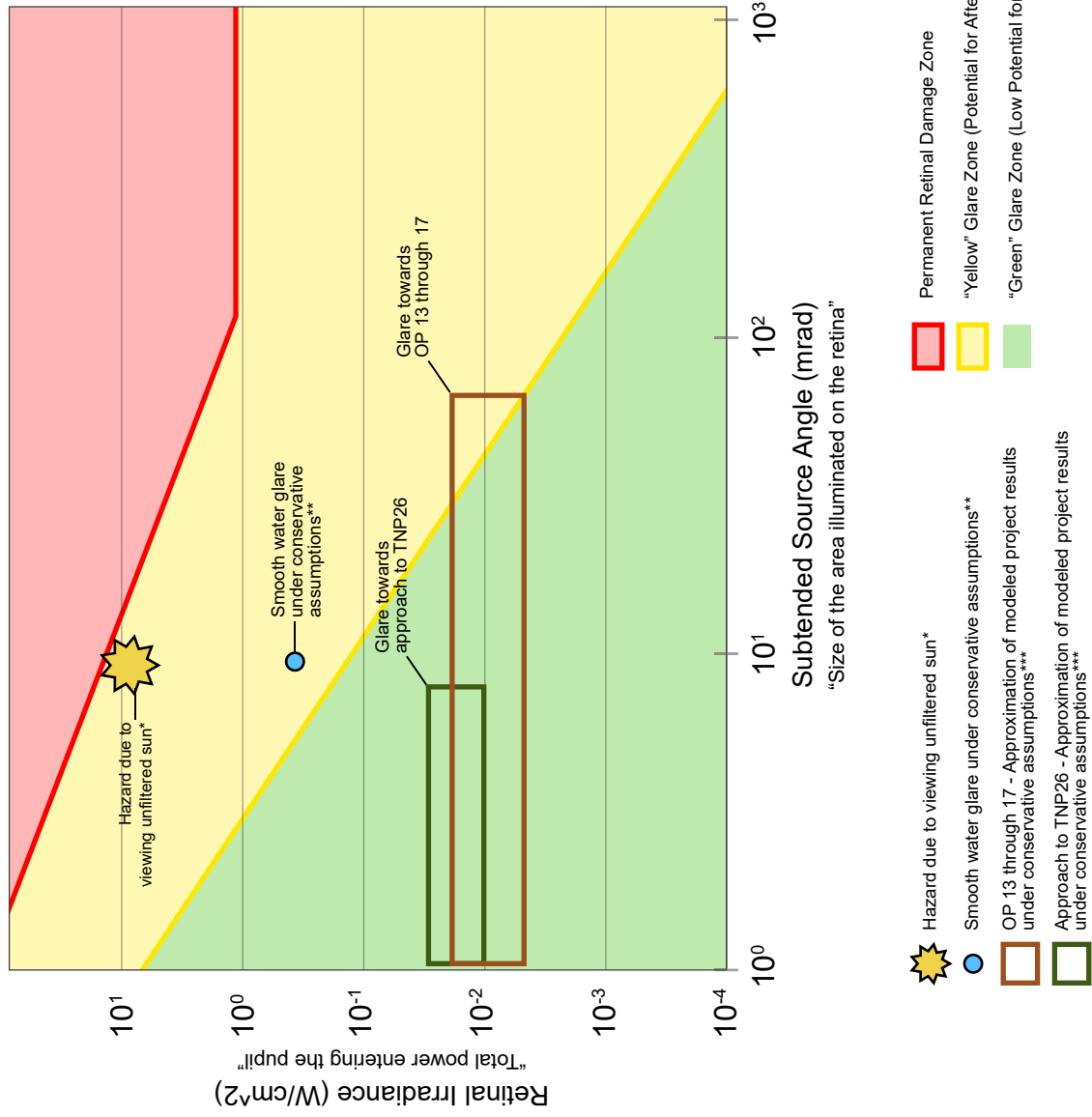
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

FIGURE 5

Airport Receptor Locations

E-Group PS Solar Project

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Note: Plotted point locations are approximate
 * ForgeSolar, 2019
 ** Riley, 2011
 *** Polygon represents approximate glare intensity for the Project over the course of the year.

- Hazard due to viewing unfiltered sun*
- Smooth water glare under conservative assumptions**
- OP 13 through 17 - Approximation of modeled project results under conservative assumptions***
- Approach to TNP26 - Approximation of modeled project results under conservative assumptions***
- Permanent Retinal Damage Zone
- "Yellow" Glare Zone (Potential for After-Image)
- "Green" Glare Zone (Low Potential for After-Image)

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Appendix A

Detailed Modeling Results

FORGESOLAR GLARE ANALYSIS

Project: **Twentynine Palms Solar Project**

Site configuration: **Twentynine Palms Solar Nov 2023**

Created 16 Nov, 2023

Updated 16 Nov, 2023

Time-step 1 minute

Timezone offset UTC-8

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 10 MW to 100 MW

Site ID 105732.18334

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	
PV01	21.0	180.0	7,327	122.1	0	0.0	-
PV02	21.0	180.0	4,954	82.6	0	0.0	-
PV03	21.0	180.0	7,683	128.1	0	0.0	-
PV04	21.0	180.0	10,545	175.8	0	0.0	-
PV05	21.0	180.0	6,401	106.7	0	0.0	-
PV06	21.0	180.0	7,385	123.1	2,273	37.9	-
PV07	21.0	180.0	4,592	76.5	0	0.0	-
PV08	21.0	180.0	4,416	73.6	0	0.0	-
PV09	21.0	180.0	7,431	123.8	3,166	52.8	-
PV10	21.0	180.0	1,373	22.9	0	0.0	-
PV11	21.0	180.0	2,063	34.4	0	0.0	-
PV12	21.0	180.0	8,227	137.1	1,771	29.5	-
PV13	21.0	180.0	1,300	21.7	0	0.0	-
PV14	21.0	180.0	1,932	32.2	348	5.8	-
PV15	21.0	180.0	1,766	29.4	0	0.0	-
PV16	21.0	180.0	5,425	90.4	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
Route01	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP26	10,415	173.6	0	0.0
TNP35	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	10,331	172.2	0	0.0
OP 14	13,021	217.0	741	12.3
OP 15	15,005	250.1	1,757	29.3
OP 16	16,287	271.4	2,654	44.2
OP 17	17,761	296.0	2,406	40.1
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV01

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

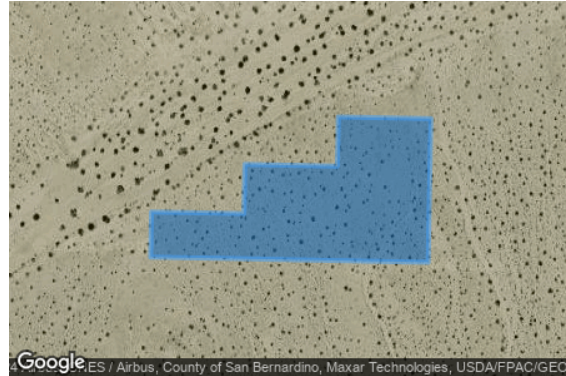
Orientation: 180.0°

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	34.162983	-116.120869	2076.20	6.70	2082.90
2	34.162971	-116.120074	2082.50	6.70	2089.20
3	34.163320	-116.120066	2075.04	6.70	2081.74
4	34.163307	-116.119271	2079.71	6.70	2086.41
5	34.163656	-116.119263	2071.67	6.70	2078.37
6	34.163644	-116.118468	2069.85	6.70	2076.55
7	34.162626	-116.118491	2092.86	6.70	2099.56
8	34.162663	-116.120876	2083.58	6.70	2090.28
9	34.162983	-116.120869	2076.20	6.70	2082.90

Name: PV02

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

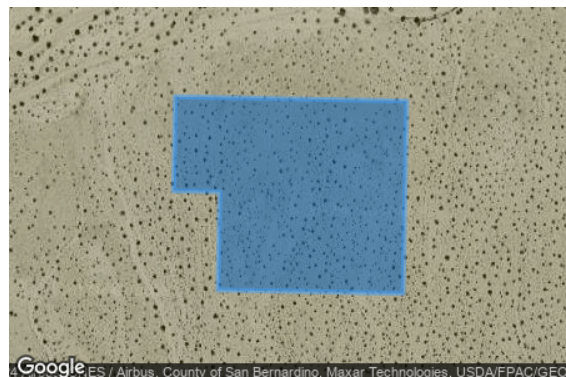
Orientation: 180.0°

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	34.163313	-116.117803	2082.29	6.70	2088.99
2	34.163982	-116.117788	2069.64	6.70	2076.34
3	34.163951	-116.115801	2080.57	6.70	2087.27
4	34.162585	-116.115832	2105.16	6.70	2111.86
5	34.162609	-116.117421	2094.67	6.70	2101.37
6	34.163307	-116.117406	2086.05	6.70	2092.75
7	34.163313	-116.117803	2082.29	6.70	2088.99

Name: PV03

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

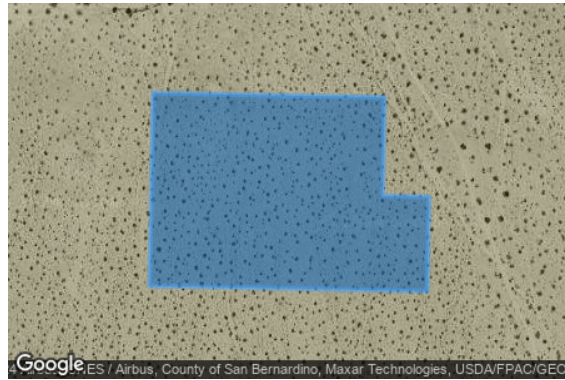
Orientation: 180.0°

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	34.163946	-116.115502	2079.65	6.70	2086.35
2	34.163915	-116.113515	2071.52	6.70	2078.22
3	34.163218	-116.113530	2085.85	6.70	2092.55
4	34.163212	-116.113133	2083.38	6.70	2090.08
5	34.162543	-116.113148	2097.23	6.70	2103.93
6	34.162580	-116.115533	2105.27	6.70	2111.97
7	34.163946	-116.115502	2079.65	6.70	2086.35

Name: PV04

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

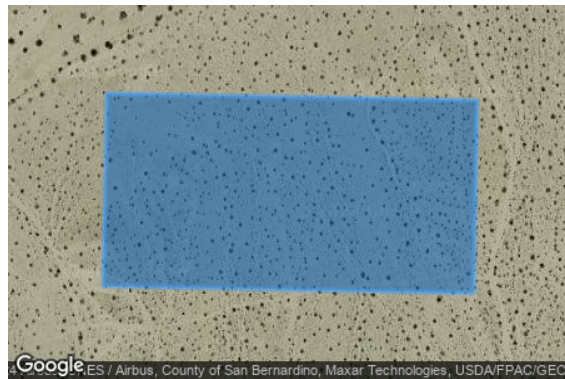
Orientation: 180.0°

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	34.162538	-116.118096	2093.42	6.70	2100.12
2	34.161869	-116.118111	2113.47	6.70	2120.17
3	34.161171	-116.118127	2130.01	6.70	2136.71
4	34.161177	-116.118524	2131.56	6.70	2138.26
5	34.161177	-116.118524	2131.56	6.70	2138.26
6	34.161177	-116.118524	2131.56	6.70	2138.26
7	34.161221	-116.121306	2110.01	6.70	2116.71
8	34.162587	-116.121275	2081.72	6.70	2088.42
9	34.162538	-116.118096	2093.42	6.70	2100.12

Name: PV05

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

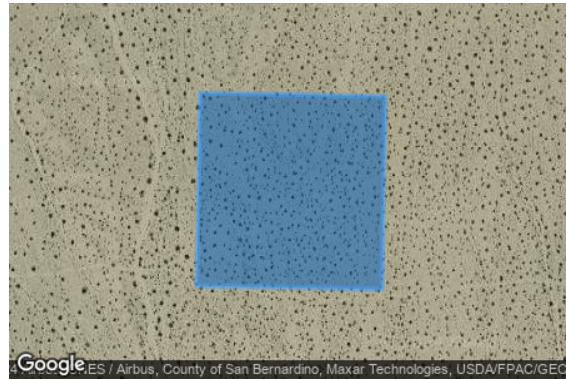
Orientation: 180.0°

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	34.162527	-116.117423	2096.92	6.70	2103.62
2	34.162502	-116.115833	2106.73	6.70	2113.43
3	34.161136	-116.115864	2135.35	6.70	2142.05
4	34.161161	-116.117454	2124.11	6.70	2130.81
5	34.162527	-116.117423	2096.92	6.70	2103.62

Name: PV06

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

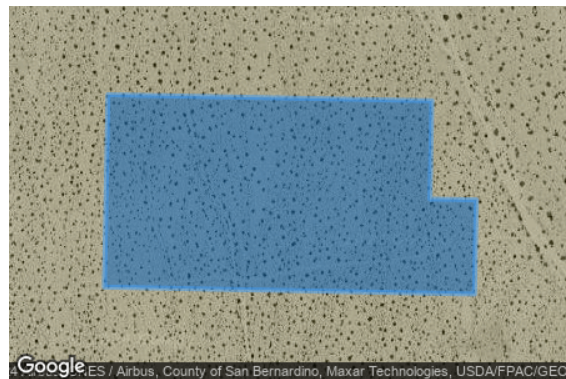
Orientation: 180.0°

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	34.162498	-116.115535	2106.85	6.70	2113.55
2	34.162454	-116.112752	2096.99	6.70	2103.69
3	34.161757	-116.112768	2109.92	6.70	2116.62
4	34.161750	-116.112371	2109.05	6.70	2115.75
5	34.161082	-116.112386	2123.21	6.70	2129.91
6	34.161131	-116.115565	2133.93	6.70	2140.63
7	34.162498	-116.115535	2106.85	6.70	2113.55

Name: PV07

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

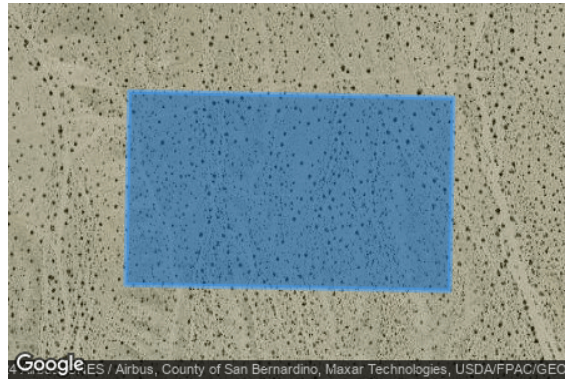
Orientation: 180.0°

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	34.159766	-116.120941	2149.53	6.70	2156.23
2	34.161132	-116.120910	2114.17	6.70	2120.87
3	34.161089	-116.118128	2130.90	6.70	2137.60
4	34.159722	-116.118159	2165.00	6.70	2171.70
5	34.159766	-116.120941	2149.53	6.70	2156.23

Name: PV08

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

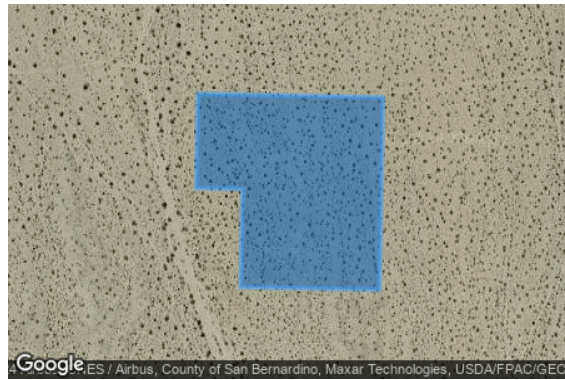
Orientation: 180.0°

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	34.161078	-116.117456	2126.42	6.70	2133.12
2	34.161053	-116.115866	2136.86	6.70	2143.56
3	34.159687	-116.115897	2167.12	6.70	2173.82
4	34.159706	-116.117089	2164.63	6.70	2171.33
5	34.160403	-116.117073	2146.37	6.70	2153.07
6	34.160409	-116.117471	2143.59	6.70	2150.29
7	34.161078	-116.117456	2126.42	6.70	2133.12

Name: PV09

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

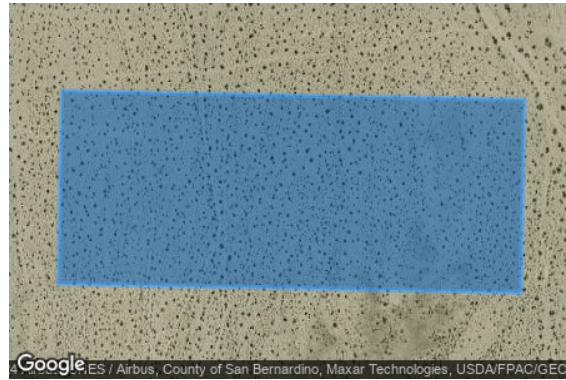
Orientation: 180.0°

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	34.161049	-116.115567	2136.02	6.70	2142.72
2	34.160987	-116.111593	2123.26	6.70	2129.96
3	34.159620	-116.111624	2151.06	6.70	2157.76
4	34.159682	-116.115598	2166.30	6.70	2173.00
5	34.161049	-116.115567	2136.02	6.70	2142.72

Name: PV10

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

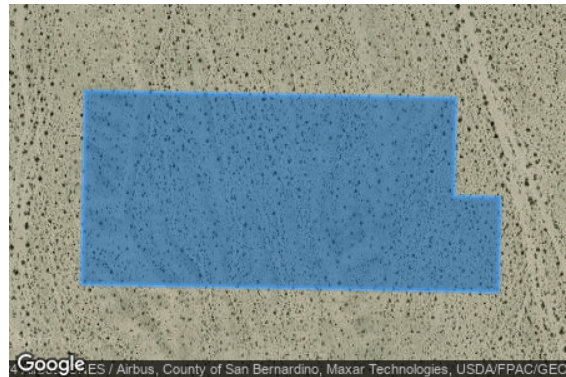
Orientation: 180.0°

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	34.158317	-116.120974	2184.56	6.70	2191.26
2	34.159683	-116.120943	2151.59	6.70	2158.29
3	34.159634	-116.117764	2164.44	6.70	2171.14
4	34.158936	-116.117779	2184.70	6.70	2191.40
5	34.158930	-116.117382	2182.63	6.70	2189.33
6	34.158261	-116.117397	2199.76	6.70	2206.46
7	34.158317	-116.120974	2184.56	6.70	2191.26

Name: PV11

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

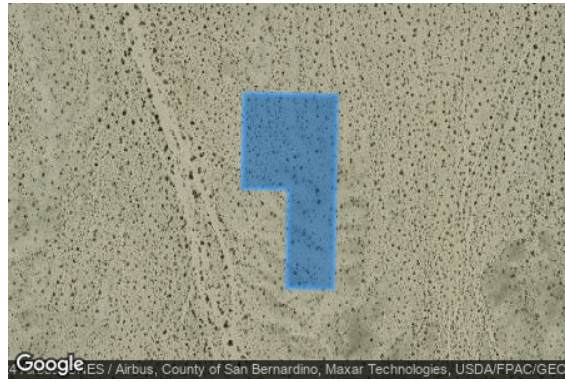
Orientation: 180.0°

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	34.159617	-116.116694	2167.34	6.70	2174.04
2	34.159605	-116.115899	2169.09	6.70	2175.79
3	34.158238	-116.115930	2215.01	6.70	2221.71
4	34.158244	-116.116327	2212.11	6.70	2218.81
5	34.158942	-116.116311	2190.37	6.70	2197.07
6	34.158948	-116.116709	2186.16	6.70	2192.86
7	34.159617	-116.116694	2167.34	6.70	2174.04

Name: PV12

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

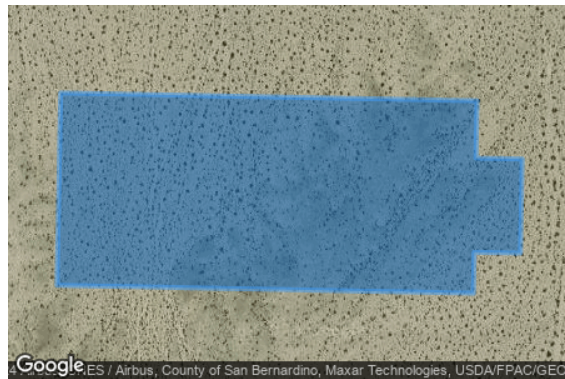
Orientation: 180.0°

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	34.159600	-116.115600	2168.45	6.70	2175.15
2	34.159544	-116.112023	2153.92	6.70	2160.62
3	34.159137	-116.112032	2161.71	6.70	2168.41
4	34.159131	-116.111635	2160.32	6.70	2167.02
5	34.158462	-116.111650	2174.95	6.70	2181.65
6	34.158468	-116.112047	2178.30	6.70	2185.00
7	34.158178	-116.112054	2183.30	6.70	2190.00
8	34.158234	-116.115631	2214.43	6.70	2221.13
9	34.159600	-116.115600	2168.45	6.70	2175.15

Name: PV13

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

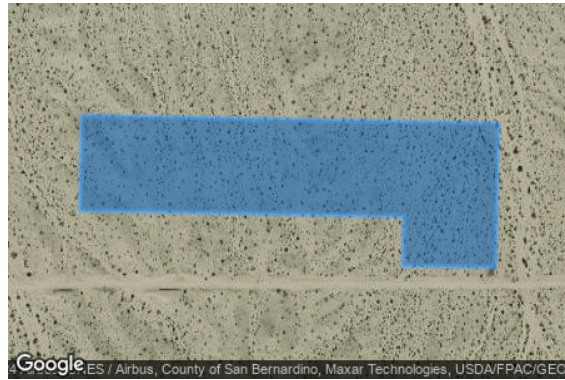
Orientation: 180.0°

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	34.157155	-116.117024	2223.91	6.70	2230.61
2	34.157167	-116.117819	2230.52	6.70	2237.22
3	34.157516	-116.117811	2221.59	6.70	2228.29
4	34.157559	-116.120593	2213.31	6.70	2220.01
5	34.158228	-116.120578	2194.99	6.70	2201.69
6	34.158173	-116.117001	2197.51	6.70	2204.21
7	34.157504	-116.117016	2214.20	6.70	2220.90
8	34.157155	-116.117024	2223.91	6.70	2230.61

Name: PV14

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

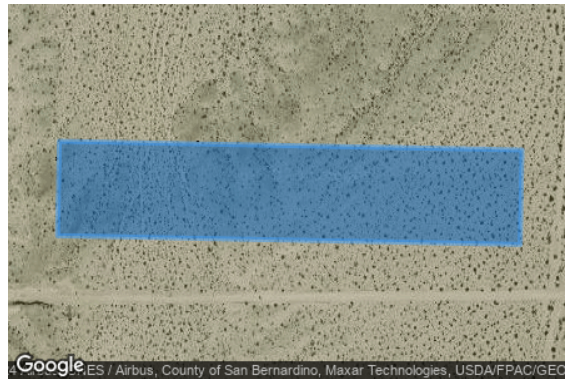
Orientation: 180.0°

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	34.158151	-116.115633	2216.76	6.70	2223.46
2	34.158089	-116.111658	2181.87	6.70	2188.57
3	34.157420	-116.111674	2194.38	6.70	2201.08
4	34.157482	-116.115648	2234.69	6.70	2241.39
5	34.158151	-116.115633	2216.76	6.70	2223.46

Name: PV15

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

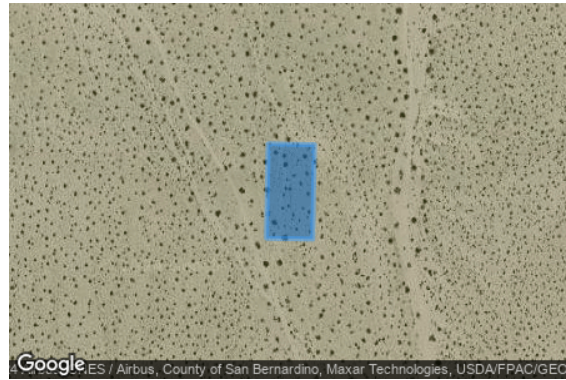
Orientation: 180.0°

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	34.163901	-116.112613	2073.47	6.70	2080.17
2	34.163895	-116.112215	2079.39	6.70	2086.09
3	34.163226	-116.112231	2085.83	6.70	2092.53
4	34.163233	-116.112628	2084.42	6.70	2091.12
5	34.163901	-116.112613	2073.47	6.70	2080.17

Name: PV16

Axis tracking: Fixed (no rotation)

Tilt: 21.0°

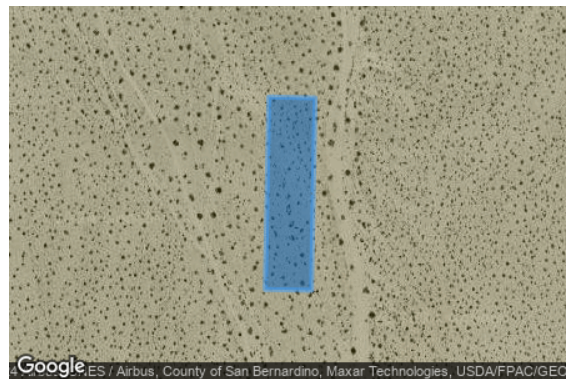
Orientation: 180.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



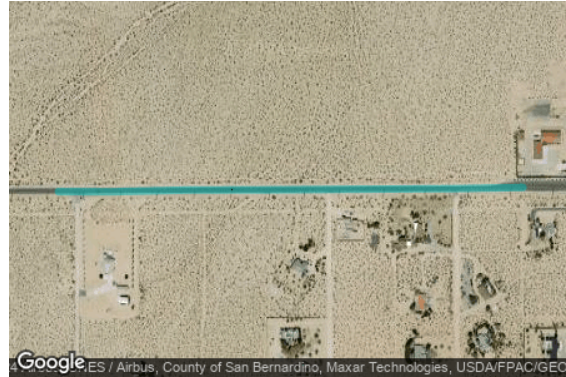
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	34.163892	-116.112039	2079.05	6.70	2085.75
2	34.163886	-116.111641	2075.70	6.70	2082.40
3	34.162520	-116.111672	2100.22	6.70	2106.92
4	34.162526	-116.112070	2098.07	6.70	2104.77
5	34.163892	-116.112039	2079.05	6.70	2085.75

Route Receptors

Name: Route01

Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	34.149715	-116.116217	2353.95	7.60	2361.55
2	34.149713	-116.115334	2354.44	7.60	2362.04
3	34.149738	-116.114007	2344.10	7.60	2351.70
4	34.149740	-116.112640	2332.86	7.60	2340.46
5	34.149750	-116.111066	2324.63	7.60	2332.23
6	34.149758	-116.109408	2316.07	7.60	2323.67
7	34.149774	-116.108234	2309.58	7.60	2317.18

Flight Path Receptors

Name: NXP10

Description: None

Threshold height: 50 ft

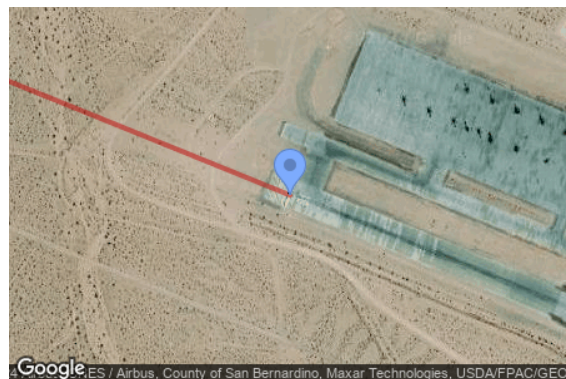
Direction: 112.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.300254	-116.174354	2051.60	50.00	2101.60
Two-mile	34.311085	-116.206843	2118.10	536.90	2655.00

Name: NXP28

Description: None

Threshold height: 50 ft

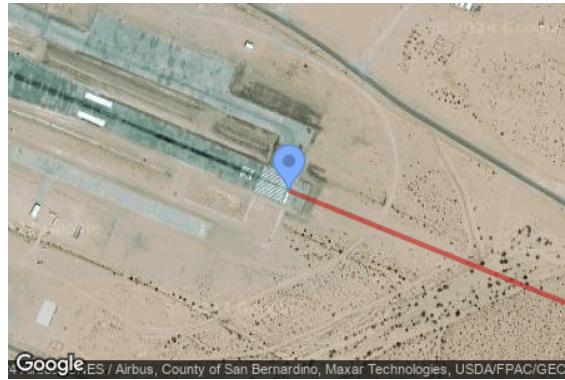
Direction: 292.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.291942	-116.149860	2017.30	50.00	2067.30
Two-mile	34.281111	-116.117374	1850.70	770.00	2620.70

Name: TNP08

Description: None

Threshold height: 40 ft

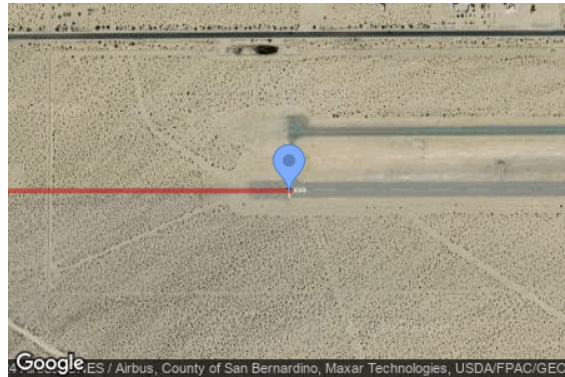
Direction: 90.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.134350	-115.953435	1873.50	40.00	1913.50
Two-mile	34.134350	-115.988406	1988.60	478.30	2466.90

Name: TNP17

Description: None

Threshold height: 40 ft

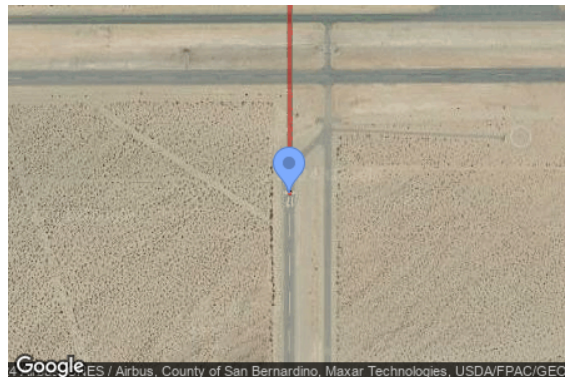
Direction: 180.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.132738	-115.948031	1852.40	40.00	1892.40
Two-mile	34.161651	-115.948031	1740.20	705.70	2445.90

Name: TNP26

Description: None

Threshold height: 40 ft

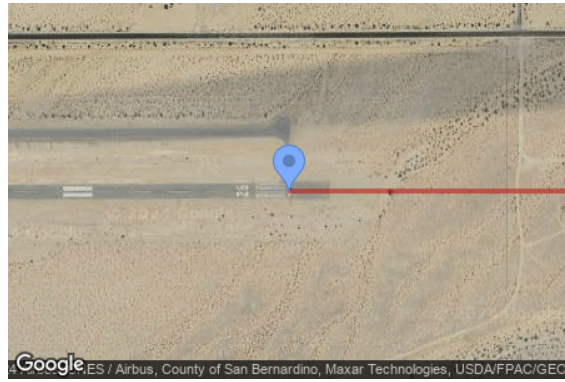
Direction: 270.0°

Glide slope: 3.1°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.134442	-115.935194	1784.70	40.00	1824.70
Two-mile	34.134447	-115.900223	1598.40	798.20	2396.60

Name: TNP35

Description: None

Threshold height: 40 ft

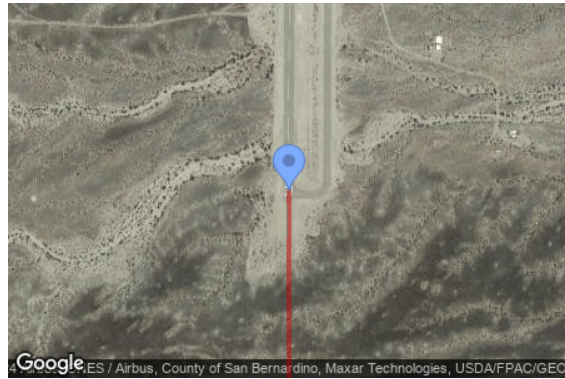
Direction: 0.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	34.122427	-115.948063	1880.30	40.00	1920.30
Two-mile	34.093514	-115.948063	2301.90	171.80	2473.70

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	34.176656	-116.106456	2102.22	5.50
OP 2	2	34.176559	-116.111878	2174.80	5.50
OP 3	3	34.176404	-116.108833	2140.72	5.50
OP 4	4	34.176195	-116.113755	2192.46	5.50
OP 5	5	34.176013	-116.109470	2146.45	5.50
OP 6	6	34.174813	-116.107810	2117.95	5.50
OP 7	7	34.174497	-116.120349	2218.96	5.50
OP 8	8	34.173820	-116.122810	2241.65	5.50
OP 9	9	34.173633	-116.118199	2208.27	5.50
OP 10	10	34.173424	-116.119443	2217.77	5.50
OP 11	11	34.172248	-116.126703	2281.99	5.50
OP 12	12	34.170884	-116.120626	2230.76	5.50
OP 13	13	34.161485	-116.104484	2181.70	5.50
OP 14	14	34.160015	-116.104309	2205.91	5.50
OP 15	15	34.159228	-116.105353	2216.77	5.50
OP 16	16	34.159034	-116.106283	2212.62	5.50
OP 17	17	34.157312	-116.106401	2239.53	5.50
OP 18	18	34.149400	-116.111160	2329.22	5.50
OP 19	19	34.149324	-116.109957	2323.40	5.50
OP 20	20	34.148791	-116.112000	2342.61	5.50

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
	°	°	min	hr	min	hr	kWh
PV01	21.0	180.0	7,327	122.1	0	0.0	-
PV02	21.0	180.0	4,954	82.6	0	0.0	-
PV03	21.0	180.0	7,683	128.1	0	0.0	-
PV04	21.0	180.0	10,545	175.8	0	0.0	-
PV05	21.0	180.0	6,401	106.7	0	0.0	-
PV06	21.0	180.0	7,385	123.1	2,273	37.9	-
PV07	21.0	180.0	4,592	76.5	0	0.0	-
PV08	21.0	180.0	4,416	73.6	0	0.0	-
PV09	21.0	180.0	7,431	123.8	3,166	52.8	-
PV10	21.0	180.0	1,373	22.9	0	0.0	-
PV11	21.0	180.0	2,063	34.4	0	0.0	-
PV12	21.0	180.0	8,227	137.1	1,771	29.5	-
PV13	21.0	180.0	1,300	21.7	0	0.0	-
PV14	21.0	180.0	1,932	32.2	348	5.8	-
PV15	21.0	180.0	1,766	29.4	0	0.0	-
PV16	21.0	180.0	5,425	90.4	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
Route01	0	0.0	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP26	10,415	173.6	0	0.0
TNP35	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

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	10,331	172.2	0	0.0
OP 14	13,021	217.0	741	12.3
OP 15	15,005	250.1	1,757	29.3
OP 16	16,287	271.4	2,654	44.2
OP 17	17,761	296.0	2,406	40.1
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

PV: PV01 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	513	8.6	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 13	881	14.7	0	0.0
OP 14	1,144	19.1	0	0.0
OP 15	1,933	32.2	0	0.0
OP 16	1,884	31.4	0	0.0
OP 17	972	16.2	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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

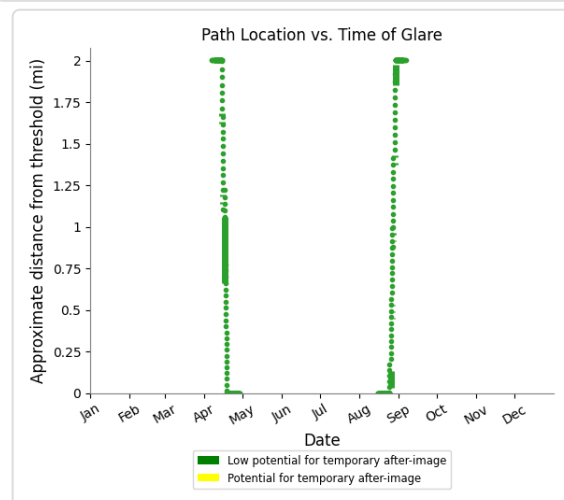
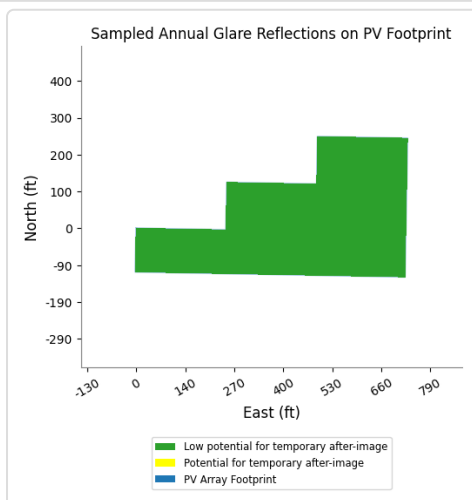
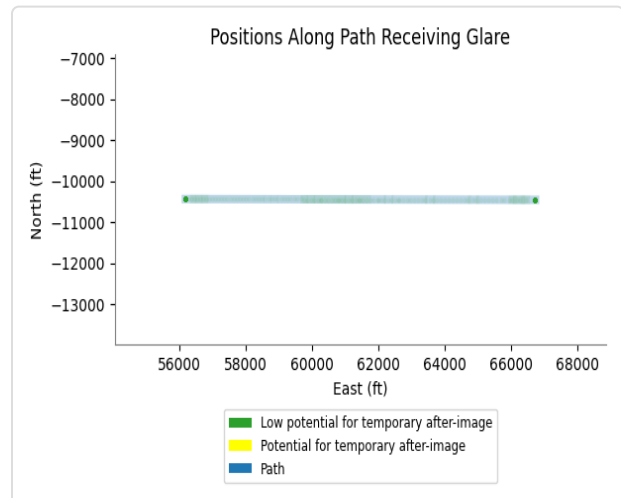
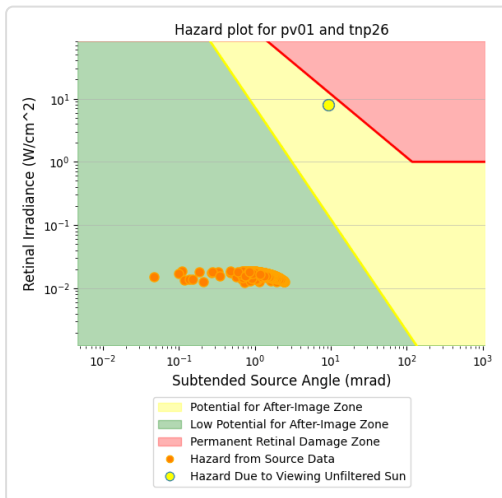
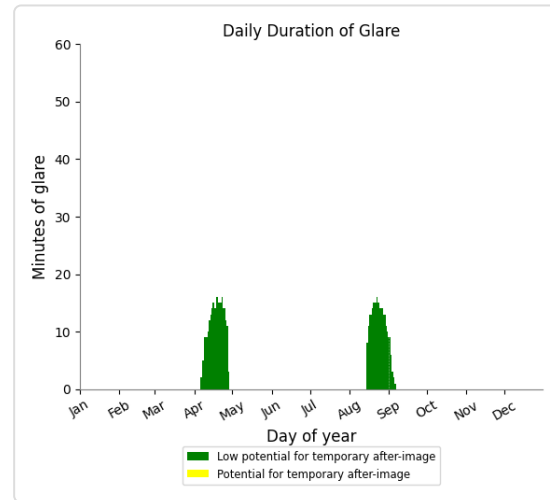
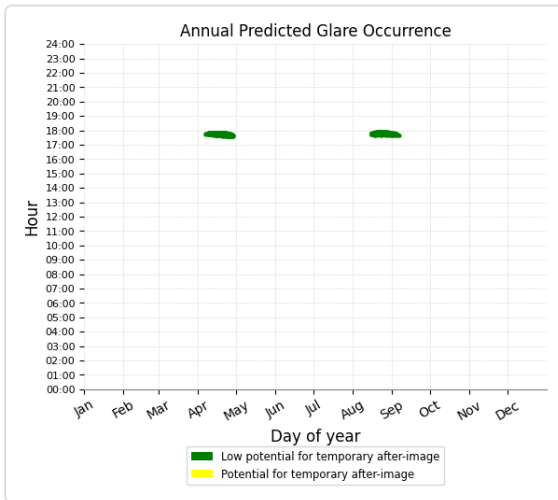
PV01 and Route: Route01

No glare found

PV01 and FP: TNP26

Yellow glare: none

Green glare: 513 min.



PV01 and FP: NXP10

No glare found

PV01 and FP: NXP28

No glare found

PV01 and FP: TNP08

No glare found

PV01 and FP: TNP17

No glare found

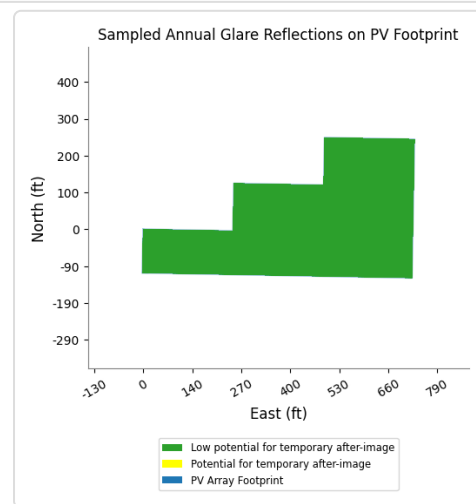
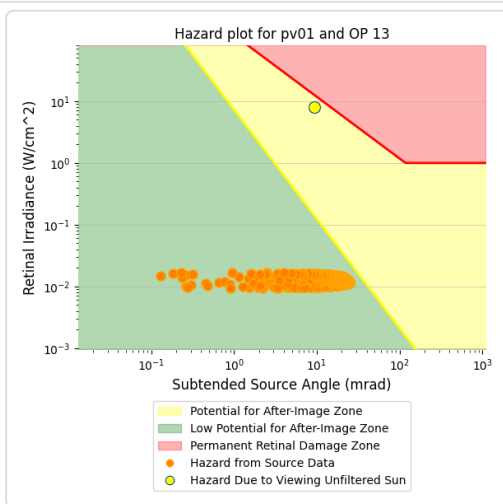
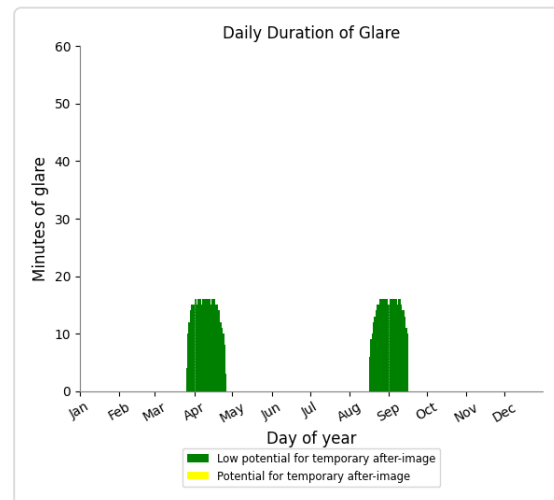
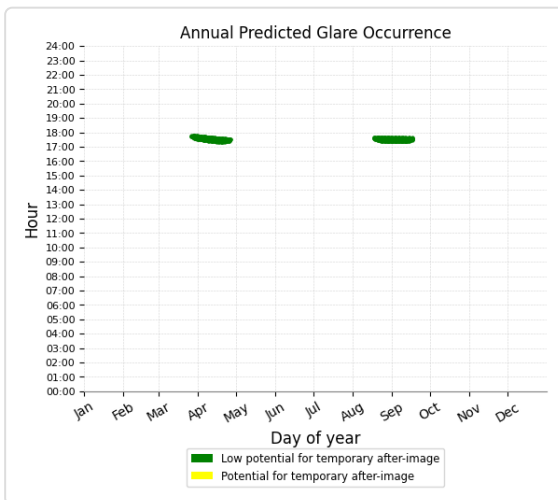
PV01 and FP: TNP35

No glare found

PV01 and OP 13

Yellow glare: none

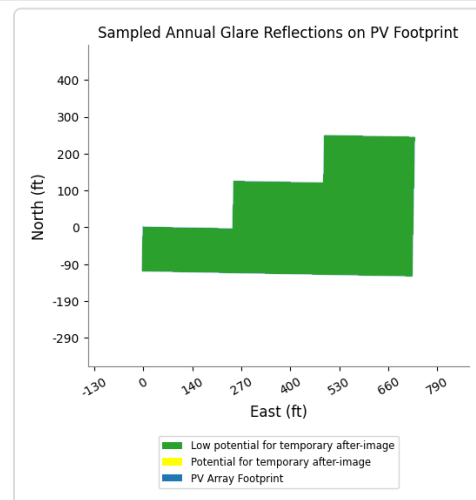
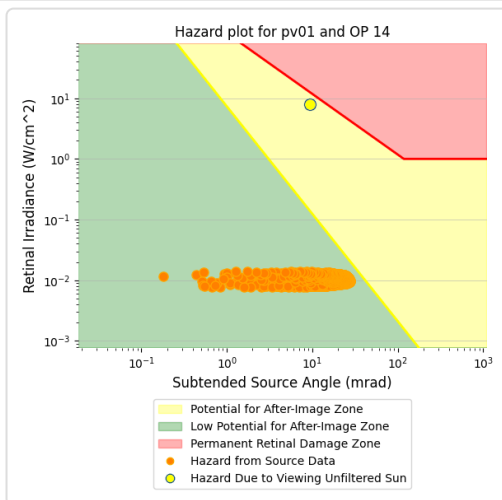
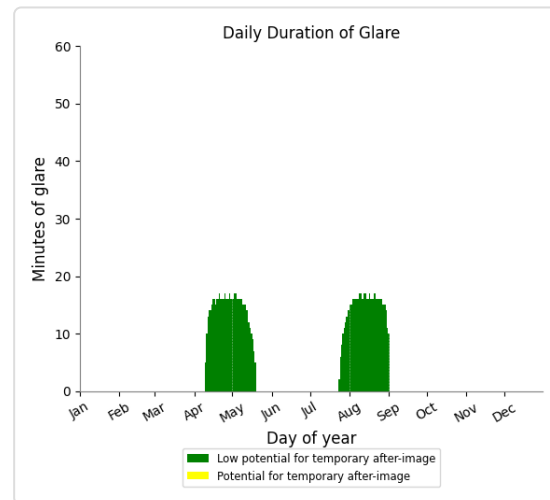
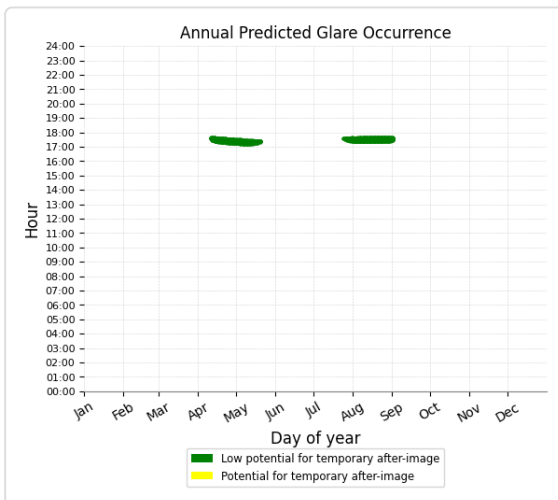
Green glare: 881 min.



PV01 and OP 14

Yellow glare: none

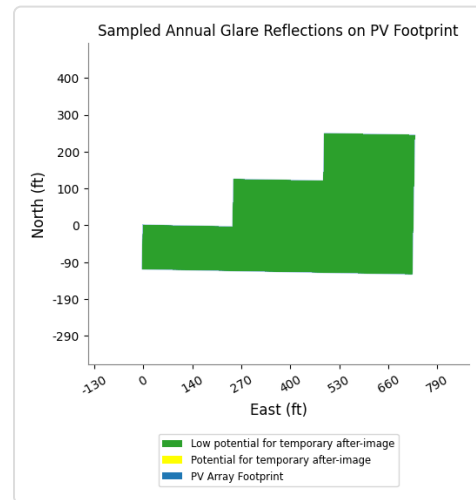
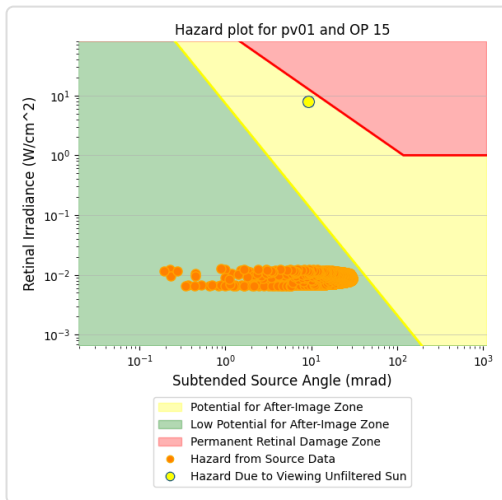
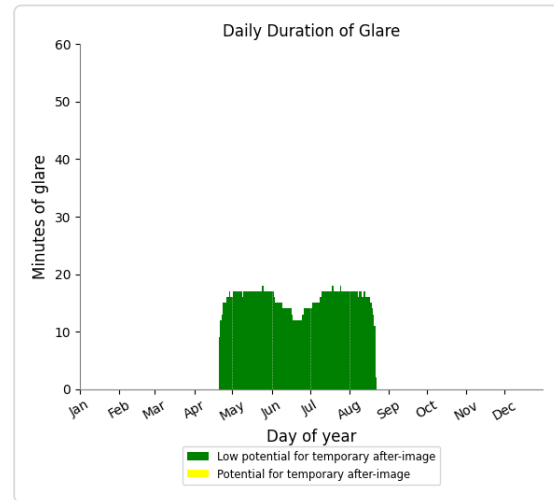
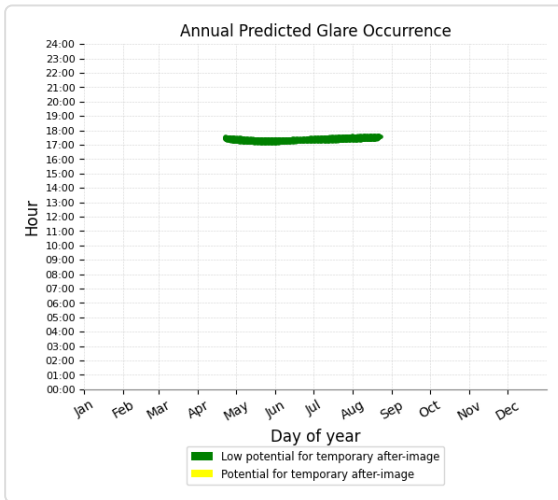
Green glare: 1,144 min.



PV01 and OP 15

Yellow glare: none

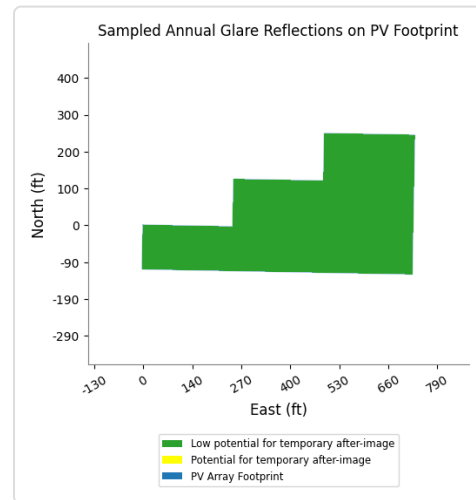
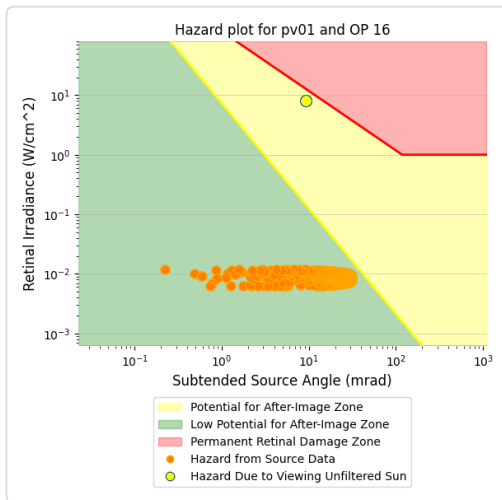
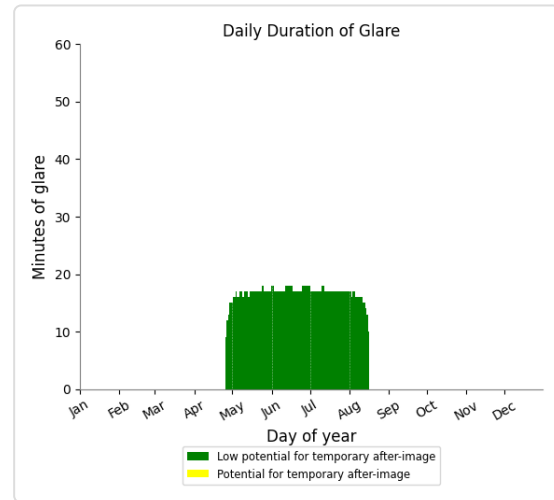
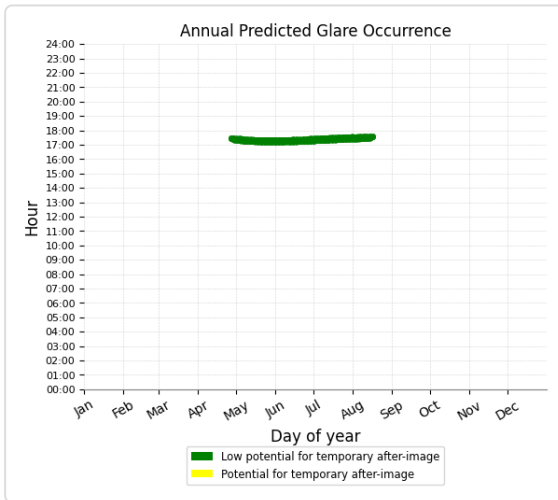
Green glare: 1,933 min.



PV01 and OP 16

Yellow glare: none

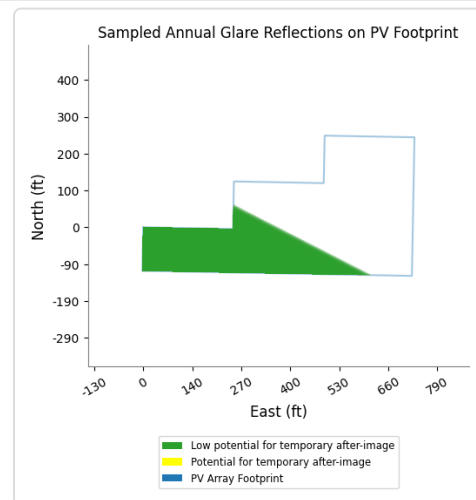
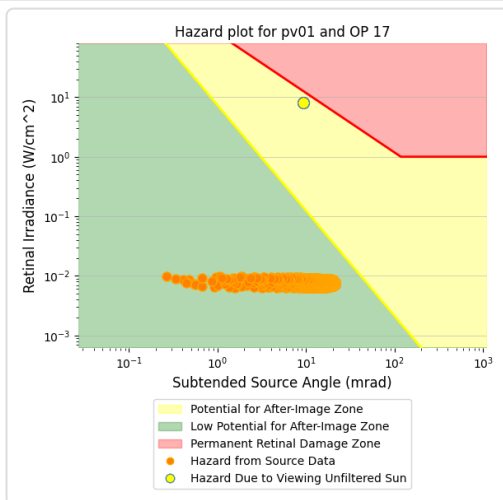
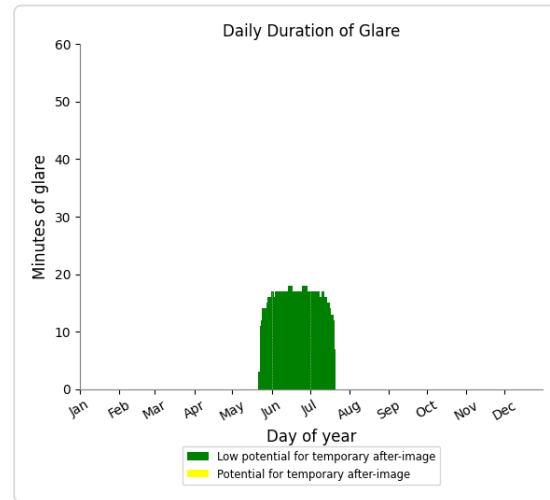
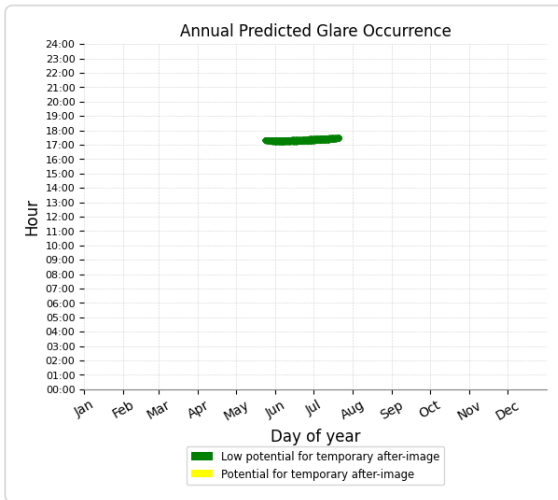
Green glare: 1,884 min.



PV01 and OP 17

Yellow glare: none

Green glare: 972 min.



PV01 and OP 1

No glare found

PV01 and OP 2

No glare found

PV01 and OP 3

No glare found

PV01 and OP 4

No glare found

PV01 and OP 5

No glare found

PV01 and OP 6

No glare found

PV01 and OP 7

No glare found

PV01 and OP 8

No glare found

PV01 and OP 9

No glare found

PV01 and OP 10

No glare found

PV01 and OP 11

No glare found

PV01 and OP 12

No glare found

PV01 and OP 18

No glare found

PV01 and OP 19

No glare found

PV01 and OP 20

No glare found

PV: PV02 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	758	12.6	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 13	762	12.7	0	0.0
OP 14	1,471	24.5	0	0.0
OP 15	956	15.9	0	0.0
OP 16	1,007	16.8	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 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

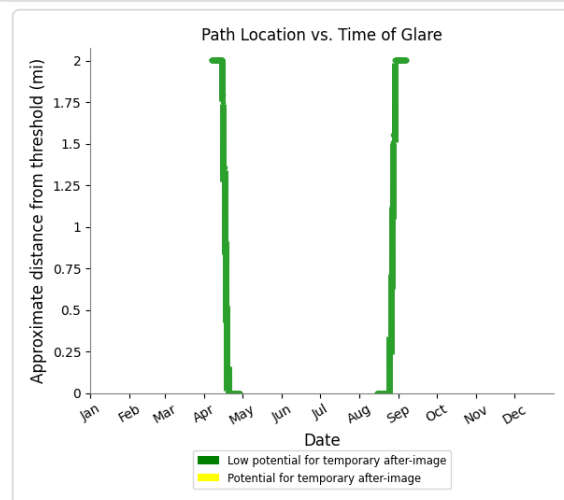
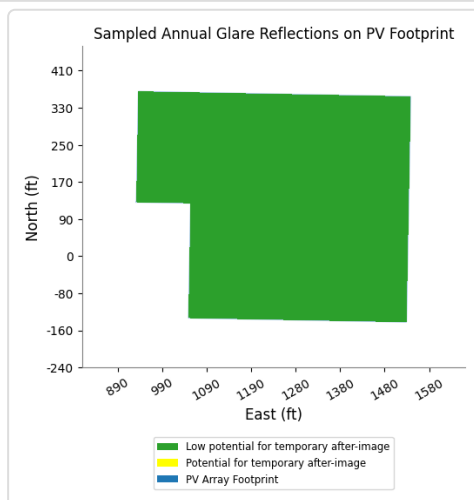
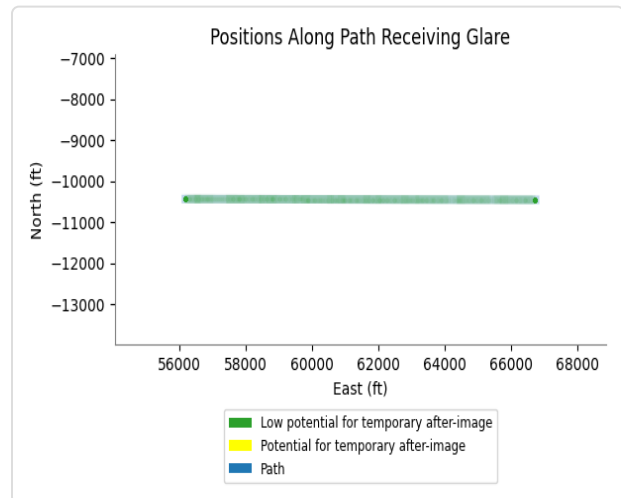
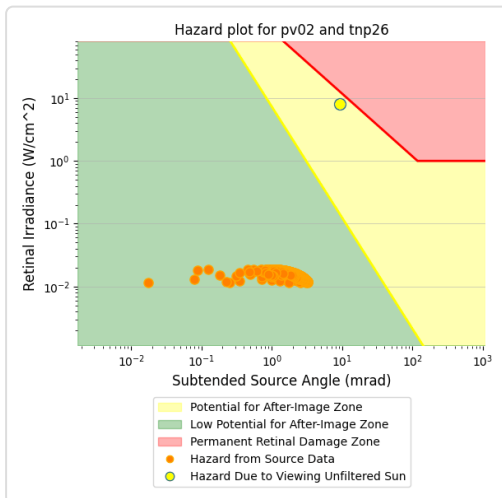
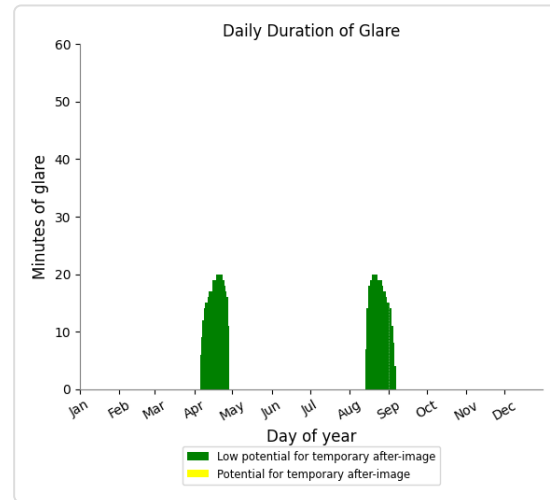
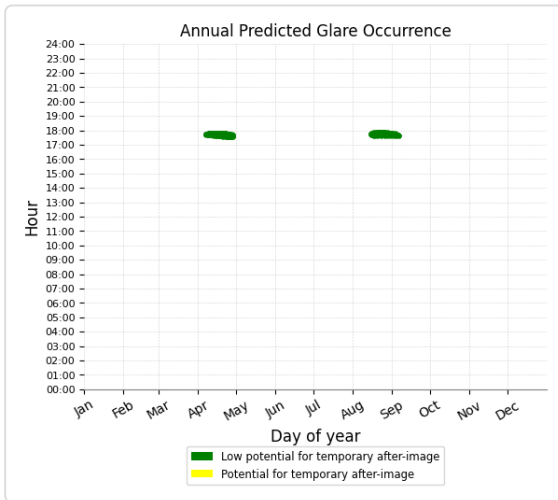
PV02 and Route: Route01

No glare found

PV02 and FP: TNP26

Yellow glare: none

Green glare: 758 min.



PV02 and FP: NXP10

No glare found

PV02 and FP: NXP28

No glare found

PV02 and FP: TNP08

No glare found

PV02 and FP: TNP17

No glare found

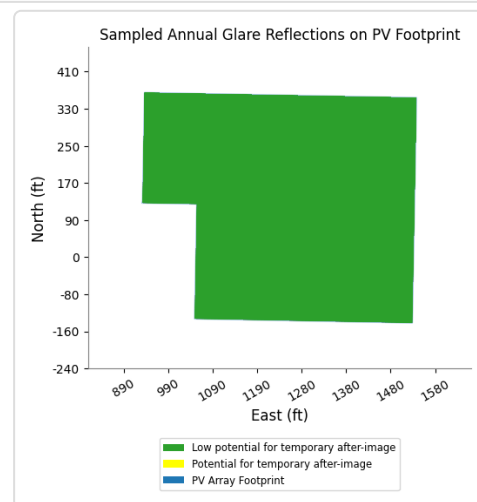
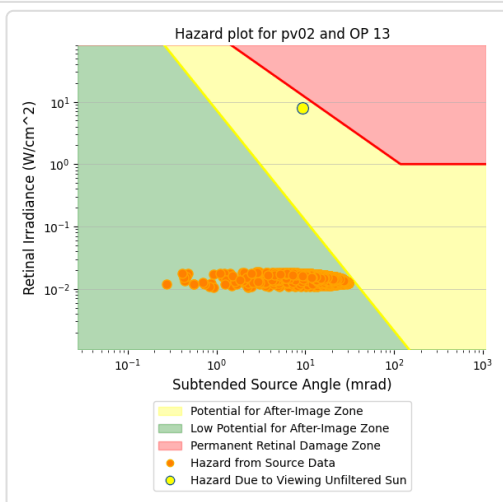
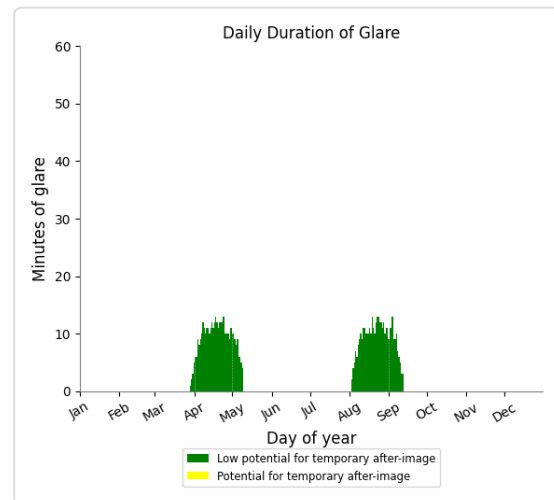
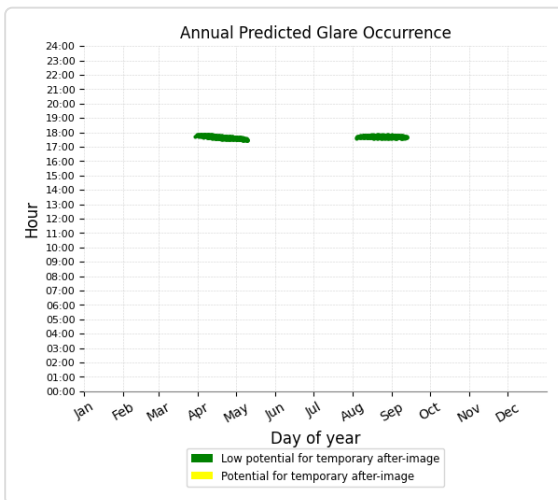
PV02 and FP: TNP35

No glare found

PV02 and OP 13

Yellow glare: none

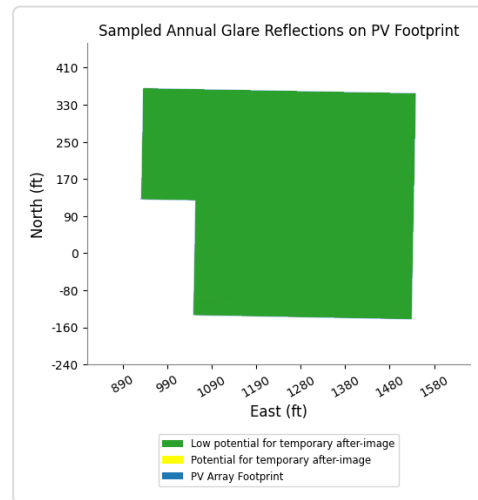
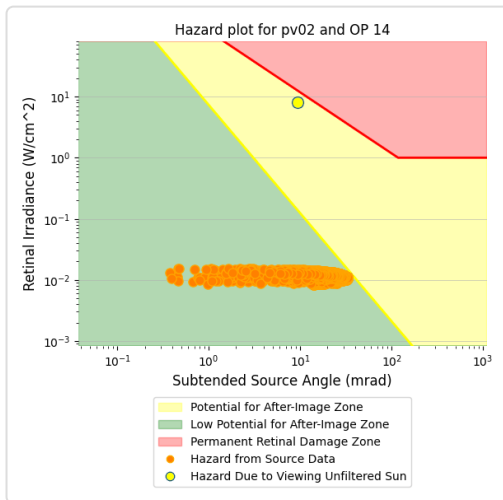
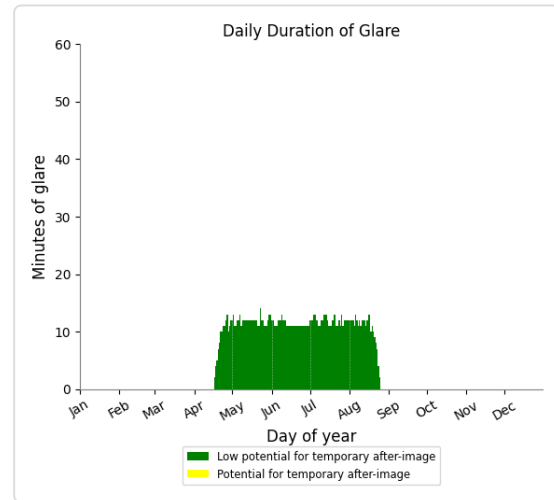
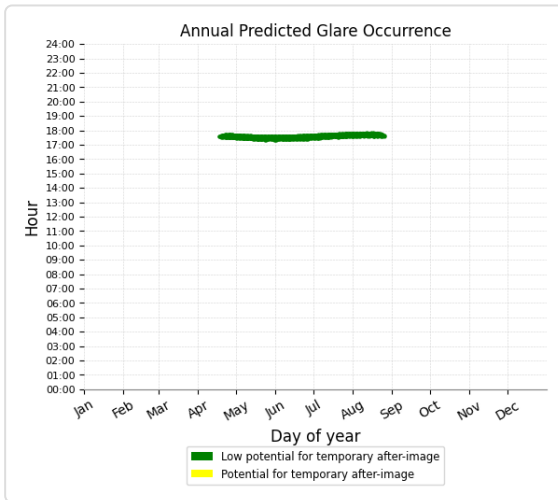
Green glare: 762 min.



PV02 and OP 14

Yellow glare: none

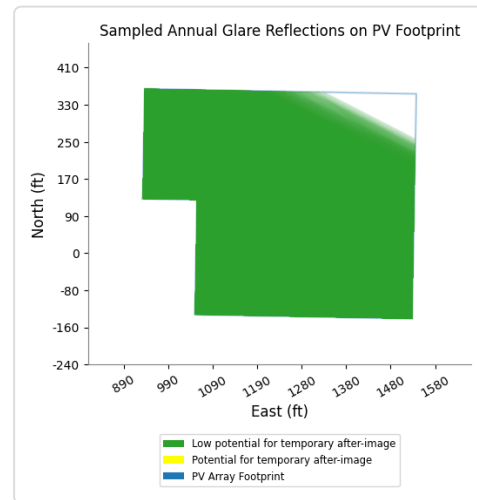
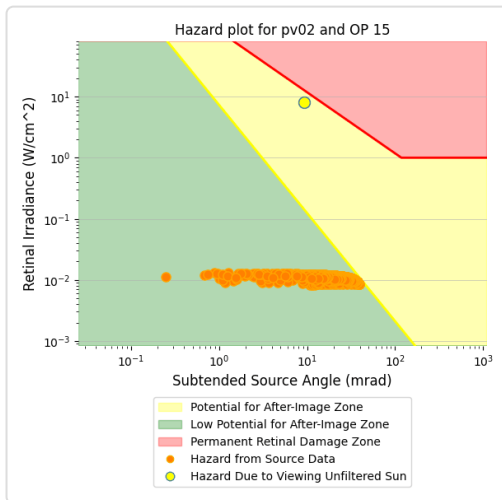
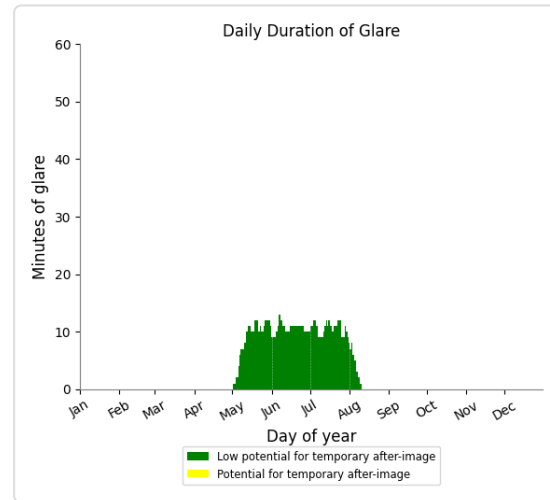
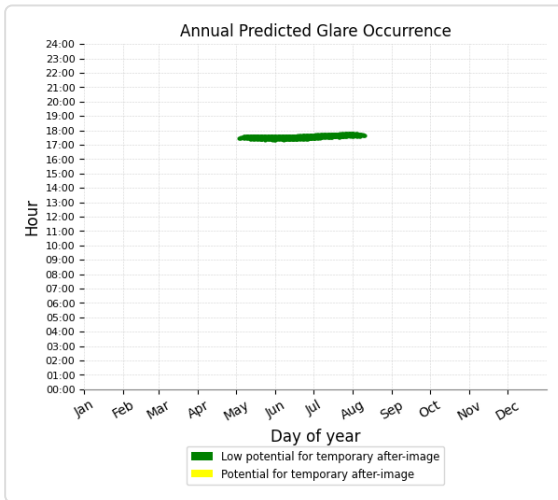
Green glare: 1,471 min.



PV02 and OP 15

Yellow glare: none

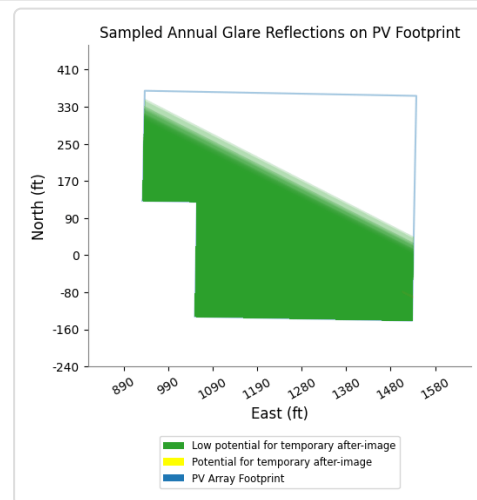
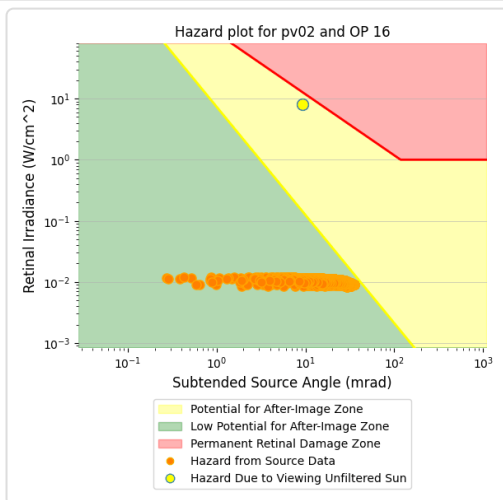
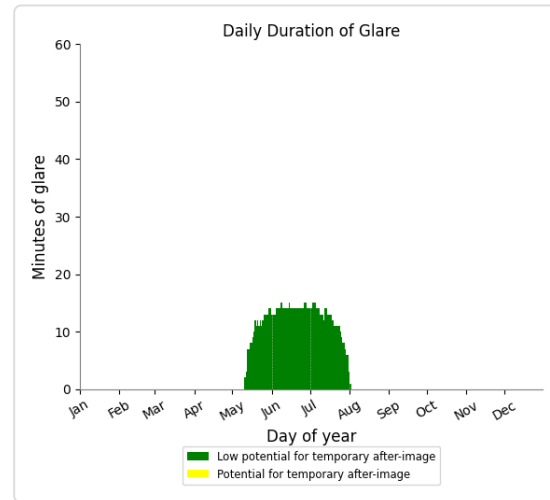
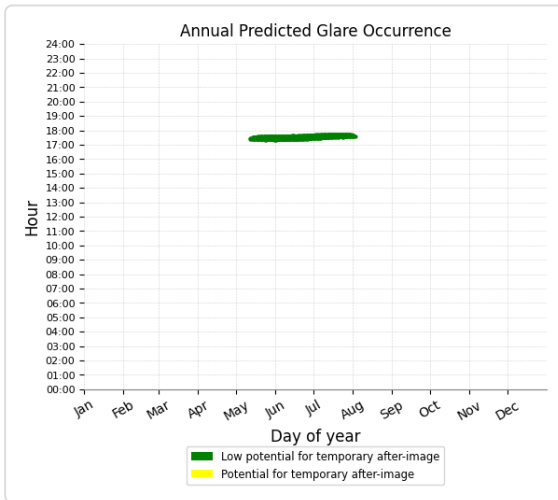
Green glare: 956 min.



PV02 and OP 16

Yellow glare: none

Green glare: 1,007 min.



PV02 and OP 1

No glare found

PV02 and OP 2

No glare found

PV02 and OP 3

No glare found

PV02 and OP 4

No glare found

PV02 and OP 5

No glare found

PV02 and OP 6

No glare found

PV02 and OP 7

No glare found

PV02 and OP 8

No glare found

PV02 and OP 9

No glare found

PV02 and OP 10

No glare found

PV02 and OP 11

No glare found

PV02 and OP 12

No glare found

PV02 and OP 17

No glare found

PV02 and OP 18

No glare found

PV02 and OP 19

No glare found

PV02 and OP 20

No glare found

PV: PV03 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	524	8.7	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 13	2,102	35.0	0	0.0
OP 14	2,516	41.9	0	0.0
OP 15	1,600	26.7	0	0.0
OP 16	941	15.7	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 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

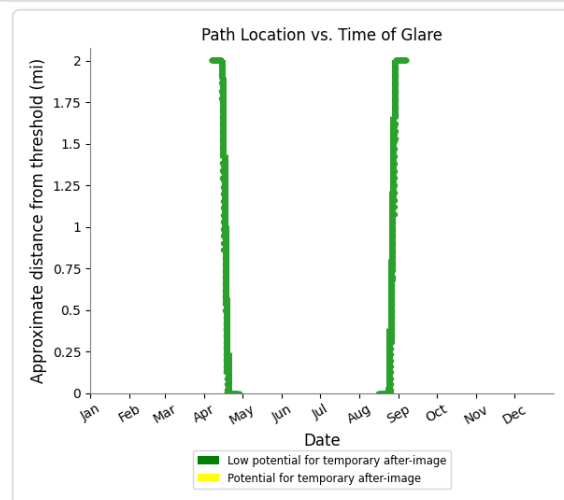
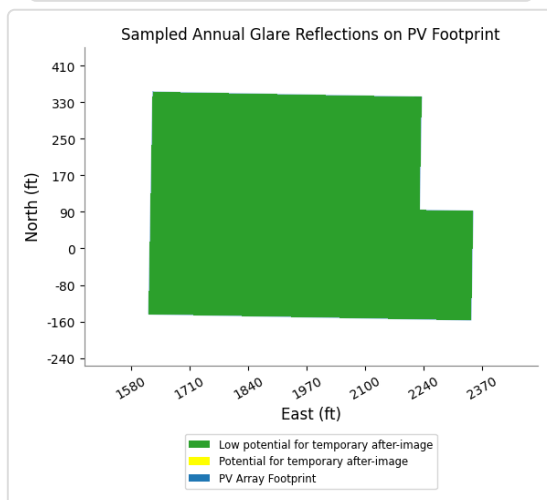
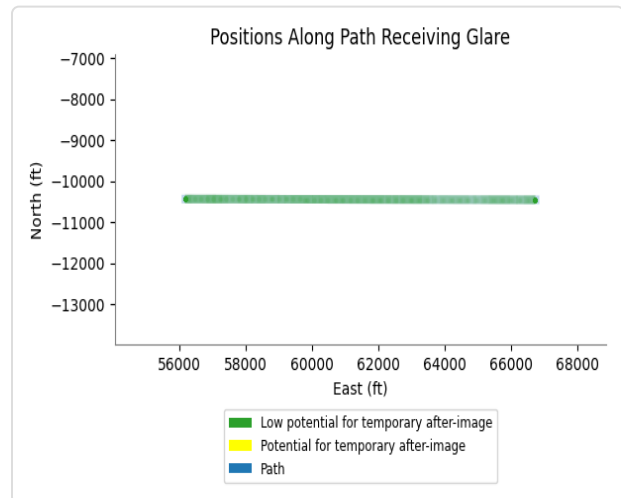
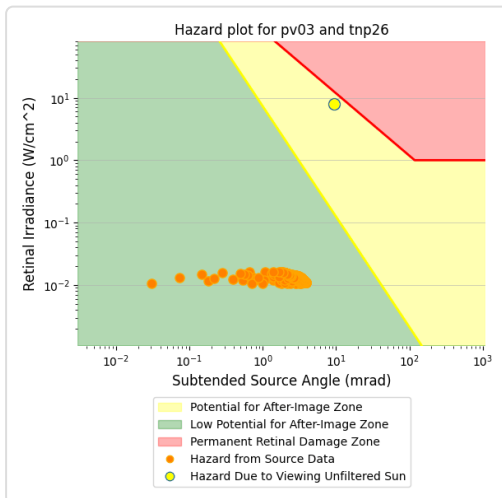
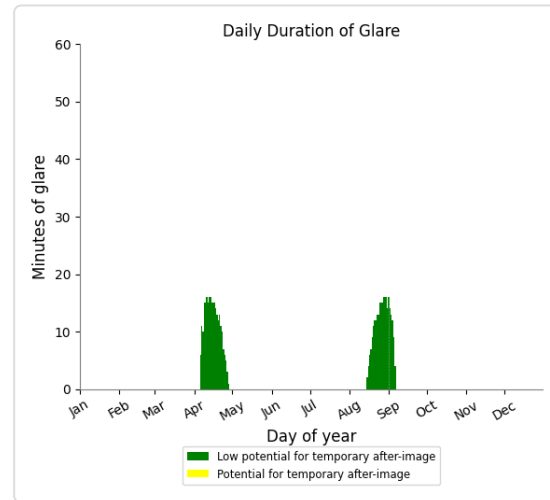
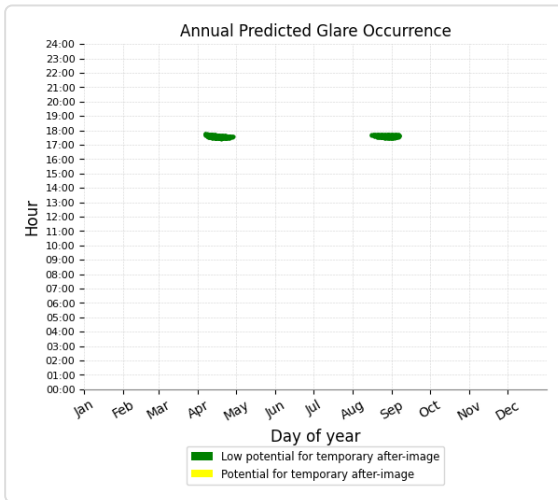
PV03 and Route: Route01

No glare found

PV03 and FP: TNP26

Yellow glare: none

Green glare: 524 min.



PV03 and FP: NXP10

No glare found

PV03 and FP: NXP28

No glare found

PV03 and FP: TNP08

No glare found

PV03 and FP: TNP17

No glare found

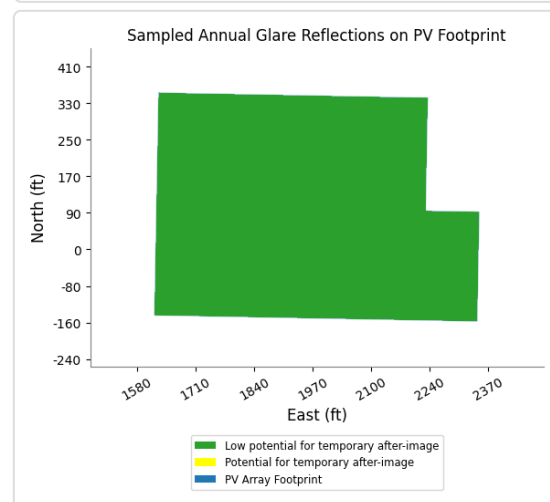
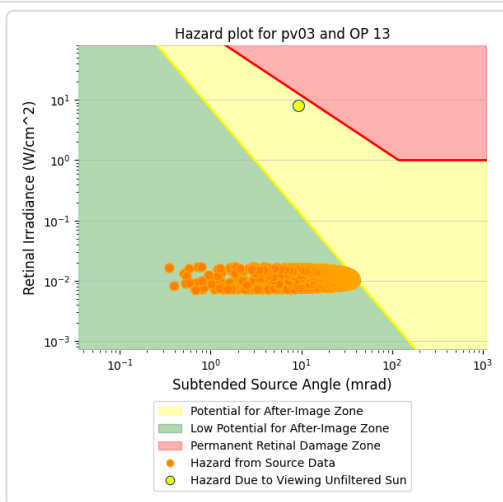
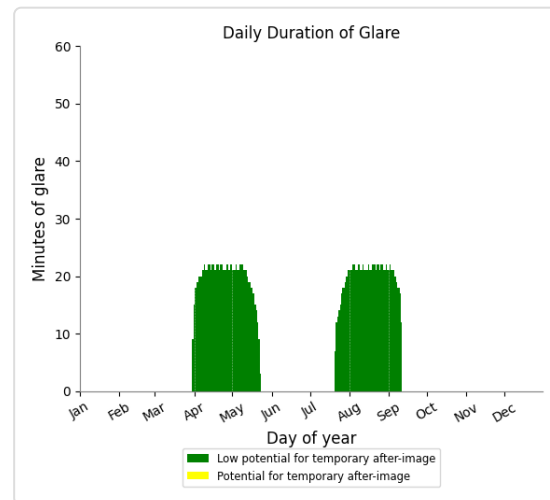
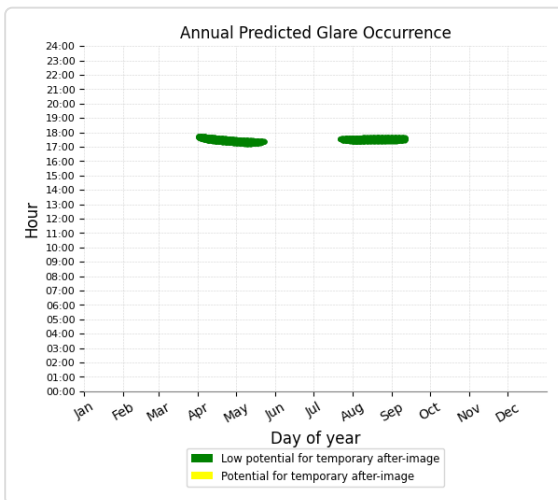
PV03 and FP: TNP35

No glare found

PV03 and OP 13

Yellow glare: none

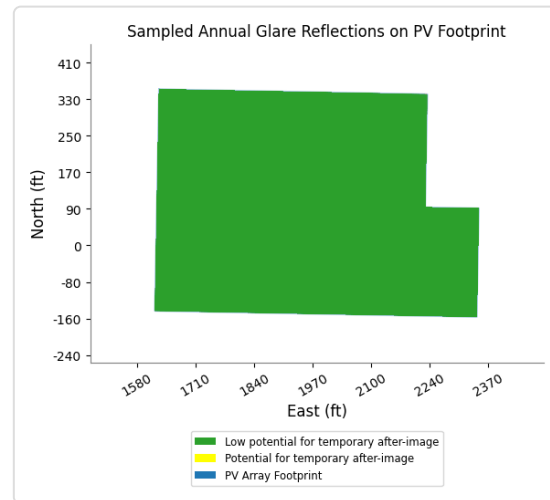
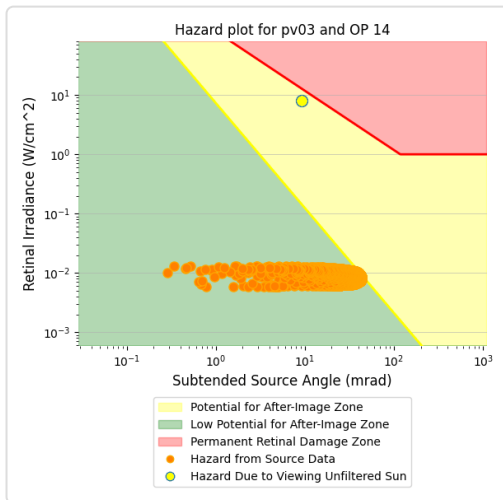
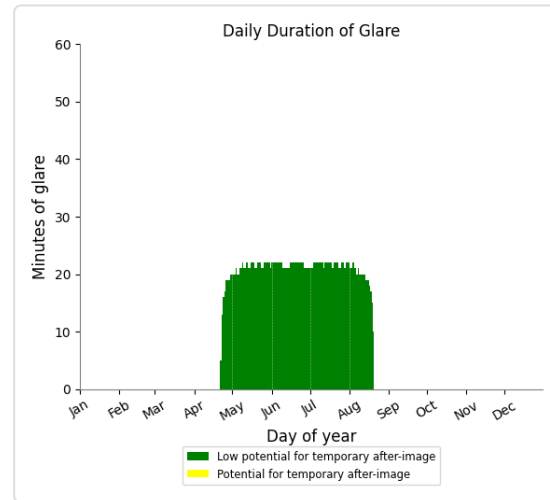
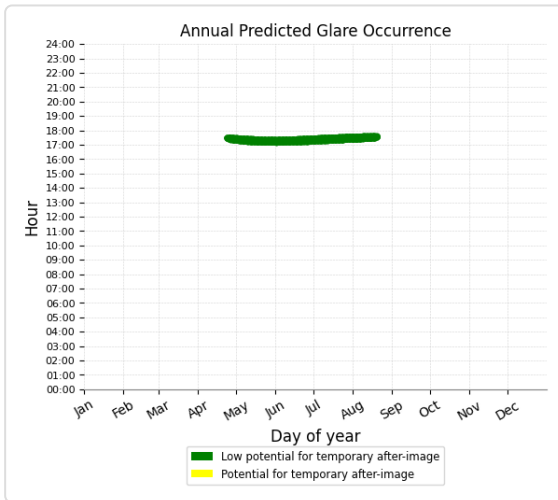
Green glare: 2,102 min.



PV03 and OP 14

Yellow glare: none

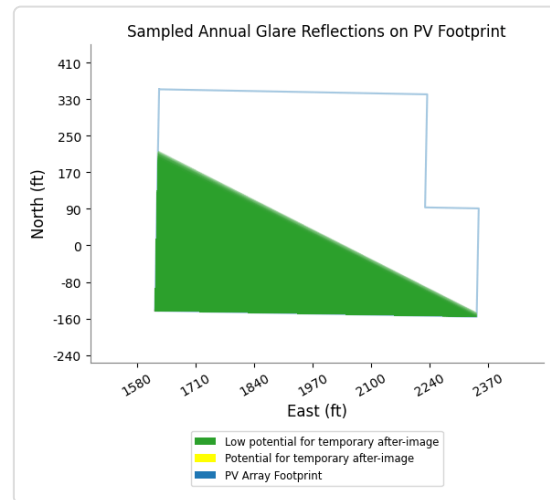
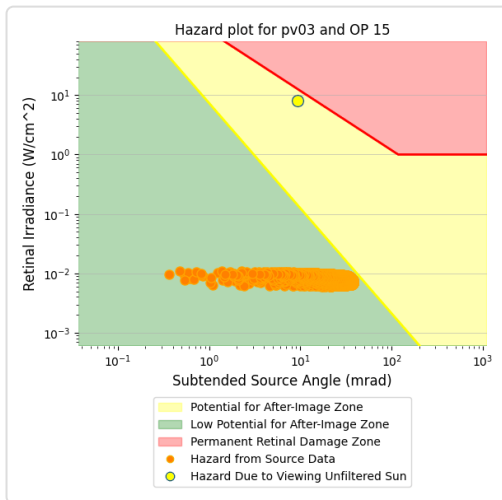
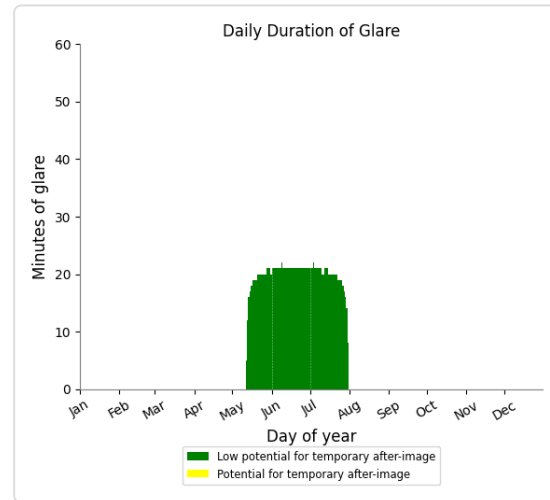
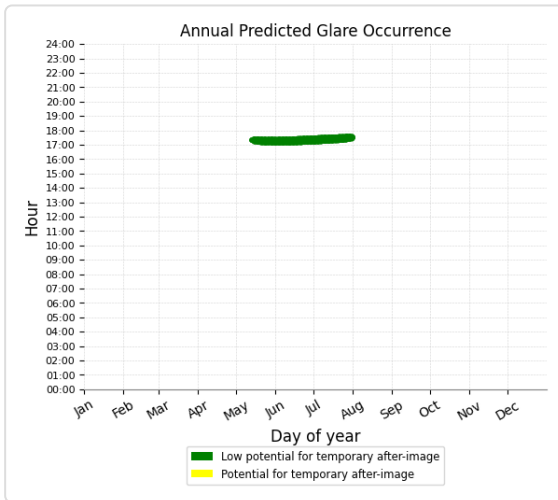
Green glare: 2,516 min.



PV03 and OP 15

Yellow glare: none

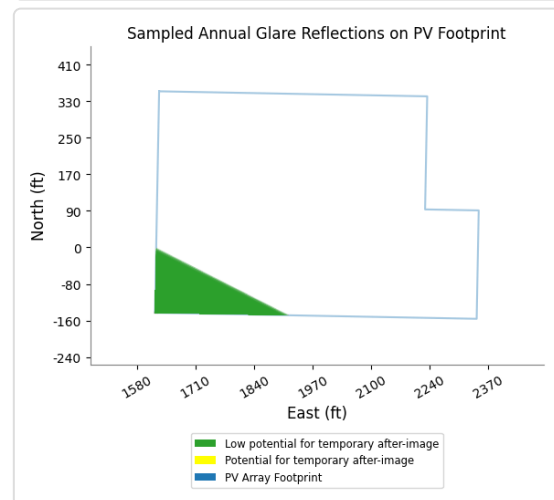
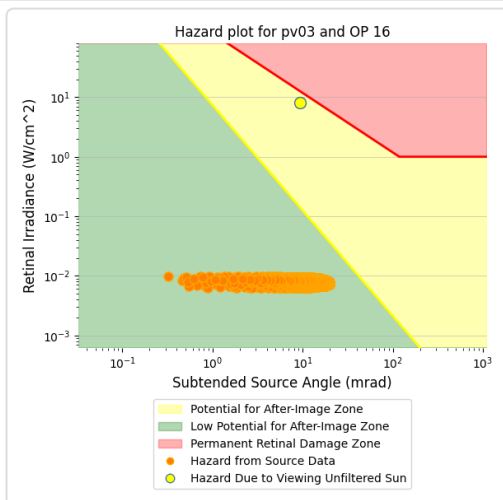
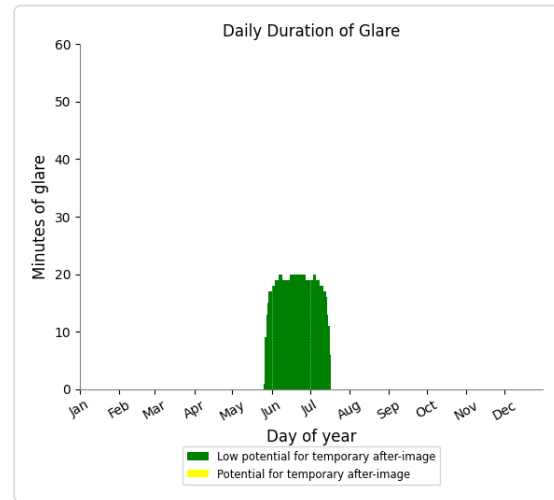
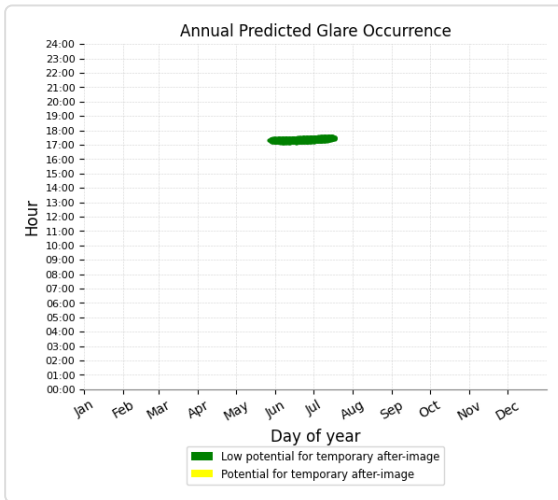
Green glare: 1,600 min.



PV03 and OP 16

Yellow glare: none

Green glare: 941 min.



PV03 and OP 1

No glare found

PV03 and OP 2

No glare found

PV03 and OP 3

No glare found

PV03 and OP 4

No glare found

PV03 and OP 5

No glare found

PV03 and OP 6

No glare found

PV03 and OP 7

No glare found

PV03 and OP 8

No glare found

PV03 and OP 9

No glare found

PV03 and OP 10

No glare found

PV03 and OP 11

No glare found

PV03 and OP 12

No glare found

PV03 and OP 17

No glare found

PV03 and OP 18

No glare found

PV03 and OP 19

No glare found

PV03 and OP 20

No glare found

PV: PV04 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	702	11.7	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 13	988	16.5	0	0.0
OP 14	1,558	26.0	0	0.0
OP 15	2,064	34.4	0	0.0
OP 16	2,508	41.8	0	0.0
OP 17	2,725	45.4	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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

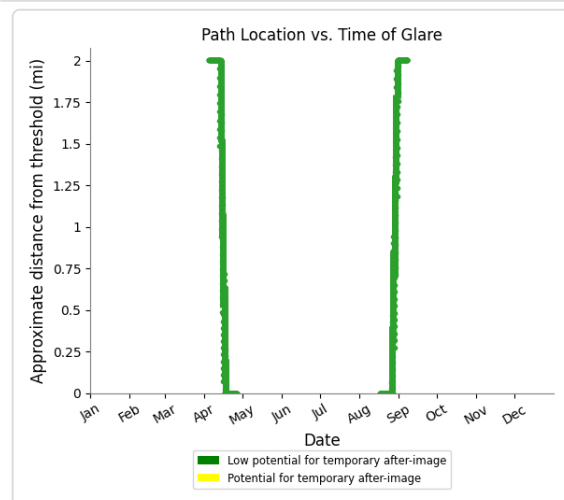
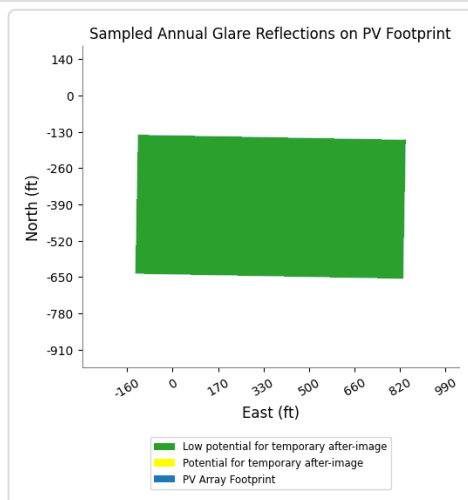
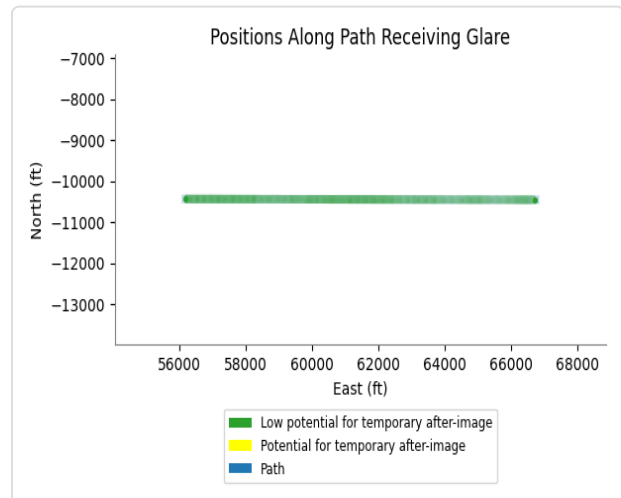
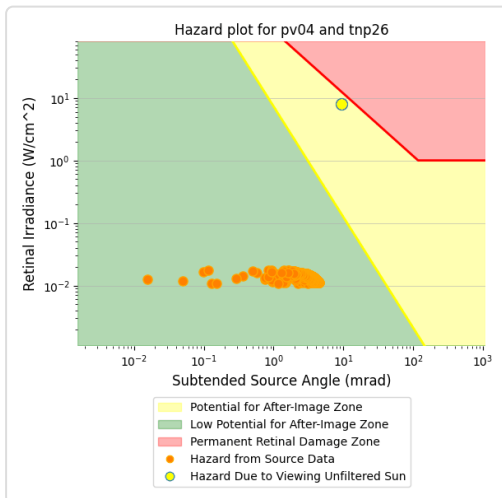
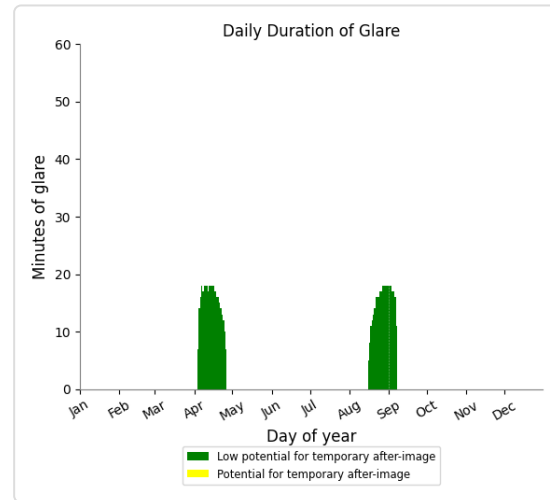
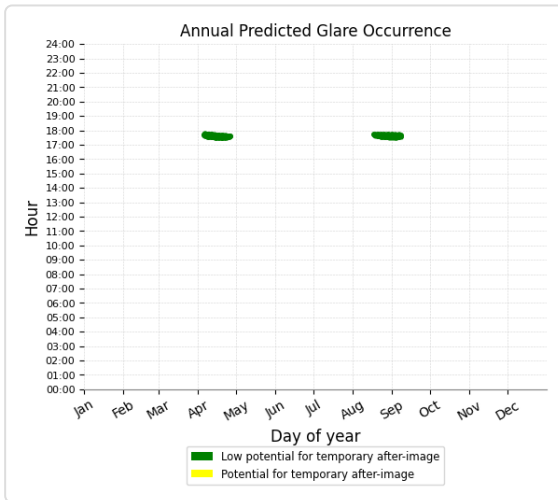
PV04 and Route: Route01

No glare found

PV04 and FP: TNP26

Yellow glare: none

Green glare: 702 min.



PV04 and FP: NXP10

No glare found

PV04 and FP: NXP28

No glare found

PV04 and FP: TNP08

No glare found

PV04 and FP: TNP17

No glare found

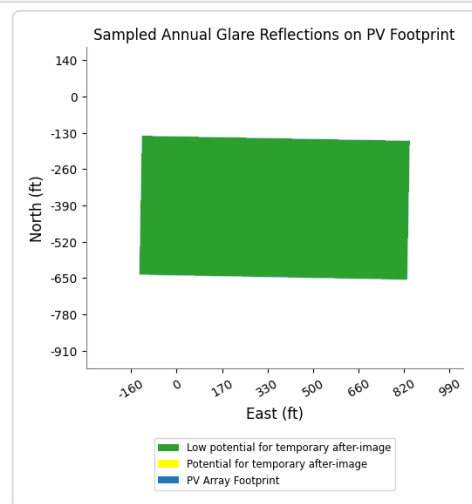
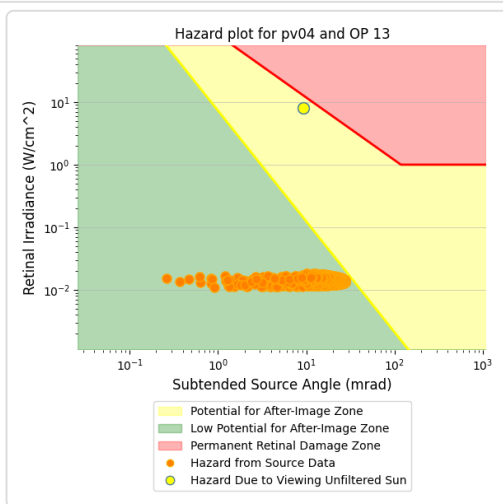
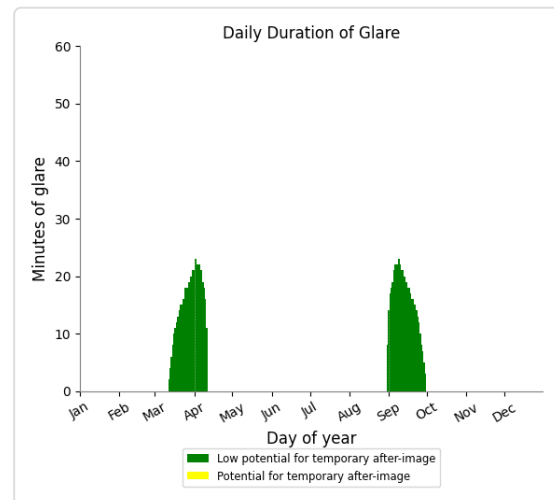
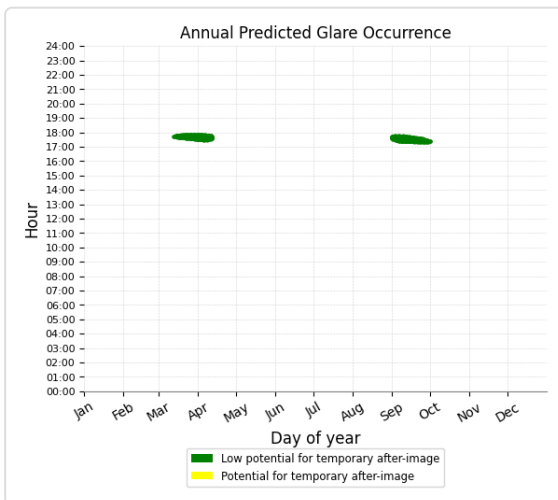
PV04 and FP: TNP35

No glare found

PV04 and OP 13

Yellow glare: none

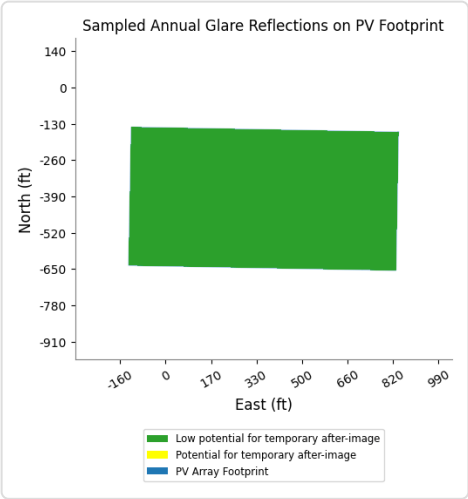
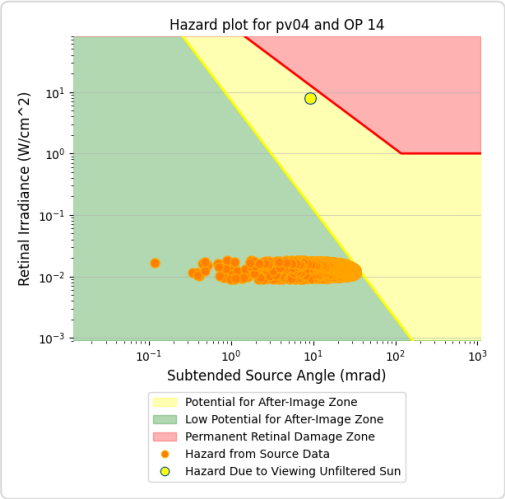
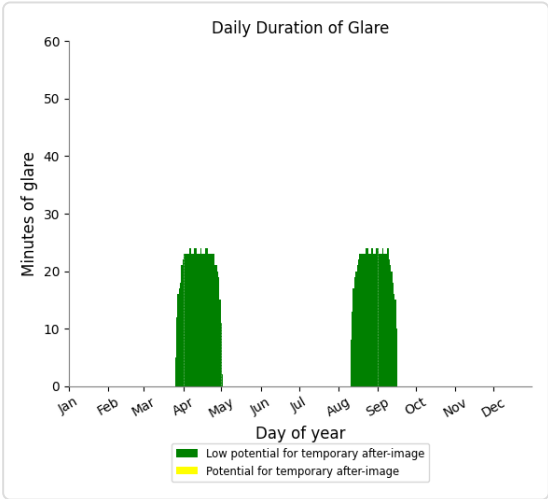
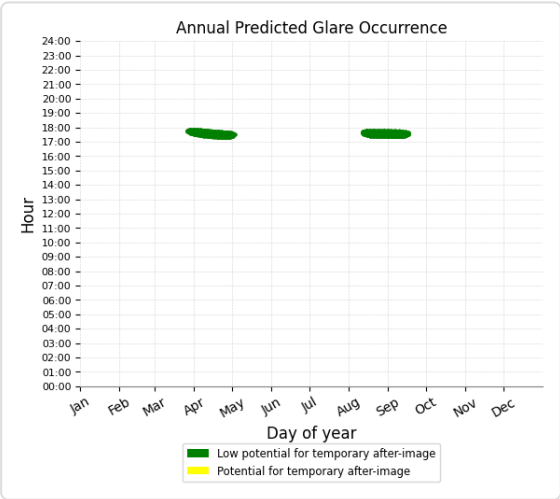
Green glare: 988 min.



PV04 and OP 14

Yellow glare: none

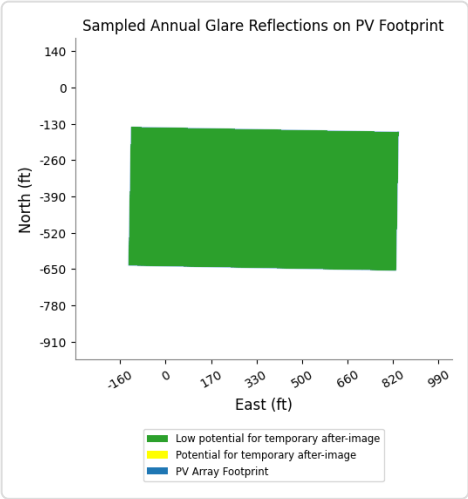
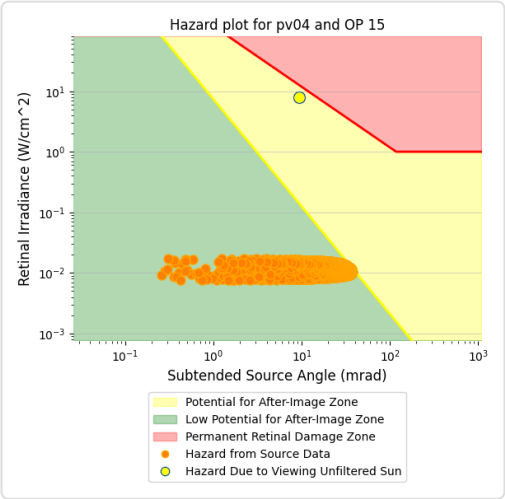
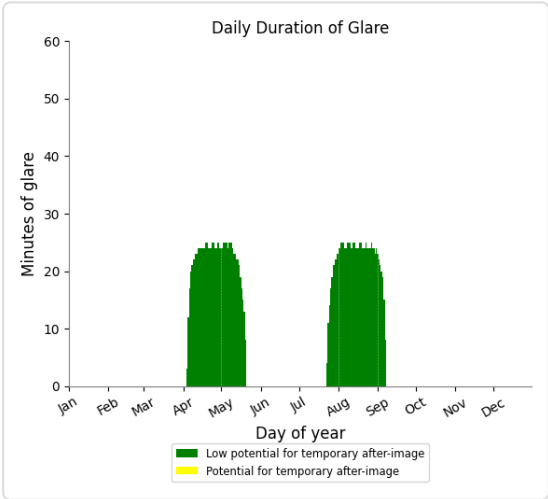
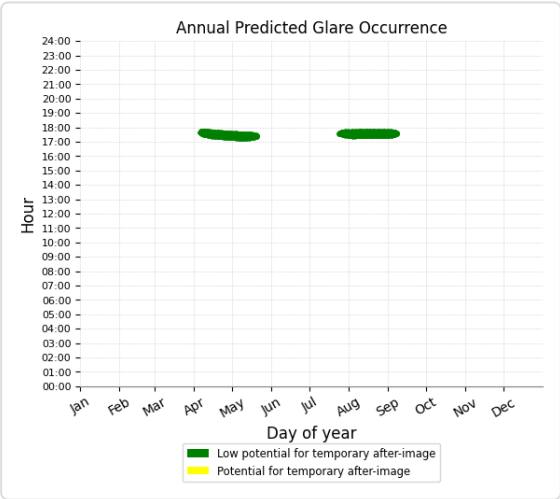
Green glare: 1,558 min.



PV04 and OP 15

Yellow glare: none

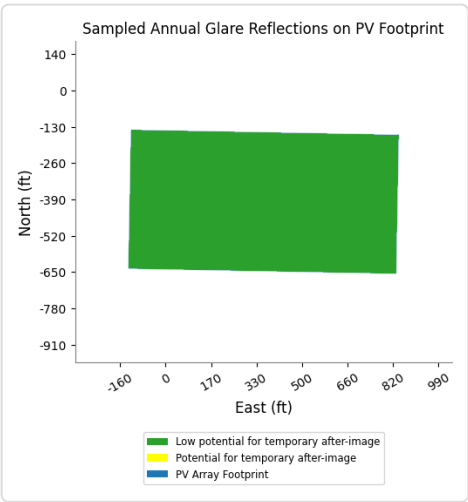
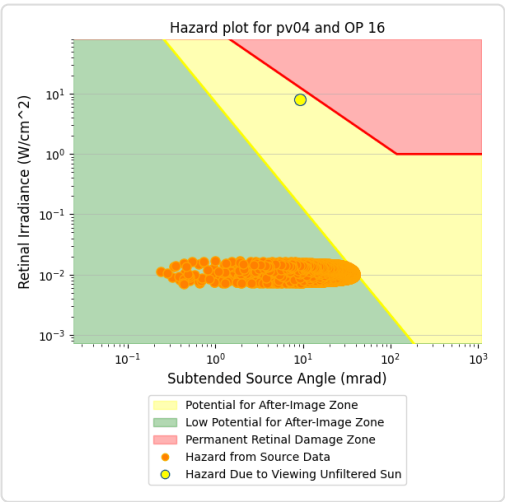
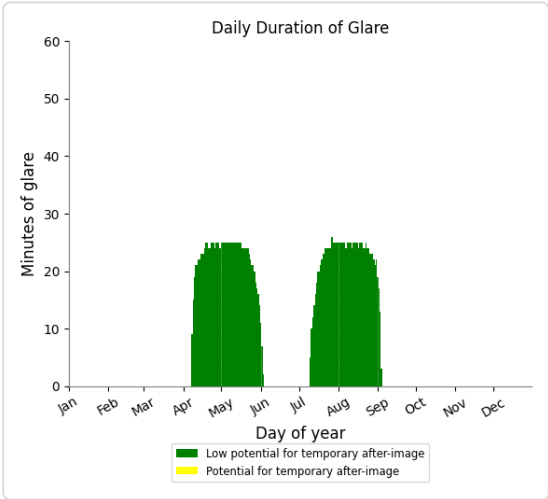
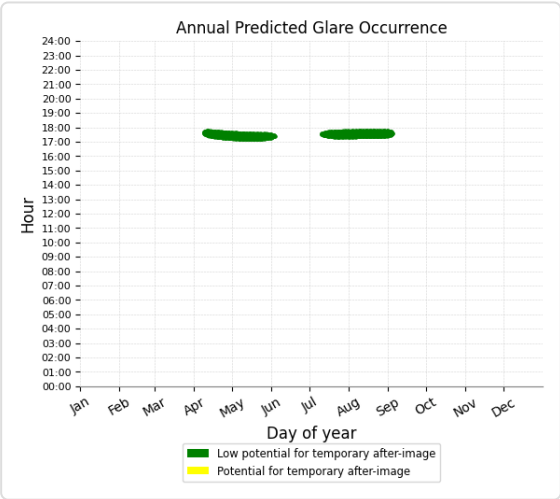
Green glare: 2,064 min.



PV04 and OP 16

Yellow glare: none

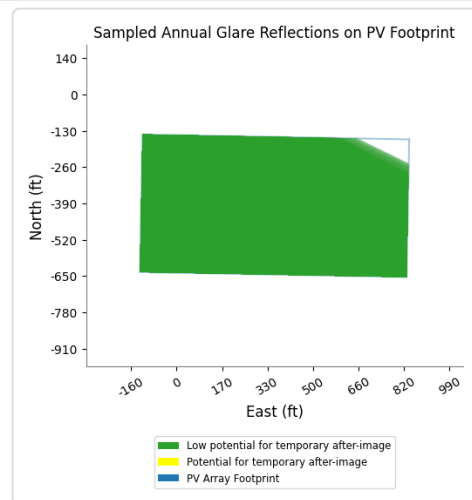
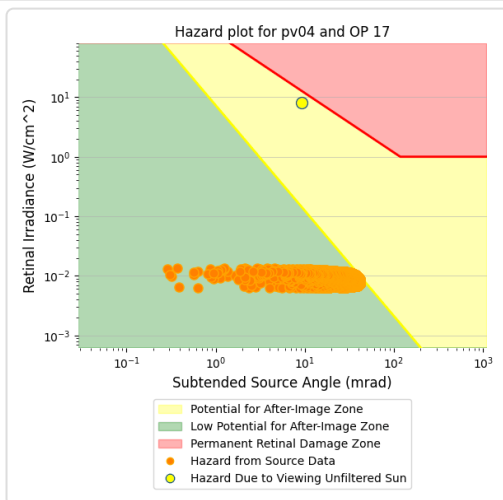
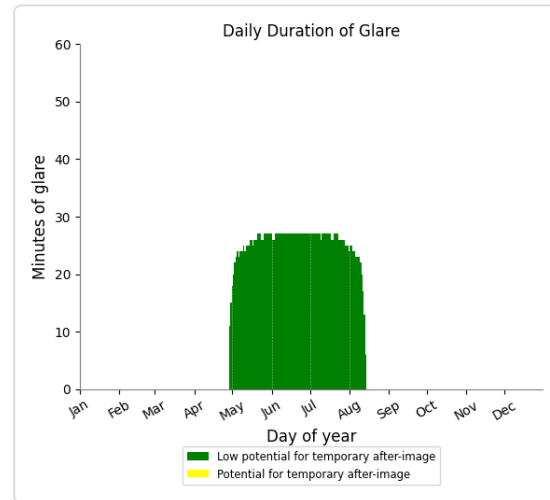
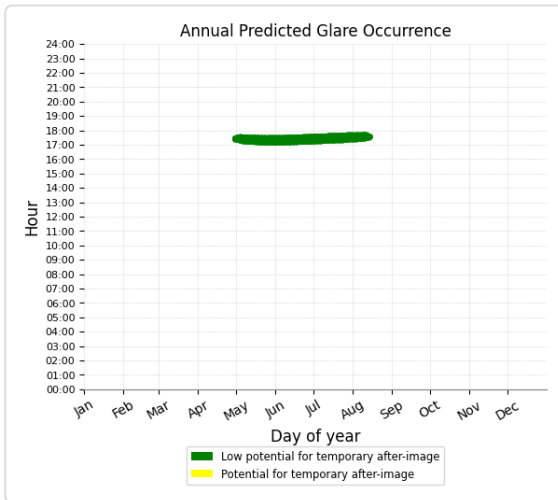
Green glare: 2,508 min.



PV04 and OP 17

Yellow glare: none

Green glare: 2,725 min.



PV04 and OP 1

No glare found

PV04 and OP 2

No glare found

PV04 and OP 3

No glare found

PV04 and OP 4

No glare found

PV04 and OP 5

No glare found

PV04 and OP 6

No glare found

PV04 and OP 7

No glare found

PV04 and OP 8

No glare found

PV04 and OP 9

No glare found

PV04 and OP 10

No glare found

PV04 and OP 11

No glare found

PV04 and OP 12

No glare found

PV04 and OP 18

No glare found

PV04 and OP 19

No glare found

PV04 and OP 20

No glare found

PV: PV05 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	733	12.2	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 13	238	4.0	0	0.0
OP 14	939	15.7	0	0.0
OP 15	1,656	27.6	0	0.0
OP 16	1,924	32.1	0	0.0
OP 17	911	15.2	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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

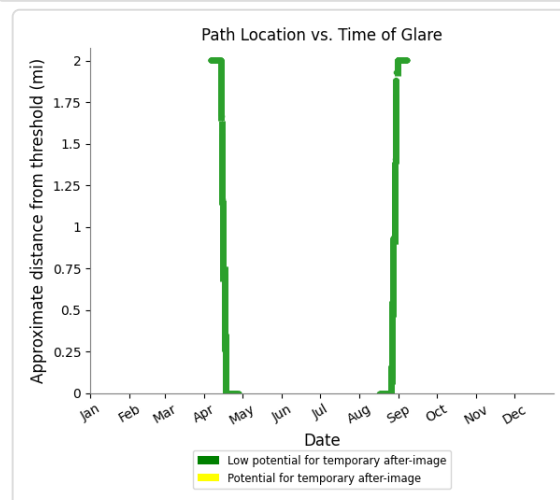
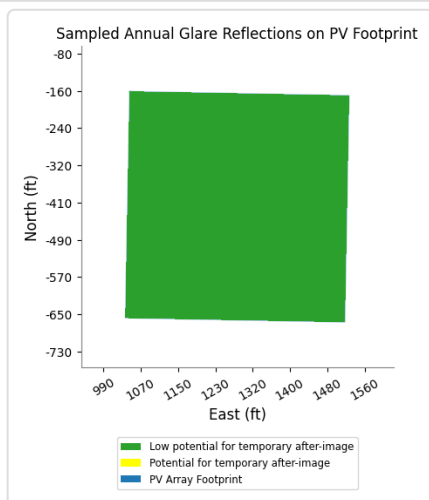
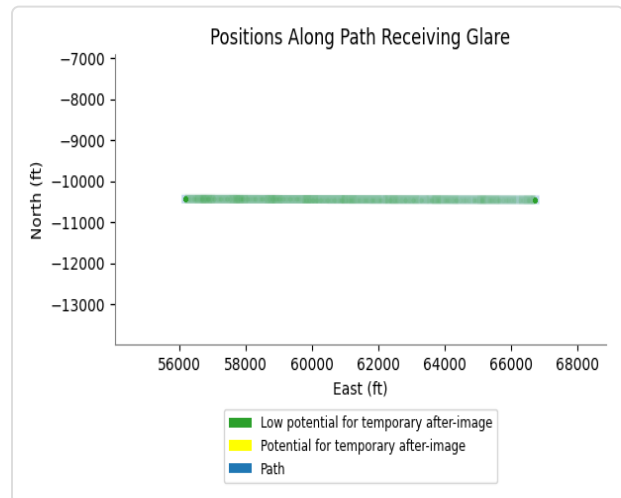
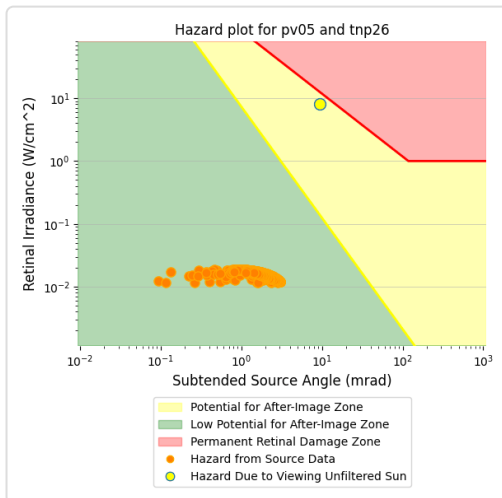
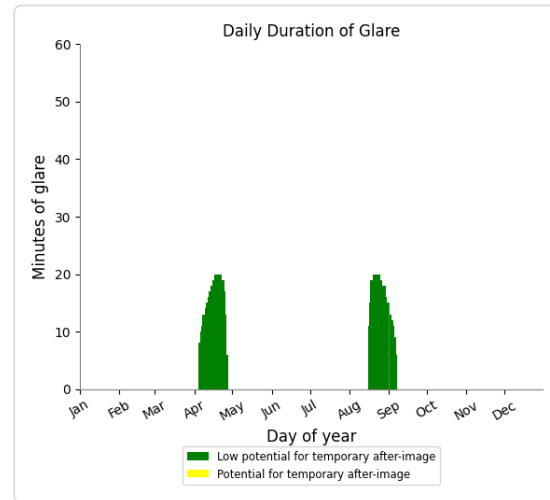
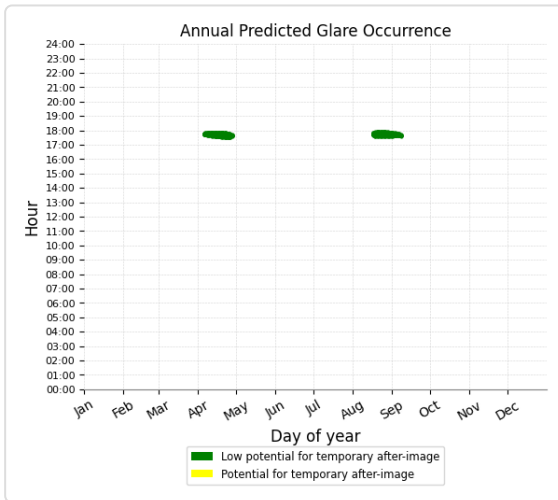
PV05 and Route: Route01

No glare found

PV05 and FP: TNP26

Yellow glare: none

Green glare: 733 min.



PV05 and FP: NXP10

No glare found

PV05 and FP: NXP28

No glare found

PV05 and FP: TNP08

No glare found

PV05 and FP: TNP17

No glare found

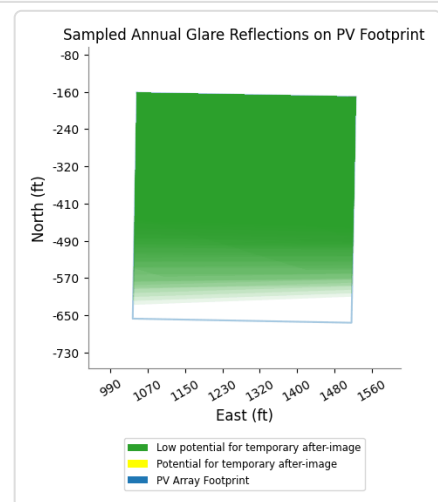
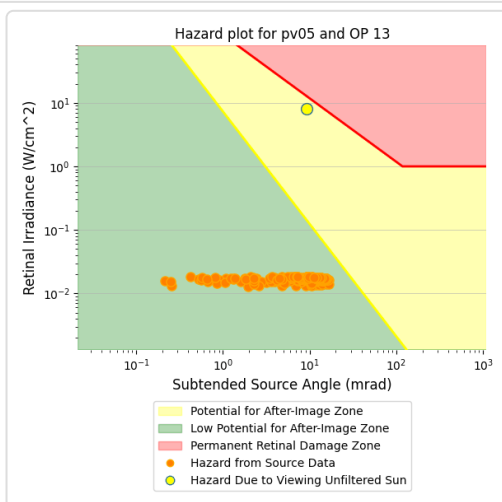
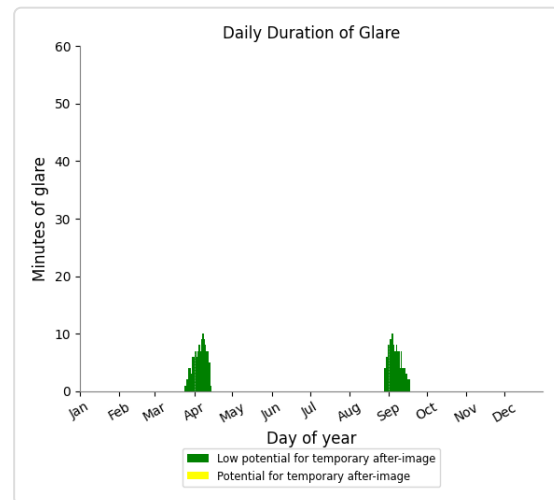
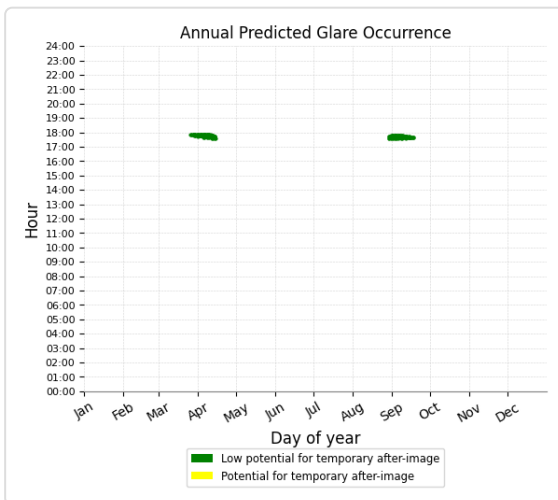
PV05 and FP: TNP35

No glare found

PV05 and OP 13

Yellow glare: none

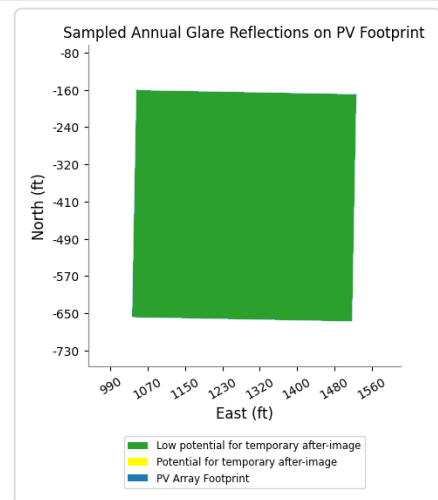
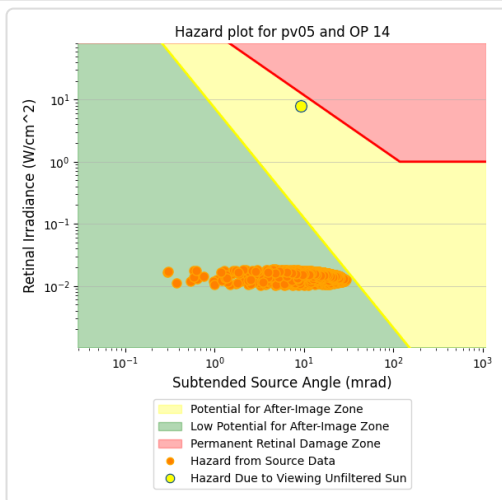
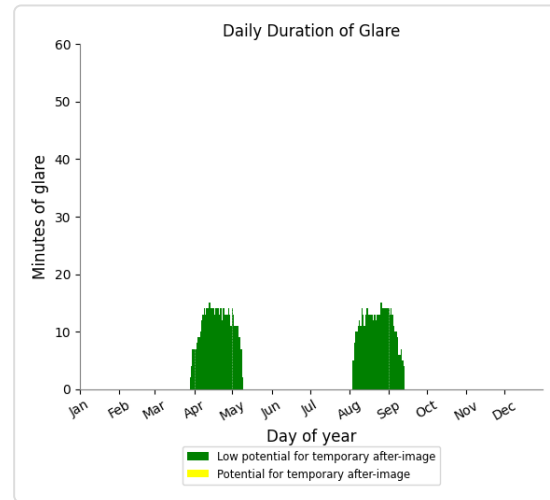
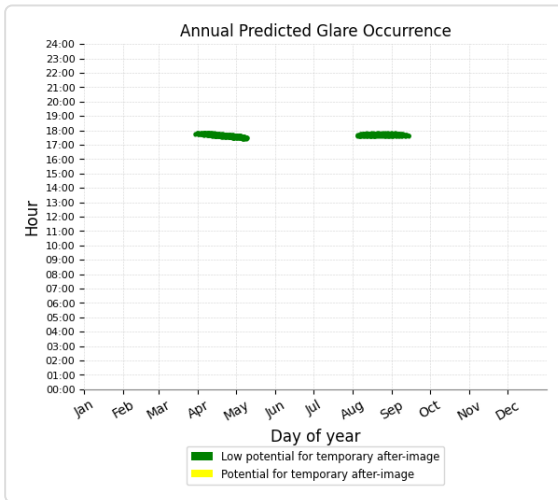
Green glare: 238 min.



PV05 and OP 14

Yellow glare: none

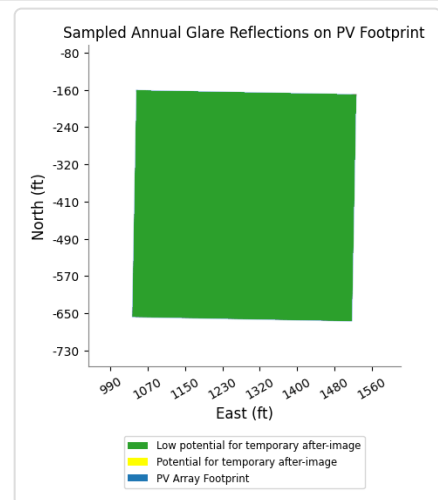
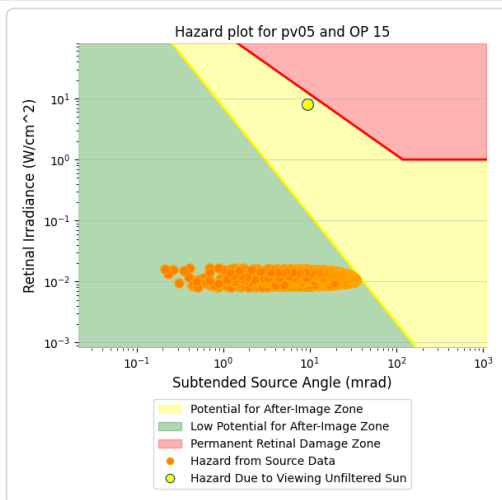
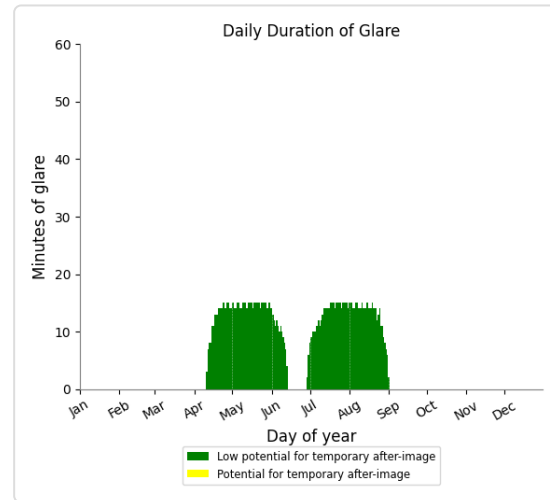
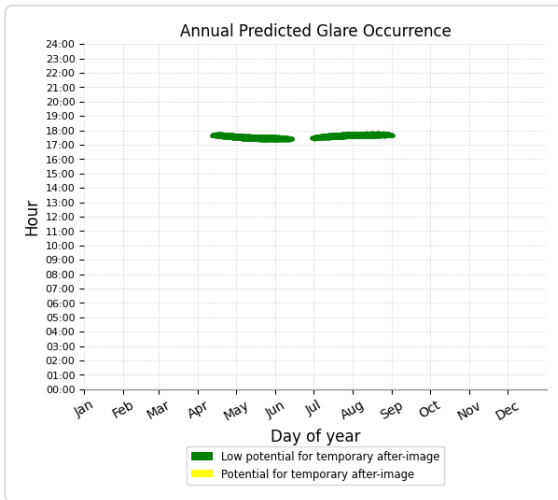
Green glare: 939 min.



PV05 and OP 15

Yellow glare: none

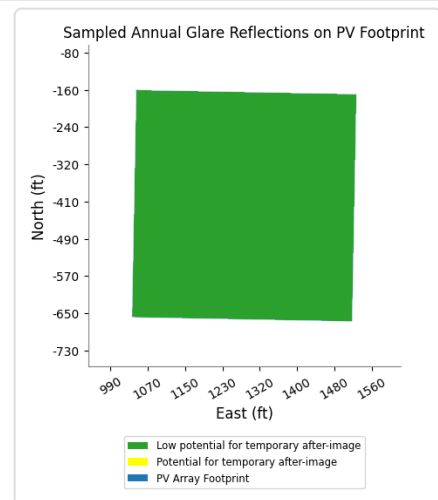
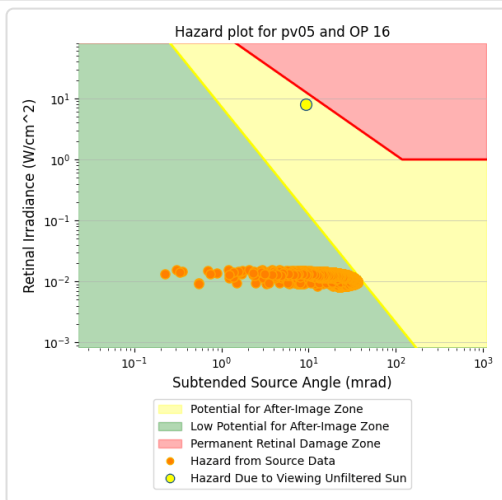
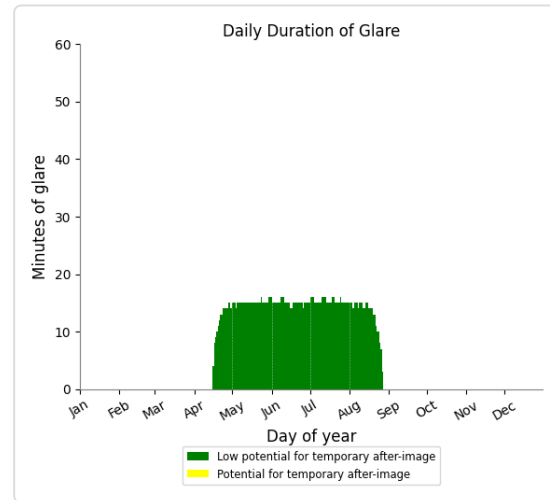
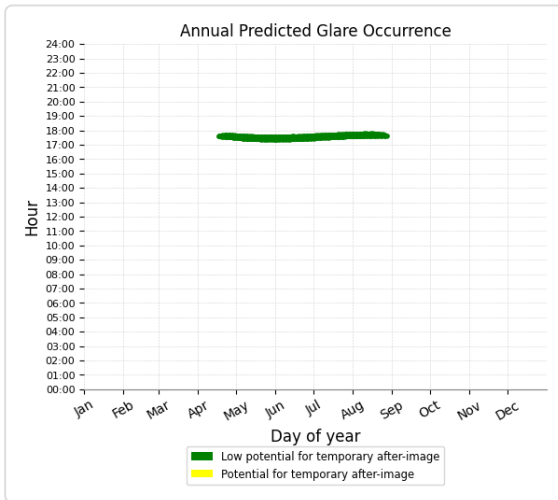
Green glare: 1,656 min.



PV05 and OP 16

Yellow glare: none

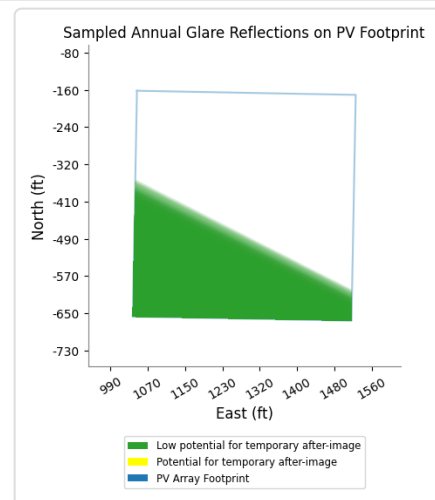
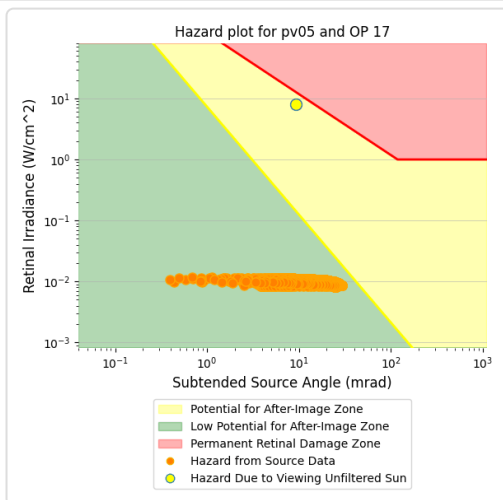
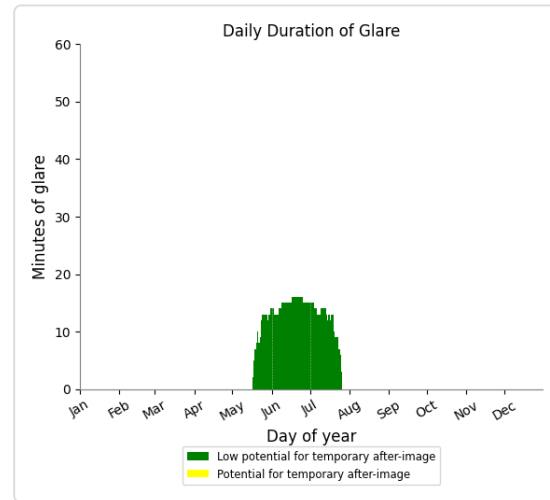
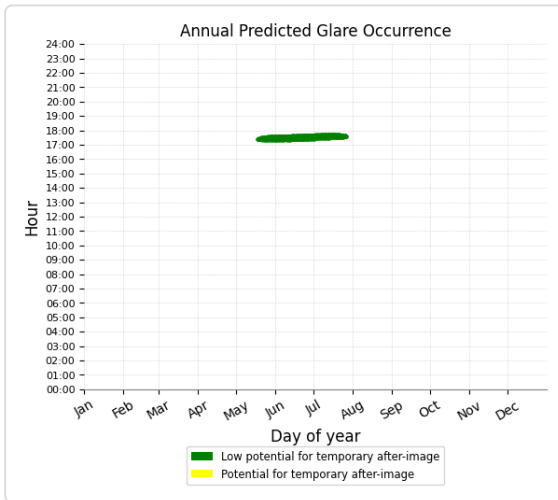
Green glare: 1,924 min.



PV05 and OP 17

Yellow glare: none

Green glare: 911 min.



PV05 and OP 1

No glare found

PV05 and OP 2

No glare found

PV05 and OP 3

No glare found

PV05 and OP 4

No glare found

PV05 and OP 5

No glare found

PV05 and OP 6

No glare found

PV05 and OP 7

No glare found

PV05 and OP 8

No glare found

PV05 and OP 9

No glare found

PV05 and OP 10

No glare found

PV05 and OP 11

No glare found

PV05 and OP 12

No glare found

PV05 and OP 18

No glare found

PV05 and OP 19

No glare found

PV05 and OP 20

No glare found

PV: PV06 potential temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	427	7.1	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 14	1,859	31.0	428	7.1
OP 15	2,064	34.4	771	12.8
OP 16	1,427	23.8	1,074	17.9
OP 13	1,324	22.1	0	0.0
OP 17	284	4.7	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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

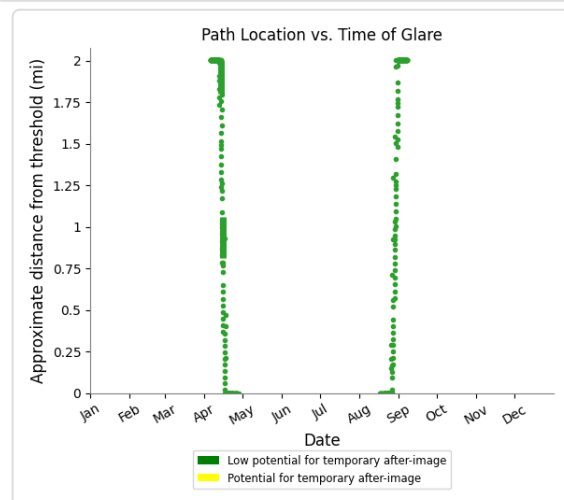
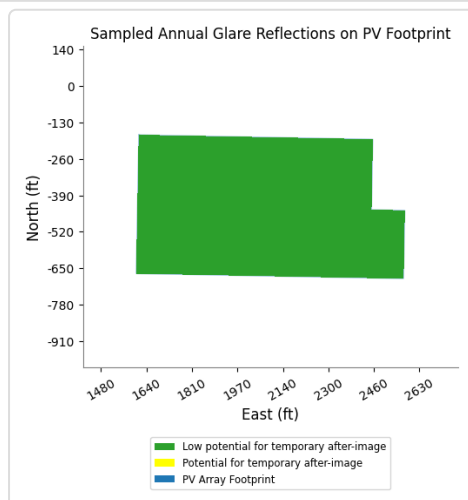
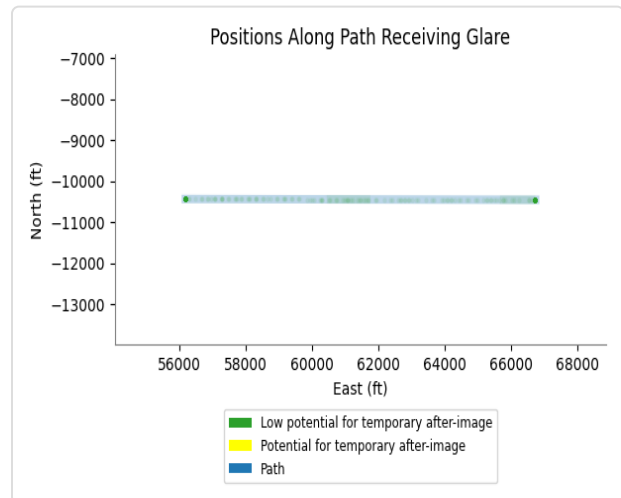
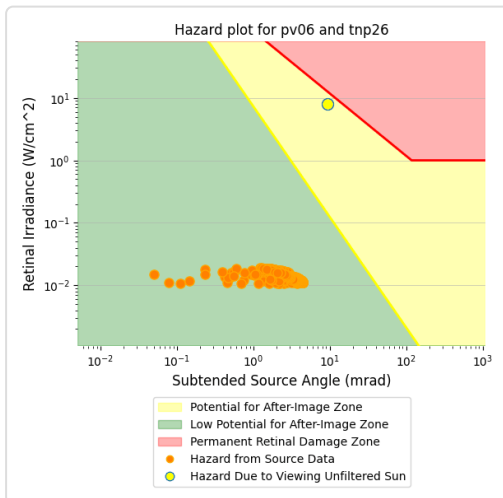
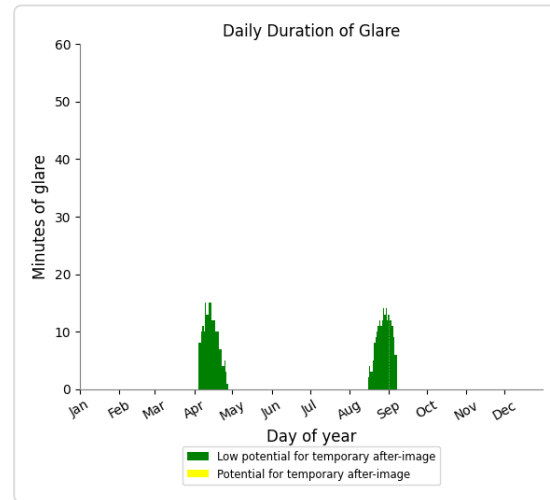
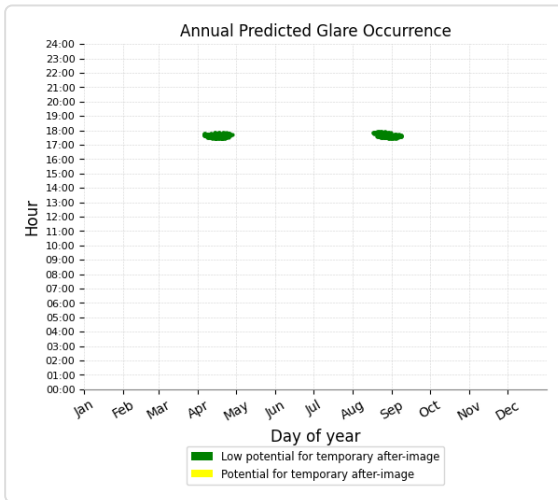
PV06 and Route: Route01

No glare found

PV06 and FP: TNP26

Yellow glare: none

Green glare: 427 min.



PV06 and FP: NXP10

No glare found

PV06 and FP: NXP28

No glare found

PV06 and FP: TNP08

No glare found

PV06 and FP: TNP17

No glare found

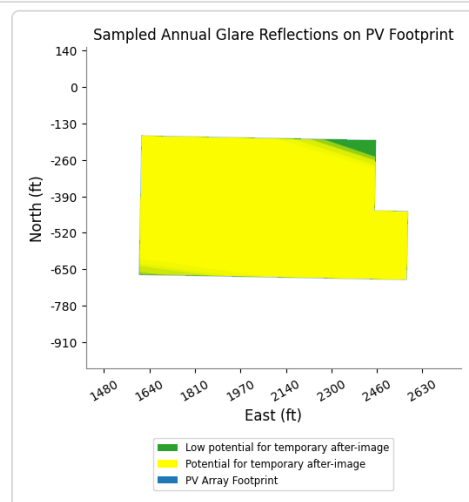
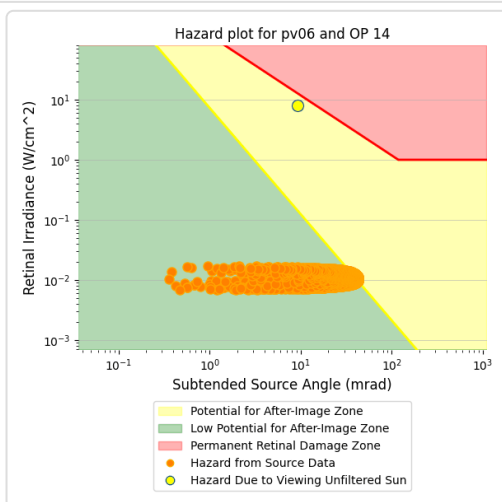
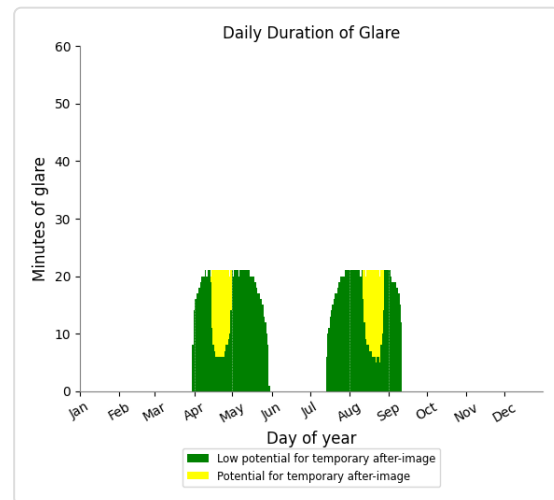
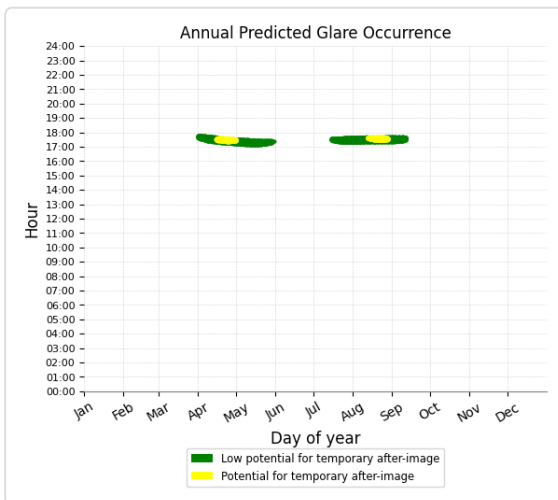
PV06 and FP: TNP35

No glare found

PV06 and OP 14

Yellow glare: 428 min.

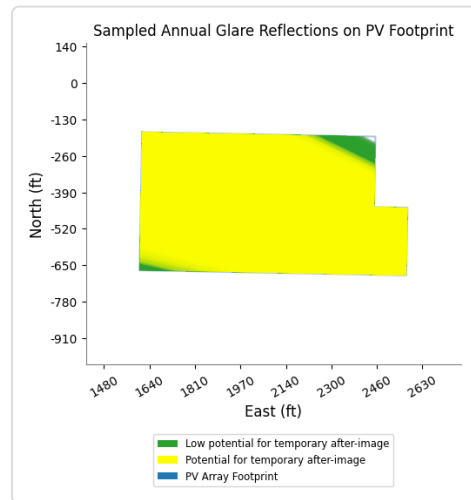
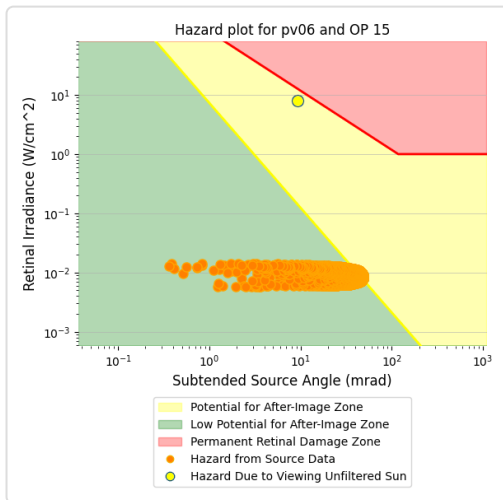
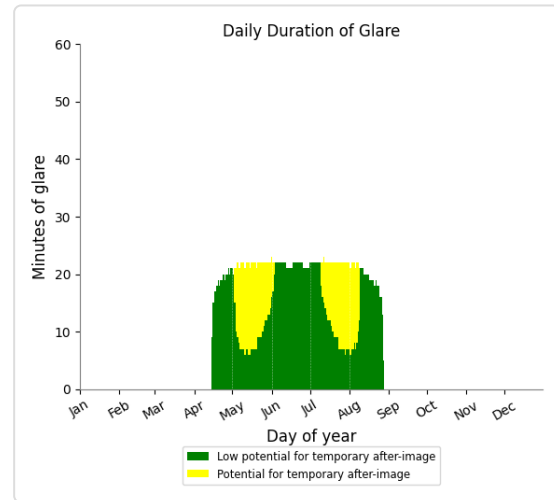
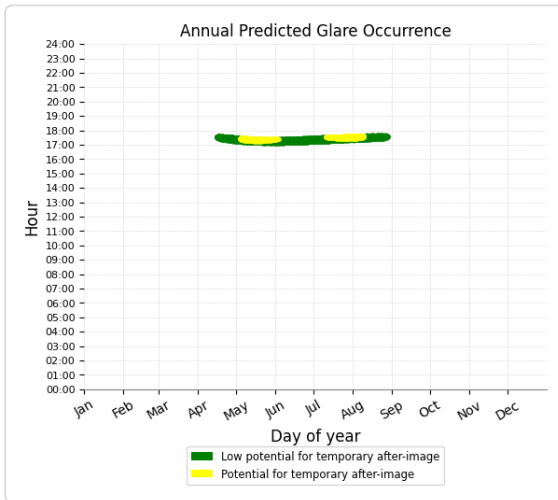
Green glare: 1,859 min.



PV06 and OP 15

Yellow glare: 771 min.

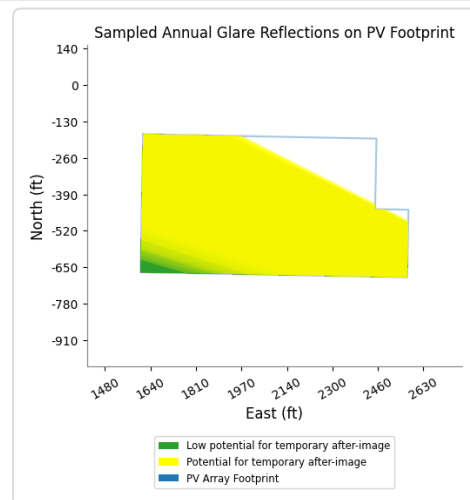
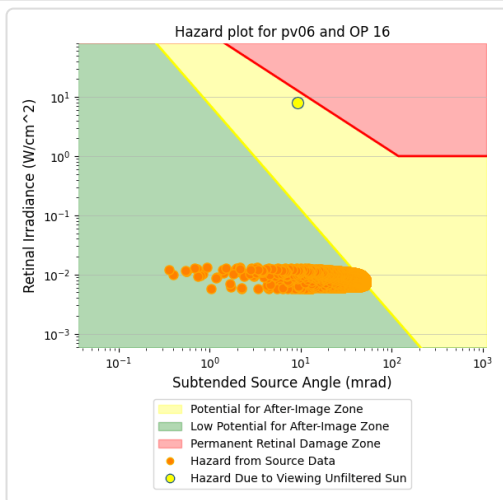
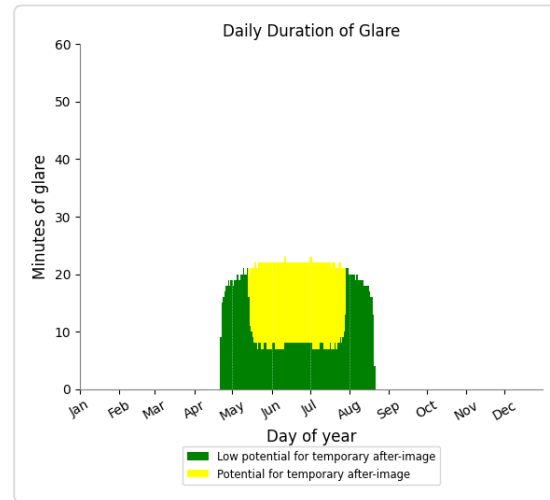
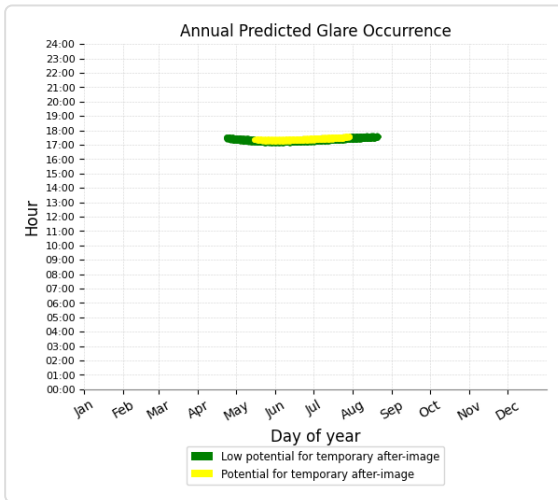
Green glare: 2,064 min.



PV06 and OP 16

Yellow glare: 1,074 min.

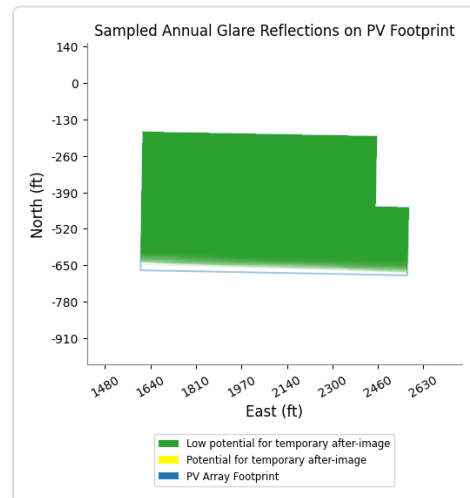
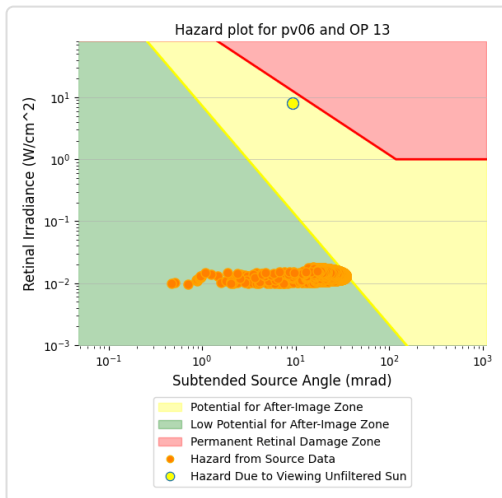
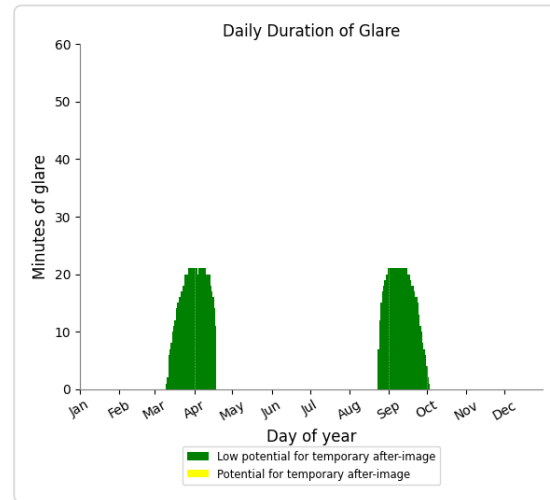
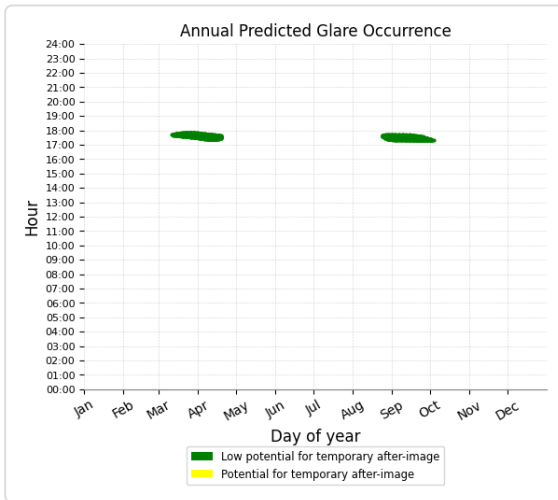
Green glare: 1,427 min.



PV06 and OP 13

Yellow glare: none

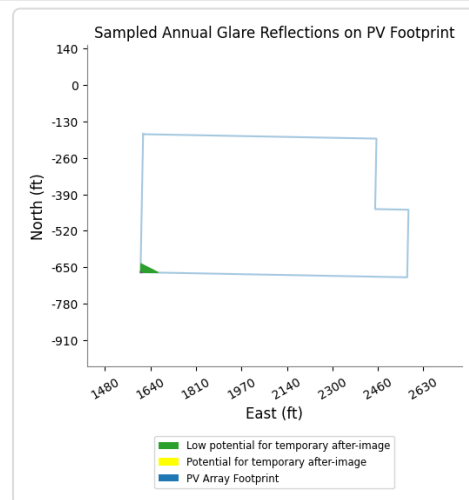
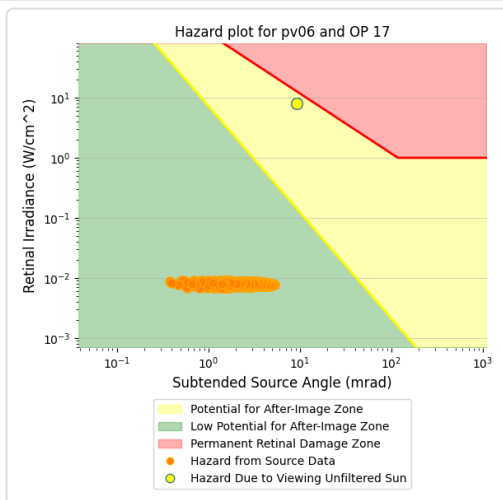
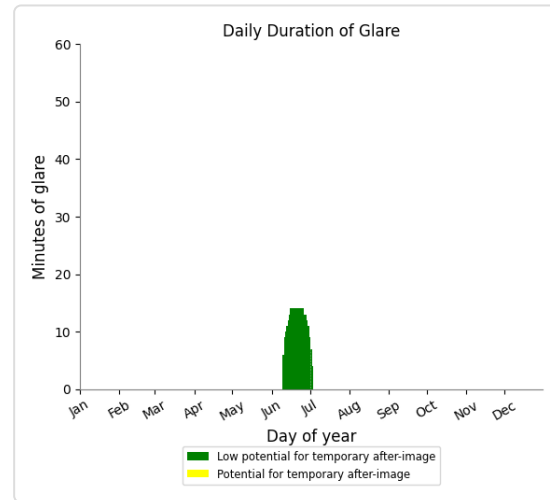
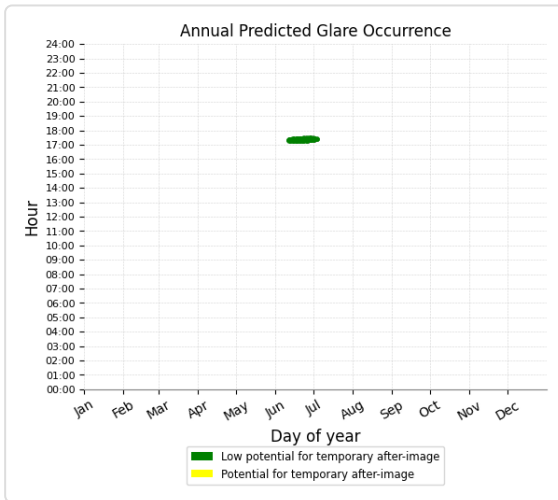
Green glare: 1,324 min.



PV06 and OP 17

Yellow glare: none

Green glare: 284 min.



PV06 and OP 1

No glare found

PV06 and OP 2

No glare found

PV06 and OP 3

No glare found

PV06 and OP 4

No glare found

PV06 and OP 5

No glare found

PV06 and OP 6

No glare found

PV06 and OP 7

No glare found

PV06 and OP 8

No glare found

PV06 and OP 9

No glare found

PV06 and OP 10

No glare found

PV06 and OP 11

No glare found

PV06 and OP 12

No glare found

PV06 and OP 18

No glare found

PV06 and OP 19

No glare found

PV06 and OP 20

No glare found

PV: PV07 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	699	11.7	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 14	318	5.3	0	0.0
OP 15	691	11.5	0	0.0
OP 16	860	14.3	0	0.0
OP 17	2,024	33.7	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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

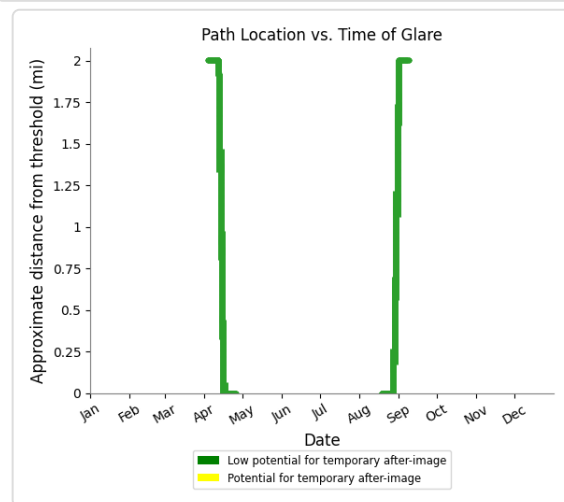
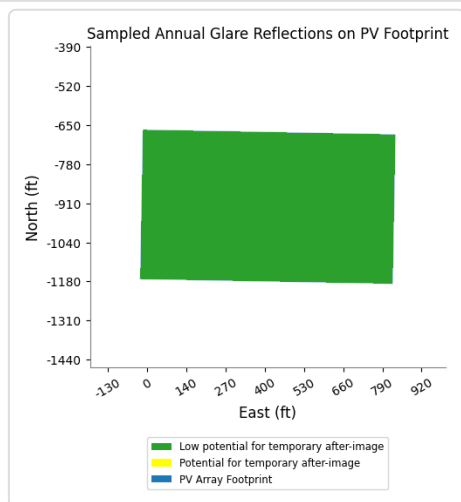
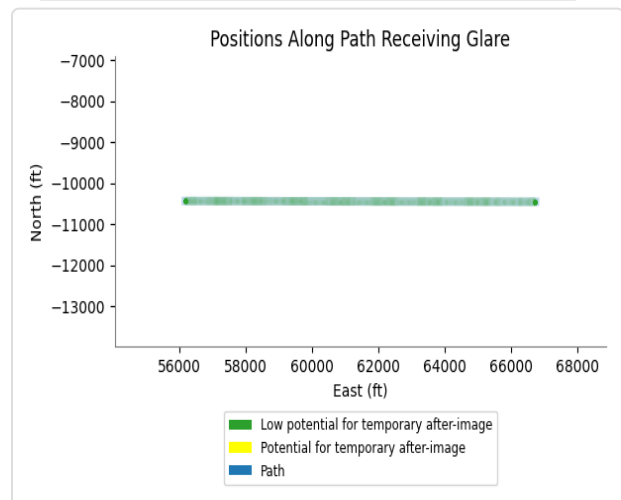
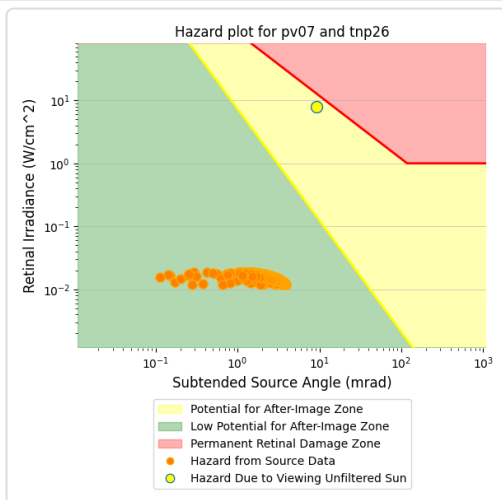
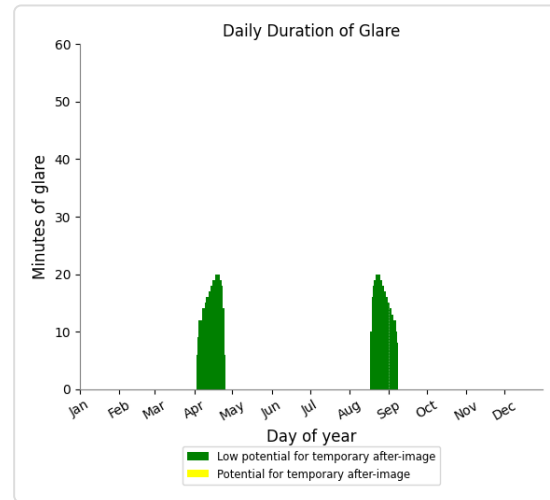
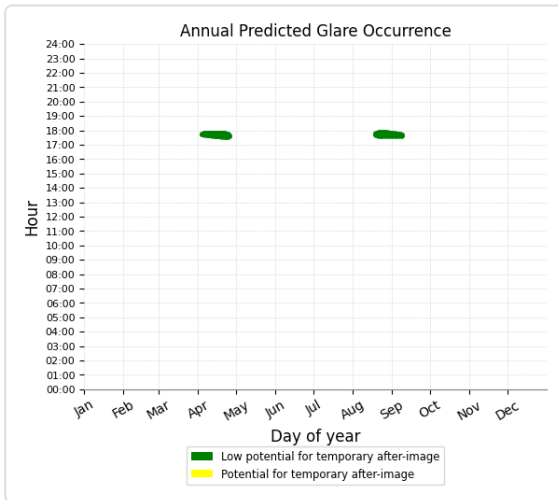
PV07 and Route: Route01

No glare found

PV07 and FP: TNP26

Yellow glare: none

Green glare: 699 min.



PV07 and FP: NXP10

No glare found

PV07 and FP: NXP28

No glare found

PV07 and FP: TNP08

No glare found

PV07 and FP: TNP17

No glare found

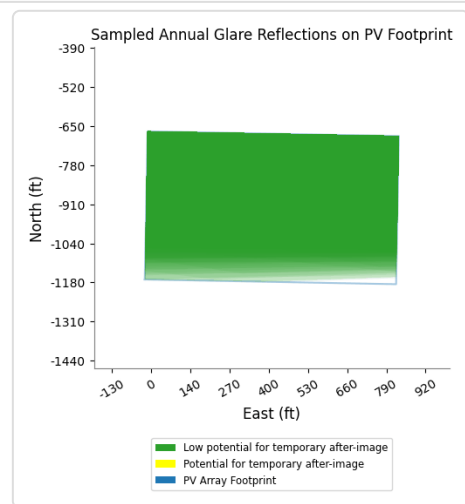
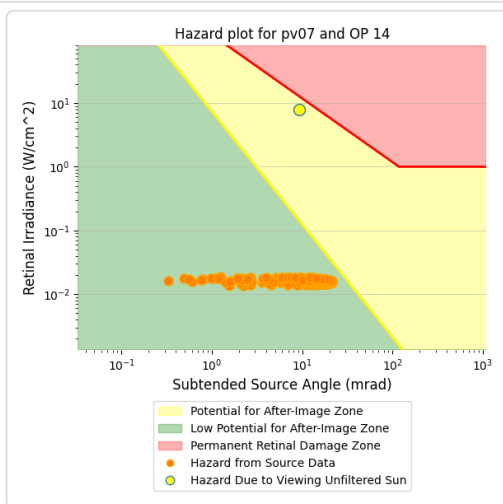
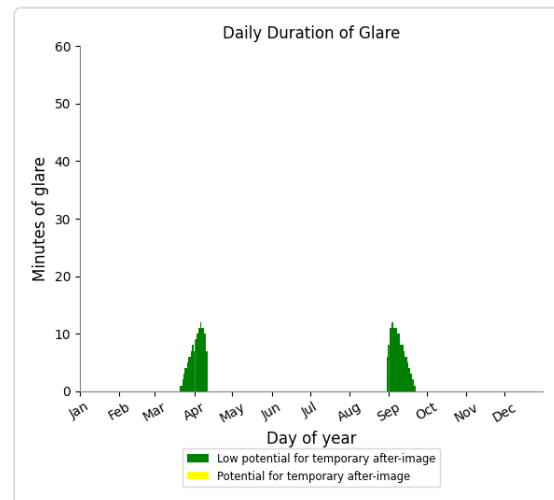
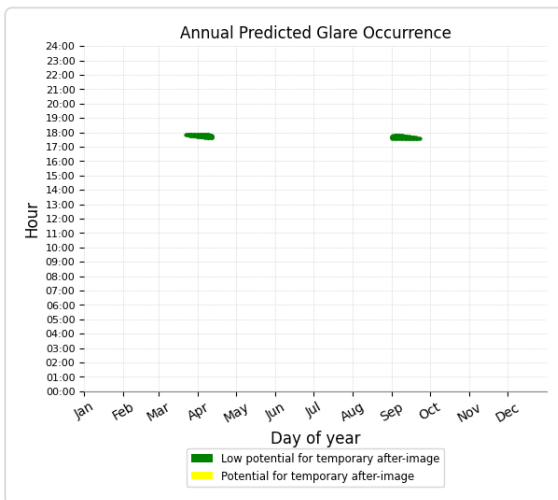
PV07 and FP: TNP35

No glare found

PV07 and OP 14

Yellow glare: none

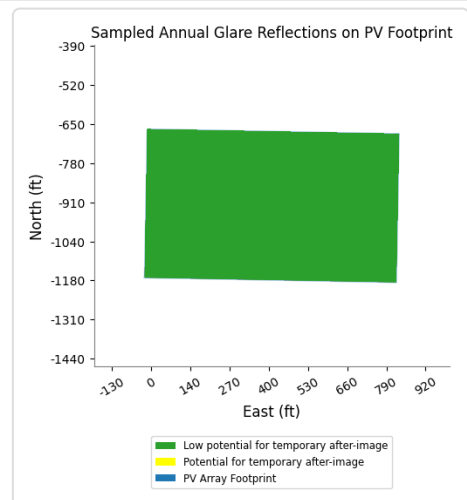
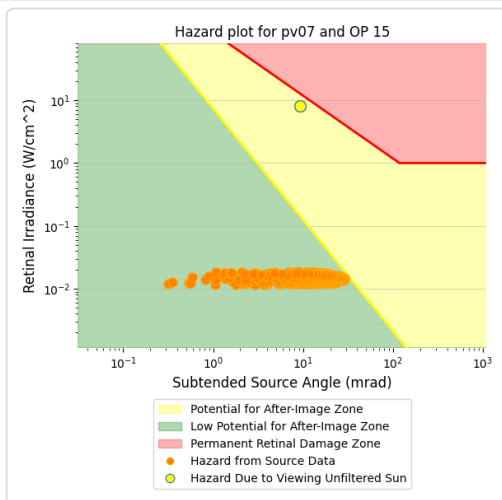
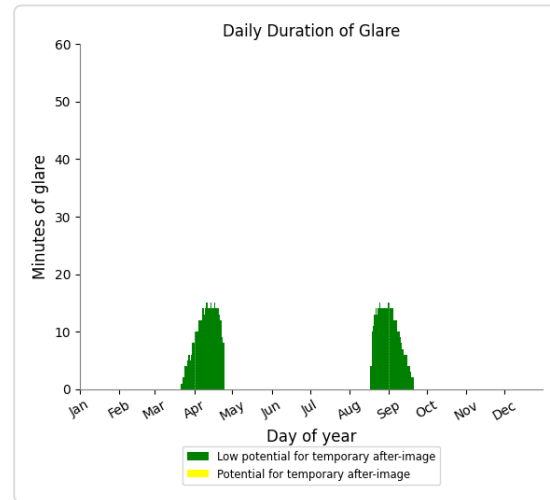
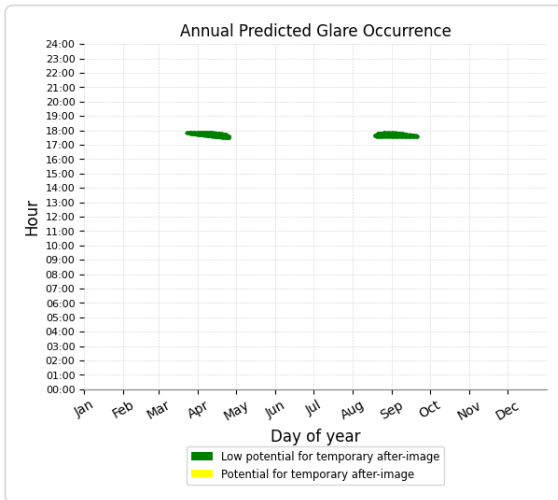
Green glare: 318 min.



PV07 and OP 15

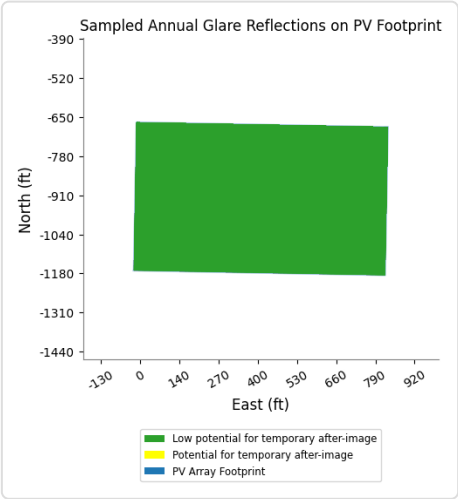
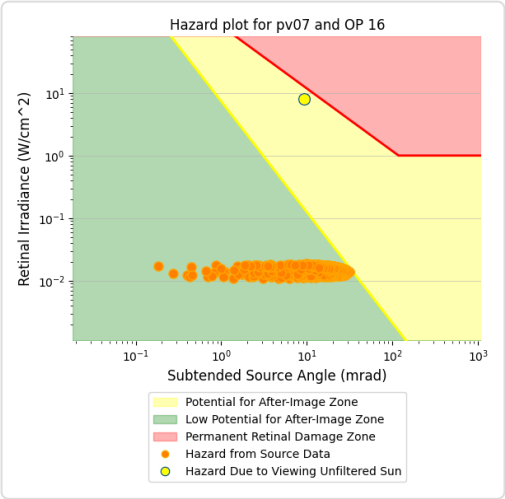
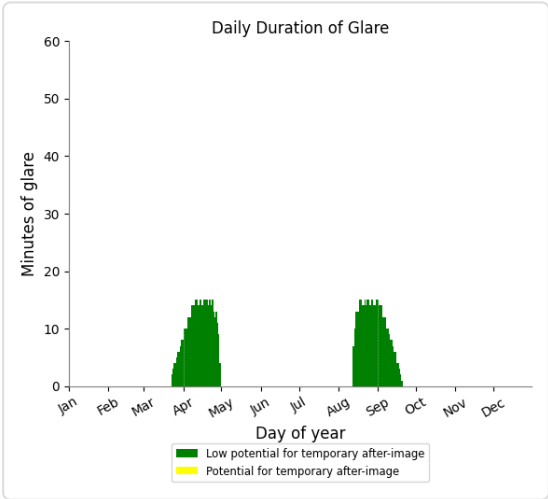
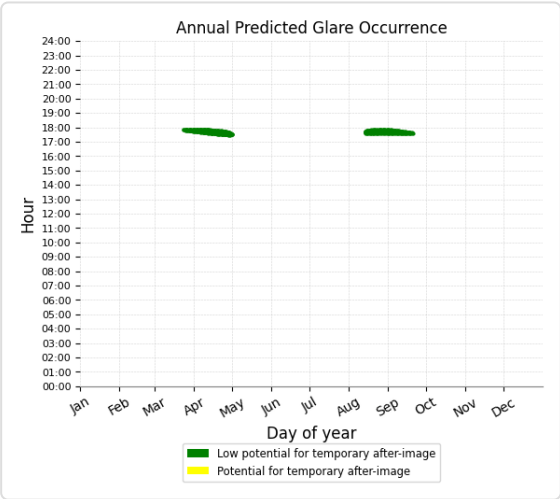
Yellow glare: none

Green glare: 691 min.



PV07 and OP 16

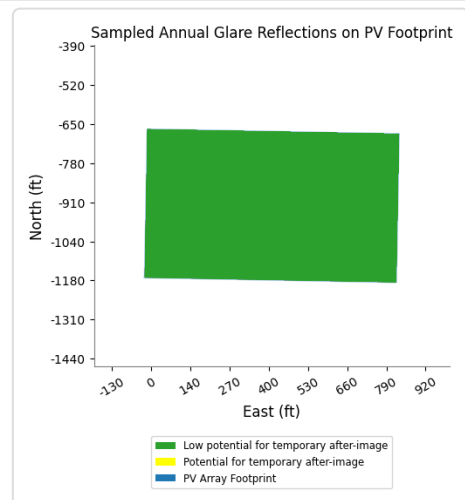
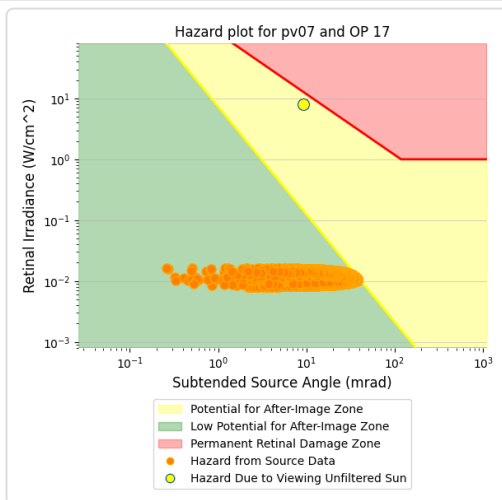
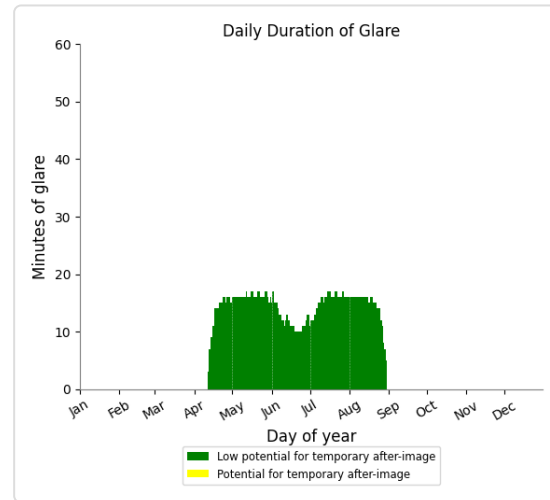
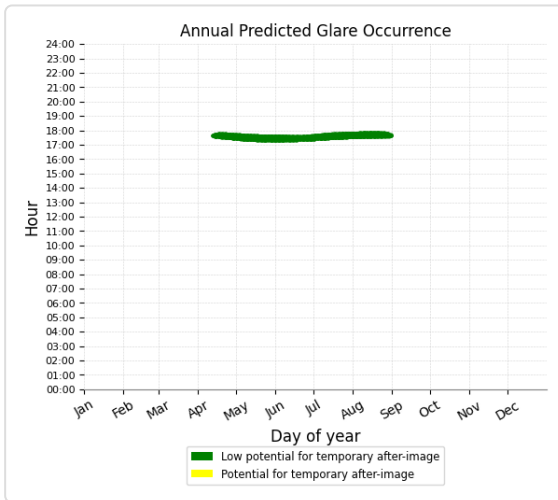
Yellow glare: none
Green glare: 860 min.



PV07 and OP 17

Yellow glare: none

Green glare: 2,024 min.



PV07 and OP 1

No glare found

PV07 and OP 2

No glare found

PV07 and OP 3

No glare found

PV07 and OP 4

No glare found

PV07 and OP 5

No glare found

PV07 and OP 6

No glare found

PV07 and OP 7

No glare found

PV07 and OP 8

No glare found

PV07 and OP 9

No glare found

PV07 and OP 10

No glare found

PV07 and OP 11

No glare found

PV07 and OP 12

No glare found

PV07 and OP 13

No glare found

PV07 and OP 18

No glare found

PV07 and OP 19

No glare found

PV07 and OP 20

No glare found

PV: PV08 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	692	11.5	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 14	262	4.4	0	0.0
OP 15	576	9.6	0	0.0
OP 16	1,025	17.1	0	0.0
OP 17	1,861	31.0	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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

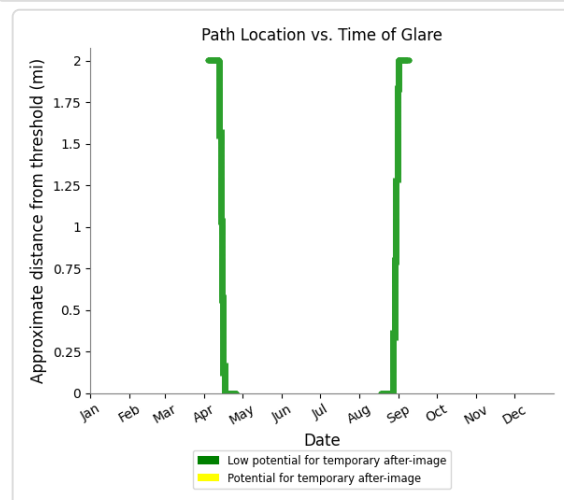
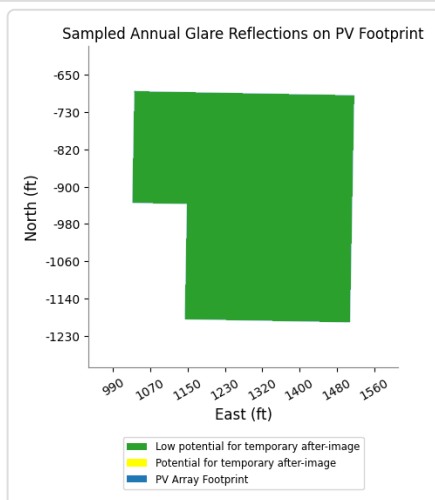
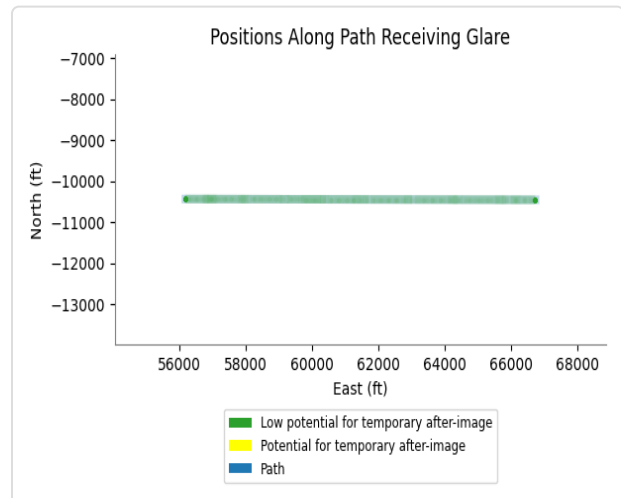
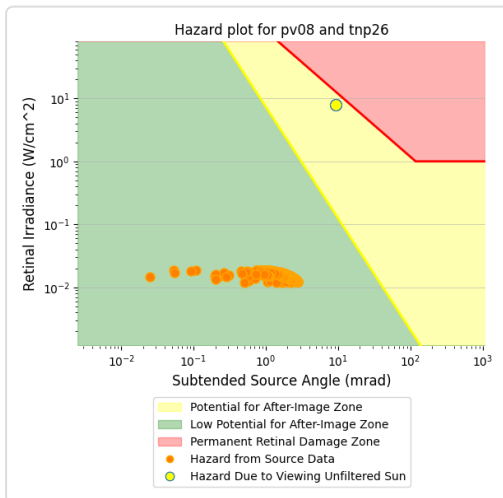
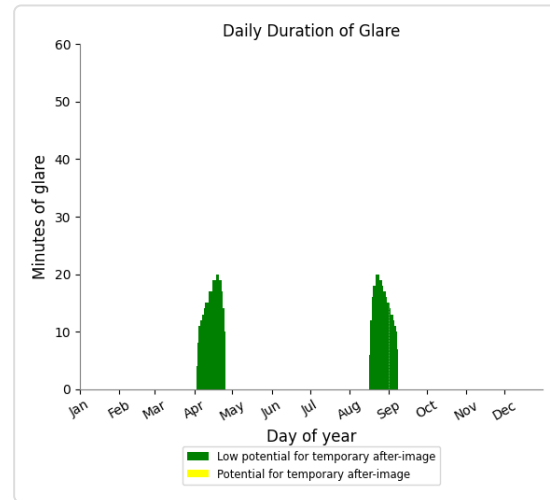
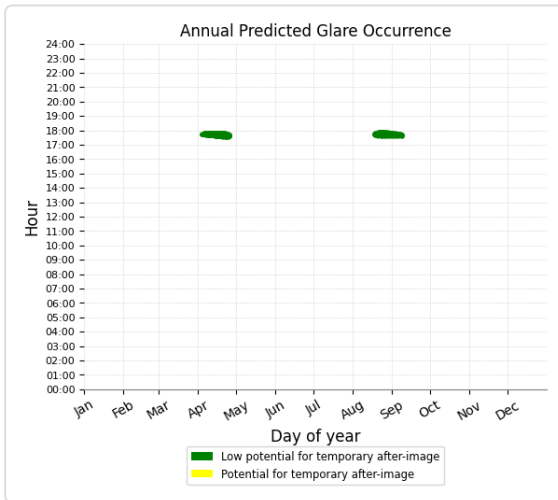
PV08 and Route: Route01

No glare found

PV08 and FP: TNP26

Yellow glare: none

Green glare: 692 min.



PV08 and FP: NXP10

No glare found

PV08 and FP: NXP28

No glare found

PV08 and FP: TNP08

No glare found

PV08 and FP: TNP17

No glare found

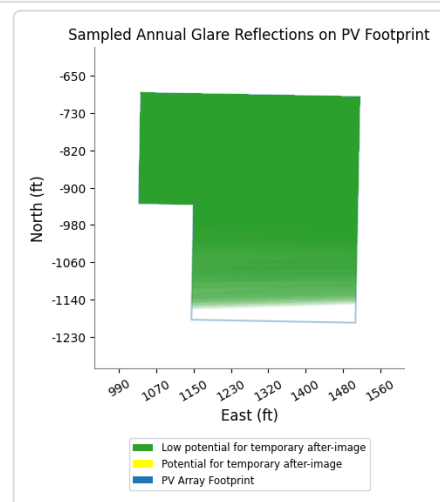
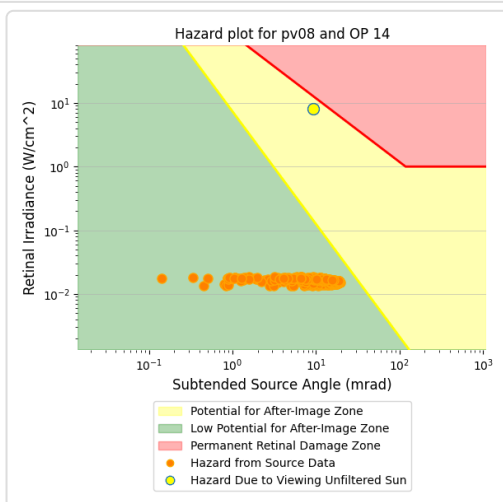
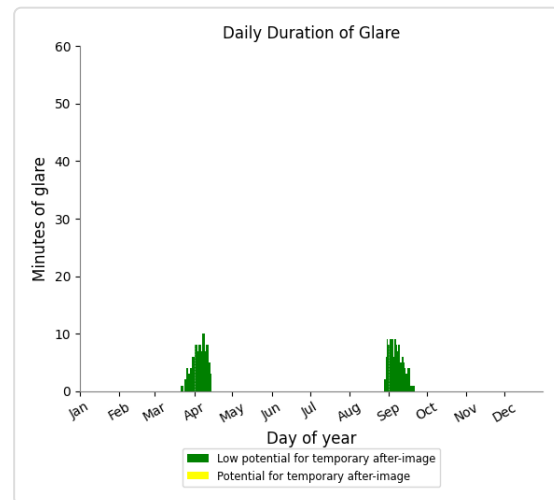
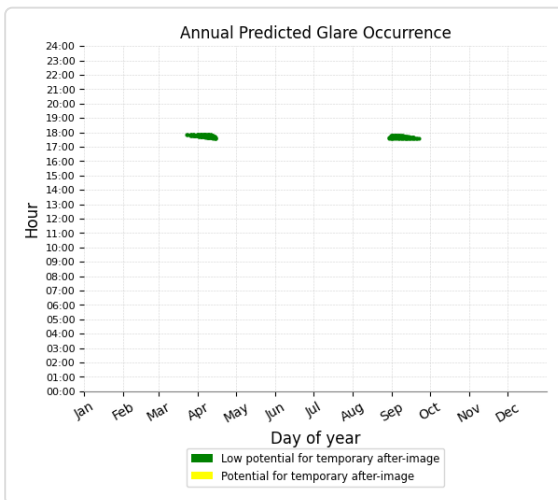
PV08 and FP: TNP35

No glare found

PV08 and OP 14

Yellow glare: none

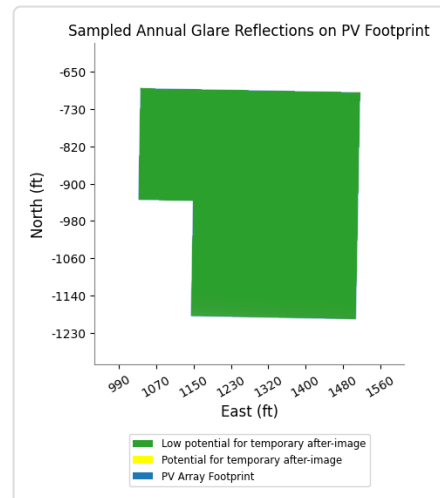
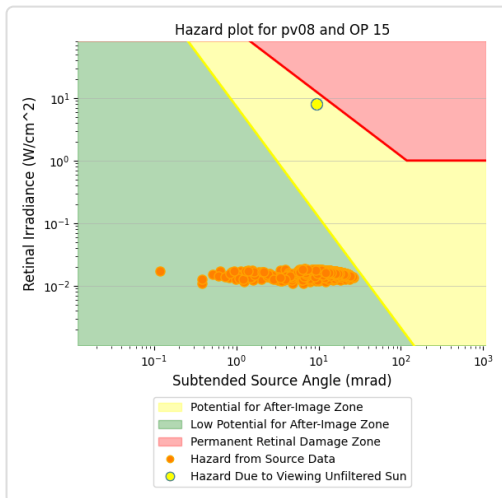
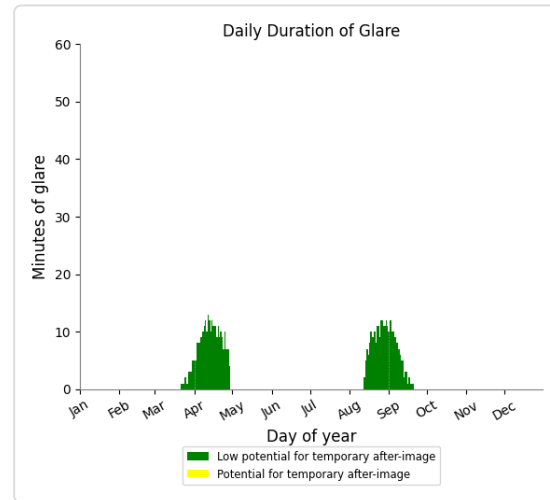
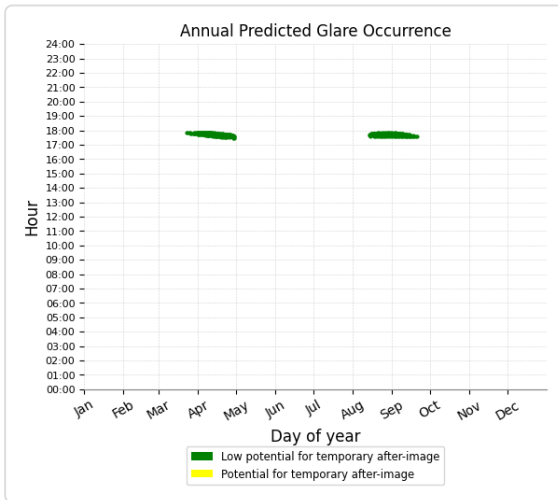
Green glare: 262 min.



PV08 and OP 15

Yellow glare: none

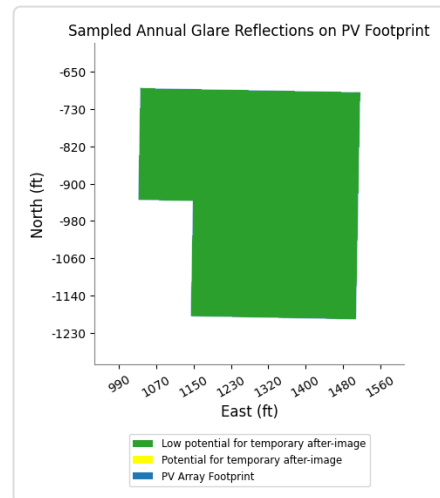
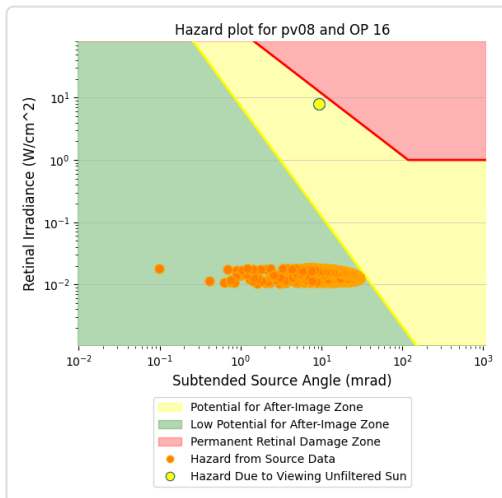
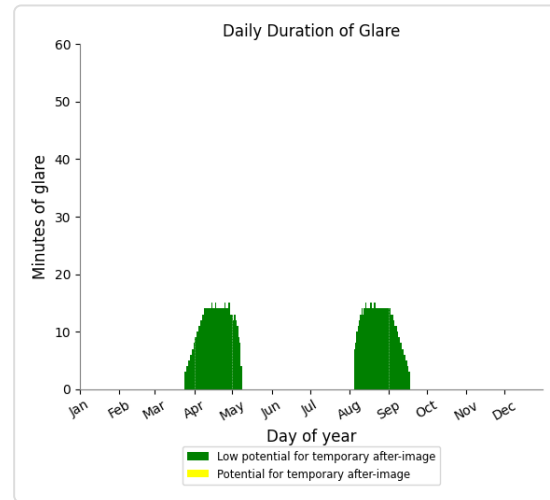
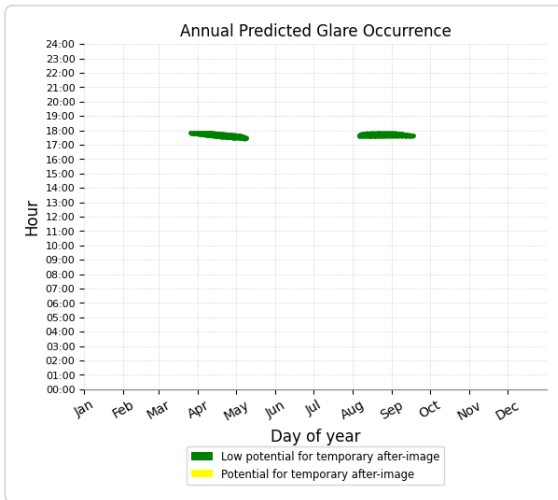
Green glare: 576 min.



PV08 and OP 16

Yellow glare: none

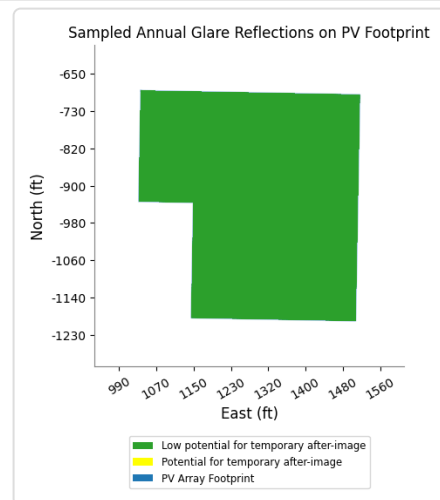
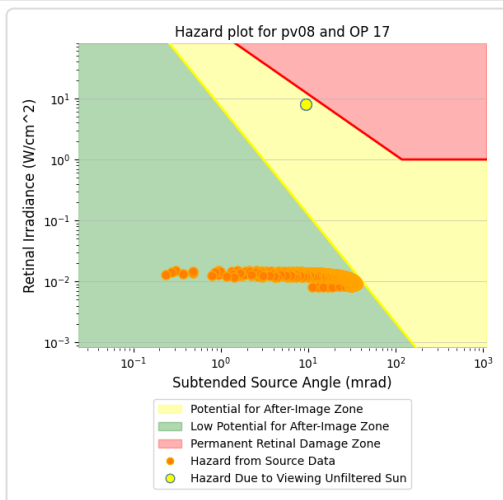
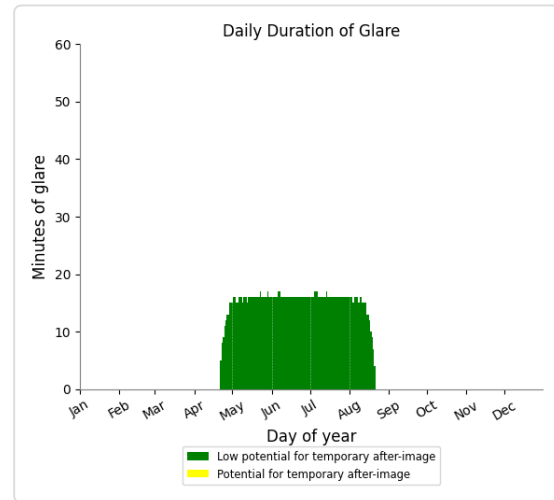
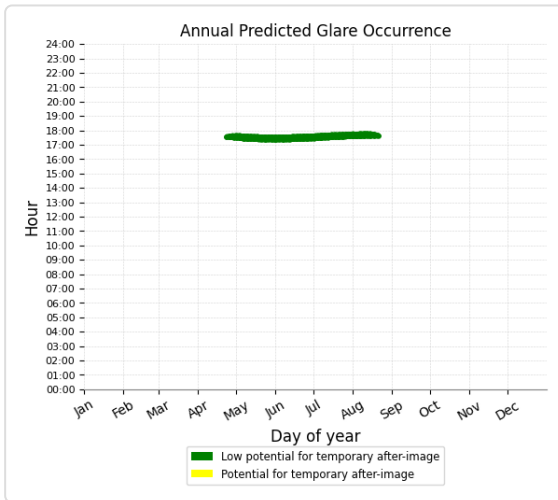
Green glare: 1,025 min.



PV08 and OP 17

Yellow glare: none

Green glare: 1,861 min.



PV08 and OP 1

No glare found

PV08 and OP 2

No glare found

PV08 and OP 3

No glare found

PV08 and OP 4

No glare found

PV08 and OP 5

No glare found

PV08 and OP 6

No glare found

PV08 and OP 7

No glare found

PV08 and OP 8

No glare found

PV08 and OP 9

No glare found

PV08 and OP 10

No glare found

PV08 and OP 11

No glare found

PV08 and OP 12

No glare found

PV08 and OP 13

No glare found

PV08 and OP 18

No glare found

PV08 and OP 19

No glare found

PV08 and OP 20

No glare found

PV: PV09 potential temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	490	8.2	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 14	1,171	19.5	313	5.2
OP 15	1,768	29.5	944	15.7
OP 16	2,555	42.6	1,280	21.3
OP 17	1,447	24.1	629	10.5
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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

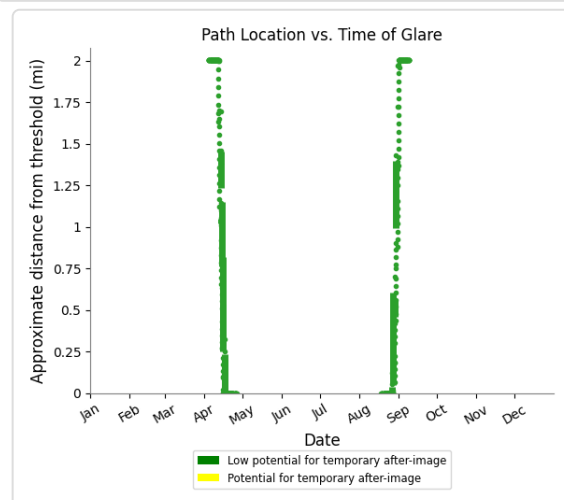
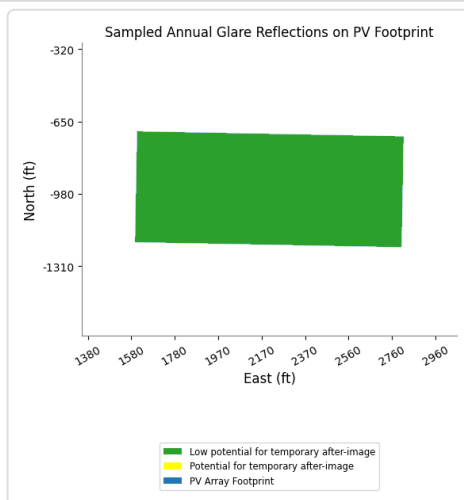
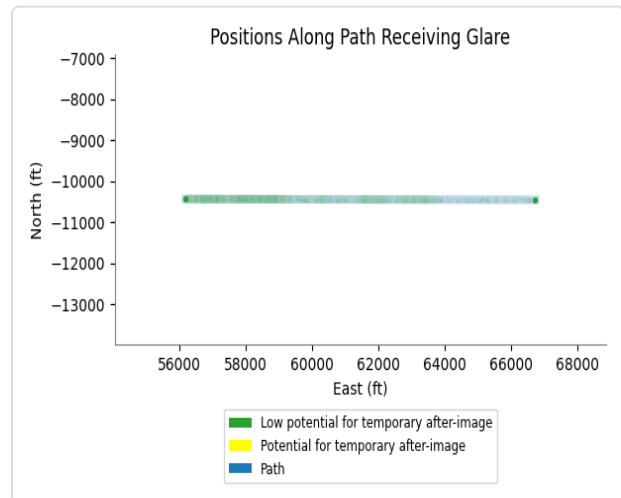
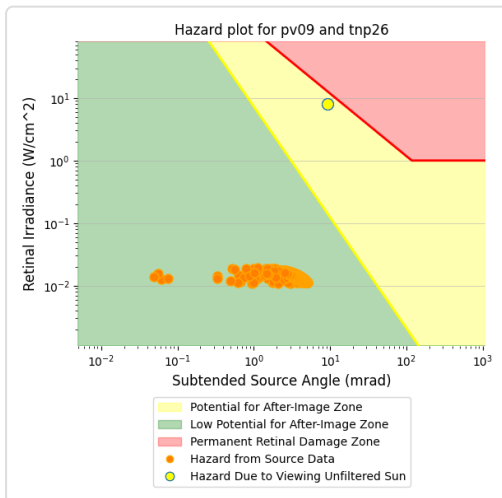
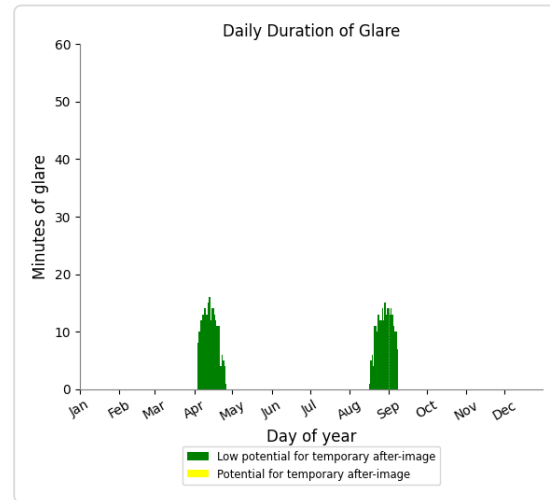
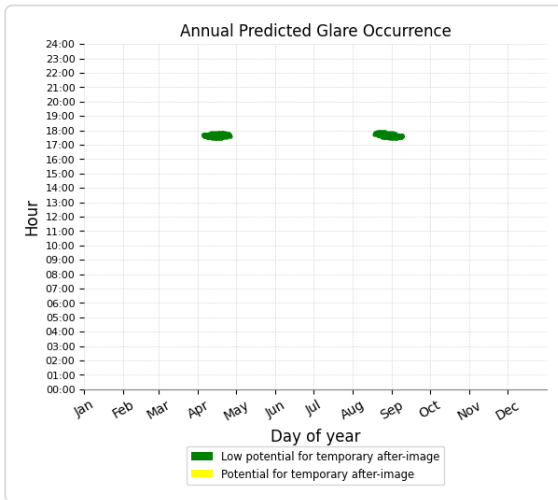
PV09 and Route: Route01

No glare found

PV09 and FP: TNP26

Yellow glare: none

Green glare: 490 min.



PV09 and FP: NXP10

No glare found

PV09 and FP: NXP28

No glare found

PV09 and FP: TNP08

No glare found

PV09 and FP: TNP17

No glare found

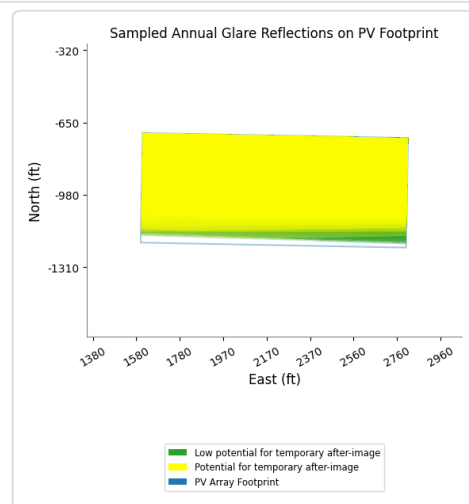
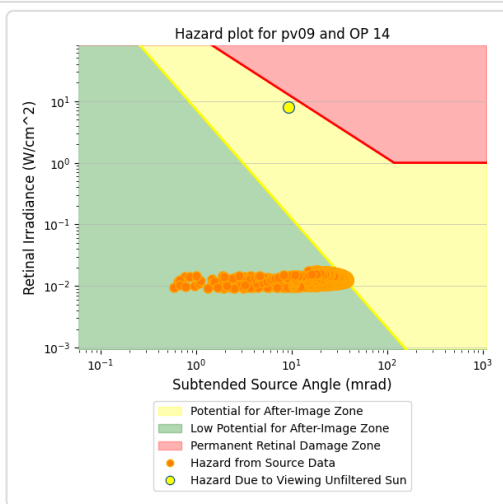
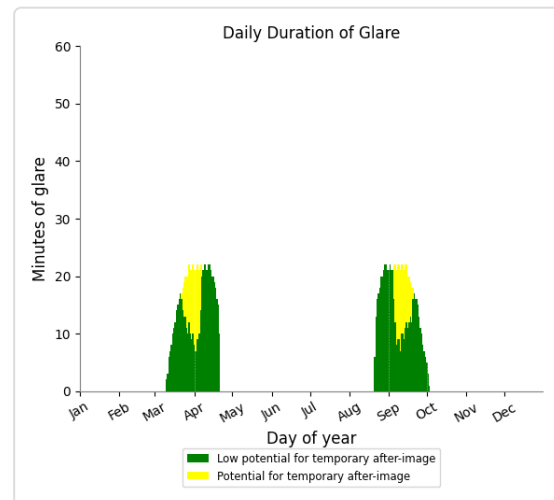
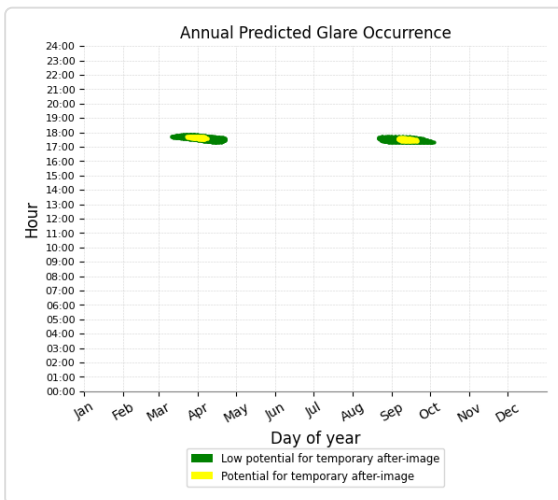
PV09 and FP: TNP35

No glare found

PV09 and OP 14

Yellow glare: 313 min.

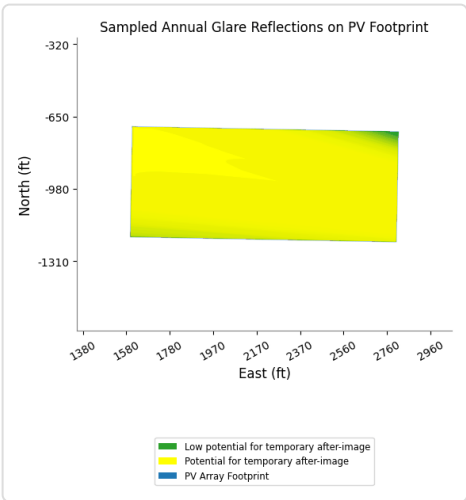
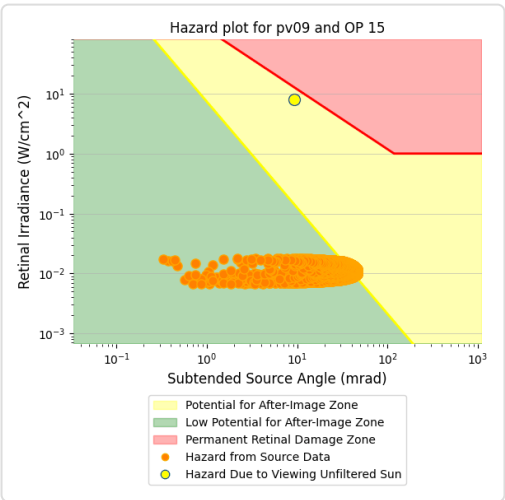
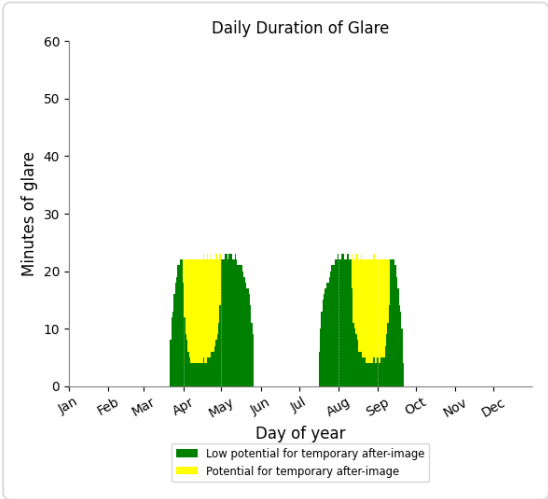
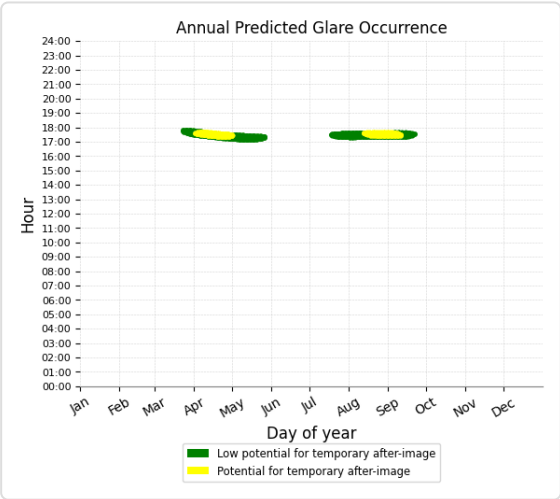
Green glare: 1,171 min.



PV09 and OP 15

Yellow glare: 944 min.

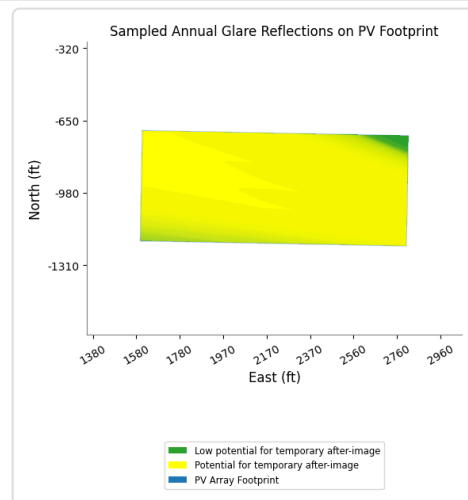
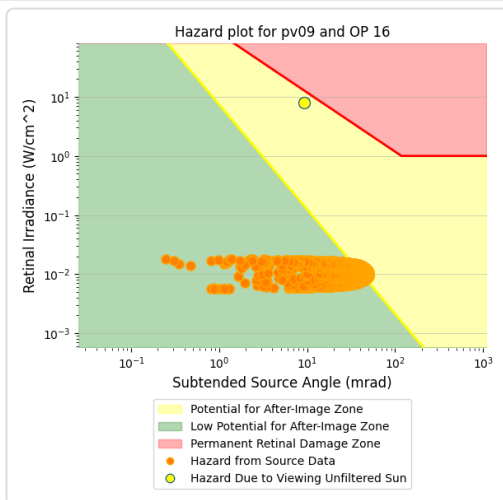
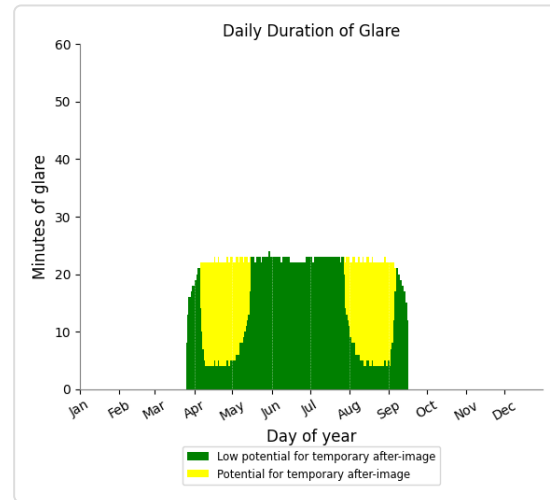
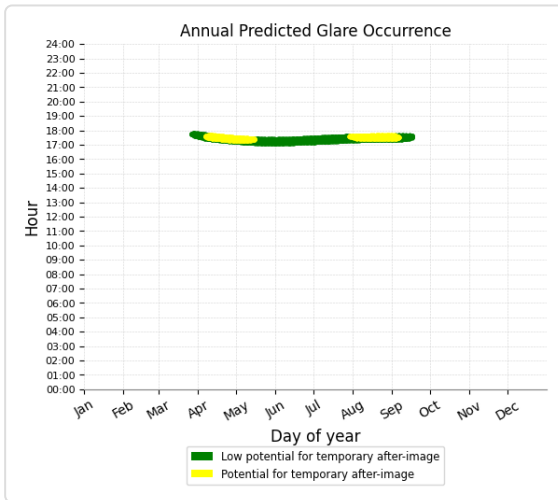
Green glare: 1,768 min.



PV09 and OP 16

Yellow glare: 1,280 min.

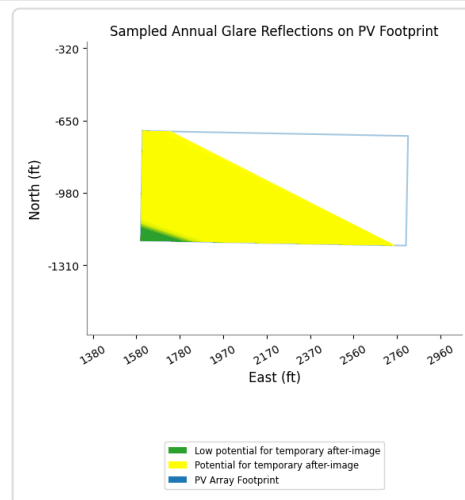
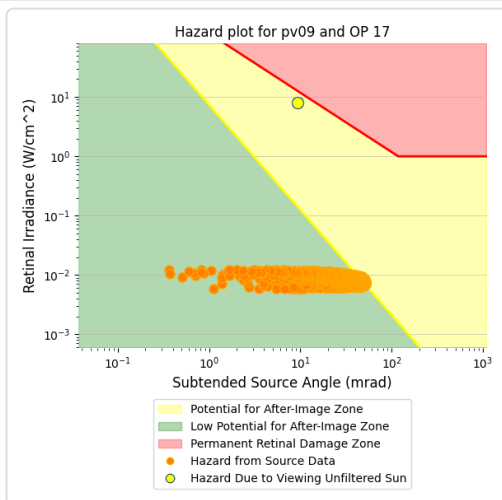
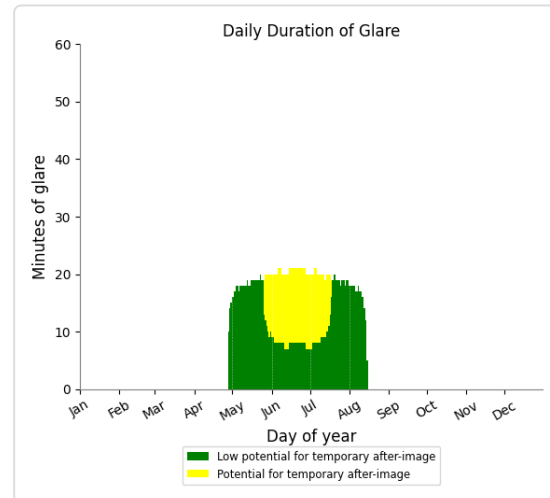
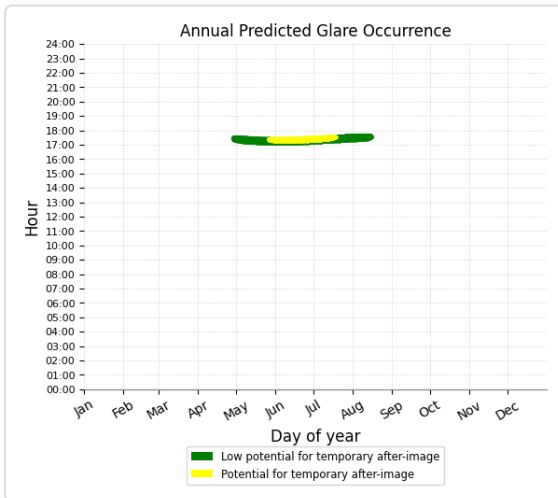
Green glare: 2,555 min.



PV09 and OP 17

Yellow glare: 629 min.

Green glare: 1,447 min.



PV09 and OP 1

No glare found

PV09 and OP 2

No glare found

PV09 and OP 3

No glare found

PV09 and OP 4

No glare found

PV09 and OP 5

No glare found

PV09 and OP 6

No glare found

PV09 and OP 7

No glare found

PV09 and OP 8

No glare found

PV09 and OP 9

No glare found

PV09 and OP 10

No glare found

PV09 and OP 11

No glare found

PV09 and OP 12

No glare found

PV09 and OP 13

No glare found

PV09 and OP 18

No glare found

PV09 and OP 19

No glare found

PV09 and OP 20

No glare found

PV: PV10 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	544	9.1	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 15	418	7.0	0	0.0
OP 16	411	6.8	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 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

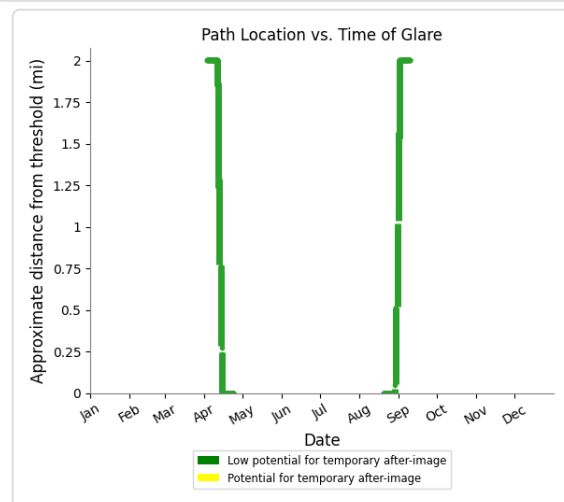
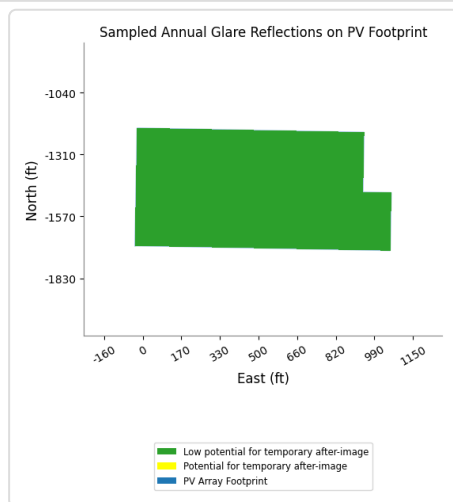
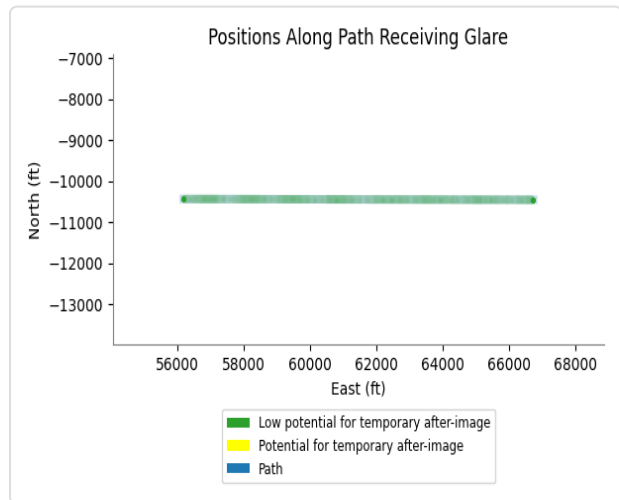
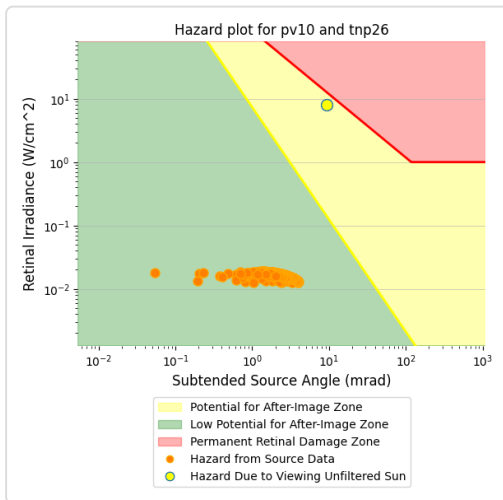
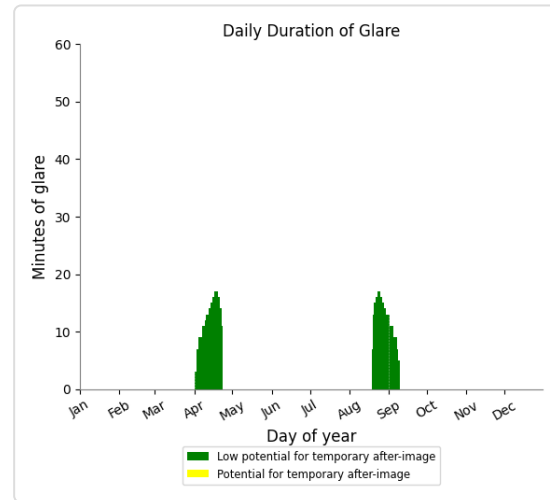
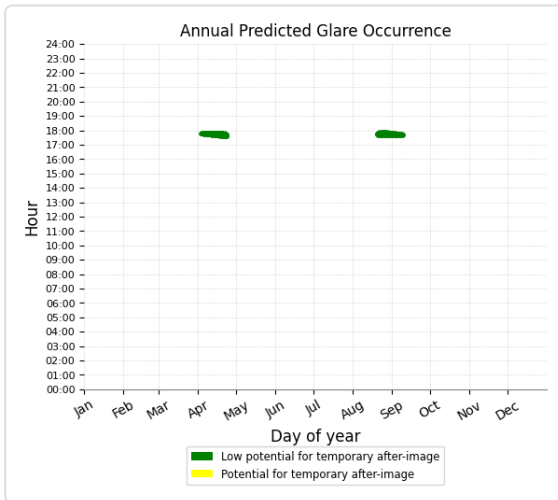
PV10 and Route: Route01

No glare found

PV10 and FP: TNP26

Yellow glare: none

Green glare: 544 min.



PV10 and FP: NXP10

No glare found

PV10 and FP: NXP28

No glare found

PV10 and FP: TNP08

No glare found

PV10 and FP: TNP17

No glare found

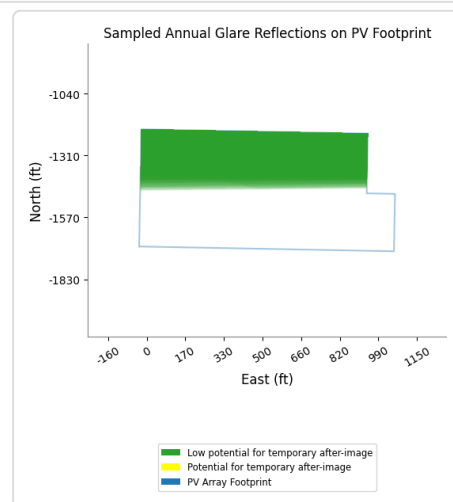
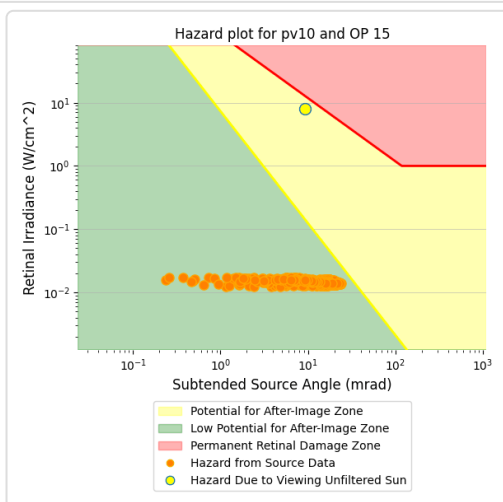
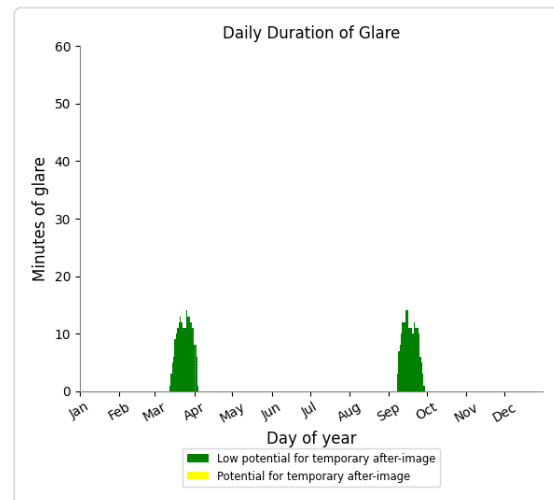
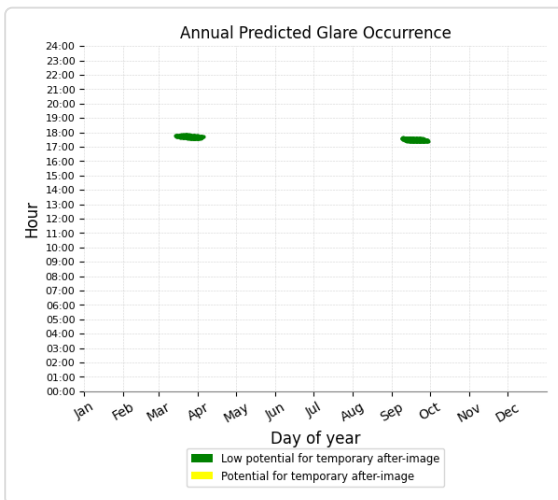
PV10 and FP: TNP35

No glare found

PV10 and OP 15

Yellow glare: none

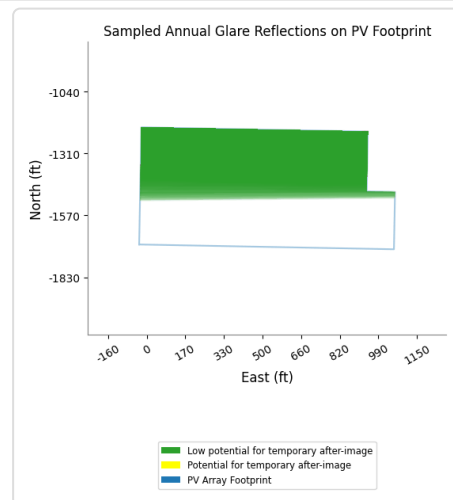
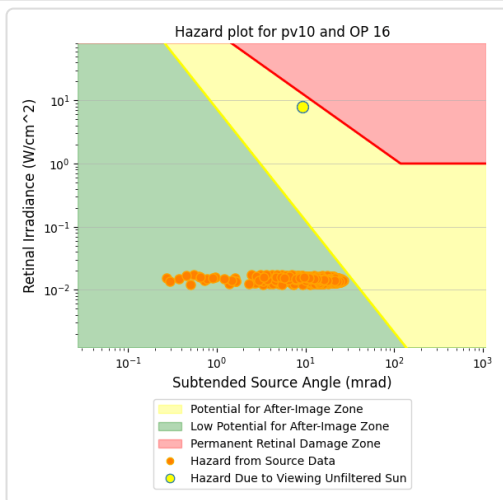
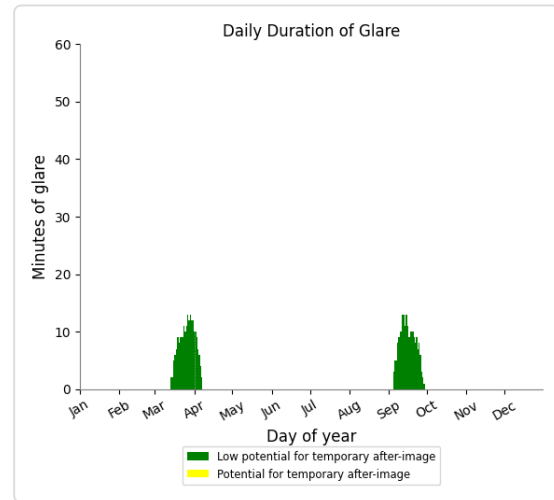
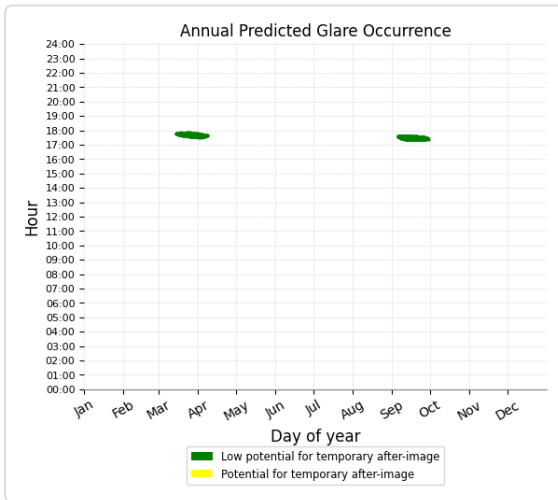
Green glare: 418 min.



PV10 and OP 16

Yellow glare: none

Green glare: 411 min.



PV10 and OP 1

No glare found

PV10 and OP 2

No glare found

PV10 and OP 3

No glare found

PV10 and OP 4

No glare found

PV10 and OP 5

No glare found

PV10 and OP 6

No glare found

PV10 and OP 7

No glare found

PV10 and OP 8

No glare found

PV10 and OP 9

No glare found

PV10 and OP 10

No glare found

PV10 and OP 11

No glare found

PV10 and OP 12

No glare found

PV10 and OP 13

No glare found

PV10 and OP 14

No glare found

PV10 and OP 17

No glare found

PV10 and OP 18

No glare found

PV10 and OP 19

No glare found

PV10 and OP 20

No glare found

PV: PV11 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	638	10.6	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 16	137	2.3	0	0.0
OP 17	1,288	21.5	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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

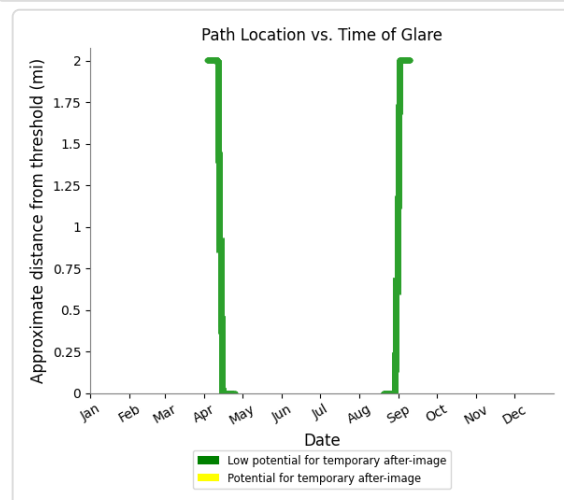
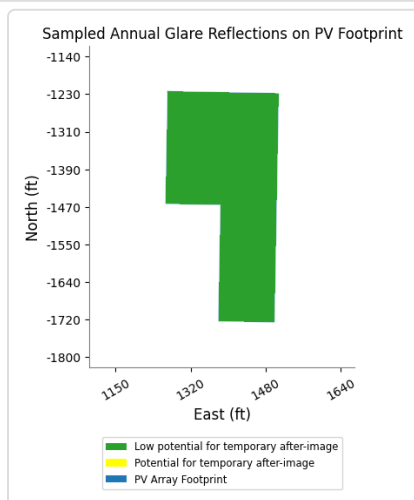
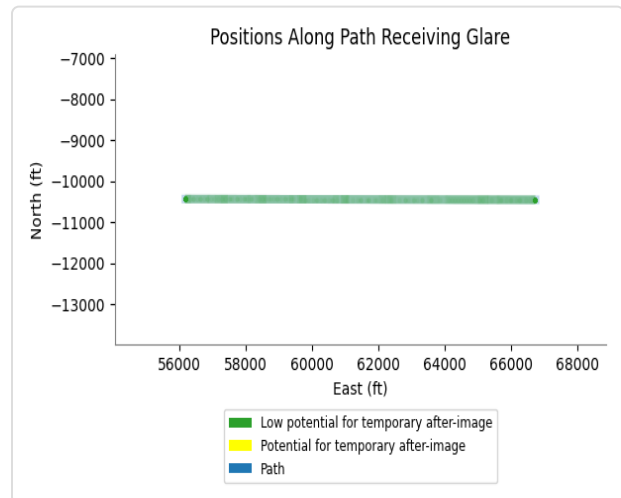
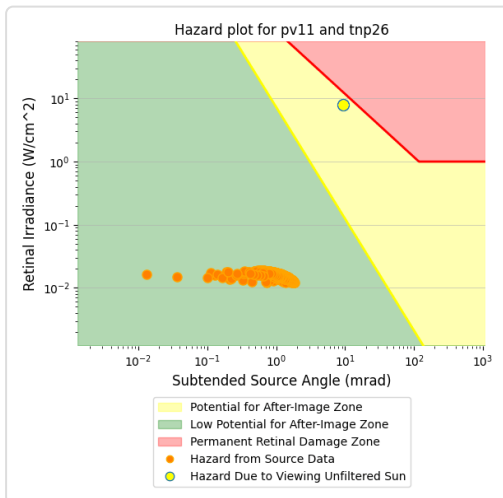
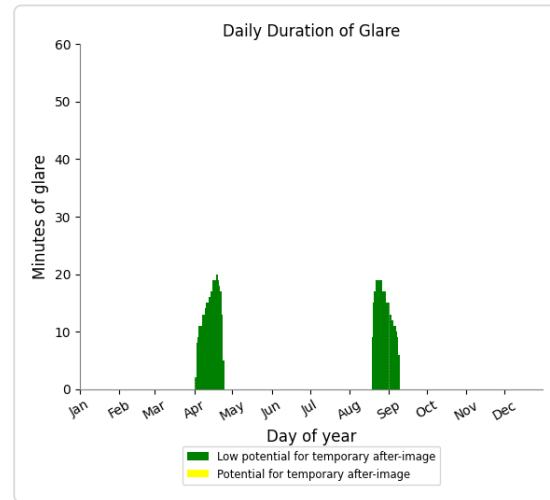
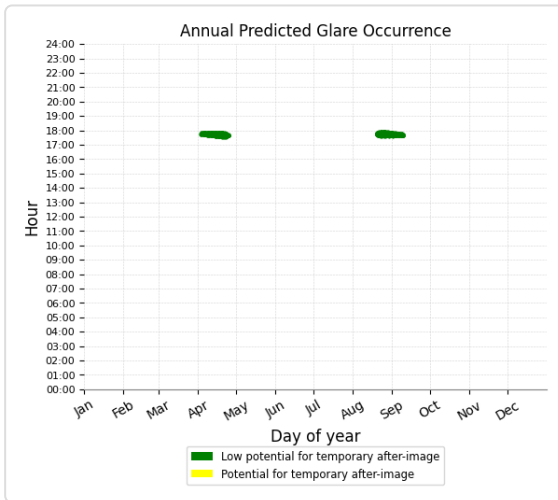
PV11 and Route: Route01

No glare found

PV11 and FP: TNP26

Yellow glare: none

Green glare: 638 min.



PV11 and FP: NXP10

No glare found

PV11 and FP: NXP28

No glare found

PV11 and FP: TNP08

No glare found

PV11 and FP: TNP17

No glare found

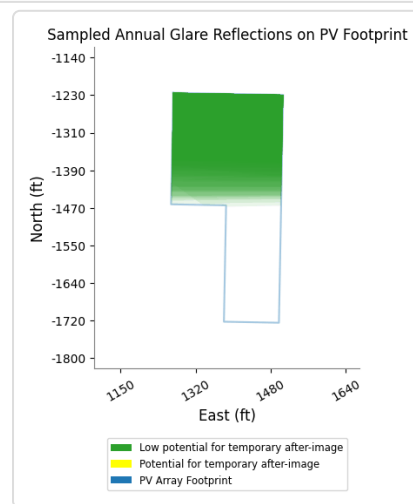
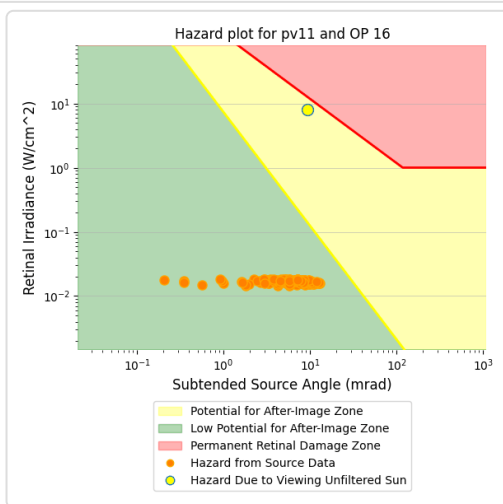
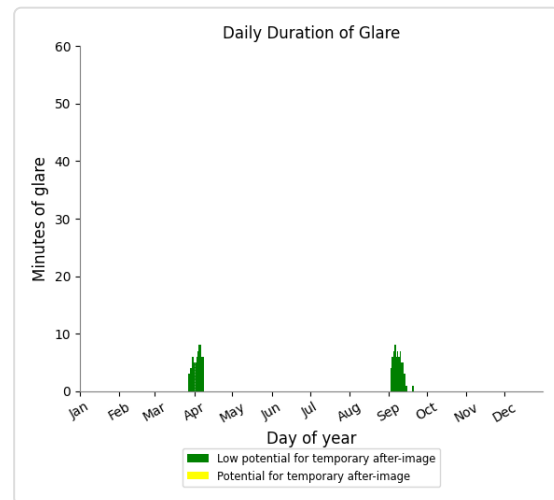
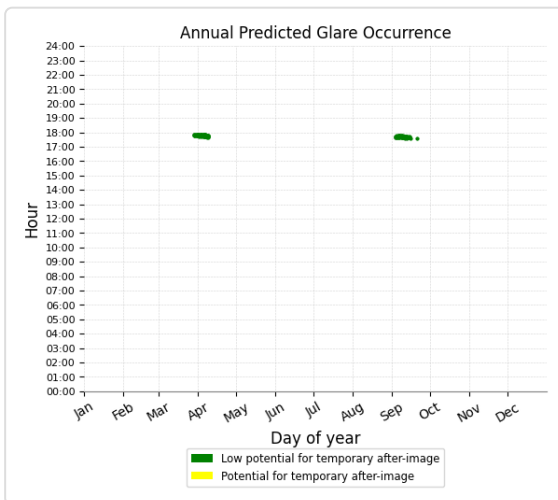
PV11 and FP: TNP35

No glare found

PV11 and OP 16

Yellow glare: none

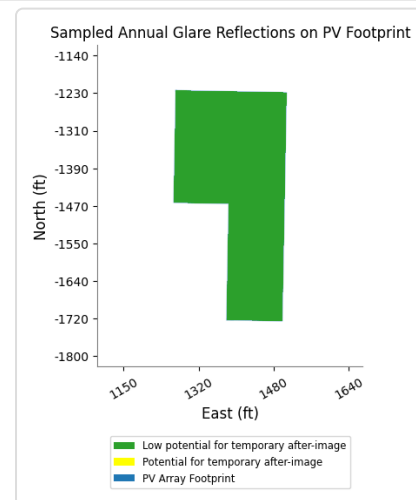
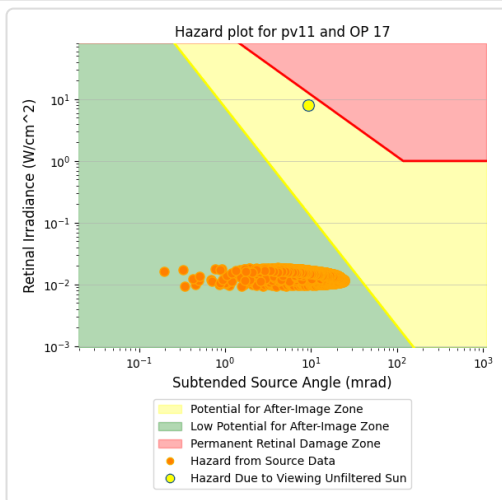
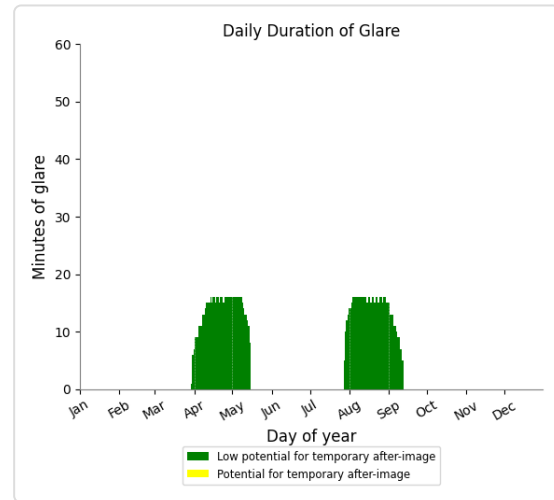
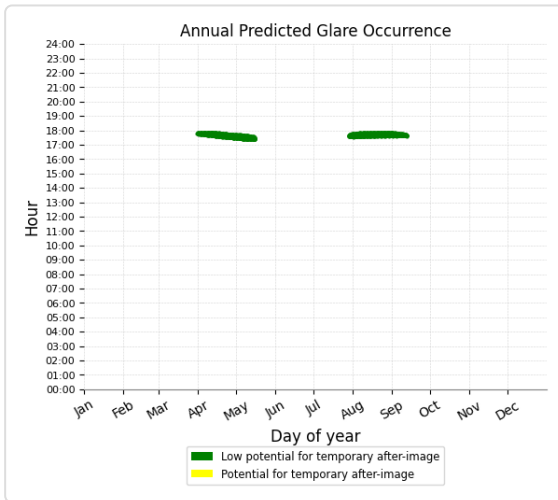
Green glare: 137 min.



PV11 and OP 17

Yellow glare: none

Green glare: 1,288 min.



PV11 and OP 1

No glare found

PV11 and OP 2

No glare found

PV11 and OP 3

No glare found

PV11 and OP 4

No glare found

PV11 and OP 5

No glare found

PV11 and OP 6

No glare found

PV11 and OP 7

No glare found

PV11 and OP 8

No glare found

PV11 and OP 9

No glare found

PV11 and OP 10

No glare found

PV11 and OP 11

No glare found

PV11 and OP 12

No glare found

PV11 and OP 13

No glare found

PV11 and OP 14

No glare found

PV11 and OP 15

No glare found

PV11 and OP 18

No glare found

PV11 and OP 19

No glare found

PV11 and OP 20

No glare found

PV: PV12 potential temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	930	15.5	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 15	1,279	21.3	42	0.7
OP 16	1,608	26.8	300	5.0
OP 17	4,410	73.5	1,429	23.8
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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

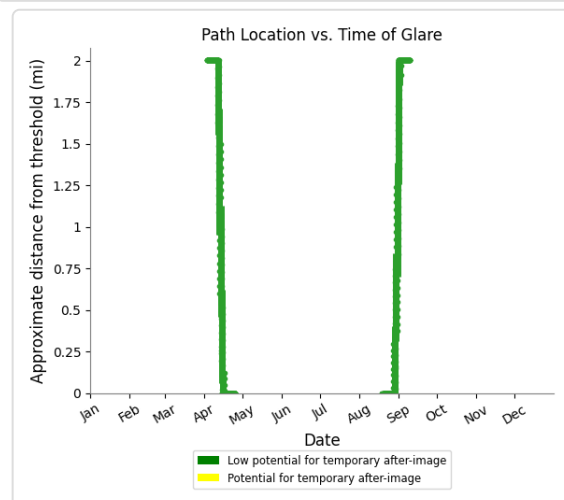
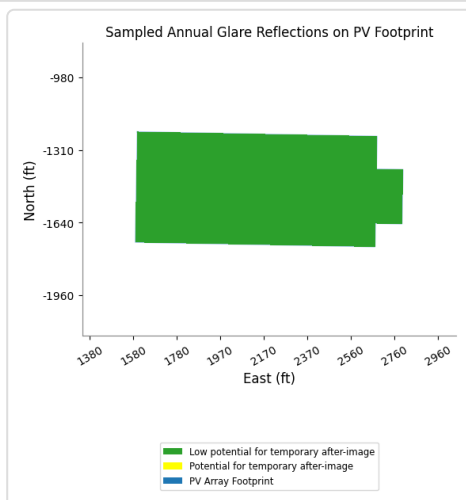
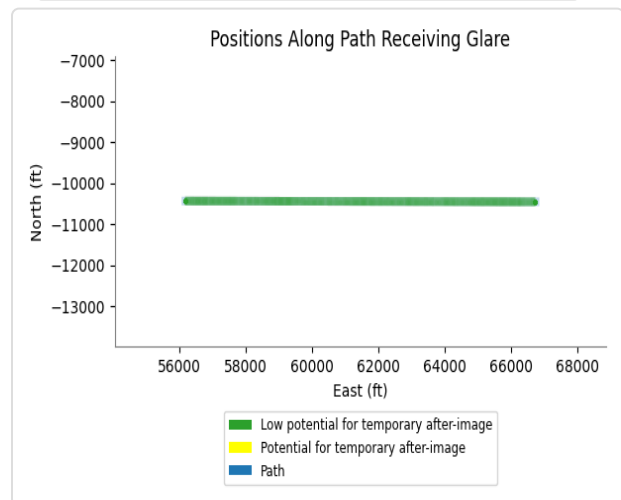
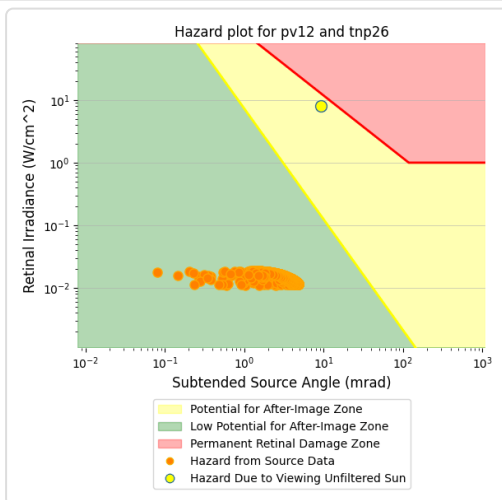
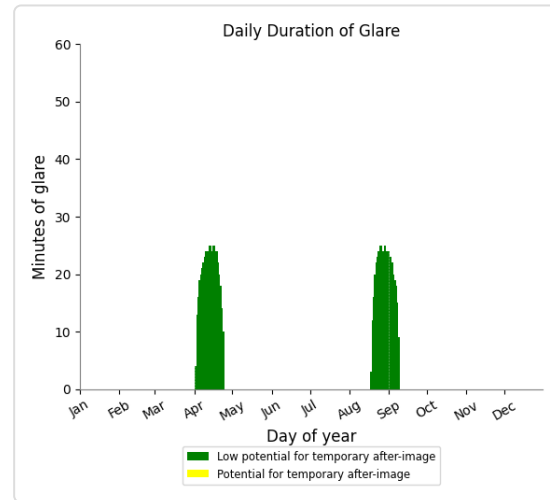
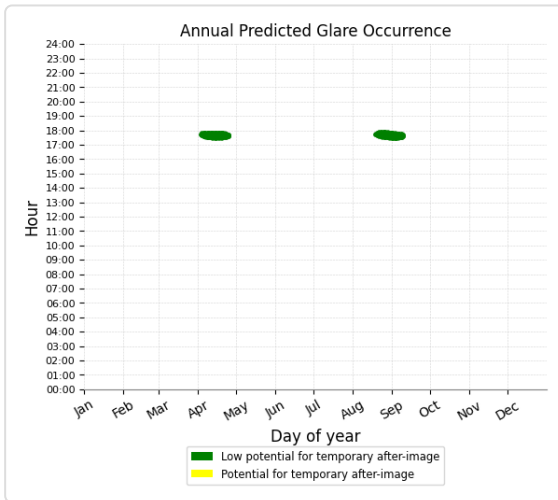
PV12 and Route: Route01

No glare found

PV12 and FP: TNP26

Yellow glare: none

Green glare: 930 min.



PV12 and FP: NXP10

No glare found

PV12 and FP: NXP28

No glare found

PV12 and FP: TNP08

No glare found

PV12 and FP: TNP17

No glare found

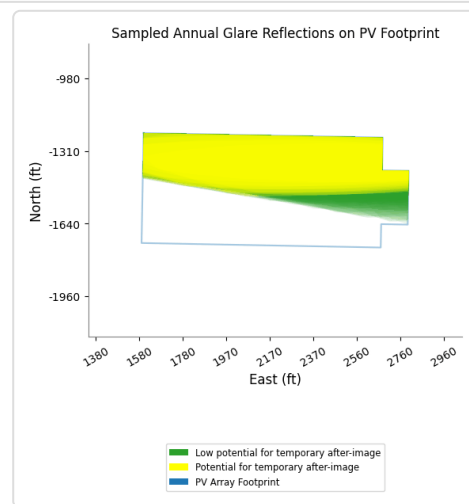
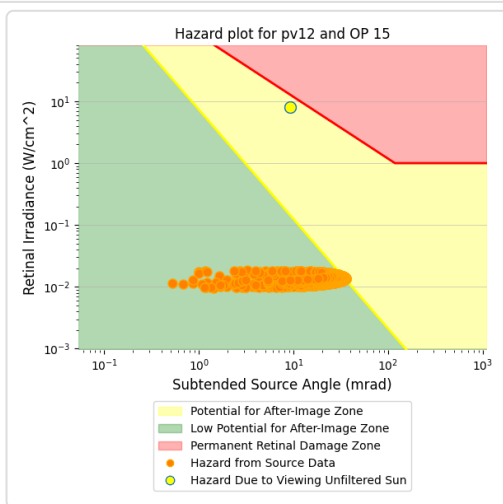
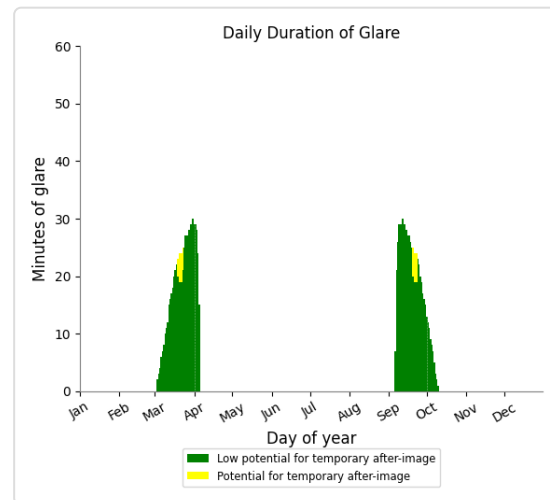
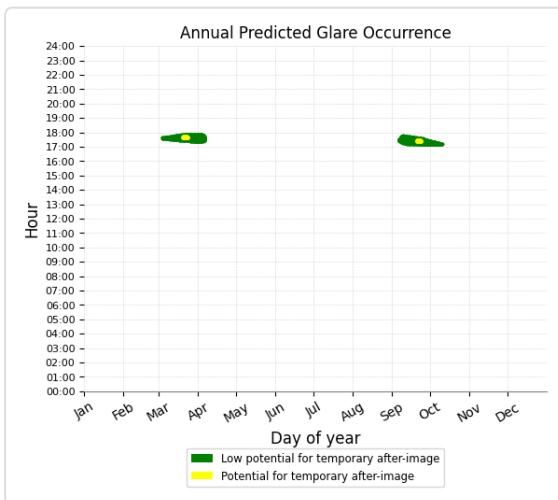
PV12 and FP: TNP35

No glare found

PV12 and OP 15

Yellow glare: 42 min.

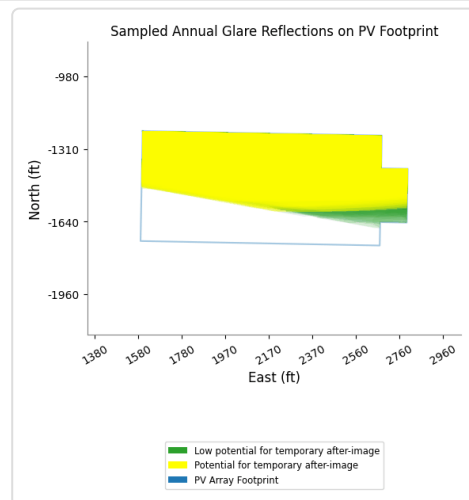
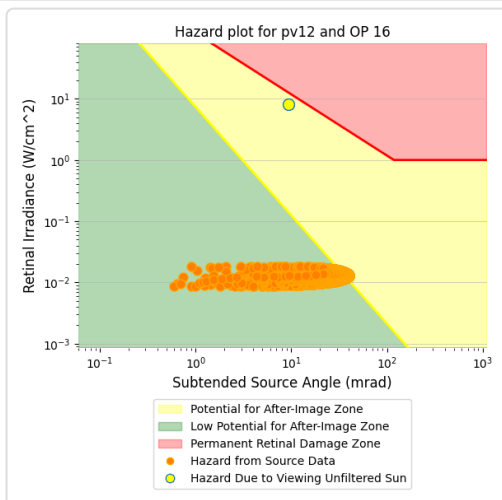
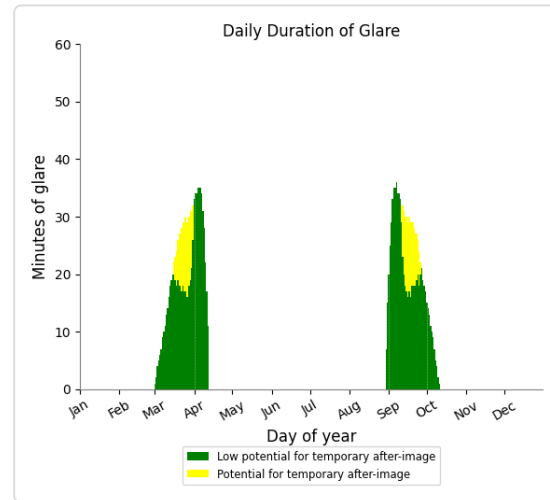
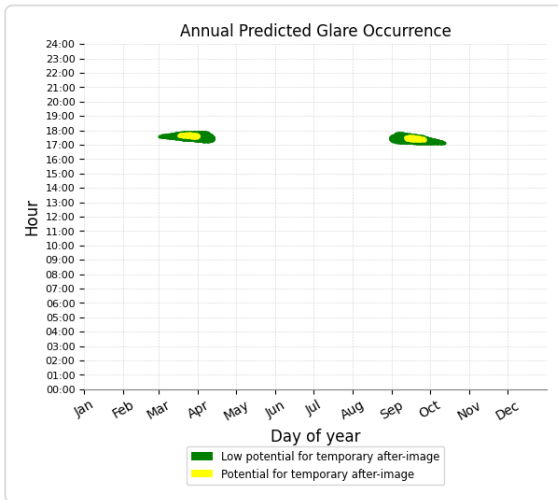
Green glare: 1,279 min.



PV12 and OP 16

Yellow glare: 300 min.

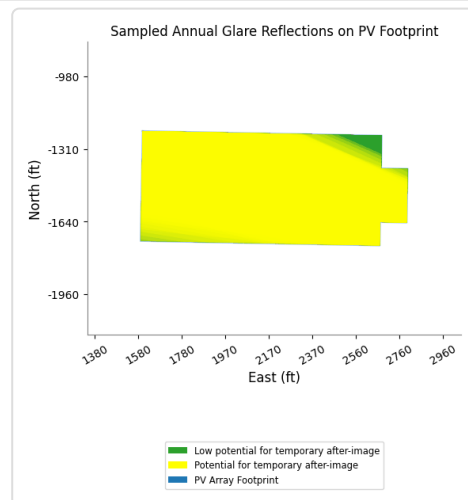
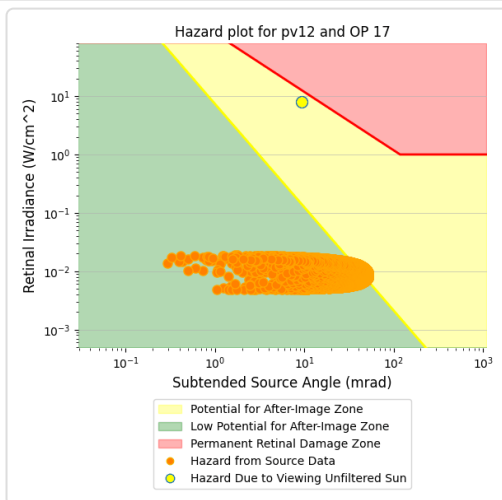
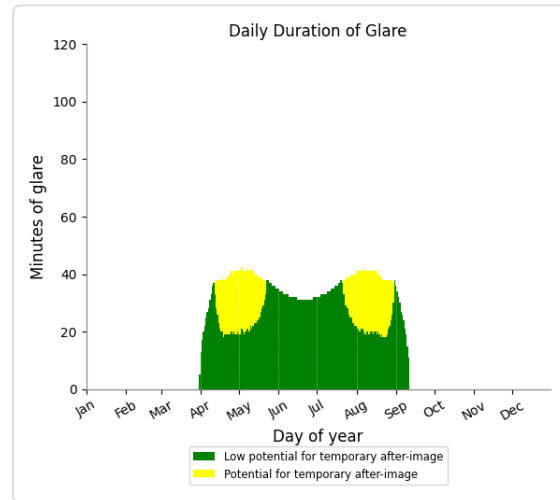
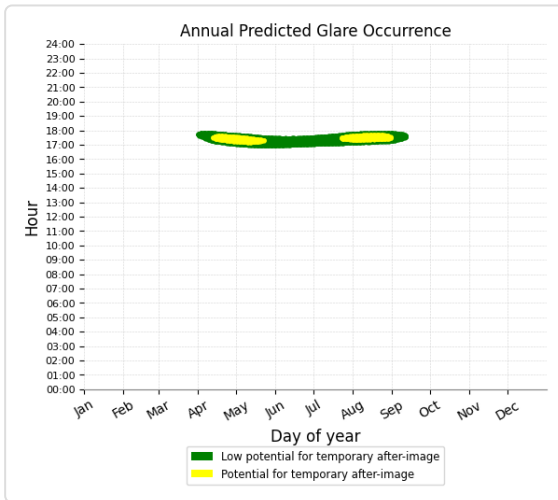
Green glare: 1,608 min.



PV12 and OP 17

Yellow glare: 1,429 min.

Green glare: 4,410 min.



PV12 and OP 1

No glare found

PV12 and OP 2

No glare found

PV12 and OP 3

No glare found

PV12 and OP 4

No glare found

PV12 and OP 5

No glare found

PV12 and OP 6

No glare found

PV12 and OP 7

No glare found

PV12 and OP 8

No glare found

PV12 and OP 9

No glare found

PV12 and OP 10

No glare found

PV12 and OP 11

No glare found

PV12 and OP 12

No glare found

PV12 and OP 13

No glare found

PV12 and OP 14

No glare found

PV12 and OP 18

No glare found

PV12 and OP 19

No glare found

PV12 and OP 20

No glare found

PV: PV13 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	745	12.4	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 17	555	9.2	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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

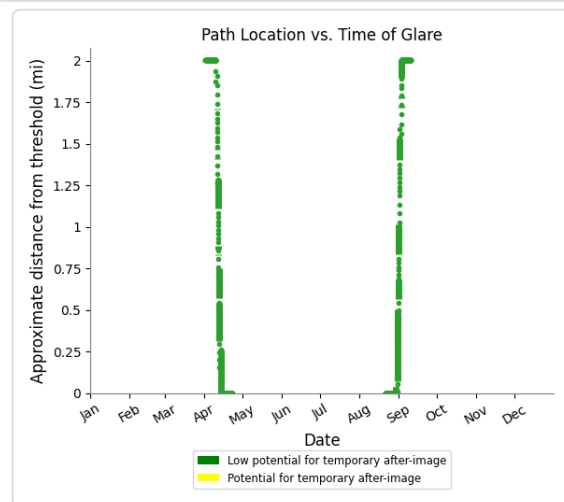
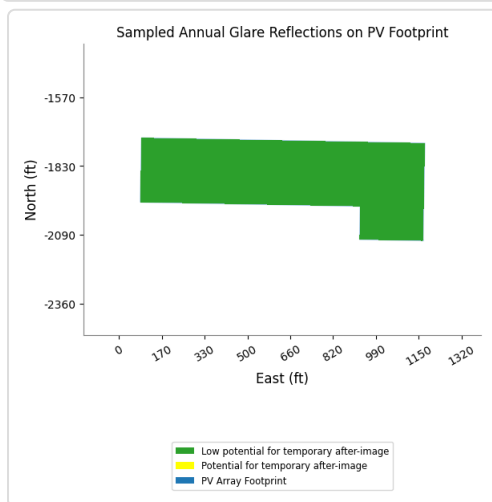
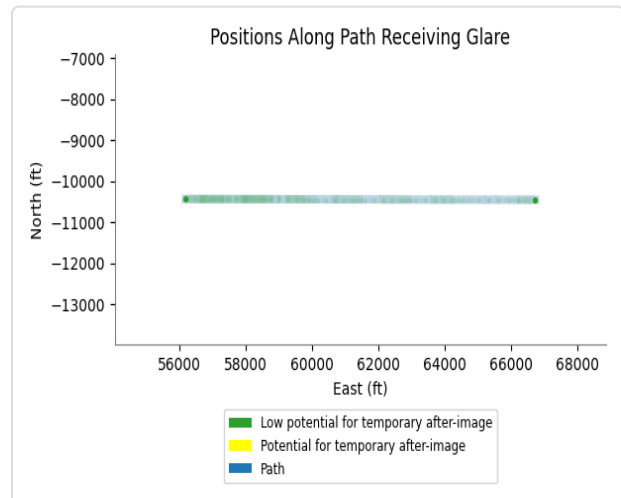
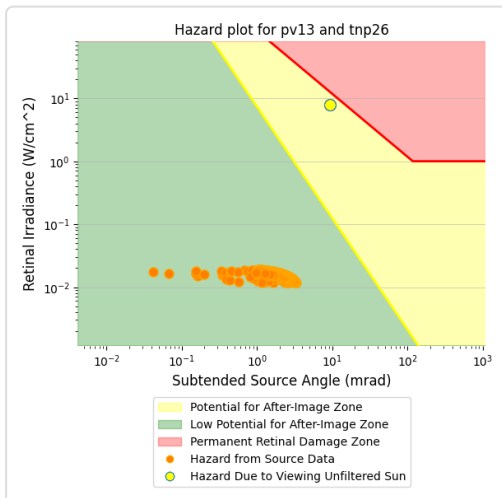
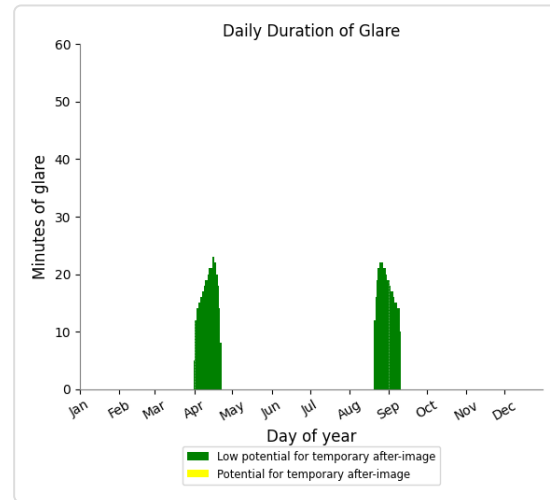
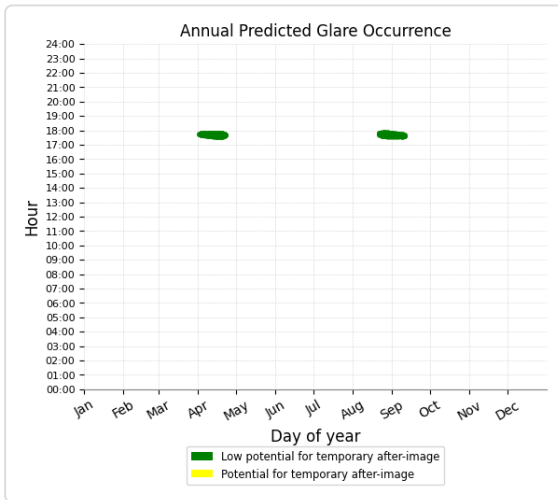
PV13 and Route: Route01

No glare found

PV13 and FP: TNP26

Yellow glare: none

Green glare: 745 min.



PV13 and FP: NXP10

No glare found

PV13 and FP: NXP28

No glare found

PV13 and FP: TNP08

No glare found

PV13 and FP: TNP17

No glare found

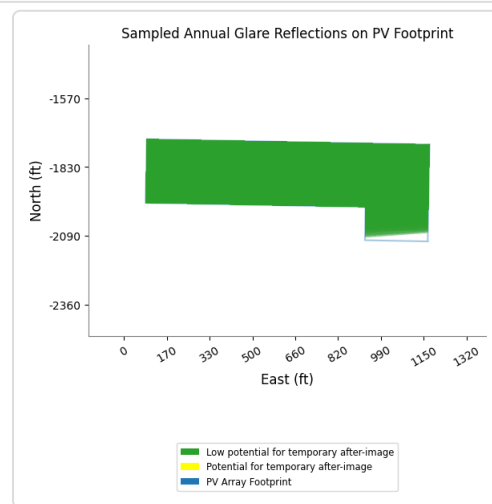
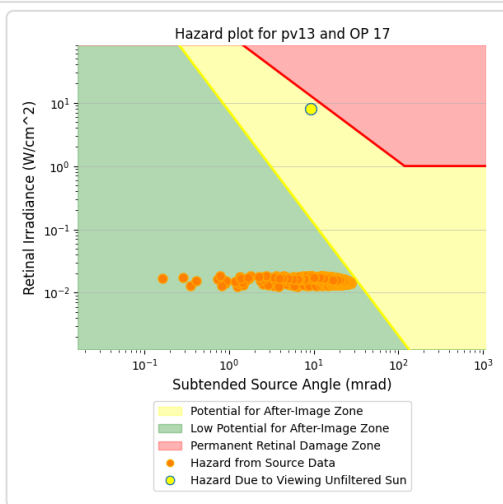
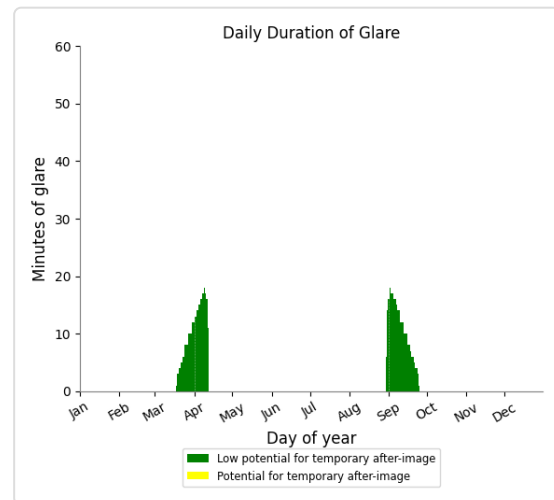
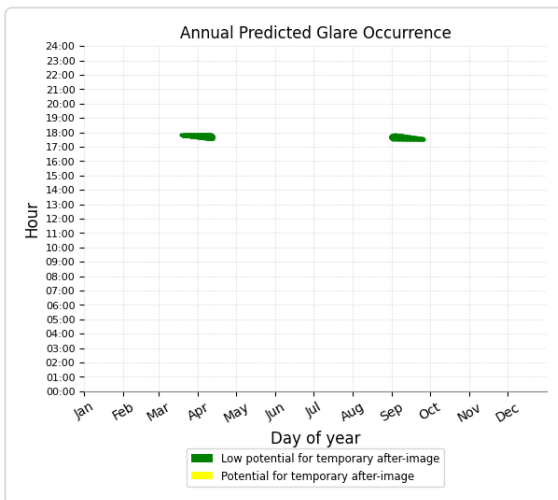
PV13 and FP: TNP35

No glare found

PV13 and OP 17

Yellow glare: none

Green glare: 555 min.



PV13 and OP 1

No glare found

PV13 and OP 2

No glare found

PV13 and OP 3

No glare found

PV13 and OP 4

No glare found

PV13 and OP 5

No glare found

PV13 and OP 6

No glare found

PV13 and OP 7

No glare found

PV13 and OP 8

No glare found

PV13 and OP 9

No glare found

PV13 and OP 10

No glare found

PV13 and OP 11

No glare found

PV13 and OP 12

No glare found

PV13 and OP 13

No glare found

PV13 and OP 14

No glare found

PV13 and OP 15

No glare found

PV13 and OP 16

No glare found

PV13 and OP 18

No glare found

PV13 and OP 19

No glare found

PV13 and OP 20

No glare found

PV: PV14 potential temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	648	10.8	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 17	1,284	21.4	348	5.8
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 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

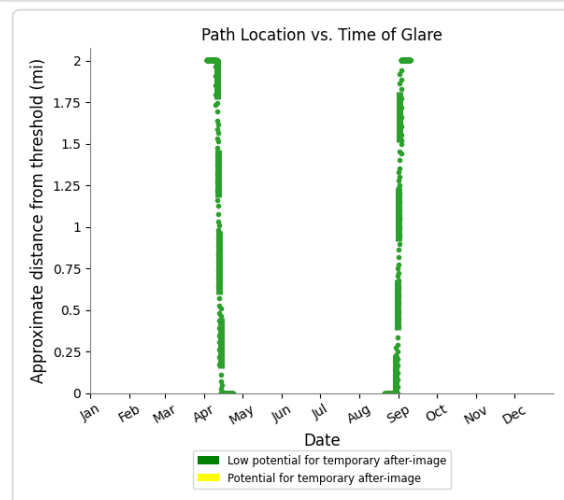
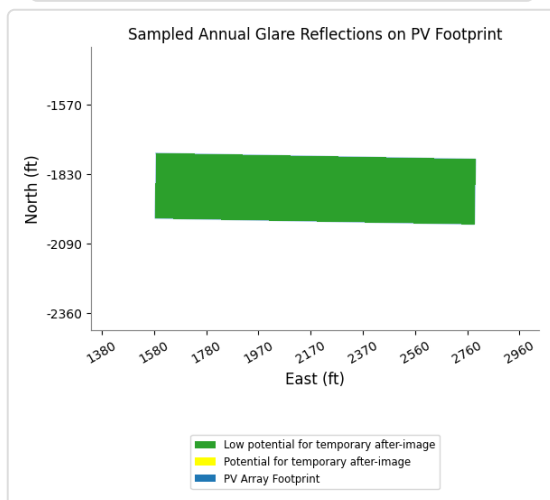
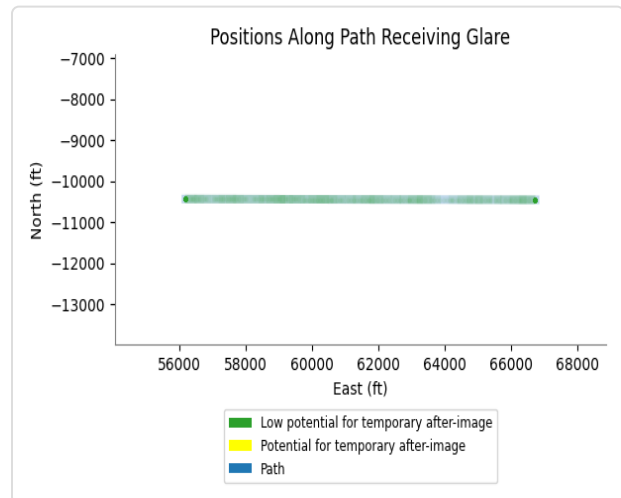
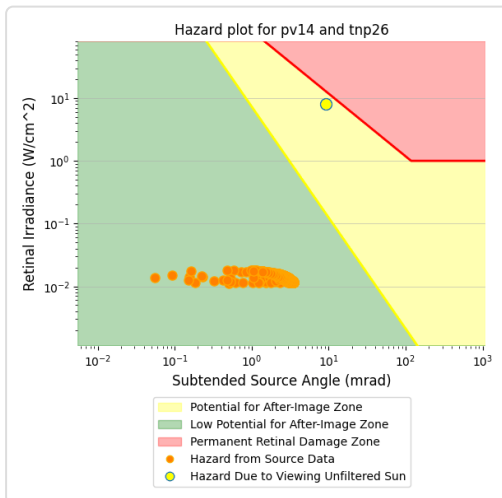
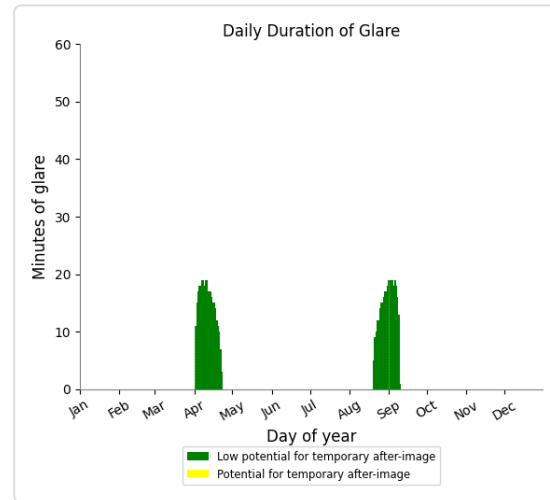
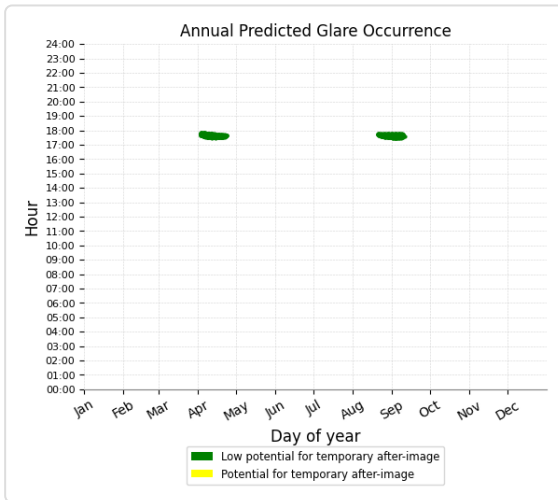
PV14 and Route: Route01

No glare found

PV14 and FP: TNP26

Yellow glare: none

Green glare: 648 min.



PV14 and FP: NXP10

No glare found

PV14 and FP: NXP28

No glare found

PV14 and FP: TNP08

No glare found

PV14 and FP: TNP17

No glare found

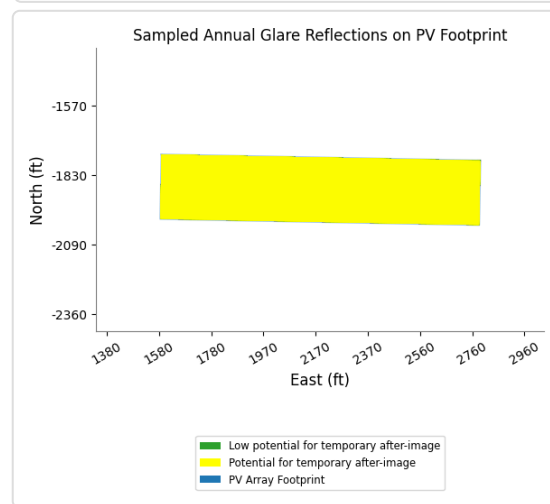
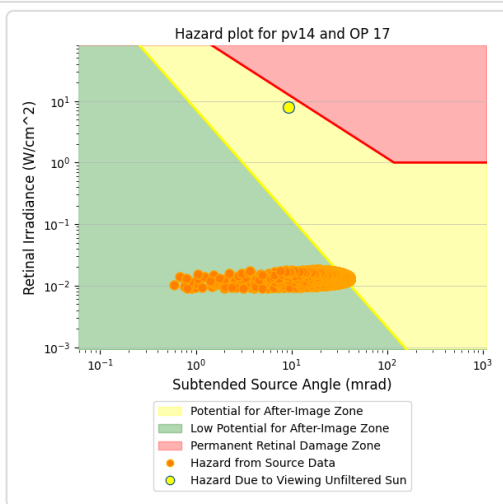
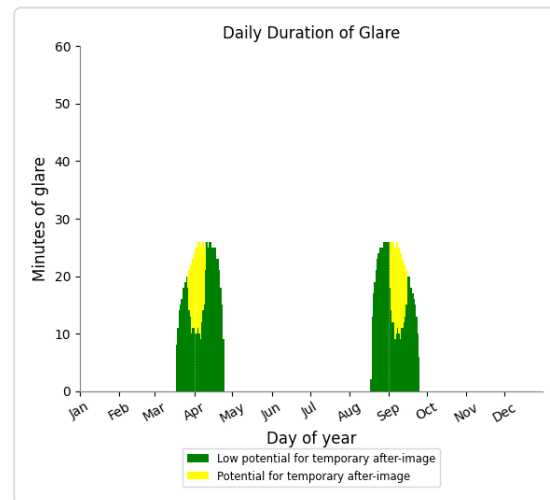
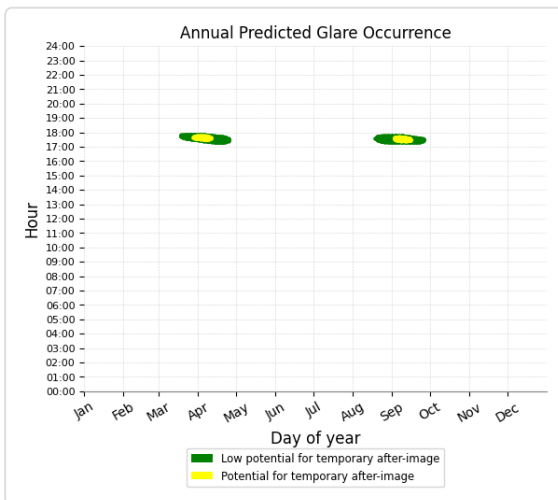
PV14 and FP: TNP35

No glare found

PV14 and OP 17

Yellow glare: 348 min.

Green glare: 1,284 min.



PV14 and OP 1

No glare found

PV14 and OP 2

No glare found

PV14 and OP 3

No glare found

PV14 and OP 4

No glare found

PV14 and OP 5

No glare found

PV14 and OP 6

No glare found

PV14 and OP 7

No glare found

PV14 and OP 8

No glare found

PV14 and OP 9

No glare found

PV14 and OP 10

No glare found

PV14 and OP 11

No glare found

PV14 and OP 12

No glare found

PV14 and OP 13

No glare found

PV14 and OP 14

No glare found

PV14 and OP 15

No glare found

PV14 and OP 16

No glare found

PV14 and OP 18

No glare found

PV14 and OP 19

No glare found

PV14 and OP 20

No glare found

PV: PV15 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	855	14.2	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 13	911	15.2	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 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

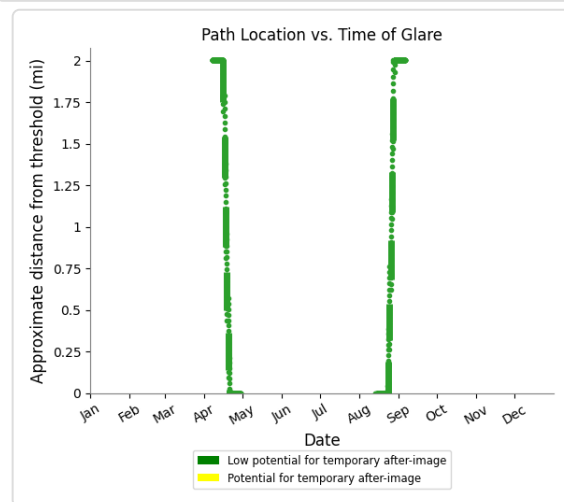
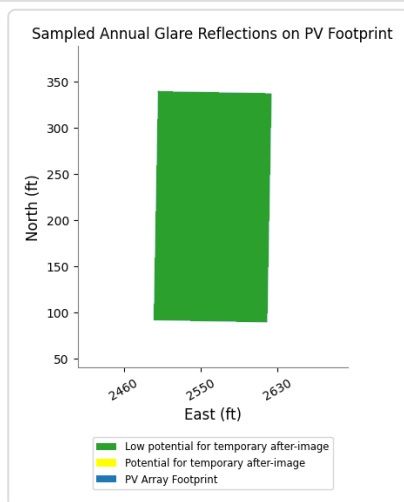
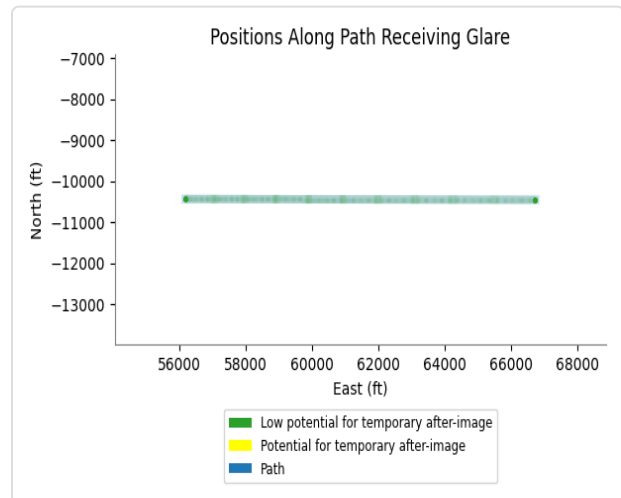
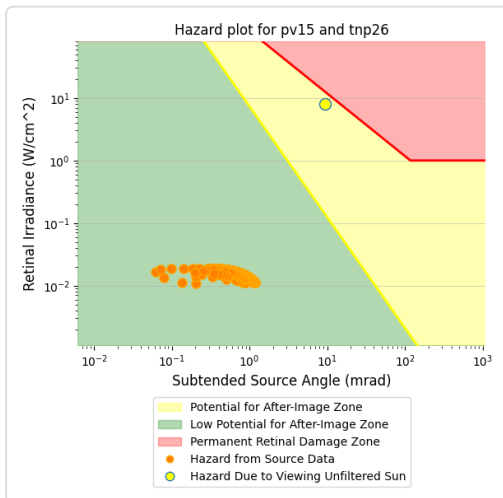
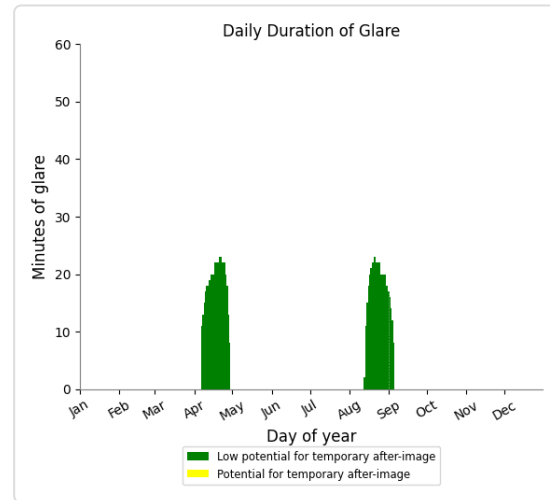
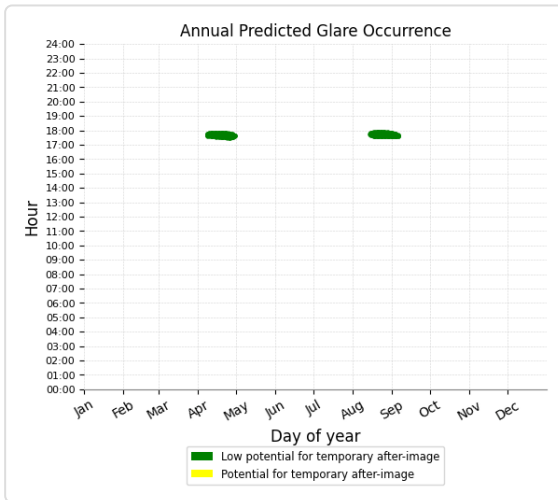
PV15 and Route: Route01

No glare found

PV15 and FP: TNP26

Yellow glare: none

Green glare: 855 min.



PV15 and FP: NXP10

No glare found

PV15 and FP: NXP28

No glare found

PV15 and FP: TNP08

No glare found

PV15 and FP: TNP17

No glare found

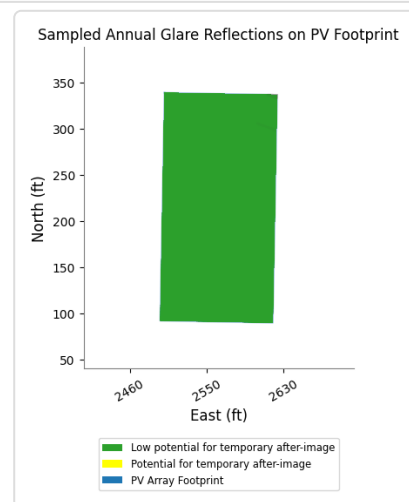
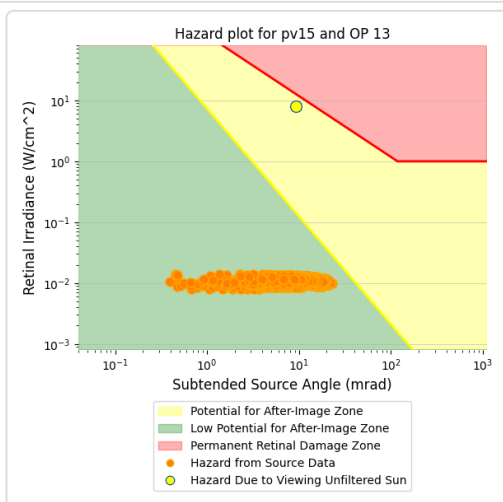
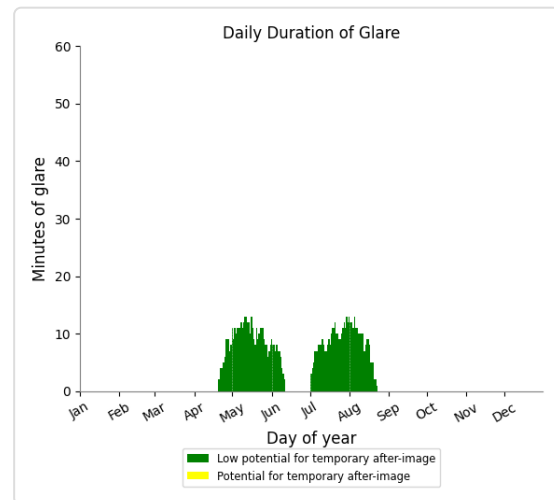
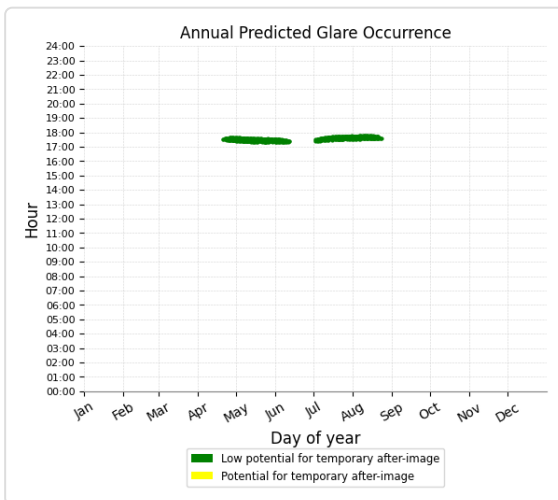
PV15 and FP: TNP35

No glare found

PV15 and OP 13

Yellow glare: none

Green glare: 911 min.



PV15 and OP 1

No glare found

PV15 and OP 2

No glare found

PV15 and OP 3

No glare found

PV15 and OP 4

No glare found

PV15 and OP 5

No glare found

PV15 and OP 6

No glare found

PV15 and OP 7

No glare found

PV15 and OP 8

No glare found

PV15 and OP 9

No glare found

PV15 and OP 10

No glare found

PV15 and OP 11

No glare found

PV15 and OP 12

No glare found

PV15 and OP 14

No glare found

PV15 and OP 15

No glare found

PV15 and OP 16

No glare found

PV15 and OP 17

No glare found

PV15 and OP 18

No glare found

PV15 and OP 19

No glare found

PV15 and OP 20

No glare found

PV: PV16 low potential for temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route01	0	0.0	0	0.0
TNP26	517	8.6	0	0.0
NXP10	0	0.0	0	0.0
NXP28	0	0.0	0	0.0
TNP08	0	0.0	0	0.0
TNP17	0	0.0	0	0.0
TNP35	0	0.0	0	0.0
OP 13	3,125	52.1	0	0.0
OP 14	1,783	29.7	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 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

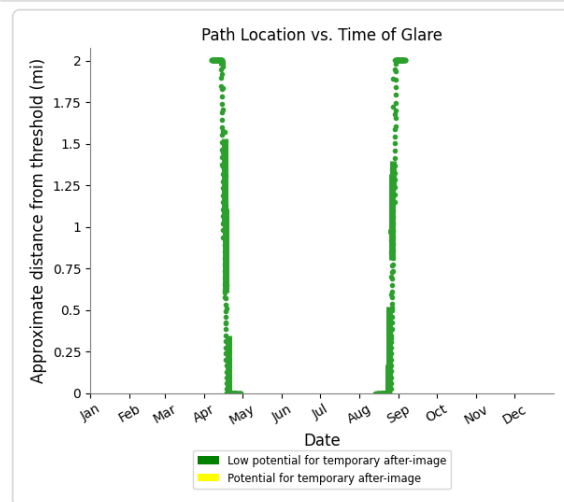
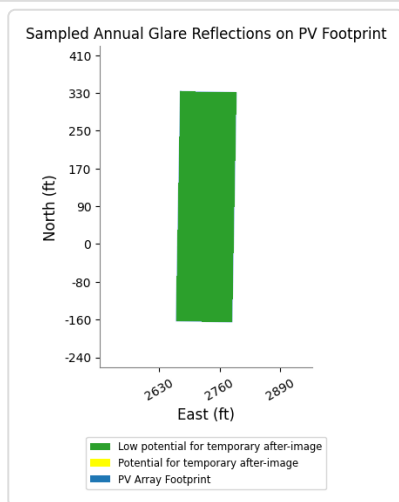
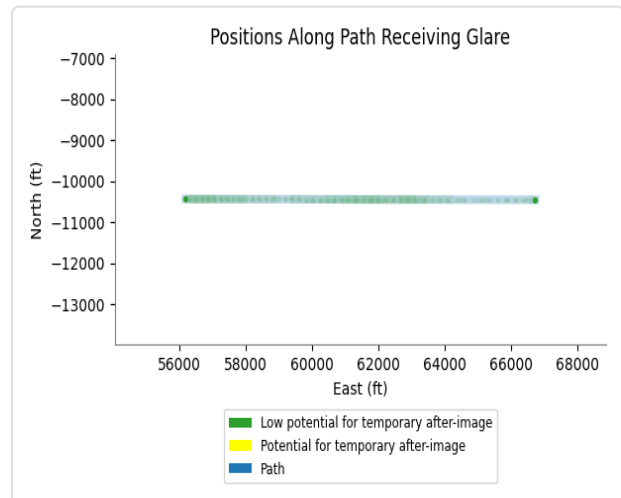
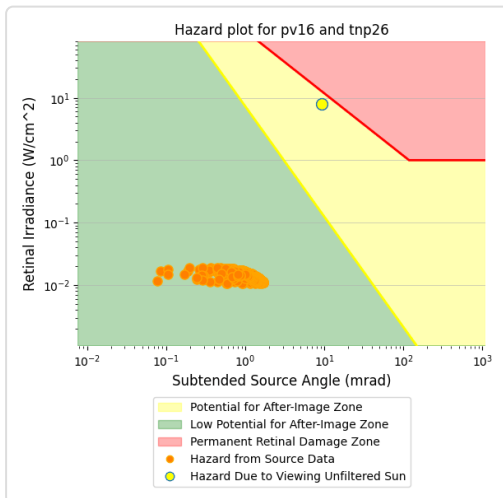
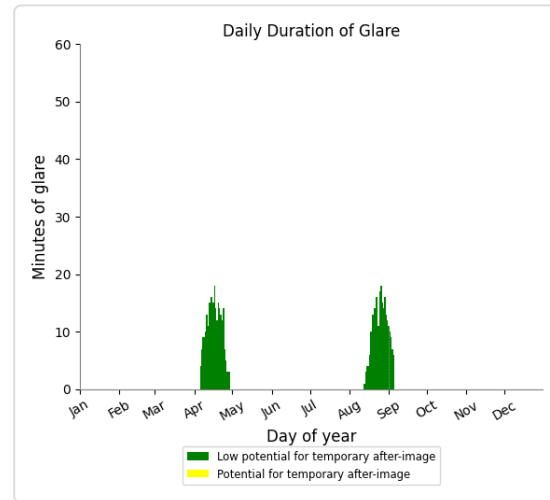
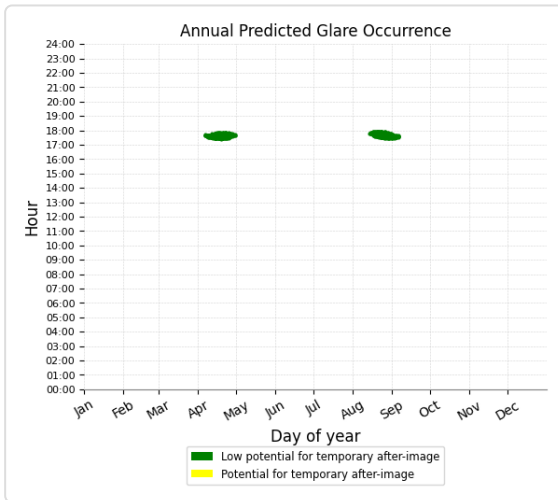
PV16 and Route: Route01

No glare found

PV16 and FP: TNP26

Yellow glare: none

Green glare: 517 min.



PV16 and FP: NXP10

No glare found

PV16 and FP: NXP28

No glare found

PV16 and FP: TNP08

No glare found

PV16 and FP: TNP17

No glare found

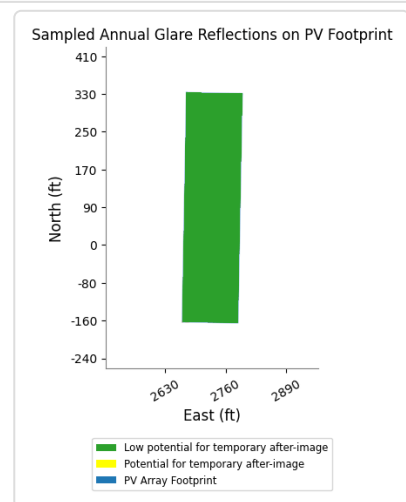
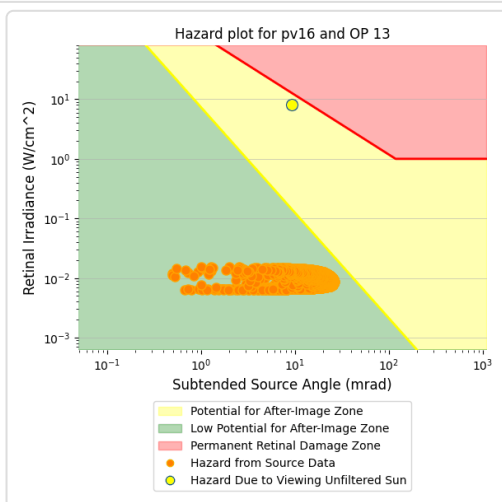
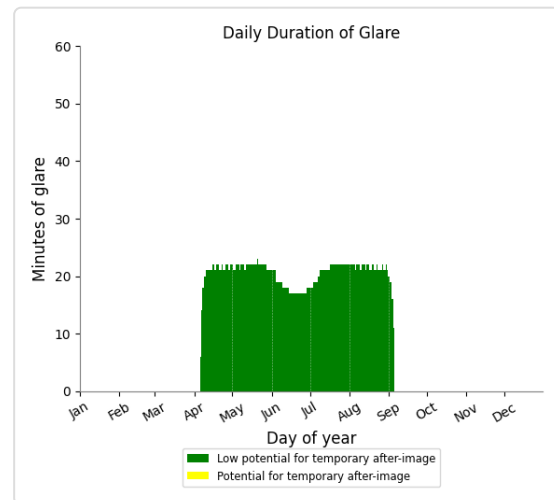
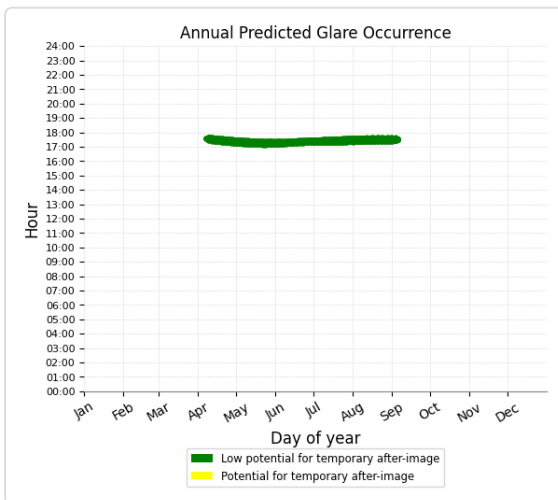
PV16 and FP: TNP35

No glare found

PV16 and OP 13

Yellow glare: none

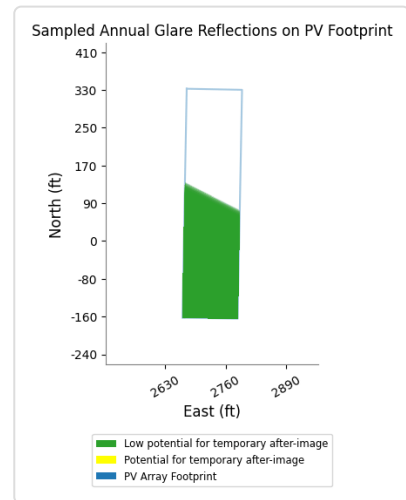
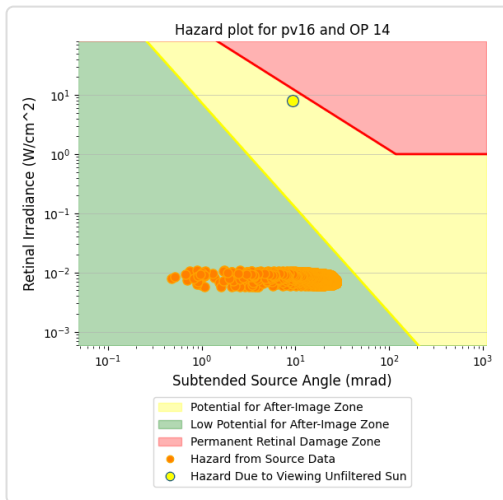
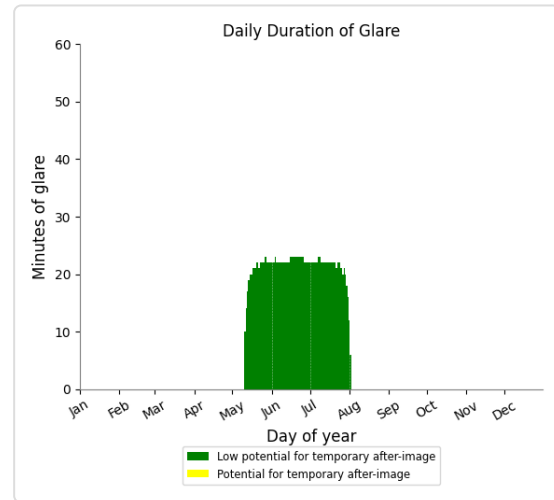
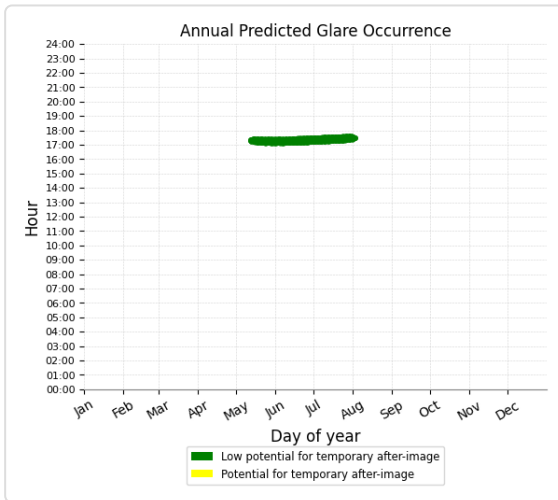
Green glare: 3,125 min.



PV16 and OP 14

Yellow glare: none

Green glare: 1,783 min.



PV16 and OP 1

No glare found

PV16 and OP 2

No glare found

PV16 and OP 3

No glare found

PV16 and OP 4

No glare found

PV16 and OP 5

No glare found

PV16 and OP 6

No glare found

PV16 and OP 7

No glare found

PV16 and OP 8

No glare found

PV16 and OP 9

No glare found

PV16 and OP 10

No glare found

PV16 and OP 11

No glare found

PV16 and OP 12

No glare found

PV16 and OP 15

No glare found

PV16 and OP 16

No glare found

PV16 and OP 17

No glare found

PV16 and OP 18

No glare found

PV16 and OP 19

No glare found

PV16 and OP 20

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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