GREEN HILL
SOLAR FARM

Green Hill Solar Farm
EN010170

Glint and Glare Technical Note

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The Infrastructure Planning (Examination Procedure) Rules 2010
Rules 8(1)(c)

Contents

1. Introduction

This document is an addendum to **ES Chapter 15 Glint and Glare [APP-052].** This Addendum report should be read in conjunction with ES Chapter 15 Glint and Glare [APP-052]. This Addendum supplements and updates certain elements of the ES Chapter, and does not replace it.

The Addendum has been prepared to respond to comments made in written representations and Issue Specific Hearing 1 regarding the following:

- The potential impact of glint and glare from Green Hill A and Green Hill A.2 towards local roads Newland Road, Broughton Road, and Kettering Road.
- The potential impact of glint and glare from Green Hill G towards residents at Lower Farm.
- The potential impact of glint and glare from Green Hill G towards equestrians, horses, and horse facilities, including impact towards users of the Three Shires Way.

1.1 Proposed Development

The Proposed Development comprises of the installation of ground mounted solar PV arrays across eight areas of agricultural land. At this early stage it is understood that two options are being considered for the Proposed Development: fixed tilt and single axis tracker panels.

For the modelling undertaken for [APP-052] ES Chapter 15 Glint and Glare, Green Hill A PV2 was modelled such that it spanned across Newland Road. Due to the proximity of the road, Arthian has split the modelled footprint of Green Hill A PV2 into two separate arrays (PV2 and PV4). All other panel footprints remain the same as when modelled for the ES Chapter.

The modelled PV module orientations and inclinations, as well as the modelled panel height, are summarised in the below tables, based on information provided by the Applicant.

For the fixed tilt option, a range of tilts are being considered from 10-35°. As such, a tilt of 22.5° has been modelled to represent the average tilt proposed. The average height[1] of the fixed tilt solar panels will be 1.95m above ground. It is noted that a small variation in panel height or panel tilt angle will not change the conclusions of the report because the modelling results are unlikely to be meaningfully affected.

The proposed PV module orientation and inclination, as well as PV panel height above ground, is summarised in Table 1.1.

Table 1.1: Proposed Fixed Panel Details

PV Array	Orientation (Azimuth)[2]	Panel Tilt	Height Above Ground (m)[3]
Green Hill A			
Arrays 1-4	180°	22.5°	1.95
Green Hill A.2			

[1] The heights of the panels (minimum = 0.40m and maximum = 3.5m) have been provided. A centre height of 1.95m (0.4+((3.5-0.4)/2) has been used for the assessment.

[2] North referenced at 0°

[3] The middle of the solar panel has been used as the assessed height in metres above ground level, which has been chosen as it represents the smallest possible variation in height from the bottom and top of the solar panels. The small variation in panel height will not change the conclusions of the report because the modelling results are unlikely to be meaningfully affected. When the visibility of the solar panels for ground-based receptors is discussed, the maximum height of the panel is considered since it will be the most visible part of the panel.

PV Array	Orientation (Azimuth)[2]	Panel Tilt	Height Above Ground (m)[3]
Arrays 1-2	180°	22.5°	1.95
Green Hill G			
Arrays 1-3	180°	22.5°	1.95

For the single axis track option, the tracking range will be between +/- 60°, where 0° refers to the solar panel laying horizontal. The average height[4] of the tracking solar panels will be 2.45m above ground. The proposed PV module orientation and inclination, as well as PV panel height above ground, is summarised in Table 1.2.

Table 1.2: Proposed Tracking Panel Details

PV Array	Backtracking Method	Tracking Axis Orientation (Azimuth)	Tracking Axis Tilt	Maximum Tracking Angle	Height Above Ground (m)[3]
Green Hill A					
Arrays 1-4	None	180°	0°	60°	2.45
Green Hill A.2					
Arrays 1-2	None	180°	0°	60°	2.45
Green Hill G					
Arrays 1-3	None	180°	0°	60°	2.45

For the purpose of this assessment, 'Smooth glass with Anti-Reflective Coating (ARC)' modules have been used to model the surface material of the arrays.

For modelling purposes, the array layouts have been simplified, as shown below in Figure 1.1 and Figure 1.2.

[4] The heights of the panels (minimum = 0.40m and maximum = 4.5m) have been provided. A centre height of 2.45m (0.4+((4.5-0.4)/2) has been used for the assessment.

Figure 1.1: Modelled Panels at Green Hill A (left) and Green Hill A.2 (right)

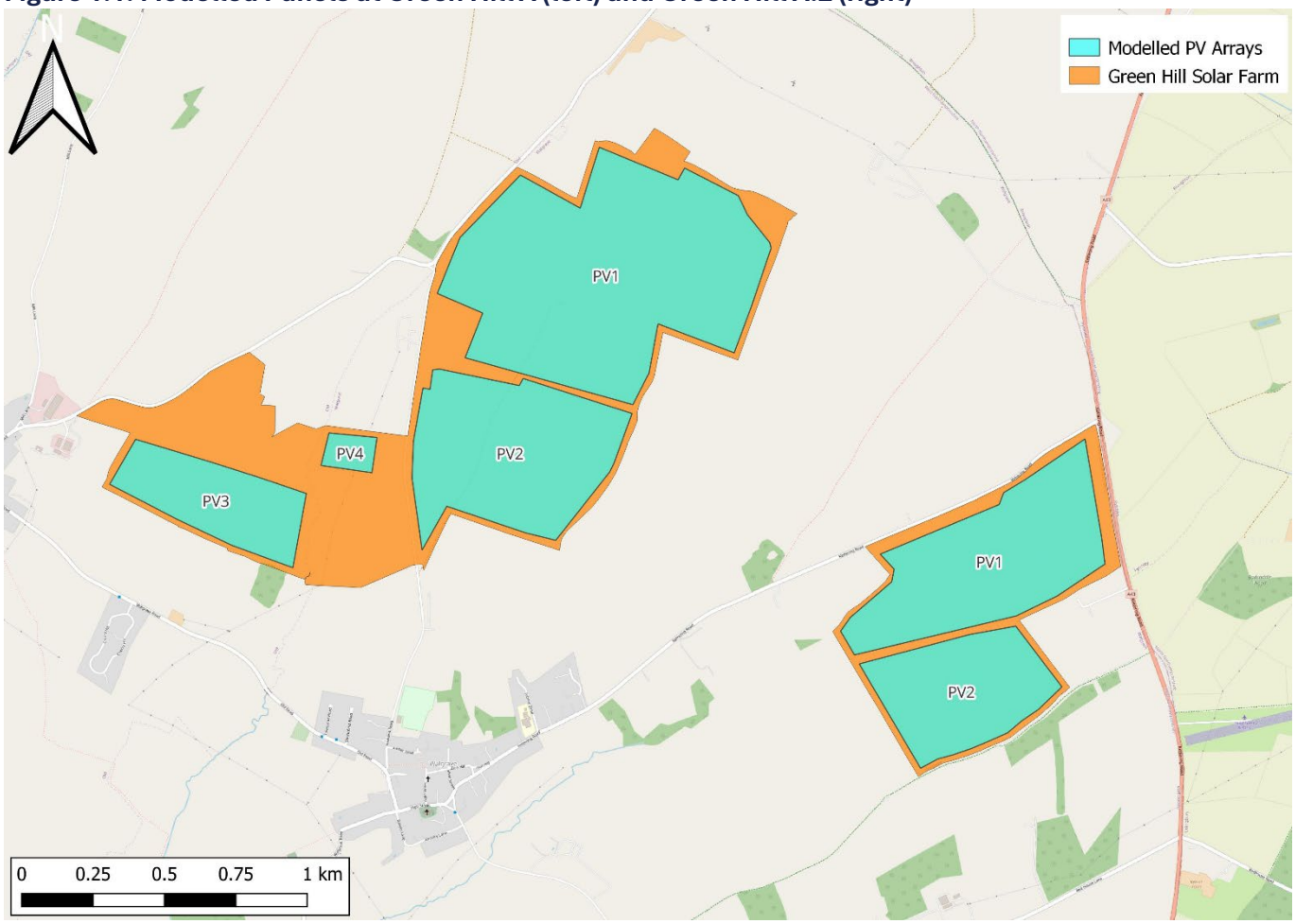
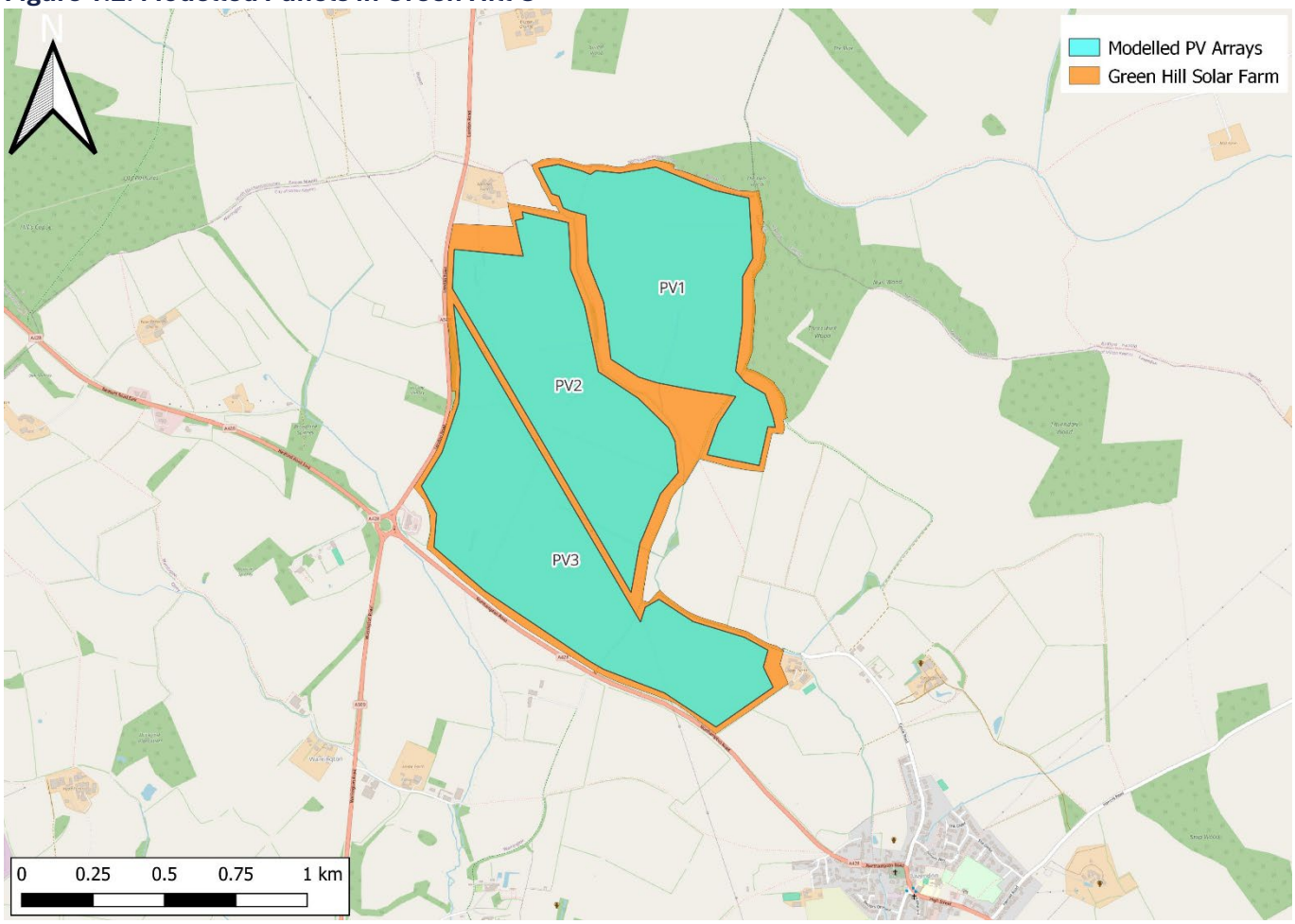


Figure 1.2: Modelled Panels in Green Hill G



2. Receptor Screening and Model Considerations

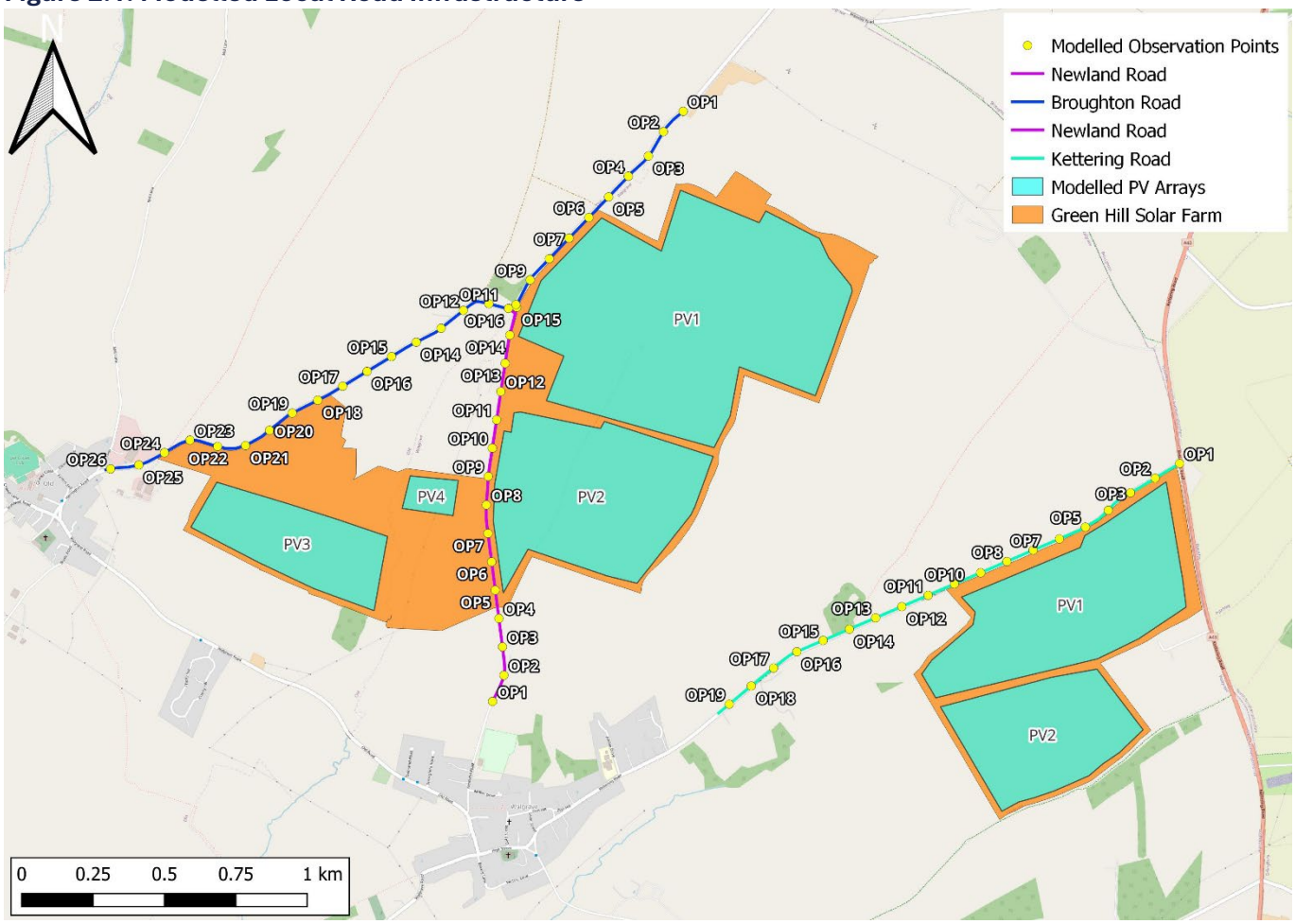
2.1 Road Infrastructure – Local Roads

Based on industry guidance, technical modelling is not recommended for local roads, where traffic densities are likely to be relatively low. Any solar reflections from the Scheme that are experienced by a road user along a local road would be considered 'Low / Minor' impact magnitude. However, West Northamptonshire Council has requested that three local roads are assessed for potential impacts of glint and glare. As such, modelling has been undertaken of Newland Road, Broughton Road, and Kettering Road.

In line with guidance, a field-of-view (FOV) of 100° has been applied (50° view angle to left and right). According to research, glare outside this FOV is mitigated. Furthermore, as a worst-case approach, modelled observation points (which do not include the field of view of the drivers) have been included along the road length at 100m intervals. These receptors have been modelled as Observation Points (OPs). Each modelled observation point has been modelled at an additional 1.5m above ground level to represent the eye level of a standard height road user.

The modelled sections of Newland Road, Broughton Road, and Kettering Road is shown below in Figure 2.1. It is noted that the full length of Newland Road has been modelled.

Figure 2.1: Modelled Local Road Infrastructure



Line of sight from outside these sections is obstructed by intervening topography, vegetation and infrastructure, as shown below in Figure 2.2 to Figure 2.8.

Figure 2.2: Line of sight from Newland Road Northbound towards Green Hill A

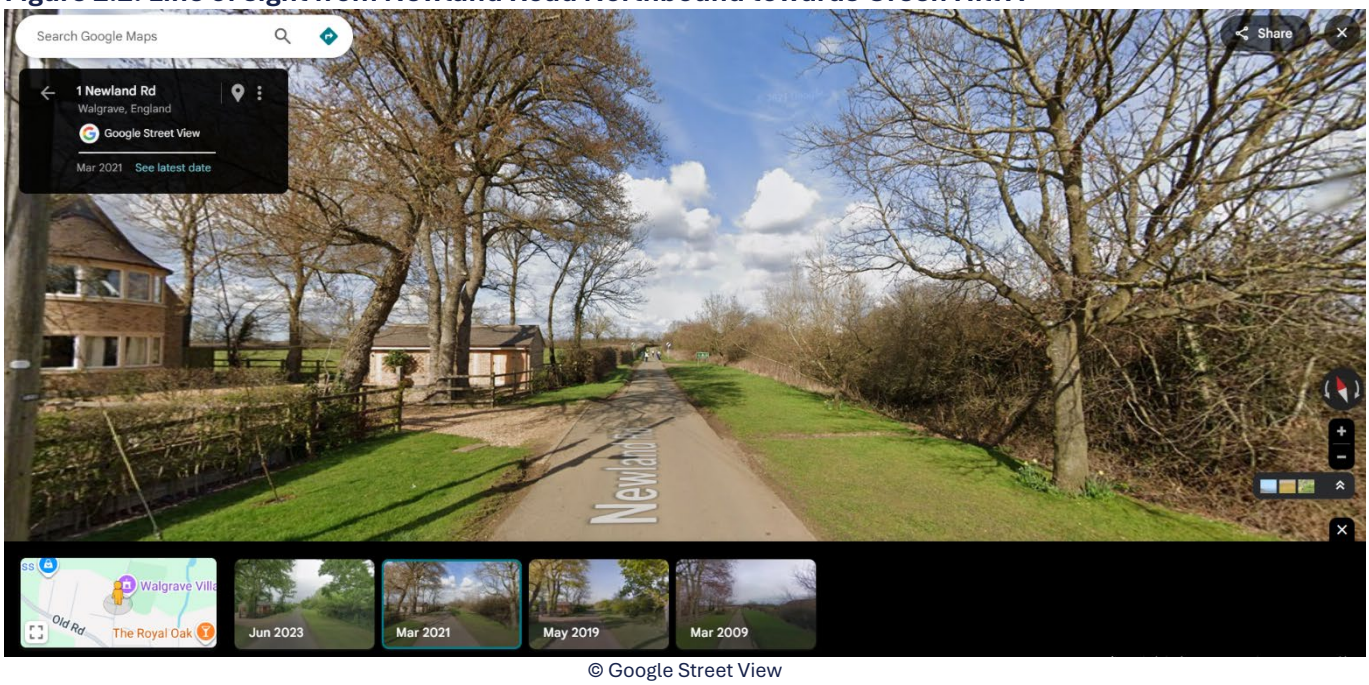


Figure 2.3: Line of sight from Newland Road Northbound towards Green Hill A

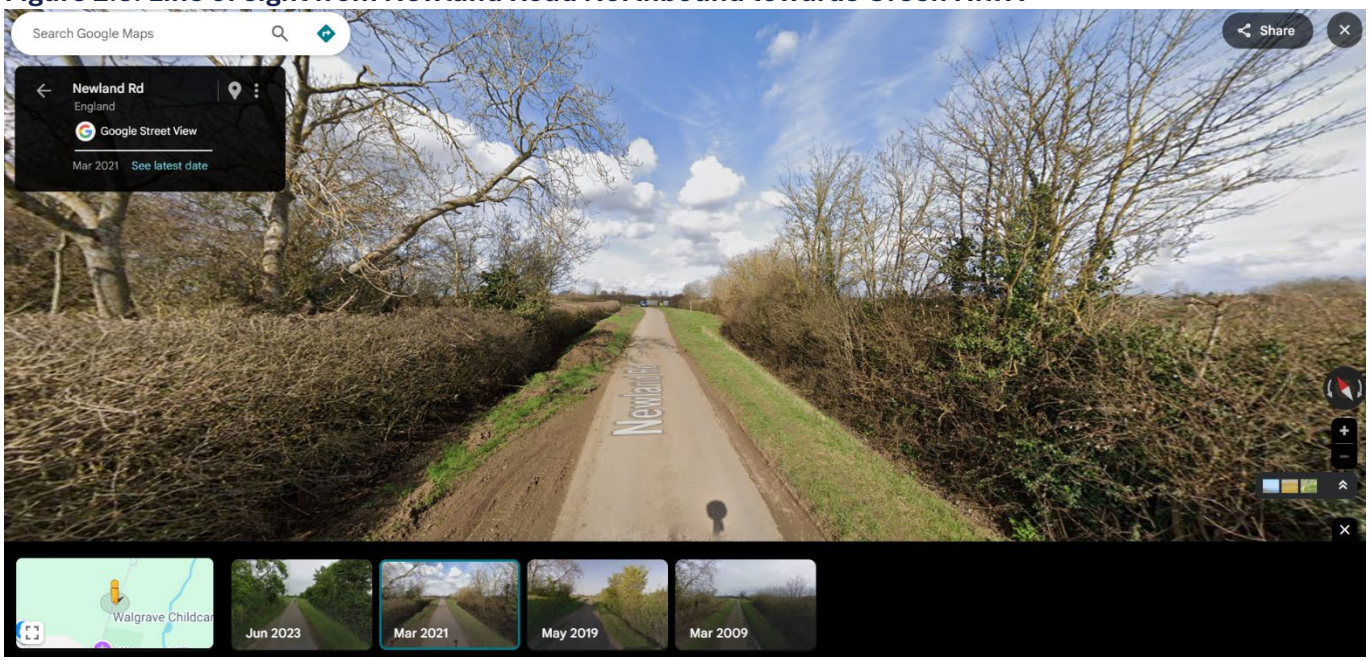


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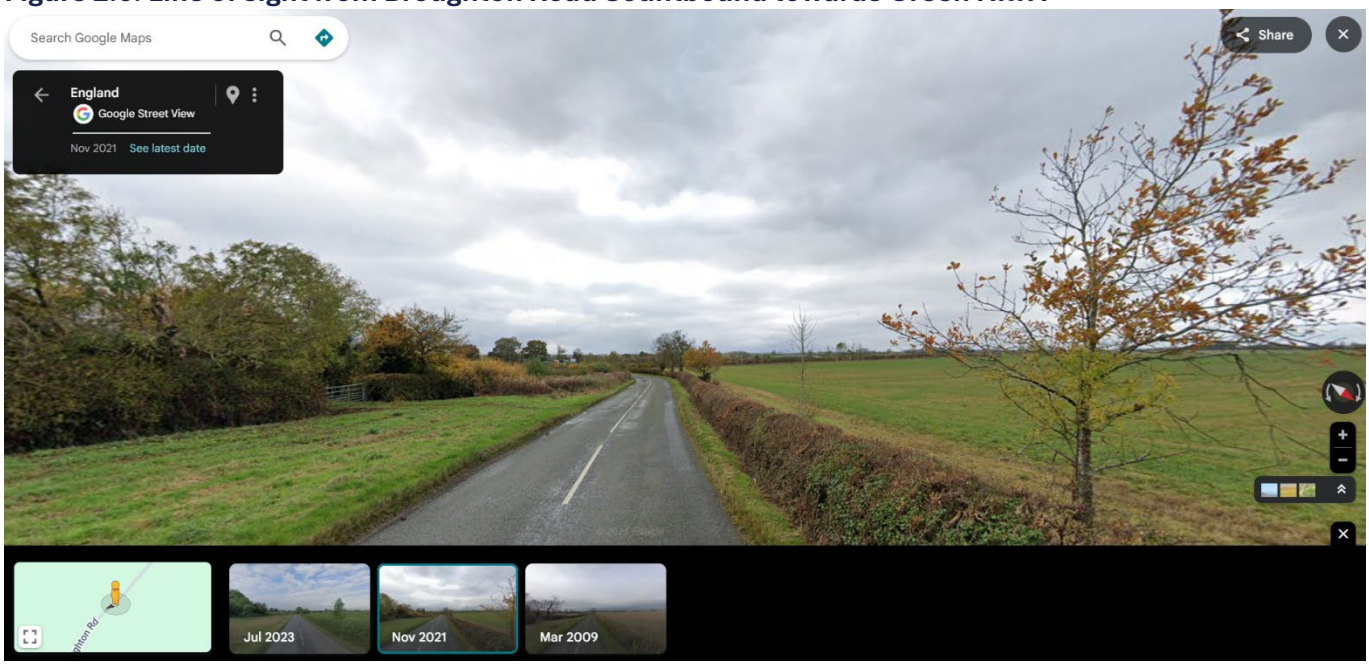
Figure 2.4: Line of sight from Broughton Road Southbound towards Green Hill A

© Google Street View

Figure 2.5: Line of sight from Broughton Road Southbound towards Green Hill A

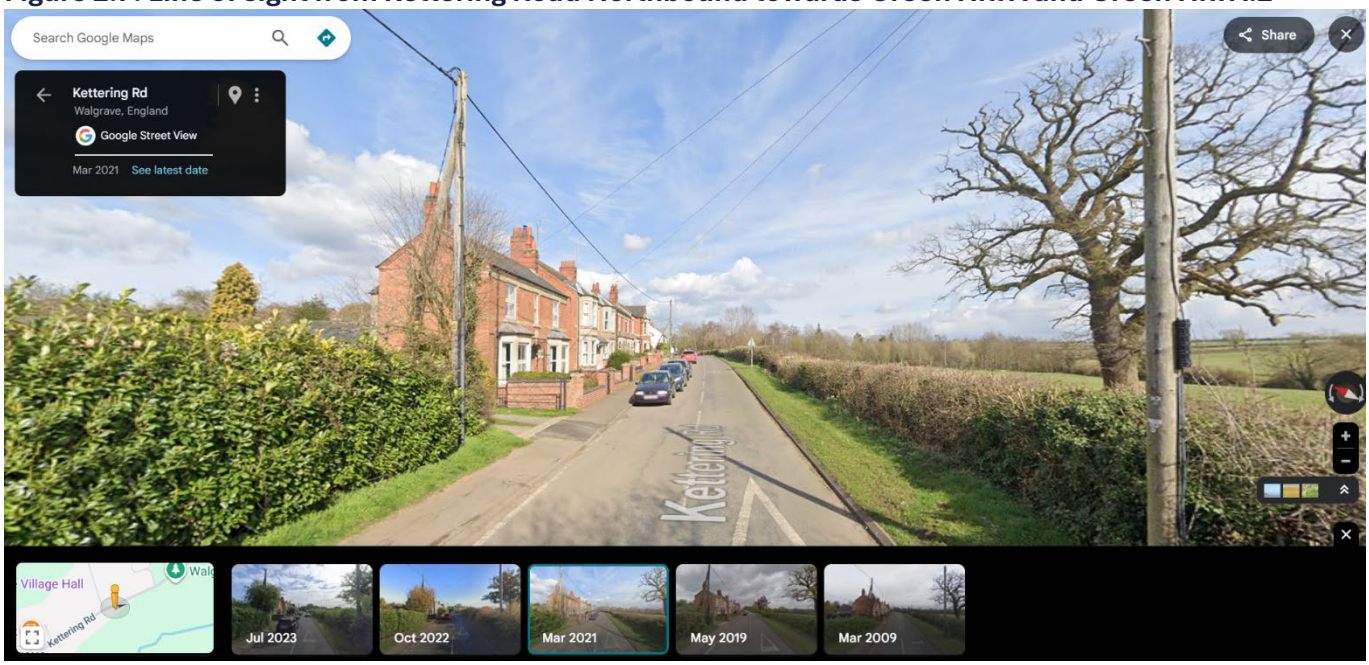
© Google Street View

Figure 2.6: Line of sight from Broughton Road Souhtbound towards Green Hill A



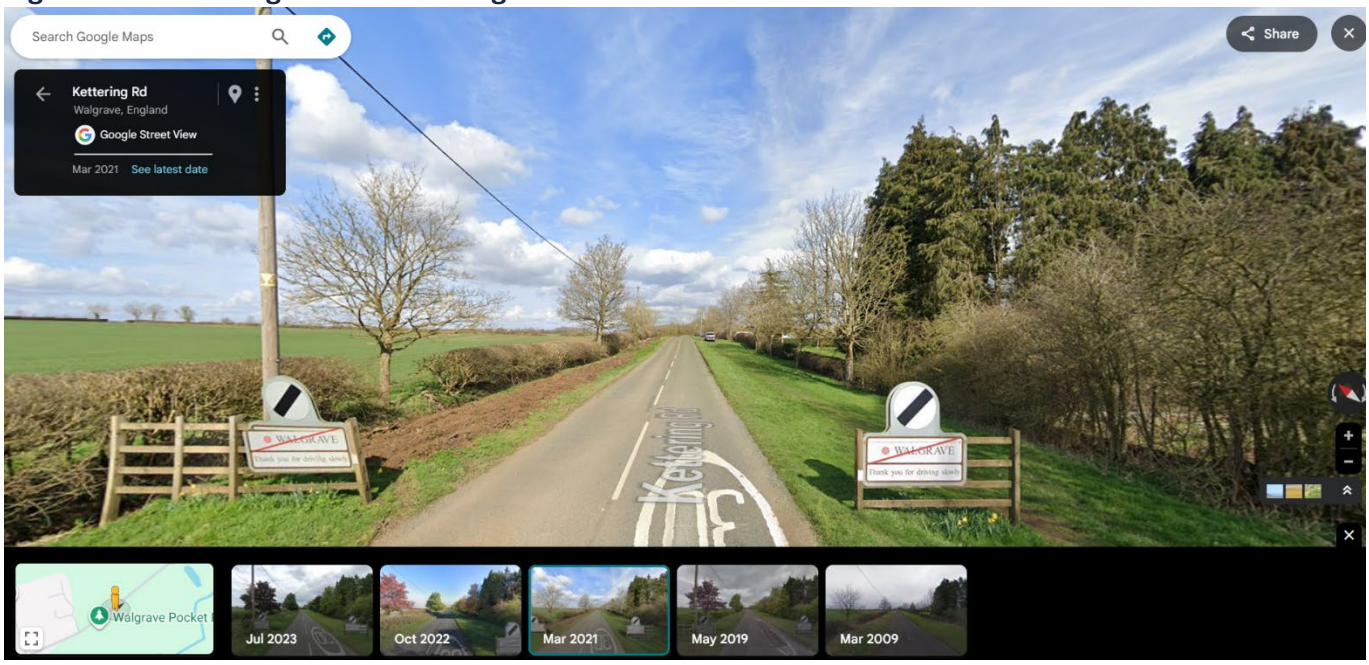
© Google Street View

Figure 2.7: Line of sight from Kettering Road Northbound towards Green Hill A and Green Hill A.2



© Google Street View

Figure 2.8: Line of sight from Kettering Road Northbound towards Green Hill A and Green Hill A.2



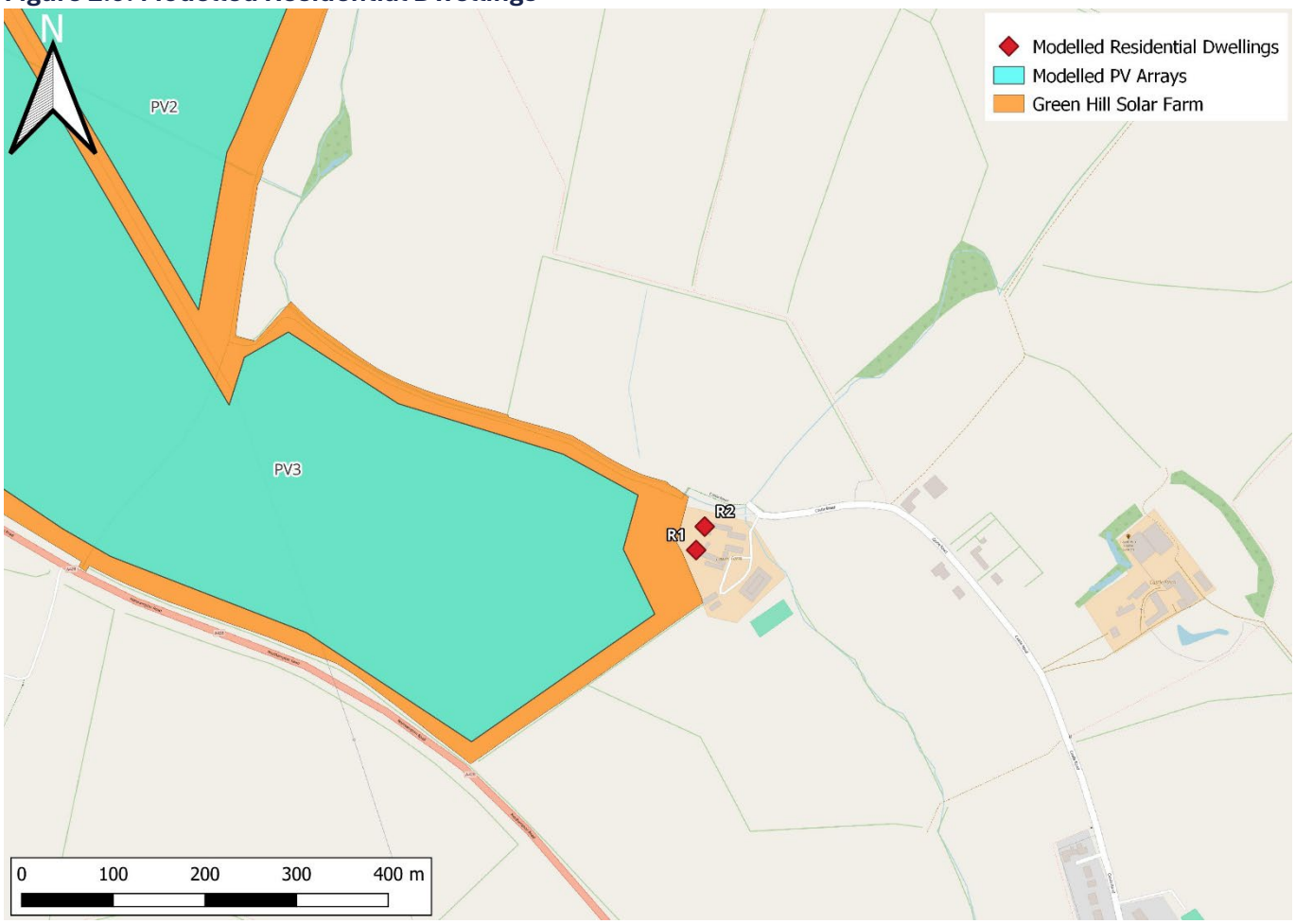
© Google Street View

2.2 Residential Dwellings – Lower Farm

Residential dwellings at Lower Farm have been assessed for potential impact of glint and glare from Green Hill G. The residential dwellings will be modelled at an additional height of 1.8m above ground level as this is considered to represent typical viewing height on ground floor, which is typically occupied during daylight hours.

The buildings closest to the proposed arrays have been modelled to represent the residential dwellings, as shown below in Figure 2.9.

Figure 2.9: Modelled Residential Dwellings



3. ForgeSolar Results

3.1 Road Infrastructure – Newland Road

3.1.1 Newland Road – Fixed Panel Results

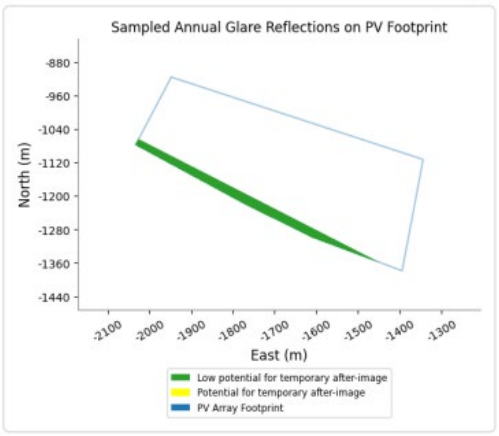
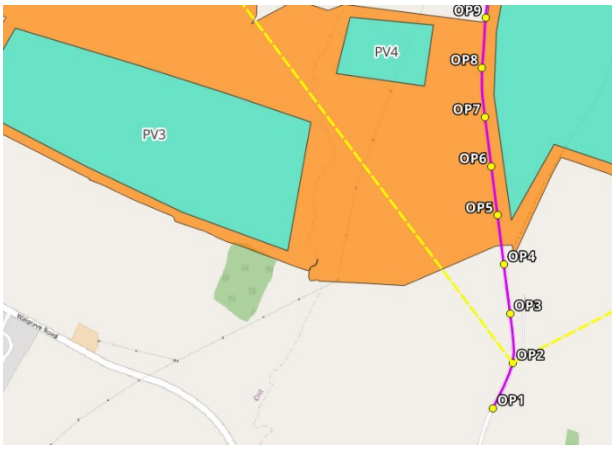
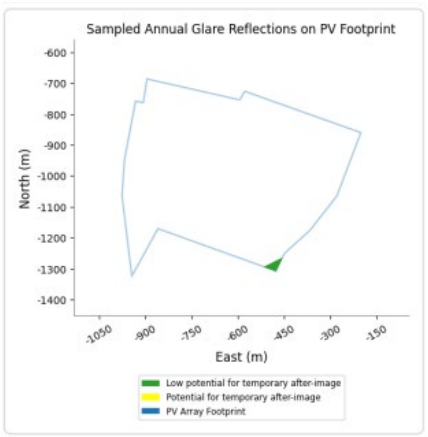
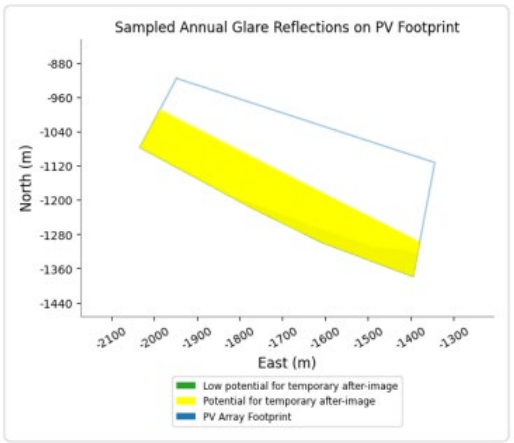
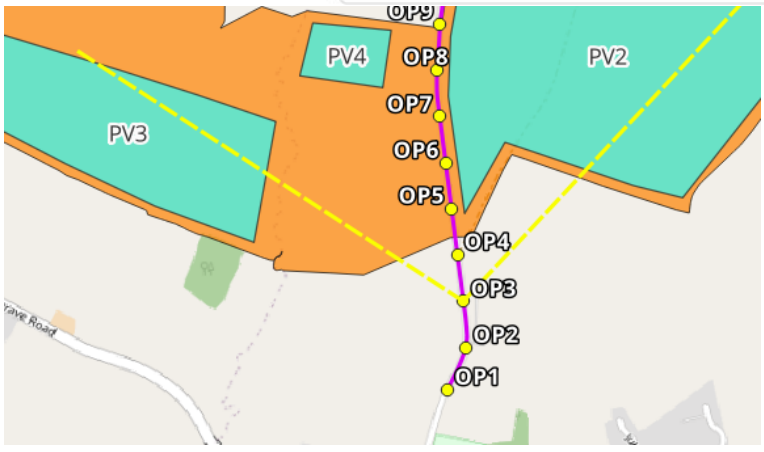
It is noted that Newland Road is outside the 1km screening distance of Green Hill A.2. Based on industry guidance, the highest magnitude of impact possible from Green Hill A.2 will be a 'low impact'. As such, no further mitigation is required.

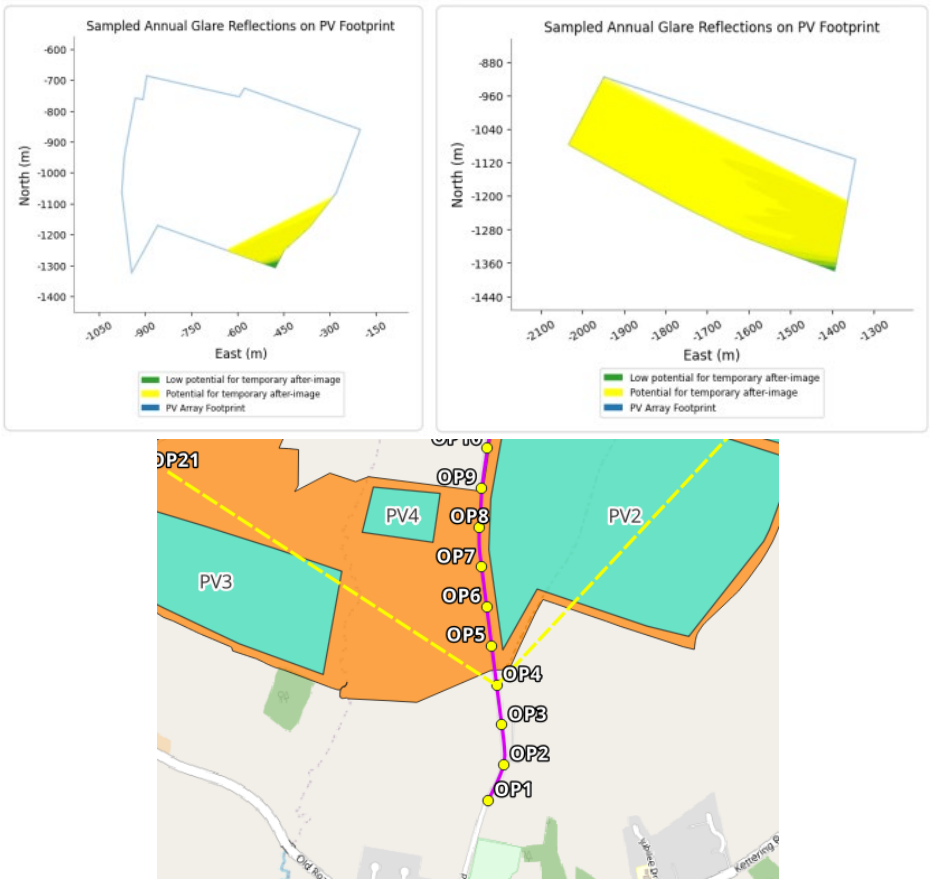
Due to the orientation of the panels, it is geometrically not possible for road users to receive glare within the central field of view whilst travelling southbound along Newland Road. As such, a 'low impact' is predicted towards road users travelling southbound and no further mitigation is required.

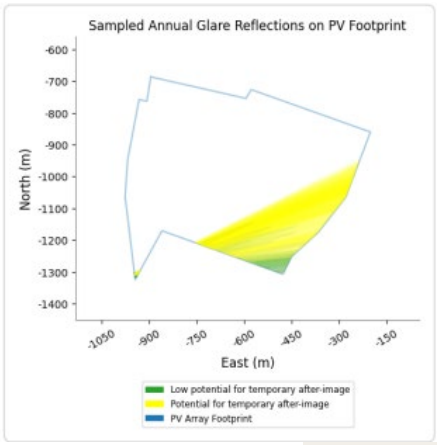
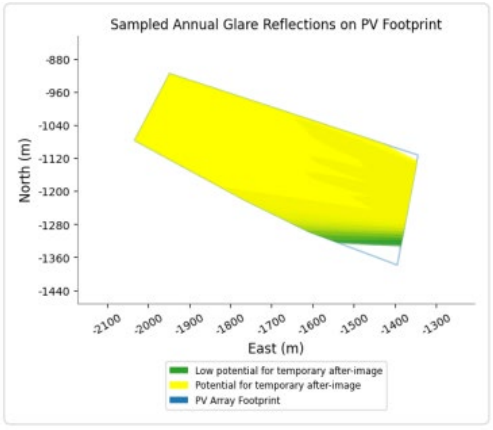
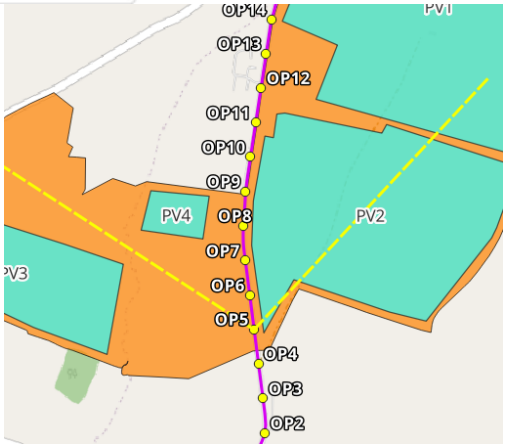
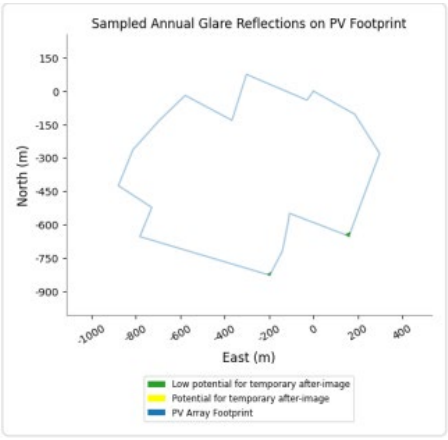
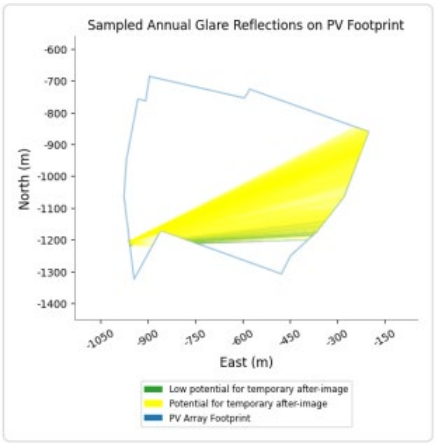
The below results show the area of the modelled PV arrays that is predicted glare compared to the 50° field of view of road users travelling northbound at the corresponding observation points.

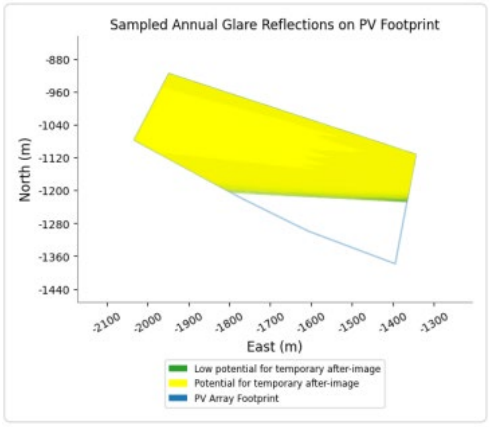
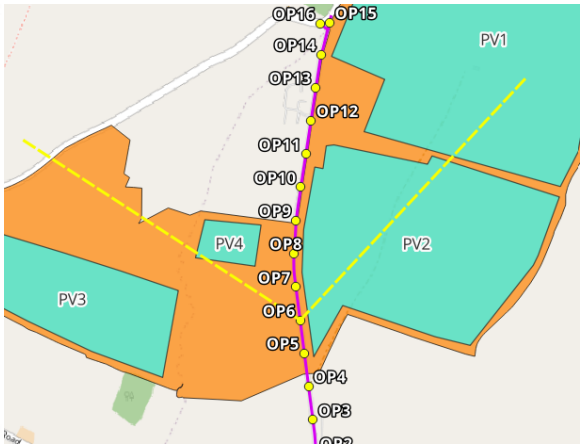
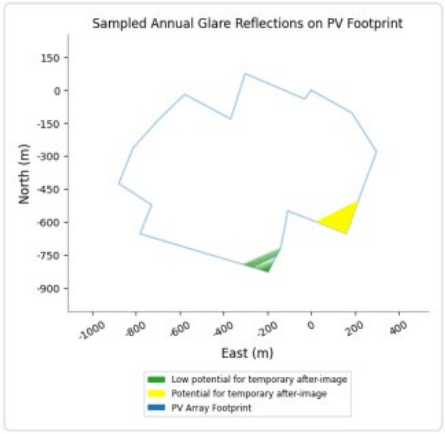
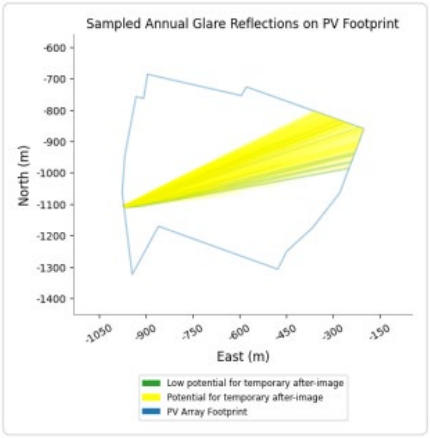
Table 3.1: Newland Road – Fixed Panel Results

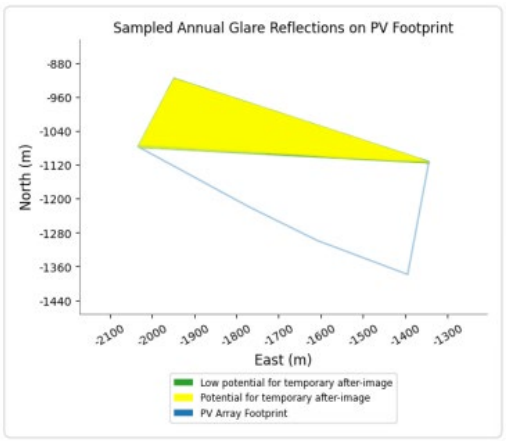
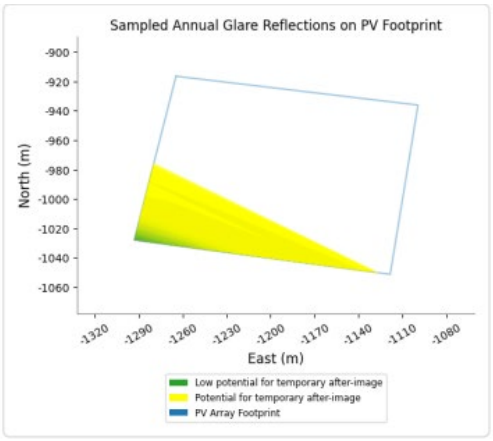
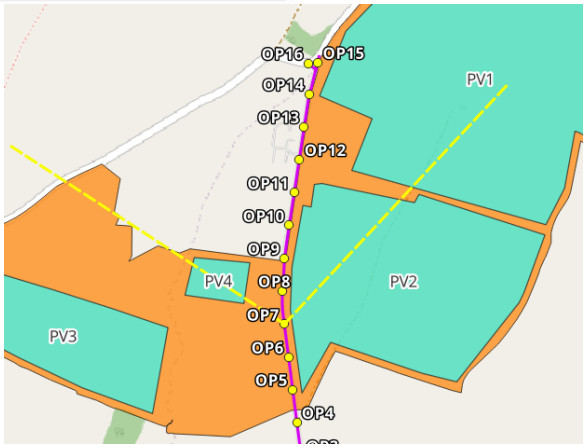
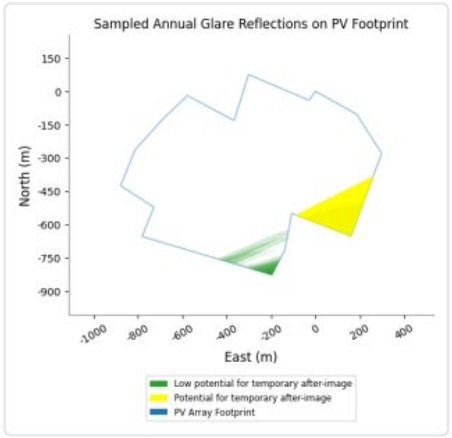
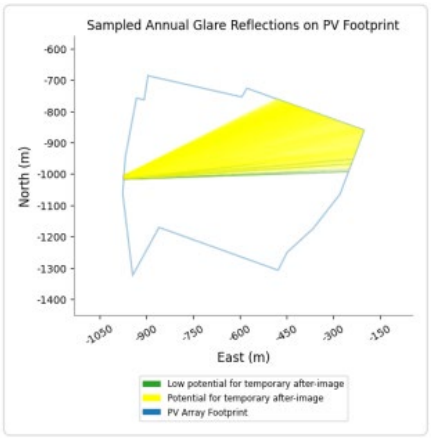
Receptor	Results
OP1	***No glare predicted towards OP1.***
OP2	Glare is predicted from PV3 Green Hill A.

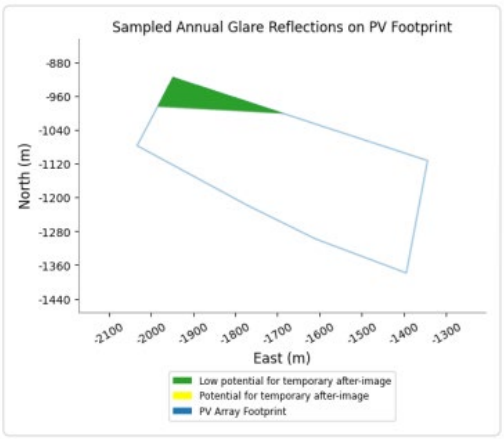
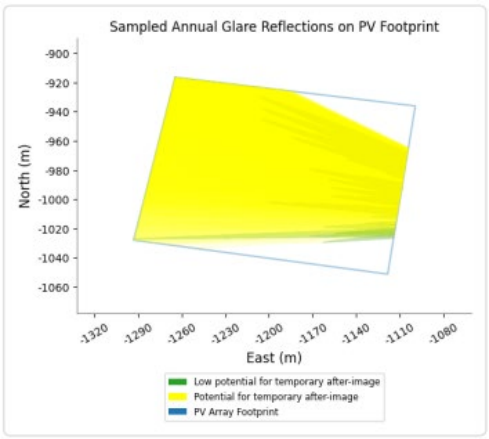
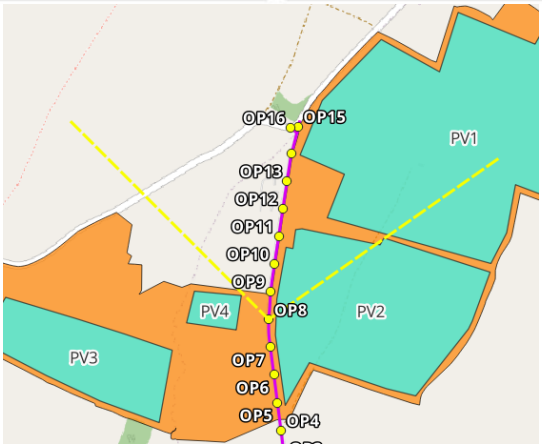
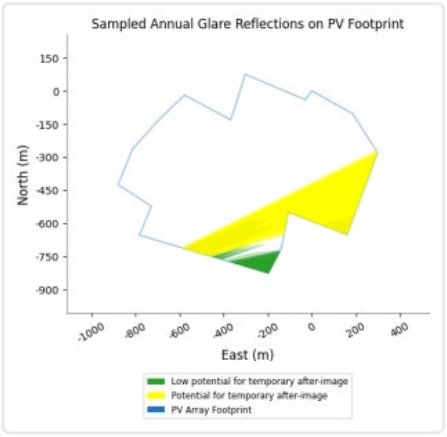
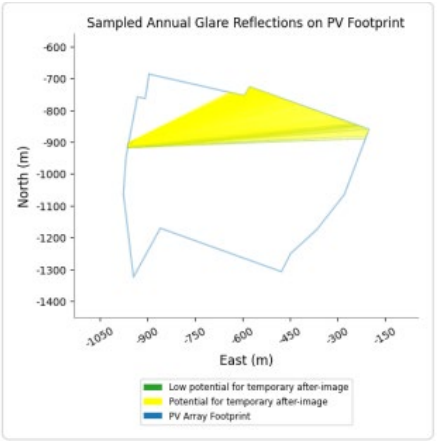
Receptor	Results
	The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'. As such, a 'low impact' may be classified, and no further mitigation is recommended.
OP3	Glare is predicted from PV2 and PV3 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   

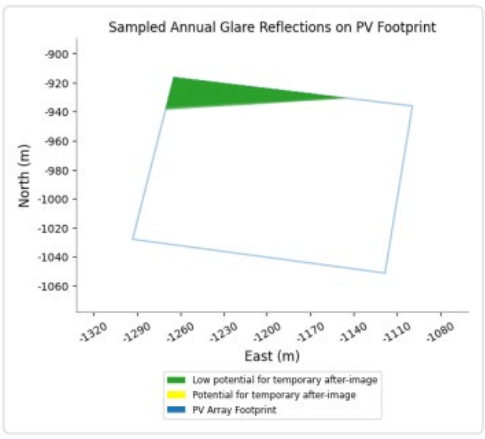
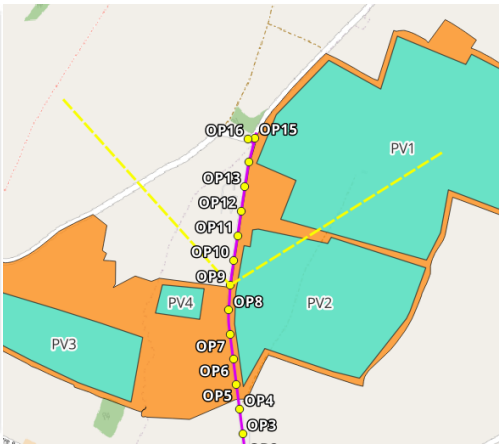
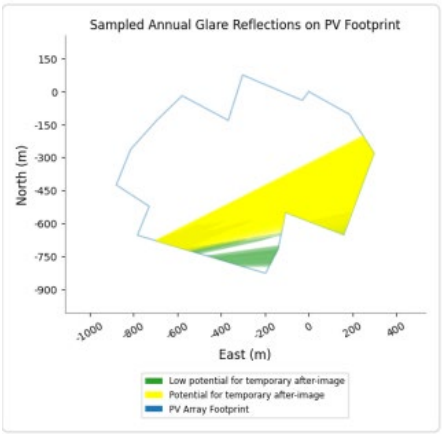
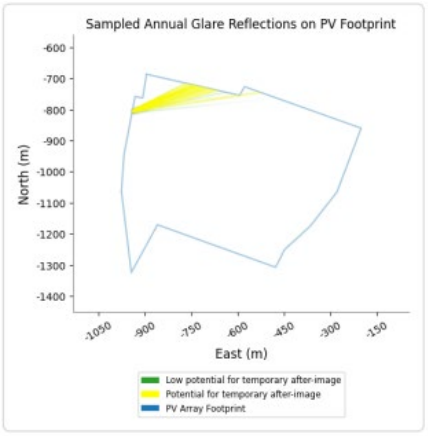
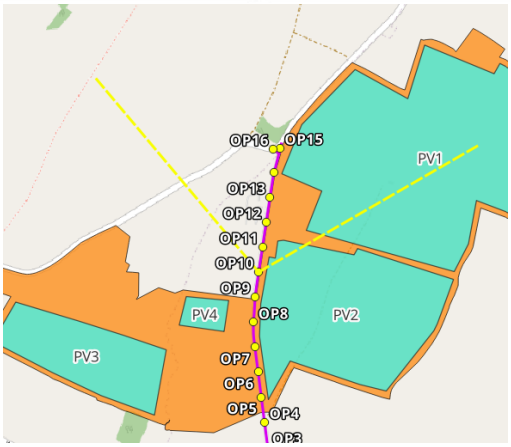
Receptor	Results
	Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'. As such, a 'low impact' may be classified, and no further mitigation is recommended.
OP4	Glare is predicted from PV2 and PV3 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'. As such, a 'low impact' may be classified, and no further mitigation is recommended.
OP5	Glare is predicted from PV2 and PV3 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

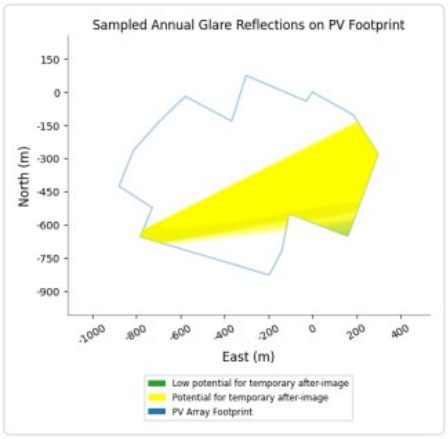
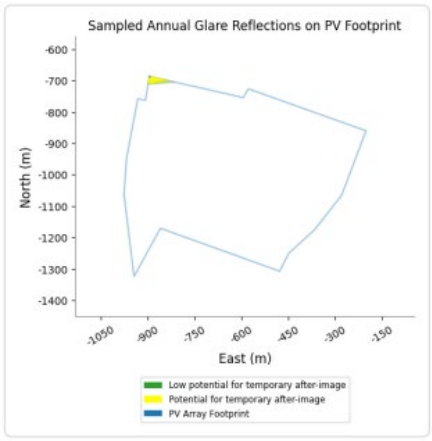
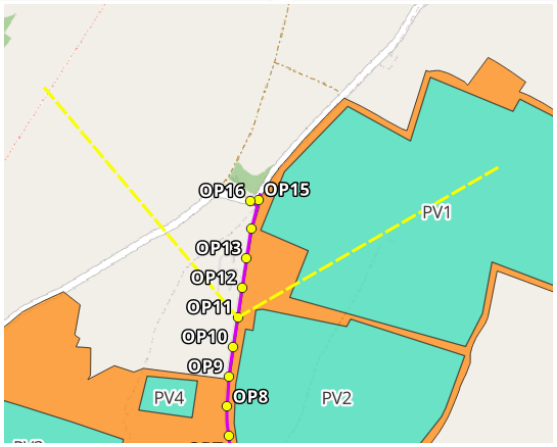
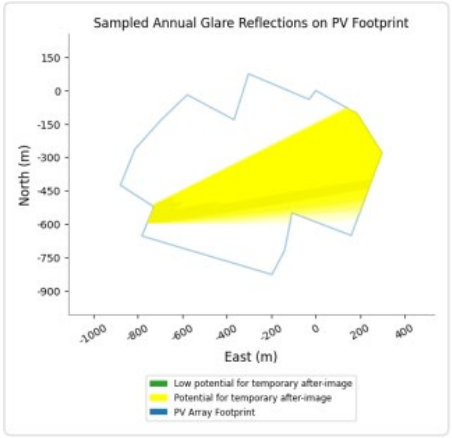
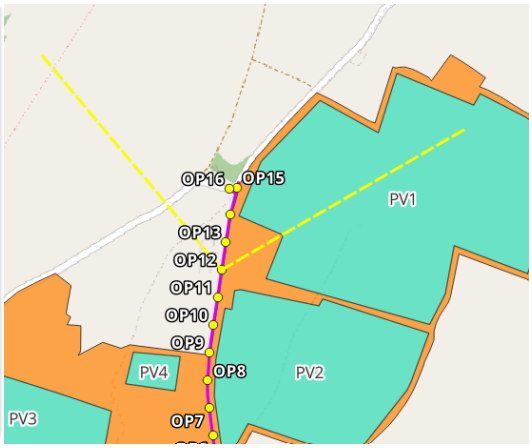
Receptor	Results
	   Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'. As such, a 'low impact' may be classified, and no further mitigation is recommended.
OP6	Glare is predicted from PV1-PV3 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

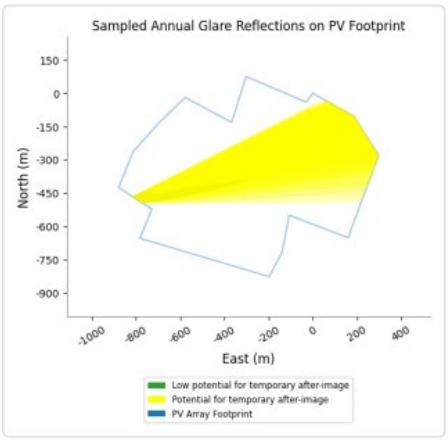
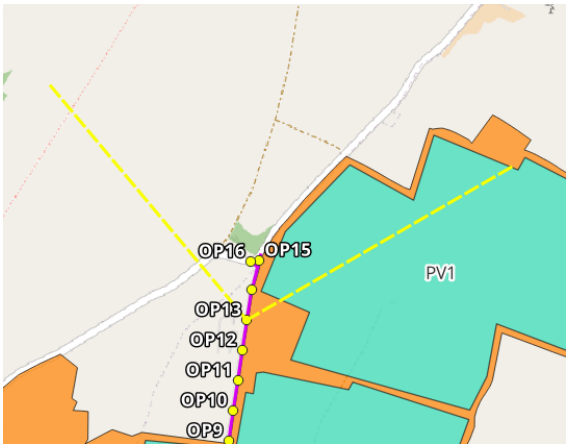
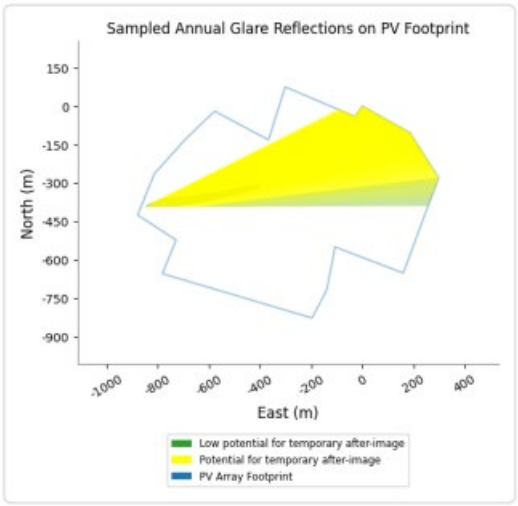
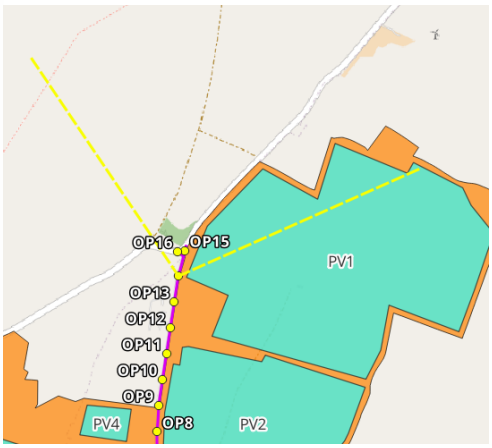
Receptor	Results
	  Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'. As such, a 'low impact' may be classified, and no further mitigation is recommended.
OP7	Glare is predicted from PV1-PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

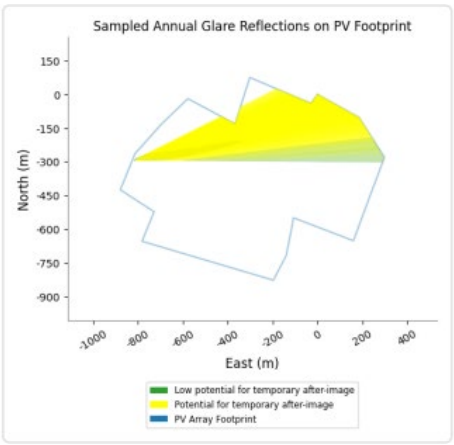
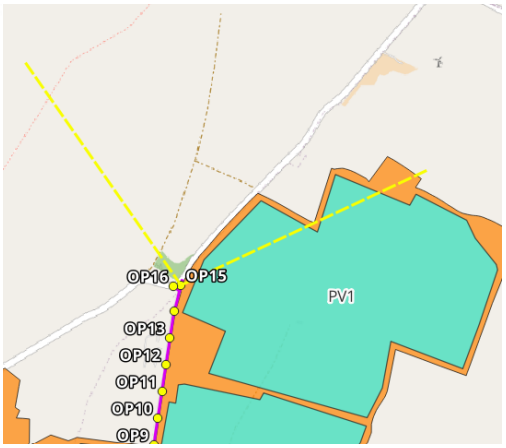
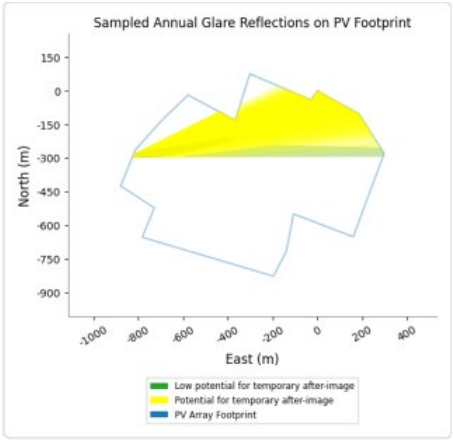
Receptor	Results
	   Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP8	Glare is predicted from PV1-PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

Receptor	Results
	   Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP9	Glare is predicted from PV1, PV2, and PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

Receptor	Results
	  Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP10	Glare is predicted from PV1 and PV2 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.    Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP11	Glare is predicted from PV1 and PV2 Green Hill A.

Receptor	Results
	The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.    Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP12	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

Receptor	Results
	Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP13	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP14	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP15	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

Receptor	Results
	  Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP16	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'

Detailed ForgeSolar output results are available on request.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]** a 'no impact' significance may be classified where glare will not be visible from the assessed receptor. As such, no impacts are predicted to occur at OP1.

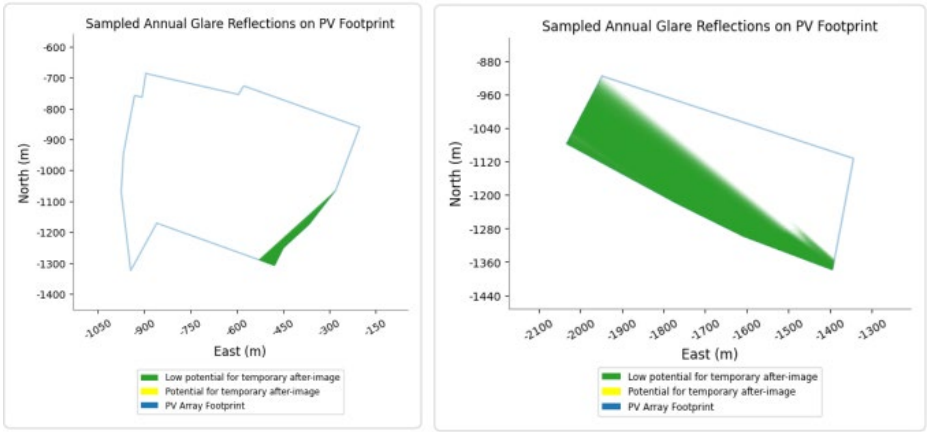
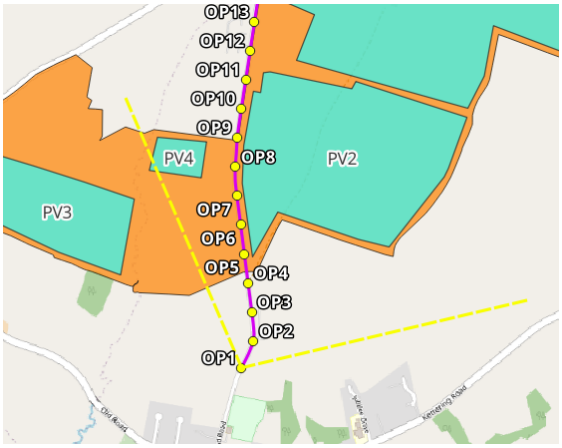
With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]** , a 'low impact' may be classified where glare is predicted outside the 50° FOV of road users. As such, low impacts are predicted to occur at OP2-OP16.

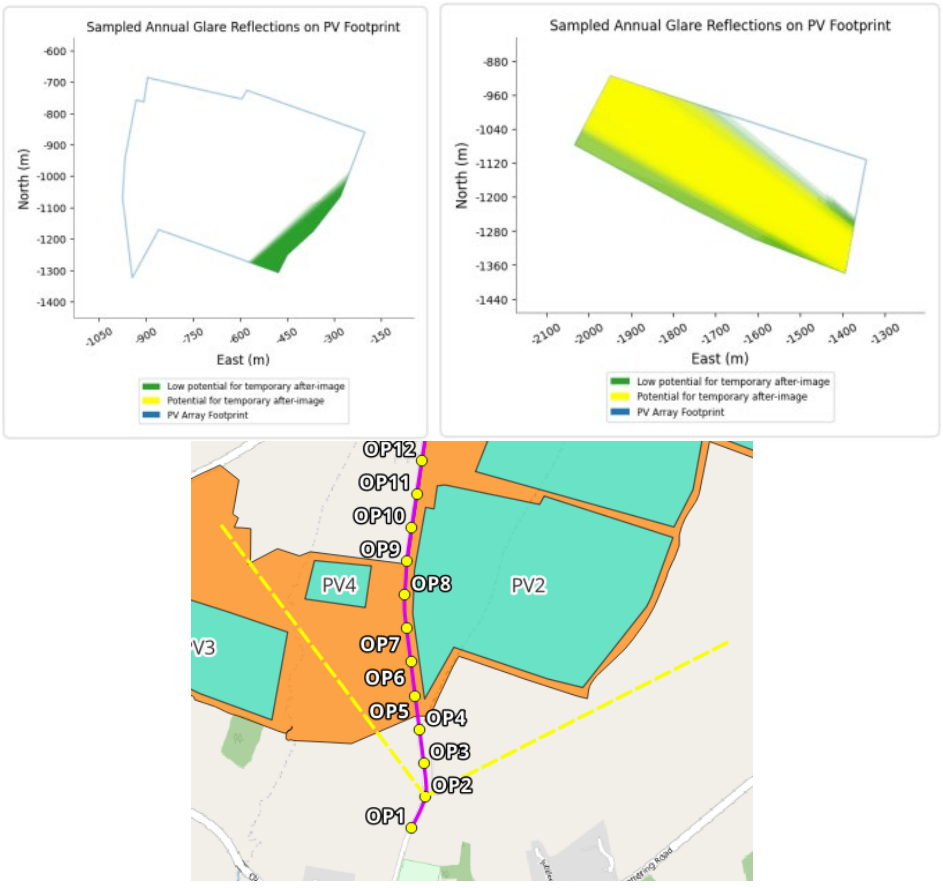
3.1.2 Newland Road – Tracking Panel Results

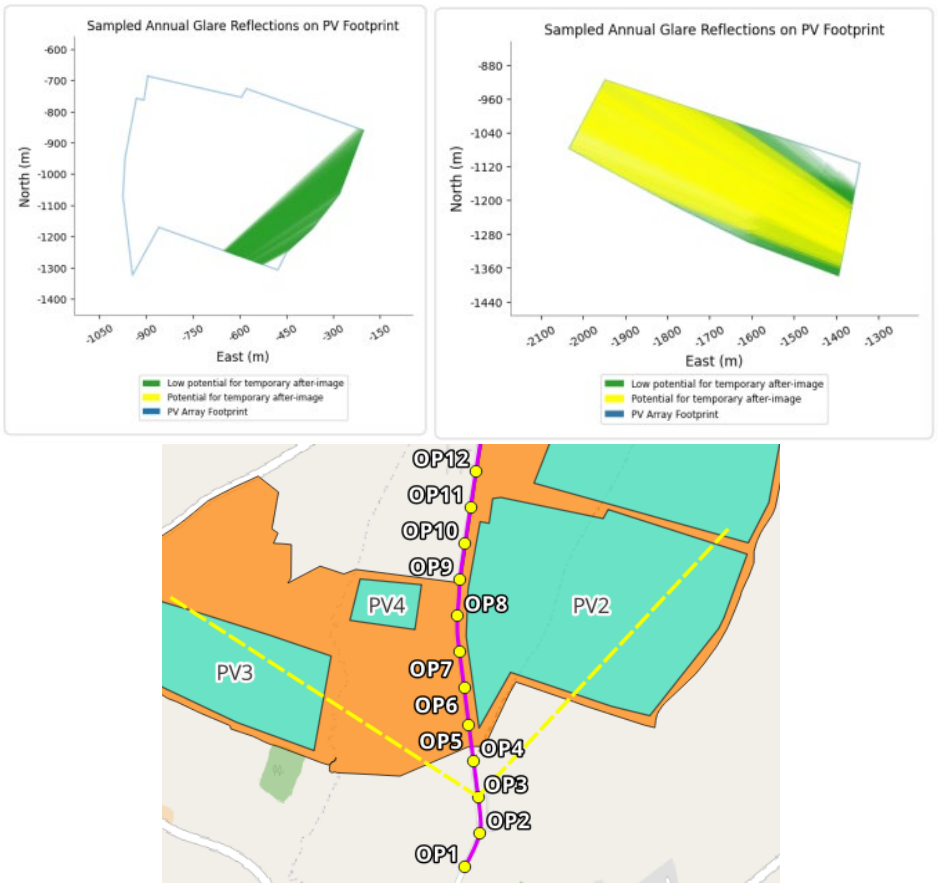
It is noted that Newland Road is outside the 1km screening distance of Green Hill A.2. Based on industry guidance, the highest magnitude of impact possible from Green Hill A.2 will be a 'low impact'. As such, no further mitigation is required.

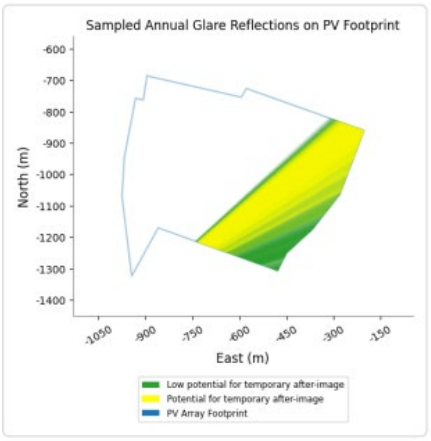
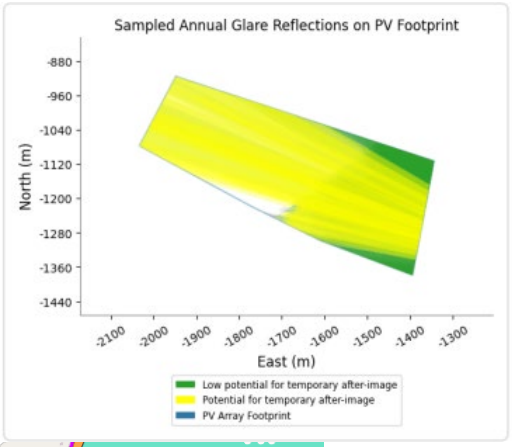
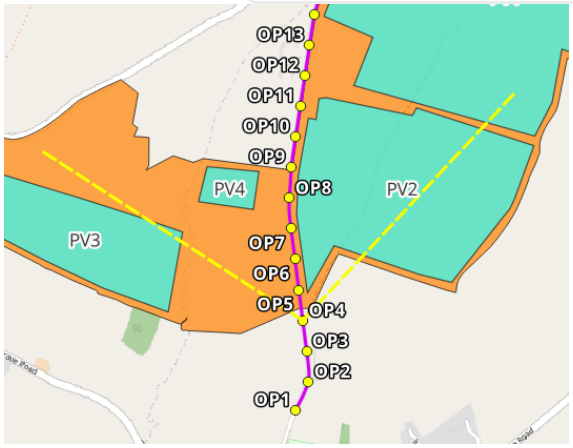
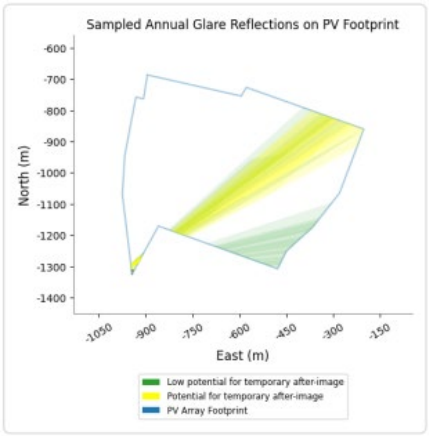
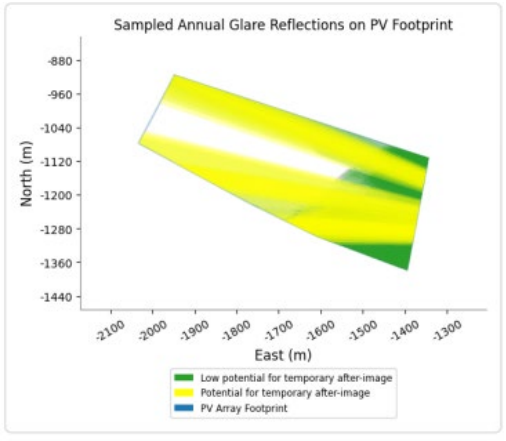
The below results show the area of the modelled PV arrays that is predicted glare compared to the 50° field of view of road users travelling northbound at the corresponding observation points.

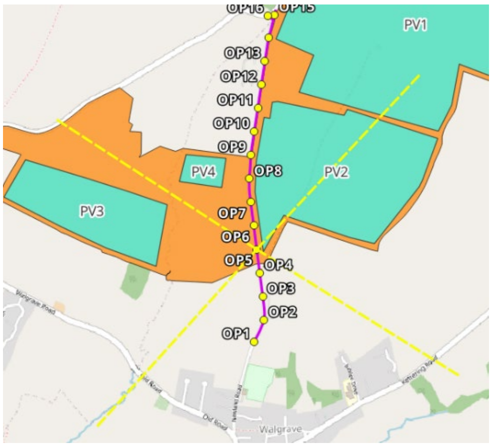
Table 3.2: Newland Road – Tracking Panel Results

Receptor	Results
OP1	Glare is predicted from PV2 and PV3 Green Hill A. Due to the orientation of the panels, it is geometrically not possible for road users to receive glare within the central field of view whilst travelling southbound along Newland Road. As such, a 'low impact' is predicted towards road users travelling southbound and no further mitigation is required. It is noted that PV3 Green Hill A is outside the 1km screening distance. Based on industry guidance, the highest magnitude of impact possible from PV3 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

Receptor	Results
	Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'. As such, a 'low impact' may be classified, and no further mitigation is recommended.
OP2	Glare is predicted from PV2 and PV3 Green Hill A. Due to the orientation of the panels, it is geometrically not possible for road users to receive glare within the central field of view whilst travelling southbound along Newland Road. As such, a 'low impact' is predicted towards road users travelling southbound and no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
OP3	Glare is predicted from PV2 and PV3 Green Hill A. Due to the orientation of the panels, it is geometrically not possible for road users to receive glare within the central field of view whilst travelling southbound along Newland Road. As such, a 'low impact' is predicted towards road users travelling southbound and no further mitigation is required.

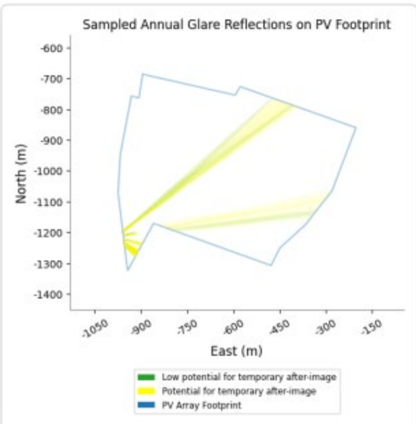
Receptor	Results
	The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
OP4	Glare is predicted from PV2 and PV3 Green Hill A. Due to the orientation of the panels, it is geometrically not possible for road users to receive glare within the central field of view whilst travelling southbound along Newland Road. As such, a 'low impact' is predicted towards road users travelling southbound and no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

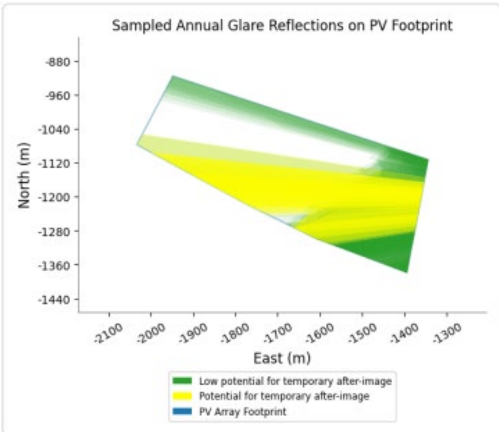
Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
OP5	Glare is predicted from PV2 and PV3 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

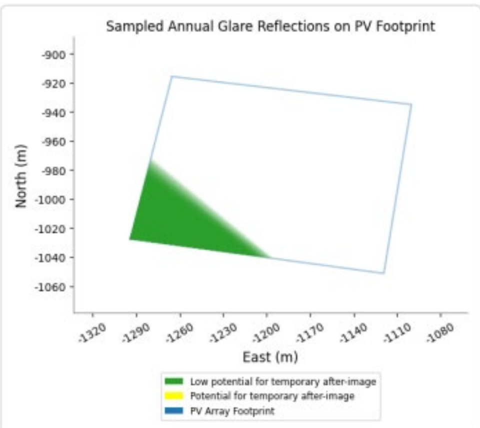
<table>
<tr><th>Receptor</th><th>Results</th></tr>
<tr><td></td><td>


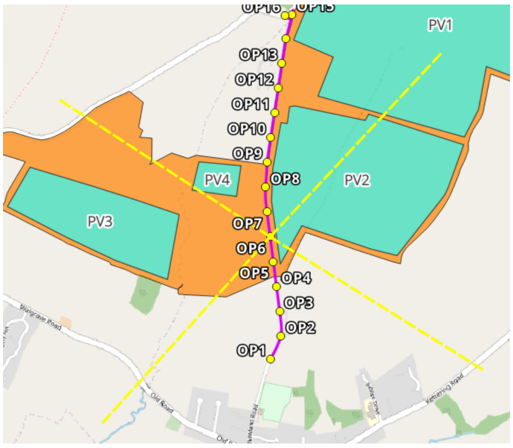
Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of ‘low impact’. As such, a ‘low impact’ may be classified, and no further mitigation is recommended.
</td></tr>
<tr><td>OP6</td><td>
Glare is predicted from PV2-PV4 Green Hill A.

The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

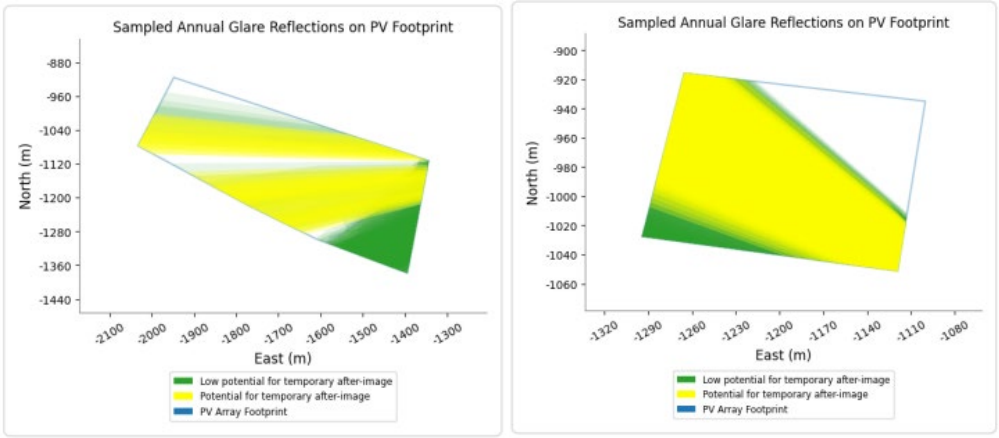
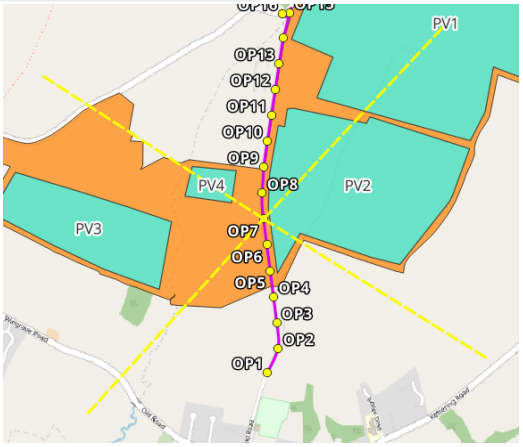


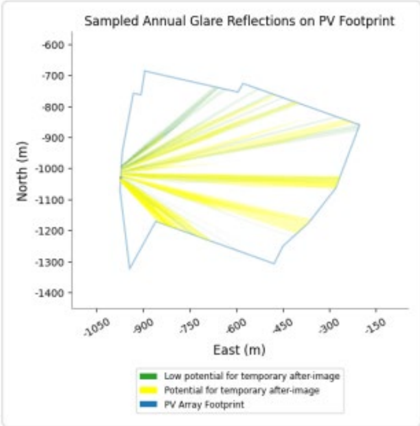


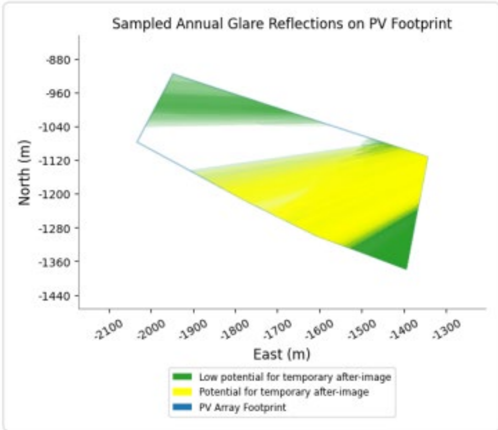


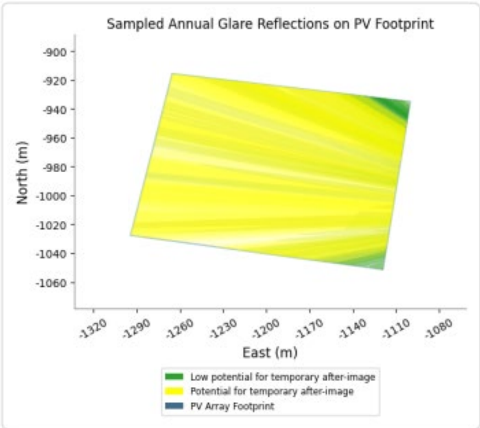


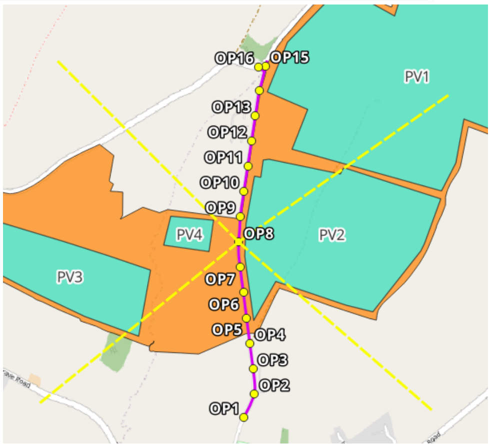
</td></tr>
</table>

Receptor	Results
	As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
OP7	Glare is predicted from PV3 and PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
OP8	Glare is predicted from PV2-PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

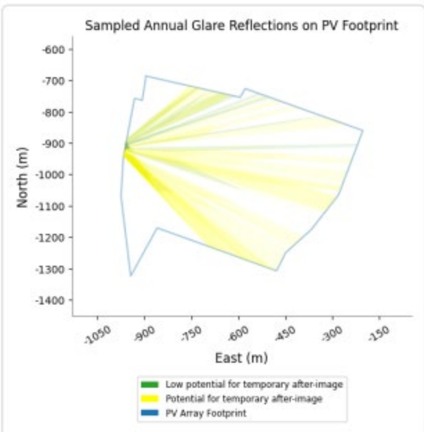
<table>
<tr><th>Receptor</th><th>Results</th></tr>
<tr><td></td><td>


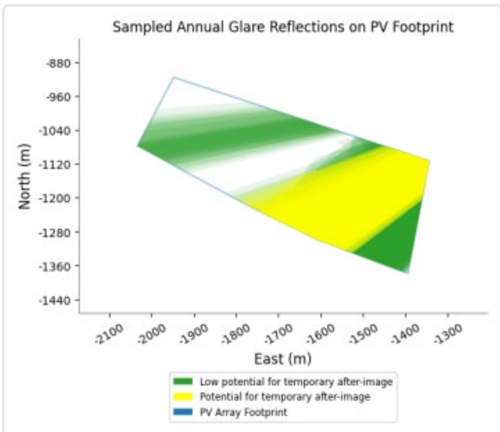




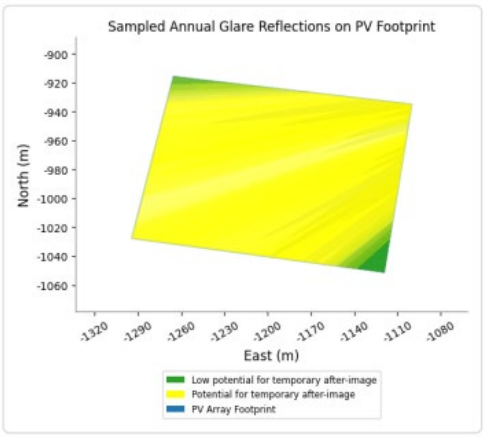
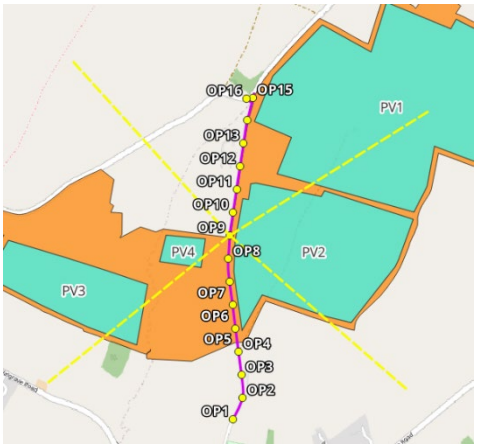
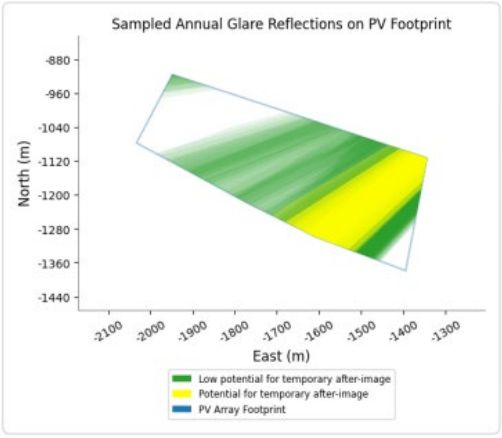
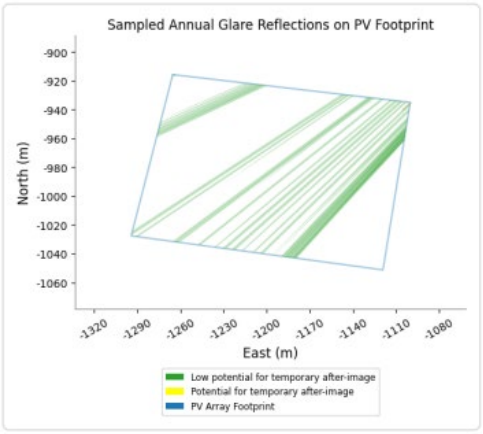
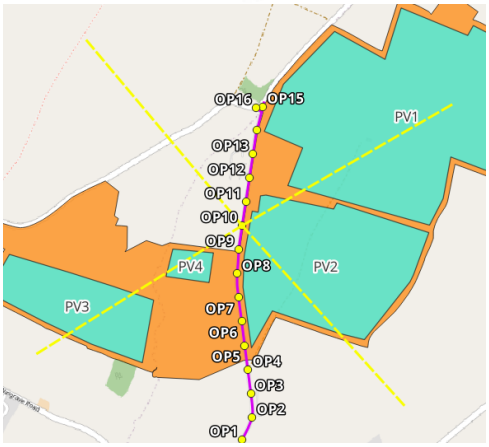


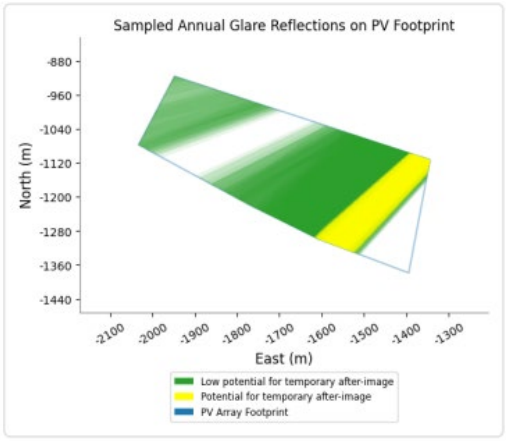
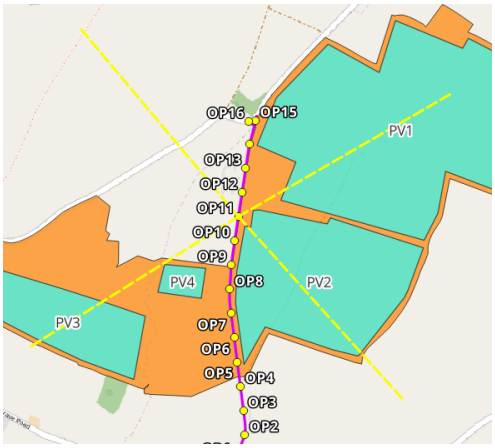
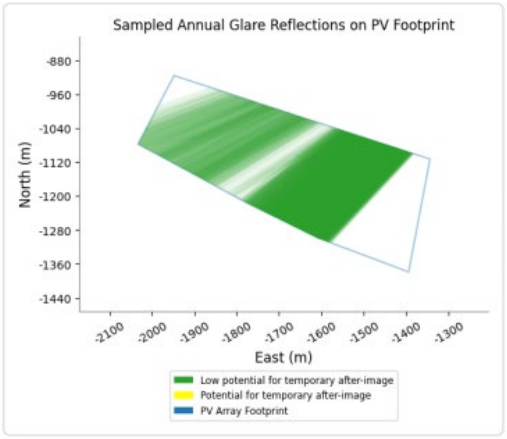
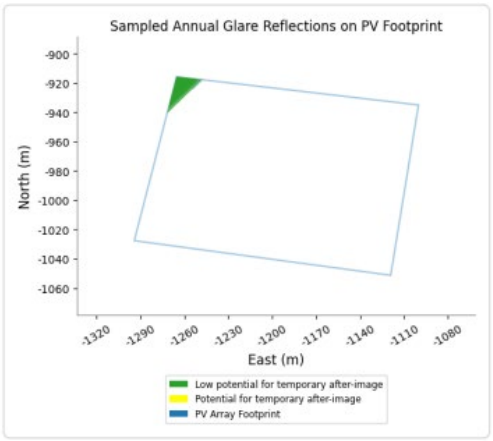
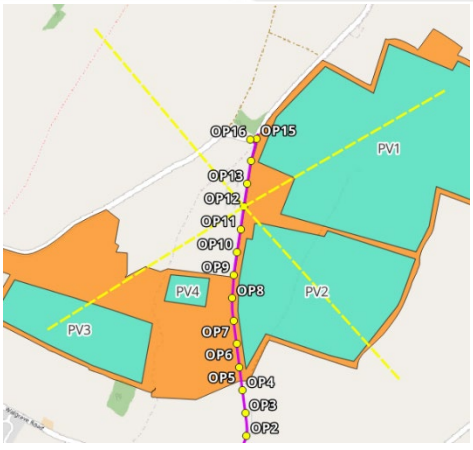
As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
</td></tr>
<tr><td>OP9</td><td>
Glare is predicted from PV2-PV4 Green Hill A.

The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.




</td></tr>
</table>

Receptor	Results
	  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
OP10	Glare is predicted from PV3 and PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.    As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
OP11	Glare is predicted from PV3 Green Hill A.

Receptor	Results
	The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
OP12	Glare is predicted from PV3 and PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   

Receptor	Results
	As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.1.3.
OP13-OP16	***No glare is predicted towards OP13-OP16.***

Detailed ForgeSolar output results are available on request.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'no impact' significance may be classified where glare will not be visible from the assessed receptor. As such, no impacts are predicted to occur at OP13-OP16.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]** , a 'low impact' may be classified where glare is predicted outside the 50° FOV of road users. As such, low impacts are predicted to occur at OP1 and OP5.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]** , a 'moderate impact' may be classified where unmitigated glare is predicted inside the 50° FOV of road users. As such, moderate impacts are predicted to occur at OP2-OP4 and OP6-OP12. Based on industry guidance, professional judgement will be applied and a further review of factors not included within the model is set out in Section 3.1.3.

3.1.3 Results Discussion

Additional factors have been considered to determine the residual impact significance at receptors OP2-OP4 and OP6-OP12. These include:

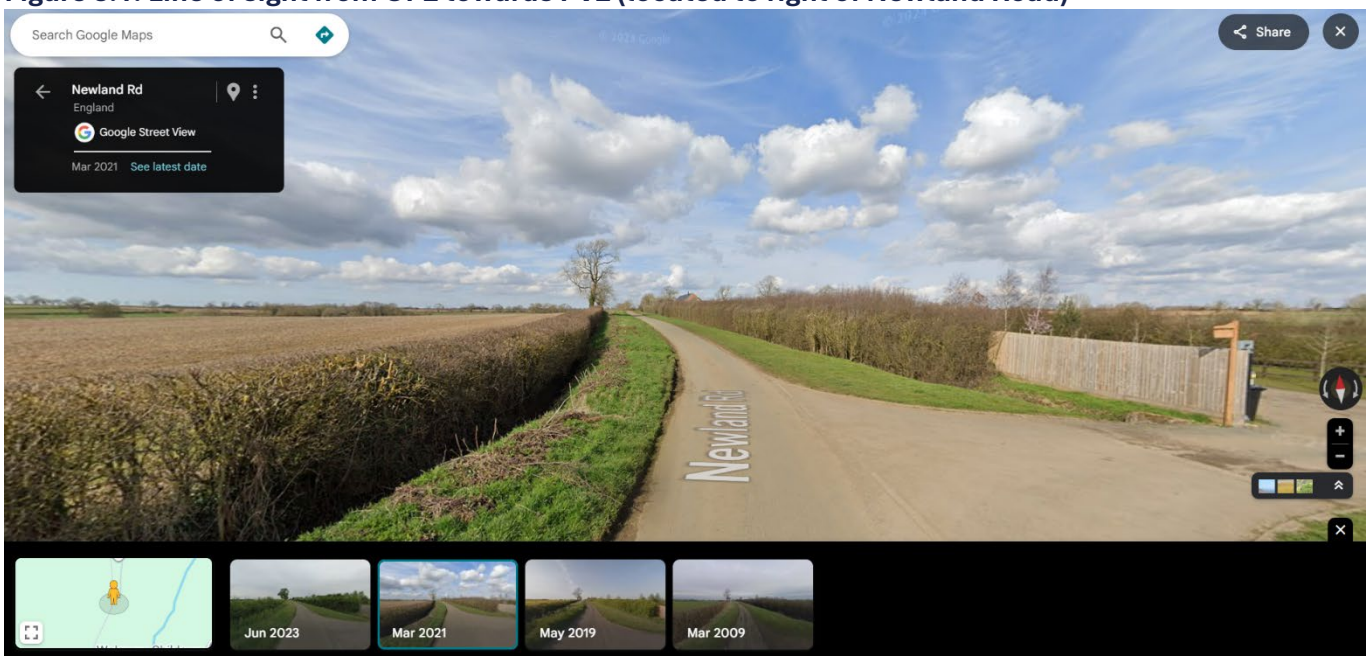
- Existing screening/obstructions; and
- The extent to which cloud cover and glare impacts coincide.

3.1.3.1 Existing Screening and Obstructions

<u>OP2</u>

Unmitigated glare is predicted inside the 50° FOV of road users from PV2. Dense vegetation aligning Newland Road is expected to obstruct line of sight between road users and the reflecting area of PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.1: Line of sight from OP2 towards PV2 (located to right of Newland Road)



© Google Street View

OP3

Unmitigated glare is predicted inside the 50° FOV of road users from PV3. Dense vegetation aligning Newland Road is expected to obstruct line of sight between road users and the reflecting area of PV3. As such, a maximum impact magnitude of 'low impact' may be classified.

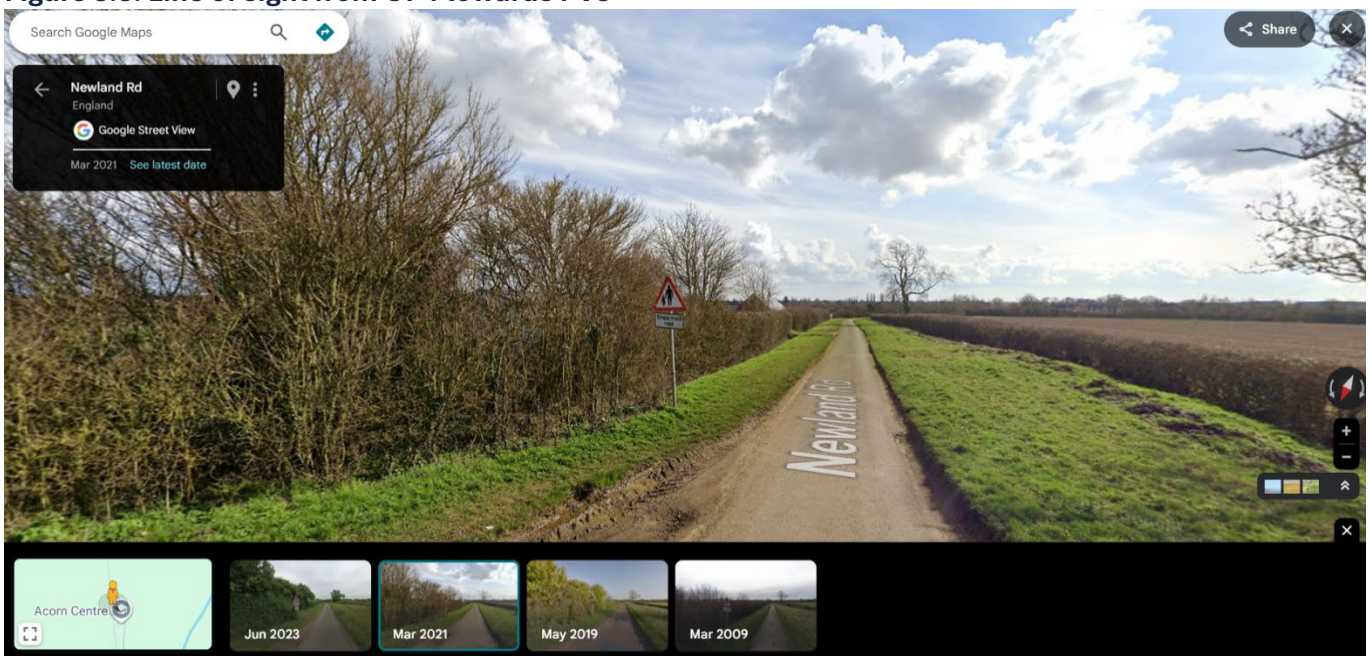
Figure 3.2: Line of sight from OP3 towards PV3

© Google Street View

OP4

Unmitigated glare is predicted inside the 50° FOV of road users from PV3. Dense vegetation aligning Newland Road is expected to obstruct line of sight between road users and the reflecting area of PV3. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.3: Line of sight from OP4 towards PV3

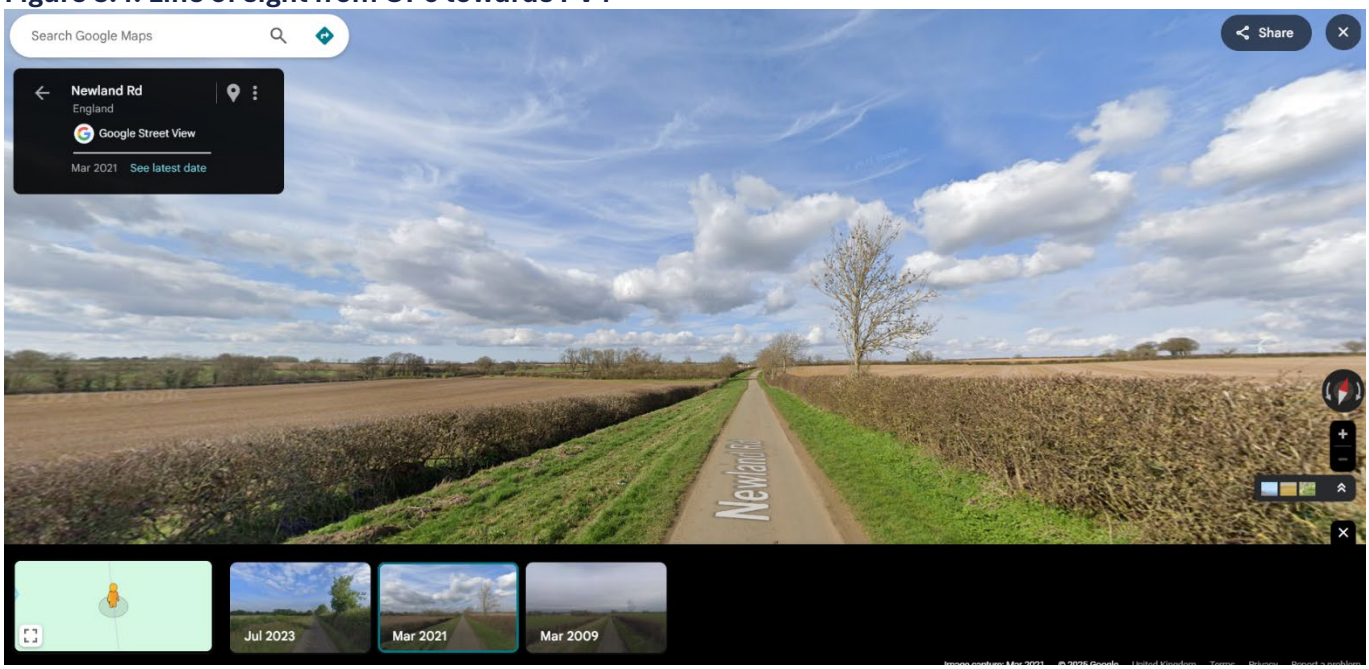


© Google Street View

OP6

Unmitigated glare is predicted inside the 50° FOV of road users from PV4. Dense vegetation aligning Newland Road is expected to partially obstruct line of sight between road users and the reflecting area of PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.4: Line of sight from OP6 towards PV4



© Google Street View

OP7

Unmitigated glare is predicted inside the 50° FOV of road users from PV4. Dense vegetation aligning Newland Road is expected to partially obstruct line of sight between road users and the reflecting area of PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

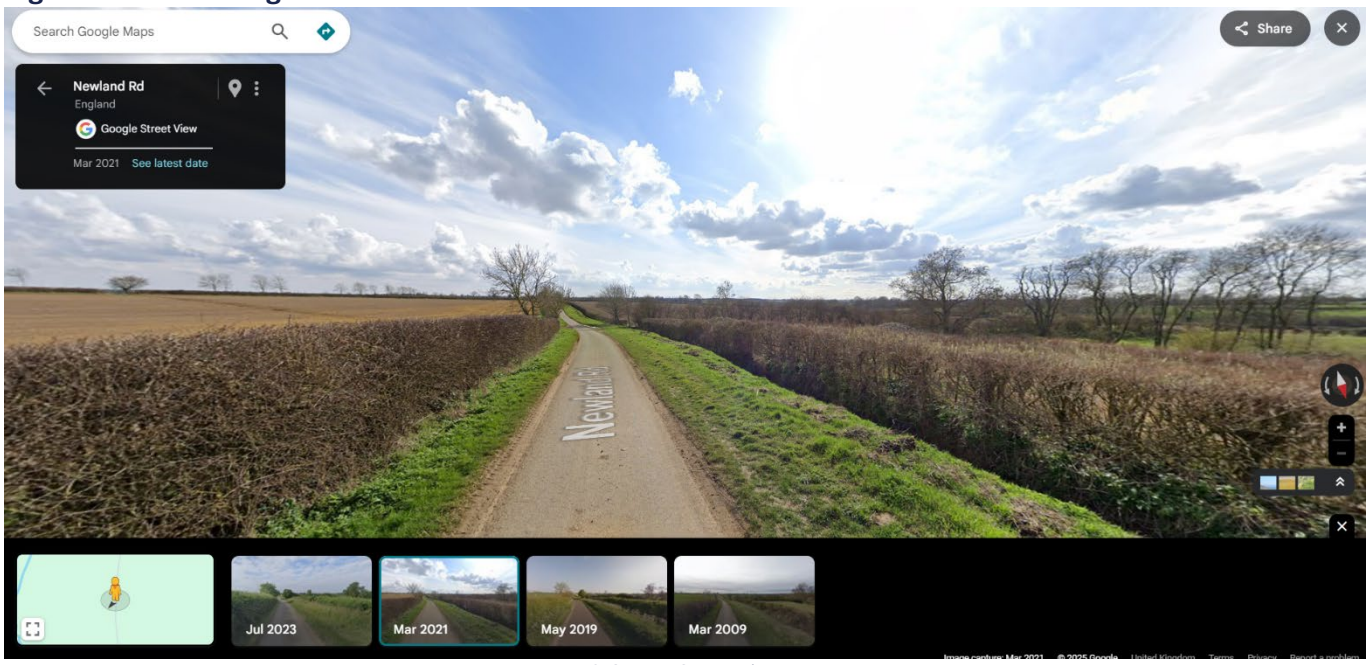
Figure 3.5: Line of sight from OP7 towards PV4 (obstructing vegetation circled)

© Google Street View

OP8

Unmitigated glare is predicted inside the 50° FOV of road users from PV3. Topography aligning Newland Road is expected to obstruct line of sight between road users and the reflecting area of PV3. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.6: Line of sight from OP8 towards PV3

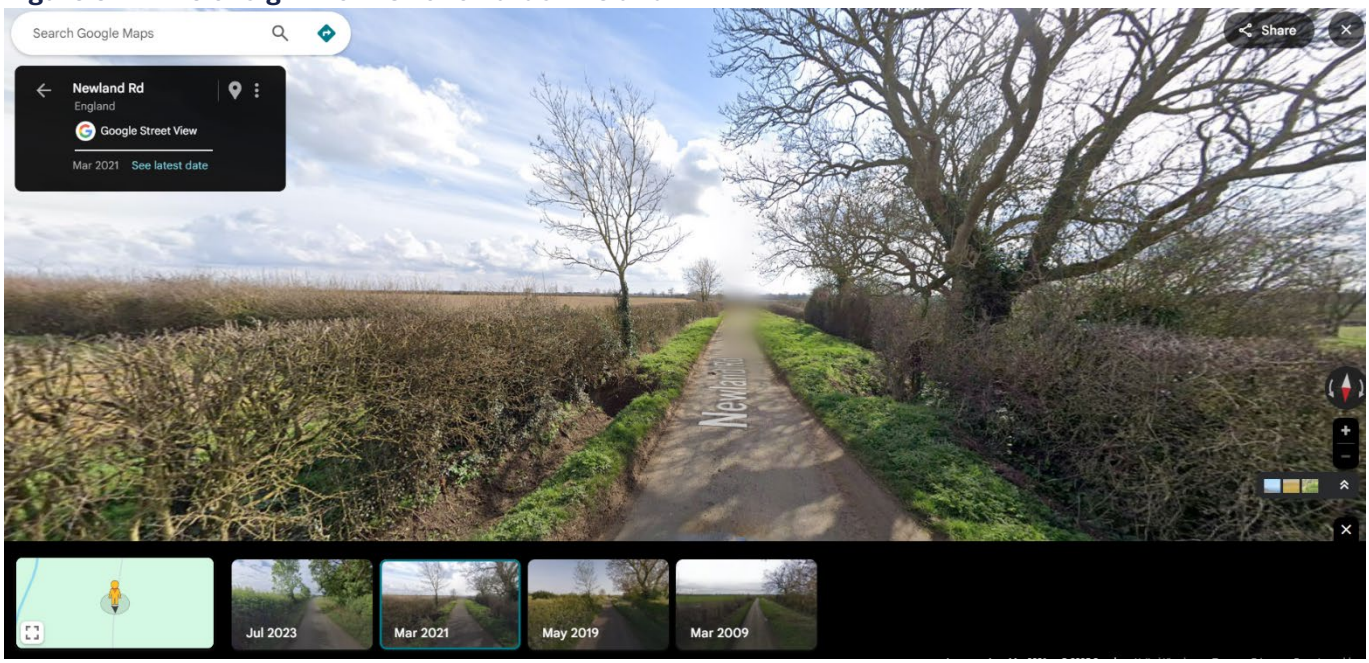


© Google Street View

OP9

Unmitigated glare is predicted inside the 50° FOV of road users from PV2-PV4. It is considered that line of sight between the road users and the reflecting portion of PV2 within the 50° FOV is likely to be obstructed by other panels within PV2. Furthermore. dense vegetation aligning Newland Road is expected to obstruct line of sight between road users and the reflecting area of PV3-PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.7: Line of sight from OP9 towards PV3 and PV4

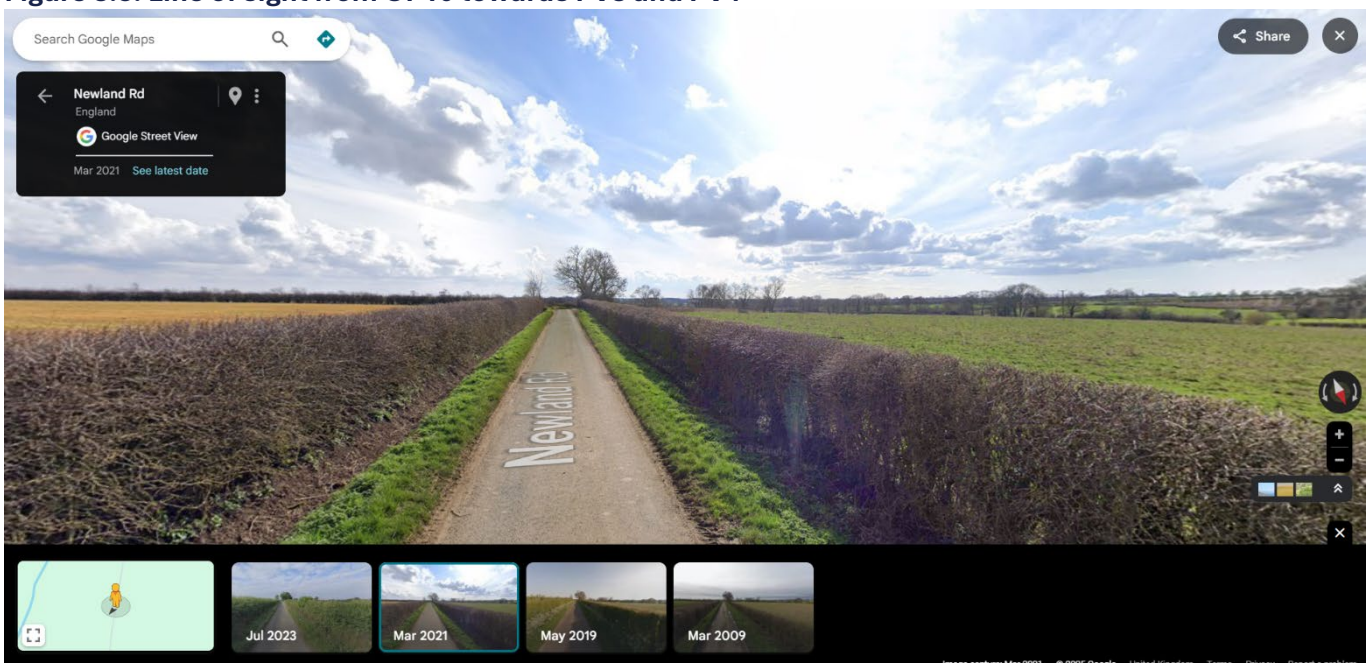


© Google Street View

OP10

Unmitigated glare is predicted inside the 50° FOV of road users from PV3 and PV4. Topography aligning Newland Road is expected to obstruct line of sight between road users and the reflecting area of PV3 and PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.8: Line of sight from OP10 towards PV3 and PV4

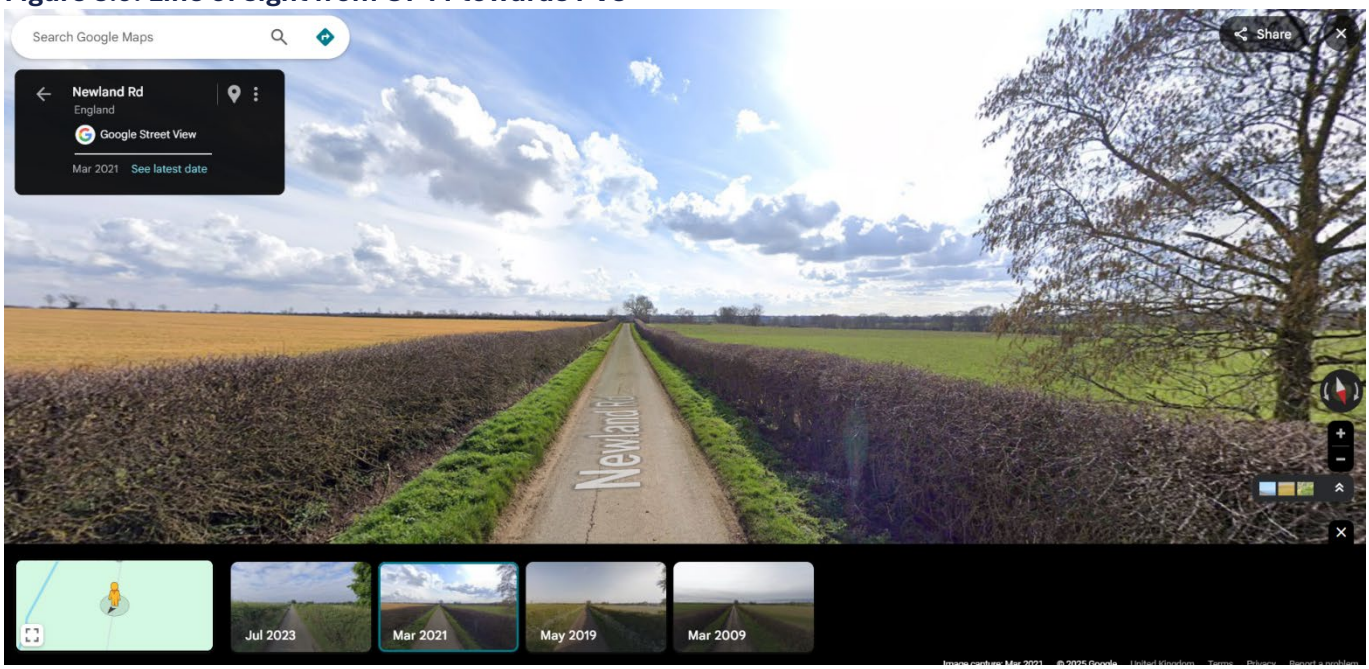


© Google Street View

OP11

Unmitigated glare is predicted inside the 50° FOV of road users from PV3. Topography aligning Newland Road is expected to obstruct line of sight between road users and the reflecting area of PV3. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.9: Line of sight from OP11 towards PV3



© Google Street View

OP12

Unmitigated glare is predicted inside the 50° FOV of road users from PV3 and PV4. Topography aligning Newland Road is expected to obstruct line of sight between road users and the reflecting area of PV3 and PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

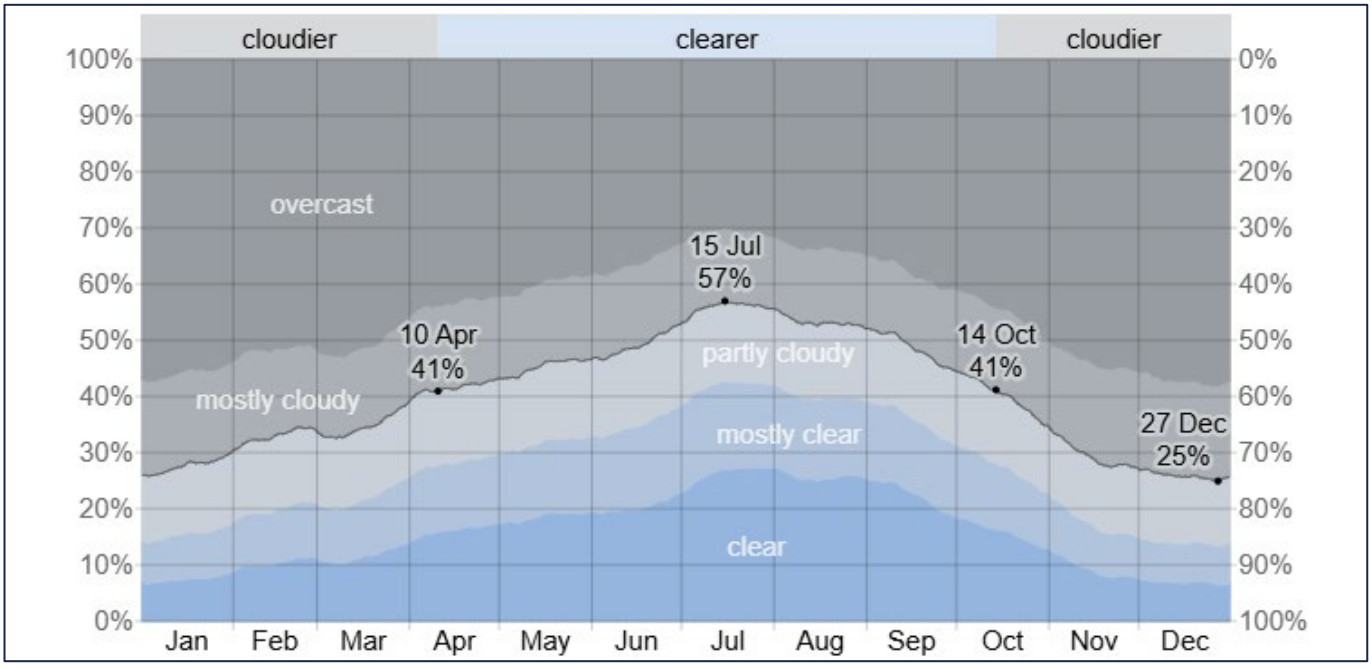
Figure 3.10: Line of sight from OP12 towards PV3 and PV4

© Google Street View

3.1.3.2 Cloud Cover

As the worst-case approach, the model assumes clear sky conditions all year round. Cloudier conditions (overcast and mostly cloudy) exist in Broughton (nearest weather data available) for 43-75% of the time, as shown in Figure 3.11. This would reduce the glare experienced along the approach path.

Figure 3.11: Predicted Annual Cloud Cover in Broughton



© Weatherspark.com

Considering the cloud cover that is likely to occur in the area, the modelled glare from the Proposed Development is likely to occur at least 43% less often than predicted, as a minimum. This would likely reduce the amount of glare experienced along Newland Road.

3.1.4 Significance of Impact

As discussed in Section 2.1, based on industry guidance and good practice, technical modelling is not recommended for local roads and a maximum magnitude impact of 'low impact' may be classified from glint and glare. Notwithstanding this, the assessment in this note confirms that, with the presence of planting and cloud cover taken into consideration, no local road will experience more than a 'low impact' from glint and glare.

Figure 3.12: Significance of Impact - Newland Road

Receptor	Significance of Impact	
	Fixed Panels	Tracking Panels
OP1	**No Impact**	**Low Impact**
OP2	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP3	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP4	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP5	**Low Impact**	**Low Impact**
OP6	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP7	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP8	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP9	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP10	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP11	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP12	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP13	**Low Impact**	**No Impact**
OP14	**Low Impact**	**No Impact**
OP15	**Low Impact**	**No Impact**
OP16	**Low Impact**	**No Impact**

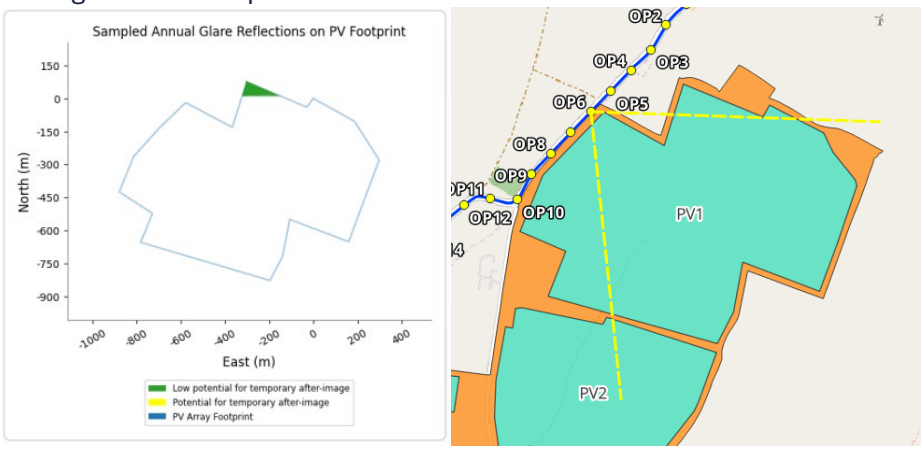
3.2 Road Infrastructure – Broughton Road

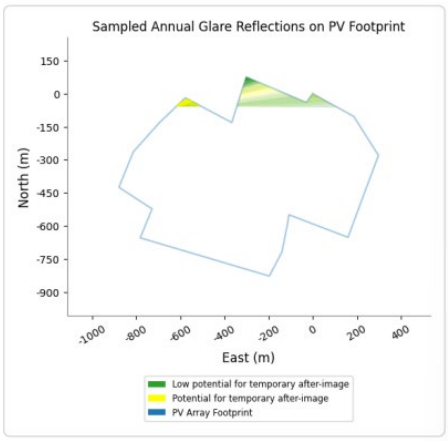
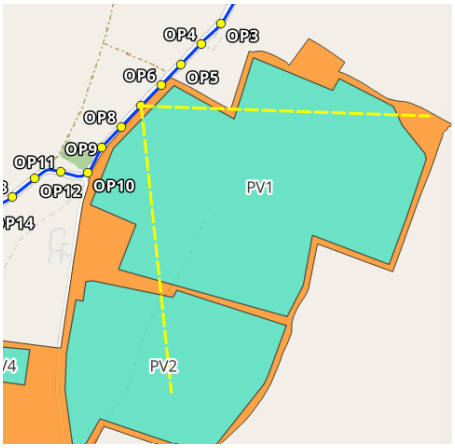
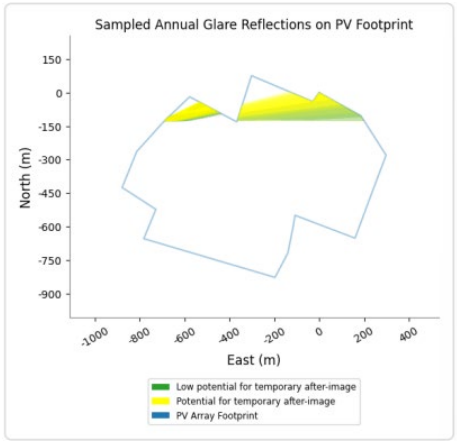
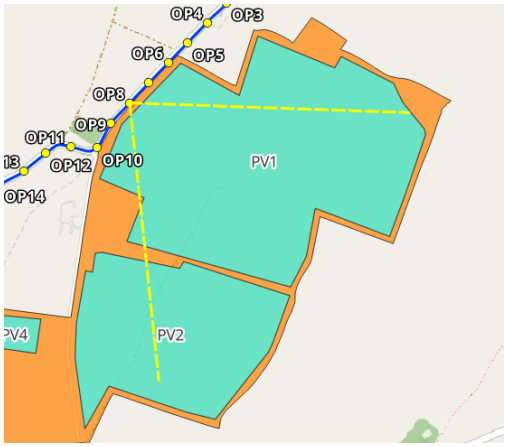
3.2.1 Broughton Road – Fixed Panel Results

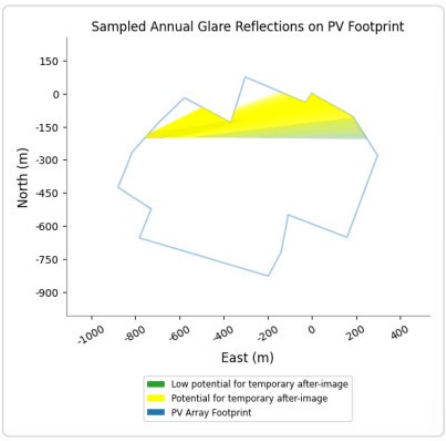
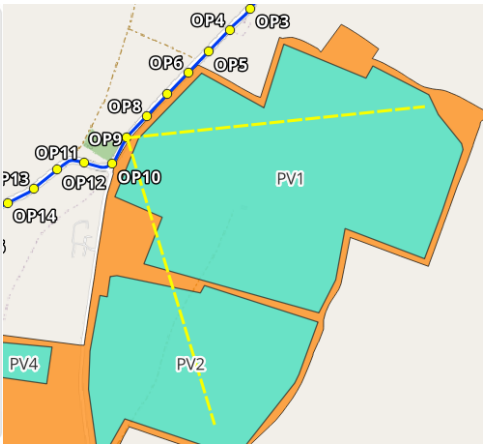
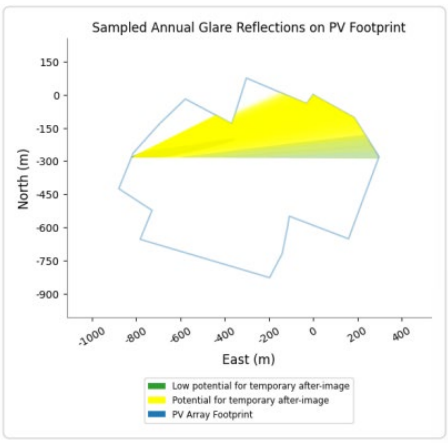
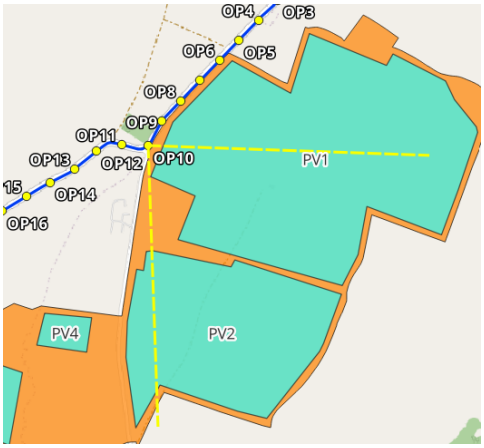
It is noted that Broughton Road is outside the 1km screening distance of Green Hill A.2. Based on industry guidance, the highest magnitude of impact possible from Green Hill A.2 will be a 'low impact'. As such, no further mitigation is required.

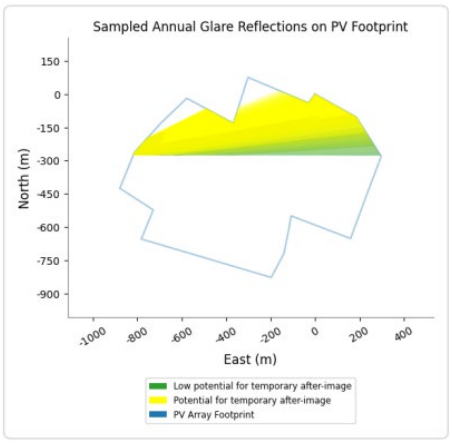
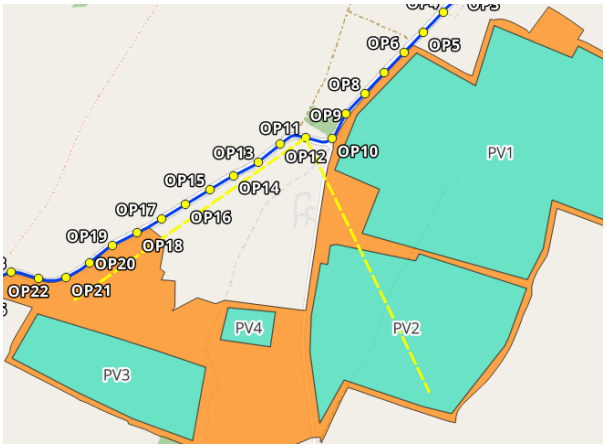
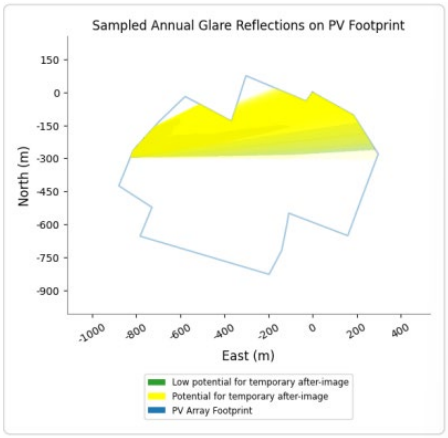
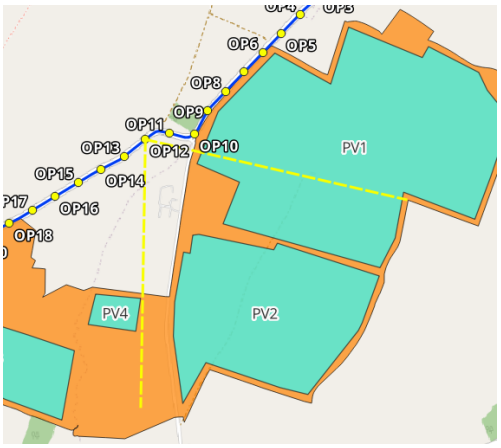
The below results show the area of the modelled PV arrays that is predicted glare compared to the 50° field of view of road users travelling northbound at the corresponding observation points.

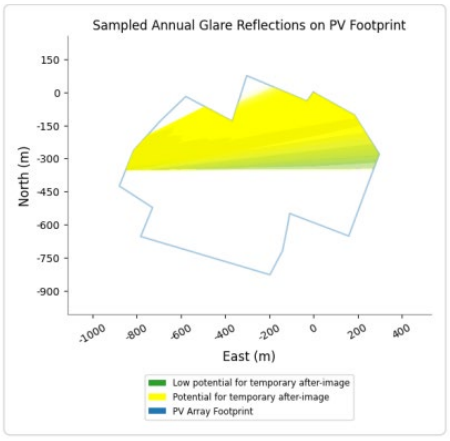
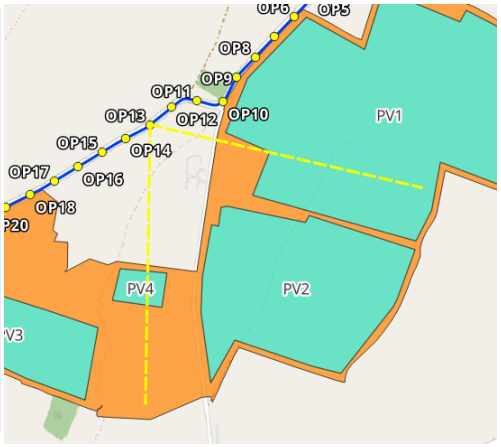
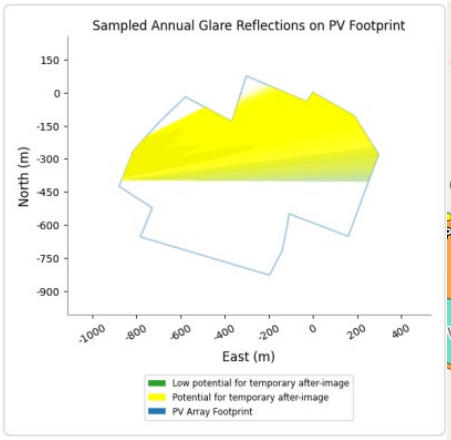
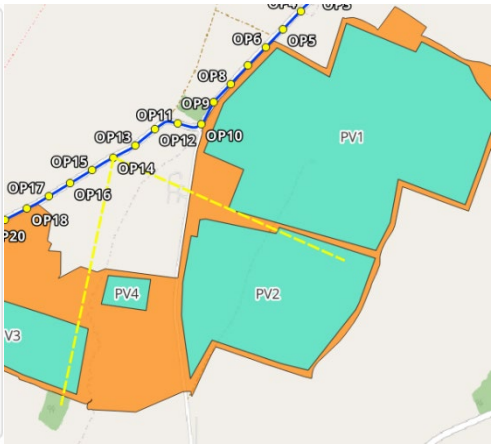
Table 3.3: Broughton Road – Fixed Panel Results

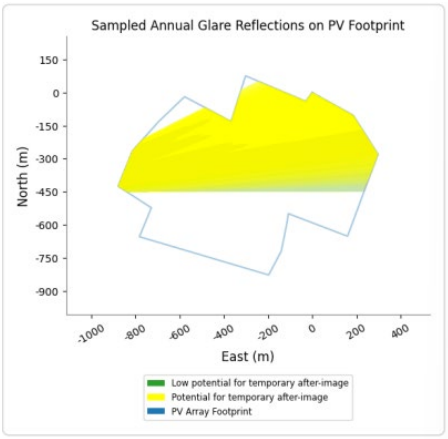
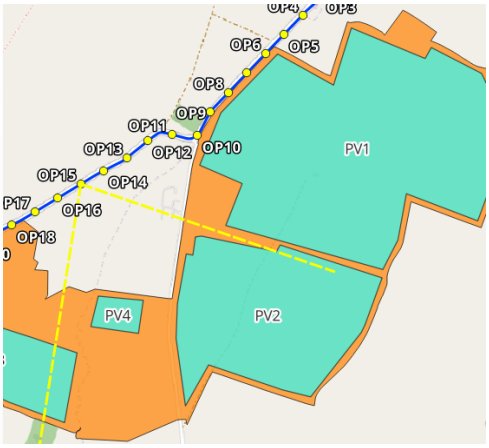
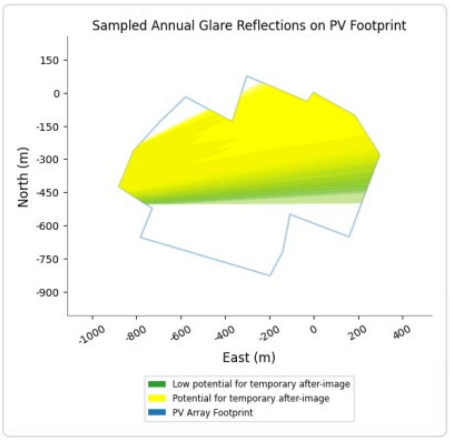
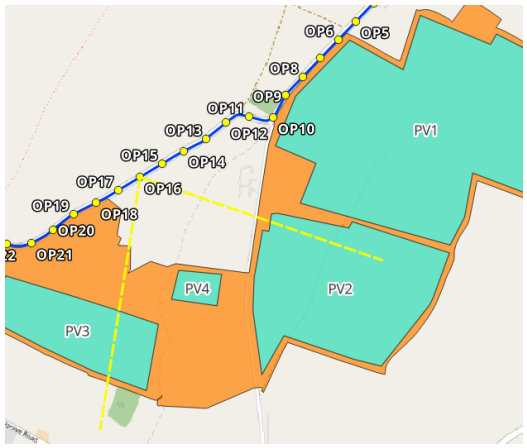
Receptor	Results
OP1-OP5	***No glare predicted towards OP1-OP5.***
OP6	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP7	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

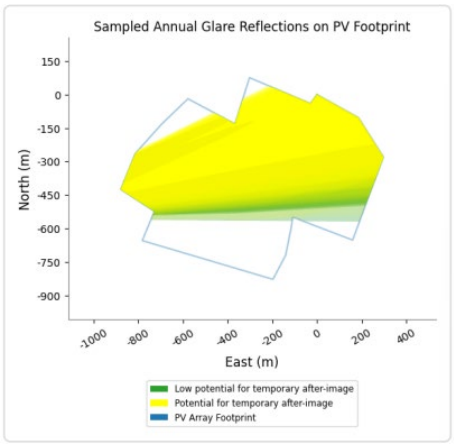
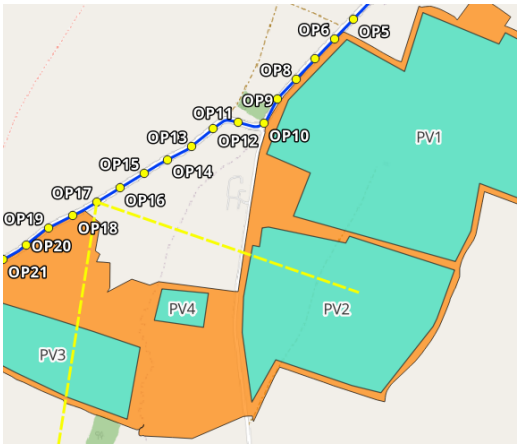
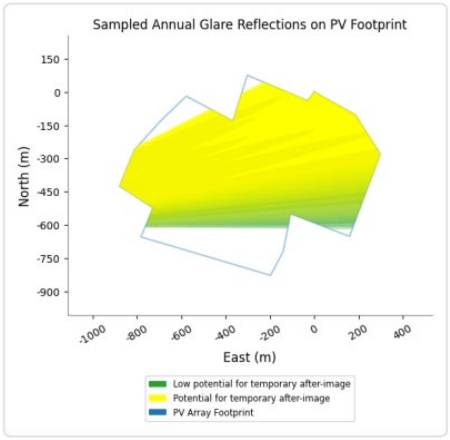
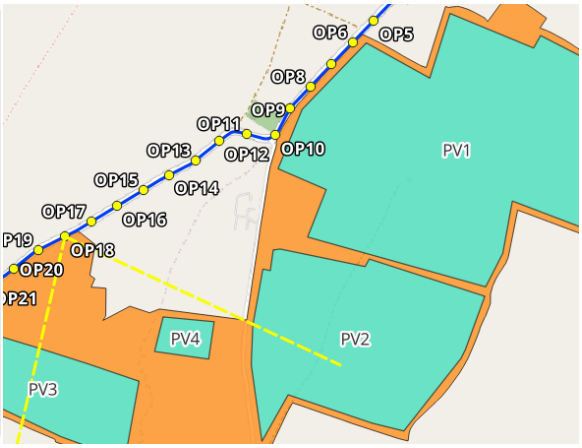
Receptor	Results
	  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP8	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP9	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

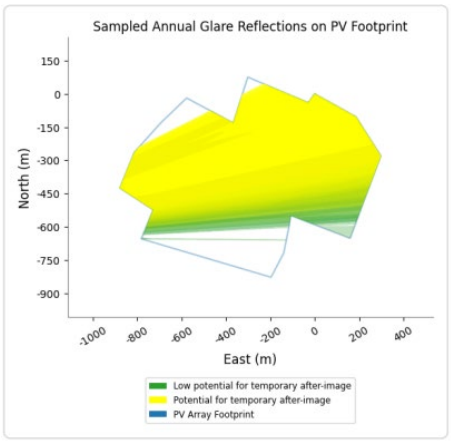
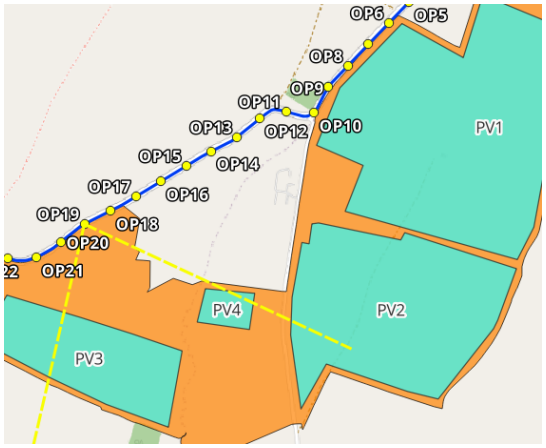
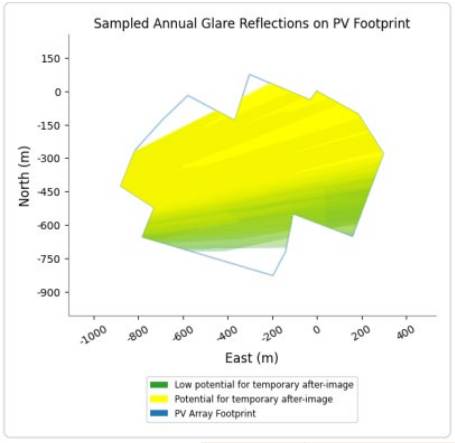
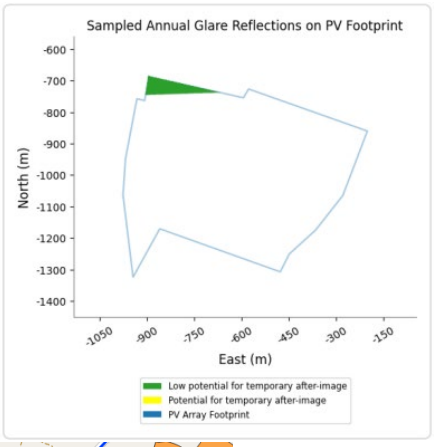
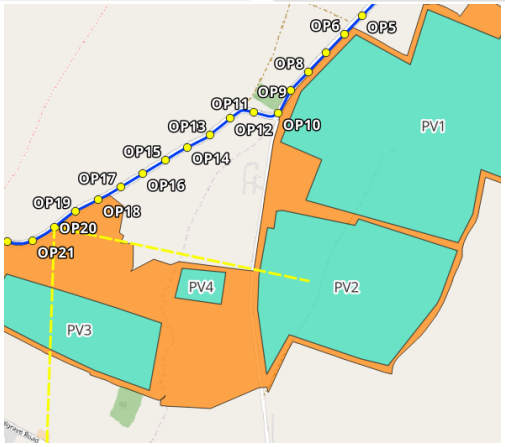
Receptor	Results
	  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP10	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP11	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

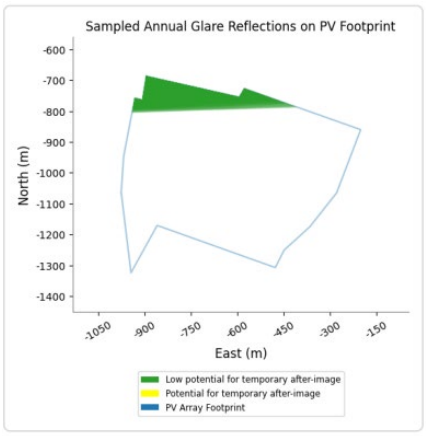
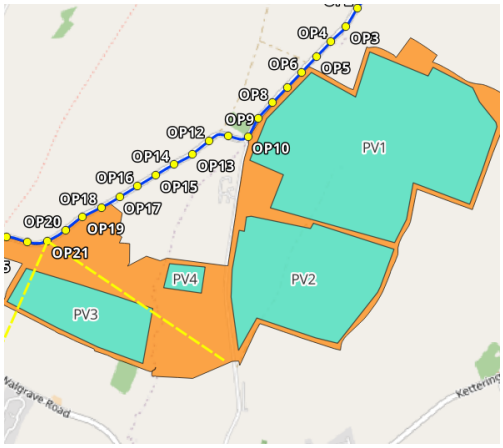
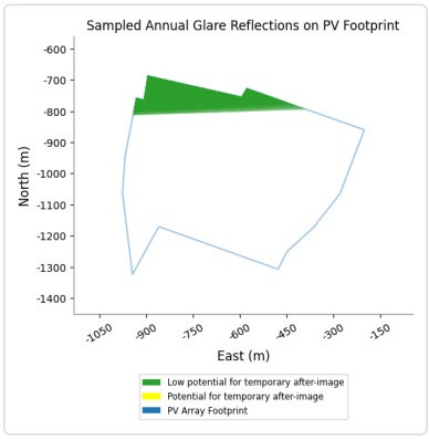
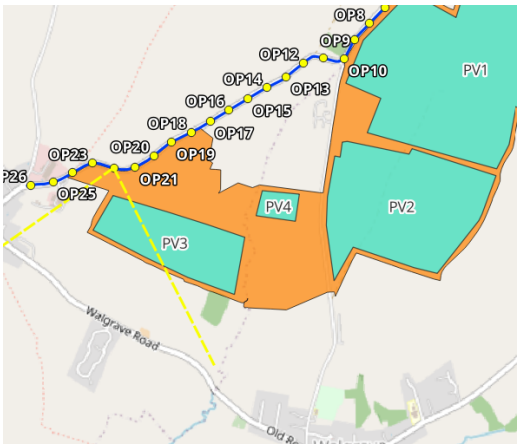
Receptor	Results
	  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP12	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP13	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

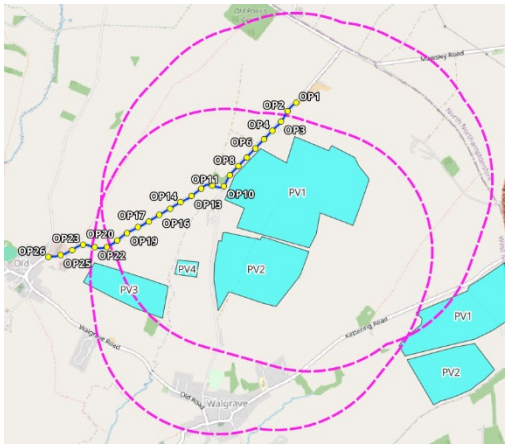
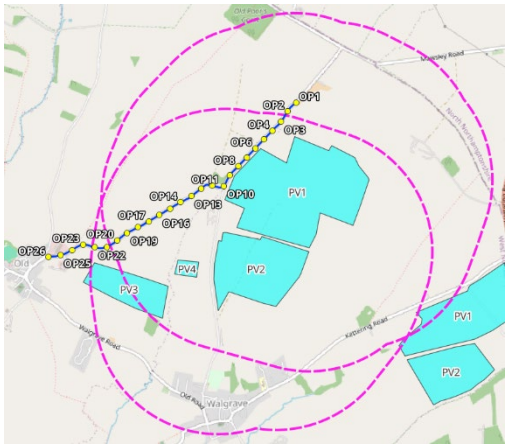
Receptor	Results
	  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP14	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP15	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

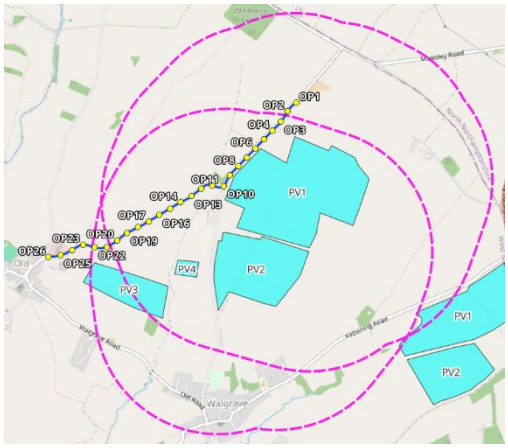
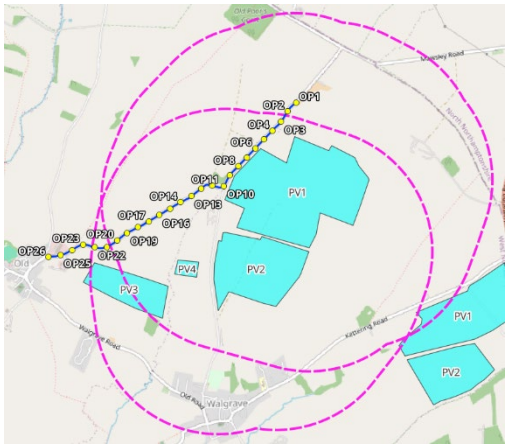
Receptor	Results
	  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP16	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP17	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

Receptor	Results
	  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP18	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP19	Glare is predicted from PV1 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

Receptor	Results
	  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP20	Glare is predicted from PV1 and PV2 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.    As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP21	Glare is predicted from PV1 and PV2 Green Hill A.

Receptor	Results
	It is noted that OP21 is outside the 1km screening distance of PV1 Green Hill. Based on industry guidance, the highest magnitude of impact possible from PV1 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP22	Glare is predicted from PV1 and PV2 Green Hill A. It is noted that OP22 is outside the 1km screening distance of PV1 Green Hill. Based on industry guidance, the highest magnitude of impact possible from PV1 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP23	Glare is predicted from PV1 and PV2 Green Hill A. It is noted that OP23 is outside the 1km screening distance of PV1 and PV2 Green Hill. The 1km screening distance from PV1 and PV2 is shown below.

Receptor	Results
	 Based on industry guidance, the highest magnitude of impact possible from PV1 and PV2 Green Hill A will be a 'low impact'. As such, no further mitigation is required.
OP24	Glare is predicted from PV1 and PV2 Green Hill A. It is noted that OP24 is outside the 1km screening distance of PV1 and PV2 Green Hill. The 1km screening distance from PV1 and PV2 is shown below.  Based on industry guidance, the highest magnitude of impact possible from PV1 and PV2 Green Hill A will be a 'low impact'. As such, no further mitigation is required.
OP25	Glare is predicted from PV1 and PV2 Green Hill A. It is noted that OP25 is outside the 1km screening distance of PV1 and PV2 Green Hill. The 1km screening distance from PV1 and PV2 is shown below.

Receptor	Results
	 Based on industry guidance, the highest magnitude of impact possible from PV1 and PV2 Green Hill A will be a 'low impact'. As such, no further mitigation is required.
OP26	Glare is predicted from PV1 and PV2 Green Hill A. It is noted that OP26 is outside the 1km screening distance of PV1 and PV2 Green Hill. The 1km screening distance from PV1 and PV2 is shown below.  Based on industry guidance, the highest magnitude of impact possible from PV1 and PV2 Green Hill A will be a 'low impact'. As such, no further mitigation is required.

Detailed ForgeSolar output results are available on request.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'no impact' significance may be classified where glare will not be visible from the assessed receptor. As such, no impacts are predicted to occur at OP1-OP5.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]** , a 'low impact' may be classified where glare is predicted outside the 50° FOV of road users, or outside the 1km screening distance. As such, low impacts are predicted to occur at OP22-OP26.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'moderate impact' may be classified where unmitigated glare is predicted inside the 50° FOV of road users. As such, moderate impacts are predicted to occur at OP6-OP21. Based on industry

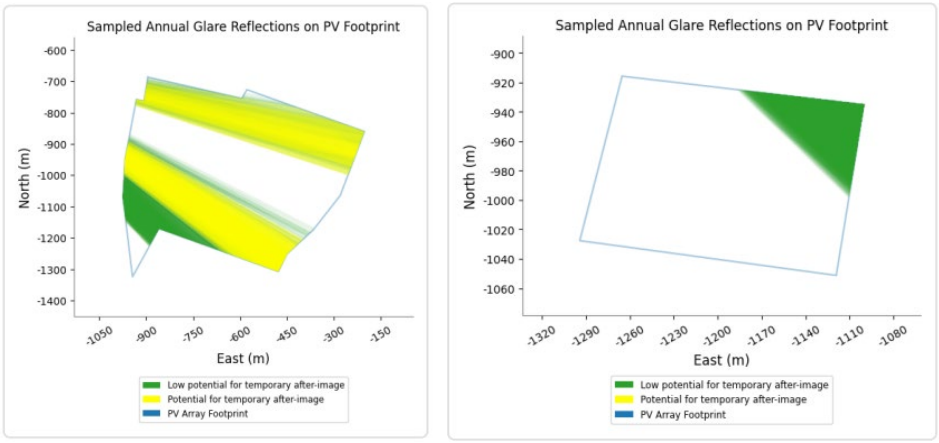
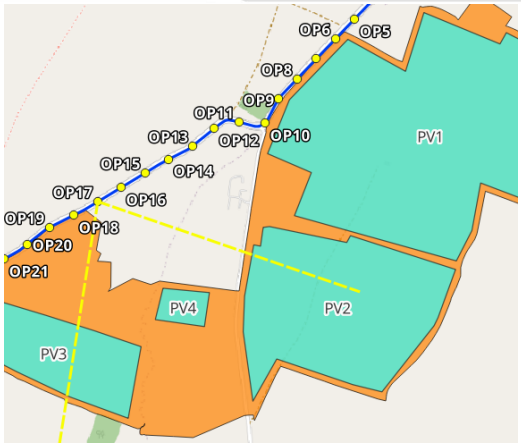
guidance, professional judgement is applied and further review of factors not included within the model are considered in Section 3.2.3.

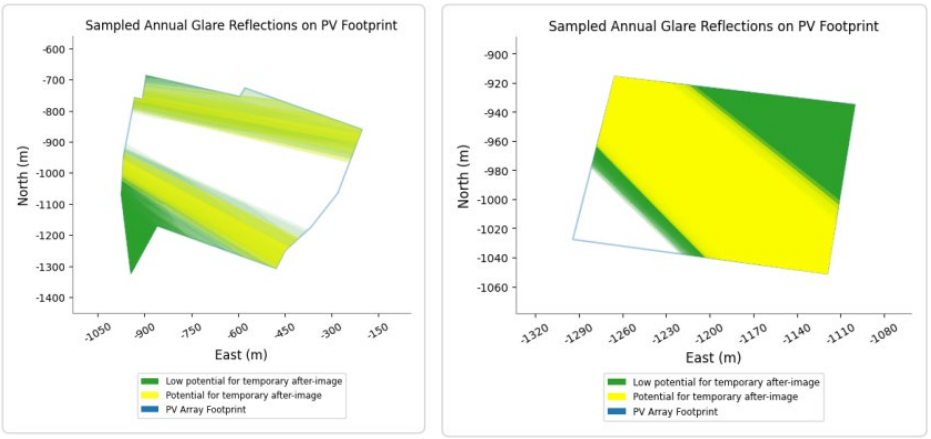
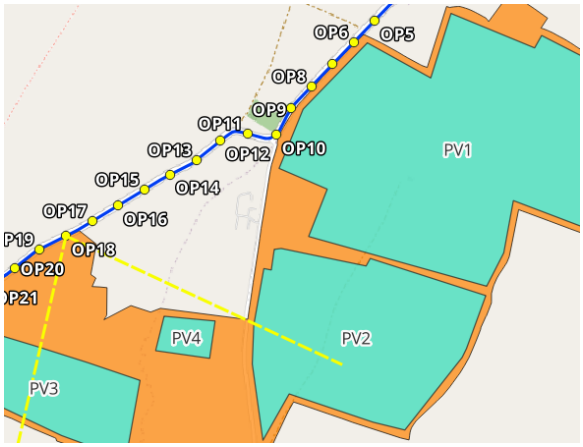
3.2.2 Broughton Road – Tracking Panel Results

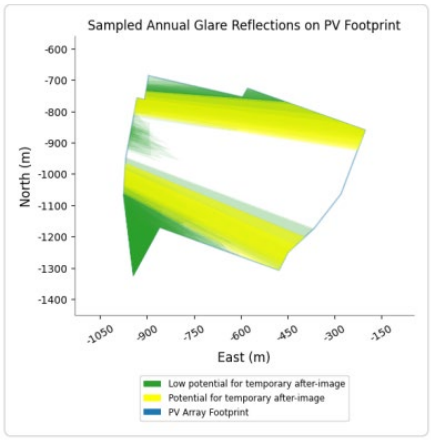
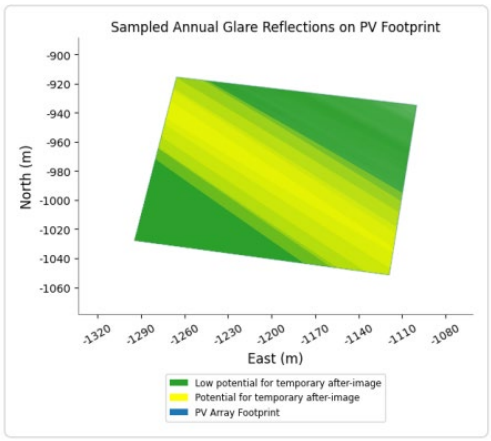
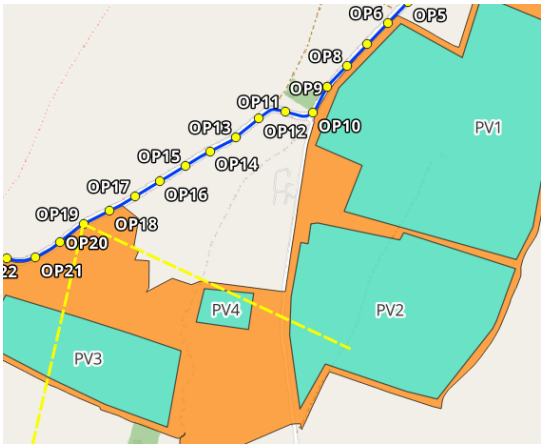
It is noted that Broughton Road is outside the 1km screening distance of Green Hill A.2. Based on industry guidance, the highest magnitude of impact possible from Green Hill A.2 will be a 'low impact'. As such, no further mitigation is required.

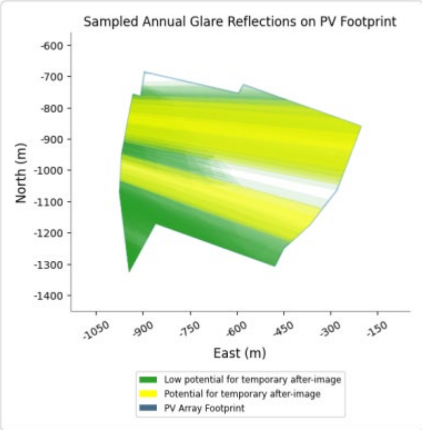
The below results show the area of the modelled PV arrays that is predicted glare compared to the 50° field of view of road users travelling northbound at the corresponding observation points.

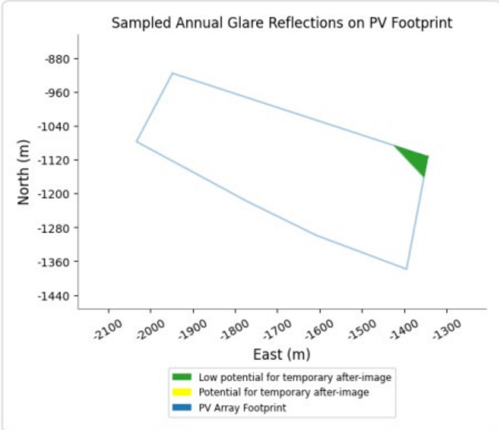
Table 3.4: Broughton Road – Tracking Panel Results

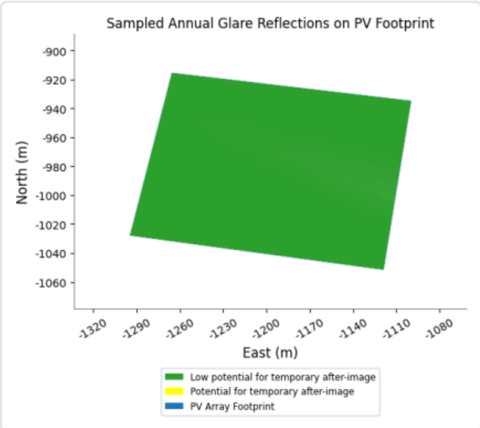
Receptor	Results
OP1-OP16	***No glare is predicted towards OP1-OP16.***
OP17	Glare is predicted from PV2 and PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP18	Glare is predicted from PV2 and PV4 Green Hill A.

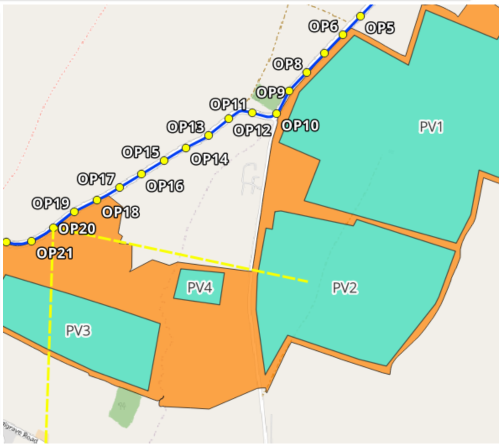
Receptor	Results
	The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP19	Glare is predicted from PV2 and PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP20	Glare is predicted from PV2-PV4 Green Hill A. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

<table>
<tr><th>Receptor</th><th>Results</th></tr>
<tr><td></td><td>


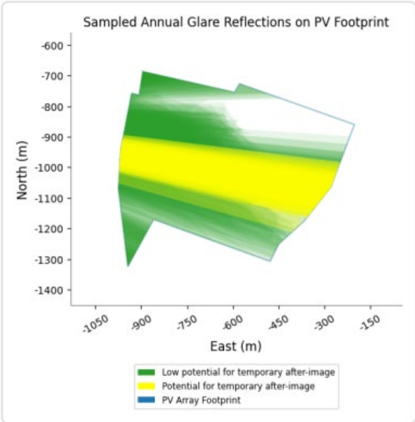


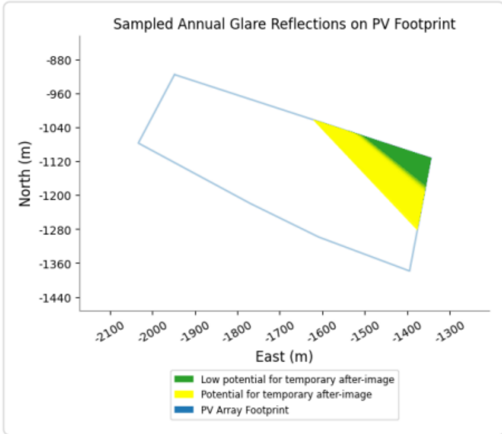


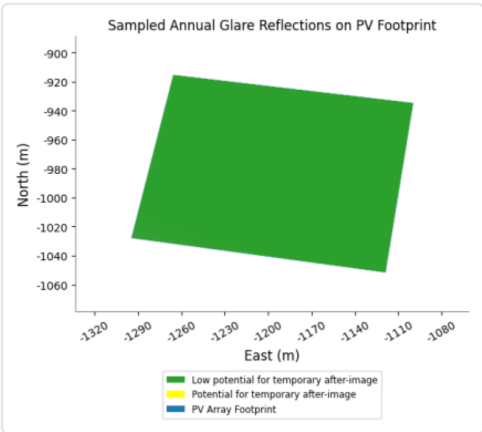


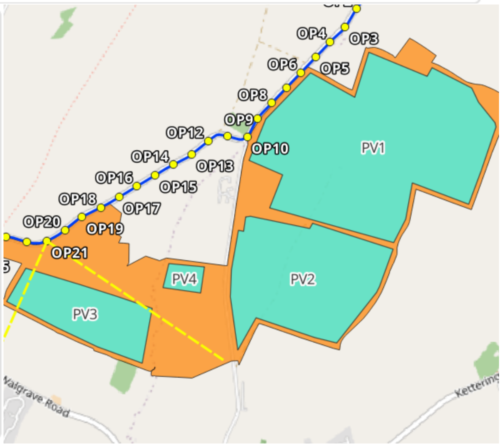
As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
</td></tr>
<tr><td>OP21</td><td>Glare is predicted from PV2-PV4 Green Hill A.

The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.</td></tr>
</table>

<table>
<tr><th>Receptor</th><th>Results</th></tr>
<tr><td></td><td>


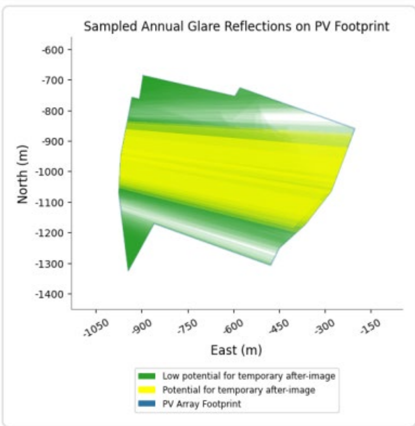


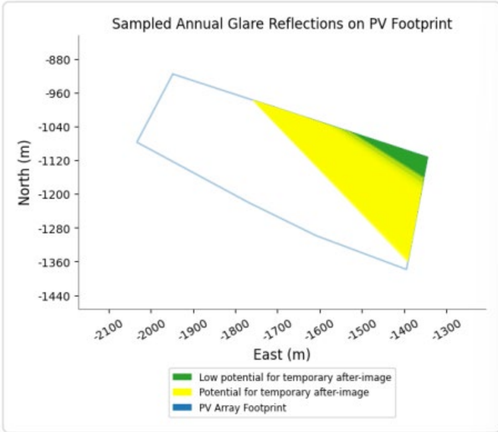


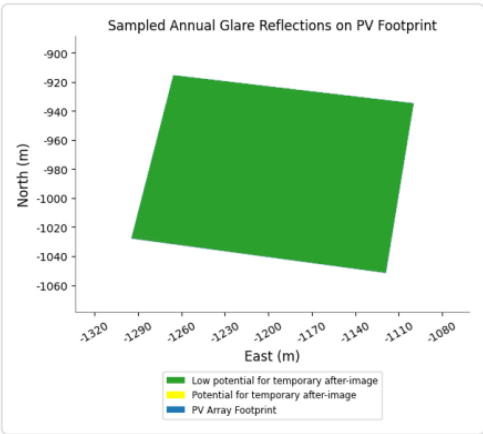


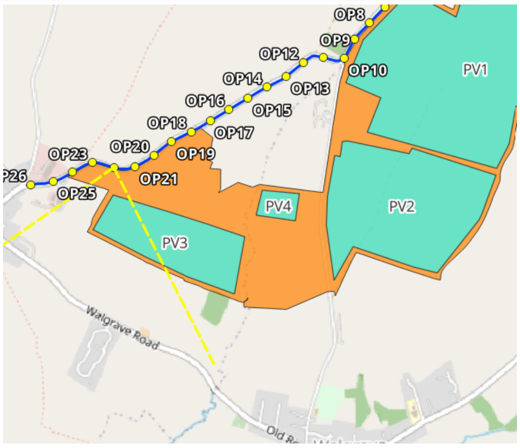
As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.</td></tr>
<tr><td>OP22</td><td>Glare is predicted from PV2-PV4 Green Hill A.

The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.</td></tr>
</table>

<table>
<tr><th>Receptor</th><th>Results</th></tr>
<tr><td></td><td>




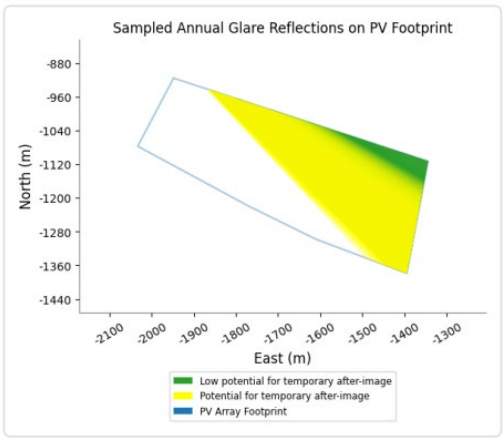
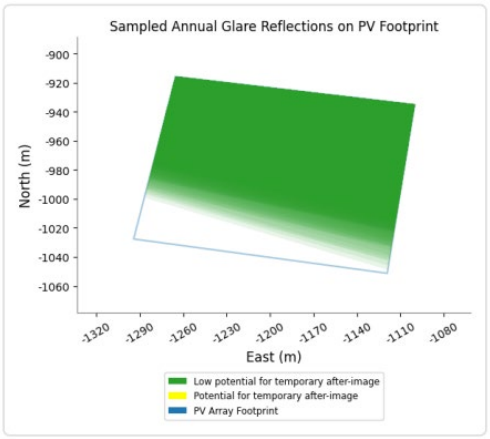
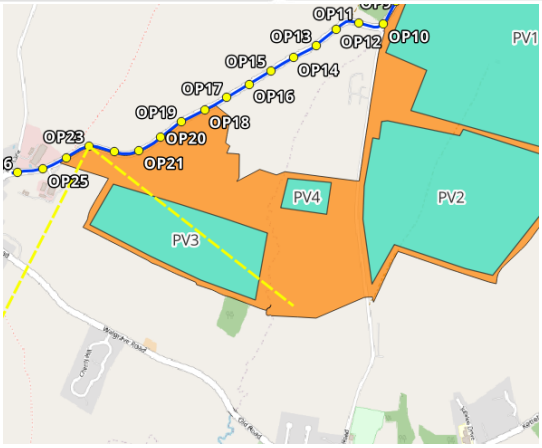


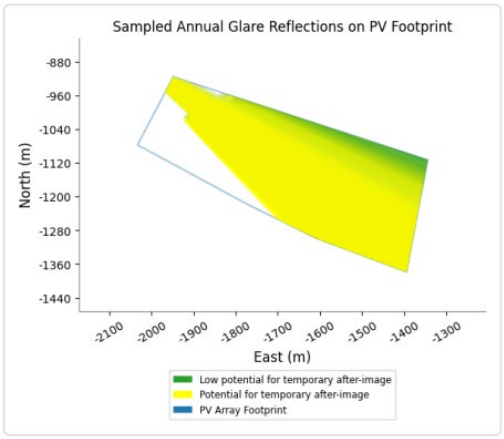
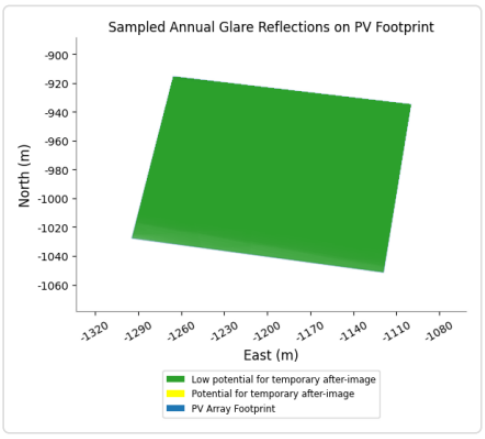
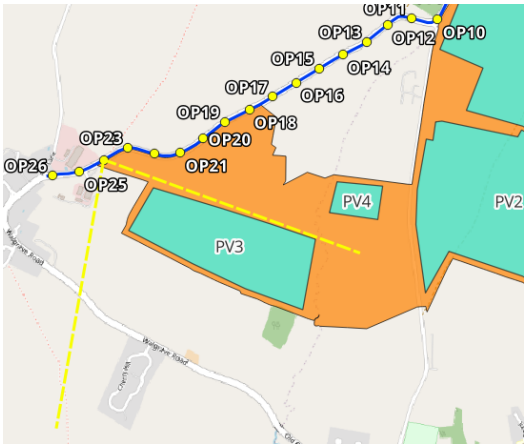


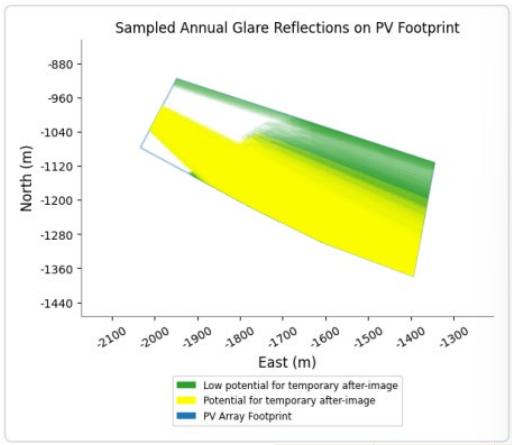
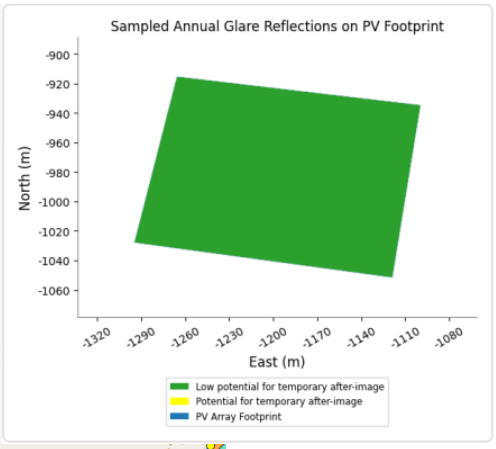
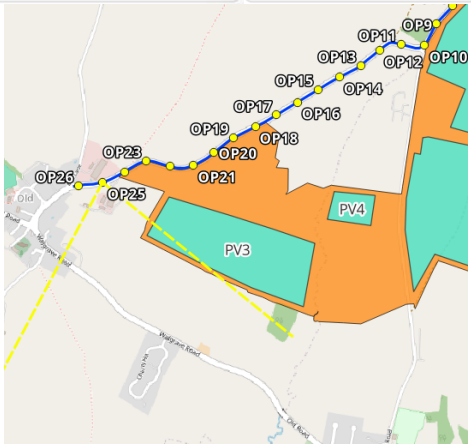
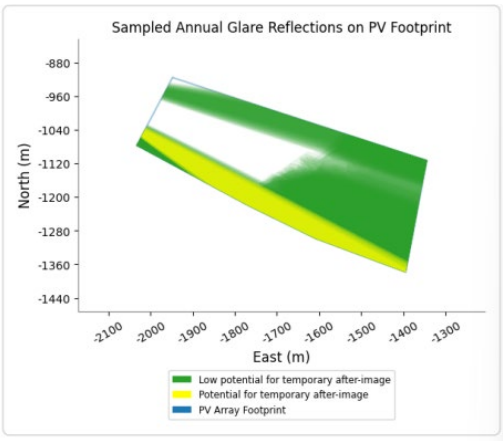
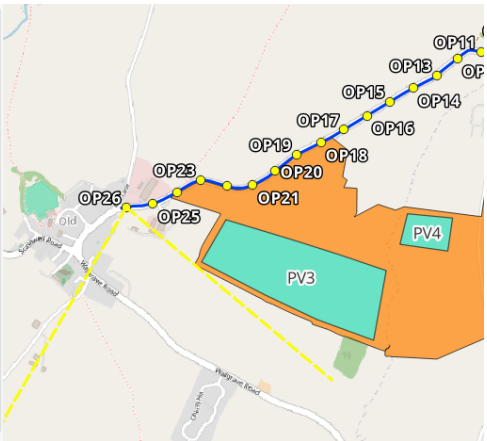
As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
</td></tr>
<tr><td>OP23</td><td>
Glare is predicted from PV2-PV4 Green Hill A.

It is noted that OP23 is outside the 1km screening distance of PV2 Green Hill. Based on industry guidance, the highest magnitude of impact possible from PV2 Green Hill A will be a ‘low impact’. As such, no further mitigation is required.

The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.
</td></tr>
</table>

Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP24	Glare is predicted from PV2-PV4 Green Hill A. It is noted that OP24 is outside the 1km screening distance of PV2 Green Hill. Based on industry guidance, the highest magnitude of impact possible from PV2 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP25	Glare is predicted from PV2-PV4 Green Hill A. It is noted that OP25 is outside the 1km screening distance of PV2 Green Hill. Based on industry guidance, the highest magnitude of impact possible from PV2 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.
OP26	Glare is predicted from PV2-PV4 Green Hill A. It is noted that OP26 is outside the 1km screening distance of PV2 and PV4 Green Hill. Based on industry guidance, the highest magnitude of impact possible from PV2 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

Receptor	Results
	As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.2.3.

Detailed ForgeSolar output results are available on request.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'no impact' significance may be classified where glare will not be visible from the assessed receptor. As such, no impacts are predicted to occur at OP11-OP16.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'moderate impact' may be classified where unmitigated glare is predicted inside the 50° FOV of road users. As such, moderate impacts are predicted to occur at OP17-OP26. Based on industry guidance, professional judgement is applied and further review of factors not included within the model are considered in Section 3.2.3.

3.2.3 Results Discussion

Additional factors have been considered to determine the residual impact significance at receptors and OP6-OP26. These include:

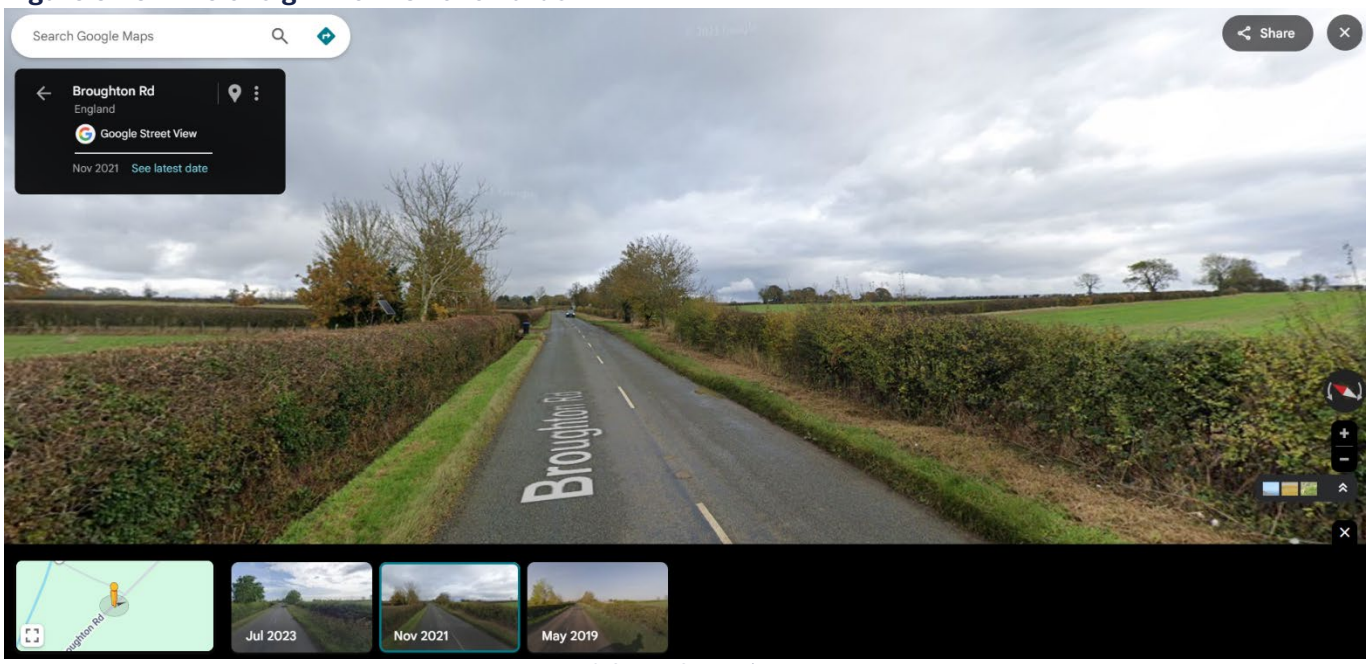
- Existing screening/obstructions; and
- The extent to which cloud cover and glare impacts coincide.

3.2.3.1 Existing Screening and Obstructions

<u>OP6</u>

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Intervening topography is expected to obstruct line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.13: Line of sight from OP6 towards PV1



© Google Street View

OP7

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Intervening topography is expected to obstruct the majority of line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.14: Line of sight from OP7 towards PV1

© Google Street View

OP8

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Intervening topography is expected to obstruct the majority of line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.15: Line of sight from OP8 towards PV1

© Google Street View

OP9

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Dense vegetation aligning Broughton Road is expected to partially obstruct line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.16: Line of sight from OP9 towards PV1

© Google Street View

OP10

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Dense vegetation and topography aligning Broughton Road is expected to partially obstruct line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.17: Line of sight from OP10 towards PV1

© Google Street View

OP11

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Topography aligning Broughton Road is expected to obstruct the majority line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.18: Line of sight from OP11 towards PV1

© Google Street View

OP12

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Dense vegetation aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.19: Line of sight from OP12 towards PV1

© Google Street View

OP13

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Topography aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.20: Line of sight from OP13 towards PV1

© Google Street View

OP14

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Topography aligning Broughton Road is expected to partially line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.21: Line of sight from OP14 towards PV1

© Google Street View

OP15

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Dense vegetation and topography aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.22: Line of sight from OP15 towards PV1

© Google Street View

OP16

Unmitigated glare is predicted inside the 50° FOV of road users from PV1. Dense vegetation aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.23: Line of sight from OP16 towards PV1

© Google Street View

OP17

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 and PV2. Existing infrastructure is expected to obstruct line of sight between road users and the reflecting area of PV1 and PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.24: Line of sight from OP17 towards PV1 and PV2

© Google Street View

OP18

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 and PV2. Existing infrastructure and topography are expected to obstruct line of sight between road users and the reflecting area of PV1 and PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.25: Line of sight from OP18 towards PV1 and PV2

© Google Street View

OP19

Unmitigated glare is predicted inside the 50° FOV of road users from PV1, PV2 and PV4. Topography aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV1, PV2, and PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.26: Line of sight from OP19 towards PV1, PV2 and PV4

OP20

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 and PV2. Topography and dense vegetation aligning Broughton Road is expected to partially obstruct line of sight between road users and the reflecting area of PV1 and PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.27: Line of sight from OP20 towards PV1 and PV2

OP21

Unmitigated glare is predicted inside the 50° FOV of road users from PV2-PV4. Topography and vegetation aligning Broughton Road is expected to partially obstruct line of sight between road users and the reflecting area of PV2-PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.28: Line of sight from OP21 towards PV2-PV4

© Google Street View

OP22

Unmitigated glare is predicted inside the 50° FOV of road users from PV2-PV4. Topography aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV2-PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.29: Line of sight from OP22 towards PV2-PV4

© Google Street View

OP23

Unmitigated glare is predicted inside the 50° FOV of road users from PV3 and PV4. Topography aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV3 and PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.30: Line of sight from OP23 towards PV3 and PV4

OP24

Unmitigated glare is predicted inside the 50° FOV of road users from PV4. Topography aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.31: Line of sight from OP24 towards PV4

OP25

Unmitigated glare is predicted inside the 50° FOV of road users from PV3 and PV4. Dense vegetation and topography aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV3 and PV4. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.32: Line of sight from OP25 towards PV3 and PV4

© Google Street View

OP26

Unmitigated glare is predicted inside the 50° FOV of road users from PV3. Dense vegetation and topography aligning Broughton Road is expected to obstruct line of sight between road users and the reflecting area of PV3. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.33: Line of sight from OP26 towards PV3

© Google Street View

3.2.3.2 Cloud Cover

As the worst-case approach, the model assumes clear sky conditions all year round. Cloudier conditions (overcast and mostly cloudy) exist in Broughton (nearest weather data available) for 43-75% of the time, as shown in Figure 3.11. This would reduce the glare experienced along the approach path.

Considering the cloud cover that is likely to occur in the area, the modelled glare from the Proposed Development is likely to occur at least 43% less often than predicted as a minimum. This would likely reduce the amount of glare experienced along Broughton Road.

3.2.4 Significance of Impact

As discussed in Section 2.1, based on industry guidance and good practice, technical modelling is not recommended for local roads and a maximum magnitude impact of 'low impact' may be classified from glint and glare. Notwithstanding this, the assessment in this note confirms that, with the presence of planting and cloud cover taken into consideration, no local road will experience more than a 'low impact' from glint and glare.

Figure 3.34: Significance of Impact - Broughton Road

Receptor	Significance of Impact	
	Fixed Panels	Tracking Panels
OP1	**No Impact**	**No Impact**
OP2	**No Impact**	**No Impact**
OP3	**No Impact**	**No Impact**
OP4	**No Impact**	**No Impact**
OP5	**No Impact**	**No Impact**
OP6	**Low Impact** (upon applying professional judgement)	**No Impact**
OP7	**Low Impact** (upon applying professional judgement)	**No Impact**
OP8	**Low Impact** (upon applying professional judgement)	**No Impact**
OP9	**Low Impact** (upon applying professional judgement)	**No Impact**
OP10	**Low Impact** (upon applying professional judgement)	**No Impact**
OP11	**Low Impact** (upon applying professional judgement)	**No Impact**
OP12	**Low Impact** (upon applying professional judgement)	**No Impact**
OP13	**Low Impact** (upon applying professional judgement)	**No Impact**
OP14	**Low Impact** (upon applying professional judgement)	**No Impact**
OP15	**Low Impact** (upon applying professional judgement)	**No Impact**
OP16	**Low Impact** (upon applying professional judgement)	**No Impact**
OP17	**Low Impact** (upon applying professional judgement)	**Low Impact** (upon applying professional judgement)

Receptor	Significance of Impact	
	Fixed Panels	Tracking Panels
OP18	**Low Impact** (upon applying professional judgement)	**Low Impact** (upon applying professional judgement)
OP19	**Low Impact** (upon applying professional judgement)	**Low Impact** (upon applying professional judgement)
OP20	**Low Impact** (upon applying professional judgement)	**Low Impact** (upon applying professional judgement)
OP21	**Low Impact** (upon applying professional judgement)	**Low Impact** (upon applying professional judgement)
OP22	**Low Impact** (upon applying professional judgement)	**Low Impact** (upon applying professional judgement)
OP23	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP24	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP25	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP26	**Low Impact**	**Low Impact** (upon applying professional judgement)

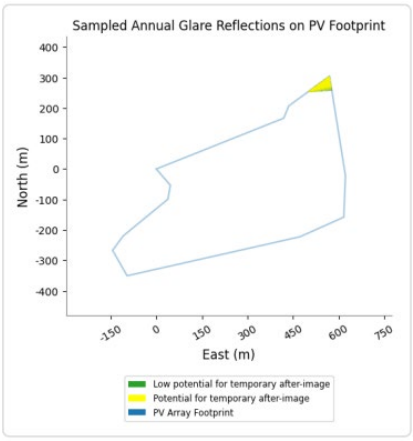
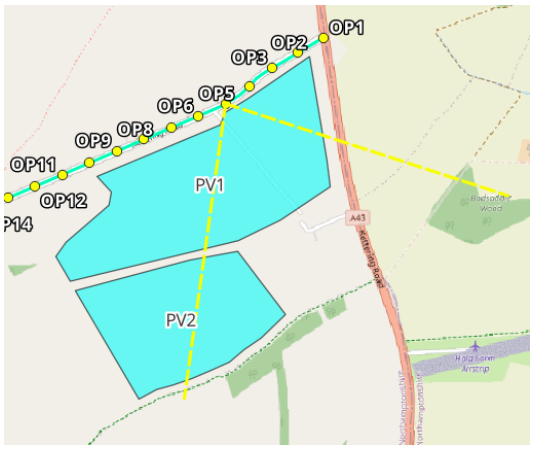
3.3 Road Infrastructure – Kettering Road

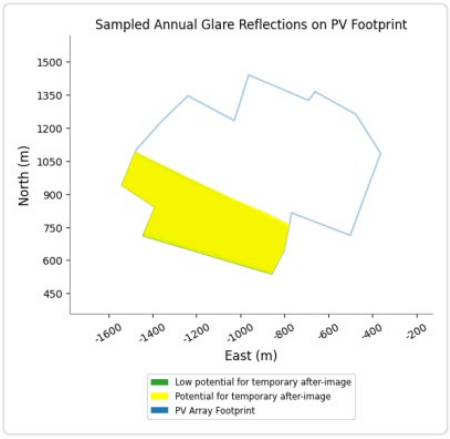
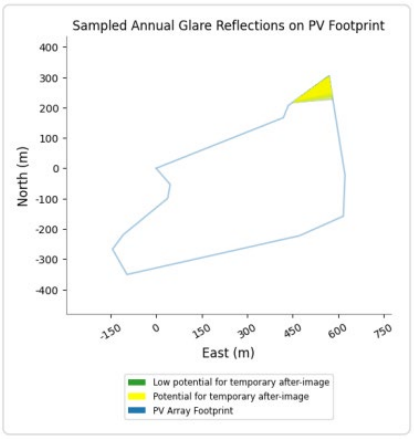
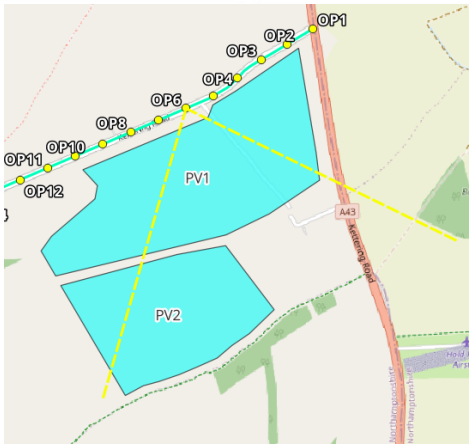
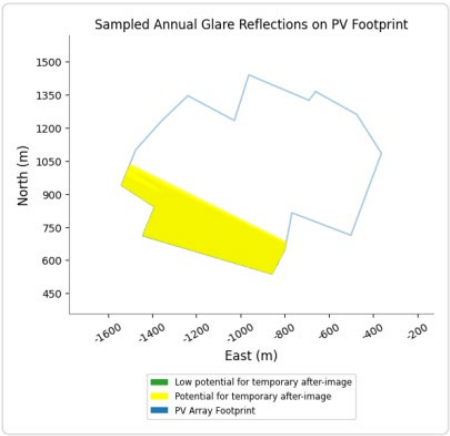
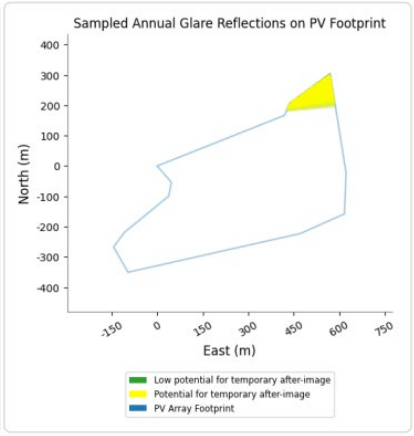
3.3.1 Kettering Road – Fixed Panel Results

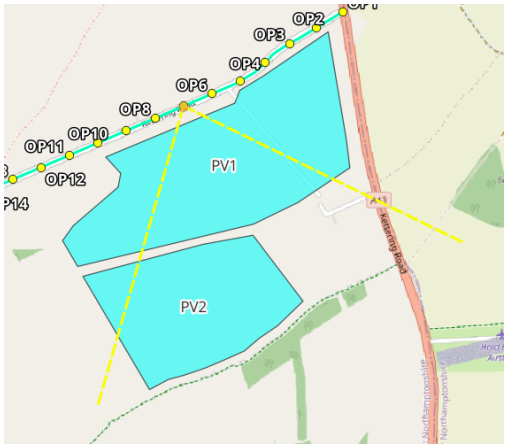
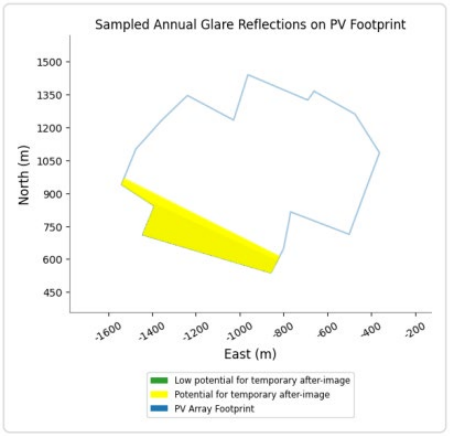
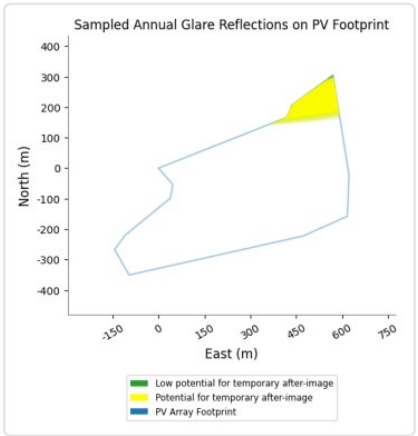
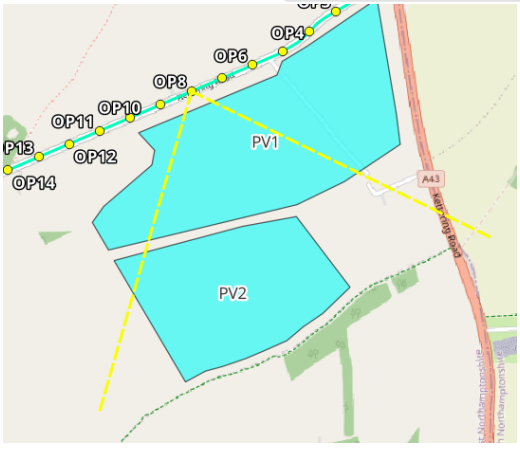
The below results show the area of the modelled PV arrays that is predicted glare compared to the 50° field of view of road users travelling northbound at the corresponding observation points.

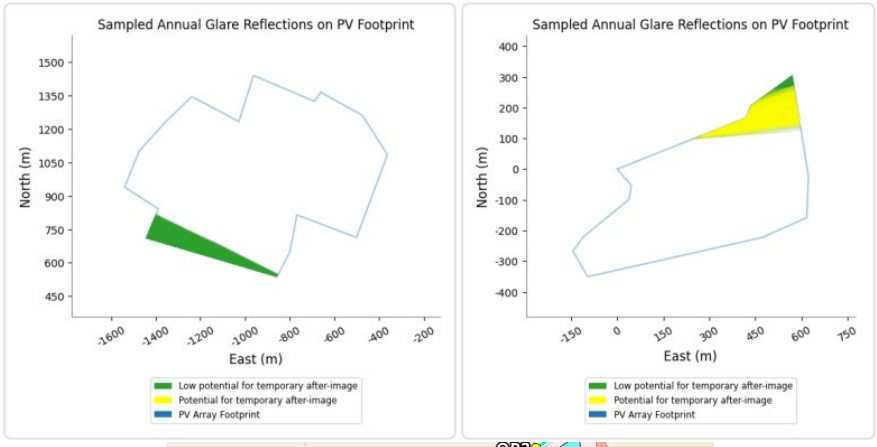
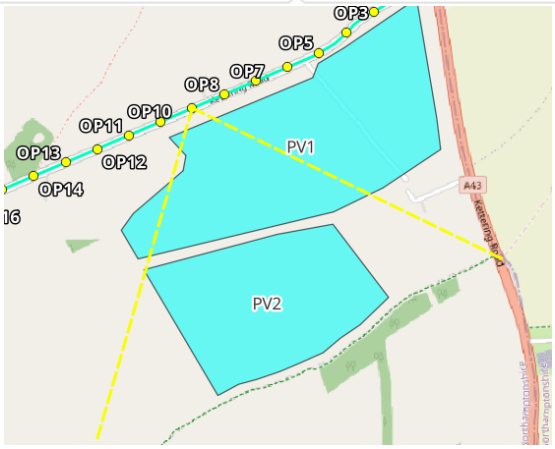
Table 3.5: Kettering Road – Fixed Panel Results

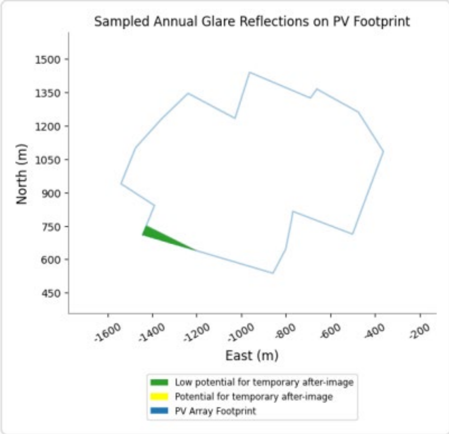
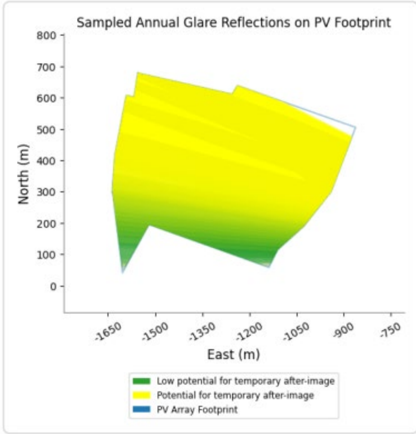
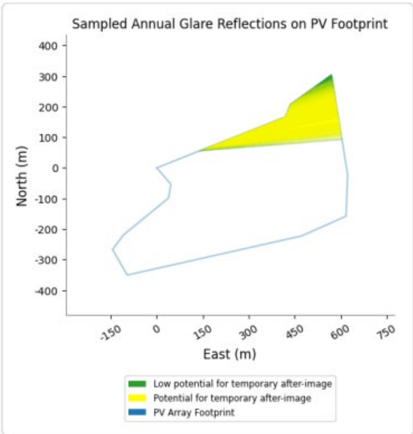
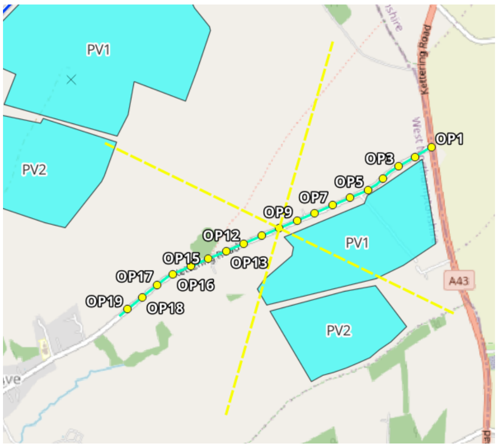
Receptor	Results
OP1	Glare is predicted from PV1, PV2, and PV4 Green Hill A. It is noted that OP1 is outside the 1km screening distance of Green Hill A. Based on industry guidance, the highest magnitude of impact possible from Green Hill A will be a 'low impact'. As such, no further mitigation is required.
OP2	Glare is predicted from PV1- PV4 Green Hill A. It is noted that OP1 is outside the 1km screening distance of Green Hill A. Based on industry guidance, the highest magnitude of impact possible from Green Hill A will be a 'low impact'. As such, no further mitigation is required.
OP3	Glare is predicted from PV1- PV4 Green Hill A. It is noted that OP1 is outside the 1km screening distance of Green Hill A. Based on industry guidance, the highest magnitude of impact possible from Green Hill A will be a 'low impact'. As such, no further mitigation is required.

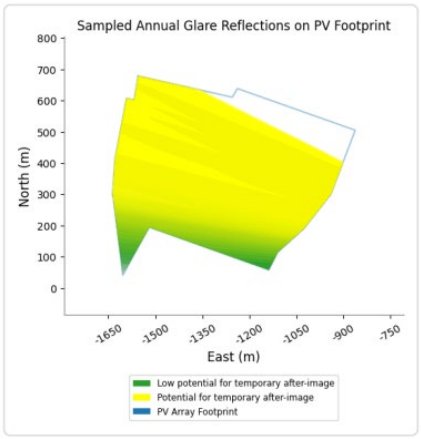
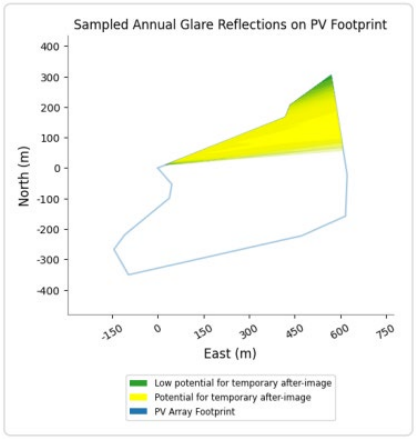
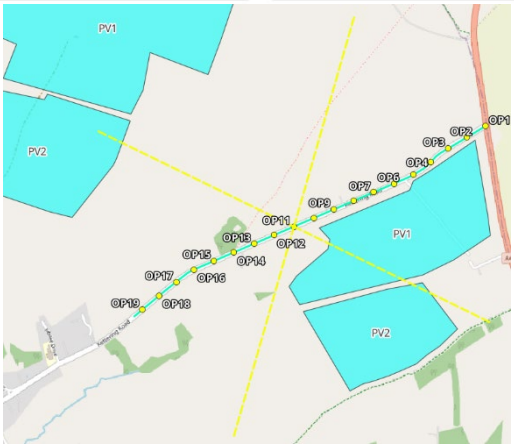
Receptor	Results
OP4	Glare is predicted from PV1- PV4 Green Hill A. It is noted that OP1 is outside the 1km screening distance of Green Hill A. Based on industry guidance, the highest magnitude of impact possible from Green Hill A will be a 'low impact'. As such, no further mitigation is required.
OP5	Glare is predicted from PV1- PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP1 is outside the 1km screening distance of Green Hill A. Based on industry guidance, the highest magnitude of impact possible from Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP6	Glare is predicted from PV1-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP6 is outside the 1km screening distance of PV2-PV4 Green Hill A, and the reflecting area of PV1. Based on industry guidance, the highest magnitude of impact possible from PV1-PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

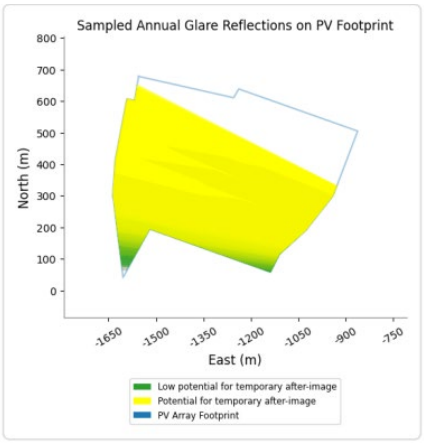
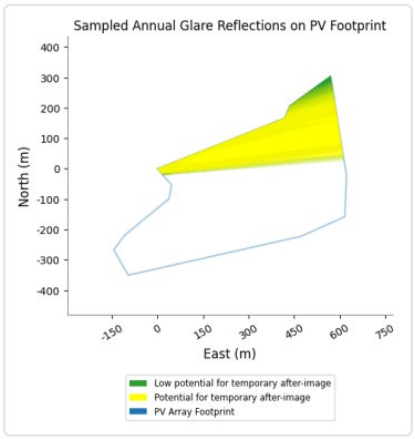
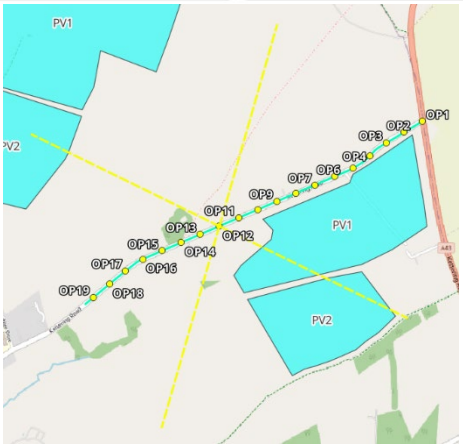
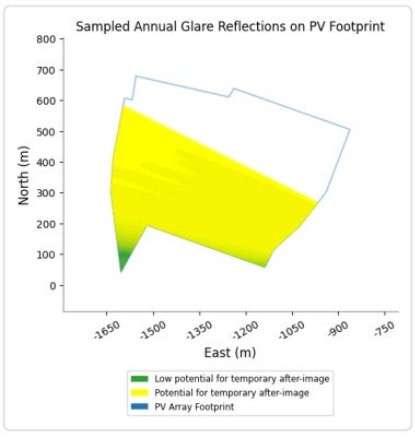
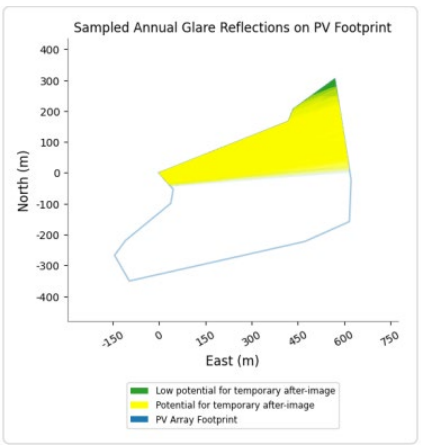
Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP7	Glare is predicted from PV1-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP7 is outside the 1km screening distance of PV2-PV4 Green Hill A, and the reflecting area of PV1. Based on industry guidance, the highest magnitude of impact possible from PV1-PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

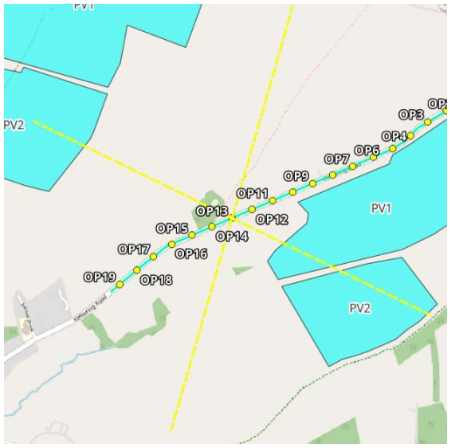
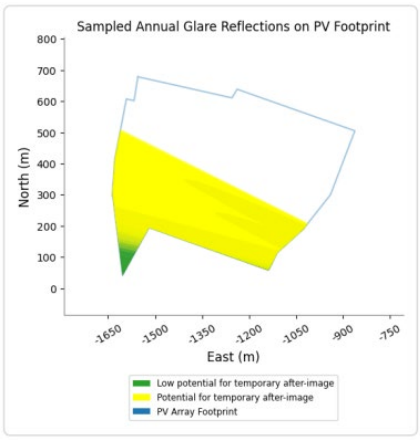
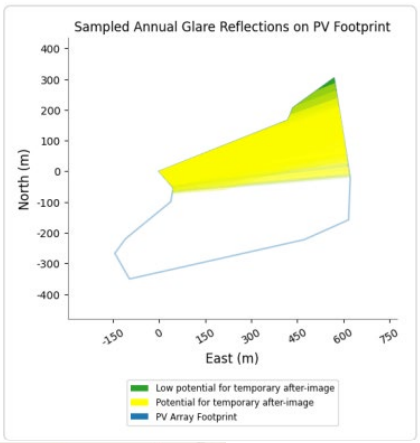
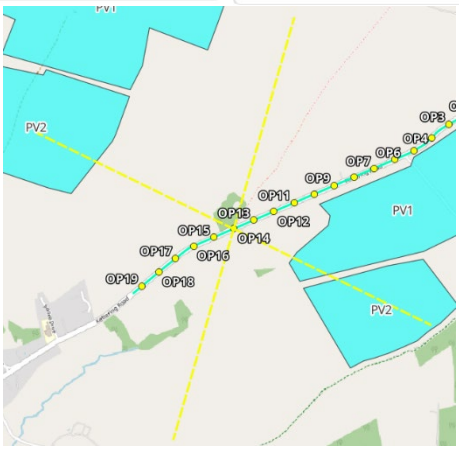
Receptor	Results
	 As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP8	Glare is predicted from PV1-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP8 is outside the 1km screening distance of PV2-PV4 Green Hill A, and the reflecting area of PV1. Based on industry guidance, the highest magnitude of impact possible from PV1-PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   

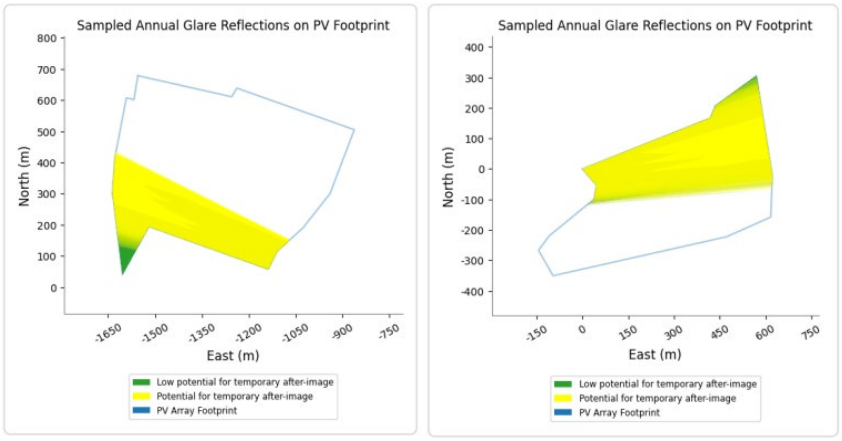
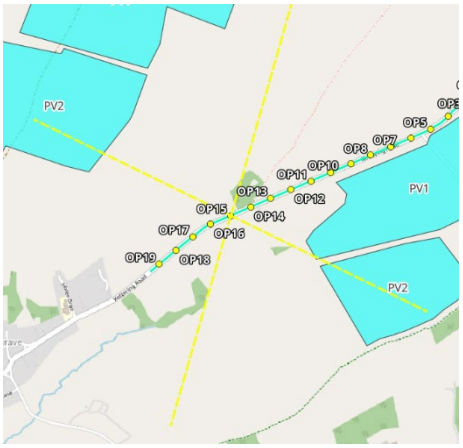
Receptor	Results
	As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP9	Glare is predicted from PV1-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP9 is outside the 1km screening distance of PV2-PV4 Green Hill A, and the reflecting area of PV1. Based on industry guidance, the highest magnitude of impact possible from PV1-PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP10	Glare is predicted from PV1-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP10 is outside the 1km screening distance of PV3 and PV4 Green Hill A, and the reflecting area of PV1. Based on industry guidance, the highest magnitude of impact possible from PV1, PV3, and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

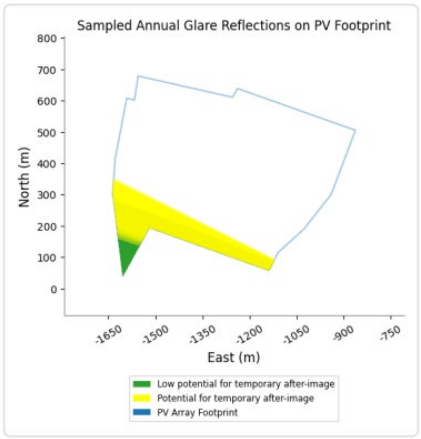
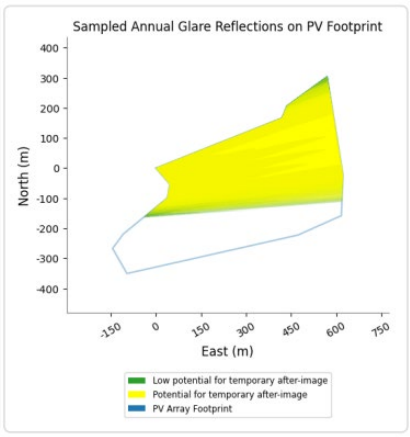
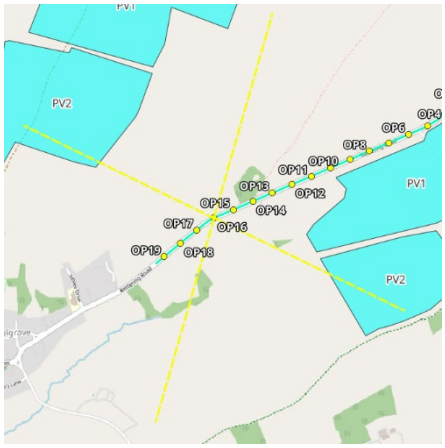
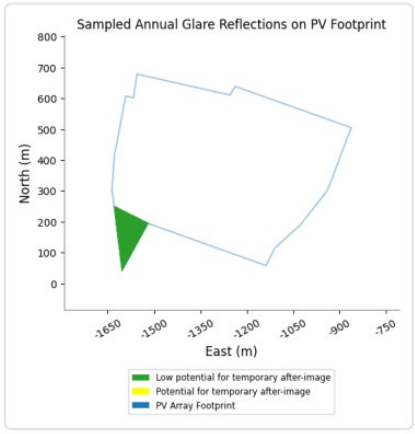
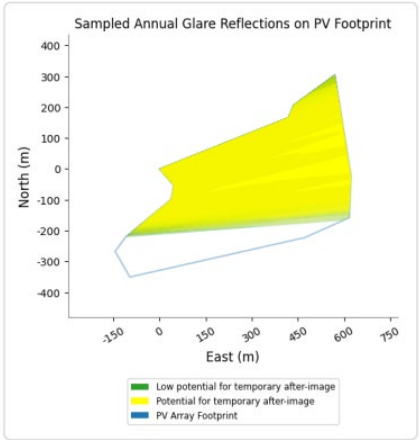
Receptor	Results
	    As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP11	Glare is predicted from PV2-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP11 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 and PV4 Green Hill A will be a ‘low impact’. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

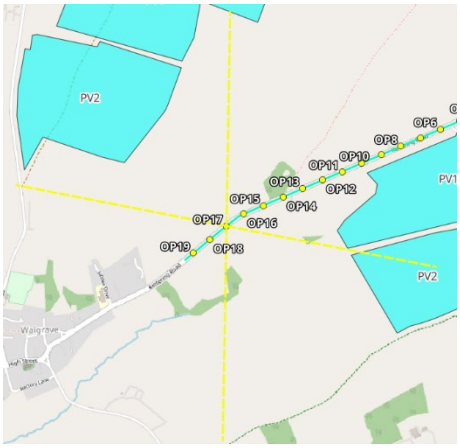
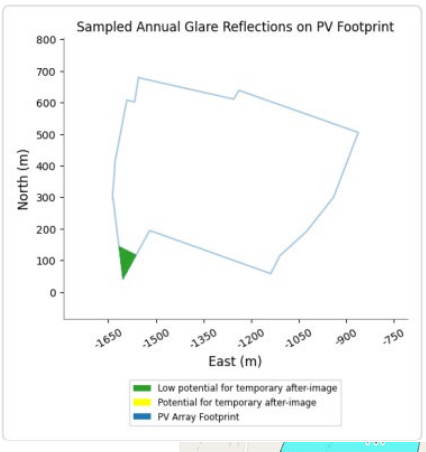
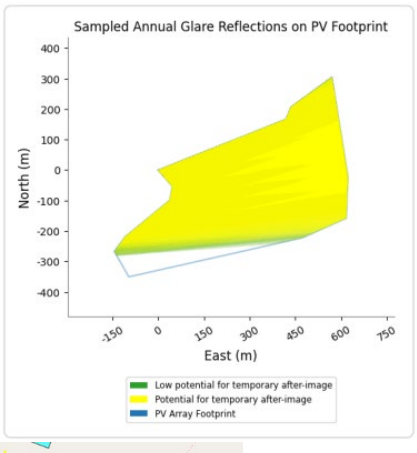
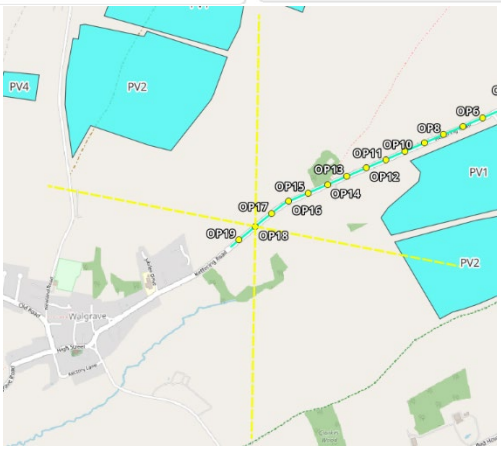
Receptor	Results
	   Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of 'low impact'
OP12	Glare is predicted from PV2-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP12 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

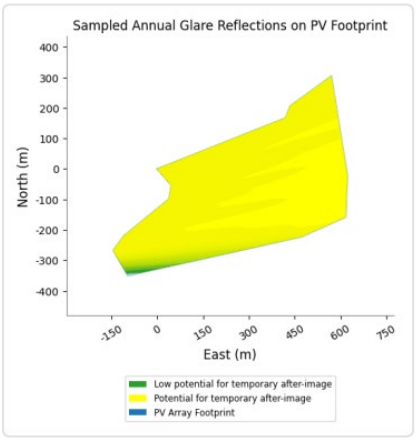
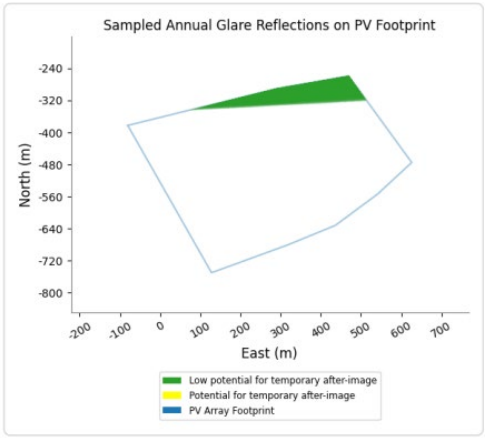
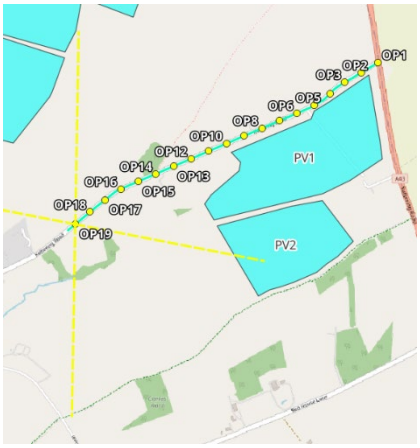
Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP13	Glare is predicted from PV2-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP13 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

Receptor	Results
	 As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP14	Glare is predicted from PV2-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP14 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   

Receptor	Results
	As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP15	Glare is predicted from PV2-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP15 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP16	Glare is predicted from PV2-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP16 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP17	Glare is predicted from PV2-PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP17 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

Receptor	Results
	 As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP18	Glare is predicted from PV2 and PV3 Green Hill A and PV1 Green Hill A.2. It is noted that OP18 is outside the 1km screening distance of PV3 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   

Receptor	Results
	As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP19	Glare is predicted from PV3 Green Hill A and PV1 and PV2 Green Hill A.2. It is noted that OP19 is outside the 1km screening distance of PV3 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.    As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.

Detailed ForgeSolar output results are available on request.

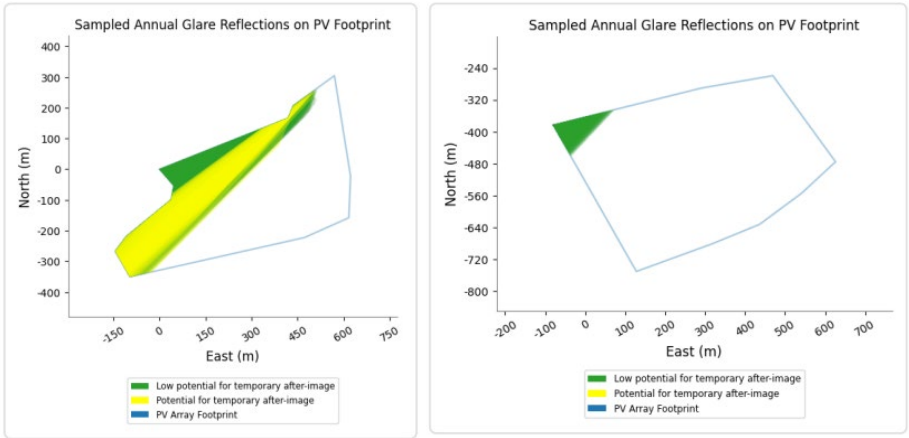
With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'low impact' may be classified where glare is predicted outside the 50° FOV of road users, or outside the 1km screening distance. As such, low impacts are predicted to occur at OP1-OP4.

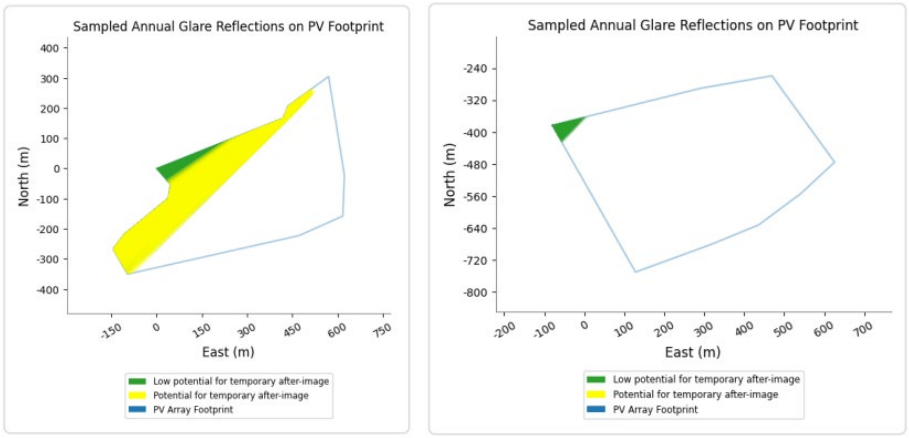
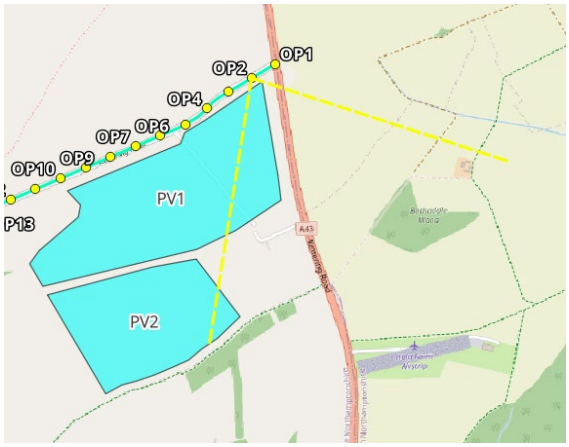
With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'moderate impact' may be classified where unmitigated glare is predicted inside the 50° FOV of road users. As such, moderate impacts are predicted to occur at OP5-OP19. Based on industry guidance, professional judgement is applied and further review of factors not included within the model are considered in Section 3.3.3.

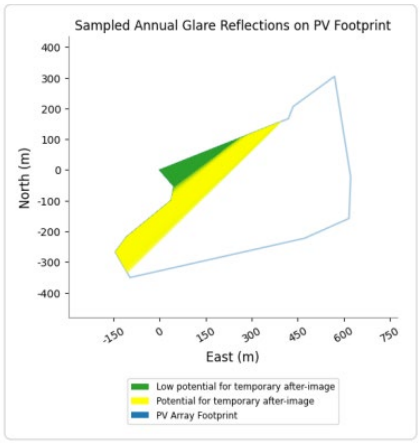
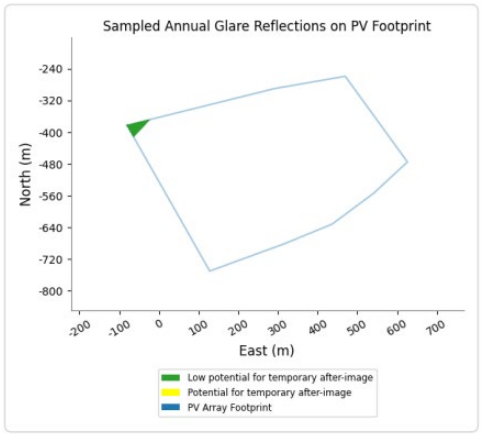
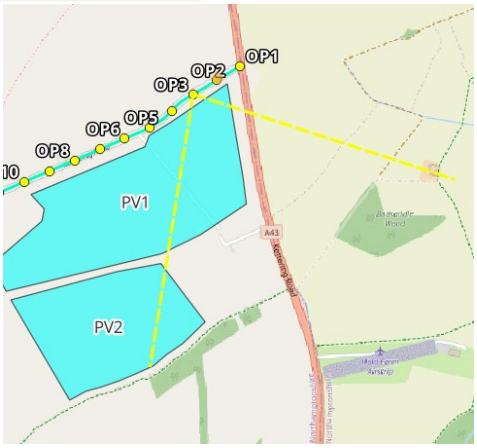
3.3.2 Kettering Road – Tracking Panel Results

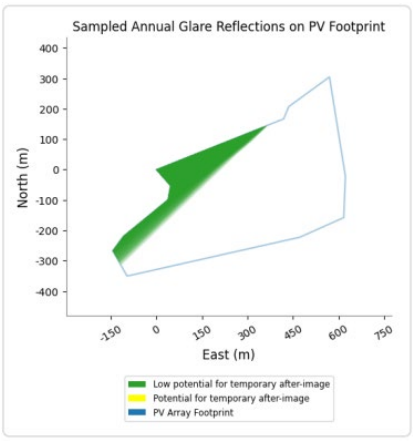
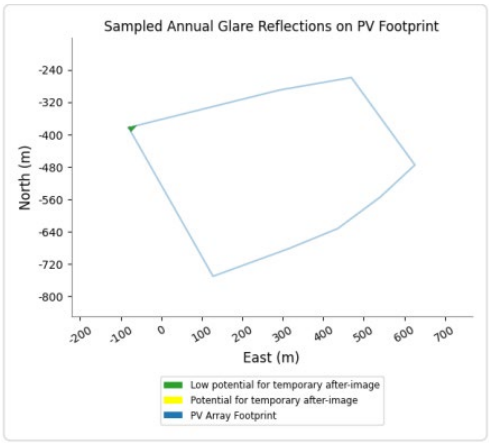
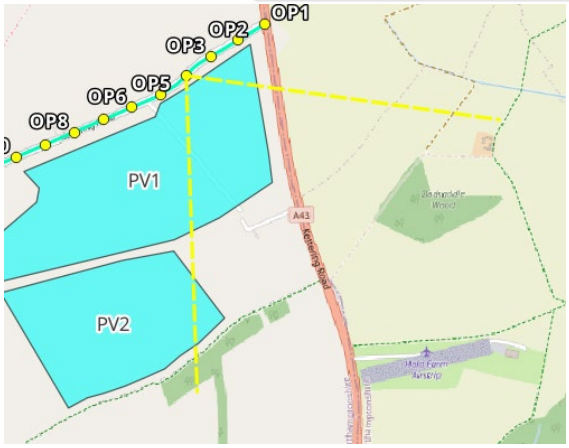
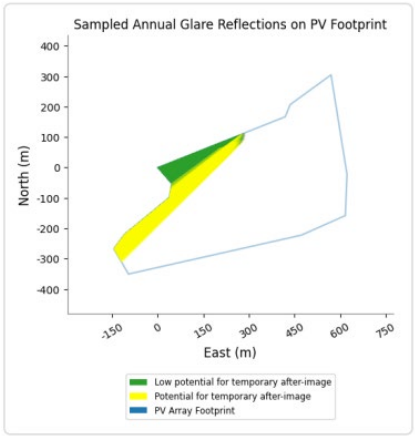
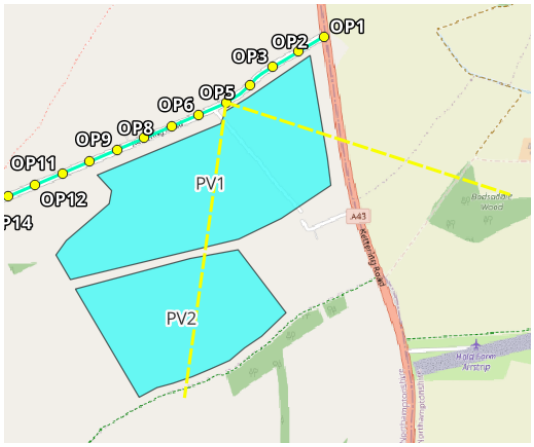
The below results show the area of the modelled PV arrays that is predicted glare compared to the 50° field of view of road users travelling northbound at the corresponding observation points.

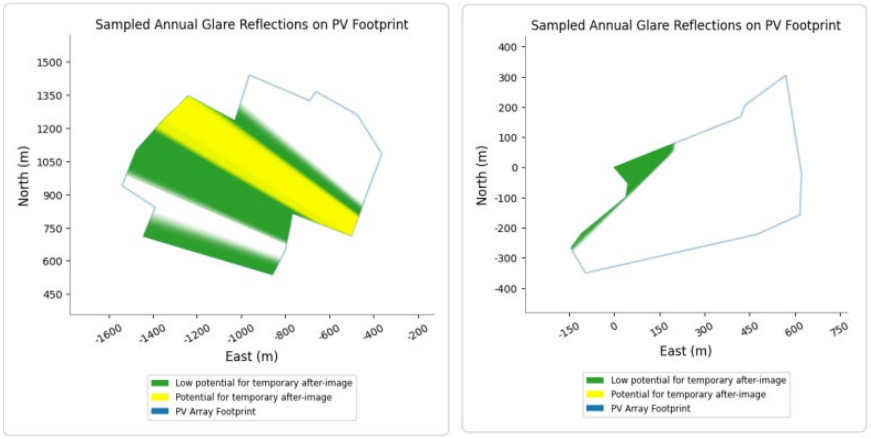
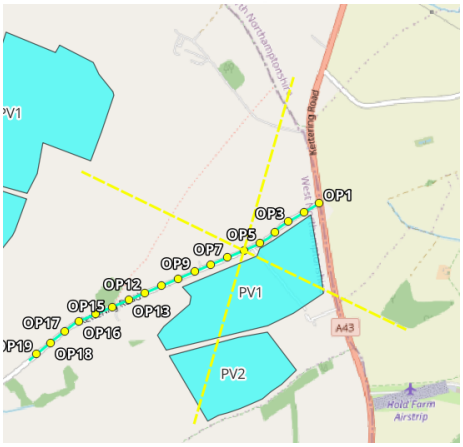
Table 3.6: Kettering Road – Tracking Panel Results

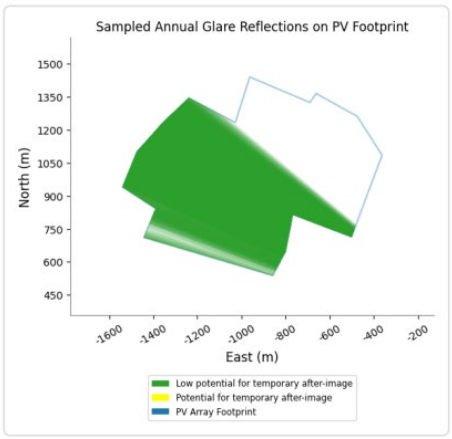
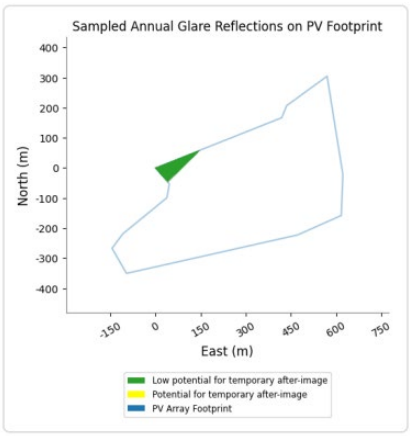
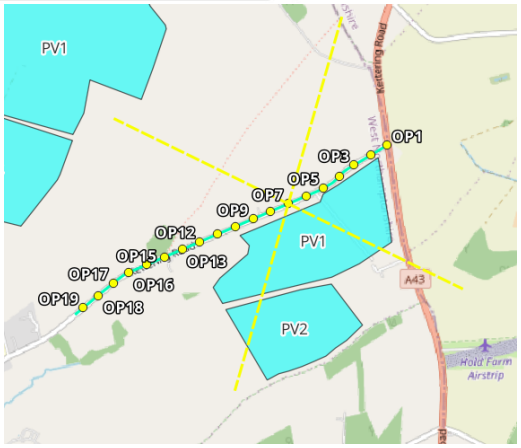
Receptor	Results
OP1	Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 and PV2 Green Hill A.2. It is noted that OP1 is outside the 1km screening distance of Green Hill A, and the reflecting area of PV2 Green Hill A.2. Based on industry guidance, the highest magnitude of impact possible from Green Hill A and PV2 Green Hill A.2 will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP2	Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 and PV2 Green Hill A.2. It is noted that OP2 is outside the 1km screening distance of Green Hill A, and the reflecting area of PV2 Green Hill A.2. Based on industry guidance, the highest magnitude of impact possible from Green Hill A and PV2 Green Hill A.2 will be a 'low impact'. As such, no further mitigation is required.

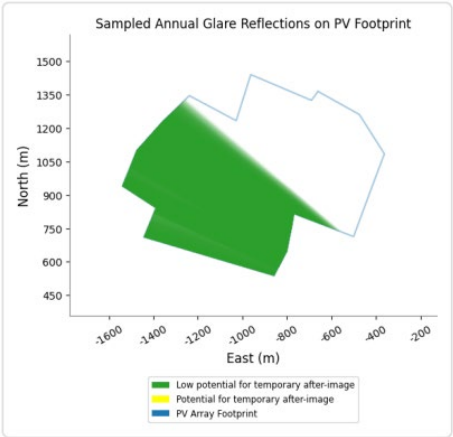
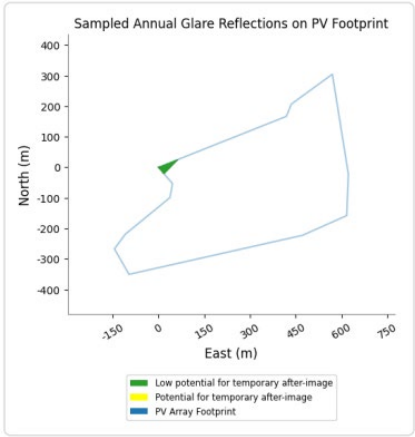
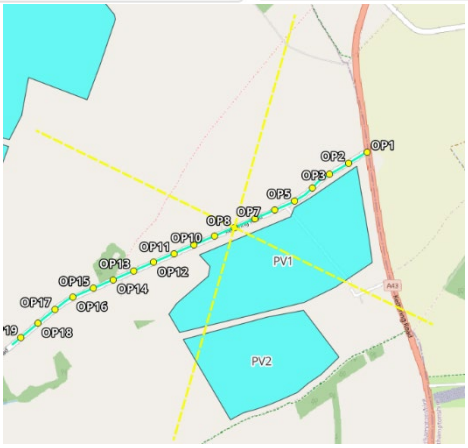
Receptor	Results
	The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP3	Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 and PV2 Green Hill A.2. It is noted that OP3 is outside the 1km screening distance of Green Hill A. Based on industry guidance, the highest magnitude of impact possible from Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

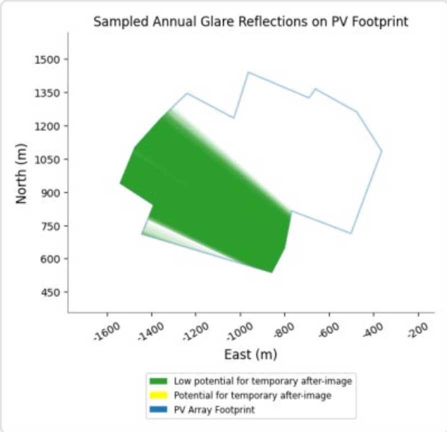
Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP4	Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 and PV2 Green Hill A.2. It is noted that OP4 is outside the 1km screening distance of Green Hill A. Based on industry guidance, the highest magnitude of impact possible from Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

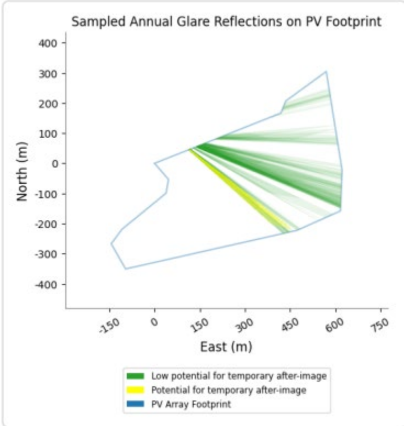
Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP5	Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP5 is outside the 1km screening distance of Green Hill A. Based on industry guidance, the highest magnitude of impact possible from Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

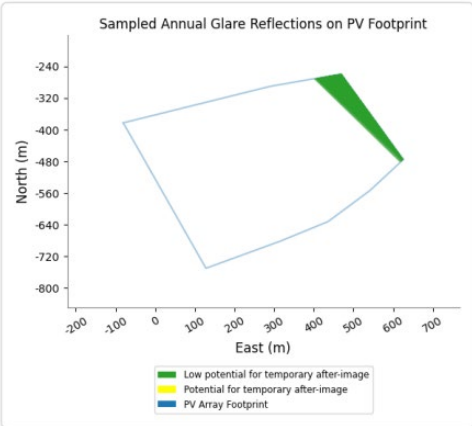
Receptor	Results
	As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP6	Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP6 is outside the 1km screening distance of PV3 and PV4 Green Hill A, and the reflecting area of PV1 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV1, PV3 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP7	Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP7 is outside the 1km screening distance of PV3 and PV4 Green Hill A, and the reflecting area of PV1 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV1, PV3 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

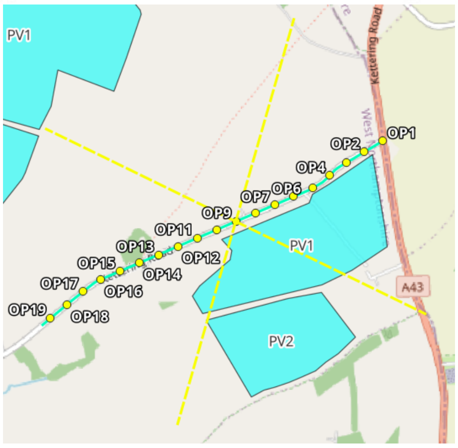
Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP8	Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 Green Hill A.2. It is noted that OP8 is outside the 1km screening distance of PV3 and PV4 Green Hill A, and the reflecting area of PV1 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV1, PV3 and PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

Receptor	Results
	   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP9	Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 and PV2 Green Hill A.2. It is noted that OP9 is outside the 1km screening distance of PV2-PV4 Green Hill A, and the reflecting area of PV1. Based on industry guidance, the highest magnitude of impact possible from PV1-PV4 Green Hill A will be a 'low impact'. As such, no further mitigation is required. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

<table>
<tr><th>Receptor</th><th>Results</th></tr>
<tr><td></td><td>


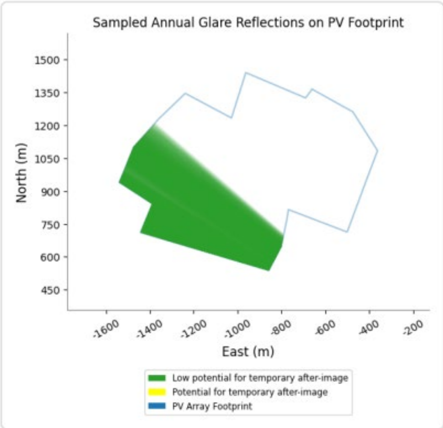


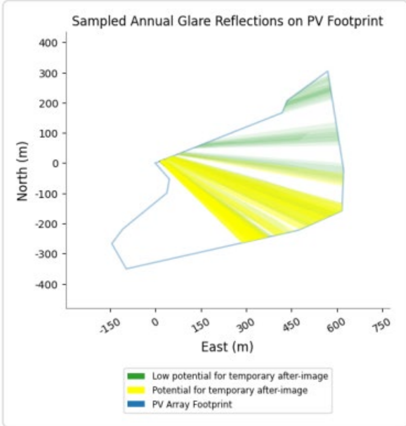


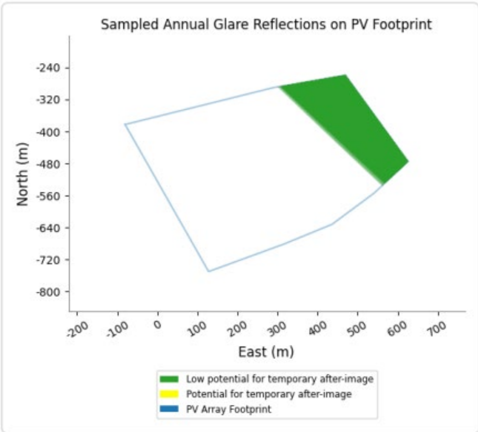


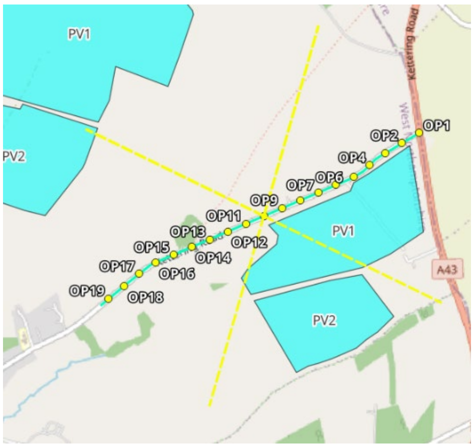
As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
</td></tr>
<tr><td>OP10</td><td>
Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 and PV2 Green Hill A.2.
It is noted that OP10 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3, and PV4 Green Hill A will be a ‘low impact’. As such, no further mitigation is required.
The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.
</td></tr>
</table>

<table>
<tr><th>Receptor</th><th>Results</th></tr>
<tr><td></td><td>







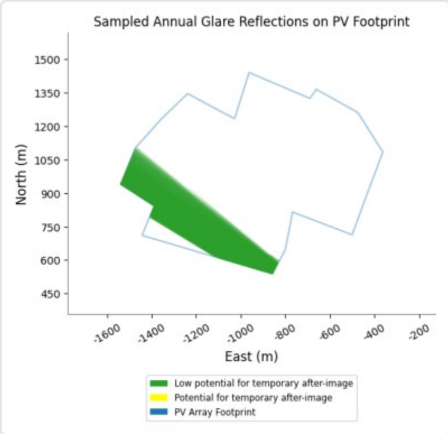


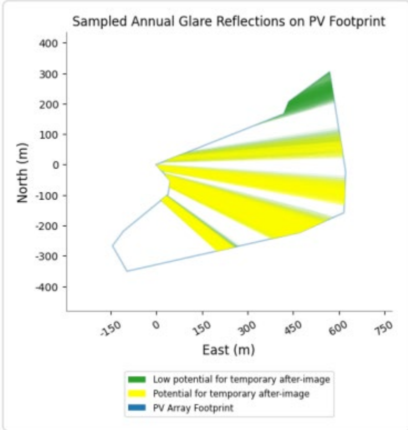
As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.</td></tr>
<tr><td>OP11</td><td>

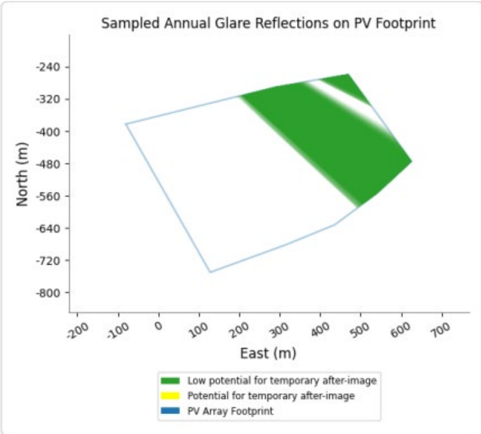
Glare is predicted from PV1, PV3, and PV4 Green Hill A and PV1 and PV2 Green Hill A.2.

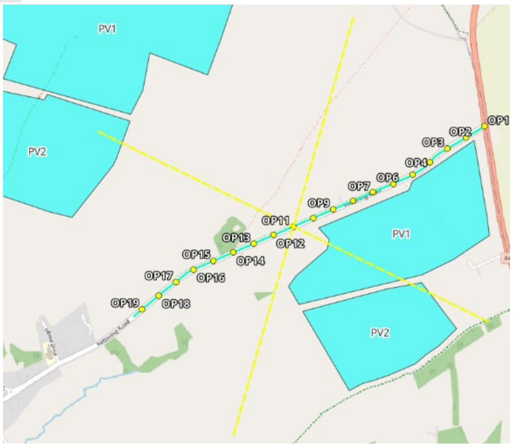
It is noted that OP11 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 and PV4 Green Hill A will be a ‘low impact’. As such, no further mitigation is required.

The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.</td></tr>
</table>

<table>
<tr><th>Receptor</th><th>Results</th></tr>
<tr><td></td><td>




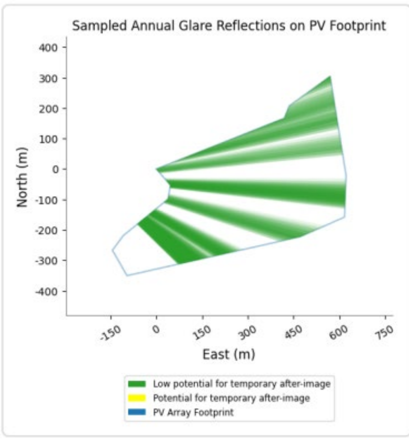


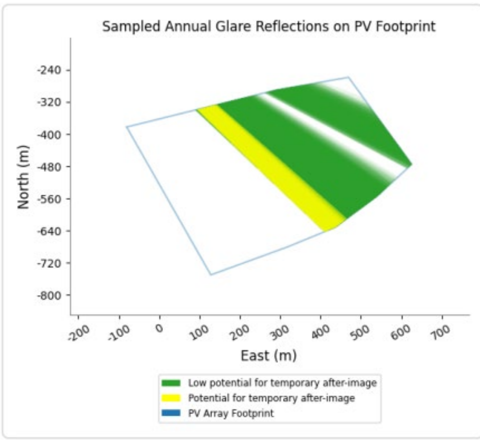


Based on industry guidance, the highest magnitude of impact possible from glare that originates outside the 50° field of view is of ‘low impact’</td></tr>
<tr><td>OP12</td><td>Glare is predicted from PV3 and PV4 Green Hill A and PV1 and PV2 Green Hill A.2.

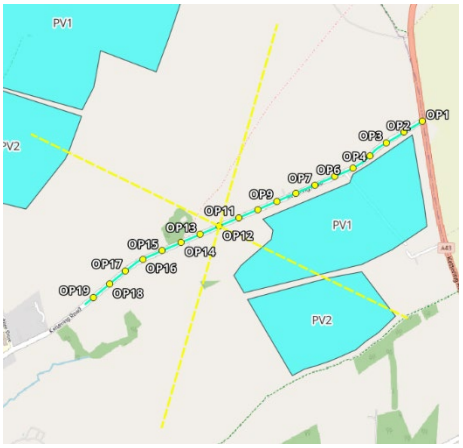
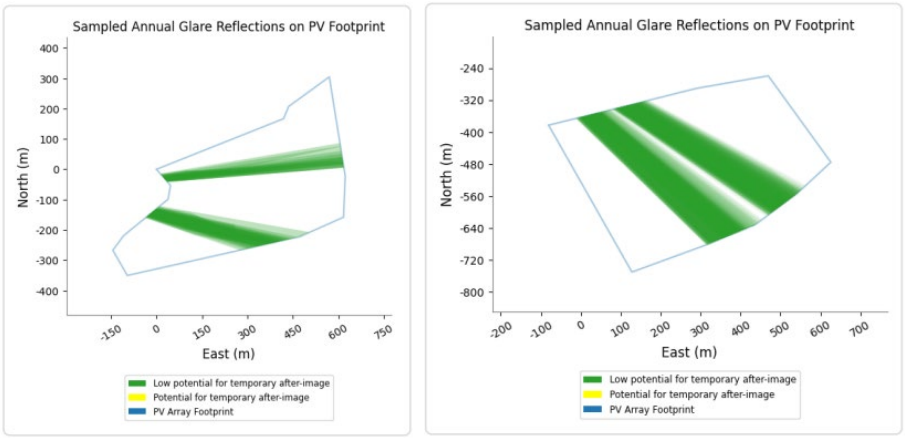
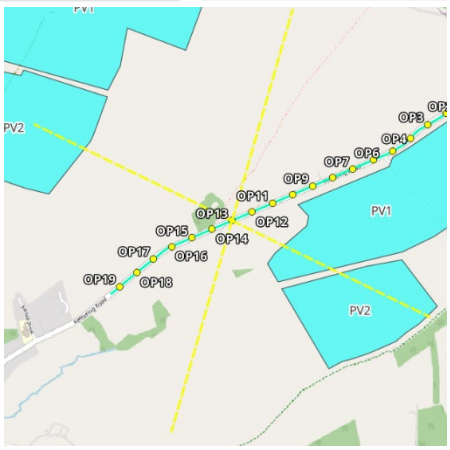
It is noted that OP12 is outside the 1km screening distance of PV3 and PV4 Green Hill A. Based on industry guidance, the highest magnitude of impact possible from PV3 and PV4 Green Hill A will be a ‘low impact’. As such, no further mitigation is required.

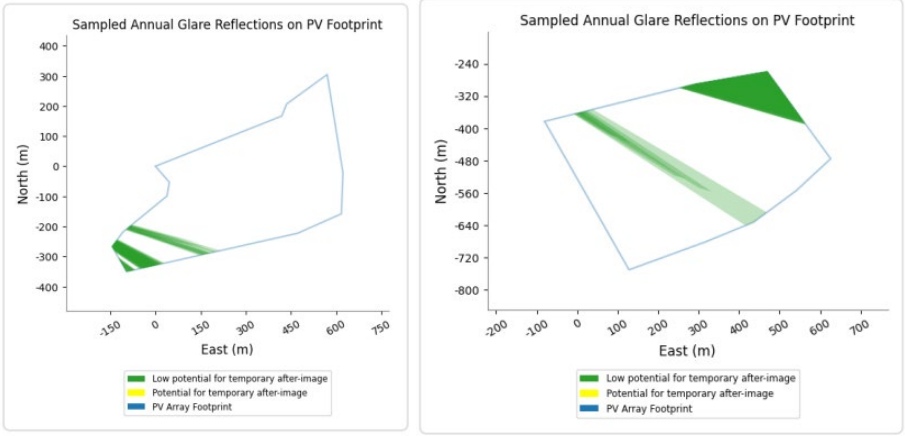
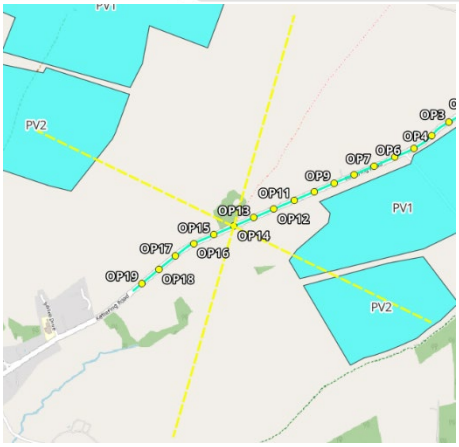
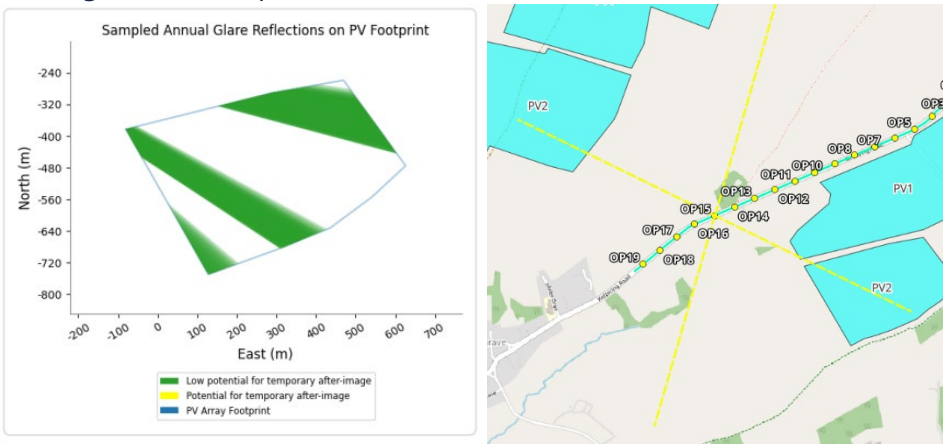
The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.

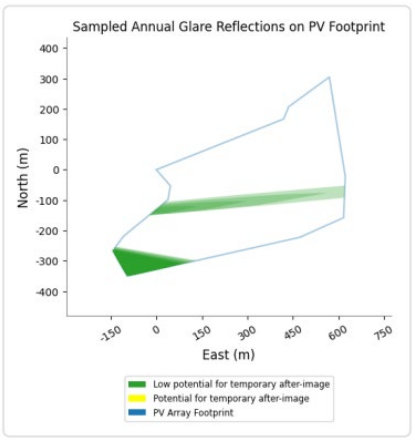
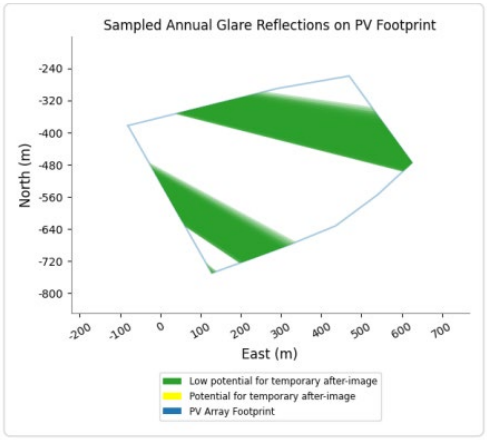
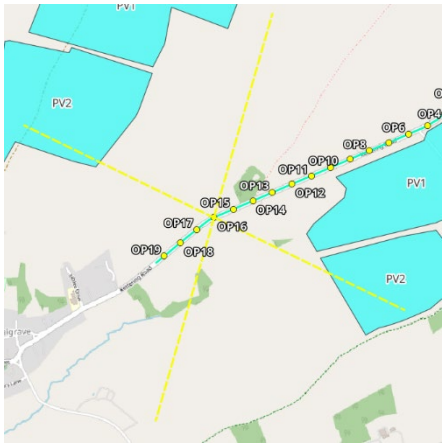
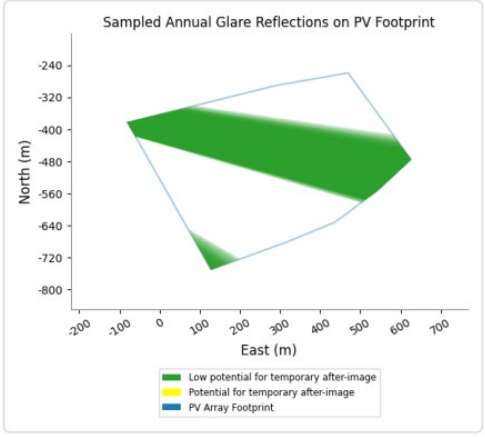
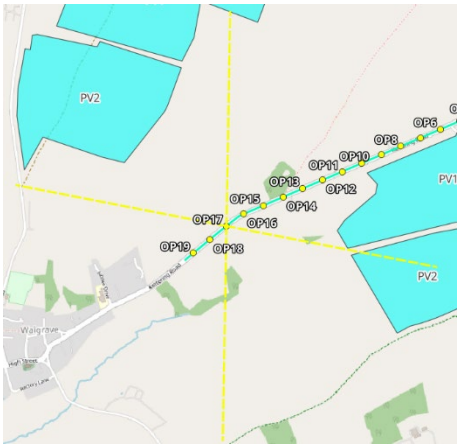


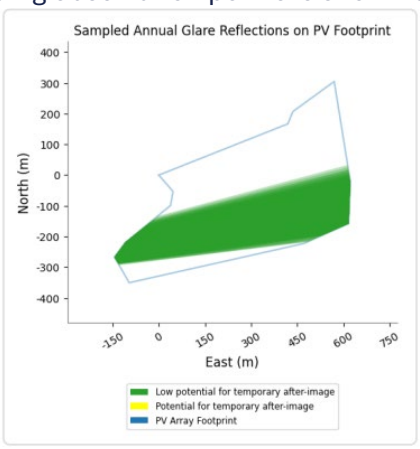
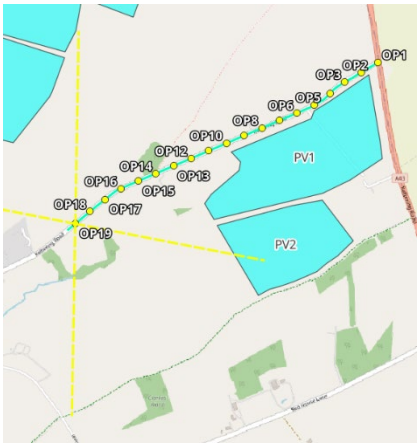


</td></tr>
</table>

Receptor	Results
	 As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP13	Glare is predicted from PV1 and PV2 Green Hill A.2. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP14	Glare is predicted from PV1 and PV2 Green Hill A.2.

Receptor	Results
	The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP15	Glare is predicted from PV2 Green Hill A.2. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.

Receptor	Results
OP16	Glare is predicted from PV1 and PV2 Green Hill A.2. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.    As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP17	Glare is predicted from PV2 Green Hill A.2. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.  

Receptor	Results
	As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.
OP18	***No glare predicted towards OP18.***
OP19	Glare is predicted from PV1 Green Hill A.2. The area of the modelled PV array that is predicted glare, and the 50° field of view at the corresponding observation points is shown below.   As such, glare is predicted within the 50° field of view. A review of mitigation considerations has been undertaken in Section 5.3.3.

Detailed ForgeSolar output results are available on request.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'no impact' significance may be classified where glare will not be visible from the assessed receptor. As such, no impacts are predicted to occur at OP18.

With reference to impact significance guidance as outlined in Section 15.4.30 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'moderate impact' may be classified where unmitigated glare is predicted inside the 50° FOV of road users. As such, moderate impacts are predicted to occur at OP1-OP17 and OP19. Based on industry guidance, professional judgement is applied and further review of factors not included within the model are considered in Section 5.1.3.

3.3.3 Results Discussion

Additional factors have been considered to determine the residual impact significance at receptors at OP1-OP19. These include:

- Existing screening/obstructions; and
- The extent to which cloud cover and glare impacts coincide.

3.3.3.1 Existing Screening and Obstructions

OP1

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. It is expected that panels within PV1 Green Hill A.2 closest to road users at OP1 will obstruct line of sight to reflecting panels further away. Furthermore, as shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are

proposed along the north and north east border of PV1 Green Hill A.2, further obstructing line of sight. As such, a maximum impact magnitude of 'low impact' may be classified.

OP2

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. As shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are proposed along the north and north east border of PV1 Green Hill A.2, obstructing line of sight between road users and the proposed arrays. As such, a maximum impact magnitude of 'low impact' may be classified.

OP3

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 and PV2 Green Hill A.2. It is expected that panels within PV1 Green Hill A.2 closest to road users at OP3 will obstruct line of sight to reflecting panels further away. Furthermore, as shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are proposed along the north and north east border of PV1 Green Hill A.2, obstructing line of sight between road users and the proposed arrays. As such, a maximum impact magnitude of 'low impact' may be classified.

OP4

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 and PV2 Green Hill A.2. It is expected that panels within PV1 Green Hill A.2 closest to road users at OP4 will obstruct line of sight to reflecting panels further away. Furthermore, as shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are proposed along the north and north east border of PV1 Green Hill A.2, obstructing line of sight between road users and the proposed arrays. As such, a maximum impact magnitude of 'low impact' may be classified.

OP5

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. It is expected that panels within PV1 Green Hill A.2 closest to road users at OP5 will obstruct line of sight to reflecting panels further away. Furthermore, as shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are proposed along the north and north east border of PV1 Green Hill A.2, obstructing line of sight between road users and the proposed arrays. As such, a maximum impact magnitude of 'low impact' may be classified.

OP6

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. It is expected that panels within PV1 Green Hill A.2 closest to road users at OP6 will obstruct line of sight to reflecting panels further away. Furthermore, as shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are proposed along the north and north east border of PV1 Green Hill A.2, obstructing line of sight between road users and the proposed arrays. As such, a maximum impact magnitude of 'low impact' may be classified.

OP7

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. It is expected that panels within PV1 Green Hill A.2 closest to road users at OP7 will obstruct line of sight to reflecting panels further away. Furthermore, as shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are proposed along the north and north east border of PV1 Green Hill A.2, obstructing line of sight between road users and the proposed arrays. As such, a maximum impact magnitude of 'low impact' may be classified.

OP8

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. It is expected that panels within PV1 Green Hill A.2 closest to road users at OP8 will obstruct line of sight to reflecting panels further away. Furthermore, as shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are proposed along the north and north east border of PV1 Green Hill A.2, obstructing line of sight between road users and the proposed arrays. As such, a maximum impact magnitude of 'low impact' may be classified.

OP9

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. It is expected that panels within PV1 Green Hill A.2 closest to road users at OP9 will obstruct line of sight to reflecting panels further away. Furthermore, as shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are proposed along the north and north east border of PV1 Green Hill A.2, obstructing line of sight between road users and the proposed arrays. As such, a maximum impact magnitude of 'low impact' may be classified.

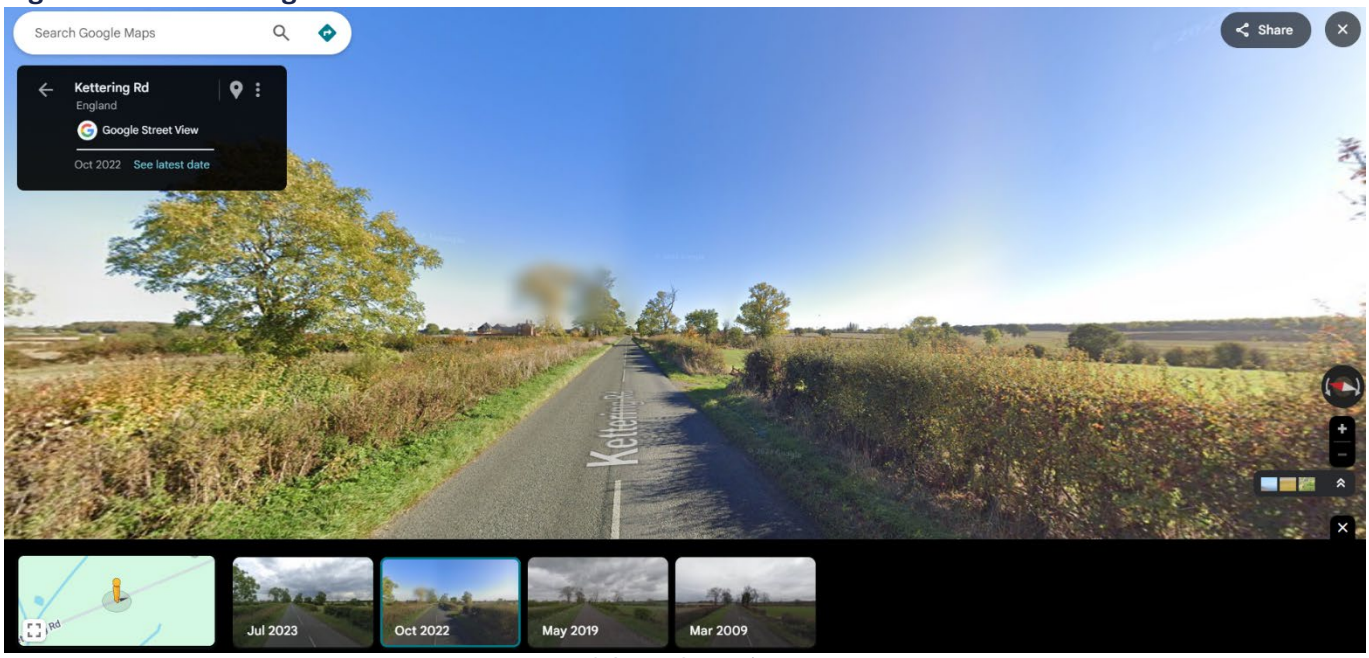
OP10

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. It is expected that panels within PV1 Green Hill A.2 closest to road users at OP10 will obstruct line of sight to reflecting panels further away. Furthermore, as shown in [APP-208] Landscape and Ecology Mitigation Plan A.2, hedgerows are proposed along the north and north east border of PV1 Green Hill A.2, obstructing line of sight between road users and the proposed arrays. As such, a maximum impact magnitude of 'low impact' may be classified.

OP11

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 and PV2 Green Hill A.2. Topography and dense vegetation aligning Kettering Road is expected to partially obstruct line of sight between road users and the reflecting area of PV1 and PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.35: Line of sight from OP11 towards PV1 and PV2

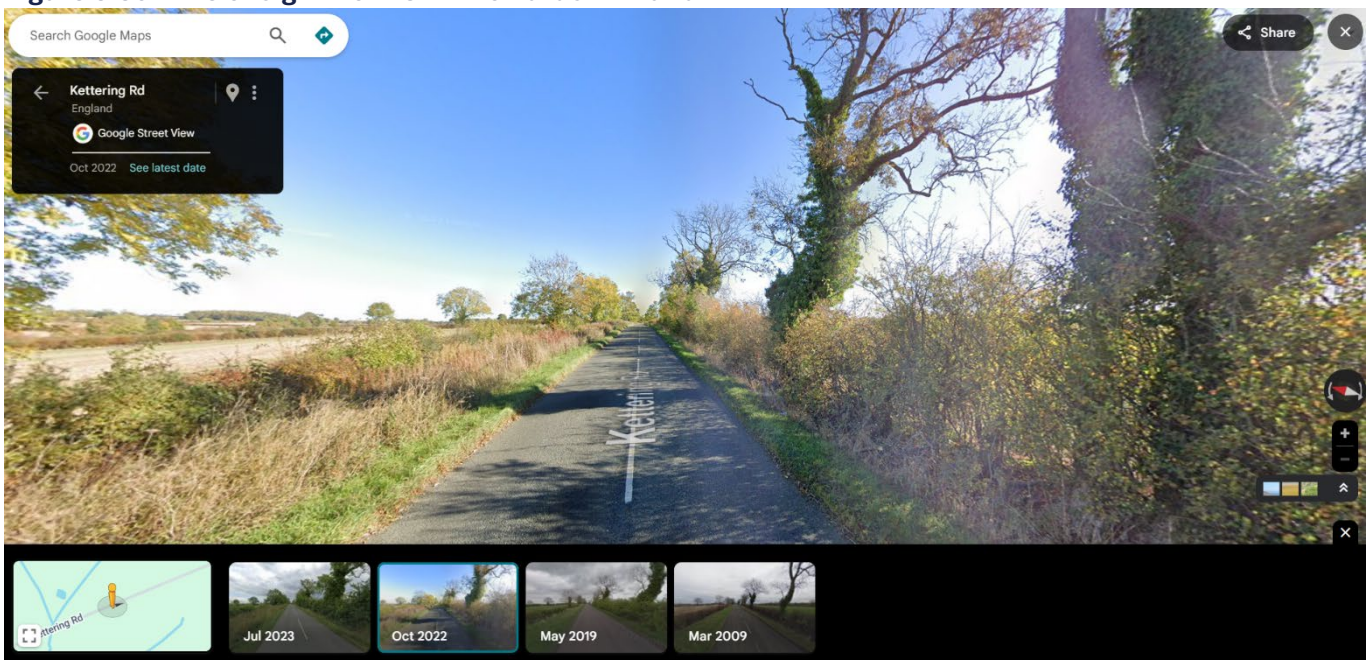


© Google Street View

OP12

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 and PV2 Green Hill A.2. Topography and dense vegetation aligning Kettering Road is expected to partially obstruct line of sight between road users and the reflecting area of PV1 and PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.36: Line of sight from OP12 towards PV1 and PV2



© Google Street View

OP13

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. Topography and dense vegetation aligning Kettering Road is expected to partially obstruct line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.37: Line of sight from OP13 towards PV1

© Google Street View

OP14

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 and PV2 Green Hill A.2. Topography and dense vegetation aligning Kettering Road is expected to partially obstruct line of sight between road users and the reflecting area of PV1 and PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.38: Line of sight from OP14 towards PV1 and PV2

© Google Street View

OP15

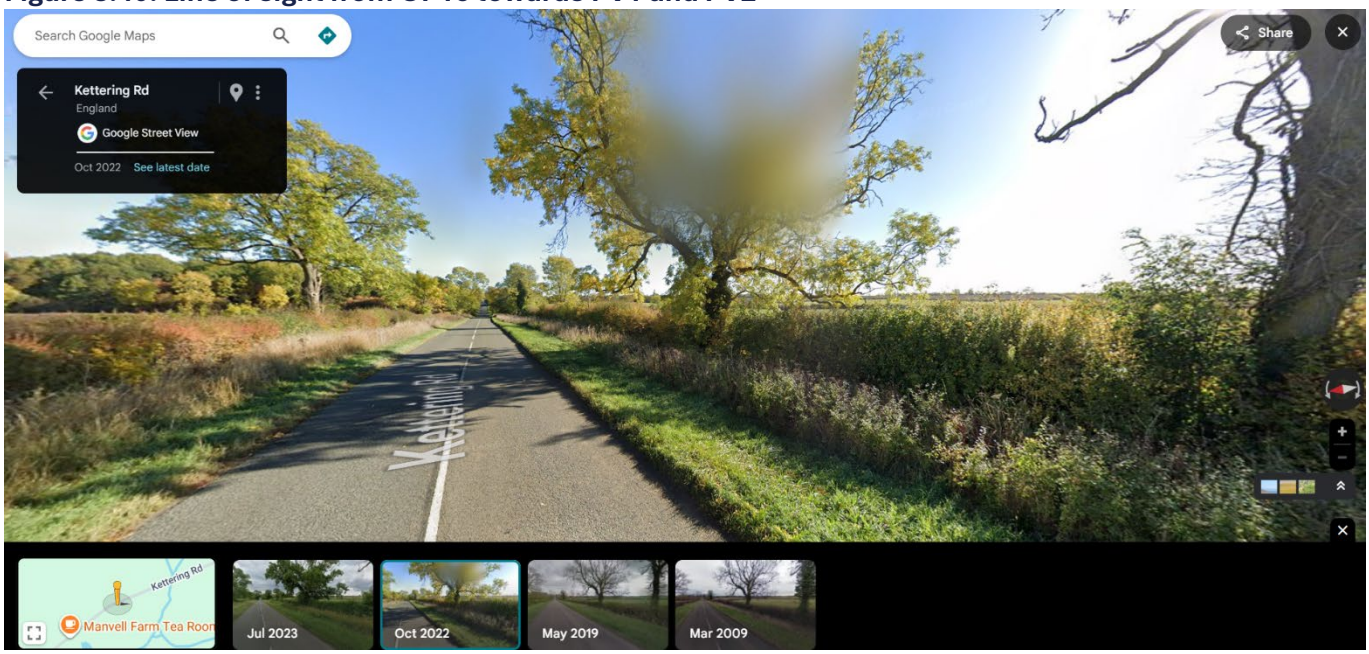
Unmitigated glare is predicted inside the 50° FOV of road users from PV2 Green Hill A.2. Topography and dense vegetation aligning Kettering Road is expected to partially obstruct line of sight between road users and the reflecting area of PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.39: Line of sight from OP15 towards PV2

OP16

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 and PV2 Green Hill A.2. Topography and dense vegetation aligning Kettering Road is expected to partially obstruct line of sight between road users and the reflecting area of PV1 and PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

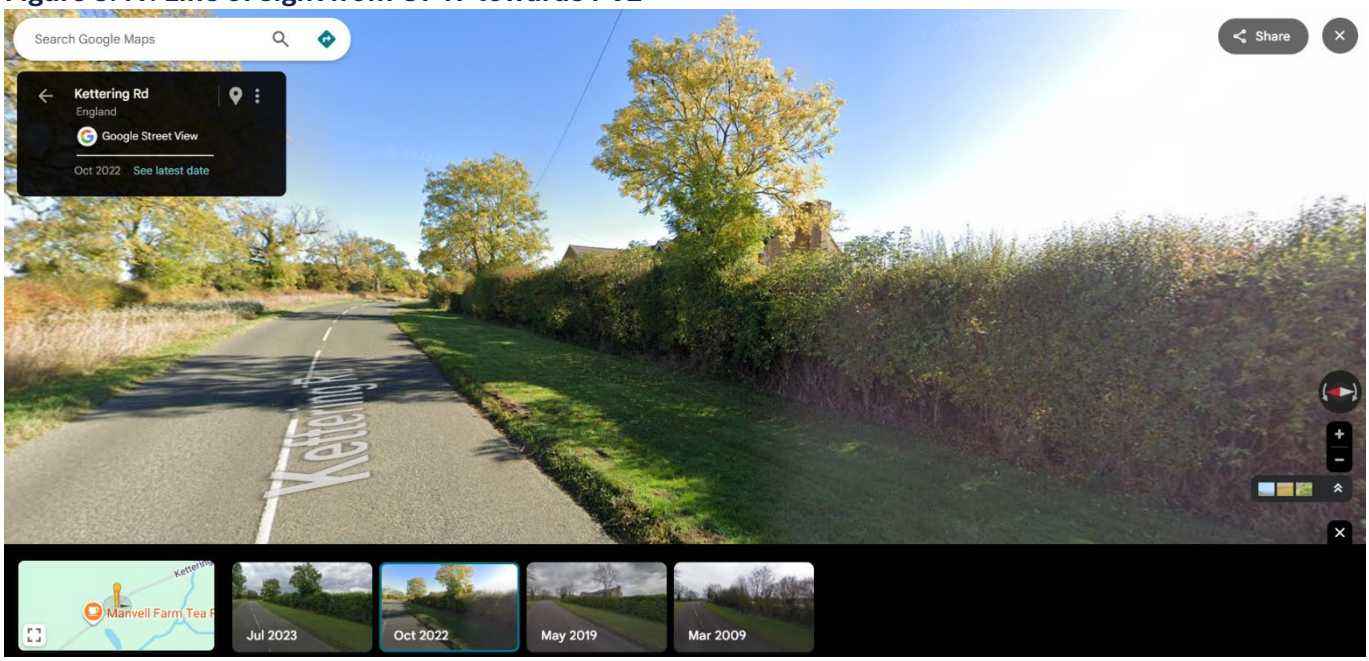
Figure 3.40: Line of sight from OP16 towards PV1 and PV2



OP17

Unmitigated glare is predicted inside the 50° FOV of road users from PV2 Green Hill A.2. Topography and dense vegetation aligning Kettering Road is expected to partially obstruct line of sight between road users and the reflecting area of PV2. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.41: Line of sight from OP17 towards PV2

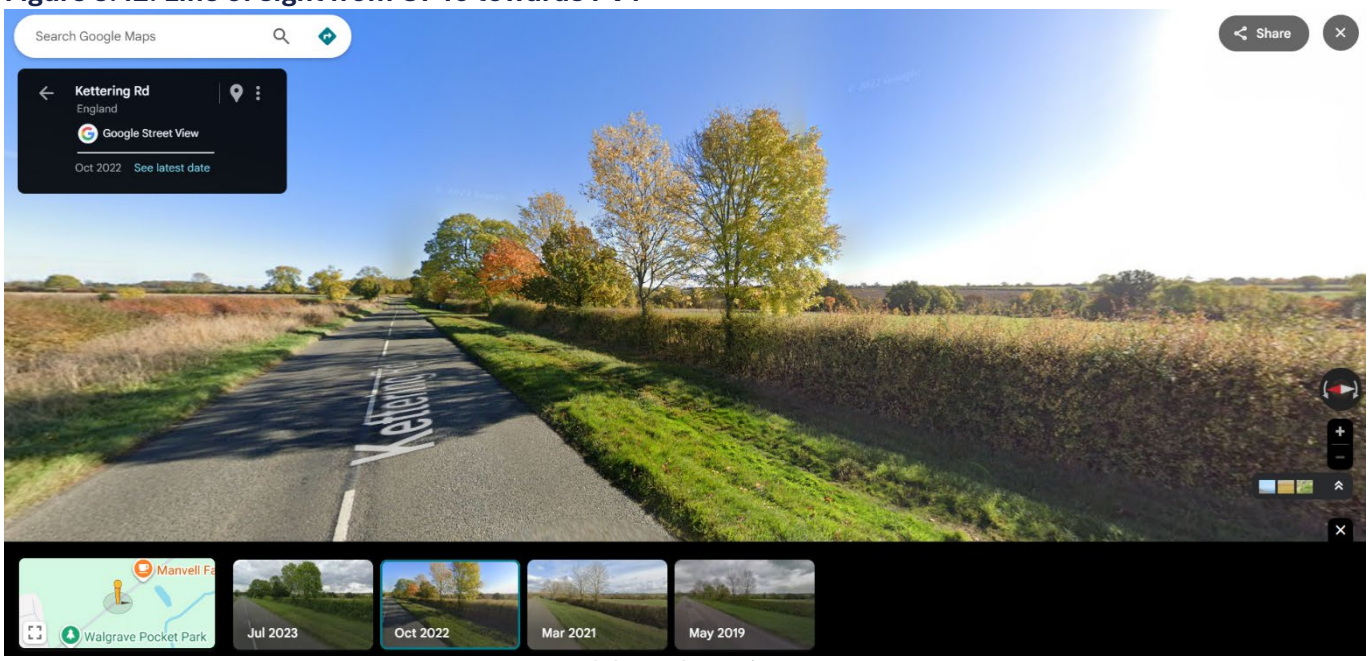


© Google Street View

OP19

Unmitigated glare is predicted inside the 50° FOV of road users from PV1 Green Hill A.2. Topography and dense vegetation aligning Kettering Road is expected to partially obstruct line of sight between road users and the reflecting area of PV1. As such, a maximum impact magnitude of 'low impact' may be classified.

Figure 3.42: Line of sight from OP19 towards PV1



© Google Street View

3.3.3.2 Cloud Cover

As the worst-case approach, the model assumes clear sky conditions all year round. Cloudier conditions (overcast and mostly cloudy) exist in Broughton (nearest weather data available) for 43-75% of the time, as shown in Figure 3.11. This would reduce the glare experienced along the approach path.

Considering the cloud cover that is likely to occur in the area, the modelled glare from the Proposed Development is likely to occur at least 43% less often than predicted as a minimum. This would likely reduce the amount of glare experienced along Kettering Road.

3.3.4 Significance of Impact

As discussed in Section 2.1, based on industry guidance and good practice, technical modelling is not recommended for local roads and a maximum magnitude impact of 'low impact' may be classified from glint and glare. Notwithstanding this, the assessment in this note confirms that, with the presence of planting and cloud cover taken into consideration, no local road will experience more than a 'low impact' from glint and glare.

Table 3.7: Significance of Impact - Kettering Road

Receptor	Significance of Impact	
	Fixed Panels	Tracking Panels
OP1	**No Impact**	**Low Impact**
OP2	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP3	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP4	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP5	**Low Impact**	**Low Impact**
OP6	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP7	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP8	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP9	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP10	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP11	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP12	**Low Impact**	**Low Impact** (upon applying professional judgement)
OP13	**Low Impact**	**No Impact**
OP14	**Low Impact**	**No Impact**
OP15	**Low Impact**	**No Impact**
OP16	**Low Impact**	**No Impact**

3.4 Residential Dwellings – Lower Farm

3.4.1 Lower Farm – Fixed Panel Results

Table 3.8: Lower Farm – Fixed Panel Results

Receptor	Results
R1	Glare is predicted from PV3 Green Hill G. Glare is predicted from PV3 Green Hill G from late March to mid-September between 18:00-19:30 for a maximum of 40 minutes per day. As such, glare is predicted for less than 60 minutes per day, but for longer than 3 months of the year. A review of the predicted glare has been undertaken in Section 3.4.3.
R2	Glare is predicted from PV2 and PV3 Green Hill G. Glare is predicted from PV2 Green Hill G late May to mid-July between 16:30-17:30 for a maximum of 15 minutes per day. Glare is predicted from PV3 Green Hill G from late March to mid-September between 18:00-19:30 for a maximum of 40 minutes per day. As such, glare is predicted for less than 60 minutes per day, but for longer than 3 months of the year. A review of the predicted glare has been undertaken in Section 3.4.3.

Detailed results can be provided upon request.

With reference to impact significance guidance as outlined in Section 15.4.25 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'moderate impact' may be classified where unmitigated glare of any intensity occurs for longer than 60 minutes per day, or for more than 3 months of the year. Residential dwellings R1 and R2 are predicted to receive glare for less than 60 minutes daily, however the incidence of glare is predicted to exceed 3 months. Based on industry guidance, further review of factors not included within the model are considered in Section 3.4.3.

3.4.2 Lower Farm – Tracking Panel Results

Table 3.9: Lower Farm - Tracking Panel Results

Receptor	Results
R1	Glare is predicted from PV3 Green Hill G. Glare is predicted from PV2 Green Hill G during July between 19:30-20:30 for a maximum of 20 minutes per day. Based on industry guidance, glare that is predicted for less than 60 minutes per day and less than 3 months per year is of 'low impact', and no further mitigation is required.
R2	Glare is predicted from PV2 Green Hill G. Glare is predicted from PV2 Green Hill G during July between 19:30-20:30 for a maximum of 20 minutes per day.

Receptor	Results
	Based on industry guidance, glare that is predicted for less than 60 minutes per day and less than 3 months per year is of 'low impact', and no further mitigation is required.

Detailed results can be provided upon request.

With reference to impact significance guidance as outlined in Section 15.4.25 of **ES Chapter 15 Glint and Glare [APP-052]**, a 'low impact' may be classified where glare of any intensity occurs for less than 60 minutes per day and for less than 3 months per year. As such, low impacts are predicted to occur at R1 and R2.

3.4.3 Results Discussion

Glare has been predicted towards R1 and R2 from fixed panels for less than 60 minutes daily, however the incidence of glare is predicted to exceed 3 months.

It is noted that dense vegetation partially obstructs line of sight between the residential dwellings, as shown below in Viewpoint 52 from the Landscape and Visual Impact Assessment

Figure 3.43: Viewpoint 52 - Vegetation Intervening Residential Dwellings and Proposed Arrays

© Lanpro

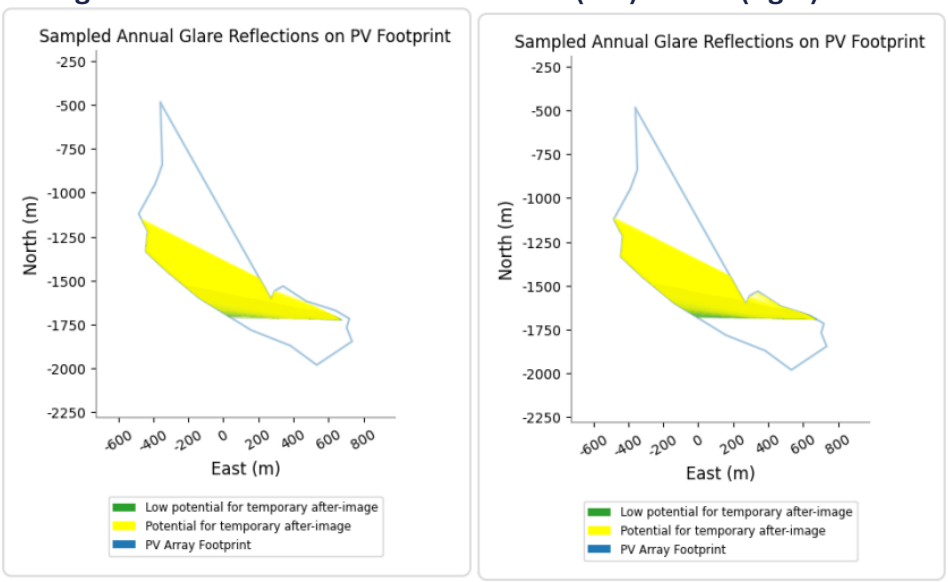
It is noted that the resident has illustrated line of sight from the garden of the residencies towards the south east corner of PV3 Green Hill G, as shown below in Figure 3.44.

Figure 3.44: Line of sight from Garden of Residential Dwellings

It is noted that there is no line of sight towards PV2 Green Hill G. As such, a 'no impact' may be classified towards PV2 Green Hill G.

The reflecting areas of PV3 Green Hill G is shown below in Figure 3.45.

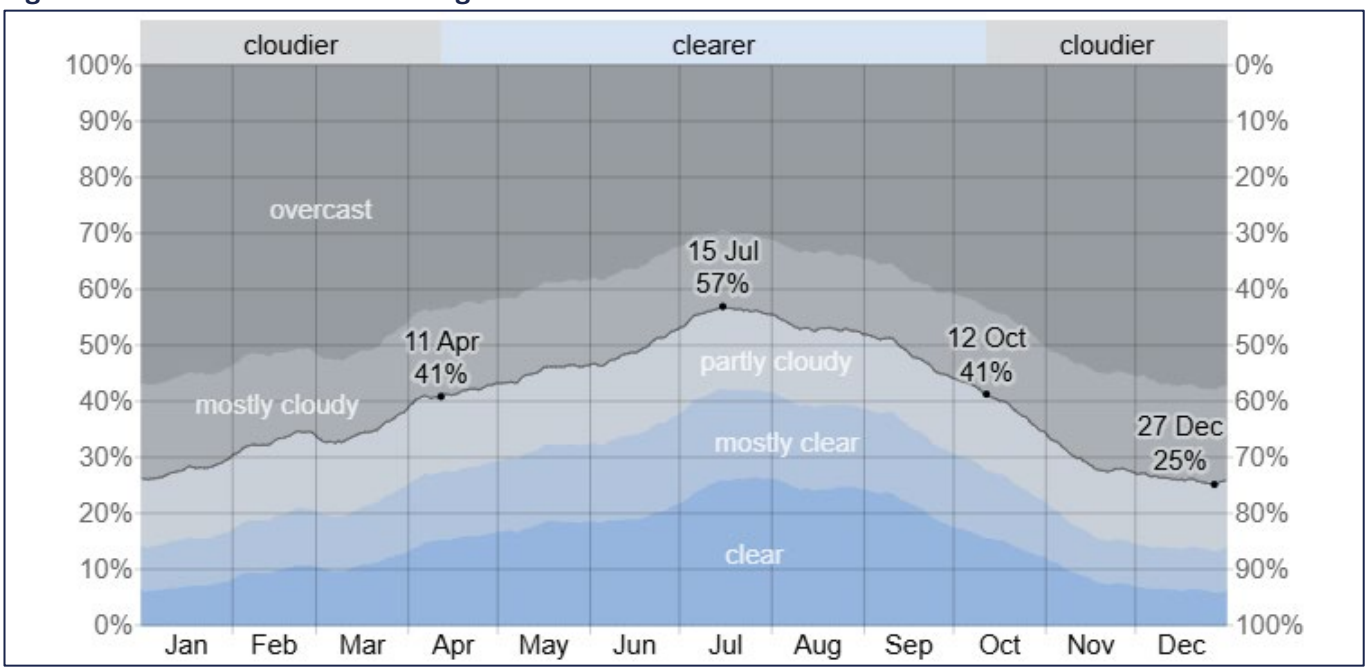
Figure 3.45: Reflecting Area of PV3 Green Hill G towards R1 (left) and R2 (right)



Only a small portion of the reflecting area of PV3 Green Hill G will be visible from the residential dwellings. As shown in the Landscape and Ecology Mitigation Plan G [APP-219], dense linear tree planting is also proposed between the residential dwellings and proposed arrays. This will further obstruct line of sight between the residential dwellings and the proposed arrays.

As the worst-case approach, the model assumes clear sky conditions all year round. In the affected months (March to September) cloudier conditions (overcast and mostly cloudy) exist in Warrington (closest weather data available) for 43-65% of the time, as shown below in Figure 3.46.

Figure 3.46: Cloud Cover at Warrington



© weatherspark.com

Considering the cloud cover that is likely to occur in the area, the modelled glare from the Scheme is likely to occur 43% less of often than predicted as a minimum. This is likely to further mitigate glare impacts towards the residential dwellings.

3.4.4 Significance of Impact

Table 3.10: Significance of Impact - Lower Farm

Receptor	Significance of Impact	
	Fixed Panels	Tracking Panels
OP1	**Low Impact** (upon applying professional judgement)	**No Impact**
OP2	**Low Impact** (upon applying professional judgement)	**No Impact**

4. Three Shires Way

The Three Shires Way is a public right of way (PRoW) that runs adjacent to Green Hill G.

In accordance with UK industry guidance on glint and glare assessment, it is not anticipated that users of PRoW, including equestrians and horses, would experience significant impacts from solar panel reflections.

The sensitivity of PRoW receptors, in terms of amenity and safety, is considered low significance due to the following:

- The typical density of users on a bridlepath is generally low in a rural environment. This is relative to other transport methods that are typically modelled within a glint and glare assessment, i.e. major and regional roads;
- Reflections typically coincide with direct sunlight. Impacts that coincide with direct sunlight appear less prominent than those that do not as the sun is a far more significant source of light than reflecting panels;
- Any resultant effect is much less serious and has far lesser consequences than, for example, solar reflections experienced towards a road network whereby the resultant impacts of a solar reflection can be much more serious to safety;
- Glint and glare effects towards PRoW receptors are transient, and depend on time and location. Users of PRoW can move beyond the solar reflection zone with minimal impact upon safety or amenity.

Furthermore, any effect is likely to have a low magnitude because the reflection intensity from solar panels is similar to that of still water or common glass, a common feature of the outdoor environment (i.e. puddles or stable windows). Therefore, the reflections are likely to be comparable to those from common outdoor sources whilst navigating the natural and built environment on a regular basis.

Additionally, the British Horse Society (BHS) *'Advice on Solar Farms near Routes Used by Equestrians'*, found in Appendix A of the Written Summary of the Applicant's Oral Submissions and Responses at Issue Specific Hearing 1 and Responses to Action Points **[REP1-162]** states that *'any reflection is unlikely to be a direct problem to horses or equestrians because of the angles and distances involved and because the surface has a dull sheen rather than glare even on a bright day.'* It also states that the BHS *'has no evidence of glint and glare from solar panels and no evidence of horses reacting to it or of it being detrimental to the health and wellbeing of horses.'*

As such, the effects of glint and glare on users of the Three Shires Way, including horse riders, will be low and a detailed assessment is not required.

5. Conclusions

5.1 Local roads

Based on industry guidance, technical modelling is not recommended for local roads. However, upon request of WNC, Newland Road, Broughton Road, and Kettering Road were modelled for the potential impact of glint and glare. The modelling predicted glare within the central 50° field-of-view of receptors along the three roads for both fixed tilt and tracking panels. However, upon consideration of factors not included within the model, such as additional obstructions and cloud cover, a 'low impact' may be classified towards all three roads. As such, no further mitigation is recommended.

5.2 Lower Farm

Technical modelling was undertaken for residential dwellings at Lower Farm to assess the potential impact of glint and glare. The modelling predicted glare for less than 60 minutes a day and for less than 3 months a year from tracking panels located within Green Hill G. As such, a 'low impact' may be classified from tracking panels. Glare was predicted for less than 60 minutes per day, but for longer than 3 months of the year from fixed tilt panels. However, upon consideration of factors not included within the model, such as additional obstructions and cloud cover, a 'low impact' may be classified towards Lower Farm. As such, no further mitigation is recommended.

5.3 Three Shires Way

A review of industry guidance was undertaken to determine the potential impact of glint and glare towards users of the Three Shires Way. This concluded that detailed assessment of PRoW such as Three Shires Way

is not required, due to the low sensitivity of the users and based on good practice. Users of PRoW, including horse riders, will experience no more than a low impact from glint and glare.

Quality Assurance

Issue Record

Revision	Description	Date	Author	Reviewer	Approver
1.0	Final Issue	18 November 2025	AC	JJ	JJ