Eastervale Solar Project

Solar Glare Hazard Analysis Report

Client: Eastervale Solar Inc.
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greencat Renewables

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Eastervale Solar Inc.

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This document has been prepared by Green Cat Renewables Canada Corporation. The material and data in this report were prepared under the supervision and direction of the undersigned.

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PERMIT TO PRACTICE
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This solar glare hazard analysis is being issued with professional engineering authentication. The information contained in this report, to which the engineering authentication applies, is deemed complete for the intended purpose.

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Executive Summary

Eastervale Solar Inc. (Eastervale Solar) is developing a solar photovoltaic (PV) project designated as the Eastervale Solar Project (the Project). The Project site is located approximately 14km southwest of the village of Czar, Alberta. The Project will use a fixed-tilt racking system with a total capacity of up to 300-megawatts (MW_{AC}). Eastervale Solar retained Green Cat Renewables Canada Corporation (GCR) to conduct a solar glare hazard analysis (SGHA) for the potential of glare on receptors near the Project.

A prior iteration of the Eastervale Solar Project design was submitted to the AUC; however, the AUC determined that iteration of the Project design was not in the public interest, primarily due to the potential impact to wetlands in the area.[1] In its decision, the AUC also commented on the predicted glare impacts presented in the previous SGHA[2] (Previous Assessment) for the Project. Consequently, Eastervale Solar has revised the Project design to address the Commission's concerns, and have explored potential mitigation strategies to address potential glare impacts for the Project. GCR assessed the Project on the basis of both the unmitigated and mitigated cases.

GCR utilizes ForgeSolar's GlareGauge software to assess user-input PV arrays for potential glare on identified roadways and aviation assets. The software evaluates the occurrence of glare on a minute-by-minute basis. If glare is predicted, each minute of glare as a function of retinal irradiance and subtended angle is plotted on a hazard plot. Retinal irradiance and subtended angle predict the ocular hazard associated with the glare as either green (low potential for after-image), yellow (potential for temporary after-image), or red (potential for retinal damage). The software does not consider obstacles such as trees, hills, buildings, etc. between the PV array and glare receptor.

GCR followed the guidelines provided in AUC Rule 007 for the receptors to be included in a solar glare assessment, but Rule 007 does not specify any modelling parameters or glare threshold limits.[3] GCR also referred to the information provided in Leden et al.'s study of glare impacts on drivers,[4] Zehndorfer Engineering's *Solar Glare and Glint Project Report*,[5] Alberta Transportation and Economic Corridors (TEC) guidelines,[6] and other relevant literature.

GCR evaluated the area within 4,000m of the Project for aerodromes and within 800m for any other receptors. The assessment considered the following receptors near the Project:

- Nine observation points representing nearby dwellings;
- One observation point representing a nearby intersection;
- One highway; and
- Two local roads.

The above receptors are identical to those included in the Previous Assessment, with the exception of the addition of the intersection. There were no aerodromes identified within 4,000m of the Project or railways identified within 800m

[1] AUC Decision 28847-D01-2025, *Eastervale Solar + Energy Storage Project* (February 2025).

[2] AUC Exhibit 28847-X0020, *Eastervale Solar Project Solar Glare Hazard Analysis Report* (Green Cat Renewables Canada Corp., January 2025)

[3] AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, Industrial System Designations, Hydro Developments and Gas Utility Pipelines* (April 2022), subsection 4.4.2 SP14.

[4] *Verhinderung von Sonnenreflexionen in Lärmschutzwallen – ein Laborexperiment [Obstruction of sun reflections in noise barriers - laboratory experiment]* (Leden, N. & Alferdinck, J.W.A.M. & Toet, Alexander, 2015).

[5] *Solar Glare. and Glint Project* (Zehndorfer Engineering, September 2019).

[6] *Assessment requirements for solar development near provincial highways* (Alberta Transportation and Economic Corridors, December 2021).

of the Project, so none were evaluated in this assessment. There are no other known solar power projects with shared receptors in the study area, so a cumulative assessment was not completed.

The glare analysis indicates that the Project is predicted to create green and yellow glare conditions for some of the dwellings and roads that were assessed, in both the unmitigated and mitigated cases. There were significant reductions in glare predictions in the mitigated case. Furthermore, in any case, the actual glare impacts that will be experienced in the field along road routes are expected to be only a fraction of the results presented in this report. The actual impact is expected to be less because the observers will be travelling past the affected areas, not standing still while looking at the solar PV arrays. The impact of the glare on affected receptors may also be reduced by sun-masking as the glare occurs around sunrise/sunset when the sun aligns with the glare spot and observer, and the sunlight glances across the arrays at a shallow angle. The actual glare impacts that will be experienced at dwellings are anticipated to be only a fraction of the results presented in this report due to existing vegetation and agricultural infrastructure around the properties. The assessment is also conservative as it assumes that there are clear skies and bright sunshine throughout the day.

Based on the unmitigated assessment results, glare from Eastervale Solar Project is not expected to present a hazard to drivers along nearby roads or have an adverse effect on a resident's use of their home.

The modelled results of this assessment include significant conservatisms resulting from both limitations within the software, and assumptions on real-world conditions that an observer would be under while travelling past, or observing, the Project. While the conclusion of the assessment is that the Project is not expected to present a hazard, the assessment results also indicate that potential mitigation is an effective option for greatly reducing the predicted glare on nearby roads and dwellings. Of note, Eastervale Solar has already committed to mitigation via visual screening for one of the assessed dwellings, which substantially reduces the predicted glare impact at that receptor. Additionally, Eastervale Solar has also committed to the use of newer, lower reflectivity solar PV modules in the Project design, which are likely to further reduce the predicted (and practical) glare impacts from the Project, though this is subject to commercial availability.

A potential further mitigation option, a Project redesign which reduces the PV array footprint of the Project, was considered and evaluated, and could be implemented to further reduce the predicted glare impacts at specific receptors. In the event such mitigation is deemed to be required, it can be implemented as part of the detailed engineering and design of the Project. While the implementation of such mitigation would work to reduce the predicted glare results modelled at receptors, it will not change the conclusion of the assessment, such that glare from Eastervale Solar Project is not expected to present a hazard to drivers along nearby roads or have an adverse effect on a resident's use of their home.

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1 Introduction

Eastervale Solar Inc. (Eastervale Solar) retained Green Cat Renewables Canada Corporation (GCR) to conduct a solar glare hazard analysis (SGHA) for the proposed Eastervale Solar Project (the Project). The solar photovoltaic (PV) project is located 14km southwest of the village of Czar, Alberta, and will have a total capacity of up to 300-megawatts (MW_{AC}). The proposed Project will use a fixed-tilt racking system.

It is considered that a developer, in this case Eastervale Solar Inc., should provide safety assurances regarding the full potential impact of the installation on nearby receptors in the form of a glare assessment.

Glint and glare refer to light reflected off smooth surfaces, either momentarily and intense (glint) or less intense for a more sustained period (glare). Solar PV technology is specifically designed to absorb as much sunlight as possible and modules are generally coated in an anti-reflective coating, as is the case with the modules selected for the Project. Solar PV sites have been developed alongside major transport routes and airports around the world, including adjacent to road infrastructure. This suggests that solar PV technology, such as that being used for the Project, can safely coexist with roads and aerodromes.

The assessment considers the glare impact of the Project on dwellings and ground transportation routes within 800m of the Project. No railways were identified within 800m of the Project, nor any registered or unregistered aerodromes within 4,000m of the Project, so none were included in the assessment.

The Project was previously submitted to the Alberta Utilities Commission (AUC) for regulatory approval; however, the AUC determined that iteration of the Project design was not in the public interest, primarily due to the potential impact to wetlands in the area.[7] In its decision, the AUC also commented on the predicted glare impacts presented in the previous SGHA[8] (Previous Assessment) for the Project. Consequently, Eastervale Solar has revised the Project design and explored potential mitigation strategies for the Project. This SGHA will present the unmitigated, worst-case glare results based on the latest Project design, and will also outline the potential mitigation measures that could be implemented, along with their expected or assessed impact on the glare predictions.

[7] AUC Decision 28847-D01-2025, *Eastervale Solar + Energy Storage Project* (February 2025).
[8] AUC Exhibit 28847-X0020, *Eastervale Solar Project Solar Glare Hazard Analysis Report* (Green Cat Renewables Canada Corp., January 2025)

2 Background Information

The potential for glint and glare from solar PV modules on the surrounding roads, residential properties and nearby aerodromes should be fully considered when planning a solar project.

Glint and glare are both caused by the reflection of light from a surface, in this case sunlight from a solar module. Glare is caused by a continuous but less intense reflection of a bright light, whereas glint is caused by a strong, momentary reflection of sunlight. Reflections from smooth surfaces produce more direct "specular" reflections, and rougher surfaces disperse the light in multiple directions, creating "diffuse" reflections. **Figure 2-1** shows these two types of reflections from a solar PV module.

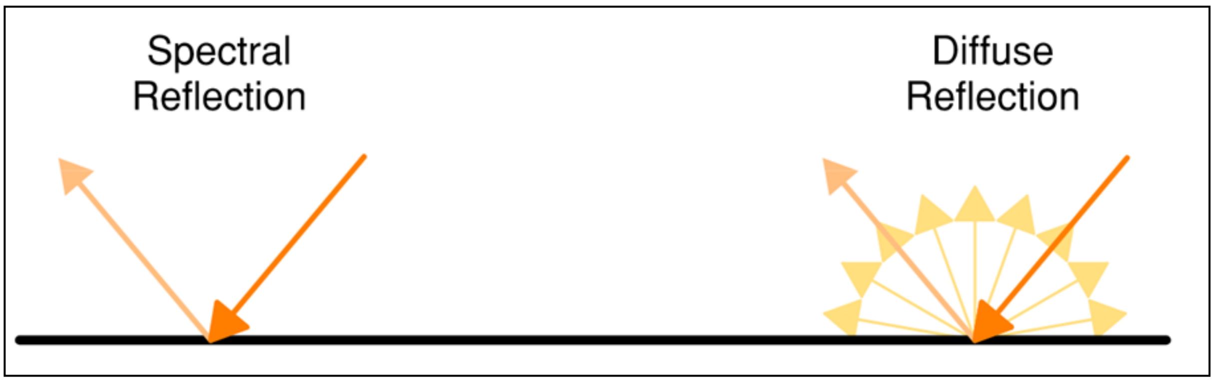


Figure 2-1 – Types of Light Reflection from Solar Modules

Calculation of potential glare requires the azimuth and elevation angle of the sun, and the consequent angles of incidence and reflection at the array, at all times throughout the year.

The angle of incidence is the angle at which the sun strikes the module (measured from normal/perpendicular to the surface). The angle of reflection is equal and opposite the angle of incidence. Light transmission through the glass and absorption by the PV module is greatest when the light is normal to the glass surface, while more light is reflected at shallower angles. As shown in **Figure 2-2** a low incidence angle is associated with the sun being high in the sky such that the sun's rays are shining at close to a right angle with the module surface. The highest incidence angles will occur in the early morning and late evening when the sun is low in the sky.

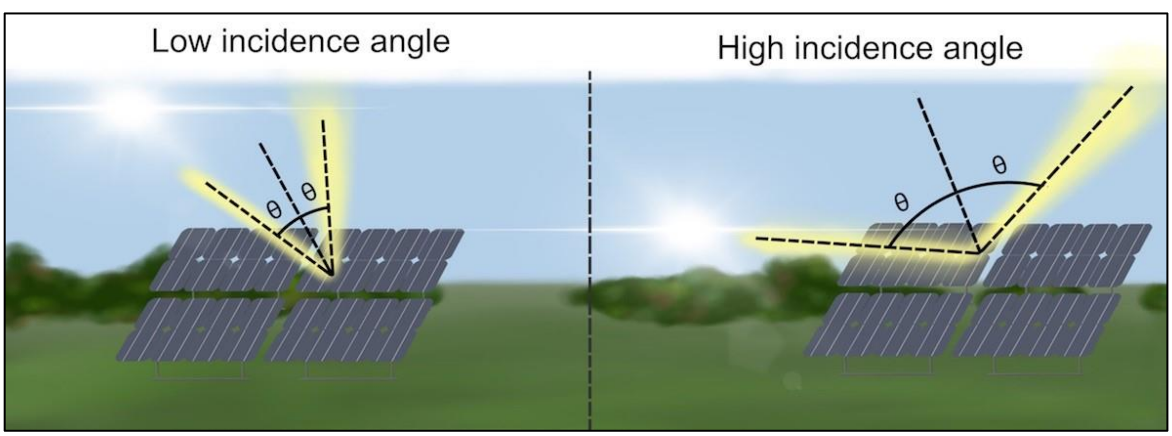


Figure 2-2 – Angles of Incidence relative to the Sun's Position

Throughout the day the sun will track across the sky; therefore, the angle at which the light is incident on the module will vary. Figure 2-3 shows the two angles (azimuth and elevation/zenith) required to define the orientation of the sun with respect to the solar module.

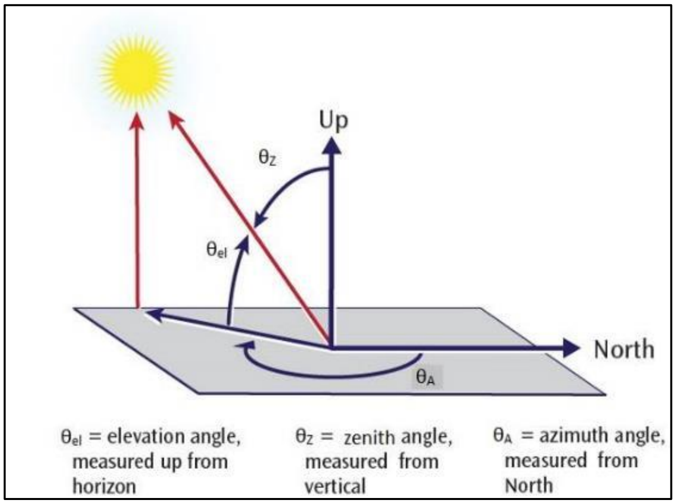


Figure 2-3 – Sun's Position relative to Solar Module

There are many factors that affect the glare level. These include but are not limited to:

- The type of solar module
- The module's tilt angle and orientation
- Size of solar development
- Shape of solar development
- Location of solar development
- Distance between solar development and observer
- Angle to observer
- Relative height of observer

The following section describes the proposed development and the associated infrastructure in detail.

3 Project Description

The proposed Project site is located within the Municipal District of Provost No. 52, Alberta, southwest of the village of Czar. The Project location relative to the village of Czar is show in **Figure 3-1**.

The Project has a total fenced area of approximately 309 hectares with a total capacity of 300 MW_{AC}. The PV modules will be mounted on fixed-tilt racking secured to the ground with piles.

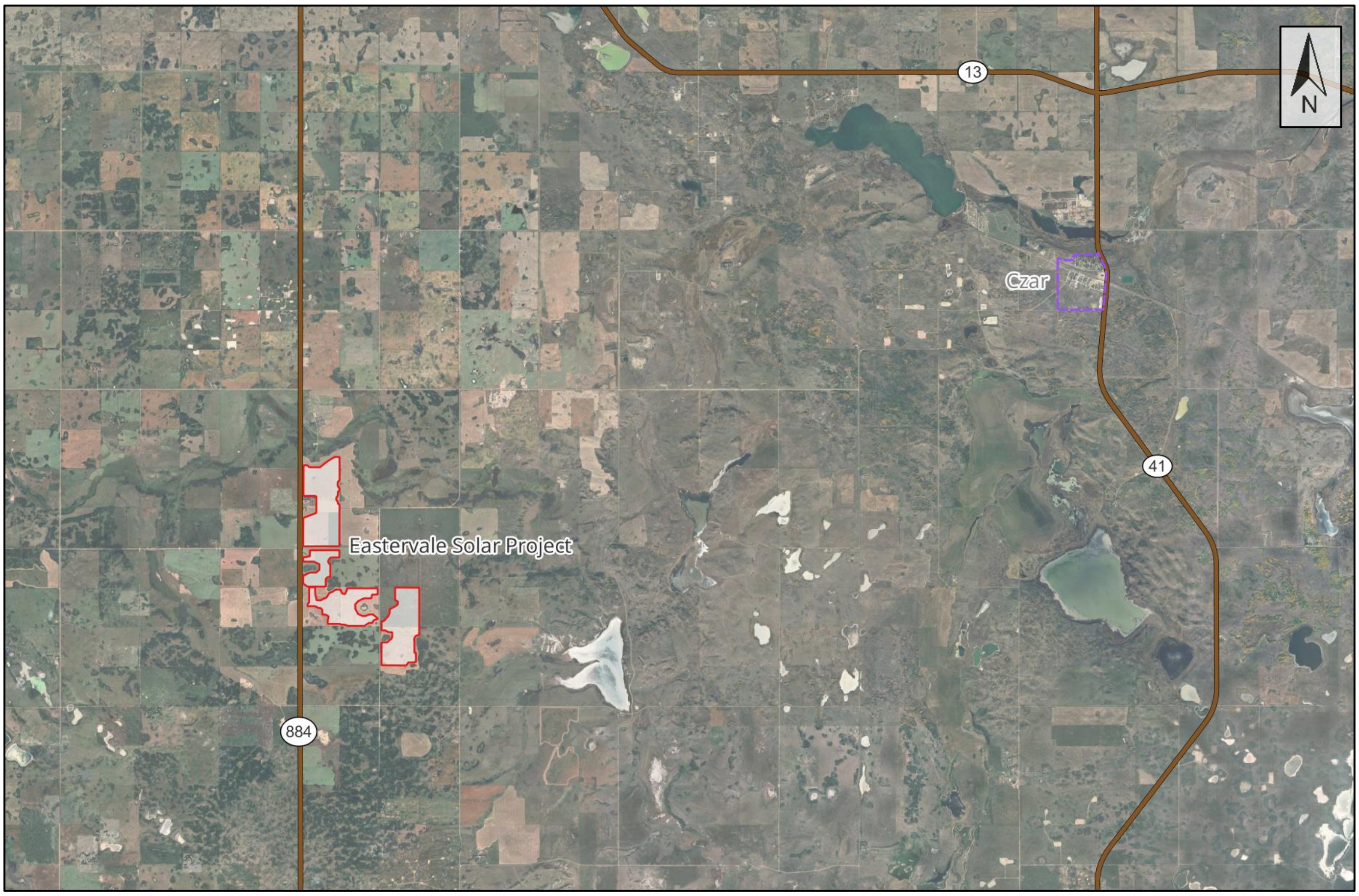


Figure 3-1 – Eastervale Solar Project Location

4 Legislation and Guidelines

There is currently no adopted legislation for assessing the impacts of glare for solar energy development in Canada, and standardized guidance only specifies what receptors to include in an assessment without specifying acceptable thresholds. Transport Canada publication TP1247E indicates that glare from solar arrays should be evaluated when proposed near aerodromes but does not provide additional specifications.[9]

The Alberta Utilities Commission (AUC)'s Rule 007 states that solar glare assessment reports must include receptors within 800m from the boundary of the project and aerodromes within 4,000m from the boundary of the project.[10] It continues to state the following requirements:

- Describe the time, location, duration, and intensity of solar glare predicted to be caused by the project.
- Describe the software or tools used in the assessment, the assumptions, and the input parameters (equipment-specific and environmental) utilized.
- Describe the qualification of the individual(s) performing the assessment.
- Identify the potential solar glare at critical points along highways, major roadways, and railways.
- Identify the potential solar glare at any aerodrome within 4,000 metres from the boundary of the project, including the potential effect on runways, flight paths and air traffic control towers.
- Include a map (or maps) identifying the solar glare receptors, critical points along highways, major roadways and railways, and aerodromes that were assessed.
- Include a table that provides the expected intensity of the solar glare (e.g., green, yellow, or red) and the expected duration of solar glare at each identified receptor, critical points along highways, major roadways and railways, and any registered and known unregistered aerodromes that were assessed.

Transportation and Economic Corridors Alberta (TEC) developed requirements for the assessment of solar PV projects being proposed near provincial highways. The guideline is based on AUC Rule 007 with additional specifications for the assessment of roads. This includes vehicle heights, consideration of potential shading and sun-masking, and discussion of potential mitigation for glare predicted within ±15° of a driver's heading.[11] In AUC Decision 27842-D01-2024, the AUC indicated that presenting conservative glare predictions within ±50° of heading may be helpful in understanding potential glare impacts on highways and railways, though glare within this wider range does not necessarily need to be mitigated. Similarly, the AUC noted a contextual ±25° range would be sufficient for more minor roads.[12]

Leden et al. performed a laboratory experiment to study the impact of solar glare on motorists. While this assessment was performed to assess sunlight reflected off roadside noise barriers, the fundamental principles remain the same for glare from solar projects. The study assessed glare at angles of 5°, 10°, and 20° from heading and determined that glare impacts are greater at smaller angles than at larger angles. Glare at 5° from heading had a pronounced impact on a driver's performance, glare at 10° resulted in a minor decrease in performance, and glare at 20° did not have an adverse impact on performance. This indicates that considering the ±15° field-of-view (FOV) is reasonable when

[9] *Aviation – Land Use in the Vicinity of Aerodromes – TP1247E* (Transport Canada, 2013/14).

[10] AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, Industrial System Designations, Hydro Developments and Gas Utility Pipelines* (April 2022), subsection 4.4.2 SP14.

[11] *Assessment requirements for solar development near provincial highways* (Transportation and Economic Corridors Alberta, December 2021).

[12] *Decision 27842-D01-2024, Aira Solar Project and Moose Trail 1049S Substation* (AUC, March 2024).

assessing potential solar PV glare impacts that may affect a driver's operation of their vehicle. Glare beyond 15° of heading should not be expected to create a hazard for drivers on minor roads or highways (and by extension, railways).[13] Per the precedent established in AUC Decision 27842-D01-2024, an intermediate FOV of ±25° can provide context for peripheral glare observations along route receptors, and can be viewed as a conservative FOV considering the findings of the Leden et al. study.

Transport Canada publication TP1247E indicates that glare from solar arrays should be evaluated when proposed near aerodromes but does not provide additional specifications.[14]

This report will abide by: requirements in AUC Rule 007; suggestions made in Zehndorfer Engineering's *Solar Glare and Glint Project Report*;[15] findings from Leden et al.'s study of glare impacts on drivers;[16] TEC guidelines; and other relevant literature.

As observed in the Zehndorfer document, solar glare assessments in Canada typically utilize Sandia National Laboratories' Solar Glare Hazard Analysis Tool (SGHAT) through ForgeSolar's software called GlareGauge. The Zehndorfer report notes that: "*the typical Solar Glare Assessment in Canada consists of more than just the plain SGHAT report. It describes the geometric situation, highlights glare duration and suggests glare-reducing measures.*"[17] This approach has been adopted for this assessment.

The Zehndorfer report also comments that: "*with respect to dwellings, geometrical considerations can be useful. The inclination angle towards a window makes a difference, because light rays perpendicular towards the glass will penetrate the window, while window recesses will shade flat-angled rays of light.*"[18]

In addition to Zehndorfer's report, the US Federal Aviation Administration (FAA) have provided the *Technical Guidance for Evaluating Selected Solar Technologies on Airports*.[19] This document states that potential for glare might vary depending on site specifics such as existing land uses, location, and size of the project.

A geometric analysis may be required to assess any reflectivity issues coming from the solar modules. FAA guidelines have also been informed by the 2015 study, *Evaluation of Glare as a Hazard for General Aviation Pilots on Final Approach*, by Rogers, et al. This study concludes that glare of sufficient size and intensity in an airplane pilot's view, within ±25° of heading, may have an adverse impact on the pilot's ability to read their instruments or land their plane. The study also indicates that glare beyond ±50° of heading is not likely to impair a pilot.[20]

4.1 Geometric Analysis – Use of the Solar Glare Hazard Analysis Tool

The SGHAT is a validated tool specifically designed to estimate potential glare according to a Solar Glare Hazard Analysis Plot at a certain module height, tilt, type, and observer location. ForgeSolar's GlareGauge/SGHAT software allows for the analysis of potential glare on flight paths, routes, and stationary observation points. It is widely accepted as the most comprehensive tool to assess potential glare impacts on receptors near solar power projects. The Zehndorfer report reviewed several glare software packages that may be used to assess solar PV glare, including

[13] *Verhinderung von Sonnenreflexionen in Lärmschutzwallen – ein Laborexperiment [Obstruction of sun reflections in noise barriers - laboratory experiment]* (Leden, N. & Alferdinck, J.W.A.M. & Toet, Alexander, 2015).

[14] *Aviation – Land Use in the Vicinity of Aerodromes – TP1247E* (Transport Canada, 2013/14).

[15] *Solar Glare and Glint Project* (Zehndorfer Engineering, September 2019).

[16] *Verhinderung von Sonnenreflexionen in Lärmschutzwallen – ein Laborexperiment [Obstruction of sun reflections in noise barriers - laboratory experiment]* (Leden, N. & Alferdinck, J.W.A.M. & Toet, Alexander, 2015).

[17] *Solar Glare and Glint Project* (Zehndorfer Engineering, September 2019), PDF page 8.

[18] *Solar Glare and Glint Project* (Zehndorfer Engineering, September 2019), PDF page 6.

[19] *Technical Guidance for Evaluating Selected Solar Technologies on Airports* (FAA, April 2018), pg. 40.

[20] *Evaluation of Glare as a Hazard for General Aviation Pilots on Final Approach* (Rogers, J. A., et al., July 2015).

ForgeSolar's GlareGauge/SGHAT. The report does not make a specific recommendation, but the findings suggest that the SGHAT is the most accessible tool of those evaluated, and the most robust with respect to the output information.[21]

[21] *Solar Glare and Glint Project* (Zehndorfer Engineering, September 2019).

5 Assessment Methodology

For ground-based routes, the FOV within ±15° from the vehicle operator's heading is assessed based on TEC guidelines and Leden et al.'s work.[22] This covers the region where a person's vision will be most focussed, which is the critical area of concern where glare may present a safety hazard. The analysis has focused on the potential for glare impacts to occur within this range as glare outside this range has not been found to affect a driver's ability to operate their vehicle on rural roads or highways.

A ±25° FOV can also be modelled to provide context for routes that may be peripherally impacted by glare. This wider FOV is based on a conservative interpretation of Leden et al.'s study of glare impacts on drivers, as well as the information presented in the Rogers FAA report for airplane pilots, adapted to suit vehicle operators using ground-based routes. The AUC has also suggested modelling a peripheral ±50° FOV for highways and railways to provide additional context for higher speed transportation routes.[23] This assessment includes peripheral viewing ranges to provide greater context, but the peripheral results do not describe glare with the potential to affect a vehicle operator's ability to safely operate their vehicle.

In line with TEC guidelines,[24] passenger, truck, and commercial vehicle heights are considered in the analysis.

As per AUC Rule 007's guidelines for choosing receptors to include in a solar glare analysis, the assessment evaluated the receptors listed below.

- Nine observation points representing nearby dwellings;
- One observation point representing a nearby intersection;
- One highway; and
- Two local roads.

These are identical to the receptors assessed in the Previous Assessment, with extents and locations maintained for consistency. There were no aerodromes identified within 4,000m of the Project or railways identified within 800m of the Project, so none were evaluated in this assessment. There are no other known solar power projects with shared receptors in the area, so a cumulative assessment was not completed.

Note, if the modules are not visible to the individual receptor, then no glare can be observed at that receptor.

5.1 Assessment Input Parameters

The solar arrays, transportation routes, and dwellings were plotted using an interactive Google map, and site-specific data was entered into the software prior to modelling. The following sections provide details of the parameters specified for the analysis calculations in the GlareGauge software.

[22] *Solar Glare and Glint Project* (Zehndorfer Engineering, September 2019).
[23] *Decision 27842-D01-2024, Aira Solar Project and Moose Trail 1049S Substation* (AUC, March 2024).
[24] *Assessment requirements for solar development near provincial highways* (Transportation and Economic Corridors Alberta, December 2021).

5.1.1 PV Array

The general PV array areas were plotted on the interactive Google map as shown in **Figure 5-1**. The Project was split into 31 sub-arrays to avoid conflict between complex array geometry and software calculations, while also providing additional detail in areas with greater topographical variation. The modelled arrays include more land than the proposed PV array coverage, which results in a more conservative analysis.

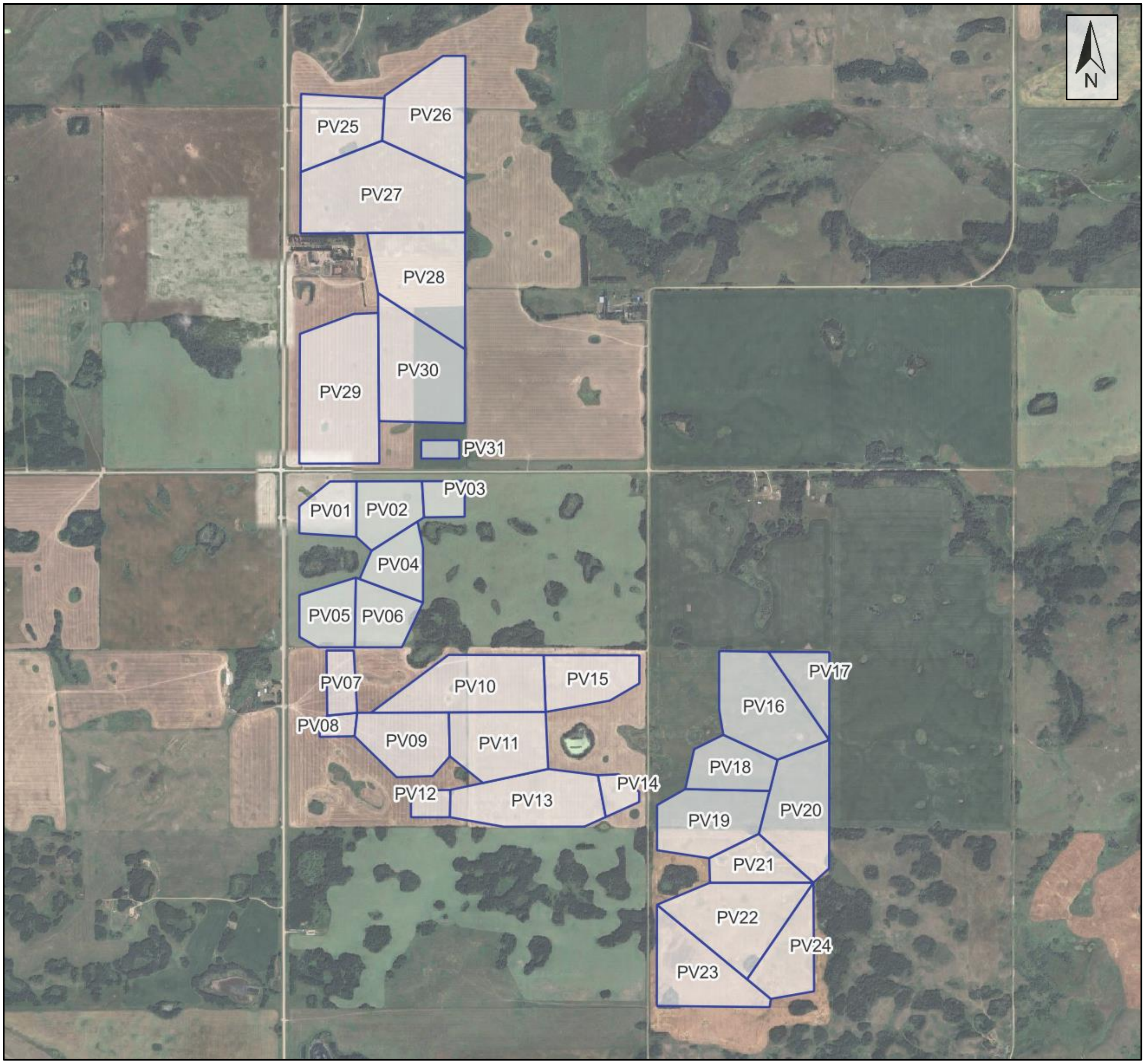


Figure 5-1 – General PV Array Areas Plotted in GlareGauge Software

The modelled sub-arrays presented in **Figure 5-1** represent the full, unmitigated case Project design, and serve as the basis for the analysis. Sub-array extents and counts were adjusted for the mitigated case. This is detailed further in **Section 7.**

The modelled sub-arrays were plotted to balance the influences of several factors on the glare modelling and results. Sub-array polygons were sized to be small enough to capture varying topographical changes, but large enough to allow for representative glare spot sizes. The modelled polygons were also designed to follow and be representative of the module layout, while also avoiding concave perimeters and including extra area to be conservative.

The Project details in **Table 5-1** were specified in the model.

Table 5-1– PV Array Specified Parameters – Current Assessment

Required Inputs	Specified Parameters	Description
Axis Tracking	None	Modules are mounted on fixed-tilt racking
Orientation	180°	Azimuthal position measured from true north
Fixed Tilt Angle	30°	Fixed tilt angle of modules
Module Surface Material	Smooth glass with anti-reflective coating	Surface material of modules
Minimum Module Height Above Ground	0.8m	Approximate height at the bottom of the array
Maximum Module Height Above Ground	3.2m	Approximate height at the top of the array

In the case of a fixed-tilt PV array, the potential for glare is assessed at both the minimum and maximum possible heights of the array. This provides greater insight into the potential range of glare impacts as opposed to assessing a single module height, or an averaged (centroid) module height of the arrays. Results will be presented for both heights of the array, but these results are not additive to one another.

Solar PV modules are designed to maximize light absorption and conversion to electricity. Specifying different types of glass and coatings used on the modules can affect a system's energy production and glare potential. Smooth glass with anti-reflective coatings (typical of solar PV modules) will generally reflect less light, i.e., create less glare, than uncoated or conventional glass. The extent to which light is reflected off the modules rather than absorbed is defined using a parameter known as reflectivity. GlareGauge defines reflectivity based on the type of glass and coating specified within the model.

The elevation variation across the site is moderate, ranging from approximately 739m to 756m above mean sea level (AMSL). The topography is undulating, with generally higher ground elevations in the western area of the Project than the east area. As noted, topographical variations were incorporated into the sub-array breakdown in the models.

5.1.2 Route Paths

Three route paths were evaluated for glare impacts from the Project: Highway 884, Township Road 400, and Range Road 81 within approximately 800m of the Project. Additionally, one intersection, between Highway 884 and Township Road 400, was assessed. **Figure 5-2** shows the routes and intersection in relation to the Project.

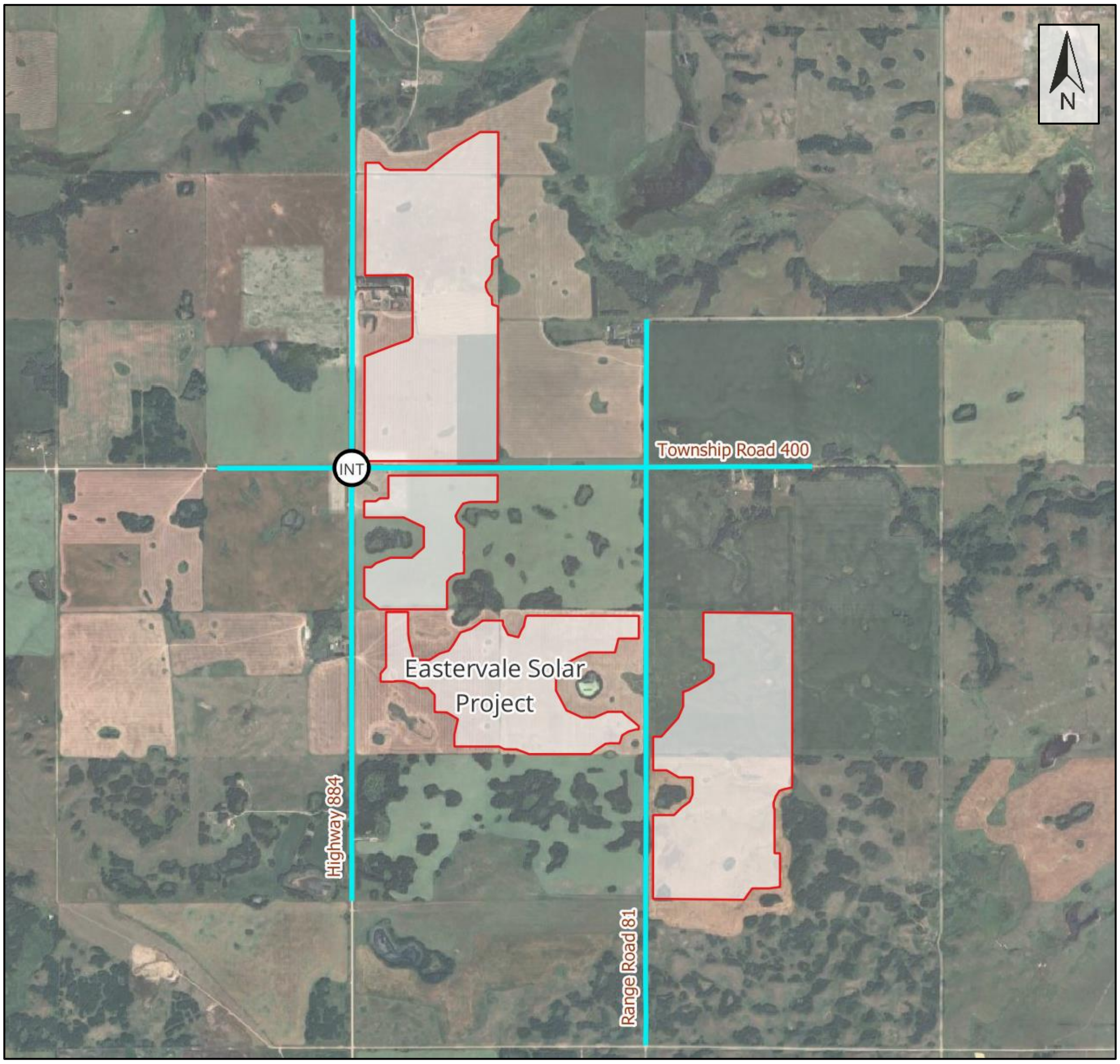


Figure 5-2 – Roads near the Project

All routes were modelled as two-way routes to represent vehicles travelling in both possible directions. Two horizontal viewing angles were evaluated for vehicle operators: ±15° and ±25° (30° and 50° total FOV). The ±15° range encompasses the region where a person's vision will be most focussed, which is the critical area of concern.[25] The ±25° range is a more conservative view representing a person's extended visual range that may be impacted by glare. The ±50° FOV was also assessed for highways specifically to provide further peripheral context to glare that may be

[25] *Solar Glare and Glint Project* (Zehndorfer Engineering, September 2019).

observed by highway drivers. The road routes were set at an elevation of 1.08m to represent the height of a typical passenger vehicle, 1.8m to represent the height of a typical truck or bus, and 2.3m to represent the height of a commercial truck in accordance with TEC guidelines.[26] For a given road route, commercial vehicles are typically more susceptible to glare than passenger vehicles due to their increased height.

5.1.3 Dwellings

Nine receptors were assessed to represent dwellings near the Project. Dwellings were modelled at 1.5m above ground for single-storey buildings, and 4.5m above ground for two-storey buildings to represent a scenario where an observer can see the Project from a window on the top floor. The model assumes the receptors have an unobstructed view of the arrays, i.e., the view is not affected by any part of the building being evaluated, or by any objects between the receptor and the Project. **Figure 5-3** shows the dwellings in relation to the Project.

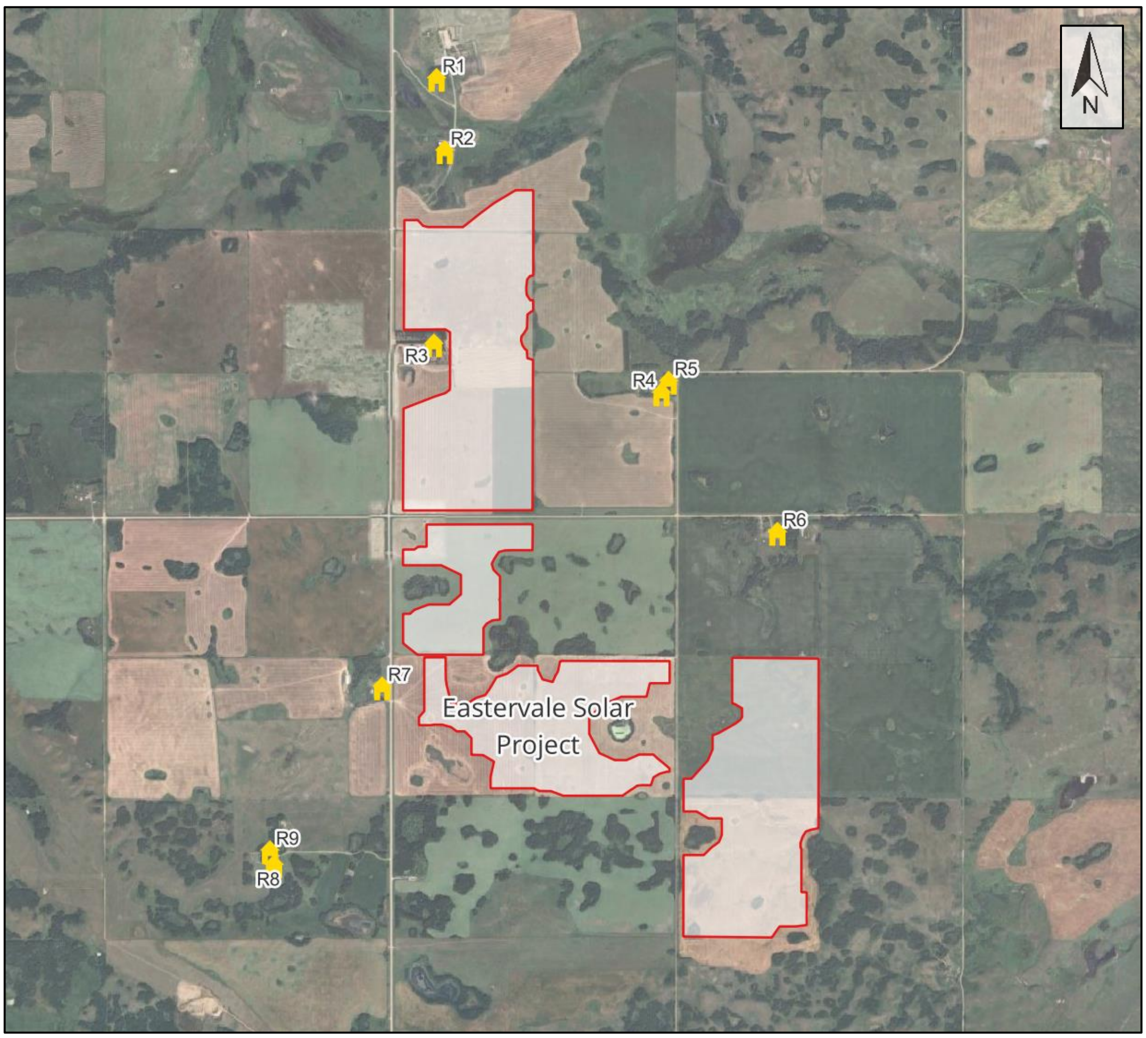


Figure 5-3 – Dwellings near the Project

[26] *Assessment requirements for solar development near provincial highways* (Transportation and Economic Corridors Alberta, December 2021).

GCR followed the guidelines provided in AUC Rule 007 to identify dwellings within 800m of the Project. R8 and R9 are slightly outside of the 800m assessment area but have been included due to their proximity to it, and for consistency with the Previous Assessment. GCR also conducted a site visit in March 2023 to confirm dwelling details.

5.1.4 Other Assumptions

The following assumptions have been made in setting the parameters for this analysis:

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not account for physical obstructions between reflectors and receptors that may mitigate impacts. This includes buildings, tree cover and geographic obstructions (topography).
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values may differ.
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare analysis does not account for change in weather patterns. It is assessed as clear sunny skies throughout the year.
- To increase accuracy of modelling results, parts of the array may be divided into sub-sections if the footprint covers a large surface area with drastic elevation changes, or to avoid concave outlines.
- Default parameters, as alluded to in the following section, highlight ocular metrics used in this assessment as has been acceptable according to the Sandia National Laboratories methodology on assessing potential glint and glare hazards.[27] These are shown below in Table 5-2.

Table 5-2 – Default Parameters

GlareGauge Parameters	
Direct Normal Irradiance, DNI (amount of solar radiation received in a collimated beam on a surface normal to the sun during a 60-minute period)	Varies and peaks at 1000 W/m^2
Ocular Transmission Coefficient (absorption of radiation within the eye before it reaches the retina)	0.5
Pupil Diameter (Typical daylight adjusted length)	0.002m
Eye Focal Length (distance where rays intersect in the eye)	0.017m
Sun Subtended Angle	9.3 mrad

[27] *Methodology to Assess Potential Glint and Glare Hazards from Concentrating Solar Power Plants: Analytical Models and Experimental Validation* (Ho, C.K., C.M. Ghanbari and R.B. Diver, Journal of Solar Energy Engineering-Transactions of the ASME, 133 (3), 2011).

5.2 Glare Analysis Procedure

GCR calculated the potential glare for observation points and route receptors using the SGHAT. Although effects from glare are subjective, depending on variables such as a person's ocular parameters and size/distance from the glare source, the SGHAT has a generalized approach to specify the hazard that glare may produce. GCR's commentary on the levels of glare found and related sources of mitigation, if required, are intended to help decision makers evaluate potential impacts.

The SGHAT User's Manual v3.0 states that: *"If glare is found, the tool calculates the retinal irradiance and subtended source angle (size/distance) of the glare source to predict potential ocular hazards ranging from temporary after-image to retinal burn. The results are presented in a simple, easy-to-interpret plot that specifies when glare will occur throughout the year, with color codes indicating the potential ocular hazard."*[28]

The colour codes are based on a red, yellow, and green structure to categorize the level of risk to a person's eyes. Glare classification is dependent on the glare intensity and the apparent size of the glare area as viewed from the eye. The severity of glare is proportional to the effects of an after-image, which can be described as a lingering image of glare in the field-of-view when observed prior to a typical blink response time. Generally, this is observed as a temporary darker/discolored area within the observer's vision. The descriptions for each category are as follows:

- Green: Glare is present but there is a low potential for temporary after-image;
- Yellow: Glare is present with the potential for temporary after-image; and
- Red: Glare is present with the potential for permanent eye damage.

The level of glare is derived using the graph below that plots the level of irradiance against the angle that is occupied by the glare in the field-of-view.

ForgeSolar have developed a plot to categorize glare based on its intensity at the eye and its size in the observer's FOV. The plot is divided into the red, yellow, and green regions described above. The hazard associated with directly viewing the sun unfiltered is also plotted for comparison. Figure 5-4 shows an example of the hazard plot.

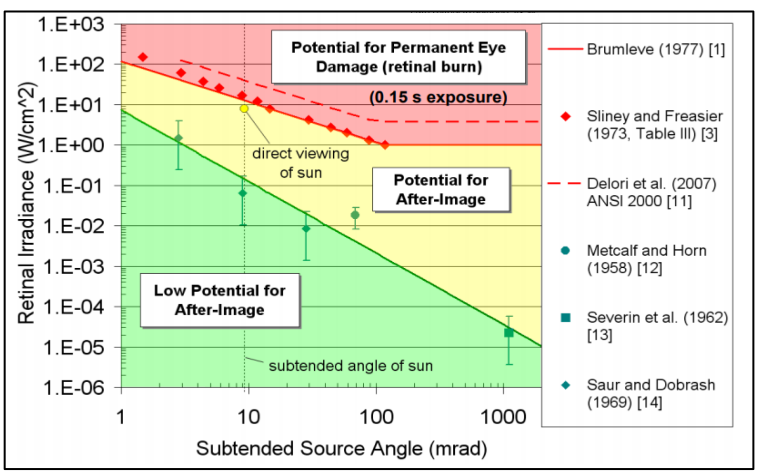


Figure 5-4 – Hazard Plot depicting the Retinal Effects of Light

[28] *Solar Glare Hazard Analysis Tool (SGHAT) User's Manual v 3.0* (Ho and Sims, Sandia National Laboratories, 2016).

Ho et al. developed a model to estimate potential impacts to eyesight with regards to retinal irradiance (amount of light entering the eye and reaching the retina) and subtended source angle (the size of the glare divided by the distance from the emitting source). Significant damage, including retinal burn, may occur at high retinal irradiances and large subtended angles. This is highlighted in the red region. The yellow section denotes the potential for a temporary after-image. The size and impact of the after-image is dependent upon the subtended source angle.[29] At a low retinal irradiance and small subtended angle, the hazard will be in the green section where there is very low potential for after-image.

5.2.1 Limitations

The SGHAT may convert the footprint of a concave polygon to a convex polygon.[30] For example, an array that is in the shape of a 'C' has a concave section and GlareGauge will modify the 'C' shape into a semi-circle. By closing the 'C' shape, the size of the PV array is increased thus potentially over-estimating the size of the array and consequently over-predicting the glare effects. This change in geometry is required by the glare-check algorithm during analysis. PV arrays with significant concavities should be modelled as multiple arrays to avoid over-estimating the size of the PV array and the resultant glare. The limitations of the software have been carefully considered to ensure the PV array is not concave in order to represent the glare impacts as accurately as possible.

An unavoidable limitation of the SGHAT is that "*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 [air traffic control towers].*"[31]

[29] *Evaluation of glare at the Ivanpah Solar Electric Generating System* (C.K. Ho et al., Elsevier Ltd., 2015).
[30] *ForgeSolar "Help" page*. Retrieved April 22, 2025.
[31] *ForgeSolar "Help" page*. Retrieved April 22, 2025.

6 Assessment of Impact

This section presents the findings of the glare assessment, which are based on model input parameters considered to be conservative and reasonable. AUC Rule 007 provides guidelines for the receptors to be included in a solar glare assessment but modelling parameters and glare threshold limits are not specified. Therefore, this analysis also considers the principles laid out in Leden et al.'s study of glare impacts on drivers,[32] the Zehndorfer Engineering Report,[33] TEC guidelines,[34] and other relevant literature.

The GlareGauge software considers the glare potential for a full one-year period in one-minute intervals to account for the variations between seasons, DNI, and sun angle. Existing obstructions between the Project and observers are not considered in the models, but they are likely to block at least some of the potential glare and reduce the predicted impacts.

Overall, glare is not expected to create hazardous conditions for the evaluated roads or intersection, nor have an adverse effect on a resident's use of their home near the Project. Please note that the following results come from the worst-case, unmitigated glare model. Assessment results from mitigated cases are provided in **Section 7.**

6.1 Route Path Results

The following tables present the glare results for the route paths and intersection assessed from the array minimum and maximum heights in the unmitigated case. Note that the results presented for each array height are not additive to each other and are only intended to show the potential range of impacts. Results are shown for passenger, trucks, and commercial road vehicles at 1.08m, 1.8m, and 2.3m, respectively. Results in **Table 6-1** used a ±15° FOV, which was modelled to capture potential glare within a vehicle operator's critical visual range. Results in **Table 6-2** were evaluated with a ±25° horizontal FOV to highlight routes that may experience glare from an extended visual range. Equivalent levels of glare within ±15° will have a greater impact on the observer than glare outside that range.

Appendix A includes the results for the ±50° FOV along Highway 884. These results do not necessarily represent an adverse impact on an observer, but they have been included separately to align with the AUC's suggestion that evaluating a peripheral range may help provide additional broad context.

Note that the assessed intersection results are only presented in **Table 6-1**, as they were only assessed at one (unrestricted) field of view.

[32] *Verhinderung von Sonnenreflexionen in Lärmschutzwallen – ein Laborexperiment [Obstruction of sun reflections in noise barriers - laboratory experiment]* (Leden, N. & Alferdinck, J.W.A.M. & Toet, Alexander, 2015).

[33] *Solar Glare and Glint Project* (Zehndorfer Engineering, September 2019).

[34] *Assessment requirements for solar development near provincial highways* (Transportation and Economic Corridors Alberta, December 2021).

Table 6-1 – Annual Route Path Glare Levels for Passenger Vehicles, Buses, and Commercial Vehicles, ±15° FOV

Receptor	Green Glare (min/year)		Yellow Glare (min/year)		Red Glare (min/year)		Max Daily Glare (min/day)	
Module Height	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m
Highway 884 (Passenger)	0	0	0	0	0	0	0	0
Highway 884 (Truck/Bus)	0	0	0	0	0	0	0	0
Highway 884 (Commercial)	0	0	0	0	0	0	0	0
Range Road 81 (Passenger)	0	0	0	0	0	0	0	0
Range Road 81 (Truck/Bus)	0	0	0	0	0	0	0	0
Range Road 81 (Commercial)	0	0	0	0	0	0	0	0
Township Road 400 (Passenger)	1,193	945	2,453	3,182	0	0	53	53
Township Road 400 (Truck/Bus)	1,376	921	2,685	2,851	0	0	54	50
Township Road 400 (Commercial)	1,517	1,057	2,813	2,426	0	0	54	49
Intersection of Highway 884 with Township Road 400 (Passenger)*	741	1,843	1,827	1,767	0	0	18	30
Intersection of Highway 884 with Township Road 400 (Truck/Bus)*	884	1,923	1,961	1,444	0	0	20	30
Intersection of Highway 884 with Township Road 400 (Commercial)*	831	1,138	2,175	378	0	0	21	15

*Modelled as an observation point with an unrestricted field of view.

Table 6-2 – Annual Route Path Glare Levels for Passenger Vehicles, Buses, and Commercial Vehicles, ±25° FOV

Receptor	Green Glare (min/year)		Yellow Glare (min/year)		Red Glare (min/year)		Max Daily Glare (min/day)	
Module Height	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m
Highway 884 (Passenger)	0	0	0	0	0	0	0	0
Highway 884 (Truck/Bus)	0	0	0	0	0	0	0	0
Highway 884 (Commercial)	0	0	0	0	0	0	0	0
Range Road 81 (Passenger)	0	0	0	0	0	0	0	0
Range Road 81 (Truck/Bus)	0	0	0	0	0	0	0	0
Range Road 81 (Commercial)	0	0	0	0	0	0	0	0
Township Road 400 (Passenger)	2,625	1,212	6,195	7,294	0	0	66	61
Township Road 400 (Truck/Bus)	2,755	1,275	6,568	6,677	0	0	70	59
Township Road 400 (Commercial)	2,508	1,651	7,223	6,094	0	0	73	61

In this unmitigated case, the evaluated sections of Highway 884 and Range Road 81 are not predicted to observe glare at any level from the Project, at either the ±15° or ±25° FOV. Township Road 400 and the assessed intersection are predicted to have the potential to observe moderate annual and daily durations of yellow and green glare from the Project. Broadly speaking, these results indicate an overall reduction in predicted glare impacts to the assessed route receptors as compared to those predicted in the Previous Assessment.

While the assessment of intersections as observation points provides an understanding of the potential impact of an observer standing at the intersections and looking directly at the Project, additional context is necessary to determine whether this glare presents a potential safety risk to drivers. The use of an observation point provides a wider FOV for assessment at these locations; however, in practice, a driver will not be looking directly at the Project when approaching an intersection and instead will primarily be looking in the direction of oncoming vehicles. There is inherently less of a safety risk to a stationary observer at an intersection than a driver actively travelling down a road. From review of satellite imagery and Google StreetView, this intersection is a controlled intersection with a stop sign for drivers seeking to enter Highway 884 from Township Road 400. This presents an inherently safer situation as opposed to an uncontrolled intersection with no signage. A reasonable driver stopped at an intersection will have ample time to adjust to cross-traffic and mitigate potential risks by proceeding into the intersection when safe enough to do so, which includes considering any glare present. Given this, and the results showing minimal amounts of green and yellow glare in an overly conservative and unrestricted (360°) FOV, it is considered that glare is not expected to create a hazardous situation for drivers approaching or travelling through the intersection.

The evaluated section of Township Road 400 is an unpaved, minor and local road, leading to very few features or destinations in the area. In the previous AUC Decision Report[35] for the Project, it was noted that Township Road 400 is traversed by local residents in the area several times a day. Though there is no recorded traffic data for Township Road 400, there is data available for Highway 884, near the Project. This traffic data is available in Appendix B, which was obtained from the two intersections along Highway 884 that are closest to the Project and have data available. Between these two intersections, the maximum recorded traffic volume in the direction towards or from the Project was an Average Annual Daily Traffic (AADT) volume of 260 vehicles. This indicates that the traffic volumes along Highway 884 adjacent to the Project are estimated to be well below the AUC's threshold of a heavily travelled road as it is defined in AUC Rule 012, which is an AADT volume of 900 vehicles or more per day. Though the AUC Rule 012 threshold is related to noise impact assessment, these definitions also provide an understanding of what would reasonably constitute a heavily traveled road.

Given that Township Road 400 is a local road connecting to Highway 884, it is reasonable to infer that the traffic volumes along the road will be even less than those reported for the highway. Therefore, traffic volumes along Township Road 400 are expected to be objectively low – less than one-third of the AUC Rule 012 threshold for a heavily travelled road. This reduces the risk of a driver being in the exact right spot at the exact right time to observe the predicted glare. To address these risks in more detail, the results for passenger vehicles using Township Road 400 are described further below as it is predicted to be the route and receptor height most impacted by glare from the Project. Conclusions drawn from the results of this receptor height will be broadly applicable to the other vehicle heights assessed (i.e., commercial and truck/bus), given the similarity in their results.

Observers travelling along Township Road 400 in passenger vehicles are predicted to see yellow glare in the more critical ±15° FOV for a maximum of 3,182 minutes/year. The yellow glare is predicted between 06:14 and 06:54 MST for up to 31 minutes in the morning, and in the evenings between 18:14 and 18:40 MST for up to 19 minutes in the

[35] Decision 28847-D01-2025, *Eastervale Solar + Energy Storage Project* (AUC, February 2025).

evening. It should be noted that these values are maximums, and do not represent average daily durations of glare. For clarity, the daily split of predicted glare durations for this receptor are provided in Table 6-3.

Table 6-3 – Breakdown of Daily Maximum Yellow Glare for Passenger Vehicles on Township Road 400, ±15° FOV

Period of Day	Maximum Yellow Glare (min/day)		Average Yellow Glare* (min/day)		Number of Days with Yellow Glare (per year)	
Module Height	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**
Morning (AM)	17	31	12	21	91	94
Evening (PM)	27	19	15	14	89	88
AM and/or PM	43	49	26	34	93	94

*Average is taken across the days predicted to observe yellow glare, not across all days of the year.

The glare is predicted to occur in mid-March to mid-May, and in late July to late September.

It should be noted that the glare durations predicted for Township Road 400 in different periods of day will correspond to different directions of travel. Since the route receptor is modelled as a single two-way route, the overall results as shown in Table 6-1 and Table 6-2 represent the amalgamated potential impact for both directions of travel. However, in this case, glare predicted in the morning would only be experienced by drivers travelling eastbound, while glare predicted in the evening would only be experienced by drivers travelling westbound, due to the position of the sun relative to the Project and assessed route during these periods. This phenomenon holds true for most cases where glare occurs in distinct periods of the day.

Furthermore, the glare is predicted to originate from the same general direction as the sun for periods close to sunrise/sunset, so any glare impacts are likely to be eclipsed by the direct effects of the sun if both can be seen simultaneously by the observer. This is an effect called "sun-masking". In addition, the actual impact is expected to be less because vehicle operators will be travelling past the affected areas, not standing still while looking at the solar PV arrays. Since the results describe times when a vehicle operator may see glare from the Project and apply to a portion of the route (not a single point), the predicted values provide a sense of the likelihood that a driver may see glare from the Project, not the actual amount of glare that will be seen. The glare analysis does not account for any change in weather patterns – it is assessed as clear sunny skies throughout the year. Finally, the SGHAT model does not account for visual obstructions between the arrays and receptors, or screening by intervening rows of PV panels, so the results are conservative.

The following figures represent the predicted glare within the ±15° FOV of passenger vehicle drivers travelling along Township Road 400. Figure 6-1 shows the daily time periods during which glare is predicted, and Figure 6-2 shows the daily duration of predicted glare.

Figure 6-3 presents the glare hazard plot for glare predicted to affect drivers of commercial vehicles using Township Road 400. The hazard plot shows that the glare seen from Township Road 400 will be approximately 10 times the subtended angle of the sun, but it will be around 433 times dimmer. The glare is also about two orders of magnitude below the threshold for glare that has the potential to cause permanent eye damage at the same subtended angle.

In summary, the route path results show that there is the potential for motorists driving on Township Road 400 near the Project to experience glare from the solar PV arrays. The level and amount of glare predicted by the models may impact a motorist's driving performance, but the impacts and chances of a driver seeing the glare are reduced by several factors, including: reduced impacts of glare due to sun-masking; clouds and weather patterns blocking incoming sunlight; obstructions like topography and intervening parts of the arrays; and minimal traffic volumes, especially during the affected time periods. Overall, the glare predicted in this unmitigated case is not expected to create a hazardous situation that requires mitigation.

Notwithstanding the conclusion that glare in the unmitigated case is not expected to create a hazard, Eastervale Solar has prepared potential mitigation measures which can be implemented that can further mitigate the predicted glare for Township Road 400. These measures and their resulting effectiveness are detailed in Section 7. Furthermore, if complaints are raised and glare is determined to be an issue after the Project is built, additional, specific mitigation measures can be developed in consultation with the concerned party at that time.

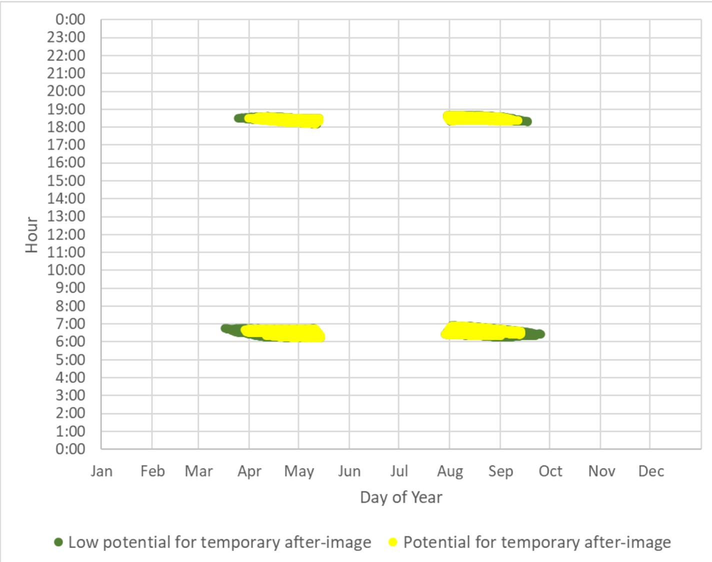


Figure 6-1 – Annual Predicted Glare occurrence for Township Road 400 (Passenger, ±15° FOV)

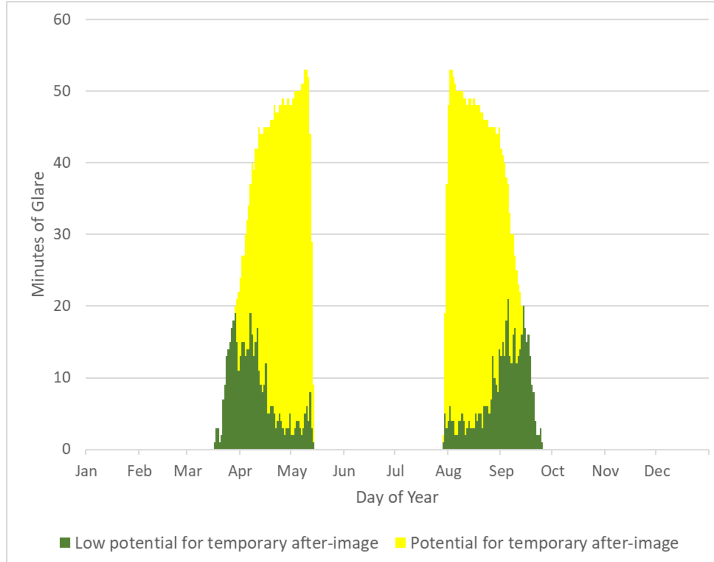


Figure 6-2 – Daily Duration of Glare for Township Road 400 (Passenger, ±15° FOV)

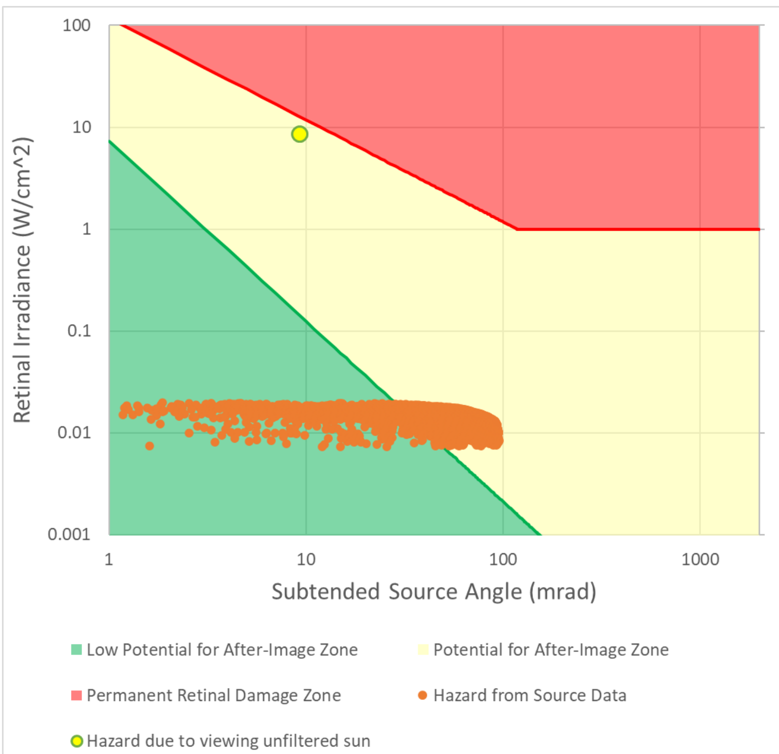


Figure 6-3 – Hazard Plot for Township Road 400 (Passenger, ±15° FOV)

6.2 Dwelling Results

Nine receptors were assessed to represent dwellings near the Project. Dwellings were modelled at 1.5m above ground for single-storey buildings, and 4.5m above ground for two-storey buildings. **Table 6-4** provides the glare results for the dwellings assessed at the array minimum and maximum heights in the unmitigated case. Note that the results presented for each array height are not additive to each other and are only intended to show the potential range of impacts.

Table 6-4 – Annual Glare Levels for Dwellings near the Project

Receptor	Green Glare (min/year)		Yellow Glare (min/year)		Red Glare (min/year)		Max Daily Glare (min/day)	
Module Height	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**
R1 (two-storey)	0	0	0	0	0	0	0	0
R2 (two-storey)	0	0	0	0	0	0	0	0
R3 (two-storey)	1,943	1,498	2,874	2,377	0	0	42	35
R4 (one-storey)	1,262	1,378	1,782	1,513	0	0	24	25
R5 (two-storey)	1,122	1,021	1,890	1,868	0	0	18	20
R6 (two-storey)	1,910	1,945	529	547	0	0	16	16
R7 (two-storey)	1,433	2,998	1,983	943	0	0	29	28
R8 (two-storey*)	4,558	4,586	0	0	0	0	28	29
R9 (two-storey*)	4,660	4,683	52	0	0	0	30	29

*R8 and R9 were not field-verified as the buildings were not visible from publicly accessible areas, so they were conservatively assumed to be two-storey dwellings.

In this unmitigated case, dwellings R1 and R2 are not predicted to observe any level of glare from the Project, while dwelling R8 is only predicted to observe green glare from the Project. Dwellings R3, R4, R5, R6, R7 and R9 are predicted to observe both green and yellow glare from the Project. Overall, these results indicate a reduction in predicted glare impacts to dwellings as compared to those predicted in the Previous Assessment. Furthermore, the site visit previously conducted determined that agricultural infrastructure and vegetation partially surround R3, R4, R5, R6 and R7, which is also seen for R8 and R9 in satellite imagery. These obstructions are likely to reduce the glare observed at the dwellings, particularly in the case of R3, R4, R5, and R6, where such obstructions are in the line of sight of much of the glare-producing portions of the array. Results for R3 are described in further detail below, as it is predicted to be the most impacted dwelling.

Observers at R3 are predicted to see yellow glare for a maximum of 2,874 minutes/year, and green glare for a maximum of 1,943 minutes/year, and is predicted to occur between mid-March and late September. The yellow glare is predicted in between 06:23 and 07:00 MST for up to 17 minutes in the morning. The average daily duration of yellow glare on the days it occurs is 15 minutes. Green glare is predicted in between 06:21 and 07:06 MST for up to 11 minutes in the morning, and in between 17:52 and 18:18 MST for up to 20 minutes in the evening. Some of the glare is expected to originate from the same general direction as the sun for periods close to sunrise/sunset, so glare impacts may be reduced due to sun-masking.

R3 is approximately 80m from the Project fence line at its closest point, with the Project surrounding the dwelling to the north, south, and east. There is agricultural infrastructure throughout the property and vegetation surrounding the dwelling to the north, south and east, which are expected to at least partially obstruct the view of the Project from R3, as determined from the site visit and satellite imagery. The glare at R3 is predicted to originate from areas northeast and east of the dwelling. Thick vegetation and silos are visible between the receptor and the glare-producing section of the Project. These obstructions are likely to reduce or eliminate the glare observed at R3. Additionally, views of glare-producing parts of the Project may be blocked by topography or intervening parts of the arrays, which is not modelled by the software. These conservatisms make the results of the assessment a “worst-case” scenario, and the actual observed glare will be less.

The following figures represent the predicted glare for R3. **Figure 6-4** shows the daily time periods during which glare is predicted, and **Figure 6-5** shows the daily duration of predicted glare.

Figure 6-6 presents the glare hazard plot for glare predicted to be seen at R3. The hazard plot shows that the glare seen from R3 will be approximately seven times the subtended angle of the sun, but it will be around 480 times dimmer. The glare is also around two orders of magnitude below the threshold for glare that has the potential to cause permanent eye damage at the same subtended angle. Glare at this level is not expected to create a hazardous situation or affect a resident’s use of their home. There are no known risks to human health or vision resulting from green or yellow glare being perceived by an observer, nor are there any known safety hazards associated with such glare being observed in the context of a resident’s use of their home. It is also understood that the residents of R3 own the land being leased for the Project, and they have not raised any concerns regarding glare during consultation. As such, mitigation for dwellings is not expected to be required.

Notwithstanding the conclusion that glare in the unmitigated case is not expected to create a hazard, Eastervale Solar has prepared potential mitigation measures which can be implemented that can further mitigate the predicted glare for some of the assessed dwellings. These measures and their resulting/potential effectiveness are detailed in **Section 7.** Furthermore, if complaints are raised and glare is determined to be an issue after the Project is built, additional, specific mitigation measures can be developed in consultation with the concerned party at that time.

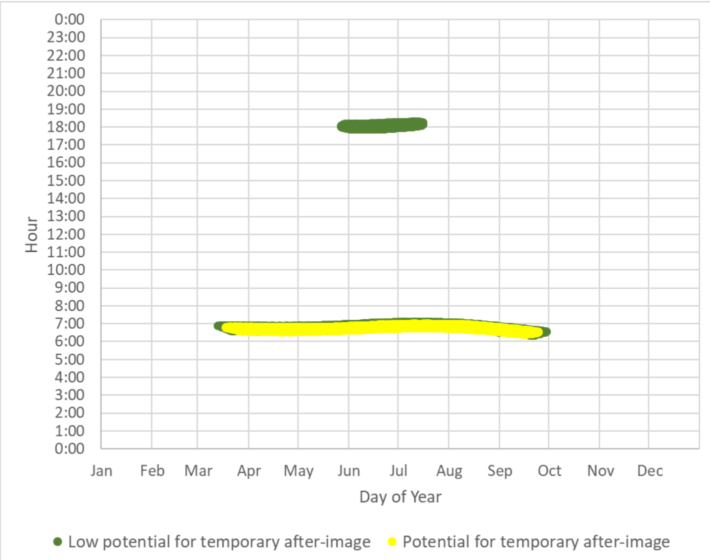


Figure 6-4 – Annual Predicted Glare occurrence for R3

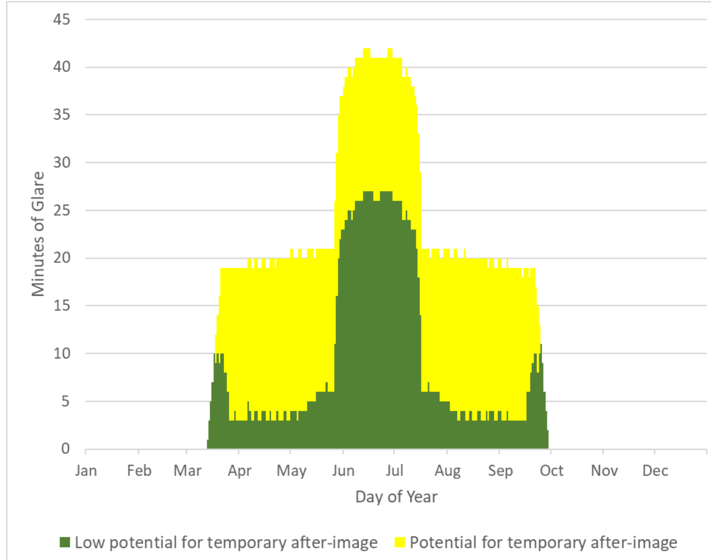


Figure 6-5 – Daily Duration of Glare for R3

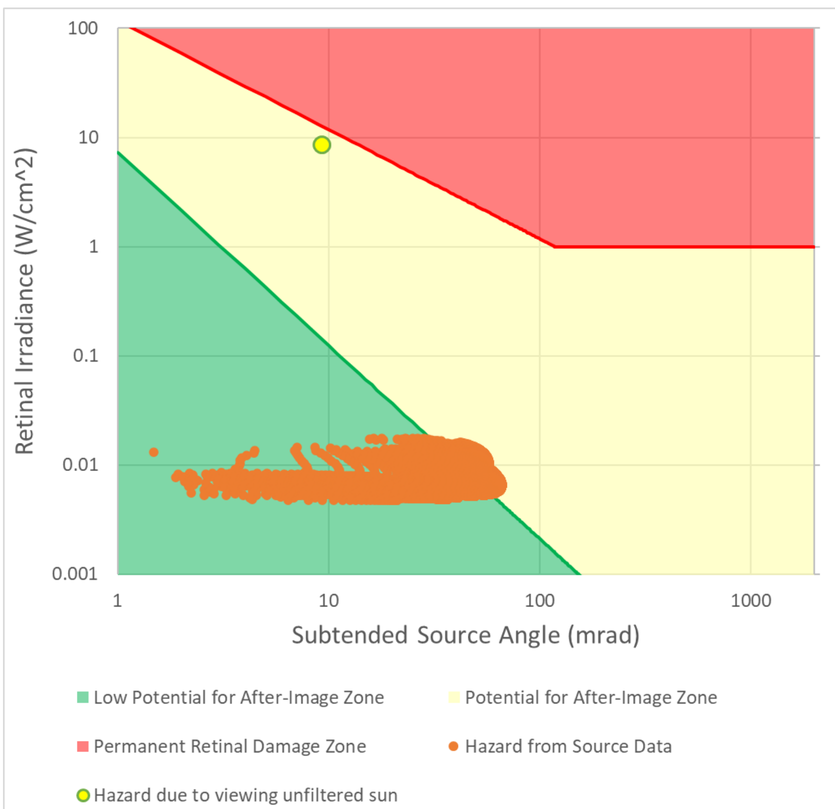


Figure 6-6 – Hazard Plot for R3

7 Mitigation

As detailed previously, all glare results in this assessment are based on several significant conservative assumptions that lead to over-predicted impacts (See **Section 5.1.1** and **Section 5.1.4**). Even so, the glare at the predicted levels and durations are not expected to create a hazardous situation for drivers on the assessed routes or intersections. As such, while the predicted results do not show a zero-glare scenario, it is concluded that the real-world glare impacts will be materially less than what has been predicted, and therefore, glare mitigation is not being recommended for the evaluated ground transportation routes or dwellings.

However, in light of the previous AUC decision on the Project, which cited the predicted glare impacts reported in the Previous Assessment as a factor in the AUC's decision,[36] Eastervale Solar has explored additional mitigation strategies which may be implemented to further reduce the predicted glare impact. GCR has assessed the proposed mitigation strategies for their effectiveness in reducing potential glare impacts. This section will outline the mitigation strategies and their corresponding glare analysis results.

Any results presented as part of proposed or committed mitigation strategies are subject to the same methodologies and conservatisms as outlined in the previous sections of this report. This includes, but is not limited to:

- Glare analysis does not account for change in weather patterns. It is assessed as clear sunny skies throughout the year.
- Unless explicitly modelled, glare analyses do not account for physical obstructions between the sun and reflectors, or reflectors and receptors, that may mitigate impacts. This includes buildings/structures, tree cover and geographic obstructions (topography).
- Only simple, fully opaque obstructions can be modelled within the software, limiting the ability to model certain types or shapes of physical obstructions. This is particularly relevant for potential mitigation strategies such as vegetative screening, which would be expected to reduce observed glare impacts but cannot be modelled with meaningful accuracy within the software.
    - It is understood that Eastervale Solar is considering the use of vegetative screening along Township Road 400 to further reduce the potential for drivers to observe glare from the Project. Due to software limitations, this scenario has not been modelled or quantitatively evaluated, but vegetation would be expected to effectively obstruct views of glare-producing arrays, especially within narrower FOVs of shorter receptors.
- Any glare analyses conducted for assessing mitigation strategies used the same design parameters for the Project as the unmitigated case, including module heights, module tilt, and orientation. This includes the reflectivity of the modules, which presents a conservative assumption based on the modules selected for the Project (detailed further in **Section 7.2**).
- Any glare analyses conducted for evaluating mitigation strategies assessed identical receptors to the unmitigated case.

Overall, Eastervale Solar has presented several potential options for mitigating the predicted glare durations at the assessed receptors for the Project if they are deemed necessary.

[36] Decision 28847-D01-2025, *Eastervale Solar + Energy Storage Project* (AUC, February 2025).

7.1 Visual Obstruction for R7

Eastervale Solar has committed to glare mitigation via installation of a visual barrier at the Project fence line in order to reduce the predicted yellow glare for dwelling R7. Example implementations of this type of screening may include plastic slats inserted in a standard chain link fence, or mesh materials attached to the fence. To be clear, this mitigation is distinct from the existing obstructions between R7 and the Project, including existing vegetation, so impacts may be even further reduced than what is presented here as the same modeling conservatisms listed previously still apply.

GCR modelled the visual barrier as an opaque obstruction within the glare model, as shown below in **Figure 7-1.**

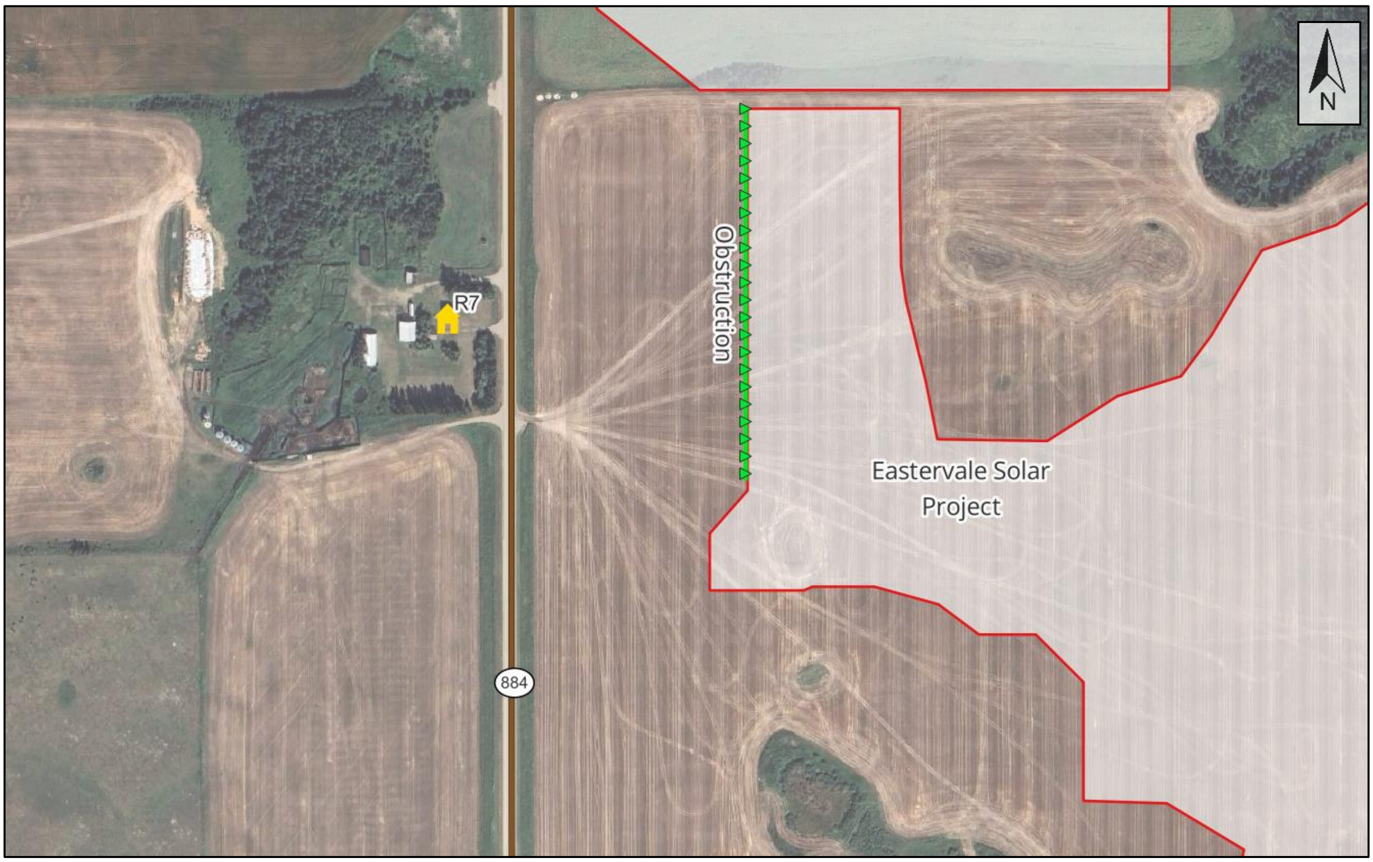


Figure 7-1 – Obstruction modelled for glare mitigation at R7

The visual obstruction was modelled between the ground and a height of 1.8m (6ft), which represents the height of a standard chain link security fence. The predicted glare durations for R7 with the visual obstruction mitigation are shown below in **Table 7-1.**

Table 7-1 – Annual Glare Levels for Dwelling R7 with visual obstruction mitigation

Receptor	Green Glare (min/year)		Yellow Glare (min/year)		Red Glare (min/year)		Max Daily Glare (min/day)	
Module Height	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m
R7 (two-storey)	136	2,316	0	68	0	0	4	18

With the visual obstruction mitigation implemented, R7 is predicted to observe green glare for up to 2,316 minutes/year, and yellow glare for up to 68 minutes/year. This represents a substantial reduction from the unmitigated case, which predicted up to 2,998 minutes/year of green glare and 1,983 minutes/year of yellow glare. Predicted maximum daily glare durations have also decreased, from a maximum of 29 minutes/day to 18 minutes/day.

Note that the visual obstruction modelled did not materially impact the predicted glare durations or intensities for any of the other assessed receptors. For clarity, GCR understands that Eastervale Solar has committed to the visual obstruction mitigation at R7 for the Project, so these results reflect the current Project design.

7.2 Advanced Anti-Reflective Module Selection

Eastervale Solar has committed to the use of advanced anti-reflective solar modules, assuming they are available for the final Project design. This section will outline the potential impacts of using such modules in the final design.

Solar modules are specifically designed to absorb light rather than reflect it. The amount of incident light which modules (or any material) reflects off of its surface is defined by a quantity known as reflectivity. A higher reflectivity value indicates that more incident light is reflected off the concerned surface and is typically expressed as a fraction of incident light reflected (either a percentage or value up to 1.0). Reflectivity varies based on several factors, including the surface material properties, surface texture, and the angle of incidence of the light.

Most solar modules are now manufactured with anti-reflective coatings that help further mitigate the intensity of reflections, lowering their overall reflectivity. The modules selected for the Project include an anti-reflective coating (ARC). As such, the PV arrays modelled in GlareGauge were defined to have a module surface material of 'smooth glass with anti-reflective coating,' as previously outlined in **Section 5.1.1.** GlareGauge has pre-defined reflectivity values,[37] which vary as a function of incidence angle and module surface material and is used within the simulation in determining the glare impact on assessed receptors. For reference, the lowest reflectivity value listed by GlareGauge for the 'smooth glass with anti-reflective coating' is 0.0167, or 1.67%, which occurs at an incidence angle of 30 degrees.

In recent years, further advancements in anti-reflective modules have progressed. Recently, LONGi Green Energy Technology Co. Ltd. (LONGi) developed the LR8-66HYD lineup of solar modules, which are the modules selected for the current Project design. These modules were assessed by a third party for their reflectivity, and the third-party test report[38] found that the average external light reflectivity of the tested solar module was 1.0%, which is notably lower than the minimum value used by GlareGauge in the glare analysis.[39] Longi claims that the 1.0% reflectivity value is valid for common real-world conditions, but then also confirms that it should not be used for assessment across all incidence angles without adjustment.[40]

By having a lower overall reflectivity for the PV arrays, it is likely that the predicted and actual glare impacts would be reduced, given that a lower reflectivity would result in less light being reflected off of the solar modules. GlareGauge has the capability to define a custom module reflectivity for the analysis, but this is a static value which will not account for differing light incidence angles throughout the day. This is a limitation within the software itself which limits the ability to quantify the reduction expected for a less reflective module throughout the day and throughout the year at a receptor.

For these reasons, it is not possible to model or otherwise meaningfully quantify the effect of the lower reflectivity modules at this time. However, these developments in solar modules are relevant context for the AUC to consider when assessing predicted solar glare impacts. The development of such technology highlights the conservatisms and limitations inherent to the GlareGauge modelling.

GCR understands that Eastervale Solar has committed to the use of such lower-reflectivity modules in the final Project design, should they become commercially available in Canada prior to finalization of the Project design. In practice, it

[37] *ForgeSolar "Reflectivity Data" page*. Retrieved April 22, 2025. Available online: https://www.forgesolar.com/reflectivity-data/

[38] *Test Report No.: DE25VTU2 001, Measurement of Optical Reflectance of Photovoltaic (PV) Modules* (TÜV Rheinland, February 2025).

[39] The test report found a reflectivity of 1.0% at an incidence angle of 8°. For a closer comparison, GlareGauge lists a reflectivity value of 2.42% at an incidence angle of 10°. This further illustrates the difference between the modelled and tested reflectivity of the module (and thereby potential reduction in glare).

[40] Email correspondence, LONGi Green Energy Technology Co. Ltd. (April 2025).

is likely that the use of these newer, lower reflectivity modules will further reduce the observable glare impact for the assessed receptors near the Project. This further supports the assertion that mitigation is not expected to be required.

Currently, the timeline for commercial availability of the lower reflectivity LR8-66HYD modules in Canada from LONGi is uncertain. However, at the time of the Final Project Update submission to the AUC, another SGHA will be conducted on the final equipment selection. It is anticipated that the LR8-66HYD modules will be available in Canada and the lower reflectivity values can also be assessed meaningfully using GlareGauge at that time. Assuming this is the case, the other mitigation measures described herein will also be re-evaluated to determine their extent and/or necessity.

7.3 Reduced Array Footprint Layout

GCR understands that should Eastervale Solar not be able to deliver a SGHA at Final Project Update submission with predicted glare levels deemed acceptable by the AUC, Eastervale Solar is willing to consider a Project adjustment with the aim of reducing the predicted glare on Township Road 400. This would involve the removal of some glare-producing portions of the PV array. **Figure 7-2** below illustrates the considered array reductions, with the modules proposed for removal coloured in yellow (i.e., the blue modules represent the reduced array footprint, or the Reduced Layout).

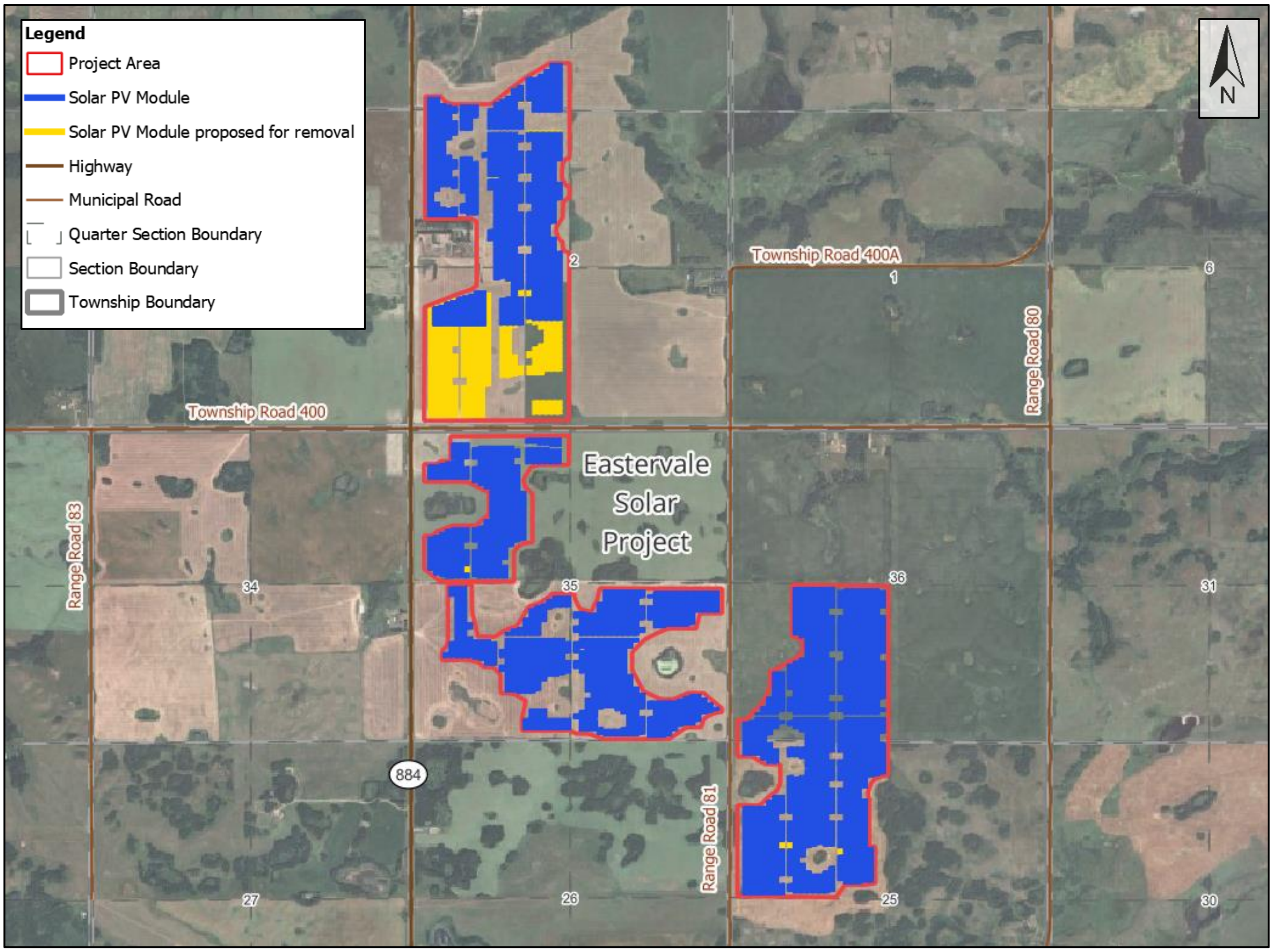


Figure 7-2 – Considered Array Reductions (Reduced Layout)

The above figure reflects the maximum extent of the array removal that is required to eliminate all yellow glare predicted within the inner ±15° FOV of drivers travelling along Township Road 400, based on the current Project design. This depicted layout adjustment will be referred to herein as the Reduced Layout and serves as the basis for the results presented in this section. Actual adjustments to the Project array footprint will be determined based on the SGHA conducted for the Final Project Update.

To reflect the considered array reductions for the Reduced Layout, the modelled sub-arrays were adjusted for this mitigated case. This included the removal of PV31, and reductions in size of PV29 and PV30, bringing the total number of modelled sub-arrays to 30. The adjusted sub-array configuration is shown in **Figure 7-3.**

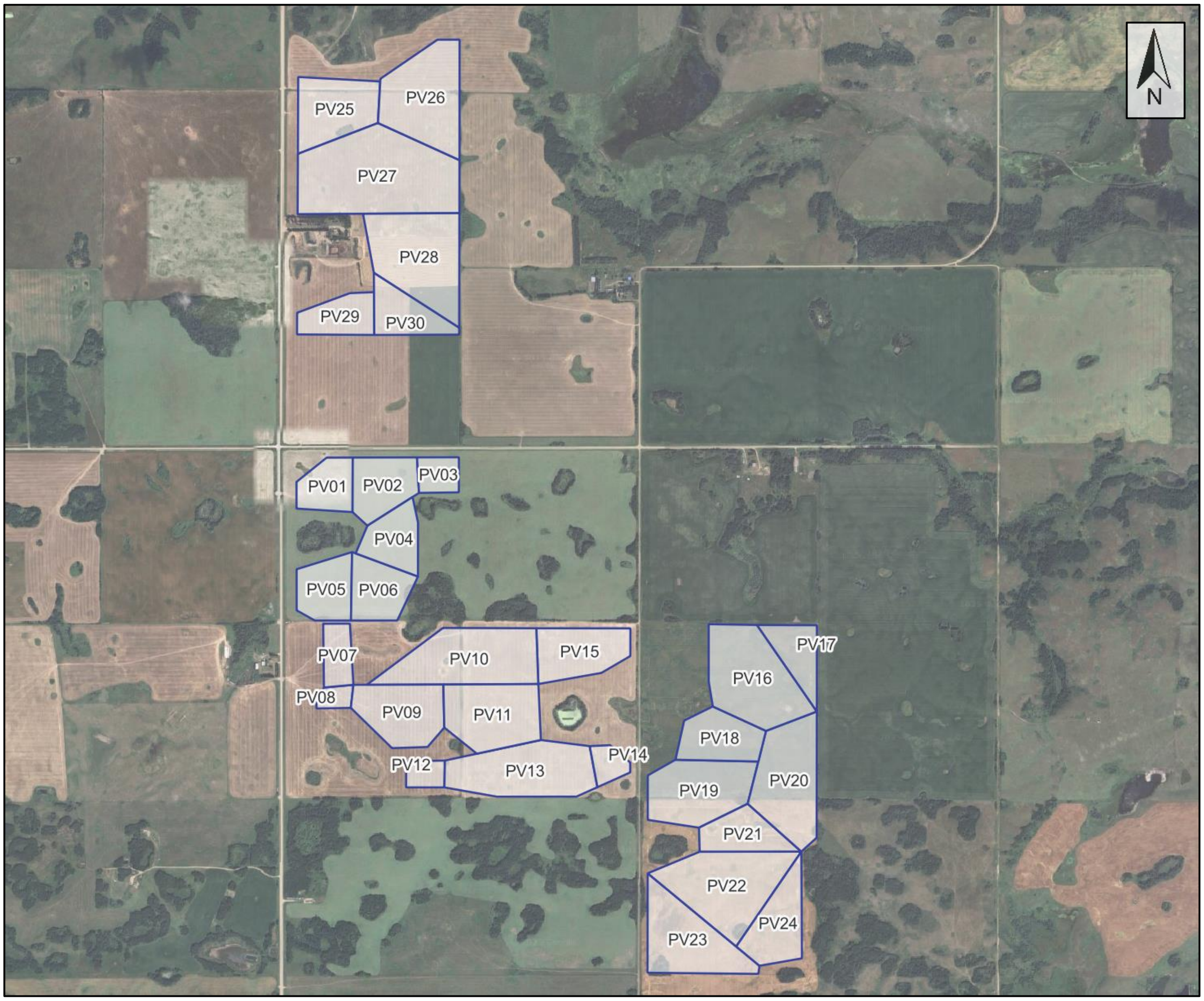


Figure 7-3 – General PV Array Areas Plotted in GlareGauge Software for Reduced Layout

With the proposed array reductions, the predicted glare impacts are substantially reduced across several of the assessed receptors. The predicted glare durations on the basis of the Reduced Layout are provided below.

7.3.1 Route Receptor Results for the Reduced Layout

The following tables present the glare results for the route paths and intersection assessed from the array minimum and maximum heights, on the basis of the Reduced Layout. As before, route receptor results are shown for passenger, trucks, and commercial road vehicles at 1.08m, 1.8m, and 2.3m, respectively. Results in **Table 7-2** used a ±15° FOV, which was modelled to capture potential glare within a vehicle operator's critical visual range. Results in **Table 7-3** were evaluated with a ±25° horizontal FOV to highlight routes that may experience glare from an extended visual range. Equivalent levels of glare within ±15° have a greater impact on the observer than glare outside that range.

Table 7-2 – Annual Route Path Glare Levels with a reduced Project PV array footprint for Passenger Vehicles, Buses, and Commercial Vehicles, ±15° FOV

Receptor	Green Glare (min/year)		Yellow Glare (min/year)		Red Glare (min/year)		Max Daily Glare (min/day)	
Module Height	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**
Highway 884 (Passenger)	0	0	0	0	0	0	0	0
Highway 884 (Truck/Bus)	0	0	0	0	0	0	0	0
Highway 884 (Commercial)	0	0	0	0	0	0	0	0
Range Road 81 (Passenger)	0	0	0	0	0	0	0	0
Range Road 81 (Truck/Bus)	0	0	0	0	0	0	0	0
Range Road 81 (Commercial)	0	0	0	0	0	0	0	0
Township Road 400 (Passenger)	1,153	1,100	0	0	0	0	34	35
Township Road 400 (Truck/Bus)	1,130	1,086	0	0	0	0	34	34
Township Road 400 (Commercial)	1,135	1,141	0	0	0	0	32	33
Intersection of Highway 884 with Township Road 400 (Passenger)*	0	0	0	0	0	0	0	0
Intersection of Highway 884 with Township Road 400 (Truck/Bus)*	0	0	0	0	0	0	0	0
Intersection of Highway 884 with Township Road 400 (Commercial)*	0	0	0	0	0	0	0	0

*Modelled as an observation point with an unrestricted field of view.

Table 7-3 – Annual Route Path Glare Levels with a reduced Project PV array footprint for Passenger Vehicles, Buses, and Commercial Vehicles, ±25° FOV

Receptor	Green Glare (min/year)		Yellow Glare (min/year)		Red Glare (min/year)		Max Daily Glare (min/day)	
Module Height	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**
Highway 884 (Passenger)	0	0	0	0	0	0	0	0
Highway 884 (Truck/Bus)	0	0	0	0	0	0	0	0
Highway 884 (Commercial)	0	0	0	0	0	0	0	0
Range Road 81 (Passenger)	0	0	0	0	0	0	0	0
Range Road 81 (Truck/Bus)	0	0	0	0	0	0	0	0
Range Road 81 (Commercial)	0	0	0	0	0	0	0	0
Township Road 400 (Passenger)	4,116	4,342	462	284	0	0	50	49
Township Road 400 (Truck/Bus)	4,276	4,148	451	295	0	0	52	50

Receptor	Green Glare (min/year)		Yellow Glare (min/year)		Red Glare (min/year)		Max Daily Glare (min/day)	
Module Height	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**
Township Road 400 (Commercial)	3,986	4,253	505	441	0	0	48	48

The glare results from the Reduced Layout indicate that the evaluated sections of Highway 884 and Range Road 81, along with the assessed intersection, are not predicted to observe glare at any level from the Project, at either the ±15° or ±25° FOV. Township Road 400 is only predicted to observe minimal durations of green glare within the inner ±15° FOV, and minimal durations of yellow and green glare within the extended ±25° FOV.

In this mitigated case, Township Road 400 remains the only assessed route receptor that is predicted to observe glare of any level from the Project. For comparison to the unmitigated case, results for the passenger vehicle receptor height will be detailed further. Again, conclusions drawn from the results of this receptor height will be broadly applicable to the other vehicle heights assessed (i.e., commercial and truck/bus), given the similarity in their results.

Observers travelling along Township Road 400 in passenger vehicles are predicted to see green glare in the more critical ±15° FOV for a maximum of 1,153 minutes per year. The green glare is predicted between 06:21 and 06:54 MST for up to 18 minutes per morning, and in the evenings between 18:11 and 18:37 MST for up to 16 minutes per evening. It should be noted that these values are maximums, and do not represent average daily durations of glare. For clarity, the daily split of predicted glare durations for this receptor are provided in Table 7-4.

Table 7-4 – Breakdown of Daily Maximum Green Glare with a reduced Project PV array footprint for Passenger Vehicles on Township Road 400, ±15° FOV

Period of Day	Maximum Green Glare (min/day)		Average Green Glare* (min/day)		Number of Days with Green Glare (per year)	
Module Height	**0.8m**	**3.2m**	**0.8m**	**3.2m**	**0.8m**	**3.2m**
Morning (AM)	16	19	9	7	33	32
Evening (PM)	18	17	14	14	62	62
AM and/or PM	34	35	16	15	73	72

*Average is taken across the days predicted to observe green glare, not across all days of the year.

The glare is predicted to occur in mid-March, mid-April to mid-May, late July to late August, and late September.

These results indicate a substantial reduction in predicted green and yellow glare durations as compared to the unmitigated case. Notably, within the more critical ±15° FOV, no yellow glare is predicted for drivers travelling along Township Road 400, compared to a maximum of 3,182 minutes/year in the unmitigated case. While minimal annual and daily durations of green glare remain, it is not generally considered a hazard, and it is not expected to create a hazardous situation for drivers. Additionally, the same impact-reducing effects as previously outlined in this report still apply, including the effects of sun-masking, and the fact that glare durations predicted in different periods of day will correspond to different directions of travel.

For comparison, the following figures represent the predicted glare within the ±15° FOV of passenger vehicle drivers travelling along Township Road 400 in this mitigated case. Figure 7-4 shows the daily time periods during which glare is predicted, Figure 7-5 shows the daily duration of predicted glare, and Figure 7-6 presents the glare hazard plot.

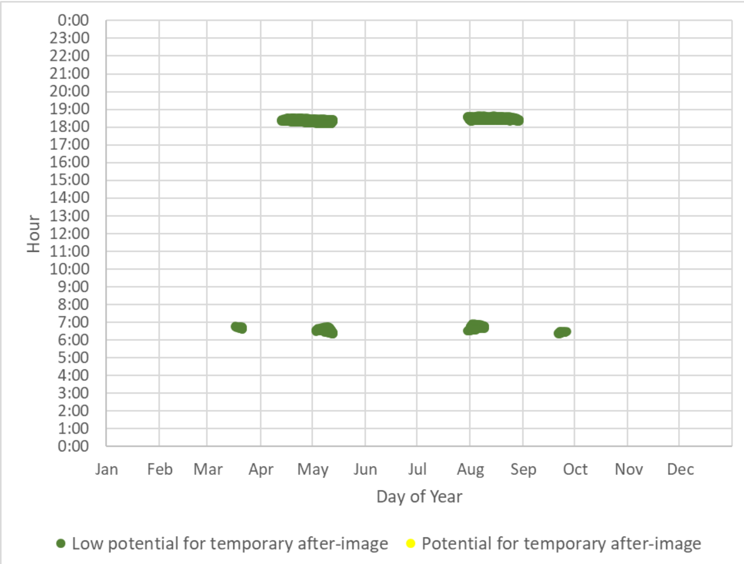


Figure 7-4 – Annual Predicted Glare occurrence with a reduced Project PV array footprint for Township Road 400 (Passenger, ±15° FOV)

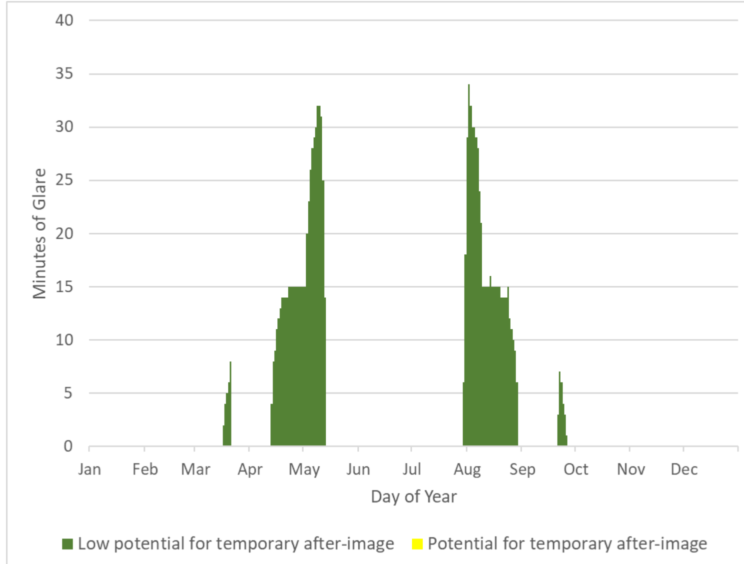


Figure 7-5 – Daily Duration of Glare with a reduced Project PV array footprint for Township Road 400 (Passenger, ±15° FOV)

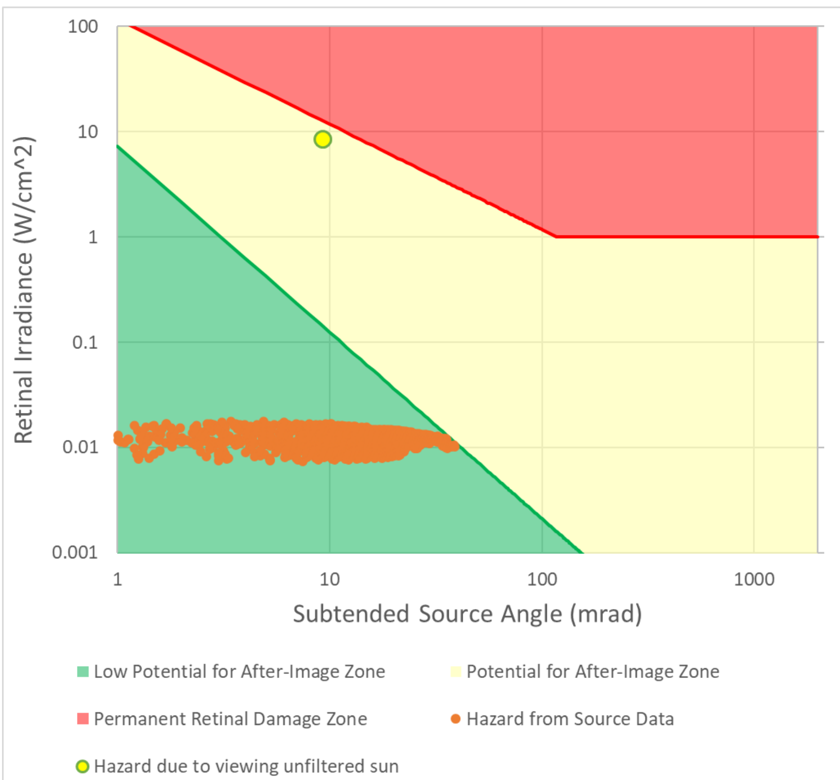


Figure 7-6 – Hazard Plot with a reduced Project PV array footprint for Township Road 400 (Passenger, ±15° FOV)

7.3.2 Dwelling Receptor Results for the Reduced Layout

Table 7-5 provides the glare results for the dwellings assessed at the array minimum and maximum heights on the basis of the Reduced Layout.

Table 7-5 – Annual Glare Levels with a reduced Project PV array footprint for Dwellings near the Project

Receptor	Green Glare (min/year)		Yellow Glare (min/year)		Red Glare (min/year)		Max Daily Glare (min/day)	
Module Height	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m
R1 (two-storey)	0	0	0	0	0	0	0	0
R2 (two-storey)	0	0	0	0	0	0	0	0
R3 (two-storey)	1,943	1,498	2,874	2,377	0	0	42	35
R4 (one-storey)	1,313	1,385	1,782	1,513	0	0	25	25
R5 (two-storey)	1,145	1,026	1,890	1,868	0	0	19	19
R6 (two-storey)	1,677	1,678	0	0	0	0	16	16
R7 (two-storey)*	136	2,316	0	68	0	0	4	18
R8 (two-storey**)	4,558	4,586	0	0	0	0	28	29
R9 (two-storey**)	4,660	4,683	52	0	0	0	30	29

*With visual screening mitigation implemented for R7.

**R8 and R9 were not field-verified as the buildings were not visible from publicly accessible areas, so they were conservatively assumed to be two-storey dwellings.

In this mitigated case, dwellings R1 and R2 are not predicted to observe any level of glare from the Project, while dwellings R6 and R8 are only predicted to observe green glare from the Project. Dwellings R3, R4, R5, R7 and R9 are predicted to observe both green and yellow glare from the Project. Aside from the reduction in annual and daily glare durations at R7 as a result of the visual screening mitigation described in **Section 7.1**, and a notable reduction at R6, predicted glare impacts for the other assessed dwelling receptors remain materially unchanged as compared to the unmitigated case.

R3 remains the most impacted dwelling receptor with the Reduced Layout, and its predicted green and yellow glare durations are unchanged as compared to the unmitigated case. The predicted glare figures presented, and conclusions drawn in **Section 6.2** for the unmitigated case remain representative of the predicted glare for R3 in this mitigated case.

8 Summary

Solar modules are specifically designed to absorb light rather than reflect it. Moreover, most modules are now manufactured with anti-reflective coatings that help further mitigate the intensity of reflections, as is the case with the modules selected for the Project.

The assessment of the Project was undertaken using GlareGauge software. The fixed-tilt arrays were modelled at their minimum and maximum module heights with a tilt angle of 30°. The assessment also evaluated different cases for unmitigated and mitigated scenarios. For mitigation, Eastervale Solar has committed to visual screening for a dwelling receptor, and the use of modules with advanced anti-reflective properties (pending commercial availability of the technology). GCR has also modelled a modified Project layout, with the aim of reducing the predicted glare on Township Road 400, which may be pursued by Eastervale Solar at the time of the Final Project Update, if it is deemed necessary.

In all cases, the same receptors were assessed. The ground-based route paths assessed for glare impacts included both directions of travel on sections of Highway 884, Township Road 400, and Range Road 81 at passenger, truck, and commercial vehicle heights. The routes were evaluated with a horizontal viewing angle of ±15° to capture potential glare within a vehicle operator's critical visual range, as well as ±25° to identify routes that may observe peripheral glare. In the unmitigated case, drivers travelling along the evaluated sections of Highway 884 and Range Road 81 are not predicted to observe glare at any level from the Project, while Township Road 400 is predicted to observe moderate annual and daily durations of yellow and green glare from the Project.

Township Road 400 is predicted to be the only route impacted by glare from the Project. Along this route in the unmitigated case, observers in passenger height vehicles are predicted to see yellow glare in the more critical ±15° FOV for a maximum of 3,182 minutes/year. The yellow glare is predicted for moderately short periods in the mornings and evenings from mid-March to mid-May, and in late July to late September. Sun-masking is expected to reduce potential impacts from the glare. In addition, the actual impact is expected to be less because vehicle operators will be travelling past the affected areas, not standing still while looking at the solar PV arrays. Since the results describe times when a vehicle operator may see glare from the Project and apply to a portion of the route (not a single point), the predicted values provide a sense of the likelihood that a driver may see glare from the Project, not the actual amount or duration of glare that will be seen. This is compounded by the fact that glare occurring in distinct periods throughout the day will only apply to a specific direction of travel. The glare analysis does not account for any change in weather patterns – it is assessed as clear sunny skies throughout the year. Furthermore, the SGHAT model does not account for visual obstructions between the arrays and receptors, so the results are conservative. Based on the assessment results, glare from the Project is not expected to present a hazard to drivers along nearby roads, and mitigation is not expected to be required.

However, mitigation options were developed for the Project in the event they are deemed necessary. In a Reduced Layout scenario, there is no yellow glare predicted within the more critical ±15° FOV of drivers travelling along Township Road 400, and only green glare is predicted for up to 1,153 minutes/year, or an average of 16 minutes per day on the days it occurs.

Nine receptors were assessed to represent dwellings near the Project. Dwellings were modelled at 1.5m above ground for single-storey buildings, and 4.5m above ground for two-storey buildings. In the unmitigated case, Dwellings R1 and R2 are not predicted to observe any level of glare from the Project. Dwellings R8 and R9 are only predicted to observe green glare from the Project. Dwellings R3, R4, R5, R6 and R7 are predicted to observe both green and yellow glare from the Project. The dwellings predicted to observe glare have existing obstructions between them and the Project arrays, so actual glare observations are expected to be less in practice. Furthermore, Eastervale Solar has committed to visual screening for the glare predicted to be observed at R7, which drastically reduces the predicted glare impact at this dwelling receptor.

Additionally, in the Reduced Layout scenario, Dwelling R6 has a notable reduction in glare durations, and is no longer predicted to observe yellow glare. There is no significant impact in predicted glare impacts at any other assessed dwelling receptors as a result of this mitigation measure.

Nevertheless, R3 is predicted to be the dwelling that is most impacted by glare from the Project. In all assessed cases, observers at this location are predicted to see yellow glare for a maximum yellow glare for a maximum of 2,874 minutes/year, and green glare for a maximum of 1,943 minutes/year. The glare is predicted for moderately short morning periods from mid-March to late September. Sun-masking is also expected to reduce potential impacts from the glare. Vegetation and buildings appear to obstruct the view of the Project from R3 and are likely to reduce or eliminate the glare observed at R3. The results of the assessment are the “worst-case” scenario, and the actual observed glare will be less. Based on the assessment results, glare from the Project is not expected to have an adverse effect on a resident’s use of their home, and mitigation is not expected to be required.

There are no aerodromes within 4,000m of the Project and no railways within 800m of the Project, so none were evaluated in this assessment.

Due to the predicted duration and level of glare in any case, mitigation is not being recommended to address the predicted glare at the modelled dwellings and transportation routes. However, Eastervale Solar has committed to visual screening for the glare predicted at R7 and using advanced anti-reflective solar PV modules in the final Project design. The lower reflectivity modules are a developing technology that cannot be assessed meaningfully at this time but are likely to further reduce glare impacts in practice if implemented. If required, Eastervale Solar will also consider implementing a reduced array footprint that will reduce the predicted glare durations at assessed receptors.

Furthermore, if glare is determined to be an issue during the Project’s operation, further mitigation measures may be designed to reduce or eliminate its impact on an observer, and specific mitigation measures may be developed in consultation with affected stakeholders.

9 Conclusion

In conclusion, the Eastervale Solar Project is not likely to have the potential to create hazardous glare conditions for the dwellings or roads that were assessed.

The actual glare impacts that will be experienced in the field along transportation routes are anticipated to be only a fraction of the results presented in this report. The actual impact is expected to be less because vehicle operators will be travelling past the affected areas, not standing still while looking at the solar PV arrays. Additionally, Township Road 400, the only route predicted to experience glare from the Project, is unpaved and minor in nature, leading to very few features or destinations in the area. Thus, traffic volumes are expected to be very low, so there is an even lower chance a driver will be in the right place and with the proper conditions to create a hazardous glare situation. Although mitigation is not expected to be required, Eastervale Solar is willing to consider mitigation options that can reduce the glare observed along Township Road 400. A Project adjustment with a reduced PV array footprint was assessed to be a potential option to eliminate all yellow glare within the more critical field-of-view (FOV) of drivers travelling along Township Road 400.

Furthermore, the actual glare impact at the assessed dwellings is anticipated to be only a fraction of the results presented in this report. The actual impact is expected to be less because of existing obstructions between the dwellings and the solar PV arrays. Glare is not expected to have an adverse effect on a resident’s use of their home. Although mitigation is not expected to be required for residential receptors, Eastervale Solar has committed to the mitigation via installation of a visual obstruction for the glare predicted at a dwelling receptor, and the proposed mitigation options may further reduce glare predictions at other dwelling receptors.

For predictions around sunrise/sunset, the impact of the glare on affected receptors is expected to be reduced by sun-masking as the glare occurs when the sun aligns with the glare spot and observer, and the sunlight glances across the arrays at a shallow angle. The glare analysis does not account for any change in weather patterns – it is assessed as clear sunny skies throughout the year. The results of the assessment are the “worst-case” scenario, and the actual observed glare will likely be less.

Based on the assessment results, glare from the Eastervale Solar Project is not expected to present a hazard to drivers along nearby roads or have an adverse effect on a resident’s use of their home. If deemed necessary, implementable mitigation options were developed and modelled to reduce the predicted glare impacts further.

10 Glare Practitioners' Information

Table 9-1 summarizes the information of the author and technical reviewer of the solar glare hazard analysis.

Table 10-1 – Summary of Practitioners' Information

Name	Joshua Kim	Jason Mah	Alex Van Horne
Title	Renewable Energy EIT	Technical Lead	Regulatory Specialist and Project Manager
Role	Glare Analyst, Author	Technical Reviewer	Technical Reviewer and Approver
Experience	• Analyst on multiple glare assessments in Alberta and Quebec • BSc Mechanical Engineering • E.I.T. (APEGA)	• Analyst on 50+ glare assessments in Alberta, BC, Saskatchewan, Quebec, Nova Scotia, Nunavut, the USA, and the UK • Technical support for AUC information requests and hearings • Expert witness experience in technical solar development for the Sollair Solar Energy Project, Three Hills Solar Project, Eastervale Solar + Energy Storage Project, Dolcy Solar + Energy Storage Project, Caroline Solar Farm, and Harvest Sky Solar Farm • BSc Chemical Engineering • P.Eng. (APEGA, APEGS)	• Analyst/reviewer on 15+ glare assessments in Alberta • Technical support for AUC information requests and hearings • Technical support for the AUC as the Lead Application Officer on 15+ solar power plant proceedings in which glare was considered • Expert witness experience in technical solar development for the Aira Solar Project, Creekside Solar Power Plant, Caroline Solar Farm, Harvest Sky Solar Farm, and Sweetgrass Solar with Storage Project • BSc Chemical Engineering • P.Eng. (APEGA)

Appendix A – ±50° FOV Results for Highway 884

Results in **Table A-1** used a ±50° FOV to assess the potential for peripheral glare observations along Highway 884 assessed from the array minimum and maximum heights. Glare predictions within this extended FOV do not necessarily represent an adverse impact on an observer but have been included to align with the AUC's suggestion that evaluating this FOV may help provide additional broad context.[41]

Table A-1 – Annual Route Path Glare Levels for Passenger Vehicles, Trucks/Buses and Commercial Vehicles (±50° FOV)

Receptor	Green Glare (min/year)		Yellow Glare (min/year)		Red Glare (min/year)		Max Daily Glare (min/day)	
Module Height	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m	0.8m	3.2m
Highway 884 (Passenger)	0	0	0	0	0	0	0	0
Highway 884 (Truck/Bus)	0	0	0	0	0	0	0	0
Highway 884 (Commercial)	0	0	0	0	0	0	0	0

These results show that no glare is predicted from the Project along Highway 884 within the very broad ±50° FOV. The same results apply to both the unmitigated and mitigated scenarios for the Project.

41 *Decision 27842-D01-2024, Aira Solar Project and Moose Trail 1049S Substation* (AUC, March 2024).

Appendix B – Traffic Data for Highway 884 near the Project

Intersection of Highway 884 and Highway 599, approximately 17km south of the Project

Reference Number:
129330

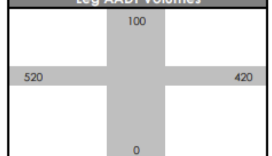
Intersection of:
599 & 884 NE OF TALBOT EJ

North On: 884

Vehicle Type	Volume	%
A: Passenger Vehicle	51	51.0%
B: Recreational Vehicle	2	2.0%
C: Bus	0	0.0%
D: Single Unit Truck	1	1.0%
E: Tractor Trailer Unit	46	46.0%
AADT	100	
ASDT	100	

2023 AADT / ASDT Estimates

Leg AADT Volumes



Total Entering Volume:
540

From North: 50

	Right	Thru	Left
	40	0	10
A	17	0	6
B	1	0	0
C	0	0	0
D	0	0	0
E	22	0	4

To North: 50

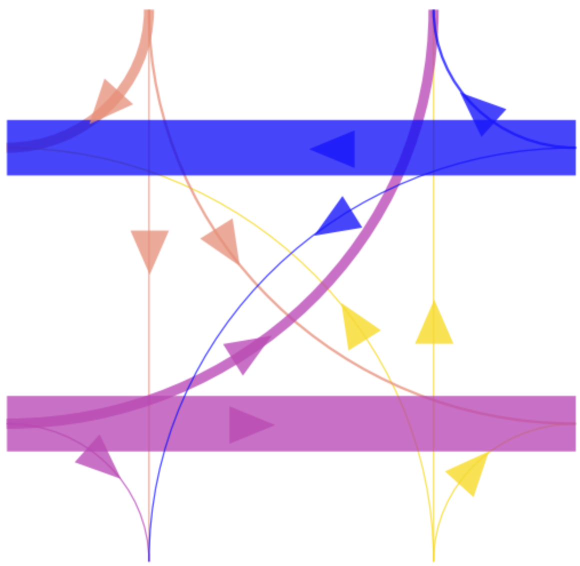
A	28
B	1
C	0
D	1
E	20

To West: 260

A	170
B	13
C	0
D	7
E	70

From East: 230

	Left	Thru	Right
	0	220	10
A	0	153	6
B	0	12	1
C	0	0	0
D	0	7	0
E	0	48	3



West On: 599

	Volume	%
A	346	66.5%
B	22	4.2%
C	0	0.0%
D	11	2.1%
E	141	27.1%
AADT	520	
ASDT	580	

East On: 599

Vehicle Type		
A	319	69.3%
B	22	4.8%
C	0	0.0%
D	10	2.2%
E	109	23.7%
AADT	420	
ASDT	490	

From West: 260

	Left	Thru	Right
	40	220	0
A	22	154	0
B	0	9	0
C	0	0	0
D	1	3	0
E	17	54	0

To East: 210

A	160
B	9
C	0
D	3
E	58

To South: 0

A	0
B	0
C	0
D	0
E	0

From South: 0

	Left	Thru	Right
	0	0	0
A	0	0	0
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

South On:

Vehicle Type	Volume	%
A: Passenger Vehicle	0	-
B: Recreational Vehicle	0	-
C: Bus	0	-
D: Single Unit Truck	0	-
E: Tractor Trailer Unit	0	-
AADT	0	
ASDT	0	

ABBREVIATIONS:

AADT: Annual Average Daily Traffic. Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

Intersection of Highway 884 and Highway 603, approximately 9.5km north of the Project

Reference Number:
129340

Intersection of:
603 & 884 W OF HUGHENDEN

North On: 884

Vehicle Type	Volume	%
A: Passenger Vehicle	135	75.0%
B: Recreational Vehicle	3	1.7%
C: Bus	0	0.0%
D: Single Unit Truck	6	3.3%
E: Tractor Trailer Unit	36	20.0%
AADT	180	
ASDT	210	

2023 AADT / ASDT Estimates

Leg AADT Volumes

North	West	East	South
180	60	180	260

Total Entering Volume:
340

From North

	Right	Thru	Left
Total (90)	10	60	20
A	10	43	19
B	0	1	0
C	0	0	0
D	0	3	1
E	0	13	0

To North

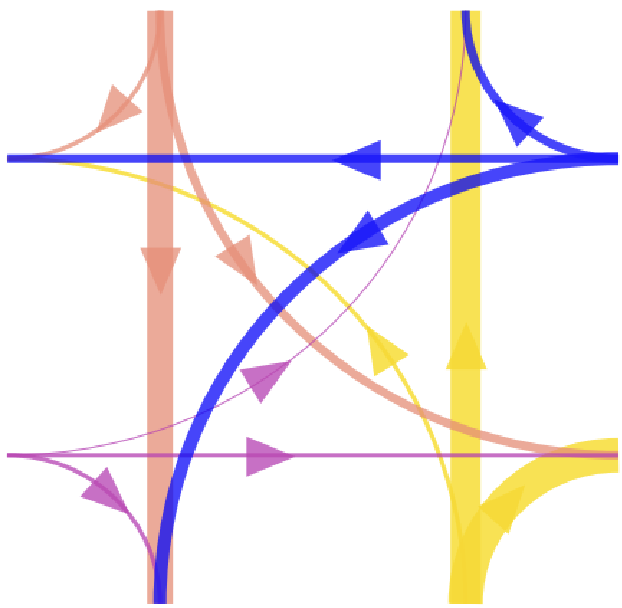
	90
A	63
B	2
C	0
D	2
E	23

To West

	40
A	27
B	0
C	0
D	0
E	13

From East

	Left	Thru	Right
Total (70)	30	20	20
A	16	14	19
B	0	0	0
C	0	0	0
D	2	0	1
E	12	6	0



West On: Twp Rd 411

	Volume	%
A	40	66.7%
B	0	0.0%
C	0	0.0%
D	0	0.0%
E	20	33.3%
AADT	60	
ASDT	70	

East On: 603

Vehicle Type		%
A	129	71.7%
B	1	0.6%
C	0	0.0%
D	7	3.9%
E	43	23.9%
AADT	180	
ASDT	210	

From West

	Left	Thru	Right
Total (20)	0	10	10
A	0	10	3
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	7

To East

	110
A	80
B	1
C	0
D	4
E	25

To South

	100
A	62
B	1
C	0
D	5
E	32

From South

	Left	Thru	Right
Total (160)	10	70	80
A	3	44	51
B	0	2	1
C	0	0	0
D	0	1	3
E	7	23	25

South On: 884

Vehicle Type	Volume	%
A: Passenger Vehicle	160	61.5%
B: Recreational Vehicle	4	1.5%
C: Bus	0	0.0%
D: Single Unit Truck	9	3.5%
E: Tractor Trailer Unit	87	33.5%
AADT	260	
ASDT	310	

ABBREVIATIONS:

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ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

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