Green Hill Solar Farm
EN010170

Environmental Statement
Chapter 15: Glint and Glare

Prepared by: Arthian Ltd

Date: May 2025

Document Reference: APP/GH6.2.15

APFP Regulation 5(2)(a)

Contents

Issue Sheet

Report Prepared for: Green Hill Solar Farm

DCO Submission

Chapter 15: Glint and Glare

Prepared by
Name: Alexandra Clacy
Job title: Environmental Engineer

Approved by
Name: Joshua Jones
Job title: Principal Environmental Consultant

Revision	Date	Prepared by	Approved by
Original	23/05/2025	AC	JJ

15 Glint and Glare

15.1 Introduction

15.1.1 This chapter presents the findings of the Environmental Impact Assessment (EIA) concerning the potential glint and glare impacts of the Scheme during the operation and maintenance phase.

15.1.2 The following aspects will be considered within the Glint and Glare assessment process:

- Road users – specifically drivers of motor vehicles;
- Occupants of nearby residential dwellings;
- Aviation activity at nearby airfields;
- Community uses (e.g. horse facilities), public rights of way (including all users e.g. cyclists, equestrians, walkers);
- Agricultural workers;
- Ecological receptors; and
- Waterways.

15.1.3 This chapter have been prepared by Arthian Ltd (see Statement of Competence [**EN010170/APP/GH6.3.1.1**]).

15.1.4 For scheme description details, please refer to Chapter 4: Scheme Description [**EN010170/APP/GH6.2.4**].

Appendices and Figures

15.1.5 This chapter is supported by the following appendices:

- Appendix 15.1: Green Hill Solar Farm – Green Hill A and Green Hill A.2 Ground-Based Receptor Results **[EN010170/APP/GH6.3.15.1];**
- Appendix 15.2: Green Hill Solar Farm – Green Hill B Ground-Based Receptor Results **[EN010170/APP/GH6.3.15.2];**
- Appendix 15.3: Green Hill Solar Farm – Green Hill C, D, and E Ground-Based Receptor Results **[EN010170/APP/GH6.3.15.3];**
- Appendix 15.4: Green Hill Solar Farm – Green Hill F Ground-Based Receptor Results **[EN010170/APP/GH6.3.15.4];**
- Appendix 15.5: Green Hill Solar Farm – Green Hill G Ground-Based Receptor Results **[EN010170/APP/GH6.3.15.5];**
- Appendix 15.6: Green Hill Solar Farm - Easton Maudit Airfield Aviation Receptor Results **[EN010170/APP/GH6.3.15.6];**
- Appendix 15.7: Green Hill Solar Farm – Hold Farm Airstrip Aviation Receptor Results **[EN010170/APP/GH6.3.15.7];**
- Appendix 15.8: Green Hill Solar Farm – Pitsford Airstrip Aviation Receptor Results **[EN010170/APP/GH6.3.15.8];**

- Appendix 15.9: Green Hill Solar Farm – Hold Farm Airstrip Aviation Receptor Results **[EN010170/APP/GH6.3.15.9];**
- Appendix 15.10: Green Hill Solar Farm – Tower Farm Airstrip Aviation Receptor Results **[EN010170/APP/GH6.3.15.1];** and
- Appendix 15.11: Green Hill Solar Farm – William Pitt Airstrip Aviation Receptor Results **[EN010170/APP/GH6.3.15.11].**

15.1.6 This chapter is supported by the following tables:

- **Table 15.1 Relevant Scoping Opinion Comments;**
- **Table 15.2 Statutory Consultation Comments;**
- **Table 15.3 Table of Receptor Sensitivity;**
- **Table 15.4 Significance of Impact; and**
- **Table 15.5 Summary of Residual Effects for Glint and Glare.**

15.2 Consultation

Scoping Opinion

15.2.1 An EIA Scoping Report [**EN010170/APP/GH6.3.2.1**] was submitted to the Planning Inspectorate (PINS) in July 2024 (Ref 15.1), with a formal request for a Scoping Opinion. PINS subsequently issued the Scoping Opinion [**EN010170/APP/GH6.3.2.2**] on 30 August 2024.

Table 15.1 Relevant Scoping Opinion Comments

Consultee and Date	Comment	How has the comment been addressed	Location of response in chapter
The Planning Inspectorate 30 August 2024 ID 3.10.1 and ID 3.10.2	The Planning Inspectorate agreed to scope out Railways from the Glint and Glare Assessment, as well as the construction and decommissioning phases of the Scheme as per 3.10.1 and 3.10.2.	Railways and the construction and decommissioning phases have been scoped out and emitted from the report.	Not Applicable
The Planning Inspectorate	The Planning Inspectorate states that due to a lack of	Further justification demonstrating likely significant effect for PRoW and horse facilities is	Further justification demonstrating the LSE is provided

Consultee and Date	Comment	How has the comment been addressed	Location of response in chapter
30 August 2024 ID 3.10.3	adequate justification, the Inspectorate is not content to scope Public Right of Ways or Horse Facilities out of the ES, as per 3.10.3 of the Scoping Opinion. The Inspectorate considers that this matter should be subject to further assessment in the ES, or supporting evidence should be provided demonstrating the absence of LSE and agreement with the relevant consulting bodies.	provided outlining a qualitative review of the likely significant effects.	within Section 15.4 of this ES chapter.
The Planning Inspectorate 30 August 2024 ID 3.10.4	As per 3.10.4 if the Scoping Opinion, the Planning Inspectorate considers that given the current rural nature of the surrounding area, the ES should assess other receptors such as users of vessels on waterways within the ZTV, agricultural workers including when using farm machinery, and ecological receptors in	There are no waterways large enough for vessels within 1km of the solar arrays. As such, navigable waterways are not considered further within this chapter. It is noted that there is no evidence in Glint and Glare guidance or wider literature to suggest that there are ecological impacts of glint and glare as such, ecological receptors have not been included within the modelling assessment.	Consideration towards agricultural workers, including when using machinery, is found in Section 15.4. Consideration towards ecological receptors and navigable waterways are found in Section 15.4

Consultee and Date	Comment	How has the comment been addressed	Location of response in chapter
	addition to those already identified.		
The Planning Inspectorate 30 August 2024 ID 3.10.4	As per 3.10.4 of the Scoping Opinion, the Planning Inspectorate states that the assessment should also consider the implications of these users being at varying heights from ground level, as for example, a horse rider would experience glint and glare at a difference angle than a pedestrian.	As highlighted within the report, qualitative assessment of Public Rights of Way encompassing all users (e.g. cyclists, walkers, equestrians) has been carried out including factors considered when determining the sensitivity and impact magnitude criterium are applicable to all potential users of Public Rights of Way.	The potential sensitivity and magnitude of impact is discussed in Section 15.4.

Statutory Consultation

15.2.2 Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information Report (PEIR). **Table 15.2** outlines the statutory consultation responses relating to glint and glare and how these have been addressed through the ES.

15.2.3 Responses to the Statutory Consultation are outlined in the Consultation Report [**EN010170/APP/GH5.1**].

Table 15.2 Statutory Consultation Comments

Consultee and Date	Comments	How has this comment been addressed	Location of response in the ES
Mears Ashby Parish Council 12 December 2024	Mears Ashby Parish Council have expressed concern about the effect of Glint and Glare on aviation receptors, namely Sywell Aerodrome	Impacts from Glint and Glare towards aviation receptors have been assessed, including impacts on approach paths towards Sywell	This is presented in Section 5.8 and ES Appendix 15.11 Sywell Aerodrome Aviation Receptor Results [**EN/10170/APP/GH 6.3.15.11**]

Consultee and Date	Comments	How has this comment been addressed	Location of response in the ES
		Aerodrome and the Air Traffic Control Tower.	
Mears Ashby Parish Council 12 December 2024	Mears Ashby Parish Council have raised concerns about how Glint and Glare from the panels may spook horses and their riders.	The stationary nature of fixed panels and the slow-moving nature of tracker panels means that there won't be sudden, unexpected movement which would typically spook horses.	This is discussed in Section 15.4.of this chapter.
Mears Ashby Parish Council 12 December 2024	Mears Ashby Parish Council have stated that the visual receptors should be scoped in to the Glint and Glare Assessment at up to 2km from the Scheme.	A 1km screening distance is the standard screening distance for ground-based receptors, including residential dwellings. At distances larger than 1km, the proportion of an observer's field of view that is affected by glare reduces with increased separation distance.	The factors considered when determining the applied screening distance for ground-based receptors is provided in Section 5.4 of this chapter.
Holcot Parish Council 17 December 2024	Holcot Parish Council have expressed concern about the effect of Glint and Glare on aviation receptors, namely Sywell Aerodrome	Impacts from Glint and Glare towards aviation receptors have been assessed, including impacts on approach paths towards Sywell	This is presented in Section 15.8 and ES Appendix 15.11 Sywell Aerodrome Aviation Receptor Results [**EN/10170/APP/GH 6.3.15.11**]

Consultee and Date	Comments	How has this comment been addressed	Location of response in the ES
		Aerodrome and the Air Traffic Control Tower.	

15.2.4 **Table 15.3** sets out a summary of the consultation comments received from aviation receptors.

Table 15.3 Aviation Receptor Consultation Comments

Consultee and Date	Comments	How has this comment been addressed	Location of response in the ES
Sywell Aerodrome 15 March 2024 31 May 2024 16 July 2024 18 December 2024 10 February 2025	Sywell Aerodrome have expressed concern regarding pilots on flight paths to the airfield, and towards the Air Traffic Control Tower.	Impacts from Glint and Glare towards aviation receptors have been assessed, including impacts on approach paths towards Sywell Aerodrome and the Air Traffic Control Tower. A meeting was held with Sywell Aerodrome on 10 February 2025 to discuss concerns and an Aviation Specialist was consulted to provide expert input into the results of the assessment.	This is presented in Section 15.8 and ES Appendix 15.11 Sywell Aerodrome Aviation Receptor Results [**EN/10170/APP/GH 6.3.15.11**]
Tower Farm Airfield 2 May 2024 16 August 2024	Tower Farm Airfield stated that they have no concerns about the effect of the proposed Scheme on the airfield	Impacts from Glint and Glare towards aviation receptors have been assessed, including impacts on	This is presented in Section 5.8 of this chapter and ES Appendix 15.9 Tower Farm Airstrip Aviation Receptor Results

Consultee and Date	Comments	How has this comment been addressed	Location of response in the ES
		approach paths towards Tower Farm Airfield	[**EN/10170/APP/GH 6.3.15.9**]
Easton Maudit Airfield 16 July 2024 31 July 2024 24 September 2024 10 February 2025	Easton Maudit Airfield have raised concerns about the effect of Glint and Glare of the Scheme towards operations at the airfield.	Impacts from Glint and Glare towards aviation receptors have been assessed, including impacts on approach paths towards Easton Maudit Airfield. An online meeting was held on 24 September 2024 to discuss the airfield's concerns. Additionally, an in-person meeting was held on 10th February 2025. An Aviation Specialist was consulted to provide expert input into the results of the assessment.	This is presented in Section 5.8 of this chapter and ES Appendix 15.6 Tower Farm Airstrip Aviation Receptor Results [**EN/10170/APP/GH 6.3.15.6**]
Pitsford Airfield 16 July 2024 31 July 2024	There has been no reply to any written communication from Pitsford Airfield	Impacts from Glint and Glare towards aviation receptors have been assessed, including impacts on approach paths towards Pitsford Airfield	This is presented in Section 5.8 of this chapter and ES Appendix 15.9 Pitsford Airstrip Aviation Receptor Results [**EN/10170/APP/GH 6.3.15.8**]
William Pitt Airfield 16 July 2024	There has been no reply to written communication	Impacts from Glint and Glare towards	This is presented in Section 5.8 and ES Appendix 15.10

Consultee and Date	Comments	How has this comment been addressed	Location of response in the ES
31 July 2024	from William Pitt Airfield	aviation receptors have been assessed, including impacts on approach paths towards William Pitt Airfield.	William Pitt Airfield Aviation Receptor Results [**EN/10170/APP/GH 6.3.15.1**]

15.3 Legislation, Planning Policy and Guidance

15.3.1 This section provides an overview of the legislation, planning policy and guidance against which the Scheme will be considered for glint and glare.

Planning Policy

National Planning Policy

National Policy Statement for energy (EN-1) (2023) (Ref 15.2)

15.3.2 The National Policy Statement for energy (EN-1) sets out the overarching policy for decisions by the Secretary of State for nationally significant energy infrastructure. It is noted that Glint and Glare is not specifically mentioned within EN-1.

15.3.3 Section 5.5 of EN-1 sets out the primary policy for the relationship between aviation and new energy:

"5.5.1 All aerodromes, covering civil and military activities, as well as aviation technical sites, meteorological radars and other types of defence interests (both onshore and offshore) can be affected by new energy development.

5.5.2 Collaboration and co-existence between aviation, defence and energy industry stakeholders should be strived for to ensure scenarios such that neither is unduly compromised."

...

"5.5.5 UK airspace is important for both civilian and military aviation interests. It is essential that new energy infrastructure is developed collaboratively alongside aerodromes, aircraft, air systems and airspace so that safety, operations and capabilities are not adversely affected by new energy infrastructure. Likewise, it is essential that aerodromes, aircraft, air systems and airspace operators work collaboratively with energy infrastructure developers essential for net zero. Aerodromes can have important economic and social benefits, particularly at the regional and local level, but their needs must be balanced with the urgent need for new energy developments, which bring about a wide range of social, economic and environmental benefits."

...

"5.5.7 The approaches and flight patterns to aerodromes can be irregular owing to a variety of factors including the performance characteristics of the aircraft concerned and the prevailing meteorological conditions. It may be possible to adapt flight patterns to work alongside new energy infrastructure without impacting on aviation safety."

...

"5.5.55 Lighting must also be designed in such a way as to ensure that there is no glare or dazzle to pilots and/or ATC, aerodrome ground lighting is not obscured and that any lighting does not diminish the effectiveness of aeronautical ground lighting and cannot be confused with aeronautical lighting. Lighting may also need to be compatible with night vision devices for military low flying purposes."

National Policy Statement for Renewable Energy Infrastructure (EN-3) (2023) (Ref 15.3)

15.3.4 The National Policy Statement for Renewable Energy Infrastructure (EN-3) sets out the primary policy for decisions by the Secretary of State for nationally significant renewable energy infrastructure and dictates how glint and glare should be considered within the decision.

15.3.5 Sections 2.10.27 and 2.10.102-2.10.106 outline the potential impact of glint and glare that the applicants may consider:

"2.10.27 Utility-scale solar farms are large sites that may have a significant zone of visual influence. The two main impact issues that determine distances to sensitive receptors are therefore likely to be visual amenity and glint and glare."

...

"2.10.102 Solar panels are specifically designed to absorb, not reflect, irradiation. However, solar panels may reflect the sun's rays at certain angles, causing glint and glare. Glint is defined as a momentary flash of light that may be produced as a direct reflection of the sun in the solar panel. Glare is a continuous source of excessive brightness experienced by a stationary observer located in the path of reflected sunlight from the face of the panel. The effect occurs when the solar panel is stationed between or at an angle of the sun and the receptor.

2.10.103 Applicants should map receptors to qualitatively identify potential glint and glare issues and determine if a glint and glare assessment is necessary as part of the application.

2.10.104 When a quantitative glint and glare assessment is necessary, applicants are expected to consider the geometric possibility of glint and glare affecting nearby receptors and provide an assessment of potential impact and impairment based on the angle and duration of incidence and the intensity of the reflection.

2.10.105 The extent of reflectivity analysis required to assess potential impacts will depend on the specific project site and design. This may need to account for

'tracking' panels if they are proposed as these may cause differential diurnal and/or seasonal impacts.

2.10.106 When a glint and glare assessment is undertaken, the potential for solar PV panels, frames and supports to have a combined reflective quality may need to be assessed, although the glint and glare of the frames and supports is likely to be significantly less than the panels."

15.3.6 Sections 2.10.134-2.10.136 outline the potential mitigations for glint and glare impacts that the applicants may consider:

"2.10.134 Applicants should consider using, and in some cases the Secretary of State may require, solar panels to comprise of (or be covered with) anti-glare/anti-reflective coating with a specified angle of maximum reflection attenuation for the lifetime of the permission.

2.10.135 Applicants may consider using screening between potentially affected receptors and the reflecting panels to mitigate the effects.

2.10.136 Applicants may consider adjusting the azimuth alignment of, or changing the elevation tilt angle of, a solar panel, within the economically viable range, to alter the angle of incidence. In practice this is unlikely to remove the potential impact altogether but in marginal cases may contribute to a mitigation strategy."

15.3.7 Sections 2.10.158-2.10.159 outlines further detail on the potential glint and glare impacts that the Secretary of State may consider as part of their decision making:

"2.10.158 Solar PV panels are designed to absorb, not reflect, irradiation. However, the Secretary of State should assess the potential impact of glint and glare on nearby homes, motorists, public rights of way, and aviation infrastructure (including aircraft departure and arrival flight paths).

2.10.159 Whilst there is some evidence that glint and glare from solar farms can be experienced by pilots and air traffic controllers in certain conditions, there is no evidence that glint and glare from solar farms results in significant impairment on aircraft safety. Therefore, unless a significant impairment can be demonstrated, the Secretary of State is unlikely to give any more than limited weight to claims of aviation interference because of glint and glare from solar farms."

Local Planning Policy

West Northampton Joint Core Strategy Local Plan (Dec 2014) (Ref 15.4)

15.3.8 The West Northampton Joint Core Strategy Local Plan sets out the long-term vision and objectives for the whole area covered by the former Daventry District, Northampton Borough, and South Northamptonshire Councils for the plan period up to 2029, including strategic policies for steering and shaping development. The West Northamptonshire Joint Core Strategy Local Plan (Part 1) states in paragraph 4.44:

"Development that aims to secure sustainable communities is designed to minimise its impact on the environment and so combat climate change. A realistic and serious response to meeting climate change objectives

must be made through the JCS direction on policies. Larger scale developments, including Sustainable Urban Extensions (SUEs), provide the opportunity to secure exemplary standards of design, renewable or low carbon energy generation and through the location of development reduce the need to travel. All development proposals will need to fully consider climate change adaption to meet the vision of sustainable development."

15.3.9 In relation to glint and glare, Policy S10 – Sustainable Development Principles describes how visual intrusion from renewable energy developments should be limited:

"When considering planning applications for low carbon and renewable energy, an assessment will need to take account of impacts on landscape, townscape, natural, historical and cultural features and areas and nature conservation interests. Proposals should also use high quality design to minimise impacts on the amenity of the area, in respect of visual intrusion, noise, dust, and odour and traffic generation."

North Northamptonshire Joint Core Strategy (July 2016) (Ref 15.5)

15.3.10 The North Northamptonshire Joint Core Strategy provides the strategic planning policies for the future development of the area from 2016 to 2031.

15.3.11 Policy 26: Renewable and Low Carbon Energy states that renewable and low carbon energy generation will be supported where the proposal meets the following criteria relevant to glint and glare:

"The siting of development does not significantly adversely affect the amenity of existing, or proposed, residential dwellings and/or businesses, either in isolation or cumulatively, by reason of noise, odour intrusion, dust, traffic generation, visual impact or shadow flicker;"

Wind and Solar Energy Supplementary Planning Document (Sep 2014) (Ref 15.6)

15.3.12 The Wind and Solar Energy Supplementary Planning Document provides guidance on the information to be submitted with a planning application and sets out the key issues that will be taken into consideration by the Council.

15.3.13 Section 16 of the Wind and Solar Energy Supplementary Planning Documents states the following on glint and glare:

"The effect of glint and glare on landscape, neighbouring uses and aircraft safety is identified in the NPPG as an important factor to consider when assessing proposals for large scale solar PV farms. The guidance further indications that there may be additional impacts if solar arrays track the daily movement of the sun.

Solar panels are designed to absorb as much light as possible rather than reflect it. Nevertheless, there is the potential for glint and glare effects. 'Glint' refers to a momentary flash of light produced as direct reflection of the sun whilst 'glare' is a more continuous source of brightness relative to the ambient lighting. These effects can have a visual impact on the landscape and can act as a potential hazard or distraction for motorists, pilots, pedestrians and occupiers' of nearby

properties. Specifically in respect to aviation, the Civil Aviation Authority has issued interim guidance on solar photovoltaic systems. There is also potential for glint and glare to have an affect on nearby heritage assets.

The potential for glint and glare to occur should therefore be assessed. This should address the additional impacts of 'tracking' panels, which follow the movement of the sun across the sky to maximise solar gain, where proposed. Modelling tools are available to evaluate solar farm projects. Undertaking an assessment at an early stage will enable variables such as the orientation and tilt angles of arrays to be changed, where necessary, to minimise any adverse impacts."

MK:Plan (2016-2031) (March 2019) (Ref 15.7)

15.3.14 The MK:Plan (2016-2031) sets out the vision and framework for the future development of the area from 2015 to 2031.

15.3.15 Policy SC3: Low Carbon and Renewable Energy Generation states the following regarding glint and glare:

"A. The Council will encourage proposals for low carbon and renewable energy generation developments that are led by, or meet the needs of local communities.

B. Planning permission will be granted for proposals to develop low carbon and renewable energy sources (including community energy networks) unless there would be:

1. Significant harm to the amenity of residential area, due to noise, traffic, pollution or odour;

2. Significant harm to wildlife species or habitat;

3. Unacceptable landscape and visual impact on the landscape, including cumulative impacts;

4. Unacceptable harm to the significance of heritage assets; and

5. Unacceptable impact on air safety.

C. In addition to the above criteria, wind turbines should avoid unacceptable shadow flicker and electro-magnetic interference and be sited an appropriate distance away from occupied properties, consistent with the size and type of the turbine. Proposals to develop solar PV farms should avoid unacceptable visual impact from the effect of glint and glare on the landscape, on neighbouring uses and aircraft safety. Proposals for large scale renewable energy in the open countryside should be informed by a satisfactory landscape and visual impact assessment."

Emerging Local Planning Policy

MK City Plan 2050 (July 2024) (Ref 15.8)

15.3.16 The MK City Plan 2050 sets out the strategy for growth through to 2050 related to the need for homes, creating jobs and supporting businesses, transport around the city, climate change, the natural and built environment, design of streets, and the places which support everyday living (i.e. schools and shops).

15.3.17 Policy CEA6: Low and Zero Carbon Energy Provision states the following regarding low carbon and renewable energy developments:

"2. Proposals to development low carbon and renewable energy sources (including community energy networks) and infrastructure needed to facilitate the green energy transition (e.g. grid and sub-station upgrades) will be supported, unless there would be

a. Conflict with other policies within the development plan.

b. Unacceptable harm on air safety, in terms of the risk of incidents on approaches/departures from local airfields/airports, as well as radar interference."

Guidance

The National Planning Practice Guidance for 'Renewable and Low Carbon Energy (June 2015) (Ref 15.9)

15.3.18 The National Planning Practice Guidance for 'Renewable and Low Carbon Energy' sets out the factors that local planning authorities will need to consider in regard to the deployment of large-scale solar farms and states the following:

"26. The deployment of large-scale solar farms can have a negative impact on the rural environment, particularly in undulating landscapes. However, the visual impact of a well-planned and well-screened solar farm can be properly addressed within the landscape if planned sensitively.

27. Particular factors a local planning authority will need to consider include:

...the proposal's visual impact, the effect on landscape of glint and glare (see guidance on landscape assessment) and on neighbouring uses and aircraft safety;

The extent to which there may be additional impacts if solar arrays follow the daily movement of the sun;...

The potential to mitigate landscape and visual impacts through, for example, screening with native hedges;…

28. The approach to assessing cumulative landscape and visual impact of large-scale solar farms is likely to be the same as assessing the impact of wind turbines. However, in the case of ground mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be zero."

BRE Planning guidance for the development of large-scale ground mounted solar PV panels (Oct 2013) (Ref 15.10)

15.3.19 The BRE Planning guidance for the development of large-scale ground mounted solar PV panels sets out guidance relating to different planning application considerations. In relation to glint and glare, the guidance states:

"Glint may be produced as a direct reflection of the sun in the surface of the solar PV panel. It may be the source of the visual issues regarding viewer distraction. Glare is a continuous source of brightness, relative to diffused lighting.

This is not a direct reflection of the sun, but rather a reflection of the bright sky around the sun. Glare is significantly less intense than glint.

Solar PV panels are designed to absorb, not reflect, irradiation. However the sensitivities associated with glint and glare, and the landscape/ visual impact and the potential impact on aircraft safety, should be a consideration. In some instances it may be necessary to seek a glint and glare assessment as part of a planning application. This may be particularly important if 'tracking' panels are proposed as these may cause differential diurnal and/or seasonal impacts.

The potential for solar PV panels, frames and supports to have a combined reflective quality should be assessed. This assessment needs to consider the likely reflective capacity of all of the materials used in the construction of the solar PV farm."

The UK Highway Code (Ref 15.11)

15.3.20 The UK Highway Code states that a road users should be aware of particular hazards such as glare from the sun, and should slow down and, if necessary, stop, if dazzled by bright sunlight.

CAA CAP 738: Safeguarding of Aerodromes (2020) (Ref 15.12)

15.3.21 Volume 3, Appendix C of CAA CAP 738 states:

"1. In 2010 the CAA published interim guidance on Solar Photovoltaic Cells (SPCs). At that time, it was agreed that we would review our policy based on research carried out by the Federal Aviation Authorities (FAA) in the United States, in addition to reviewing guidance issued by other National Aviation Authorities. New information and field experience, particularly with respect to compatibility and glare, has resulted in the FAA reviewing its original document 'Technical Guidance for Evaluating Selected Solar Technologies on Airports', which is likely to be subject to change, see link https://www.federalregister.gov/documents/2013/10/23/2013-24729/interim-policy-faa-review-of-solar-energy-system-projects-on-federally-obligated-airports
2. In the United Kingdom, there has been a further increase in SPV cells, including some located close to aerodrome boundaries; to date, the CAA has not received any detrimental comments or issues of glare at these established sites. Whilst this early indication is encouraging, those responsible for safeguarding should remain vigilant to the possibility.

Other Considerations

3. It is also wise to consider other implications of accepting SPVs within very close proximity to an aerodrome, especially in the (albeit unlikely) event of an aircraft accident at the site of the panels. If an aerodrome operator is proposing to accept a solar panel in close proximity, a risk assessment should be conducted to help understand what actions should be taken given this scenario, and by whom."

Renewable Energy Developments: Solar photovoltaic developments - Ref 15.12Combined Aerodrome Safeguarding Team (CAST) Aerodrome Safeguarding Guidance Note (July 2023) (Ref 15.13)

15.3.22 The Combined Aerodrome Safeguarding Team (CAST) Aerodrome Safeguarding Guidance Note aims to provide safeguarding advice in relation to solar photovoltaic developments.

15.3.23 Section 2 'Safety Considerations' outlines the following safety considerations that must be assessed for the design of the planned solar photovoltaic development. Points 1 and 2 are relevant to glare assessment:

▪ *"ATS personnel – The control tower (if applicable) is the most important location for visual surveillance across an aerodrome for monitoring operations on the ground as well as in the air. It is therefore of critical importance that the development of solar photovoltaic developments does not significantly hinder the view from a control tower's visual control room (VCR). This may be from redesigning the layout and design of the proposed solar development to avoid glare from the solar panels or by avoiding the physical blocking of key viewpoints.*

▪ *Pilot – A pilot's ability to safely navigate the airspace around an aerodrome is paramount. A pilot is required to look for other aircraft and obstructions on the ground, as well as navigate towards a runway or reference points. This applies to both pilots of fixed wing aircraft and helicopters in the air, and sometimes on the ground. The standard operations that should be considered are:*

pilots on approach

pilots in a visual circuit

pilots on the ground (departing and taxiing aircraft)."

15.3.24 Section 3.1 'Safety impacts - Glint and Glare' states:

"A key safety concern when considering a solar photovoltaic panel development on- or off-aerodrome is related to the reflection of sunlight off the photovoltaic panels commonly referred to as glint and glare. 'Glint and glare' is the general term used to describe the reflection of sunlight from a reflective surface, typically one that is capable of producing specular solar reflections. The definition of glint and glare is as follows:

▪ *Glint – a momentary flash of bright light typically received by moving receptors or from moving reflectors.*

▪ *Glare – a continuous source of bright light typically received by static receptors or from large reflective surfaces.*

Typical surfaces that are considered with respect to glint and glare are glass, metallic structures e.g. roofs, and solar PV panels. The orientation of a solar panel (azimuth and elevation angle) as well as its height will determine whether glint and glare effects are possible towards the assessed receptors.

The receptors that should be considered are usually ATS personnel in a control tower and pilots of aircraft within a suitable distance of an aerodrome. It is

essential to conduct a glint and glare assessment when a reflective surface is to be located on or immediately adjacent to an aerodrome. In most cases, an assessment should be undertaken for a solar PV development which is being proposed within a specific distance (indicated by the aerodrome authority) from an aerodrome. For many aerodromes, 5km is the distance of choice but it could be considered out to 10km. In exceptional circumstances, assessments may be required beyond 10km.

[...]

The effects of glare may mean that some solar PV developments are unacceptable, however layout modifications (such as changes to panel tilt and elevation angle) can often alleviate these concerns and overcome objections. The benefit of early consultation with the aerodrome authority cannot be understated."

15.3.25 Section 4 'Aerodrome Operator Safety Assurance' states:

"The aerodrome operator in conjunction with any ATS personnel should, as part of the change management process in their safety management system, consider all the potential hazards posed by solar photovoltaic developments / BESS on or in the vicinity to their aerodrome and within the aerodrome's physical and technical safeguarded areas, in order to ensure the safety of the overall operation. The developer should provide the aerodrome with a safety survey which should include:

- *a glint and glare survey when a development is within a distance specified by the aerodrome from an Aerodrome Reference Point (ARP) (5km in most cases) …*

The aerodrome operator should also ensure both impact and safety assessments are undertaken to provide assurance that any on- or off-aerodrome planned development does not introduce unacceptable hazards to aircrew, ATS personnel, RFFS and aerodrome vehicle operators undertaking their tasks.

As part of the aerodrome and or ATS change management process, safety assurances should take into account any potential adverse effect to critical ATS infrastructure and equipment.

The assessment must also consider any impacts to aircraft utilising instrument flight procedures and aircraft in the visual circuit.

Developers should apply the same principals for safety assurance for unlicensed aerodromes and airfields as required by this policy that are not officially safeguarded.

The developer in conjunction with the aerodrome operator, ATS personnel, RFFS and aerodrome operations should develop adequate mitigation to mitigate any risks identified.

Should risk mitigation or agreement not be possible, the aerodrome operator should follow Local Planning Authority procedures and lodge an objection regarding the development under their statutory obligations."

US Federal Aviation Administration (FAA) Policy (Ref 15.14)

15.3.26 The US Federal Aviation Administration (FAA) Policy sets out the standards for measuring ocular impact, and the appropriate methodology for glint and glare assessments. A final policy entitled 'Federal Aviation Administration Policy: Review of Solar Energy System Projects on Federally-Obliged Airports' was released in 2021, which superseded all previous guidance. The 2021 final policy has taken a step back and allowed aerodromes to safeguard as they see fit, with no longer a recommendation for any given glare model. Additionally, the 2021 final policy has no requirement to measure glare effects on any phase of flight as not found to be an issue.

The British Horse Society Advice on Solar farms near routes used by equestrians (Ref 15.15) and Advice on Solar Farms (Ref 15.16)

15.3.27 The British Horse Society Advice on Solar farms near routes used by equestrians and Advice on Solar Farms sets out that potential impact on equestrian businesses should be considered. The British Horse Society guidance note states the following:

"Any reflection is unlikely to be a direct problem to horses, riders or carriage-drivers because of the angles and distances involved."

"For riders or carriage drivers out hacking, glare is unlikely to present a direct problem because they are moving unless their route is directly towards the arrays at an elevation and time of day where glare is possible."

15.3.28 There is no guidance, national or local, which outlines methodology or acceptable impacts when it comes to glint and glare toward horses.

Pager Power Solar Photovoltaic and Building Development – Glint and Glare Guidance (Sep 2022) (Ref 15.17)

15.3.29 The Pager Power glint and glare guidance is good practice guidance that sets out the methodology for assessing glint and glare.

Potential ecological impacts of ground-mounted photovoltaic solar panels (2019) (Ref 15.18)

15.3.30 BSG Ecology published the literature review Potential ecological impacts of ground-mounted photovoltaic solar panels to identify potential ecological issues (as relevant to the UK).

15.3.31 The literature review concluded the following:

"From the body of research reviewed it is unlikely that the majority of concerns that have been discussed in the media are not well-founded, or are based on scientific experiments that were not specifically designed to evaluate ecological impacts of ground mounted solar PV sites.

We have reviewed the papers of ecological researchers and guidance from non-governmental organisations. These sources indicate that many authors see the installations of solar PV as an opportunity for biodiversity enhancement. This is broadly in line with what planning policy requires: e.g. … the National Planning Policy Framework (NPPF) 2019 refers to biodiversity net gain, stating:

'Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.'"

15.4 Assessment Methodology and Significance Criteria

15.4.1 The methodologies described in the following section have been developed in line with the relevant guidance for assessing potential significant effects.

15.4.2 Solar panels may generate glint and glare effects at the Sites. The length and intensity of solar reflections in the construction or decommissioning phase will be less than or equal to the operational phase as not all panels will be deployed during these phases.

15.4.3 The operational phase represents the worse-case scenario for all development phases of the Scheme. On this basis, this assessment has therefore only considered Operational Effects in accordance with the Scoping Opinion [**EN010170/APP/GH6.3.2.2**].

Study Area

15.4.4 The most reflective component of the proposed Scheme is the glass surface of the solar panel. Whilst a solar panel's frame and structure may be reflective, the potential glare is much less significant than the total panel area. Other infrastructure within the Scheme such as inverters and substations are not expected to be a source of glint and glare due to the lack of reflective materials present. No solar panels are to be installed on Green Hill BESS, and as such, no sources of glint and glare are expected.

15.4.5 Additionally, the Cable Route Corridor between the Sites and the Point of Connection will be laid underground and are therefore not a source of glint and glare. As such, the Study Area for this assessment is based on the Sites used for solar PV panels only.

15.4.6 In general, light-sensitive receptors with view of a solar PV development have potential to experience solar panel glare. There are no technical distance limits/thresholds reported within which glare is possible for such receptors. However, the potential or significance of a reflection decreases with distance. This is due to an observer's decreasing field of vision capability with increasing distance, as well as possible obstructions such as shielding caused by terrain and vegetation.

15.4.7 In the absence of U.K. government guidance, industry good practice guidance published by PagerPower (Ref 15.17) states that a 1km buffer is appropriate for assessing glint and glare effects on local dwellings and road users. For aviation receptors, CAST guidance states that 5km is the screening distance of choice, although aerodromes could be considered out to 10km. As such, a 5km screening distance has been applied unless specifically requested otherwise by the aerodrome. Assessment on aerodromes outside of a 5km screening distance is uncommon as significant impacts are not likely due to increased horizontal and vertical distance between solar panels and aviation receptors.

15.4.8 As such, the following study areas have been applied:

- 500m study area for railway infrastructure;
- 1km study area for residential dwellings;
- 1km study area for road users;
- 1km study are for Public Right of Ways (PRoWs);
- 1km study area for horse facilities;
- 1km study area for navigable waterways; and
- 5km for aviation infrastructure.

15.4.9 It should noted that the Acorn Centre is located approximately 80m south of Green Hill A. This is a riding school and therapy centre that specialises in working with children and young people. As such, although not defined under the above study areas, receptors at the Centre have been included within the modelling assessment.

15.4.10 There are no waterways large enough for vessels within 1km of the Sites on which solar panels will be located. The navigable River Nene is approximately 2.5km from the closest solar array site, and the navigable River Great Ouse is approximately 1.7km from the closest array site. As such, navigable waterways are not considered further within this chapter.

15.4.11 Additionally, there is no railway infrastructure located within 500m of the Sites on which solar panels will be located. The Midland Main Line is approximately 5.0km from the closest solar array site at its closest point. As such, railway infrastructure is not considered further within this chapter.

15.4.12 It should be noted that the model does not take into account additional factors such as intervening topography or cloud cover which may reduce the magnitude of impact at modelled receptors. As such, professional judgement is applied to each result to consider these additional factors. When applied, these are clearly laid out in the assessment appendices.

Ecological Receptors

15.4.13 In the absence of U.K. government guidance on the assessment of impact from glint and glare on ecological receptors, the literature review published by BSG Ecology (Ref 15.18) was referred to. The literature review concluded that impacts from glint and glare on ecological receptors are unlikely. As such, ecological receptors have not been included within the modelling assessment.

Sources of Information

15.4.14 The relevant information sources used for the assessment are as follows:

- Google Satellite Imagery; and
- Google Street View Imagery.

Impact Assessment Methodology

15.4.15 The following methodology is derived from good practice considerations whilst incorporating relevant guidance for undertaking this assessment:

1. Light-sensitive receptors will be identified in the area surrounding the Scheme.
2. The visibility of the panels from the identified receptors will be considered. If the panels are not visible from the receptors, then no glint or glare can occur.
3. The potential for glint and glare from solar panels at the Sites towards the identified receptors will be identified by undertaking geometric modelling calculations.
4. Where glint or glare is predicted, factors such as duration, time of day, and, for aviation receptors, the glare intensity will be considered to determine the magnitude of impact.
5. Professional judgement will be applied and additional factors that may reduce the magnitude of impact will be considered (e.g. predicted cloud cover in the area, the source of the glare relative to the receptor, existing screening obstructing line of sight between the proposed arrays and the receptors, etc.) as well as the consideration of embedded mitigation.
6. Determination will be made of the significance of the effect and whether this is a significant effect.
7. If any residual significant effects are identified, additional mitigation will be considered to reduce the effect on receptors.

Sensitivity of Receptors

15.4.16 The sensitivity of receptors can be defined as below in Error! Reference source not found..

Table 15.4 Table of Receptor Sensitivity

Sensitivity	Definitions
High	The receptor or resource has little ability to absorb the change without fundamentally altering its present character or it is of international or national importance.
Medium	The receptor or resource has moderate ability to absorb the change without significantly altering its present character or is of high and more than local importance.
Low	The receptor or resource is tolerant of change without detrimental effect, is of low or local importance.
Negligible	The receptor or resource is not affected by glare.

Dwellings

15.4.17 The sensitivity of dwellings is categorised as 'Medium' sensitivity because the receptor has moderate capacity to absorb change without significantly altering its present character.

Roads

15.4.18 Roads are generally categorised according to the road type, which is defined by the number of carriageways, speed, and traffic density.

- Major National – fast-moving vehicles (up to 70 mph) on busy roads with a minimum of two carriageways.
- National - fast-moving vehicles (up to 60 or 70 mph) on busy roads with one or more carriageways.
- Regional - fast-moving vehicles (up to 60 mph) on moderately busy to busy roads comprising single carriageways.
- Local – variable speed vehicles on less busy roads.

15.4.19 Major National, National, and Regional roads are considered to be of 'Medium' sensitivity due to having higher traffic volumes than local roads. As such, the receptor has moderate capacity to absorb change without significantly altering its present character. Local roads are considered to be of 'Low' sensitivity due to traffic volumes predicted to be low. As such, the receptor is tolerant to change without detriment to its character.

Aviation

15.4.20 The sensitivity of aviation receptors is categorised as 'Medium' due to the receptor having moderate capacity to absorb change without significantly altering its present character.

PRoWs and Horse Facilities

15.4.21 The sensitivity of PRoWs and horse facilities is categorised as 'Low' because the receptor is tolerant to change without detrimental effect and are of local importance. Other reasons for this include:

- The typical density of users on a PRoW and at a horse facility is low in a rural environment;
- Relative to other receptor types, there is less risk to safety. For example, solar glare toward a road network can be much more serious to safety, owing to the high travel speeds and higher density of users; and
- Receptors on a PRoW and at a Horse Facility are transient, and time and location sensitive, whereby a PRoW user or user at a Horse Facility could move beyond the solar reflection zone with ease and with little impact upon safety or amenity.

Agricultural Workers (including when using machinery)

15.4.22 The sensitivity of agricultural workers is categorised as 'Low' because the receptor is tolerant to change without detrimental effect and are of local importance. Other reasons for this include:

- The typical density of agricultural workers in a location is low;
- Relative to other receptor types, there is less risk to safety. For example, solar glare toward a road network can be much more serious to safety, owing to the high travel speeds and higher density of users; and
- Agricultural workers are transient, and time and location sensitive, whereby a worker could move beyond the solar reflection zone with ease and with little impact upon safety or amenity.

Other Sensitive Receptors

15.4.23 Whilst identifying sensitive receptors nearby to the Scheme, the Applicant has identified the Acorn Centre (Little Acorn Farm, Newland Road, Walgrave, Northampton NN6 9PZ) as a potentially sensitive receptor nearby to Green Hill A. The sensitivity of visitors to the Acorn Centre has been categorised as 'Medium', due to the receptor having moderate capacity to absorb change without significantly altering its present character. Other reasons for this include:

- The proximity of the Acorn Centre to Green Hill A (approximately 130m south).
- The sensitivity of the visitors at the Acorn Centre.

Magnitude of Impacts

15.4.24 The magnitude of impact is determined using different factors dependent on the type of receptor being assessed, as set out below. While there is no specific guidance on glint and glare impact magnitude evaluation, the adopted approach is in line with industry good practice.

Dwellings

15.4.25 The magnitude of glare impacts upon dwellings receptors is predominantly dependent on the following characteristics:

- Distance between the panel area and the receptor (1km screening distance applied).
- Whether glare is geometrically possible.
- The daily and annual duration of the predicted impact.

15.4.26 Where glare is not predicted to be experienced at a dwelling observation point or is not geometrically possible, no impact would occur, and the magnitude is reported as 'None'.

15.4.27 Where glare is predicted to be experienced for less than one hour per day and less than three months per year at a dwelling observation point a 'Low' magnitude impact is designated and no mitigation is required. 'Low/Minor' impacts may also

be determined upon application of professional judgement and consideration of additional factors that may reduce the magnitude of impact such as:

- Separation distance from panel area to dwelling observation point – the proportion of an observer's field of view that is affected by glare reduces with increased separation distance.
- The sun's position relative to the panel area – Effects 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. This factor is important at sunset and sunrise where the sun is lowest in the sky.
- The extent to which cloud cover and glare impacts coincide – cloud cover varies across a year with overcast or mostly cloudy conditions ranging from 51-79% of the year across the UK. This is of particular significance for interpretation of annual glare duration results, derived from models which assume clear, sunny skies all year-round.
- The location of the main living space within the dwelling – ground floor rooms are typically the most occupied part of residential dwelling during daylight hours and have a greater amenity significance than upper floors.
- Dwelling windows facing the solar arrays – where there are no windows facing the solar arrays, the impact magnitude reduces.

15.4.28 Where unmitigated glare is predicted to occur for more than one hour per day or more than three months per year, a 'Medium' magnitude impact is designated. This magnitude may be reduced following application of professional judgement and consideration of additional factors, as set out above.

15.4.29 Where unmitigated glare is predicted to occur for more than one hour per day and more than three months per year, a 'High' magnitude impact is designated.

Roads

15.4.30 The magnitude of impact upon road user receptors is predominantly dependent on the following factors:

- Distance between the solar arrays and the receptor (1 km screening distance applied).
- Whether glare is geometrically possible.
- Whether glare is within the main field of view of a road vehicle driver travelling along a road (50 degrees either side of direction of travel) – glare within the main field of view of a driver is considered to be more hazardous than glare outside this range.

15.4.31 Where glare is not predicted toward a road vehicle driver or is not geometrically possible, no impact would occur and the magnitude is reported as 'None'.

15.4.32 Where glare is predicted but it is outside a road vehicle driver's main field of view (50 degree either side of direction of travel), a 'Low' magnitude impact is designated.

15.4.33 Where glare is predicted within a road vehicle driver's main field of view, 'Medium' magnitude impact may be determined upon application of professional judgement and consideration of additional factors such as:

- Separation distance from solar array to road vehicle driver observation point – the proportion of an observer's field of view that is affected by glare reduces with increased separation distance.
- The sun's position relative to the solar array – Effects 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. This factor is important at sunset and sunrise where the sun is lowest in the sky.

15.4.34 Where glare is predicted within a road vehicle driver's main field of view and there are no mitigating factors, the magnitude of impact is 'High'.

Aviation - Air Traffic Control (ATC) Tower

15.4.35 The magnitude of glare impact toward ATC Tower personnel is dependent on the following factors:

- Whether glare is geometrically possible.
- Location of origin of the solar panel glare relative to the ATC Tower – glare predicted outside the ATC Tower personnel's view of the aerodrome key operational areas (runway threshold) has less of an effect.
- Separation distance from the solar array to ATC Tower – the proportion of an observer's field of view that is affected by glare reduces with increased separation distance.
- The predicted intensity of the solar panel glare.
- Solar panel glare duration per day.
- Number of days solar panel glare is geometrically possible per year.
- The time of day when solar panel glare is geometrically possible.

15.4.36 Where glare is not predicted toward an ATC Tower personnel or is not geometrically possible, no impact would occur and the magnitude is reported as 'None'.

15.4.37 Where glare is predicted toward ATC Tower personnel but there are sufficient additional factors that may reduce the magnitude of impact or the aerodrome confirms the glare is acceptable, a 'Low' magnitude impact is designated.

15.4.38 Where glare is predicted toward ATC Tower personnel that would occasionally and marginally affect aerodrome safeguarding operations, a 'Medium' magnitude impact is designated.

15.4.39 Where glare is predicted toward ATC Tower personnel that would regularly and substantially affect aerodrome safeguarding operations, a 'High' magnitude is designated.

Aviation - Approach Paths

15.4.40 The magnitude of impact upon aircraft pilots in flight on approach to a runway (termed "approach paths") is dependent on the following main factors:

- Whether glare is geometrically possible.
- The relative position and visibility of the reflecting panels relative to final approach path and whether the glare is within the main field of view of the pilots.
- The extent to which impacts coincide with effects of direct sunlight. Effects 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.
- Reflectors in the existing environment. Where there are existing reflective surfaces in the surrounding environment, solar panel glare is less noticeable for pilots.
- Solar panel glare duration per day.
- Number of days a solar panel glare is geometrically possible per year.
- The time of day when solar panel glare is possible.
- The length of the section of the final approach that is potentially affected by glare.

15.4.41 Where glare is not predicted toward approach paths or is not geometrically possible, a ‘No magnitude impact would occur.

15.4.42 Under the following scenarios ‘Low’ magnitude impact may be designated:

- Glare is predicted but it is outside a pilot’s main field of view.
- Glare has a “low potential for after-image” (green glare).
- Glare has a “potential for after-image” (yellow glare) with sufficient mitigating factors.
- Aerodrome has confirmed that the level of glare is acceptable.

15.4.43 Where unmitigated glare with ‘potential for temporary after-image’ (yellow glare) is predicted to occur without sufficient additional factors that may reduce the magnitude of impact, a ‘Medium' magnitude impact is designated.

15.4.44 Where unmitigated glare with ‘potential for permanent eye damage' (red glare) is predicted to occur without sufficient additional factors that may reduce the magnitude of impact, a ‘High' magnitude impact is designated.

PRoWs and Horse Facilities

15.4.45 The maximum magnitude of impact for PRoWs and Horse Facilities is considered to be ‘Low’ because:

- It is likely that the existing and the proposed screening will obstruct line of sight between the reflecting arrays and users of PRoWs and at Horse Facilities.

- Where screening does not obstruct line of sight, 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.
- The reflection intensity for solar panels is similar to common outdoor sources of solar reflection (e.g., still water or car windows). Therefore, solar panel glare is likely to be comparable to that from common outdoor sources whilst navigating the natural and built environment on a regular basis.
- The stationary characteristics of fixed panels and the slow-moving nature of tracker panels means there won't be sudden, unexpected movement which would typically spook horses.

Agricultural Workers

15.4.46 The maximum magnitude of impact for agricultural workers is considered to be 'Low' because:

- It is likely that the existing and the proposed screening will obstruct line of sight between the reflecting arrays and agricultural workers.
- Where screening does not obstruct line of sight, 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.
- The reflection intensity for solar panels is similar to common outdoor sources of solar reflection (e.g., still water or car windows). Therefore, solar panel glare is likely to be comparable to that from common outdoor sources whilst navigating the natural and built environment on a regular basis.

Other Sensitive Receptors

15.4.47 It is understood that a variety of activities are undertaken at the Acorn Centre, from classroom work to interacting with the animals. As such, receptors at the Acorn Centre have been assessed with the same impact significance evaluation as residential dwellings. This was considered to be the most relevant criterium in the absence of specific government guidance on glint and glare impact significance evaluation for schools or education facilities.

15.4.48 The magnitude of glare impacts upon receptors at the Acorn Centre is predominantly dependent on the following characteristics:

- Distance between the panel area and the receptor (1km screening distance applied).
- Whether glare is geometrically possible.
- The daily and annual duration of the predicted impact.

15.4.49 Where glare is not predicted to be experienced at a receptor or is not geometrically possible, no impact would occur, and the magnitude is reported as 'None'.

15.4.50 Where glare is predicted to be experienced for less than one hour per day and less than three months per year at a receptor, a 'Low' magnitude impact is designated and no mitigation is required. 'Low/Minor' impacts may also be determined following upon application of professional judgement and consideration of additional factors that may reduce the magnitude of impact such as:

- Separation distance from panel area to receptor – the proportion of an observer's field of view that is affected by glare reduces with increased separation distance.
- The sun's position relative to the panel area – Effects 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. This factor is important at sunset and sunrise where the sun is lowest in the sky.
- The extent to which cloud cover and glare impacts coincide – cloud cover varies across a year with overcast or mostly cloudy conditions ranging from 51-79% of the year across the UK. This is of particular significance for interpretation of annual glare duration results, derived from models which assume clear, sunny skies all year-round.

15.4.51 Where unmitigated glare is predicted to occur for more than one hour per day or more than three months per year, a 'Medium' magnitude impact is designated. This magnitude may be reduced following consideration of additional factors that may reduce the magnitude of impact, as set out above.

15.4.52 Where unmitigated glare is predicted to occur for more than one hour per day and more than three months per year, a 'High' magnitude impact is designated.

Assessment of Significance

15.4.53 The significance of any environmental effects is determined by the combination of the magnitude of any impacts and the sensitivity of the receptors, as seen below in **Table 15.5**. Effects deemed as moderate or greater are deemed to be "significant effects" in EIA terms.

Table 15.5 Significance of Impact

Sensitivity / Magnitude	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate
Moderate	Major	Moderate	Moderate	Minor
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

PRoWs and Horse Facilities

15.4.54 As such, due to the 'Low' sensitivity and the maximum magnitude of impact of PRoWs and Horse Facilities being 'Low', the maximum significance of impact is considered 'Minor'. This is not significant in EIA terms. As such, PRoWs and Horse Facilities are not considered further within the assessment.

Agricultural Workers

15.4.55 As such, due to the 'Low' sensitivity and the maximum magnitude of impact of agricultural workers being 'Low', the maximum significance of impact is considered 'Minor'. This is not significant in EIA terms. As such, agricultural workers are not considered further within the assessment.

15.5 Assessment Assumptions and Limitations

15.5.1 The methodology for glint and glare has considered the following assumptions.

- The list of technical glare model assumptions and limitations are presented in Appendix A of Technical Appendices 15.1 to 15.11 [**EN010170/APP/GH6.3.15.1 to EN010170/APP/GH6.3.15.11**].
- The model does not take into account additional factors such as intervening topography or cloud cover which may reduce the magnitude of impact at modelled receptors. As such, professional judgement is applied to each result to consider these additional factors.

15.5.2 In addition to the limitations noted by the operators of the ForgeSolar software, a number of other limitations have become apparent from the application of the software in the UK aviation environment:

- The model classifies glare according to its ocular impact as 'green' (low potential for after-image), 'yellow' (potential for after-image) or 'red' (potential for permanent eye damage). However the ForgeSolar model does not assign acceptability criteria to those levels of impact. The definition of 'green' glare as acceptable to pilots and 'yellow' glare as unacceptable is not defined by the ForgeSolar model; these definitions come from the FAA Interim Policy which was in force from 2013 to 2021. Since 2021 the FAA has withdrawn any requirement for measurement of the effects of solar PV glare on pilots and does not assign acceptability criteria to the ForgeSolar definitions of 'green' and 'yellow' glare.
- The software has not been validated against the empirical experience of pilots when encountering 'yellow glare' predicted by the model from operational solar PV installations.
- The model was designed to predict the effects of solar PV glint and glare on pilots flying a final approach path defined as a 3° descent path from two statute miles to a point 50 feet above the runway threshold. Some UK stakeholders have attempted to use the model for a wide variety of other flight path scenarios. The appropriateness or accuracy of the model in those different circumstances has not been established.

15.6 Baseline Conditions

15.6.1 This section describes the baseline environmental characteristics for the Scheme and surrounding areas with specific reference to glint and glare.

Existing Baseline

15.6.2 The existing baseline conditions are derived from desk-based studies.

Green Hill A

Dwellings

15.6.3 As per good practice guidance and recommendations (Ref 15.17), residential dwellings were identified within the 1km screening distance of the Sites through a review of mapping and aerial photography of the region. 45 residential dwellings have been identified within this area for glare modelling consideration.

Roads

15.6.4 In accordance with good practice guidance (Ref 15.17), 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' impact magnitude.

15.6.5 No major national, national or regional roads were identified within 1km of Green Hill A.

15.6.6 Given the 'Low' sensitivity of local road users and the maximum corresponding 'Low' impact magnitude, any glare experienced by a road user along a local road would be considered not significant in the worst-case scenario.

Other Sensitive Receptors

15.6.7 The Acorn Centre is located approximately 130m south of Green Hill A. Due to its proximity to the Scheme and the sensitivity of the visitors to the Centre, 8 receptors have been identified for glare modelling.

Aviation

15.6.8 Hold Farm Airfield, Pitsford Airfield and William Pitt Airfield were identified within 5km and require technical modelling.

15.6.9 Sywell Aerodrome, Rothwell Airfield and Wold Lodge Airfield were identified within 10km and as such will be discussed qualitatively within the assessment but not included within the technical modelling for Green Hill A. Sywell Aerodrome, Rothwell Airfield and Wold Lodge Airfield have not requested a modelling assessment for Green Hill A.

Green Hill A.2

Dwellings

15.6.10 As per good practice guidance and recommendations (Ref 15.17), residential dwellings were identified within the 1km screening distance of the Sites through a review of mapping and aerial photography of the region. 20 residential dwellings have been identified within this area for glare modelling consideration.

Roads

15.6.11 In accordance with good practice guidance (Ref 15.17), 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' impact magnitude.

15.6.12 Given the 'Low' sensitivity of local road users and the maximum corresponding 'Low' impact magnitude, any glare experienced by a road user along a local road would be considered not significant in the worst-case scenario.

15.6.13 Kettering Road (A43) (national road) was identified as being within the screening distance of Green Hill A.2. A screening review indicated that there is a potential line of sight from A43 road users and the proposed panels such that this road required technical modelling as presented in Appendix 15.1 Green Hill A and A.2 Ground-Based Receptor Results **[EN/10170/APP/GH6.3.15.1]**.

Aviation

15.6.14 Hold Farm Airfield, Pitsford Airfield and William Pitt Airfield were identified within 5km and required technical modelling as presented in Appendix 15.7 **[EN/10170/APP/GH6.3.15.7],** ES Appendix 15.8 **[EN/10170/APP/GH6.3.15.8]**, and Appendix 15.10 **[EN/10170/APP/GH6.3.15.10]**.

15.6.15 Sywell Aerodrome, Rothwell Airfield and Wold Lodge Airfield were identified within 10km and as such will be discussed qualitatively within the assessment but not included within the technical modelling for Green Hill A and Green Hill A.2. Sywell Aerodrome, Rothwell Airfield and Wold Lodge Airfield have not requested a modelling assessment for Green Hill A.2.

Green Hill B

Dwellings

15.6.16 As per good practice guidance and recommendations (Ref 15.17), residential dwellings were identified within the 1km screening distance of the Sites through a review of mapping and aerial photography of the region. 23 residential dwellings have been identified within this area for glare modelling consideration.

Roads

15.6.17 In accordance with good practice guidance (Ref 15.17), 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' impact magnitude.

15.6.18 Given the 'Low' sensitivity of local road users and the maximum corresponding 'Low' impact magnitude, any glare experienced by a road user along a local road would be considered not significant in the worst-case scenario.

15.6.19 Kettering Road (A43) (national road) was identified within the screening distance of Green Hill B. A screening review indicated that the line of sight is obstructed between the road users and reflecting panels by existing vegetation and terrain. As such, road receptors will be discussed qualitatively within the assessment but not included within the technical modelling, as presented in Appendix 15.2 Green Hill B Ground-Based Receptor Results **[EN/10170/APP/GH6.3.15.2]**.

Aviation

15.6.20 Pitsford Airfield, Sywell Aerodrome, William Pitt Airfield and Hold Farm Airfield were identified within 5km and required modelling, as presented in Appendix 15.8 **[EN/10170/APP/GH6.3.15.8]**, Appendix 15.10 **[EN/10170/APP/GH6.3.15.10]**, and Appendix 15.11 **[EN/10170/APP/GH6.3.15.11]**.

15.6.21 No additional aviation receptors were identified within 10km of Green Hill B.

Green Hill C, D and E

Dwellings

15.6.22 As per good practice guidance and recommendations (Ref 15.17), residential dwellings were identified within the 1km screening distance of the Sites through a review of mapping and aerial photography of the region. 85 residential dwellings have been identified within 1km of Green Hill C, D and E for glare modelling consideration.

Roads

15.6.23 No major national, national or regional roads were identified within 1km of Green Hill C.

15.6.24 In accordance with good practice guidance (Ref 15.17), 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' impact magnitude.

15.6.25 Given the 'Low' sensitivity of local road users and the maximum corresponding 'Low' impact magnitude, any glare experienced by a road user along a local road would be considered not significant in the worst-case scenario.

15.6.26 No major national, national or regional roads were identified within 1km of Green Hill C and Green Hill D.

15.6.27 The A4500 (national road) and B573 (regional road) were identified within the screening distance of Green Hill E. A screening review indicated that the potential line of sight between road users on the A4500 and the proposed panels is obstructed by vegetation and terrain. As such, the A4500 will be discussed qualitatively within the assessment but not included within the technical modelling. A screening review indicated that there is a potential line of sight from A4500 and B573 road users and the proposed panels such that these roads required technical modelling, as presented in Appendix 15.3 Green Hill C, D, and E Ground-Based Receptor Results **[EN/10170/APP/GH6.3.15.3]**.

Aviation

15.6.28 Sywell Aerodrome, William Pitt Airfield and Hold Farm Airfield were identified within 5km of Green Hill C and required technical modelling. Sywell Aerodrome is also adjacent to Green Hill C.

15.6.29 Pitsford Airfield and Tower Farm Airfield were identified within 10km and as such will be discussed qualitatively within the assessment but not included within the technical modelling for Green Hill C. Pitsford Airfield and Tower Farm Airfield have not requested a modelling assessment for Green Hill C.

15.6.30 Sywell Aerodrome, William Pitt Airfield and Hold Farm Airfield were identified within 5km of Green Hill D and required technical modelling.

15.6.31 Pitsford Airfield, Tower Farm Airfield and Easton Maudit were identified within 10km and as such will be discussed qualitatively within the report but not included within the technical modelling for Green Hill D. Pitsford Airfield, Tower Farm Airfield and Easton Maudit have not requested a modelling assessment for Green Hill D.

15.6.32 Sywell Aerodrome, William Pitt Airfield, and Hold Farm Airfield were identified within 5km of Green Hill E and required technical modelling.

15.6.33 Pitsford Airfield, Tower Farm Airfield and Easton Maudit Airfield were identified within 10km and as such will be discussed qualitatively within the assessment but not included within the technical modelling for Green Hill E. Pitsford Airfield, Tower Farm Airfield and Easton Maudit have not requested a modelling assessment for Green Hill E.

15.6.34 Results of technical modelling are presented in Appendix 15.7 **[EN/10170/APP/GH6.3.15.7],** Appendix 15.10 **[EN/10170/APP/GH6.3.15.10],** and Appendix 15.11 **[EN/10170/APP/GH6.3.15.11]**.

Green Hill F

Dwellings

15.6.35 As per good practice guidance and recommendations (Ref 15.17), residential dwellings were identified within the 1km screening distance of the Sites through a review of mapping and aerial photography of the region. 133 residential dwellings have been identified within the study area of Green Hill F for glare modelling consideration.

Roads

15.6.36 In accordance with good practice guidance (Ref 15.17), 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' impact magnitude.

15.6.37 Given the 'Low' sensitivity of local road users and the maximum corresponding 'Low' impact magnitude, any glare experienced by a road user along a local road would be considered not significant in the worst-case scenario.

15.6.38 The A509 (national road) was identified within the screening distance of Green Hill F. A screening review indicated that there is a potential line of sight from A509 road users and the proposed panels such that it required technical modelling, as presented in ES Appendix 15.4 Green Hill F Ground-Based Receptor Results [**EN/10170/APP/GH6.3.15.4**].

Aviation

15.6.39 Easton Maudit Airfield and Tower Farm Airfield were identified within 5km and required technical modelling, as presented in Appendix 15.6 **[EN/10170/APP/GH6.3.15.6]**.

15.6.40 New Farm Airfield, William Pitt Airfield and Sywell Aerodrome were identified within 10km and as such will be discussed qualitatively within the assessment but not included within the technical modelling for Green Hill F. New Farm Airfield, William Pitt Airfield and Sywell Aerodrome have not requested a modelling assessment for Green Hill F.

Green Hill G

Dwellings

15.6.41 As per good practice guidance and recommendations (Ref 15.17), residential dwellings were identified within the 1km screening distance of the Sites through a review of mapping and aerial photography of the region. 49 residential dwellings have been identified within the study area of Green Hill G for glare modelling consideration.

Roads

15.6.42 In accordance with good practice guidance (Ref 15.17), 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' impact magnitude.

15.6.43 Given the 'Low' sensitivity of local road users and the maximum corresponding 'Low' impact magnitude, any glare experienced by a road user along a local road would be considered not significant in the worst-case scenario.

15.6.44 The A428 and the A509 (national roads) were identified within the screening distance of Green Hill G. A screening review indicated that there is a potential line of sight from road users along the A428 and A509 and the proposed panels such that it required technical modelling, as presented in ES Appendix 15.5 Green Hill G Ground-Based Receptor Results [**EN/10170/APP/GH6.3.15.5**].

Aviation

15.6.45 Easton Maudit Airfield was identified within 5km and required technical modelling, as presented in Appendix 15.6 **[EN/10170/APP/GH6.3.15.6]**.

15.6.46 New Farm Airfield, Tower Farm Airfield and Top Farm Airfield were identified within 10km and as such will be discussed qualitatively within the assessment but not included within the technical modelling of Green Hill G. New Farm Airfield, Tower Farm Airfield and Top Farm Airfield have not requested a modelling assessment for Green Hill G.

Future Baseline

15.6.47 This section considers changes to the baseline conditions, described above, that might occur in the absence of the Scheme and during the time period over which the Scheme would be in place. The future baseline scenarios are set out in Chapter 2: EIA Process and Methodology **[EN010170/APP/GH6.2.2]**.

15.6.48 In absence of the Scheme, it is considered there will be no change to the future baseline from the existing baseline for glint and glare. The baseline details as presented above are not anticipated to change in the absence of the Scheme.

15.7 Embedded Mitigation Measures

15.7.1 The way that potential environmental impacts have been or will be prevented, avoided or mitigated to reduce impacts to a minimum through design and/or management of the Scheme is outlined in this section and will be taken into account as part of the assessment of the potential effects. Proposed environmental enhancements are also described where relevant.

15.7.2 The following embedded mitigation measures for the operation phase have been incorporated into the Scheme's design.

Embedded Operation Mitigation Measures

15.7.3 The Applicant has included embedded mitigation to reduce glint and glare effects from the Scheme to acceptable levels. These embedded mitigation options are in the form of mature vegetation as instant screening for ground-based receptors. Where instant screening has been factored into the assessment, this is set out within the glint and glare assessment technical appendices [**EN010170/APP/GH6.2.15.1 to 11**], and details of the vegetation can be found on Figures 4.10 to 4.20 Landscape and Ecological Management Plan **[EN010170/APP/GH6.4.4.10 to 20]**.

15.8 Assessment of Impacts and Effects

Operational Phase

Ground Based Receptors

Green Hill A

15.8.1 Results for ground-based receptors are presented in Appendix 15.1 Green Hill A and Green Hill A.2 Ground-Based Receptor Results **[EN/10170/APP/GH6.3.15.1]**.

Residential Dwellings

15.8.2 Glare was predicted towards 42 of the 45 modelled residential dwellings from fixed panels, and towards 43 of the 45 modelled residential dwellings from tracking panels. Upon application of professional judgement and consideration of additional factors such as vegetation screening and cloud cover, a low impact, and therefore a non-significant minor effect, has been classified at all modelled dwellings.

Other Sensitive Receptors

15.8.3 Glare was predicted towards all 8 of the modelled receptors at the Acorn Centre from both fixed and tracking panels. Upon application of professional judgement and consideration of additional factors such as vegetation screening and operational hours of the facility, a low impact, and therefore a non-significant minor effect, has been classified at all receptors.

Green Hill A.2

15.8.4 Results for ground-based receptors are presented in Appendix 15.1 Green Hill A and A.2 Ground-Based Receptor Results **[EN/10170/APP/GH6.3.15.1].**

Residential Dwellings

15.8.5 Glare was predicted towards 19 of the 20 modelled residential dwellings from fixed panels, and towards all modelled residential dwellings from tracking panels. Upon application of professional judgement and consideration of additional factors such as vegetation screening and cloud cover, a low impact, and therefore a non-significant minor effect, has been classified at all modelled dwellings.

Road Infrastructure

15.8.6 Glare was predicted towards 16 of the 31 modelled road receptors along the A43 from fixed panels and towards 22 of the 31 modelled road receptors from tracking panels. Upon application of professional judgement and review of additional factors such as vegetation screening, cloud cover, and consideration of road users' central field of view, a low impact, and therefore non-significant minor effect, has been classified for all road receptors.

Green Hill B

15.8.7 Results for ground-based receptors are presented in Appendix 15.2 Green Hill B Ground-Based Receptor Results **[EN/10170/APP/GH6.3.15.2**].

Residential Dwellings

15.8.8 Glare was predicted towards 9 of the 23 modelled residential dwellings from fixed panels, and towards 7 of the 23 modelled residential dwellings from tracking panels. Upon application of professional judgement and consideration of additional factors such as vegetation screening and cloud cover, a low impact, and therefore a non-significant minor effect, has been classified at all modelled dwellings.

Road Infrastructure

15.8.9 A review of line of sight from the A43 towards Green Hill B determined that vegetation and terrain will obstruct line of sight to the proposed panels. As such, no impact, and therefore non-significant minor effects, is predicted towards road users along the A43 near to Green Hill B.

Green Hill C, Green Hill D, and Green Hill E

15.8.10 Results for ground-based receptors are presented in Appendix 15.3 Green Hill C, D, and E Ground-Based Receptor Results **[EN/10170/APP/GH6.3.15.3].**

Residential Dwellings

15.8.11 Glare was predicted towards 58 of the 85 modelled residential dwellings from fixed panels, and towards 59 of the 85 modelled residential dwellings from tracking panels. Upon application of professional judgement and consideration of additional factors such as vegetation screening and cloud cover, a low impact, and therefore a non-significant minor effect, has been classified at all modelled dwellings.

Road Infrastructure

15.8.12 Glare was predicted towards 14 of the 30 modelled road receptors along the A4500 from fixed panels and towards 12 of the 30 modelled road receptors from tracking panels. Upon application of professional judgement and review of

additional factors such as vegetation screening, cloud cover, and consideration of road users' central field of view, a low impact, and therefore non-significant minor effect, has been classified for all road receptors.

Green Hill F

15.8.13 Results for ground-based receptors are presented in Appendix 15.4 Green Hill Ground-Based Receptor Results **[EN/10170/APP/GH6.3.15.4].**

Residential Dwellings

15.8.14 Glare was predicted towards 118 of the 133 modelled residential dwellings from fixed panels, and towards all modelled residential dwellings from tracking panels. Upon application of professional judgement and consideration of additional factors such as vegetation screening and cloud cover, a low impact, and therefore a non-significant minor effect, has been classified at all modelled dwellings.

Road Infrastructure

15.8.15 Glare was predicted towards 45 of the 56 modelled road receptors along the A509 from fixed panels and towards all modelled road receptors from tracking panels. Upon application of professional judgement and review of additional factors such as vegetation screening, cloud cover, and consideration of road users' central field of view, a low impact, and therefore non-significant minor effect, has been classified for all road receptors.

Green Hill G

15.8.16 Results for ground-based receptors are presented in Appendix 15.5 Green Hill G Ground-Based Receptor Results **[EN/10170/APP/GH6.3.15.5].**

Residential Dwellings

15.8.17 Glare was predicted towards 24 of the 49 modelled residential dwellings from fixed panels, and towards 14 of the 49 modelled residential dwellings from tracking panels. Upon application of professional judgement and review of additional factors such as vegetation screening and cloud cover, a low impact, and therefore a non-significant minor effect, has been classified at all modelled dwellings.

Road Infrastructure

15.8.18 Glare was predicted towards 24 of the 30 modelled road receptors along the A428 from fixed panels and towards 18 of the 30 modelled road receptors from tracking panels. Upon application of professional judgement and review of additional factors such as vegetation screening, cloud cover, and consideration of road users' central field of view, a low impact, and therefore non-significant minor effect, has been classified for all road receptors.

15.8.19 Glare was predicted towards 25 of the 35 modelled road receptors along the A509 from fixed panels and towards 27 of the 35 modelled road receptors from tracking panels. Upon application of professional judgement and review of additional factors such as vegetation screening, cloud cover, and consideration of road users' central field of view, a low impact, and therefore non-significant minor effect, has been classified for all road receptors.

Aviation Receptors

Easton Maudit Airfield

15.8.20 Results for Easton Maudit Airfield are presented in Appendix 15.6 Easton Maudit Airfield Aviation Receptor Results **[EN/10170/APP/GH6.3.15.6]**.

15.8.21 Glare with 'potential for temporary after-image' was predicted towards flight paths FP16 and FP34 from fixed and tracking panels within Green Hill F.

15.8.22 The glint and glare assessment was originally undertaken using observation points, however, there are limitations with this methodology. The model assumes that observation points have a 360° field-of-view. As such, a modelled observation point may be predicted to receive significant effects, however in reality, it may not be geometrically possible for the pilot to experience the glare.

15.8.23 Based on understanding of FAA guidance, it is considered that a pilot's central field-of-view will be confined to 100° (50° either side of travel). As such, modelling approach paths using observation points may lead to an over-exaggeration of predicted glare. This could lead to significant effects being predicted which may not be experienced in real life.

15.8.24 Due to moderate impacts predicted, an aviation specialist was consulted to assist with adjusting the model so that the results represent a more likely realistic scenario. As such, Arthian reran the glint and glare assessment, modelling the approach paths using the Route tool within ForgeSolar and applying a 25° field-of-view (FOV) for the pilots.

15.8.25 No glare was predicted towards FP34 from fixed tilt panels within Green Hill F. Additionally, no glare was predicted towards FP16 and FP34 from Green Hill G.

15.8.26 Glare with 'low potential for temporary after-image' was predicted towards FP16 from fixed tilt panels and FP34 from tracking panels within Green Hill F. As such, a low impact, and therefore non-significant minor effect, has been classified towards flight path FP16 and FP34 from panels within Green Hill F.

15.8.27 Glare with 'potential for temporary after-image' was predicted towards FP16 from tracking panels within Green Hill F. Upon review of additional factors such as the predicted annual duration of glare and cloud cover in the area, a low impact, and therefore non-significant minor effect, has been classified towards FP16.

Hold Farm Airstrip

15.8.28 Results for Hold Farm Airstrip are presented in Appendix 15.7 Hold Farm Airstrip Aviation Receptor Results **[EN/10170/APP/GH6.3.15.7]**.

15.8.29 Glare with 'potential for temporary after-image' was predicted towards the east and west flight paths from fixed and tracking panels within Green Hill A and Gren Hill A.2. Upon review of additional factors such as consideration of the pilots' central field of view and cloud cover, a low impact, and therefore non-significant minor effect, has been classified towards the east and west flight paths.

Pitsford Airstrip

15.8.30 Results for Pitsford Airfield are presented in Appendix 15.8 Pitsford Airstrip Aviation Receptor Results **[EN/10170/APP/GH6.3.15.8]**.

15.8.31 Glare with 'low potential for temporary after-image' was predicted towards flight path FP11 from fixed and tracking panels within Green Hill B. As such, a low impact, and therefore non-significant effect, has been classified towards FP11. Glare with 'potential for temporary after-image' was predicted towards FP29 from fixed and tracking panels within Green Hill B. Upon review of additional factors such as consideration of the pilots' central field of view and cloud cover, a low impact, and therefore non-significant minor effect, has been classified towards FP29.

Tower Farm Airstrip

15.8.32 Results for Tower Farm Airstrip are presented in Appendix 15.9 Tower Farm Airstrip Aviation Receptor Results **[EN/10170/APP/GH6.3.15.9].**

15.8.33 No glare was predicted towards flight paths FP10 from fixed and tracking panels within Green Hill F. As such, no impact, and therefore a non-significant effect, has been classified towards FP10. Glare with 'low potential for temporary after-image' was predicted towards flight path FP28 from fixed and tracking panels within Green Hill F. As such, a low impact, and therefore non-significant minor effect, has been classified towards flight path FP28.

William Pitt Airstrip

15.8.34 Results for William Pitt Airstrip are presented in Appendix 15.10 William Pitt Airstrip Aviation Receptor Results **[EN/10170/APP/GH6.3.15.10].**

15.8.35 Glare with 'potential for temporary after-image' was predicted towards flight path FP02 from fixed and tracking panels within Green Hill E. Glare with 'low potential for temporary after-image' was predicted towards flight path FP02 from fixed and tracking panels within Green Hill C, D, and E. As such, a low impact, and therefore non-significant minor effect, has been classified towards flight path FP02.

15.8.36 Glare with 'potential for temporary after-image' was predicted towards flight path FP20 from tracking panels within Green Hill E. As such, a moderate impact, and therefore significant moderate effect, has been classified towards flight paths FP20.

15.8.37 The glint and glare assessment was originally undertaken using observation points, however, there are limitations with this methodology. The model assumes that observation points have a 360° field-of-view. As such, a modelled observation point may be predicted to receive significant effects, however in reality, it may not be geometrically possible for the pilot to experience the glare.

15.8.38 Based on understanding of FAA guidance, it is considered that a pilot's central field-of-view will be confined to 100° (50° either side of travel). As such, modelling approach paths using observation points may lead to an over-exaggeration of predicted glare. This could lead to significant effects being predicted which may not be experienced in real life.

15.8.39 Due to moderate impacts predicted, an aviation specialist was consulted to assist adjusting the model so that the results will more likely represent a realistic scenario. As such, Arthian have reran the glint and glare assessment modelling the approach paths using the Route tool within ForgeSolar and applying a 25° field-of-view (FOV) for the pilots.

15.8.40 No glare was predicted towards FP02 and FP20 from all solar panels within Green Hill C and fixed panels within Green Hill D. Additionally, no glare was predicted towards FP02 from tracking panels within Green Hill D and Green Hill E.

15.8.41 Glare with 'low potential for temporary after-image' was predicted towards FP02 from fixed tilt panels within Green Hill E and FP20 from tracking panels within Green Hill D and fixed tilt panels within Green Hill E. As such, a low impact, and therefore non-significant minor effect, has been classified towards flight path FP02 and FP20 from these areas.

15.8.42 Glare with 'potential for temporary after-image' was predicted towards FP20 from tracking panels within Green Hill E. Upon review of additional factors such as predicted annual duration of glare and cloud cover, a moderate impact and therefore significant moderate effect, was classified.

Sywell Aerodrome

15.8.43 Results for Sywell Aerodrome are presented in Appendix 15.11 Sywell Aerodrome Aviation Receptor Results **[EN/10170/APP/GH6.3.15.11].**

15.8.44 Glare was predicted towards the air traffic control tower at Sywell Aerodrome from fixed and tracking panels within Green Hill B, Green Hill C, Green Hill D, and Green Hill E. Upon a review of additional factors such as operational hours of the aerodrome, a low impact, and therefore non-significant minor effect, has been classified towards the air traffic control tower.

15.8.45 Glare with 'low potential for temporary after-image' was predicted towards flight path FP14 from fixed and tracking panels within Green Hill C, Green Hill D, and Green Hill E. As such, a low impact, and therefore non-significant minor effect, has been classified towards flight path FP14.

15.8.46 Glare with 'potential for temporary after-image' was predicted towards flight paths FP03L, FP03R, FP21L, FP21R, FP02, and FP32 from fixed and tracking panels from within Green Hill C, Green Hill D, and Green Hill E. Upon a review of additional factors such as consideration of pilots' central field of view and cloud cover, a low impact, and therefore non-significant minor effect, has been classified towards flight paths FP03L, FP03R, FP21R, FP02, and FP32.

15.8.47 Glare with 'potential for temporary after-image' was predicted towards flight paths FP23 from tracking panels within Green Hill C. As such, a moderate impact, and therefore significant moderate effect, has been classified towards flight path FP23.

15.8.48 The glint and glare assessment was originally undertaken using observation points, however, there are limitations with this methodology. The model assumes that observation points have a 360° field-of-view. As such, a modelled observation point may be predicted to receive significant effects, however in reality, it may not be geometrically possible for the pilot to experience the glare.

15.8.49 Based on understanding of FAA guidance, it is considered that a pilot's central field-of-view will be confined to 100° (50° either side of travel). As such, modelling approach paths using observation points may lead to an over-exaggeration of

predicted glare. This could lead to significant effects being predicted which may not be experienced in real life.

15.8.50 Due to moderate impacts predicted, an aviation specialist was consulted to assist adjusting the model so that the results will more likely represent a realistic scenario. As such, Arthian have reran the glint and glare assessment modelling the approach paths using the Route tool within ForgeSolar and applying a 25° field-of-view (FOV) for the pilots. It is noted that the ATCT was not included within the additional modelling due to the receptor remaining unchanged.

15.8.51 No glare was predicted from Green Hill A and Green Hill A.2 towards any aviation receptors at Sywell Aerodrome. Additionally, no glare was predicted towards flight paths FP21L, FP21R, and FP32 from any panels within Green Hill C, Green Hill D, and Green Hill E.

15.8.52 Glare with ‘low potential for temporary after-image’ was predicted towards flight path FP32 from panels within Green Hill B. As such, a low impact, and therefore non-significant minor effect, has been classified towards flight paths FP32.

15.8.53 Glare with ‘low potential for temporary after-image’ was predicted towards flight paths FP03L and FP03R from tracking panels within Green Hill C and Green Hill D. As such, a low impact, and therefore non-significant minor effect, has been classified towards flight paths FP03L and FP03R.

15.8.54 Glare with ‘potential for temporary after-image’ was predicted from tracking panels within Green Hill C, and glare with ‘low potential for temporary after-image’ was predicted from tracking panels within Green Hill D and Green Hill E towards flight path FP14. Upon review of additional factors such as the predicted annual duration of glare and cloud cover in the area, a low impact, and therefore non-significant minor effect, has been classified towards FP14.

15.8.55 Glare with ‘potential for temporary after-image’ was predicted from panels within Green Hill C, and glare with ‘low potential for temporary after-image’ was predicted from within Green Hill D and fixed tilt panels within Green Hill E towards flight path FP05. Upon review of additional factors such as the predicted annual duration of glare and cloud cover in the area, a low impact, and therefore non-significant minor effect, has been classified towards FP05.

15.8.56 Glare with ‘potential for temporary after-image’ was predicted from tracking panels within Green Hill C, and ‘low potential for temporary after-image’ was predicted from tracking panels within Green Hil B. Upon review of additional factors such as predicted annual duration of glare and cloud cover, a moderate impact and therefore significant moderate effect, was classified.

15.8.57 It is noted that glare with ‘potential for temporary after-image' was predicted towards flight path FP23 from Sywell Road Solar Farm which is located adjacent to Green Hill C of the Scheme. No known complaints have been raised regarding the impact of glint and glare from Sywell Road Solar Farm.

15.9 Additional Mitigation Measures

15.9.1 Additional mitigation are measures that are identified as being required to avoid, prevent, reduce or, if possible, offset significant effects that have been identified through the technical assessments within the Environmental Statement.

15.9.2 Significant effects have been identified at William Pitt Airstrip and Sywell Aerodrome. In order to understand which additional mitigation options would be most effective at reducing the moderate effects identified to these aviation receptors to a non-significant level, the Applicant consulted with an Aviation Specialist. Following a review of the modelling results, the Aviation Specialist confirmed that, based on their extensive real-world experience of the effects of solar panels on aviation receptors, the modelled results would not result in a significant impact on the aviation receptors in practice. The recommendation from the Aviation Specialist was that no additional mitigation was required as the modelled effects, reported in section 15.8 above, consistently report significantly greater impacts than occur in practice.

15.9.3 The Aviation Specialist has provided a summary of empirical evidence collected from aerodromes located near to existing solar farms, owners, operators and pilots, demonstrating that modelled impacts from solar farms do not occur in practice, which is provided in [**EN010170/APP/GH7.28]**.

15.9.4 Having sought expert advice from the aviation sector in order to better understand what additional mitigation is required to reduce the identified significant effects to not significant, the Applicant has been advised that the identified effects are, in practice, not significant. On this basis, and having been provided with empirical evidence that a range of comparable aerodromes with nearby solar farms have not experienced any significant effects to aviation receptors, no additional mitigation is proposed.

15.10 Residual Effects

15.10.1 This section summarises the residual effects of the Scheme on glint and glare and receptors following the adoption of embedded and the discussion of additional mitigation with the Aviation Specialist.

15.10.2 Based on the assessment outlined above, it is considered that the potential effects of glint and glare towards ground-based receptors will be minor and not significant.

15.10.3 In respect of the aviation receptors, following consultation with the Aviation Specialist and considering the empirical evidence provided in [**EN010170/APP/GH7.28]**, and upon the application of professional judgement in interpreting the modelling results in light of that evidence, it is considered that the potential effects of glint and glare towards Easton Maudit Airstrip, Hold Farm Airstrip, Pitsford Airstrip, Tower Farm Airstrip, William Pitt Airstrip and Sywell Aerodrome will be minor and not significant.

15.11 Cumulative Effects

15.11.1 A list of cumulative projects can be found in Appendix 25.1 **[EN010170/APP/GH6.3.25.1]** of the ES. A summary of Cumulative effects will be listed within Chapter 25: Cumulative Effects and Effects Interaction of this ES.

Cumulative effects

15.11.2 Sywell Road Solar Farm is located nearby Green Hill C, Green Hill D, and Green Hill E of the Scheme.

15.11.3 Nearby ground-based receptors have been reviewed to determine if they will receive additional glare from Sywell Road Solar Farm such that cumulative effects are significant. A receptor review indicated that line of sight from the ground-based receptors towards Sywell Road Solar Farm will be obstructed by intervening vegetation and terrain such that the receptors will not receive impacts.

15.11.4 As such, there are not considered to be any likely significant cumulative effects in conjunction with this development.

In-combination effects

15.11.5 The sensitivity of receptor, magnitude (of impact) or significance of glint and glare effects is not considered to be changeable due to interactions with effects as identified in Chapter 25 Cumulative Effects and Effect Interactions chapter.

15.12 Summary

15.12.1 **Table 15.6** sets out a summary of the glint and glare environmental effects.

Table 15.6 Summary of Residual Effects for Glint and Glare

Receptor	Description of Impact	Sensitivity of Receptor	Magnitude of Impact	Embedded Mitigation	Significance of Effect (with embedded mitigation)	Additional Mitigation Measures	Residual Effect (with additional mitigation)
Operational Phase							
Residential Dwellings	Reflections towards residential dwellings.	Medium Sensitivity	Low	Mature vegetation is proposed as instant screening to obstruct line of sight between the residential dwellings and reflecting arrays.	Minor Significance	N/A	**Minor Effect (Not Significant)**
Road Infrastructure	Reflections towards road users.	Medium Sensitivity	Low Impact	Vegetation is proposed as instant screening to obstruct line of sight between the road users and reflecting arrays.	Minor Significance	N/A	**Minor Effect (Not Significant)**
The Acorn Centre	Reflection towards visitors at the Centre	Medium Sensitivity	Low Impact	N/A	Minor Significance	N/A	**Minor Effect (Not Significant)**

Receptor	Description of Impact	Sensitivity of Receptor	Magnitude of Impact	Embedded Mitigation	Significance of Effect (with embedded mitigation)	Additional Mitigation Measures	Residual Effect (with additional mitigation)
Easton Maudit Airstrip	Reflection towards pilots on final approach to the airstrip.	Medium Sensitivity	Low Impact	N/A	Minor Significance	N/A	**Minor Effect (Not Significant)**
Hold Farm Airstrip	Reflection towards pilots on final approach to the airstrip.	Medium Sensitivity	Low Impact	N/A	Minor Significance	N/A	**Minor Effect (Not Significant)**
Pitsford Airstrip	Reflection towards pilots on final approach to the airstrip.	Medium Sensitivity	Low Impact	N/A	Minor Significance	N/A	**Minor Effect (Not Significant)**
Tower Farm Airstrip	Reflection towards pilots on final approach to the airstrip.	Medium Sensitivity	Low Impact	N/A	Minor Significance	N/A	**Minor Effect (Not Significant)**
William Pitt Airstrip	Reflection towards pilots on final approach to the airstrip.	Medium Sensitivity	Moderate Impact	N/A	Moderate Significance	An Aviation Specialist was consulted to assist determine the impact of the glint and glare	**Minor Effect (Not Significant)**

Receptor	Description of Impact	Sensitivity of Receptor	Magnitude of Impact	Embedded Mitigation	Significance of Effect (with embedded mitigation)	Additional Mitigation Measures	Residual Effect (with additional mitigation)
						that would be experienced by pilots in reality.	
Sywell Aerodrome	Reflection towards pilots on final approach to the airstrip and towards ATC personnel.	Medium Sensitivity	Moderate Impact	N/A	Moderate Significance	An Aviation Specialist was consulted to assist determine the impact of the glint and glare that would be experienced by pilots in reality.	**Minor Effect (Not Significant**)

References

Ref 15.1 Green Hill Solar Farm (2024) Scoping Report. Available at: EN010170-000012-GHSF - Scoping Report.pdf

Ref 15.2 https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1 (Nov 2023)

Ref 15.3 https://assets.publishing.service.gov.uk/media/65a7889996a5ec000d731aba/nps-renewable-energy-infrastructure-en3.pdf (Nov 2023)

Ref 15.4 West Northamptonshire Joint Core Strategy Local Plan (Part 1) | West Northamptonshire Council (https://www.westnorthants.gov.uk/west-northamptonshire-joint-core-strategy/west-northamptonshire-joint-core-strategy-local-plan-part) (Dec 2014)

Ref 15.5 North Northamptonshire Local Plan | North Northamptonshire Council (https://www.northnorthants.gov.uk/planning-strategies-and-plans/north-northamptonshire-local-plan) (July 2016)

Ref 15.6 Wind and Solar Energy Supplementary Planning Document (https://www.northnorthants.gov.uk/planning-strategies-and-plans/supplementary-planning-documents-spd) (Sept 2014)

Ref 15.7 Plan:MK | Milton Keynes City Council (https://www.milton-keynes.gov.uk/planning-and-building/developingmk/planmk) (March 2019)

Ref 15.8 MK City Plan 2050 https://milton-keynes.moderngov.co.uk/documents/s19212/MK+City+Plan+2050+Regulation+18.pdf (July 2024)

Ref 15.9 https://www.gov.uk/guidance/renewable-and-low-carbon-energy (June 2015)

Ref 15.10 BRE Planning guidance for the development of large scale ground mounted solar PV systems [redacted] (Oct 2013)

Ref 15.11 The Highway Code - Driving in adverse weather conditions (226 to 237) - Guidance - GOV.UK (https://www.gov.uk/guidance/the-highway-code/driving-in-adverse-weather-conditions-226-to-237)

Ref 15.12 CAP 738 (https://www.caa.co.uk/publication/download/12346)

Ref 15.13 Renewable energy developments: solar photovoltaic developments CAST Aerodrome Safeguarding Guidance Note [redacted] (July 2023)

Ref 15.14 Federal Aviation Administration Policy: Review of Solar Energy System Projects on Federally-Obligated Airports (https://www.federalregister.gov/documents/2021/05/11/2021-09862/federal-aviation-administration-policy-review-of-solar-energy-system-projects-on-federally-obligated)

Ref 15.15 Advice on Solar farms on near routes used by equestrians [redacted] (April 2024)

Ref 15.16 Advice on Solar Farms so[redacted]

Ref 15.17 Solar Photovoltaic and Building Development – Glint and Glare Guidance ([redacted](Sep 2022)

Ref 15.18 Potential ecological impacts of ground-mounted photovoltaic solar panels. [redacted] (2019)