Heckington Fen Solar Park

ENO10123

Environmental Statement | Volume 1: Technical Chapters

Chapter 17: Glint and Glare

Applicant: Ecotricity (Heck Fen Solar) Limited

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CHAPTER 17: GLINT AND GLARE

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Table of Contents:

Tables:

17 GLINT AND GLARE

17.1 EXECUTIVE SUMMARY

17.1.1 The assessment seeks to demonstrate the possible effects that reflected sunlight from the Energy Park would have on receptors in the vicinity. These receptors include residential properties, road, rail, air traffic and national trails. The assessment employed the use of:

- A computer model to determine the times, dates and duration that glint may theoretically be visible; and
- A discussion of existing and proposed screening such that a realistic assessment of potential effects can be made.

17.1.2 The reflectivity of solar panels (forming part of the Proposed Development) is considerably less than many other common materials seen in the built or natural environment. Water bodies such as reservoirs, lakes (and on a calm day the ocean) have very similar reflective properties to solar panels and represent much larger areas than that taken up by the solar panels at the site. In any case, the overall potential for glint at receptors within the vicinity of the site is low.

17.1.3 Glint is theoretically possible for many receptors before taking screening into account but is only visible to a few receptors after the existing screening is accounted for.

17.1.4 The Observation Points (OPs) and route receptors that are still predicted to receive glint given the existing screening, will benefit further from the proposed onsite mitigation and perimeter planting. Minimal residual effects remain after the introduction of the proposed onsite screening is taken into account.

17.1.5 There are no cumulative effects as the closest solar panels are greater than 5km away.

17.2 INTRODUCTION

17.2.1 This assessment considers the potential glint effects from solar photovoltaic (PV) arrays associated with the Energy Park on land at Heckington Fen. The assessment will consider the potential effects of glint caused by the PV array elements of the Proposed Development on ground-based receptors, including road, rail and local dwellings. Aviation effects on aircrafts operating in the surrounding area have been scoped out of the assessment due to the distance to airfields and the lack of potential effects.

17.2.2 **Figure 17.1** (document reference 6.2.17) shows the Panel Area Boundary and ZTV in orange and the surrounding land. In the final design iteration, the PV arrays may not cover the entirety of this area but for the purpose of this report it is assumed that they will (in order to assess the worst case scenario).

17.2.3 Only–fixed panels are under consideration for the Proposed Development, so glint effects arising from only fixed panel layout scenarios will be considered in this ES Chapter. For the fixed installation, the panels will be set at an angle to the horizontal of either 10, 15 or 20 degrees and at a maximum height above ground of 3.5m.

17.2.4 Due to the range of panel angles under consideration, assessments for all three options have been presented throughout this report. In all cases, any discussion in the text relates to the worst case scenario for each receptor, unless otherwise indicated. Varying the panel angle will produce different sets of results for glint intensity, time and

duration at each receptor, with no one particular angle producing the worst case results at all receptors so each scenario needs to be assessed with the same methodology applied.

17.2.5 The variation between the three sets of results is not expected to be large, however the change in panel angle could result in an increase in glint at one OP or route receptor, while simultaneously producing the opposite effect at another nearby receptor and so each angle will be assessed individually.

This Chapter is supported by:

17.2.6 **Figure 17.1- Panel area boundary and ZTV** (document reference 6.2.17)

17.2.7 **Appendix 17.1 - Forge Solar Model (Fixed Panels: 15 degrees) Glint Report** (doc reference 6.3.17.1)

17.2.8 **Appendix 17.2 - Mathematical Equations** (doc reference 6.3.17.2)

17.2.9 **Appendix 17.3 – Forge Solar Model (Fixed Panels: 10 degrees) Glint Report** (doc reference 6.3.17.3)

17.2.10 **Appendix 17.4** – **Forge Solar Model (Fixed Panels: 20 degrees) Glint Report** (doc reference 6.3.17.4)

17.2.11 **Appendix 17.5 – OP description and summary for 10 degree and 20 degree panel angles** (doc reference 6.3.17.5)

17.3 ASSESSMENT APPROACH

Methodology

Defining Glint

17.3.1 Glint, glare and dazzle are often used interchangeably but the definitions used in this report are described below and can be found in **Chapter 20 Glossary** (document reference 6.1.20) and shown in **Figure 17.2** (integrated below in this chapter's main text).

17.3.2 **Glint** - Also known as a specular reflection is produced as a direct reflection of the sun on the surface of the solar panel. It occurs with the reflection of light from smooth surfaces such as glass, steel, and calm water.

17.3.3 **Glare** - A scattered reflection of light. Glare is significantly less intense than glint and is produced from rougher surfaces such as concrete, tarmac, and vegetation.

17.3.4 **Dazzle** - An effect caused by intense glint and glare, which can cause distraction, and if strong enough reduce the ability of the receptor (pilot or otherwise) to distinguish details and objects

17.3.5 It should be noted that different organisations and agencies apply slightly different definitions to these terms, and some refer to the terms glint and glare interchangeably.

1.1.1 Due to the intensity of glint being much higher than glare, this report will focus on assessing glint effects alone. The perceived intensity of glint will vary depending on the ambient light level, direction and distance to the receptor.

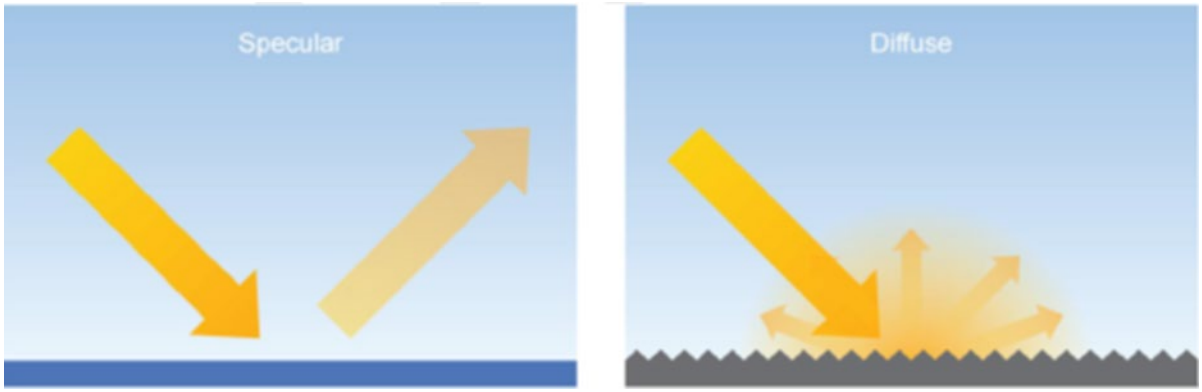


Figure 17.2 - Types of Reflection[1]

The Occurrence of Glint

17.3.6 In the northern hemisphere, the sun appears to rise in the east. For fixed, south-oriented solar panels, when the sun reaches a sufficient elevation in the sky to allow sunlight to strike the panels, ground glint can occur. When the sun's angle in the sky attains a certain value, the reflected beam will be directed back into the sky towards the west. Put simply, ground-based glint will normally only occur from fixed panels to ground-based receptors in the early morning or evening when the sun appears low in the sky.

17.3.7 In general, glint does not usually occur during winter months due to sunlight striking the panels from the front and reflecting upwards for receptors outside the immediate vicinity of a solar site. As ground-based glint outside the immediate vicinity of a solar site cannot occur during winter, the lack of leaves on deciduous trees will not affect the level of glint experienced.

17.3.8 In the northern hemisphere, for south-facing solar parks in general, glint has the potential to occur on land towards the west and southwest of the solar park in the early morning and towards the east and southeast of the solar park in the early evening. Glint will only usually occur in the morning or evening for fixed receptors but not both unless a receptor is to the immediate south of the solar park or positioned between solar parks.

Panel Types

17.3.9 The solar panel arrays in the Proposed Development will be set out using fixed panels. **Figure 17.3** (below) illustrates the configuration of a generic fixed panel array.

17.3.10 The fixed panels would be orientated to the south (or very close to south) and inclined at a set pitch. For the purpose of this ES Chapter, the angle of inclination at the Proposed Development has been set at 15 degrees to the horizontal. Angles of 20 degrees and 10 degrees have also been assessed as these remain options for the final development configuration.

17.3.11 At the Proposed Development, the maximum height at the rear of the panels is assumed to be 3.5m and this is the height assumed for all three panel angle scenarios. The actual height will be determined by the panel orientation on the frame, the number of rows of panels per arrays and the angle of inclination but the panels will not exceed the 3.5m height.

[1] *Federal Aviation Administration, "Technical Guidance for Evaluating Selected Solar Technologies on Airports" Chapter 3, Nov 2010*

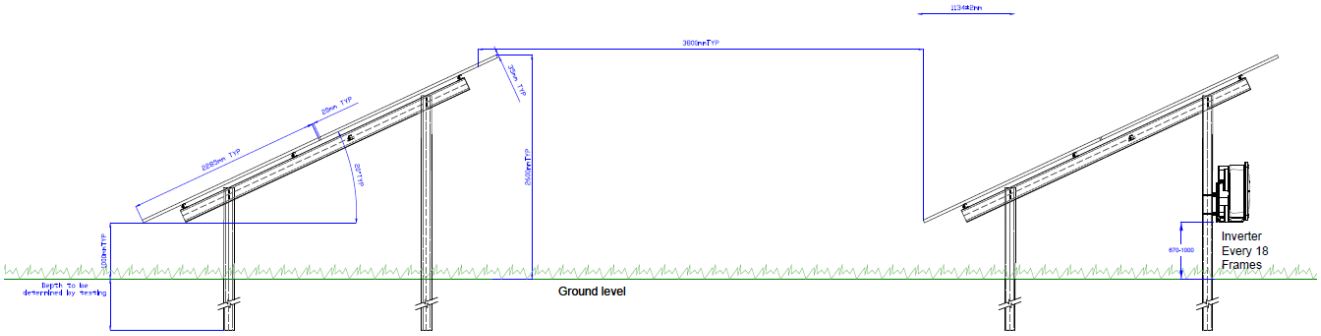


Figure 17.3 - Example of a fixed panel array[2]

Assessment of Significance

Sensitivity

17.3.12 For the purpose of this assessment, sensitivity of the receptor is judged based on the likely consequence of a negative effect. For example. the potential consequence of a motorist or train-driver being dazzled by glint could be, in the worst-case scenario, a collision or major accident. A receptor that is considered to present a possible health and safety risk is allocated as high sensitivity.

17.3.13 A nuisance risk, such as glint being visible from a property, where there is unlikely to be any physical harm but where residents could become annoyed, is allocated as a medium sensitivity.

17.3.14 A receptor that is uninhabited and irregularly frequented, or a building that does not have windows, such as a substation or warehouse, is considered to be low sensitivity.

17.3.15 A place where people are not usually present such as an agricultural field with no public access, is considered to have negligible sensitivity. It is unlikely to cause any issues even if glint were to be visible.

Magnitude

17.3.16 For the purpose of this assessment, the magnitude of effect is based on the output of the computer model, which, in the event that any glint is visible, provides a binary result for standard glint effects.

17.3.17 Green glint is low intensity glint with no potential for temporary after image. In this context 'after image' is the residual effect that remains temporarily visible after glancing towards and then away from a very bright light source.

17.3.18 Yellow glint is higher intensity glint that does have some potential for temporary after image.

17.3.19 However, the computer model predicts the likely effects in the absence of any screening. It does not recognise whether there is any intervisibility between the solar panels and the receptor. This element of assessment requires human intervention to consider whether, in reality, visibility to the panels that might be reflecting light is possible.

[2] *Image provided by Pegasus Group Ltd; viewer looking from the east or west along the rows*

Significance

17.3.20 This assessment is focussed on considering high and medium sensitivity receptors. It is considered that any yellow glint actually received at these receptors should be considered **significant**. If yellow glint is predicted in the Forge Solar model (which does not account for screening) but, in reality, the receptor is already screened and there is no visibility, or if visibility to potential glint effects will be removed by mitigation, effects at these receptors will be considered **not significant**. In general, low intensity green glint is considered to be **not significant**, unless the receptor in question happens to be an air traffic control tower (ATCT), which, due to its high sensitivity is not permitted to tolerate even green glint.

17.3.21 **Table 17.1** illustrates the Magnitude of Change and Sensitivity of the Receptor which is used to classify each receptor in **Tables 17.5** and **Table 17.8**.

Table 17.1: Significance Matrix

	Sensitivity of Receptor				
Magnitude of Change		**High**	**Medium**	**Low**	**Negligible**
	Yellow Glint	Moderate to Major	Minor to Moderate	Negligible	Negligible
	Green Glint	Minor*	Negligible	Negligible	Negligible
	No Glint Visible	None	None	None	None

**Except for an ATCT where no glint can be tolerated, hence even green glint would be considered 'Major'.*

Ultimately, a statement of whether any identified harm does or does not represent a significant effect is provided in respect of each glint receptor using the following terminology: '**Significant**' or '**Not Significant**'.

Legislative and Policy Framework

17.3.22 Specific policy and guidance on assessing glint effects from solar parks has been considered as part of this assessment and is detailed below.

National Policy Statements

Overarching National Policy Statement for Energy (NPS EN-1) – July 2011

17.3.23 EN-1 does not mention solar PV development specifically, other than in passing, but in paragraph 3.3.10, it does recognise that there is significant need to increase the penetration of renewables in the UK generation mix:

> **"As part of the UK's need to diversify and decarbonise electricity generation, the Government is committed to increasing dramatically the amount of renewable generation capacity."**

17.3.24 It continues in paragraph 3.4.5:

> **"...it is necessary to bring forward new renewable electricity generating projects as soon as possible. The need for new renewable electricity generation projects is therefore urgent."**

17.3.25 In respect of civil and military aerodromes, EN-1 comments in Section 5.4:

> **"Where the proposed development may have an effect on civil or military aviation and/or other defence assets an assessment of potential effects should be set out in the ES (see Section 4.2).**
>
> **The applicant should consult the MoD, CAA, NATS and any aerodrome – licensed or otherwise – likely to be affected by the proposed development in preparing an assessment of the proposal on aviation or other defence interests.**
>
> **Any assessment of aviation or other defence interests should include potential impacts of the project upon the operation of CNS infrastructure, flight patterns (both civil and military), other defence assets and aerodrome operational procedures. It should also assess the cumulative effects of the project with other relevant projects in relation to aviation and defence."**

17.3.26 Whilst not specifically glint related, in talking about 'artificial light', Section 5.6 mentions:

> **"The applicant should assess the potential for... artificial light to have a detrimental impact on amenity, as part of the Environmental Statement.**
>
> **In particular, the assessment provided by the applicant should describe:**
>
> - **the type, quantity and timing of emissions;**
> - **aspects of the development which may give rise to emissions;**
> - **premises or locations that may be affected by the emissions;**
> - **effects of the emission on identified premises or locations; and**
> - **measures to be employed in preventing or mitigating the emissions.**
>
> **The applicant is advised to consult the relevant local planning authority and, where appropriate, the EA about the scope and methodology of the assessment."**

17.3.27 Section 5.9 deals with Landscape and Visual Effects, and paragraph 5.9.7 mentions:

> **"The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity. This should include light pollution effects, including on local amenity, and nature conservation."**

17.3.28 Paragraph 5.9.18 continues:

> **"The IPC will have to judge whether the visual effects on sensitive receptors, such as local residents, and other receptors, such as visitors to the local area, outweigh the benefits of the project."**

17.3.29 Paragraph 5.9.23 goes on:

> **"Depending on the topography of the surrounding terrain and areas of population it may be appropriate to undertake landscaping off site. For example, filling in gaps in existing tree and hedge lines would mitigate the impact when viewed from a more distant vista."**

17.3.30 In Section 5.13 EN-1 discusses transport impacts:

> **"If a project is likely to have significant transport implications, the applicant's ES... should include a transport assessment, using the NATA/WebTAG methodology stipulated in Department for Transport guidance, or any successor to such methodology. Applicants should consult the Highways Agency and Highways Authorities as appropriate on the assessment and mitigation."**

National Policy Statement for Renewable Energy (NPS EN-3) – July 2011

17.3.31 Similarly, because at the time when EN-3 was being written, solar PV was relatively new (to the UK market) and was more of a small-scale technology. EN-3 is therefore surprisingly silent of solar energy and does not mention glint impacts at all.

17.3.32 It does however specify a '*Criteria for "good design" for energy infrastructure*' in Section 2.4:

> **"Section 10(3)(b) of the Planning Act 2008 requires the Secretary of State to have regard, in designating an NPS, to the desirability of good design. Section 4.5 of EN-1 sets out the principles of good design that should be applied to all energy infrastructure.**
>
> **Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology."**

National Policy Statement for Electricity Networks (NPS EN-5) – July 2011

17.3.33 EN-5 provides further advice for the development of electricity networks. Whilst not directly relating to solar PV and glint impacts, EN-5 includes further information on good design and technology specific information relevant to other infrastructure that will be needed as part of the Proposed Development.

Draft Energy National Policy Statements

17.3.34 The UK Government is carrying out a review of the Energy National Policy Statements, which were initially published in 2010. As part of that review process new draft National Policy Statements were prepared for consultation and the feedback from the consultation is currently being analysed.

17.3.35 Of particular note, within the consultation document for draft NPS EN-3, which has been updated to include more relevance to solar PV development, is reference to glint effects and aviation. Paragraphs 2.52.4 and 2.52.5 state:

> **"2.52.4 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 and motorists.**

> **2.52.5 There is no evidence that glint and glare from solar farms interferes in any way with aviation navigation or pilot and aircraft visibility or safety. Therefore, the Secretary of State is unlikely to have to give any weight to claims of aviation interference as a result of glint and glare from solar farms."**

National Planning Policy Framework (July 2021) - Planning Practice Guidance

17.3.36 The National Planning Policy Framework (NPPF) planning practice guidance sets out guidance for large ground mount solar farms under the section entitled 'Renewable and Low Carbon Energy'.

17.3.37 Paragraph 013 states:

> **"What are the particular planning considerations that relate to large scale ground-mounted solar photovoltaic farms?**
>
> **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.**
>
> **Particular factors a local planning authority will need to consider include [inter alia]:**
>
> - **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 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 guidelines

17.3.38 In the UK, at the domestic level, the closest guidelines regarding glint are the BRE guidelines on 'Site layout planning for Daylight and Sunlight'[3]

17.3.39 With regard to solar dazzle these state that:

> **"Glare or dazzle can occur when sunlight is reflected from a glazed façade or an area of metal cladding. This can affect road users outside and the occupants of adjoining buildings. The problem can occur where there are large areas of reflective glass or cladding on the façade, or where there are areas of glass or cladding slope back so that high altitude sunlight can be reflected along the ground. Thus solar dazzle is only a long-term problem for some heavily**

[3] Site Layout Planning for Daylight and Sunlight: A guide to good practice. (2nd Edition) Paul Littlefair, BRE Trust, First published 2011.

> **glazed (or mirror clad) buildings. Photovoltaic panels tend to cause less dazzle because they are designed to absorb light.**
>
> **If it is likely that a building may cause solar dazzle the exact scale of the problem should be evaluated. This is done by identifying key locations such as road junctions and windows of nearby buildings and working out the numbers of hours of the year that sunlight can be reflected to these points. BRE information paper IP 3/87 gives details.**
>
> **Glare to motorists approaching the building can be an issue. The worst problems occur when drivers are travelling directly towards the building and sunlight can reflect off surfaces in the driver's direct line of sight (usually this will be off the lower parts of the building)."**

17.3.40 After setting out a methodology for calculating solar reflections from sloping glazed facades, BRE information paper IP 3/872 summarises effects as follows:

> **"Initial experience suggests that, in Europe and the USA at least, the greatest problems occur with facades facing within 90° of due south, sloping back at angles between 5° and 30° to the vertical. Where the façade slopes at more than 40° to the vertical (less than 50° to the horizontal) solar reflections are likely to be less of a problem, unless nearby buildings are very high; and facades which slope forward, so that the top of the building forms an effective overhang, should also cause few problems in this respect. In the northern hemisphere, north facing facades should only cause reflected solar glare on a few occasions during the year, if at all."**

17.3.41 In the domestic setting, the guidelines therefore suggest that glare and dazzle are only likely to be issues if the facade (or panel in this case) is within 40 degrees of the vertical or 50 degrees of the horizontal. Beyond this angle, incident light will be reflected primarily skywards. This is because the angle of reflection of light from a point source will always be the same as the angle of incidence.

Aviation Guidance (CAA)

17.3.42 The UK Civil Aviation Authority (CAA) issued interim guidance in relation to solar farms in December 2010[4]. The formal policy was cancelled in September 2012, however, in the absence of formal policy, the guidance is still relevant. It refers to solar farms as Solar Photovoltaic Systems (SPV)

CAA Interim Guidance

17.3.43 This interim guidance makes the following recommendations (p.2-3):

> **"8. It is recommended that, as part of a planning application, the SPV developer provide safety assurance documentation (including risk assessment) regarding the full potential impact of the SPV installation on aviation interests.**
>
> **9. Guidance on safeguarding procedures at CAA licensed aerodromes is published within CAP 738 Safeguarding of Aerodromes and advice for unlicensed aerodromes is contained**

[4] Civil Aviation Authority, 2010. "*Interim CAA Guidance - Solar Photovoltaic Systems*"

within CAP 793 Safe Operating Practices at Unlicensed Aerodromes.

10. Where proposed developments in the vicinity of aerodromes require an application for planning permission the relevant LPA normally consults aerodrome operators or NATS when aeronautical interests might be affected. This consultation procedure is a statutory obligation in the case of certain major airports, and may include military establishments and certain air traffic surveillance technical sites. These arrangements are explained in Department for Transport Circular 1/2003 and for Scotland, Scottish Government Circular 2/2003.

11. In the event of SPV developments proposed under the Electricity Act, the relevant government department should routinely consult with the CAA. There is therefore no requirement for the CAA to be separately consulted for such proposed SPV installations or developments.

12. If an installation of SPV systems is planned on-aerodrome (i.e. within its licensed boundary) then it is recommended that data on the reflectivity of the solar panel material should be included in any assessment before installation approval can be granted. Although approval for installation is the responsibility of the ALH10, as part of a condition of a CAA Aerodrome Licence, the ALH is required to obtain prior consent from CAA Aerodrome Standards Department before any work is begun or approval to the developer or LPA is granted, in accordance with the procedures set out in CAP 791 Procedures for Changes to Aerodrome Infrastructure.

13. During the installation and associated construction of SPV systems there may also be a need to liaise with nearby aerodromes if cranes are to be used; CAA notification and permission is not required.

14. The CAA aims to replace this informal guidance with formal policy in due course and reserves the right to cancel, amend or alter the guidance provided in this document at its discretion upon receipt of new information.

15. Further guidance may be obtained from CAA's Aerodrome Standards Department via aerodromes@caa.co.uk."

17.3.44 The CAA Civil Aviation Publication (CAP) 738 document[5] notes:

"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

[5] Civil Aviation Authority - Safety and Airspace Regulation Group, 2020, CAP 738, "*Safeguarding of Aerodromes*".

> **Solar Technologies on Airports', which is likely to be subject to change, see link;**
>
> **https://www.federalregister.gov/documents/2013/10/23/2013-24729/interimpolicy-faa-review-of-solar-energy-system-projects-on-federally-obligated-airports**
>
> **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."**

Aviation Guidance (FAA)

17.3.45 The most comprehensive guidance setting out a methodology for assessing solar farm developments near aerodromes was produced November 2010 by the US Federal Aviation Administration (FAA) in a document entitled '*Technical Guidance for Evaluating Selected Solar Technologies on Airports*'. This was updated in Oct 2013 in the '*Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports*'. In April 2018 the FAA released a new version (Version 1.1) of the '*Technical Guidance for Evaluating Selected Solar Technologies on Airports*', and in May 2021 it provided a further set of guidance entitled '*14CRF Part 77 - FAA Policy: Review of Solar Energy System Projects on Federally Obligated Airports*'. In this last review the FAA concluded that, contrary to its initial beliefs:

> **"...in most cases, the glint and glare from solar energy systems to pilots on final approach is similar to glint and glare pilots routinely experience from water bodies, glass façade buildings, parking lots, and similar features. However, FAA has continued to receive reports of potential glint and glare from on-airport solar energy systems on personnel working in ATCT cabs. Therefore, FAA has determined the scope of agency policy should be focused on the impact of on airport solar energy systems to federally obligated towered airports, specifically the airport's ATCT cab."**

Scoping Criteria

17.3.46 The scoping criteria will include an assessment on aviation effects in the area, motorists and the effect to buildings and the railway. A study area of 5km has been applied for motorists, buildings and railways, due to glint intensity diminishing with distance from the source and general ground level visibility to low lying objects (3.5m agl) being minimal distances greater than 5km. Aerodromes within 15km of the Proposed Development have been considered. In most cases aerodromes located more than 5km away will be unaffected by glint effects although since air traffic control towers (ATCT) are often much taller than their surroundings they tend to have better visibility. Final approach flightpaths are assumed to extend 2miles (~3.2km) from the runway threshold so pilots at the start of this approach could be much closer to the solar farm than the aerodrome itself.

Limitations to the Assessment

17.3.47 The assessment has been based around three scenarios with panels that are fixed, at discrete angles of 10, 15 and 20 degrees from the horizontal respectively, all with a maximum panel height of 3.5m. As described above, all three panel angle options have

been considered in order to ensure that the worst-case scenario for glint effects is captured for each receptor.

17.3.48 There are a number of other limitations associated with the modelling that it is important to be aware of. These are summarised below.

17.3.49 The model calculates its results based on the geometric relationship between the observation point at height, the reflective plane at height (panels) and the position of the sun at each time interval. It therefore takes no account of any screening features whatsoever. Like for the Zone of Theoretical Visibility (ZTV), it does not account for surface features such as buildings or trees or intervening topography. Other tools used in the assessment will take this into consideration such as aerial photography, site visit photography, mapping and observations made by the design team.

1.1.2 Glint can only occur when direct sunlight can reach the solar panels. Diffused lighting, caused by weather conditions such as cloud, fog, and mist, cannot cause glint due to the low energy intensity of the light incident on the panels.

17.3.50 However, the software assumes it is sunny, at the maximum intensity possible given the season, 365 days per year. The computer model suggests when glint can happen not when it will happen, which is why further interpretation by the assessor is essential. The model is discussed further in **Appendix 17.1** (document number 6.3.17.1), **Appendix 17.2** (document number 6.3.17.2), **Appendix 17.3** (document number 6.3.17.3), **Appendix 17.4** (document number 6.3.17.4), and **Appendix 17.5** (document number 6.3.17.5)

17.3.51

17.3.52 It will be essential to interpret results in the context of the wider assessment and the methods and limitations discussed. The results will be further refined to account for local prevailing weather conditions such as cloud cover.

17.4 CONSULTATION

17.4.1 A summary of consultation prior to issue of the Preliminary Environmental Assessment Report (PEIR) in June 2022, outlines matters raised within the Scoping Opinion and how these have been addressed through the ES in relation to glint.

Table 17.2: Summary of Scoping Opinion Responses

Consultee	Details of Consultee response	How is matter addressed	Location of response
PINS Scoping Opinion	3.11.1 Aviation receptors are proposed to be scoped out on the basis there is no evidence that glint and glare for solar farms interferes in any way with aviation navigation or pilot and aircraft visibility or safety. The Inspectorate considers that this matter may be scoped out from further consideration,	The proposed Energy Park is not in close proximity to any licensed airfields. Small aerodromes exist in the local area although not immediately adjacent to the Energy Park. These include Boston Airfield	Although aviation is formally scoped out of the assessment, some additional consideration of aviation receptors is provided in Section 17.6.49

Consultee	Details of Consultee response	How is matter addressed	Location of response
	however the description of development should explain how the panel design prevents the likelihood of glint and glare.	approximately 8.3km to the east and a small grass strip airfield approximately 7.5km to the northeast of the site. As the recent FAA guidance notes, there has not been any evidence of pilots on final approach experiencing effects greater than they would routinely experience from other features present in the environment.	
	3.11.2 The Glint and Glare Assessment should ensure that it assesses a worst-case scenario, which at present includes the consideration of tracking and stationary panels. The conclusions of the assessment should inform the LVIA	This was previously considered in Chapter 6 and 7 of the PEIR. The Glint assessment does present a worst-case scenario in that it models effects for direct sunlight being present 100% of the time. Results are then adjusted to show the effect that weather is expected to have on reducing glint occurrences.	Assessment contained at Section 17.6 of this ES Chapter, however panels that track the sun are no longer being considered for the Energy Park.
North Kesteven District Council	RAF Cranwell or [and] RAF Coningsby which operate as training and Quick Reaction Alert (QRA) stations respectively and which use airspace above the site. Defence Estates should therefore be consulted regarding the proposal to scope out	Consultation with the Defence Infrastructure Organisation is noted below and is considered to address any concerns relating Defence Estates assets.	Assessment contained at Section 17.6.41 of this ES Chapter.

Consultee	Details of Consultee response	How is matter addressed	Location of response
	glint and glare on aviation interests. The assessment must also consider glint and glare potential in relation to the degree/orientation and pivot of panels relative to A17 and properties within and surrounding the site (as well as RAF airspace if needed) to rule out impacts to aviation interests, motorists and sensitive receptors (specifically residential and the school).	In respect of impacts on motorists and other sensitive receptors this is picked up in the analysis carried out for this report, where all three panel angles are assessed providing information on each to ensure that the worst case scenario is captured and presented for all receptors.	
Defence Infrastructure Organisation	Previous consultation with the Safeguarding Manager noted: "I have conducted an assessment with the grid refs you have provided and can confirm the area indicated falls within the safeguarded aerodrome height (max 91.4m AGL) and birdstrike safeguarding zones surrounding RAF Coningsby…With the above in mind and the height of the panels proposed at 4.5m, there would be no safeguarding concerns with regards to radar or airspace infringements."	The panels, which have been reduced in height again since the consultation with the Safeguarding Manager took place, will be significantly lower than the safeguarded height, and no other site infrastructure will exceed the specified height either, so it is considered that this aspect is suitably addressed though design.	Noted, no further action necessary. Response provided in this Table 17.2.

17.4.2 In addition, **Table 17.3**, outlines a summary of Section 42 consultation responses since the PEIR.

Table 17.3: Summary of Section 42 Consultation Responses since PEIR

Consultee	Details of Consultee response	How is matter addressed	Location of response
	In respect of Para 17.3.15 of the PEIR, "The	Consultation with the Defence	Further detail on the exposure

Consultee	Details of Consultee response	How is matter addressed	Location of response
North Kesteven District Council	applicant should ensure that NATS and MOD Defence Estates agree with these overall conclusions. The PEIR/Appendix document goes not appear to contain information regarding the maximum permissible/suggested 'green glint' and 'yellow glint' exposure periods against which the overall thresholds and impacts have been assessed. The ES should set out what these thresholds are with reference to adopted guidance."	Infrastructure Organisation is noted below and is considered to address any concerns relating Defence Estates assets. NATS (National Air Traffic Services) anticipates no effects.	periods against the overall thresholds and how impacts have been assessed is contained at section 17.6 of this Chapter.
	In respect of Para 17.5.16 of the PEIR, "The applicant should ensure that Network Rail agree with these overall conclusions."	Network Rail remain involved in the ongoing consultations and their opinion on the assessment results is welcomed.	Rail receptors are considered at section 17.6.15 of this ES Chapter.
	In respect of Para 17.5.16 of the PEIR, "Mitigation of any residual glint and glare impacts might need to take into account hard boundaries/fencing rather than relying on maturity of soft landscaping. The ES should identify as necessary where fixed/solid boundaries are required."	Once established soft landscaping is expected to provide the necessary screening for sensitive receptors. Depending on timescales for the buildout and planting some fencing may be required but it suggested this should be dealt with by Requirement in the [DCO].	Planting is considered further at section 17.7.
Defence Infrastructure Organisation	Previous consultation with the Safeguarding Manager noted:	The panels will be significantly lower than the safeguarded	The MOD/DIO comments are noted and as a consultee they will

Consultee	Details of Consultee response	How is matter addressed	Location of response
	"I have conducted an assessment with the grid refs you have provided and can confirm the area indicated falls within the safeguarded aerodrome height (max 91.4m AGL) and bird strike safeguarding zones surrounding RAF Coningsby. With the above in mind and the height of the panels proposed at 3.5m, there would be no safeguarding concerns with regards to radar or airspace infringements."	height, and no other site infrastructure will exceed the specified height either, so it is considered that this aspect is suitably addressed though design. The MOD has asked to be kept updated and to be notified if any fundamental parameters (which include the location, dimensions, form, and finishing materials) change.	remain updated on the Proposed Development. Response provided in this Table 17.3.
NATS Safeguarding	NATS anticipates no effects from the proposal and has no comments to make on the application	No further action required.	No further action required.
Network Rail	"Key concerns will be how the scheme impacts on the railway operations in terms of glint and glare issues causing distraction for train drivers approaching and passing the site, how any issues of this nature that may arise are to be mitigated" "In order to ensure that the scheme does not impact on operational railway safety, the developer must liaise closely with Network Rail Asset Protection to ensure that the haulage routes into the site are appropriate, and the design and construction of the new facility and associated infrastructure will not have an adverse	Work has been ongoing to establish the effects of glint at receptors around the site. Although some of the enabling works are closer to the railway network itself, the panels are, at their closest point more than 1km from the rail tracks. The land is flat and there is a large amount of screening present such that there is very limited chance of there being any visibility of the panels at all from a train. The	Assessment of rail receptors is considered further at section 17.6.15.

Consultee	Details of Consultee response	How is matter addressed	Location of response
	impact on railway operations (including glint and glare issues as outlined above). It is therefore assumed that a condition of the Order would be that detailed specifications of the proposed scheme and traffic management plans are to be provided and agreed in writing before development can commence."	vegetation present alongside the A17 will provide effective screening from most of the tracks.	

17.5 BASELINE CONDITIONS

Site Description and Context

17.5.1 The Energy Park is located on an area of greenfield land within East Heckington, approximately 3.7km east of the village of Heckington and 8.9km west of the town of Boston, Lincolnshire. The closest major city is Lincoln approximately 32km north-west of the Proposed Development. The village of Heckington is separated from the Energy Park site by agricultural land within the surrounding fenland landscape. The Energy Park extends to approximately 524ha hectares (ha). The Energy Park site lies wholly within the administrative district of North Kesteven, abutting Boston Borough Council administrative boundary along the eastern edge of the Energy Park site. The Cable Route Corridor spans across Boston Borough Council and North Kesteven District Council administrative area, with a section within the Energy Park running from the Onsite Substation in the Energy Storage Compound, south through the Energy Park site and then off-site for a short distance once it has left the Energy Park site. At this point it leaves the administrative boundary of North Kesteven and enters Boston Borough Council.

17.5.2 The Energy Park site comprises arable, agricultural land subdivided into rectilinear parcels by long linear drainage ditches that lie principally north-south, connected east-west by shorter ditches including Labour in Vain Drain. The ditches have an engineered profile, colonised in part by emerging aquatic plant species. The Energy Park is bounded by Head Dike to the north, a smaller watercourse to the east, agricultural land to the south and B1395 Sidebar Lane and further agricultural land to the west. To the south of the Energy Park site there are 3no. access points which connect to the A17 Sleaford to Holbeach road.

17.5.3 In terms of landform, the Energy Park site is very flat and low-lying at between 2m and 3m Above Ordnance Datum (AOD) across the entire Energy Park site. Hedgerow screening is intermittent and limited. The Energy Park is situated on the Lincolnshire Fens, a coastal plain in the east of England which comprises a large area of broad flat marshland supporting a rich biodiversity.

Baseline Survey Information

17.5.4 There are currently no operational solar parks in the immediate vicinity of the proposed Energy Park. However, there is a complex of glasshouses approximately 3.5km

to the east of the Energy Park that do have potential to cause glint reflections in the right conditions.

17.5.5 There are a range of other common materials and surfaces likely to cause glint that are already present in the study area. These include, inter alia:

- glass in windows;
- conservatories or greenhouses;
- flashes caused by light reflecting off passing vehicles; and
- calm water.

17.5.6 In the wider area (within approximately 10km of the Energy Park) there are a number of other solar PV developments which are existing sources of potential glint, but the distance between these and the Energy Park is such that there is very little chance of any intervisibility. Similarly, there is a large pool/reservoir halfway between Heckington and Sleaford but at circa 8.5km from the Energy Park any glint from the waterbody is not likely to directly affect locations in close proximity to the Energy Park.

17.5.7 It is not possible to accurately quantify the full level of glint currently experienced by receptors in the vicinity of the Energy Park, as there are a huge variety of sources and some reflections could arise from mobile sources such as moving vehicles. For the purposes of this report, it is therefore presumed that no baseline glint currently occurs at these receptors.

Implications of Climate Change

17.5.8 Climate change will have a limited effect on the likelihood of glint occurring at a particular receptor. If the climate were to change in a way that led to an increase or decrease in cloud cover, this may affect the number of hours of glint that might be recorded at a given receptor over the course of a year, but it would not change the receptors that could potentially be affected nor the maximum intensity of glint that could be recorded. It would only have potential to reduce or increase the frequency of occurrence compared to that experienced in the current climate. The model used in the assessment does not directly account for weather conditions and assumes that clear and bright weather persists all year. This represents a worst-case scenario that, in reality, will not be seen.

17.5.9 In order to provide a more realistic assessment of the likely glint effects a correction has been applied to the modelling to account for weather conditions. This correction is based on historic weather trends in the area. There is some potential for future climate change to affect the magnitude of this adjustment. However, in all cases, the unadjusted direct output from the model will represent a worst-case scenario with no clouds at all.

17.6 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

Construction

17.6.1 The construction phase is considered across a number of receptors separately. These include rail and road receptors, observation points (which are representative of dwellings in the surrounding area) and aviation receptors.

17.6.2 During the initial phase of ground preparation, there is not likely to be any reflections present other than possibly from the windscreens of vehicles used in the site preparation works.

17.6.3 It is anticipated that the Energy Park will be constructed sequentially in sections, with one part of being built out before the next is commenced. In this way different

sections will help provide screening from ongoing construction activities, providing an element of self-mitigation.

17.6.4 Until such time as the panels are installed on the mounting structures, there will be some potential for the mounting structures themselves to reflect sunlight. Since the mounting structures are likely to be made of steel their reflectivity will most likely be higher than the panels, so there is some chance of glint effects during this time. The surface area for the mounting structures is considerably smaller than the surface area for the panels, and the time between the installation of the mounting structures and the mounting of the panels will be minimised, so effects will be limited.

17.6.5 Numerical modelling of glint effects from the mounting structures has not been undertaken as the computer model is not designed to enable this type of analysis to take place. Any effects would be short-lived and temporary. If any particular issues are identified during the construction process, temporary screening could be used to mitigate them.

17.6.6 Therefore, effects on rail receptors during the construction phase are assessed as temporary, of high sensitivity, magnitude is not quantifiable but likely to be low. The overall significance of effect on rail receptors is **minor adverse**, and **not significant** without mitigation.

17.6.7 Road receptors during the construction phase are assessed as temporary, of high sensitivity, magnitude is not quantifiable but likely to be low. The overall significance of effect on road receptors is **minor adverse**, and **not significant** without mitigation.

17.6.8 Aviation receptors during the construction phase are assessed as temporary, of high sensitivity, magnitude is negligible. The overall significance of effect on aviation receptors is **negligible**, and **not significant** without mitigation.

17.6.9 Dwelling receptors during the construction phase are assessed as temporary, of medium sensitivity, magnitude is not quantifiable but likely to be low. The overall significance of effect on dwelling receptors is **minor adverse**, and **not significant** without mitigation.

Operation

17.6.10 During the operational phase, effects will vary during the course of each year as the sun attains different heights in the sky and weather patterns vary.

17.6.11 The operational phase is considered across a number of receptors separately. These include rail and road receptors, observation points (which are representative of dwellings in the surrounding area) and aviation receptors.

17.6.12 A ZTV has been modelled to show which areas potentially have visibility to the panels (See **Figure 17.1** (document reference 6.2.17)). It is important to note here that the ZTV is based on a bare earth model, or Digital Terrain Model (DTM). This means that it does not account for surface features such as hedgerows, trees, buildings or other physical obstructions that may prevent visibility, although it does consider the terrain of the land. Whilst using a Digital Surface Model (DSM) would introduce the surface features, it would also come with additional problems in that it would assume that receptors were located on top of those surface features, rather than just at ground level. In any event, because the ground is so flat in this area, the ZTV suggests that almost everywhere around the Energy Park has theoretical line of sight to the panels.

17.6.13 It is important to note that the model predicts the amount of glint that would be delivered by all of the panels in the array, but it does not account for the fact that some

panels will be screened by other panels in the array. If there is visibility from the receptor across the arrays then glint can arrive from all of those panels, provided the sun attains a position to allow it, however, if the panels cannot be seen from the receptor, then regardless of the potential for reflection from the panels, that receptor will not experience any glint effects

17.6.14 Since there has been a decision to use fixed panels at the Energy Park, the effects associated only with this panel type are considered for each classification of receptor.

Railways

17.6.15 The main rail receptor runs to the south of the Energy Park, between Sleaford and Boston, at a distance of approximately 1.3km at its closest point. It passes to the south of Heckington, before converging with and then running adjacent to the A1121, to the east of the Energy Park.

17.6.16 For the purpose of the assessment, it is assumed that the eyeline of the train driver would be 2.75m above the tracks (taken as ground level). The model therefore considers whether glint effects would be observable to the driver and could compromise their ability to safely control the train.

17.6.17 There are two sections of track that have been considered in the glint assessment, both running to the south of the site, as shown in **Figure 17.1** (document reference 6.2.17). The ZTV, and 5km site buffer are also shown in this figure. It should be noted that one of the lines is more than 5km from the site and at this distance there are not expected to be any significant glint effects, regardless of the panel type being used. The other line, as described above, lies to the south and within 5km of the site.

17.6.18 For a panel angle of 15 degrees, the amount of low intensity 'green glint' recorded along the closest track to site (Rail 2) is 75 minutes and the amount of 'yellow glint' is 3,006 minutes. It must be noted that these durations do not consider the effects of vegetation or other screening that exists between the tracks and the Site. The majority of glint effects would have potential to occur to the southwest of the Energy Park in the early morning (before 6am GMT) when the sun is rising to the east, with more sporadic effects possibly visible in the afternoon to the southeast of the Energy Park after 7pm GMT, as the sun is setting.

17.6.19 For a panel angle of 10 degrees, the amount of low intensity 'green glint' recorded along the closest track to site (Rail 2) is 177 minutes and the amount of 'yellow glint' is 3,311 minutes. As above, these durations do not consider the effects of vegetation or other screening that exists between the tracks and the Site. The majority of glint effects would have potential to occur to the southwest of the Energy Park in the early morning (before 6am GMT) when the sun is rising to the east, with more sporadic effects possibly visible in the afternoon to the southeast of the Energy Park after 7pm GMT, as the sun is setting.

17.6.20 For a panel angle of 20 degrees, the amount of low intensity 'green glint' recorded along the closest track to site (Rail 2) is 40 minutes and the amount of 'yellow glint' is 2,836 minutes. The durations do not consider the effects of vegetation or other screening that exists between the tracks and the Site. The majority of glint effects would have potential to occur to the southwest of the Energy Park in the early morning (before 6am GMT) when the sun is rising to the east, with more sporadic effects possibly visible in the afternoon to the southeast of the Energy Park after 7pm GMT, as the sun is setting.

17.6.21 There is scattered vegetation along the side of the tracks that will provide some screening, as well as a number of other features in the intervening topography that would

also assist. This will obscure most visibility to the site, however, onsite screening, especially around the southwestern corner of the Energy Park, to ensure there is not visibility from the railway.

17.6.22 Under the 15 degree panel angle scenario, the more distant track (Rail 1) which runs off to the south of the Energy Park will theoretically experience up to 342 minutes of green glint and 899 minutes of yellow glint in a year. That glint would be all to the west of the Energy Park near to Sleaford, at a distance of 8km or more. In reality, at these distances and with the screening present, there will be no visibility and any glint effects would be so weak they can be ignored.

17.6.23 When taking into account weather conditions, the annual duration of glint for Rail 1 adjusts to 425 minutes and 1,055 minutes per year for Rail 2 with a panel angle of 15 degrees. These values take into account weather conditions only, the values will be further reduced with screening.

17.6.24 For the 10 degree panel angle scenario, ignoring the effects of screening, Rail 1 will experience up to 507 minutes of green glint and 832 minutes of yellow glint in a year. That glint would be all to the west of the Energy Park near to Sleaford, at a distance of 8km or more. In reality, there will be no visibility and any glint effects would be so weak they can be ignored.

17.6.25 When taking into account weather conditions, the annual duration of glint for Rail 1 at adjusts to 459 minutes and 1,194 minutes per year for Rail 2 with a panel angle of 10 degrees. These values take into account weather conditions only, the values will be further reduced with screening.

17.6.26 Similarly, when the panel angle is 20 degrees, the Rail 1 receptor will theoretically experience up to 250 minutes of green glint and 950 minutes of yellow glint in a year. In line with the other scenarios, this glint would occur to the west of the Energy Park near to Sleaford, at a distance of 8km or more. In reality, after accounting for distance and screening, there will be no visibility and any glint effects would be so weak they can be ignored.

17.6.27 When taking into account weather conditions, the annual duration of glint for Rail 1 adjusts to 411 minutes and 985 minutes per year for Rail 2 with a panel angle of 20 degrees. These values take into account weather conditions but ignore the presence of screening which will reduce effects further.

17.6.28 As **Figure 17.4 – Figure 17.7** illustrate, there are adequate levels of screening and from these locations specifically, there is no visibility to the Energy Park site. This can be assumed for majority of the track but there are still some uncertainties as the whole track cannot be examined through this desk study.

17.6.29 However, with the screening proposed at the Energy Park site, visibility would be reduced further still.

Table 17.4: Modelled Results for Railway Lines without Weather Adjustment

Railway	Maximum Annual Duration (minutes)	Earliest Start Time	Latest End Time	Earliest Start Date	Latest Finish Date
Panel Angle of 10 degrees					
Rail 1	1,339	05:24	06:44	08/03/2023	05/10/203
Rail 2	3,488	04:57	19:27	08/03/2023	04/10/2023
Panel Angle of 15 degrees					
Rail 1	1,241	05:32	06:34	12/03/2022	30/09/2022
Rail 2	3,081	05:19	19:03	12/03/2022	30/09/2022
Panel Angle of 20 degrees					
Rail 1	1,200	05:45	06:28	15/03/2023	28/09/2023
Rail 2	2,876	05:38	18:39	15/03/2023	28/09/2023

Table 17.3 - Modelled Results for Railway Lines with Weather Adjustment

Observation Point (OP)	Weather Adjusted Annual Duration (minutes)	Glint Events Proportion of Daylight Hours	Number of Glint Days	Maximum Duration of Glint Event (minutes)	Average Duration of Glint Event (minutes)
Panel Angle of 10 degrees					
Rail 1	459	0.1704%	113	17	12
Rail 2	1,194	0.4438%	212	20	16
Panel Angle of 15 degrees					
Rail 1	425	117	110	15	11

Observation Point (OP)	Weather Adjusted Annual Duration (minutes)	Glint Events Proportion of Daylight Hours	Number of Glint Days	Maximum Duration of Glint Event (minutes)	Average Duration of Glint Event (minutes)
Rail 2	1,055	26	204	18	15
Panel Angle of 20 degrees					
Rail 1	411	0.1527%	109	15	11
Rail 2	985	0.3659%	199	17	14

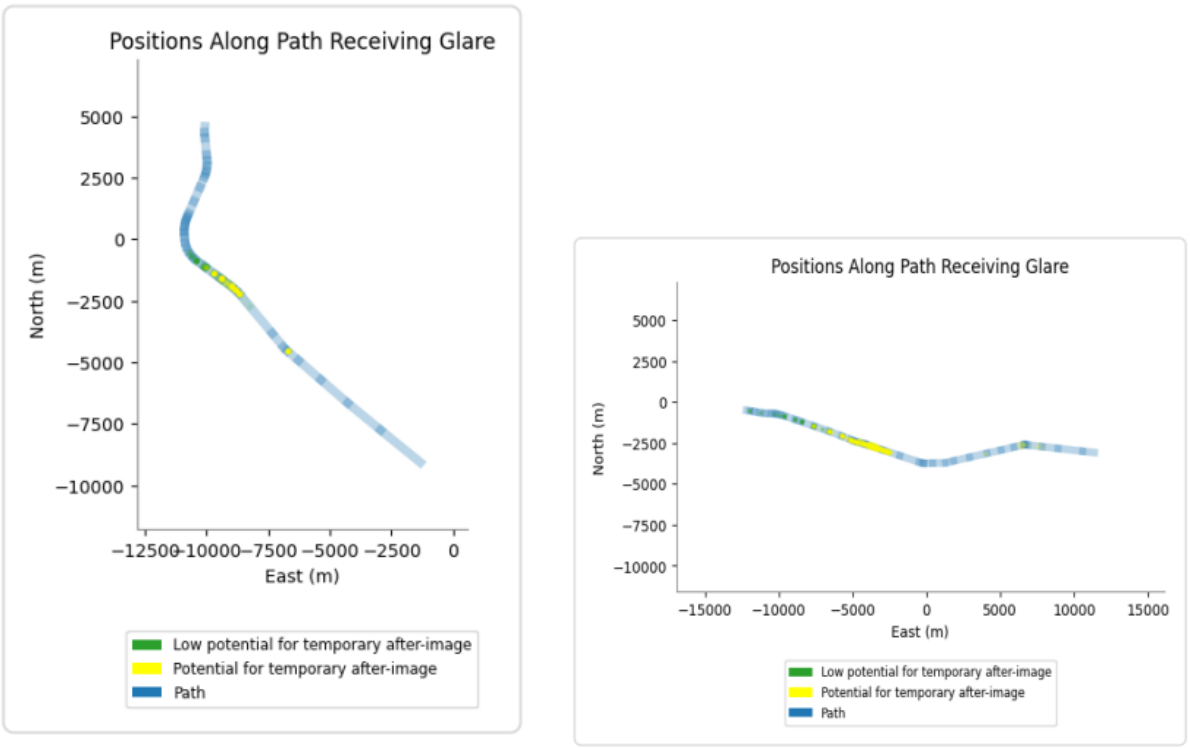


Figure 17.4 - Graphs depicting the level of glint along the railway lines Rail 1 (left) and Rail 2 (right) when panels are at 15 degrees

17.6.30 Equivalent graphs for the 10 and 20 degree panel angle scenarios are included at Appendix 17.3 (document reference 6.3.17.3) and Appendix 17.4 (document reference 6.3.17.3) respectively.

Figure 17.5 - Points along Rail 2 to Assess Screening
Rail 1 is not shown here but is more distant and lies to the west, off the image[6]

Figure 17.6 - Heckington Station Line Crossing Facing East to Illustrate Screening from Rail 2 to Energy Park[7]

[6] *Contains Google Earth Imagery © Google 2022*
[7] *Contains Google Earth Imagery © Google 2022*

Figure 17.7 - Great Hale Drove line crossing (orientation northeast) illustrating the screening present for Rail 2 and Energy Park[8]

Figure 17.8 - Swineshead Station line crossing (orientation west) illustrating screening on north side of track (left) at Rail 2 to the Energy Park[9]

[8] *Contains Google Earth Imagery © Google 2022*
[9] *Contains Google Earth Imagery © Google 2022*

Table 17.5: Assessment of Rail Receptors (panels at 10 degrees)

Railway	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
Rail 1	The northern section of Rail 1 can be excluded as its original inclusion was to account for potential effects from tracking panels which are no longer part of the design proposals. With fixed south-facing panels, glint will not be an issue to the northern section. Most of this track lies to the south of the Rail 2 line and so is in fact screened by that line plus the distance that exists between the site and also much of the track is lined by dense trees. At this distance and with screening from trees, buildings and fields, visibility to the site is likely to be low.	Limited to None	507	832	High	**Negligible (Not Significant)**
Rail 2	This section of track lies to the north of Rail 1 but to the south of the A17 and the Energy Park. It is approximately 1.3km from the Energy Park at its closest point. There is screening present in the form of hedgerows and trees, especially along the verges of the A17, which obscure most views to the Energy Park. The Figures above capture some of the variation in screening at different point along the line. Overall, visibility to the site is considered to be low to non-existent.	Limited to None	177	3,311	High	**Negligible (Not Significant)**

Table 17.6: Assessment of Rail Receptors (panels at 15 degrees)

Railway	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
Rail 1	The northern section of Rail 1 can be excluded as its original inclusion was to account for potential effects from tracking panels which are no longer part of the design proposals. With fixed south-facing panels, glint will not be an issue to the northern section. Most of this track lies to the south of the Rail 2 line and so is in fact screened by that line plus the distance that exists between the site and also much of the track is lined by dense trees. At this distance and with screening from trees, buildings and fields, visibility to the site is likely to be low.	Limited to None	342	899	High	**Negligible (Not Significant)**
Rail 2	This section of track lies to the north of Rail 1 but to the south of the A17 and the Energy Park. It is approximately 1.3km from the Energy Park at its closest point. There is screening present in the form of hedgerows and trees, especially along the verges of the A17, which obscure most views to the Energy Park. The Figures above capture some of the variation in screening at different point along the line. Overall, visibility to the site is considered to be low to non-existent.	Limited to None	75	3,006	High	**Negligible (Not Significant)**

Table 17.7: Assessment of Rail Receptors (panels at 20 degrees)

Railway	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
Rail 1	The northern section of Rail 1 can be excluded as its original inclusion was to account for potential effects from tracking panels which are no longer part of the design proposals. With fixed south-facing panels, glint will not be an issue to the northern section. Most of this track lies to the south of the Rail 2 line and so is in fact screened by that line plus the distance that exists between the site and also much of the track is lined by dense trees. At this distance and with screening from trees, buildings and fields, visibility to the site is likely to be low.	Limited to None	250	950	High	**Negligible (Not Significant)**
Rail 2	This section of track lies to the north of Rail 1 but to the south of the A17 and the Energy Park. It is approximately 1.3km from the Energy Park at its closest point. There is screening present in the form of hedgerows and trees, especially along the verges of the A17, which obscure most views to the Energy Park. The Figures above capture some of the variation in screening at different point along the line. Overall, visibility to the site is considered to be low to non-existent.	Limited to None	40	2,836	High	**Negligible (Not Significant)**

Roads

17.6.31 There are a number of roads within the study area comprising national, regional, and local roads. There are no motorways. Motorists are, as a matter of routine, used to driving towards the sun which provides a much more intense source of light than glint. Notwithstanding this, roads within the immediate vicinity of the site have been assessed for glint effects.

17.6.32 Stretches of road within the ZTV have been identified and selected for computer simulation. Although the dates and times when glint has the potential to be visible for specific stretches of the road may vary, the results reported are expected to be representative of the road in general. It should be noted that the glint results reported (dates and times) do not account for screening which will limit or eliminate the potential for glint effects, the results reported should therefore be placed in context with the discussion of screening which is provided for each road. The durations reported are the extents of when glint could be geometrically possible, but glint would not occur continuously during that period.

17.6.33 Each road that has been assessed is shown in **Figure 17.9**. The roads modelled are those closest to the Energy Park and more likely to receive glint. All the roads modelled are at least partially or completely within the ZTV and within 5km of the Energy Park.

Figure 17.9 - Assessed Stretches of Road that Lie Within the ZTV

(Extract from ForgeSolar 2022, Google 2022)

17.6.34 The model predicts some 'yellow' glint being visible along a number of the routes. However, it is important to recall that the model does not account for any existing screening features. Nor is it limited to effects within 5km of the Energy Park, although clearly these are important factors in determining the potential glint effects.

17.6.35 **Table 17.8** indicates when glint will occur and for how long at each route receptor at the various panel angles. This Table shows durations predicted by the model which assumes direct sunlight persists throughout the entire year. **Table 17.9** adjusts these durations to take account of the effects of weather.

17.6.36 **Table 17.8** and **Table 17.9** both illustrate that glint is predicted to occur most frequently along the A17, but with the screening that is proposed in this location, the glint effects will be considerably reduced.

17.6.37 Glint is also predicted during the early hours of the morning on a number of these roads so the effects will not be visible to many observers as there are less drivers on the road during this time.

Table 17.8: Modelled Results for Public Roads Without Weather Adjustment

Road	Maximum Annual Duration (minutes)	Earliest Start Time	Latest End Time	Earliest Start Date	Latest Finish Date
Panel Angle of 10 degrees					
A1121	44	18:02	19:28	04/04/2023	19/08/2023
A17	5,789	04:37	06:44	08/03/2023	05/10/2023
B1395	730	04:44	05:43	08/04/2023	03/09/2023
Claydike Bank	588	18:04	19:28	30/03/2023	14/09/2023
Harrisons Drove	35	19:02	19:28	09/05/2023	01/08/2023
Littleworth Drove	2,889	04:38	06:44	08/03/2023	03/10/2023
Panel Angle of 15 degrees					
A1121	42	18:01	19:03	12/04/2022	29/08/2022
A17	5,381	05:02	06:33	13/03/2022	30/09/2022
B1395	1,107	05:02	05:48	10/04/2022	01/09/2022
Claydike Bank	930	18:02	19:03	28/03/2022	14/09/2022
Harrisons Drove	40	18:38	19:03	27/04/2022	17/08/2022
Littleworth Drove	2,716	05:02	06:34	12/03/2022	30/09/2022

Panel Angle of 20 degrees					
A1121	36	17:56	18:44	08/04/2023	22/08/2023
A17	5,135	05:21	06:27	15/03/2023	28/09/2023
B1395	984	05:22	05:53	11/04/2023	31/08/2023
Claydike Bank	1,062	17:58	18:44	29/03/2023	16/09/2023
Harrisons Drove	35	18:25	18:44	18/04/2023	25/08/2023
Littleworth Drove	2,772	05:22	06:28	15/03/2023	28/09/2023

Table 17.9: Modelled Results for Public Roads With Weather Adjustment

Road	Weather Adjusted Annual Duration (minutes)	Glint Events Proportion of Daylight Hours	Number of Glint Days	Maximum Duration of Glint Event (minutes)	Average Duration of Glint Event (minutes)
Panel Angle of 10 degrees					
A1121	15	0.01%	43	2	1
A17	1,982	0.74%	213	39	27
B1395	250	0.09%	139	13	5
Claydike Bank	201	0.07%	148	10	4
Harrisons Drove	12	0.004%	36	1	1
Littleworth Drove	989	0.37%	211	19	14
Panel Angle of 15 degrees					
A1121	14	0.01%	41	2	1
A17	1,843	0.68%	203	34	27
B1395	379	0.14%	146	13	8

Road	Weather Adjusted Annual Duration (minutes)	Glint Events Proportion of Daylight Hours	Number of Glint Days	Maximum Duration of Glint Event (minutes)	Average Duration of Glint Event (minutes)
Claydike Bank	318	0.12%	168	13	6
Harrisons Drove	14	0.01%	41	1	1
Littleworth Drove	930	0.35%	204	17	13
Panel Angle of 20 degrees					
A1121	12	0.005%	36	2	1
A17	1,758	0.65%	199	32	26
B1395	337	0.13%	144	14	7
Claydike Bank	364	0.14%	172	11	6
Harrisons Drove	12	0.004%	36	1	1
Littleworth Drove	949	0.35%	199	17	14

17.6.38 The theoretical durations of green and yellow glint effects for each road receptor at each panel angle are given in **Table 17.10** to **Table 17.12** below. These Tables also consider the visibility of the Energy Park from the receptor and uses the combined information to draw conclusions about the significance of effect on the road receptors at each variation of panel angle.

Table 17.10: Summary Glint effects on Road Receptors from Fixed Panels and the Significance (10 degree panel angle)

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
A1121	There is little vegetation present on the northern verge of the A1121, giving open views towards the Energy Park. However, closer to the site there is a little more vegetation present which is likely to provide some screening, including the hedgerow along Browns Drove, residential buildings and other patches of hedgerow and trees in the surrounding landscape. The main area predicted to receive glint is the stretch to the east of Swineshead Bridge. Onsite screening along the eastern boundary will further reduce any chance of visibility.	Limited to None with screening in place.	0	44	High	**Moderate to Major** before mitigation. **(Significant)** **Negligible to None** after mitigation. **(Not Significant)**
A17	Intermittent screening along the northern boundary of the road. Parts, especially to the east, are heavily screened by existing vegetation and some dwellings but, in places, the boundary vegetation is low to the ground and there are open views towards the Energy Park. Most of the potential glint effects on the A17 are predicted to occur to the south and southwest of the Energy Park. Perimeter screening around the Energy Park in these locations will be needed as part of the embedded mitigation to reduce visibility.	Following hedgerow planting there should be no visibility	0	5,789	High	**Moderate to Major** before mitigation. **(Significant)** **Negligible to None** after mitigation. **(Not Significant)**

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
B1395 (Sidebar Lane into Claybank)	There are isolated trees and houses along the eastern boundary of the road which will provide some screening but there will be large sections that are currently unscreened offering uninterrupted views into the site. Glint effects are limited to the section of road north of Littleworth Drove/Crab Lane and south of Head Dike. Perimeter screening on the western boundary of the Energy Park adjacent to this area will be required to prevent glint effects being visible.	Following hedgerow planting there should be no visibility	0	730	High	**Moderate to Major** before mitigation. **(Significant)** **Negligible to None** after mitigation. **(Not Significant)**
Claydike Bank into Maryland Bank	Existing vegetation is in places quite dense and will provide good screening towards the Energy Park. Other sections are more open. Towards the southern end of Claydike Road in particular vegetation is quite low and can be looked over relatively easily, however this is also the section that is most distant from the Energy Park and therefore there is limited visibility of the Energy Park itself due to other intervening vegetation. There are some more open sections to the north where visibility to the panels will potentially be possible, and additional Site screening may be required. Glint effects are primarily restricted to the northern section of Claybank Dike to the west of Amber Hill and there is heavy existing vegetation screening to the west of the road in this area which prevents visibility to the north	Some visibility to the site but not to the area of panels responsible for glint.	0	588	Medium	**Negligible** due to existing screening **(Not Significant)** No additional mitigation proposed.

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	eastern corner of the Energy Park from where glint could emanate.					
Harrisons Drove	Mixed - where the road joins Claydike Bank there is substantial screening on the northern side of Harrisons Drove and hedgerow persists to The Cottage. Beyond this the track starts to dwindle and the hedgerow stops, leaving more visibility towards the Energy Park. Glint effects are only predicted on the section of track beyond The Cottage, which is not surfaced. Any vehicles using this will not be driving at speed and are unlikely to be affected. No specific additional mitigation is likely to be required at this location.	Limited The section of surfaced road is well screened and not predicted any glint.	0	35	Medium	**Negligible** on surfaced road due to existing screening **(Not Significant)** Negligible on unsurfaced road due to lower speeds and focus on road (**Not significant)** No additional mitigation proposed
Littleworth Drove	Littleworth Drove runs from close to the Energy Park's western boundary, back to Heckington. Sections of the road are very open with little screening. Vehicles travelling from Heckington towards the Energy Park would potentially have direct views into the Energy Park with little existing screening present to prevent this. The majority of glint predicted by the model occurs at Heckington, which is well screened from the Energy Park and hence will have no effect on road users. Some smaller amounts of glint are potentially visible closer to the Energy Park to the west of the B1395.	Limited but some visibility to panels capable of causing glint without onsite screening. After onsite screening visibility will reduce to none.	0	2,887	High	**Minor to Moderate** without screening **(Significant)** **Negligible** after mitigation **(Not significant)**

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	Although there is already a reasonable amount of vegetation present particularly along the section of Sidebar Lane immediately to the south of Littleworth Drove, some additional hedgerow screening on the western perimeter of the Energy Park is likely to be required to assist with prevent glint effects.					

Table 17.11: Summary Glint effects on Road Receptors from Fixed Panels and the Significance (15 degree panel angle)

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
A1121	There is little vegetation present on the northern verge of the A1121, giving open views towards the Energy Park. However, closer to the site there is a little more vegetation present which is likely to provide some screening, including the hedgerow along Browns Drove, residential buildings and other patches of hedgerow and trees in the surrounding landscape. The main area predicted to receive glint is the stretch to the east of Swineshead Bridge. Onsite screening along the eastern	Limited to None with screening in place.	0	42	High	**Moderate to Major** before mitigation. **(Significant)** **Negligible to None** after mitigation. **(Not Significant)**

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	boundary will further reduce any chance of visibility.					
A17	Intermittent screening along the northern boundary of the road. Parts, especially to the east, are heavily screened by existing vegetation and some dwellings but, in places, the boundary vegetation is low to the ground and there are open views towards the Energy Park. Most of the potential glint effects on the A17 are predicted to occur to the south and southwest of the Energy Park. Perimeter screening around the Energy Park in these locations will be needed as part of the embedded mitigation to reduce visibility.	Following hedgerow planting there should be no visibility	0	5,381	High	**Moderate to Major** before mitigation. **(Significant)** **Negligible to None** after mitigation. **(Not Significant)**
B1395 (Sidebar Lane into Claybank)	There are isolated trees and houses along the eastern boundary of the road which will provide some screening but there will be large sections that are currently unscreened offering uninterrupted views into the site. Glint effects are limited to the section of road north of Littleworth Drove/Crab Lane and south of Head Dike. Perimeter screening on the western boundary of the Energy Park adjacent to this	Following hedgerow planting there should be no visibility	0	1,107	High	**Moderate to Major** before mitigation. **(Significant)** **Negligible to None** after mitigation. **(Not Significant)**

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	area will be required to prevent glint effects being visible.					
Claydike Bank into Maryland Bank	Existing vegetation is in places quite dense and will provide good screening towards the Energy Park. Other sections are more open. Towards the southern end of Claydike Road in particular vegetation is quite low and can be looked over relatively easily, however this is also the section that is most distant from the Energy Park and therefore there is limited visibility of the Energy Park itself due to other intervening vegetation. There are some more open sections to the north where visibility to the panels will potentially be possible, and additional Site screening may be required. Glint effects are primarily restricted to the northern section of Claybank Dike to the west of Amber Hill and there is heavy existing vegetation screening to the west of the road in this area which prevents visibility to the north eastern corner of the Energy Park from where glint could emanate.	Some visibility to the site but not to the area of panels responsible for glint.	0	930	Medium	**Negligible** due to existing screening **(Not Significant)** No additional mitigation proposed.
Harrisons Drove	Mixed - where the road joins Claydike Bank there is substantial screening on the northern side of Harrisons Drove and hedgerow persists to The Cottage. Beyond this the track starts to dwindle and the hedgerow stops, leaving more visibility towards the Energy Park. Glint effects	Limited The section of surfaced road is well screened and	0	40	Medium	**Negligible** on surfaced road due to existing screening **(Not Significant)**

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	are only predicted on the section of track beyond The Cottage, which is not surfaced. Any vehicles using this will not be driving at speed and are unlikely to be affected. No specific additional mitigation is likely to be required at this location.	not predicted any glint.				**Negligible** on unsurfaced road due to lower speeds and focus on roads **(Not significant)** No additional mitigation proposed.
Littleworth Drove	Littleworth Drove runs from close to the Energy Park's western boundary, back to Heckington. Sections of the road are very open with little screening. Vehicles travelling from Heckington towards the Energy Park would potentially have direct views into the Energy Park with little existing screening present to prevent this. The majority of glint predicted by the model occurs at Heckington, which is well screened from the Energy Park and hence will have no effect on road users. Some smaller amounts of glint are potentially visible closer to the Energy Park to the west of the B1395. Although there is already a reasonable amount of vegetation present particularly along the section of Sidebar Lane immediately to the south of Littleworth Drove, some additional hedgerow screening on the western perimeter of the Energy Park is likely to be required to assist with prevent glint effects.	Limited but some visibility to panels capable of causing glint without onsite screening. After onsite screening visibility will reduce to none.	0	2,715	High	**Minor to Moderate** without screening **(Significant)** **Negligible** after mitigation **(Not significant)**

Table 17.12: Summary Glint effects on Road Receptors from Fixed Panels and the Significance (20 degree panel angle)

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
A1121	There is little vegetation present on the northern verge of the A1121, giving open views towards the Energy Park. However, closer to the site there is a little more vegetation present which is likely to provide some screening, including the hedgerow along Browns Drove, residential buildings and other patches of hedgerow and trees in the surrounding landscape. The main area predicted to receive glint is the stretch to the east of Swineshead Bridge. Onsite screening along the eastern boundary will further reduce any chance of visibility.	Limited to None with screening in place.	0	36	High	**Moderate to Major** before mitigation. **(Significant)** **Negligible to None** after mitigation. **(Not Significant)**
A17	Intermittent screening along the northern boundary of the road. Parts, especially to the east, are heavily screened by existing vegetation and some dwellings but, in places, the boundary vegetation is low to the ground and there are open views towards the Energy Park. Most of the potential glint effects on the A17 are predicted to occur to the south and southwest of the Energy Park. Perimeter screening around the Energy Park in these locations will be needed as part of the embedded mitigation to reduce visibility.	Following hedgerow planting there should be no visibility	0	5,135	High	**Moderate to Major** before mitigation. **(Significant)** **Negligible to None** after mitigation. **(Not Significant)**

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
B1395 (Sidebar Lane into Claybank)	There are isolated trees and houses along the eastern boundary of the road which will provide some screening but there will be large sections that are currently unscreened offering uninterrupted views into the site. Glint effects are limited to the section of road north of Littleworth Drove/Crab Lane and south of Head Dike. Perimeter screening on the western boundary of the Energy Park adjacent to this area will be required to prevent glint effects being visible.	Following hedgerow planting there should be no visibility	0	984	High	**Moderate to Major** before mitigation. **(Significant)** **Negligible to None** after mitigation. **(Not Significant)**
Claydike Bank into Maryland Bank	Existing vegetation is in places quite dense and will provide good screening towards the Energy Park. Other sections are more open. Towards the southern end of Claydike Road in particular vegetation is quite low and can be looked over relatively easily, however this is also the section that is most distant from the Energy Park and therefore there is limited visibility of the Energy Park itself due to other intervening vegetation. There are some more open sections to the north where visibility to the panels will potentially be possible, and additional Site screening may be required. Glint effects are primarily restricted to the northern section of Claybank Dike to the west of Amber Hill and there is heavy existing vegetation screening to the west of the road in this area which prevents visibility to the north	Some visibility to the site but not to the area of panels responsible for glint.	0	1,062	Medium	**Negligible** due to existing screening **(Not Significant)** No additional mitigation proposed.

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	eastern corner of the Energy Park from where glint could emanate.					
Harrisons Drove	Mixed - where the road joins Claydike Bank there is substantial screening on the northern side of Harrisons Drove and hedgerow persists to The Cottage. Beyond this the track starts to dwindle and the hedgerow stops, leaving more visibility towards the Energy Park. Glint effects are only predicted on the section of track beyond The Cottage, which is not surfaced. Any vehicles using this will not be driving at speed and are unlikely to be affected. No specific additional mitigation is likely to be required at this location.	Limited The section of surfaced road is well screened and not predicted any glint.	0	35	Medium	**Negligible** on surfaced road due to existing screening **(Not Significant)** **Negligible** on unsurfaced road due to lower speeds and focus on road **(Not significant)** No additional mitigation proposed.
Littleworth Drove	Littleworth Drove runs from close to the Energy Park's western boundary, back to Heckington. Sections of the road are very open with little screening. Vehicles travelling from Heckington towards the Energy Park would potentially have direct views into the Energy Park with little existing screening present to prevent this. The majority of glint predicted by the model occurs at Heckington, which is well screened from the Energy Park and hence will have no effect on road users. Some smaller amounts of glint are potentially visible closer to the Energy Park to the west of the B1395.	Limited but some visibility to panels capable of causing glint without onsite screening. After onsite screening visibility will reduce to none.	0	2,771	High	**Minor to Moderate** without screening **(Significant)** **Negligible** after mitigation **(Not significant)**

Route	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	Although there is already a reasonable amount of vegetation present particularly along the section of Sidebar Lane immediately to the south of Littleworth Drove, some additional hedgerow screening on the western perimeter of the Energy Park is likely to be required to assist with prevent glint effects.					

Observation Points

17.6.39 Due to the size of the Energy Park it is necessary to consider a large number of observation points around the perimeter of the Energy Park site boundary to properly assess the likely effects.

17.6.40 A total of 40 observation points (OPs) were initially identified and assessed for likely glint effects based on the use of both tracking and fixed panels. As there has been a decision to exclusively use fixed panels, a number of OPs were eliminated if they sat to the north of the site as with fixed panels there would be no glint to the north. Of those included, the majority of these observation points represent residential dwellings, although there are a few commercial premises and churches included.

17.6.41 In many cases, the receptors selected are intended to represent more than one property in the immediate area. Although the levels of screening differ slightly for the different receptors, in general the level of glint recorded will be about the same for those surrounding properties.

17.6.42 It is important to understand the level of intervisibility between the receptor and the Energy Park as this will determine whether any glint is able to arrive at the receptor. As shown in **Figure 17.10**, nearly all of the 5km buffer around the Energy Park boundary falls within the visible area according the ZTV, however, this does not account for the level of surface feature screening present at each receptor.

Figure 17.10 - Observation Points[10]

17.6.43 For the fixed panel layout, across all three panel angle scenarios, the glint effects will be visible to the east and west of the Energy Park, when the sun is low in the sky, with a small amount visible to the south. It will not be possible for reflections to reach receptors

[10] *ForgeSolar 2022, Google 2022*

located towards the north of the panels as the south facing pitches of the arrays will prevent this from happening.

17.6.44 **Table 17.13** indicates when glint will occur and for how long at each Observation Point (OP) at the various panel angles. The Table shows durations predicted by the model which assumes direct sunlight persists throughout the entire year. **Table 17.14** adjusts these durations to take account of the effects of weather.

17.6.45 **Table 17.13** and **Table 17.14** both illustrate that glint is predicted to occur most frequently at OP6 and OP36. However, the screening that is proposed will considerably reduce the potential for glint effects at these locations (see further detailed analysis in the subsequent sections).

Table 17.13: Modelled Results for Point Receptors Without Weather Adjustment

Observation Point (OP)	Maximum Annual Duration (minutes)	Earliest Start Time	Latest End Time	Earliest Start Date	Latest Finish Date
Panel Angle of 10 degrees					
OP1	136	19:04	19:28	31/05/2023	13/07/2023
OP5	1	04:38	04:38	16/06/2023	16/06/2023
OP6	2,366	04:59	06:25	17/03/2023	26/09/2023
OP7	915	04:57	05:45	20/04/2023	23/08/2023
OP8	1901	04:57	06:38	11/03/2023	02/10/2023
OP9	1,431	04:37	05:54	01/04/2023	10/09/2023
OP10	1,099	04:37	05:55	01/04/2023	10/09/2023
OP11	382	04:58	06:31	14/03/2023	29/09/2023
OP12	254	04:48	06:40	10/03/2023	04/10/2023
OP13	1,797	04:37	05:54	01/04/2023	09/09/2023
OP14	1,258	04:59	06:44	08/03/2023	04/10/2023
OP15	19	04:37	05:00	11/05/2023	30/07/2023
OP16	1,901	04:37	05:57	30/03/2023	12/09/2023
OP17	59	05:15	06:44	08/03/2023	26/09/2023

Observation Point (OP)	Maximum Annual Duration (minutes)	Earliest Start Time	Latest End Time	Earliest Start Date	Latest Finish Date
OP18	24	04:37	05:00	11/05/2023	30/07/2023
OP19	7	04/38	04:55	15/05/2023	23/07/2023
OP29	3	19:02	19:14	09/05/2023	01/08/2023
OP30	6	19:02	19:14	09/05/2023	01/08/2023
OP31	1,456	18:04	19:28	05/04/2023	14/09/2023
OP32	798	18:04	19:28	30/03/2023	14/09/2023
OP33	676	18:48	19:28	07/05/2023	06/08/2023
OP34	25	19:02	19:28	09/05/2023	01/08/2023
OP35	2,315	04:57	06:39	10/03/2023	02/10/2023
OP36	2,437	04:57	06:44	08/03/2023	05/10/2023
OP37	31	05:15	06:44	08/03/2023	26/09/2023
OP38	9	06:13	06:44	08/03/2023	26/09/2023
Panel Angle of 15 degrees					
OP6	2,171	05:21	06:24	17/03/2022	25/09/2022
OP7	738	05:20	05:56	22/04/2022	21/08/2022
OP8	1,675	05:20	06:33	13/03/2022	30/09/2022
OP9	1,401	05:02	06:01	29/03/2022	12/09/2022
OP10	1,047	05:02	05:59	30/03/2022	12/09/2022
OP11	355	05:21	06:23	17/03/2022	30/09/2022
OP12	196	05:20	06:31	14/03/2022	27/09/2022
OP13	1,781	05:02	06:01	29/03/2022	12/09/2022
OP14	1,096	05:22	06:33	13/03/2022	30/09/2022

Observation Point (OP)	Maximum Annual Duration (minutes)	Earliest Start Time	Latest End Time	Earliest Start Date	Latest Finish Date
OP15	23	05:02	05:28	25/04/2022	19/08/2022
OP16	1,921	05:01	06:02	28/03/2022	14/09/2022
OP17	54	05:35	06:33	13/03/2022	28/09/2022
OP18	28	05:02	05:28	25/04/2022	19/08/2022
OP19	10	05:02	05:28	30/04/2022	19/08/2022
OP29	11	18:38	19:01	27/04/2022	17/08/2022
OP30	19	18:38	19:01	27/04/2022	17/08/2022
OP31	1,483	18:01	19:03	29/03/2022	15/09/2022
OP32	836	18:04	19:03	28/03/2022	12/09/2022
OP33	453	18:34	19:03	15/05/2022	29/07/2022
OP34	27	18:38	19:03	27/04/2022	17/08/2022
OP35	2,098	05:19	06:33	13/03/2022	30/09/2022
OP36	2,202	05:20	06:33	13/03/2022	30/09/2022
OP37	37	05:35	06:33	13/03/2022	28/09/2022
OP38	14	06:04	06:33	13/03/2022	28/09/2022
Panel Angle of 20 degrees					
OP6	2,064	05:39	06:24	17/03/2023	26/09/2023
OP7	633	05:38	06:06	24/04/2023	18/08/2023
OP8	1,508	05:38	06:27	15/03/2023	28/09/2023
OP9	1,341	05:22	06:03	29/03/2023	13/09/2023
OP10	1,009	05:22	06:03	29/03/2023	13/09/2023
OP11	335	05:38	06:25	17/03/2023	24/09/2023

Observation Point (OP)	Maximum Annual Duration (minutes)	Earliest Start Time	Latest End Time	Earliest Start Date	Latest Finish Date
OP12	174	05:38	06:26	15/03/2023	25/09/2023
OP13	1,698	05:22	06:03	29/03/2023	16/09/2023
OP14	1,013	05:41	06:27	15/03/2023	27/09/2023
OP15	21	05:22	05:39	17/04/2023	20/08/2023
OP16	1,908	05:21	06:04	28/03/2023	16/09/2023
OP17	39	05:53	06:23	22/03/2023	26/09/2023
OP18	24	05:22	05:39	17/04/2023	20/08/2023
OP19	8	05:22	05:38	20/04/2023	14/08/2023
OP29	21	18:25	18:43	18/04/2023	25/08/2023
OP30	31	18:25	18:44	18/04/2023	25/08/2023
OP31	1,449	17:58	18:44	27/03/2023	16/09/2023
OP32	854	17:58	18:43	28/03/2023	16/09/2023
OP33	282	18:20	18:43	20/05/2023	23/07/2023
OP34	23	18:25	18:43	18/04/2023	22/08/2023
OP35	1,939	05:38	06:27	15/03/2023	29/09/2023
OP36	2,053	05:38	06:27	15/03/2023	28/09/2023
OP37	26	05:53	06:23	22/03/2023	26/09/2023
OP38	8	06:08	06:23	22/03/2023	26/09/2023

Table 17.14: Modelled Results for Point Receptors With Weather Adjustment

Observation Point (OP)	Weather Adjusted Annual Duration (minutes)	Glint Events Proportion of Daylight Hours	Number of Glint Days	Maximum Duration of Glint Event (minutes)	Average Duration of Glint Event (minutes)
Panel Angle of 10 degrees					
OP1	47	0.02%	44	6	3
OP5	0	0.0001%	2	0	1
OP6	810	0.30%	195	17	12
OP7	313	0.12%	126	13	7
OP8	651	0.25%	207	15	9
OP9	490	0.18%	162	16	9
OP10	376	0.14%	158	13	7
OP11	131	0.05%	172	6	2
OP12	87	0.03%	144	5	2
OP13	615	0.23%	162	18	11
OP14	431	0.16	212	10	6
OP15	7	0.002%	20	1	1
OP16	651	0.24%	168	18	11
OP17	20	0.01%	60	1	1
OP18	8	0.003%	25	1	1

Observation Point (OP)	Weather Adjusted Annual Duration (minutes)	Glint Events Proportion of Daylight Hours	Number of Glint Days	Maximum Duration of Glint Event (minutes)	Average Duration of Glint Event (minutes)
OP19	2	0.001%	8	1	1
OP29	1	0.0004%	4	1	1
OP30	2	0.001%	7	1	1
OP31	499	0.19%	154	15	9
OP32	272	0.10%	164	11	5
OP33	231	0.8%	93	13	7
OP34	9	0.003%	26	1	1
OP35	793	0.29%	208	16	11
OP36	835	0.31%	213	16	11
OP37	11	0.004%	32	1	1
OP38	3	0.001%	10	1	1
Panel Angle of 15 degrees					
OP6	743	0.28%	194	15	11
OP7	253	0.09%	121	12	6
OP8	574	0.21%	203	13	8
OP9	480	0.18%	167	14	8
OP10	359	0.13%	166	12	6
OP11	122	0.05%	169	5	2

Observation Point (OP)	Weather Adjusted Annual Duration (minutes)	Glint Events Proportion of Daylight Hours	Number of Glint Days	Maximum Duration of Glint Event (minutes)	Average Duration of Glint Event (minutes)
OP12	67	0.02%	133	16	11
OP13	610	0.23%	167	9	5
OP14	375	0.14%	203	1	1
OP15	8	0.00%	24	15	11
OP16	658	0.24%	172	1	1
OP17	18	0.01%	55	1	1
OP18	10	0.00%	29	1	1
OP19	3	0.00%	11	1	1
OP29	4	0.00%	12	1	1
OP30	7	0.00%	20	1	1
OP31	508	0.19%	165	14	9
OP32	286	0.11%	167	10	5
OP33	155	0.06%	77	1	1
OP34	9	0.00%	28	1	1
OP35	718	0.27%	203	15	10
OP36	754	0.28%	203	15	11
OP37	13	0.00%	38	1	1
OP38	5	0.00%	15	1	1
Panel Angle of 20 degrees					

Observation Point (OP)	Weather Adjusted Annual Duration (minutes)	Glint Events Proportion of Daylight Hours	Number of Glint Days	Maximum Duration of Glint Event (minutes)	Average Duration of Glint Event (minutes)
OP6	707	0.26%	195	15	11
OP7	217	0.81%	116	10	5
OP8	516	0.19%	199	12	8
OP9	459	0.17%	170	13	8
OP10	346	0.13%	165	11	6
OP11	115	0.04%	157	5	2
OP12	60	0.02%	118	4	1
OP13	581	0.22%	172	14	10
OP14	347	0.13%	198	11	5
OP15	7	0.003%	22	1	1
OP16	653	0.24%	174	15	11
OP17	13	0.01%	40	1	1
OP18	8	0.003%	25	1	1
OP19	3	0.001%	9	1	1
OP29	7	0.003%	22	1	1
OP30	11	0.004%	32	1	1
OP31	496	0.18%	169	13	9
OP32	292	0.11%	170	9	5
OP33	97	0.04%	66	8	4

Observation Point (OP)	Weather Adjusted Annual Duration (minutes)	Glint Events Proportion of Daylight Hours	Number of Glint Days	Maximum Duration of Glint Event (minutes)	Average Duration of Glint Event (minutes)
OP34	8	0.003%	24	1	1
OP35	664	0.25%	199	14	10
OP36	703	0.26%	199	14	10
OP37	9	0.003%	27	1	1
OP38	3	0.001%	9	1	1

17.6.46 **Table 17.15**,below, presents commentary on the visibility of the Energy Park from the receptor locations and notes the results of the modelling in terms of the duration and predicted intensity of glint effects (i.e. whether green glint or yellow glint would be present). Note, the durations presented in this table do not allow for the reductions in duration due to weather conditions, as presented in **Table 17.14**, above, instead reflecting the output of the Forge Solar model which assumes bright sunshine all year round.

17.6.47 **Table 17.15** illustrates the effects for a panel angle of 15 degrees only. To avoid excessive duplication in this chapter, the equivalent tables reporting the scenarios for the 10 and 20 degree panel angles have been included in **Appendix 17.5** (document reference 6.3.17.5).

Table 17.15: Summary Glint effects on Point Receptors from Fixed Panels (15 degrees) and the Significance

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
OP1 Rakes Farm	The building, which is located at the southern tip of the Energy Park, appears to have some large vegetation directly between it and the panels. There is also a complex of farm buildings that would potentially screen effects from the house but would be open to glint themselves.	Limited	0	0	Medium	**None (Not Significant)**
OP2 Six Hundred Farm	The dwelling, which is adjacent to the A17, is screened from most of the Energy Park by the presence of barns to its rear.	Limited	0	0	Medium	**None (Not Significant)**
OP3 Swineshead House	The dwelling is set within a large curtilage and there are mature shrubs and a walled garden which would provide a level of screening.	Limited	0	0	Medium	**None (Not Significant)**
OP4 Carpenters	On the far side of the A17, and slightly lower than the road, this dwelling would have limited views towards the Energy Park due to the presence of hedgerows on both sides of the road. The main aspect of the house is away from the Energy Park and although there appear to be two small windows that face towards the Energy Park it is unlikely that these will have any direct visibility.	Limited	0	0	Medium	**None (Not Significant)**
OP5 Maize Farm	Again, on the far side of the A17 and behind substantial dense evergreen vegetation, it is not expected that there will be any direct visibility to the Energy Park.	No	0	0	Medium	**None (Not Significant)**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
OP6 Large dwelling in midsection of Old Main Road	This dwelling is representative of a collection of other dwellings in the same area of Old Main Road. There are a lot of trees present in the area, including a number in the curtilage of this property, which will provide a good degree of screening. It is unlikely that there will be much direct visibility of the Energy Park but the area of panels predicted to cause glint are in the far south east corner of the Energy Park and should be well screened. Onsite screening will enhance this and ensure that there is no visibility.	Limited, (if any) prior to mitigation, reducing to none with screening.	0	2,171	Medium	**Minor to Negligible** prior to mitigation **(Not Significant)** **None** after mitigation **(Not Significant)**
OP7 Most easterly dwelling on Old Main Road	This dwelling is representative of several properties in the immediate area. Substantial vegetation impedes views of the majority of the Site but there is potential visibility to the most south-easterly corner of the Energy Park, which is the area predicted to cause observable glint effects. However, boundary screening onsite at the Energy Park will prevent visibility.	Limited, (if any) prior to mitigation, reducing to none with screening.	0	738	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **None** after mitigation **(Not Significant)**
OP8 Most Westerly dwelling on Old Main Road	Again, representative of a cluster of dwellings in this area, lower floors are unlikely to have visibility due to their own boundary screening. Upper floors may well have views over this, into the Energy Park. Onsite screening will help reduce visibility but there may remain some visibility from upper floors. Most of the predicted glint effects arise from the south-eastern	Yes, possibly from upper floors Some slight visibility may persist after onsite screening, but	0	1,675	Medium	**Minor to Moderate** prior to mitigation **(Significant)**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	corner of the Energy Park, of which there will be very limited views.	effects will be very limited				**Minor to Negligible** after mitigation **(Not Significant)**
OP9 Mountain's Abbey Parks Farm Shop	This is a commercial receptor rather than a residential receptor. Although there are mature trees on the opposite side of the A17 that will provide some level of screening this will not be sufficient to prevent some visibility directly to the Energy Park where there are large gaps in the coverage. Boundary treatment within the Energy Park will need to be used to provide a good degree of screening.	Yes, partial visibility without mitigation. Onsite screening will reduce this to none.	0	1,401	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **None** after mitigation **(Not Significant)**
OP10 Rectory Cottage	Vegetation within the curtilage will provide some screening but the width of the solar development would be too great for this to mask all of the Energy Park. There is likely to be some visibility to the Energy Park, especially from upper floor windows and onsite boundary planting will needed to prevent visibility.	Yes, partial visibility without mitigation. Onsite screening will reduce this to none.	0	1,047	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **None** after mitigation **(Not Significant)**
OP11 Rectory Farm House	Substantial vegetation will prevent visibility from lower level windows but there may be some views from upper floors out over the Energy Park. Other dwellings	Yes, partial visibility	0	355	Medium	**Minor to Moderate**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	in the immediate vicinity ae likely to have even less (if any) visibility due to the screening provided by Rectory Farm House itself.	without mitigation. Onsite screening will reduce this to none.				prior to mitigation **(Significant)** **None** after mitigation **(Not Significant)**
OP12 Beech House	This property is likely to have views over the Energy Park from upper-level windows and possibly from lower-level windows as well. Onsite boundary screening will likely be required to ensure glint effects are restricted.	Yes, partial visibility without mitigation. Onsite screening will reduce this to none.	0	196	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **None** after mitigation **(Not Significant)**
OP13 Dwelling at Home Farm	As with Beech House, it is likely that screening at the property will be insufficient to prevent visibility of the Energy Park. Boundary screening at the Energy Park will be required to prevent visibility.	Yes, partial visibility without mitigation. Onsite screening will reduce this to none.	0	1,781	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **None** after mitigation **(Not Significant)**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
OP14 Rose Cottage	There are a number of trees and buildings present in the foreground between the dwelling and the Energy Park that will partially screen it but the extent of the solar arrays are such that panels will remain visible beyond the intervening screening. Other dwellings in the same area but to the south of the A17 will likely have slightly less visibility. Larger properties immediately to the west are enclosed by trees and will have much more limited visibility.	Yes, partial visibility without mitigation. Onsite screening will reduce this to none.	0	1,096	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **None** after mitigation **(Not Significant)**
OP15 Dwelling on B1395 Sidebar Lane Close to A17	The selected dwelling is representative of several dwellings located in this area. They are close to the south western corner of the Energy Park and general have views out towards the east. Some of these properties are bungalows so visibility may be more limited with ground floor windows not seeing past garden hedgerows, however, some are houses and upper floors will inevitably overlook the Energy Park.	Yes, partial visibility without mitigation. Onsite screening will reduce this to none.	0	23	Medium	**Minor** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP16 Dwelling on B1395 Sidebar Lane 250m North of OP15	OP16 is representative of several houses at this location and is broadly exposed to the same views as OP15 but, being further north has potential to experience quite a bit more glint. The buildings in this location are semi-detached houses so there will be upper floor windows, with views out towards the Energy Park. Onsite screening on the western boundary will substantially reduce visibility	Yes, partial visibility without mitigation. Onsite screening will reduce this to none.	0	1,921	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
OP17 Dwelling on Sidebar Lane 61pprox. 500m south of Littleworth Drove/Crab Lane	This receptor is a bungalow on the western side of Sidebar Lane. It has open views towards the Energy Park with very little screening so any mitigation would need to be provided around the boundary of the Energy Park.	Yes, good visibility with no screening at present. Onsite mitigation will be necessary to reduce glint effects.	0	54	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP18	OP18 is not a residential receptor and can be ignored.	N/A	-	-	-	-
OP19 The Chapel House, Sidebar Lane	Like OP17, this property, which is located close to the junction between Sidebar Lane and Crab Lane, has views directly to the East towards the Energy Park. It appears to be single storey building with very high ceilings. Three large windows on the eastern side of the building look directly out towards the Energy Park with little to no screening. Only a small amount of glint is predicted at this location. This receptor is representative of Glebe Farm House, although that building is much more heavily screened with localised vegetation.	Yes, good visibility with no screening at present. Onsite mitigation will be necessary to reduce glint effects.	0	10	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP20 Five Willow Wath Farm	The main residential building is single storey with south-facing windows. There is some screening present but it is expected that there will still be views through to the Energy Park.	Partial	0	0	Medium	**None (Not Significant)**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
OP21 Pattingden House	This property has windows facing directly towards the site. However, in a fixed panel layout it will not experience any glint as the views will be of the backs of the panels, or of screening hedgerows.	No visibility to panels capable of causing glint	0	0	Medium	**None (Not Significant)**
OP22 Mill Green Farm	This farm complex is located directly to the north of the Energy Park and has views towards the panels. In a fixed panel layout glint effects will tend to affect properties to the east and west and to the south of the Energy Park but glint will not be reflected to the north.	No visibility to panels capable of causing glint	0	0	Medium	**None (Not Significant)**
OP23 The Farmhouse, Maryland Bank	Views from lower windows will be limited by the hedgerows around the garden but the upper floors will have oblique views towards Energy Park. The location is still north of the arrays though so glint will not be possible from a fixed panel layout.	No visibility to panels capable of causing glint	0	0	Medium	**None (Not Significant)**
OP24 Six Maryland Bank	This receptor is representative of a cluster of properties in this location. Farm buildings associated with Chestnut House Farm will provide some screening, as will bands of nearby trees but there may still be glimpses of the Energy Park. The positioning of the panels means that there is not predicted to be any glint from either panel configuration	No visibility to panels capable of causing glint	0	0	Medium	**None (Not Significant)**
OP25 Three Maryland Bank	This receptor is indicative of several dwellings in the vicinity. The properties are partially screened by vegetation within the curtilage of the properties themselves. They are predominantly single storey buildings.	No visibility to panels capable of causing glint	0	0	Medium	**None (Not Significant)**
OP26 St John the Baptists Church	The church appears to be well screened from the surrounding area with hedgerows enclosing the graveyard. Within the Church itself there is not likely to be windows that overlook the Energy Park.	No visibility to panels capable of causing glint	0	0	Medium	**None (Not Significant)**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
OP27	This dwelling is representative of several buildings at the northern end of Claydike Bank, just before it changes to Maryland Bank. The dwellings here appear to be well screened by mature trees and have little to no visibility to the Energy Park, especially from lower-level windows.	No visibility to panels capable of causing glint	0	0	Medium	**None (Not Significant)**
OP28 22 Sutterton Drove	This location is representative of the Old Amber Hill hamlet, including the Pilgrim School, which is very well screened. Parts of the hamlet benefit from screening with mature trees, while part has more open views towards the Energy Park. The Energy Park is approximately 2km away so visibility will be limited, and glint intensity will be lower than for receptors very close to the panels.	No visibility to panels capable of causing glint	0	0	Medium	**None (Not Significant)**
OP29 Claydike Bank	The building has a low box hedge that provides plenty of opportunity for views towards the Energy Park. It is intended to be representative of a cluster of buildings in the area but this one has some of the greatest visibility towards the Energy Park, with other dwellings screened by a combination of vegetation and agricultural buildings. As with other receptors the lack of screening close to the Energy Park is likely to need mitigating by applying screening along the Site boundary.	Yes, good visibility with no screening at present. Onsite mitigation will be necessary to reduce glint effects.	0	11	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP30 Kepplegate, Chapel Lane	This site is indicative of the dwellings nearby. The receptor is located at the intersection of Chapel Lane with Claydike Bank. This particular property benefits	Partial visibility at present.	0	19	Medium	**Minor to Moderate** prior to mitigation

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
	from an evergreen hedge (Leylandii) surrounding the building and completely screening the Energy Park. Some of the other local buildings do have clearer visibility to Energy Park and are more likely to be susceptible to observing glint effects, which emanate from the north-eastern corner of the Energy Park.	Onsite mitigation will help reduce glint effects.				**(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP31 College Farm, Browns Drove	This property has some vegetation screening views towards the southern part of the Energy Park but there is little screening to the mid and northern parts of the Energy Park. Most glint at this receptor is predicted from the mid part of the Energy Park and screening along the eastern boundary would benefit this receptor.	Good visibility of site with little screening present. Onsite mitigation necessary to reduce glint effects.	0	1,483	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP32	Small property on the west side of Browns Drove. This receptor is indicative of several other dwellings in the vicinity including College Cottage and Cattle Holme Farm. The building itself has limited views to the Energy Park as there is a thin hedgerow of trees to the rear of the property that will provide intermittent screening. The other properties benefit from greater screening. Glint primarily originates from the southern part of the site.	Partial visibility at present. Onsite mitigation will help reduce glint effects.	0	836	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
OP33 14 Brown's Drove	This receptor is one of a series of semi-detached properties arranged along the southwestern side of Brown's Drove. OP33 in particular has little screening present and will have open views towards most of the Energy Park. Other dwellings in this cluster have varying amounts of screening present, with some being well screened and others not. Glint effects only emanate from the very south-eastern corner of the Energy Park so onsite screening in this area will considerably reduce effects.	Partial visibility at present. Onsite mitigation will help reduce glint effects.	0	453	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP34 Ullyatts Farm, Ullyatt's Drove	This receptor is an isolated building approximately 1.8km to the west of the Energy Park. It has some screening present but will likely still have views of the Energy Park and will benefit from screening on the eastern perimeter of the Energy Park.	Partial visibility at present. Onsite mitigation will help reduce glint effects.	0	27	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP35 Kane Farm, off the A17	This receptor is almost 3km to the west of the Energy Park and is representative of more distant receptors to the west. Although this receptor is quite well screened not all of the other receptors are. The glint model still predicts a relatively high duration of glint despite the distance but the intensity will diminish with distance and there are screening features present in the intervening landscape that will help disrupt effects.	Partial visibility at present. Onsite mitigation will help reduce glint effects.	0	2,098	Medium	**Minor to Moderate** prior to mitigation **(Significant)**

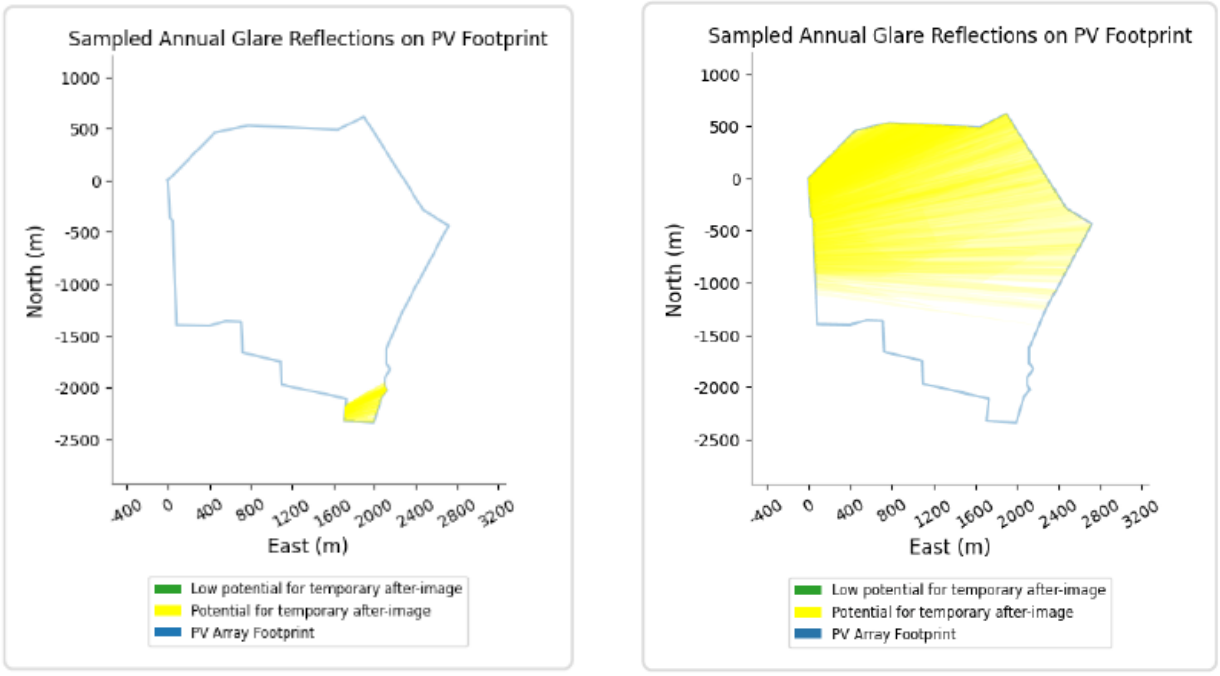
Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
						Negligible to None after mitigation **(Not Significant)**
OP36 Holme House, Littleworth Drove	At approximately 1.8km from the Energy Park this receptor is also a medium distance receptor. There is limited screening present at the dwelling to screen visibility to the Energy Park. However, there are a number of field boundaries between the receptor and the Energy Park, which are likely to provide some degree of screening due to the flat nature of the landscape. Screening mitigation will need to be carried out around the perimeter of the Energy Park in any areas where there is visibility.	Partial visibility at present. Onsite mitigation will help reduce glint effects.	0	2,202	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
OP37 Vine Cottage, Littleworth Drove	This dwelling is partially screened by trees and hedges onsite but is likely to have some unobstructed, if oblique, views to parts of the Energy Park. Glint effects are limited and arise from the northern part of the Energy Park. Other nearby properties appear to be in a similar position, with some potential for visibility. Onsite screening around the north western corner of the site will help reduce any effects.	Partial visibility at present. Onsite mitigation will help reduce glint effects.	0	37	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP38	It is not clear whether there is a residential receptor at this location or just agricultural receptors. Assuming there is a residential building it will have views partially screened by localised vegetation and trees. Views directly to the Energy Park will have to pass numerous field boundaries, any one of which may be sufficiently robust to completely block visibility.	Partial visibility at present. Onsite mitigation will help reduce glint effects.	0	38	Medium	**Minor to Moderate** prior to mitigation **(Significant)** **Negligible to None** after mitigation **(Not Significant)**
OP39 White House Farm	This observation point is to the north of the Energy Park and with fixed panels deployed glint effects will not be possible. There is some screening present at the Farm and this will prevent a number of the potential glint effects from occurring.	No visibility to panels capable of causing glint	0	0	Medium	**None** **(Not Significant)**

Observation Point (OP)	Screening Present	Site Visibility	Magnitude		Sensitivity	Significance
			Green Glint (min)	Yellow Glint (min)		
OP40 94 Clay Bank	These properties, about 1km to the north of the Energy Park, will not be able to experience any glint in the fixed panel layout as the windows would see the backs of the panels.	No visibility to panels capable of causing glint	0	0	Medium	**None (Not Significant)**

17.6.48 As can be seen in **Table 17.10** and **Appendix 17.5** (document reference 6.3.17.5)**,** OP36 has the highest exposure to potential glint effects from the PV array at the Heckington Fen Energy Park Site, closely followed by OP6, and OP35. Effects at all three of these receptors are worst when the panel angle is 10 degrees. This is not the case at all receptors though. OP16 and OP31 see peak durations of glint with a 15 degree panel angle, while OP32 would receive the largest amount of glint with a 20 degree panel angle. receptors are worst.

17.6.49 At OP36, glint from the Energy Park is modelled to occur for approximately 0.28% of annual daylight hours, with lower durations for all other residential receptors. The times and dates when glint has potential to occur at the receptors are provided in **Table 17.9**. Graphs showing the times and durations of all of the glint effects for the other receptors are included in **Appendix 17.1** (doc ref. 6.3.17.1), **Appendix 17.3** (doc ref. 6.3.17.3) and **Appendix 17.4** (doc ref. 6.3.17.4).



OP6 (2,366 mins of glint/yr) *OP36 (2,437 mins of glint/yr)*

Figure 17.1: Areas of array from which glint originates at OP6 & OP36 when panel angle is 10 degrees[11]

17.6.50 **Figure 17.11** illustrates where glint will originate at both OP6 and OP36 when the panel angles are at 10 degrees as this illustrates the worst case scenario between the three angles for these two receptors. Minutes of glint listed here do not include the weather adjustment. It is relevant to note that a small number of panels can still produce large durations of glint effects. In both cases, as with other residential receptors, effects will be reduced with onsite screening to **Non-Significant** levels.

17.6.51 The effects modelled by Forge Solar, which does not account for any surface screening nor variations in weather conditions, will be further reduced or eliminated by considering the existing and proposed screening in the form of trees, hedgerows, buildings, and other obstructions which is discussed in detail below.

[11] *Extract from ForgeSolar, 2022*

Aviation

17.6.52 As noted in the Consultation above, aviation has been scoped out of the assessment. Notwithstanding this, a brief assessment has been undertaken for the closest major aviation receptor, which is RAF Coningsby, approximately 9.2km to the north of the northern site boundary, due to the consultation response to this. The aerodrome is orientated such that the runways are nominally 07 and 25, meaning that flights leaving and landing from either runway will not directly overfly the Energy Park without changing direction. Glint effects have been assessed in the software and no glint is predicted on final approach.

17.6.53 It should also be noted that the FAA has undertaken a policy review in relation to solar farm effects on aviation receptors, and its guidance has changed as of May 2021. In the absence of any detailed UK guidance from the CAA in respect of solar PV, the FAA guidance has been adopted as default best practice over the previous eight years. In the updated guidance (FAA 14 CFR Part 77), the FAA has concluded that "*in most cases the glint and glare from solar energy systems to pilots on final approach is similar to glint and glare pilots routinely experience from water bodies, glass-façade buildings, parking lots, and similar features.*"

17.6.54 At this distance there are expected to be **no significant** glint effects to RAF Coningsby aviation receptors.

Other Aviation Receptors

17.6.55 No other aviation receptors have been formally assessed.

17.6.56 RAF Cranwell is more than 17km from the Energy Park and at such distance will not be affected by it.

17.6.57 Boston Airfield is an unlicensed grassed airfield used for small, fixed-wing and microlight planes, as well as hosting an helipad used by the air ambulance. At more than 8.5km from the Energy Park it will not be directly affected by it and, as per the FAA conclusion above, pilots routinely deal with flying towards the sun and in very bright conditions. At this distance, solar panels with anti-reflective coatings will not expose those pilots to unacceptable or unusual effects.

Decommissioning

17.6.58 The decommissioning process will largely be the exact reverse of the construction process, with activities involving the removal of the site infrastructure piece by piece. As panels are removed from the mounting frames the mounting structures will become more visible again and these will still have potential to reflect glint. It is anticipated that the Energy Park will be decommissioned in sections with panels being removed from one section, then the mounting structures, cabling and other site infrastructure being removed before the next section of the Energy Park undergoes the same procedure.

17.6.59 Whilst the mounting structures are visible there is some potential for glint to be reflected back towards receptors, but this will be a temporary effect for a short period of time, so it is not considered necessary to further mitigate against it.

17.6.60 Therefore, effects on rail receptors during the decommissioning phase are assessed as temporary, of high sensitivity, magnitude is not quantifiable but likely to be low. The overall significance of effect on rail receptors is **minor adverse**, and **not significant** without mitigation.

17.6.61 Road receptors during the decommissioning phase are assessed as temporary, of high sensitivity, magnitude is not quantifiable but likely to be low. The overall significance of effect on roads receptors is **minor adverse**, and **not significant** without mitigation.

17.6.62 Aviation receptors during the decommissioning phase are assessed as temporary, of high sensitivity, magnitude is negligible. The overall significance of effect on aviation receptors is **negligible**, and **not significant** without mitigation.

17.6.63 Dwelling receptors during the decommissioning phase are assessed as temporary, of medium sensitivity, magnitude is not quantifiable but likely to be low. The overall significance of effect on dwelling receptors is **minor adverse**, and **not significant** without mitigation.

17.7 MITIGATION AND ENHANCEMENT

Mitigation by Design

17.7.1 Design work for the Energy Park has taken glint effects into account and the layout aims to reduce the effects at sensitive receptors as far as possible. This includes through the use of embedded mitigation in the form of the proposed hedgerow planting.

17.7.2 The choice of fixed panels over tracking panels, the selection of panel inclination and orientation, as well as the arrangement and heights of panel arrays have all been conscious design decisions which affect the amount of glint that might be received at specific receptors. These factors, as well as other technical constraints have been important parts of the design evolution.

Additional Mitigation

17.7.3 Extensive hedgerow screening (some 8.5km) is already proposed across the Energy Park Site. Should further planting be incorporated into the design this may further assist the outcome of the final glint assessment. Visibility of the Energy Park will be limited by this additional hedgerow planting.

17.7.4 Should additional screening be required until such time as any planting reaches sufficient maturity, this could be achieved with some form of temporary physical screening such as fencing.

Table 17.16: Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured	
		By Design	By DCO Requirement
Construction	Layout of solar panels and mounting systems. Orientation and pitch of fixed panels.	x	
Construction	Screening Temporary construction hoarding or fencing, if glint from mounting system is too great prior to panels being installed.		x

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured	
		By Design	By DCO Requirement
Operation	Screening (First five years) If required additional screening in form of fences could be used until vegetation matures sufficiently		x
Operation	Screening (Full life of project) In-fill vegetation around perimeter of the Energy Park to be well-maintained and reinstated in the event of any die-back.		x

Enhancements

17.7.5 It is not anticipated that there will be any further enhancements required.

17.8 CUMULATIVE AND IN-COMBINATION EFFECTS

17.8.1 As noted in the earlier discussion, there are a number of other sources of reflection within the local environment. These include glasshouses to the east of the Energy Park, water bodies, windows and car windscreens, metal infrastructure, as well as more distant solar farms (i.e. >8km from the Energy Park).

17.8.2 There are several other sources of reflection in the vicinity of the proposed site so there is a potential for cumulative glint effects to be received by receptors surrounding the site. This Cumulative Effects section addresses any potential cumulative glint effect that may arise from existing and proposed sites together with this site.

17.8.3 **Figure 17.12** shows a chart for an illustrative Observation Point demonstrating the timings of cumulative effects. The geometric potential for glint associated with the proposed site is shown in orange. Cumulative effects include the glint associated with both the proposed site and existing sites (grey). Simultaneous cumulative effects have the potential to occur when the times and dates when glint is possible, overlap between the arrays, as shown in **Figure 17.12** in yellow.

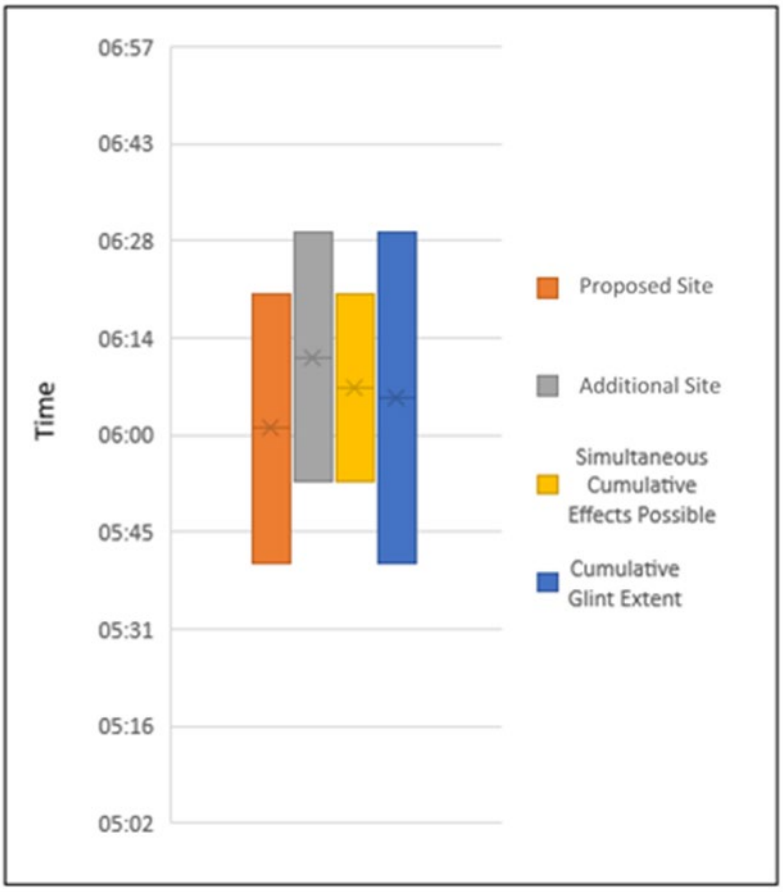


Figure 17.12 - Example Chart Representation of Simultaneous Cumulative Effects

17.8.4 Simultaneous cumulative effects will be considered as this is when glint is more intense for a particular receptor.

17.8.5 Cumulative glint can only occur where glint from the proposed Energy Park can occur. Therefore, cumulative glint cannot occur at: OP1-5, OP20-28, OP39 and OP40. These receptors will not be assessed for cumulative glint.

17.8.6 Due to the sheer number of reflective surfaces present, it is not possible to assess all the potential sources of glint in the local environment when considering cumulative effects.

17.8.7 A short list of sites has been selected to assess the cumulative effects outlined below. However, with most, the distances are too great for there to be any actual material effects.

Table 17.17: Details of Cumulative Schemes

No.	Name of Scheme	LPA	NSIP	Reference	Size	Distance from Site	Area (Ha)	Proceeded to further assessment?
1	Vicarage Drove- Approved	Boston Borough	No	B/21/0443	49.9 MW	c. 5.5km south of the Energy Park Site at its closest point but adjacent to the proposed extension to the substation at Bicker Fen	80	No - too far to be modelled
2	Land at Little Hale Fen- Screening	North Kesteven	No	21/1337/EIASCR	49.9 MW	c. 5.6km north-east of the Energy Park Site at its closest point	80	No - too far to be modelled
3	Land at Ewerby Thorpe- Screening	North Kesteven	No	14/1034/EIASCR	28MW	c. 4.1km north-west of the Energy Park Site at its closest point	73	No (no site plan and not progressed sufficiently)
4	Land to the North of White Cross Lane- Approved	North Kesteven	No	19/0863/FUL	32MW	c. 8.4km west of the Energy Park Site at its closest point	48	No - too far to be modelled
5	Grange Farm - Operational	North Kesteven		12/1242/FUL	15MW	C. 8.17km west of the Energy park at its closest point	34	No - too far to be modelled
6	Land South of Gorse Lane, Silk Willoughby - Approved	North Kesteven	No	19/0060/FUL	20MW	c. 11km west of the Energy Park Site at its closest point	70	No - too far to be modelled
7	Cottam Solar Project - Scoped	PINS to determine. Falls in administrative areas - Nottinghamshire, Lincolnshire County, Bassetlaw District and West Lindsey	Yes	EN010133	50MW + (NSIP)	c. 43.6km north-west of the Energy Park Site at its closest point	1270	No due to distance

No.	Name of Scheme	LPA	NSIP	Reference	Size	Distance from Site	Area (Ha)	Proceeded to further assessment?
8	Gate Burton Energy Park - Statutory Consultation	PINS to determine. Falls in administrative areas - Nottinghamshire, Lincolnshire County, Bassetlaw District and West Lindsey	Yes	EN010131	50MW + (NSIP)	c.48.6km north-west of the Energy Park Site at its closest point	684	No due to distance
9	West Burton Solar Project - Scoped	PINS to determine. Falls in administrative areas - Nottinghamshire, Lincolnshire County, Bassetlaw District and West Lindsey	Yes	EN010132	50MW + (NSIP)	c.41.3km north-west of the Energy Park Site at its closest point	788	No due to distance
10	Mallard Pass Solar Farm – Statutory Consultation	PINS to determine. Falls in administrative areas - Rutland County and South Kesteven	Yes	EN010127	50MW + (NSIP)	c.33.2km south-west of the Energy Park Site at its closest point	900	No due to distance
11	Boston Alternative Energy Facility (BAEF)		-	EN010095	102MWe gross (80MWe exportable)	11.7km west	119	No potential cumulative glint effects
12	Temple Oaks Renewable Energy Park	South Kesteven	-	EN010126	240MW solar capacity	18.4km south-west	280	No due to distance
13	Outer Dowsing Offshore Wind (Generating Station)	-	-	EN010130	Up to 1.5GW	85km north-east to the site boundary.	-	Wind is not part of cumulative glint assessment
14	Tillbridge Solar Project	-	-	EN010142	Generation capacity of greater	47.9km north-west	-	No due to distance

No.	Name of Scheme	LPA	NSIP	Reference	Size	Distance from Site	Area (Ha)	Proceeded to further assessment?
					than 50 MW			
15a	Land West of Cowbridge Road, Bicker Fen, Boston Proposed development of a photovoltaic solar array, grid connection, access improvement works & ancillary development on land at Bicker Fen, Boston and South Holland	Boston County Council	-	B/22/0356	Up to 49.995MW	5.3km south of main site. Adjacent to south-east corner of the site boundary cable route.	97	No as status on planning portal is undecided. Will also have different affected receptors.
15b	Land West of Cowbridge Road, Bicker Fen, Boston- Proposed development of a photovoltaic solar array, grid connection, access improvement works & ancillary development on land at Bicker Fen, Boston and South Holland – status: undecided	South Holland District Council		H04-0849-22	Up to 49.995MW	5.3km south of main site. Adjacent to south-east corner of the site boundary cable route.	97	No as status on planning portal is undecided. Will also have different affected receptors.
16	Canopus Farm – operational	East Lindsey District Council		S/054/02433/14	5MW	c. 9km north-east of the main site.	c.10	No - too far to be modelled
17	Station Road – awaiting construction	Boston Borough Council		B/21/0479	Up to 247kWp	c.2.6km south-east of the site at its closest point	Roof area	No as roof mounted, well screened and too far south to affect same receptors

No.	Name of Scheme	LPA	NSIP	Reference	Size	Distance from Site	Area (Ha)	Proceeded to further assessment?
18	Deepdale Farm	North Kesteven District Council		14/0953/FUL	8MW	c. 11.6km to the north-west of the site	c.8	No - too far to be modelled
19	Anglian Water – Lincolnshire Reservoir	PINS	Yes		n/a	c. 7km southwest of the site		No – too far to be modelled and expected to have embankment meaning limited intervisibility.

17.8.8 Additional solar developments were identified within 10 km of the Energy Park site. The locations of these sites are shown in **Figure 17.13**.

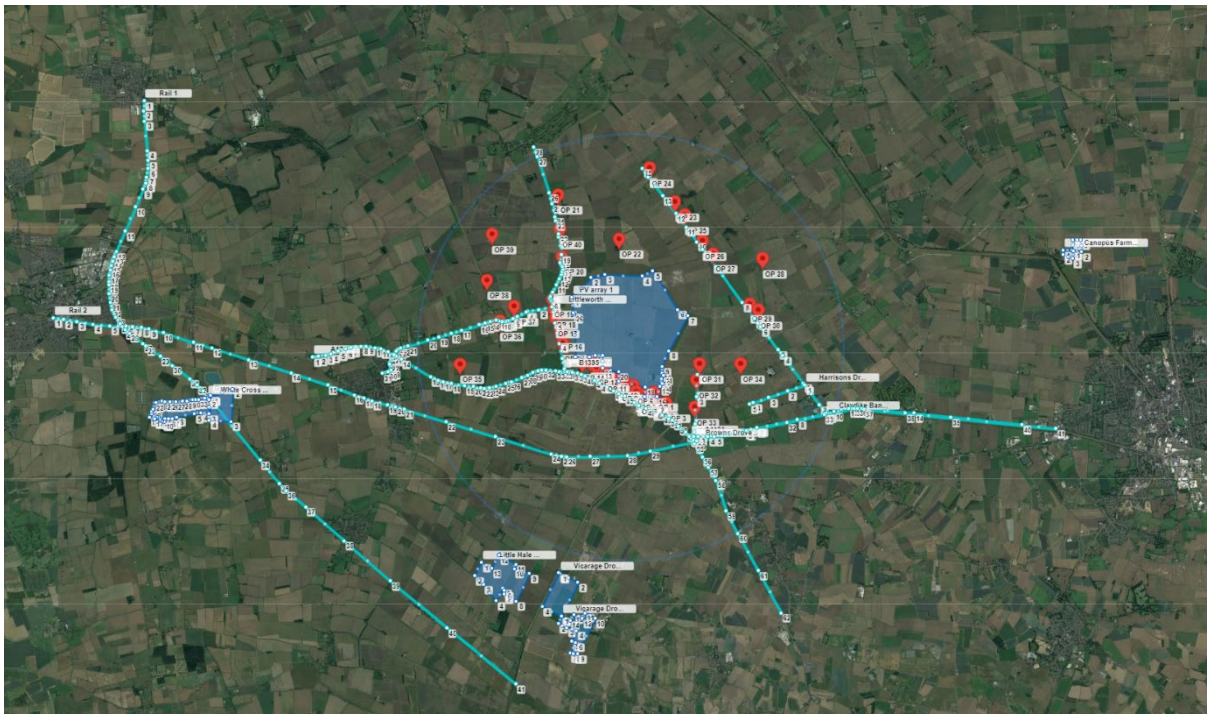


Figure 17.13 - Distribution of other solar sites for cumulative effects[12]

17.8.9 Those sites identified between 5km and 10km away from the Energy Park were eliminated as at this distance there would be no cumulative glint effects expected. The computer model used can only directly model cumulative effects for solar sites that are located within 5km of the Energy Park but no effects are predicted for receptors at this distance so cumulative effects would not exist at these locations.

17.8.10 Other solar farms present or consented in the area (as detailed in **Table 17.17**) are likely to be sufficiently far away that there will not be any cumulative glint effects present even without mitigation. Once the screening mitigation has been applied to the Energy Park most receptors are predicted to receive no glint effects and so any potential for cumulative effects involving the Energy Park would cease to be.

17.8.11 In combination effects where effects from glint and other environmental effects collectively affect the same receptor would theoretically be possible in an unmitigated design but, assuming the Energy Park is appropriately screened and given the flat landscape within which it is situated, it should be possible to eradicate almost all glint effects, except possibly from upper storey windows with views down into the Energy Park.

[12] *Extract from ForgeSolar 2022*

17.9 SUMMARY

Introduction

17.9.1 This report aims to assess the possible glint effects that arise as a consequence of the sun's rays interacting with the solar panels that are proposed to be erected. Glint is term used to describe specular reflection which is produced as a direct reflection of the sun on the surface of the solar panels. It occurs with the reflection of light from smooth surfaces such as glass, steel, and calm water. It is used interchangeably with 'glare'.

17.9.2 The computer model used to categorise glint does so by specifying whether glint is 'green' or 'yellow' and this represents the intensity of the glint event and the potential for after image. It is commonly accepted that levels of green glint are acceptable overall, and for flight approaches, however, is not acceptable at Air Traffic Control Towers (ATCT).

17.9.3 As the Energy Park will consist of fixed south orientated panels, only these types of panels have been assessed and modelled.

Baseline Conditions

17.9.4 For this report, a presumption has been made that there is no baseline glint currently occurring at any of the receptors due to a number of factors.

17.9.5 These include the fact that there are no operational solar farms in the immediate vicinity of the proposed Energy Park, the ones that do exist are greater than 10km away so at this distance they will not present any effects.

17.9.6 Further, overall there is great interchangeability between potential receptors from more common materials such as glass in windows, moving vehicles, glasshouses and calm water so it is not possible to correctly quantify the full level of glint experienced.

Likely Significant Effects

Construction

17.9.7 During the initial phase of ground preparation, there is not likely to be any reflections present other than possibly from the windscreens of vehicles used in the site preparation works.

17.9.8 It is anticipated that the Energy Park will be constructed sequentially in sections, with one part of being built out before the next is commenced. In this way completed sections will help provide screening from ongoing construction activities.

17.9.9 Some of the mounting frames, which will be manufactured from metal have the potential to cause reflections, until the panels are installed on them. Specific quantification of this type of reflection is not possible but it is short term and temporary.

17.9.10 The assessment has confirmed that, provided the above mitigation is applied, there are not expected to be any significant effects during this phase of development.

Operation

17.9.11 During the operational phase effects will vary during the course of each year as the sun attains different heights in the sky and weather patterns vary.

17.9.12 The potential effects comprise glint effects at various receptors. These have been categorised separately as rail receptors, road receptors, aviation receptors and

dwellings. Observation Points were determined which are a representative of dwellings in the surrounding area to the Energy Park. Based on the methodology outlined in this Chapter, receptors to which intense glint effects could cause potential health and safety issues (i.e. aviation, road and rail) are classified as high sensitivity, while receptors such as dwellings, where glint would more likely cause nuisance would be classified as medium sensitivity.

Railways

17.9.13 There are two rail receptors in the area, the first runs outside the 5km study area (Rail 1), and the second runs to the south of the Energy Park, between Sleaford and Boston, at a distance of approximately 1.3km at its closest point (Rail 2). It passes to the south of Heckington, before converging with and then running adjacent to the A1121, to the east of the Energy Park.

17.9.14 The two sections of track considered in the glint assessment, both running to the south of the site are likely to have low to non-existent visibility, especially after the provision of onsite screening.

17.9.15 For Rail 1 the Significance of Effects is Negligible for all three panel angles.

17.9.16 For Rail 2 the Significance of Effects is Negligible for all three panel angles.

Roads

17.9.17 There are a number of roads within the study area comprising national, regional, and local roads. There are no motorways. Motorists are, as a matter of routine, used to driving towards the sun at certain times of the day, which provides a much more intense source of light than glint will. Notwithstanding this, roads within the immediate vicinity of the site have been assessed for glint effects.

17.9.18 For the roads assessed, when the panel angle is 15 degrees, the A1121, the A17, the B1395 and Littleworth Drove, have been assessed as having potential for **Significant** effects prior to mitigation, however this becomes **Not Significant** after mitigation is taken into account.

17.9.19 When the panel angles are 10 degrees and 20 degrees, the A1121, the A17, the B1395 and Littleworth Drove, have potential for **Significant** effects prior to mitigation, however this becomes **Not Significant** after mitigation is taken into account.

17.9.20 For all three panel angles, Claydike Bank Road and Harrisons Drove, both have effects that are **Not Significant**, due to lack of visibility to the Energy Park and accessibility.

Observation Points

17.9.21 Due to the size of the Energy Park it is necessary to consider a large number of observation points around the perimeter to properly assess the likely effects.

17.9.22 The Significance of Effects has been assessed for each of the representative Observation Points (OP).

17.9.23 For all three panel angles, OP1-OP6, all have effects that are **Not Significant**.

17.9.24 For all three panel angles, with OP7 to OP17 the effects are considered **Significant** prior to mitigation, but this is reduced to **Not Significant** after mitigation is implemented.

17.9.25 For all three panel angles, OP18 can be ignored as it is not a residential receptor.

17.9.26 For all three panel angles, OP19 is assessed as having **Significant** effects prior to mitigation but this is reduced to **Not Significant** after screening is taken into account.

17.9.27 For all three panel angles, OP20 to OP28, all have **No Significant** effects.

17.9.28 For all three panel angles, OP29 to OP38 present **Significant** effects prior to onsite mitigation which are reduced to **Not Significant** after mitigation is taken into account.

17.9.29 For all three panel angles, OP39 and OP40 have **No Significant** effects.

Aviation

17.9.30 Aviation was scoped out as discussed in the Consultation section of this Chapter, however a brief assessment of the closest major aviation receptor, RAF Coningsby was caried out and effects were found to be Negligible.

Decommissioning

17.9.31 The decommissioning process will largely be the exact reverse of the construction process, with activities involving the removal of the site infrastructure piece by piece. As panels are removed from the mounting frames the mounting structures will become more visible again and these will still have potential to reflect glint. It is anticipated that the Energy Park will be decommissioned in sections with panels being removed from one section, then the mounting structures, cabling and other site infrastructure being removed before the next section of the Energy Park undergoes the same procedure.

17.9.32 Whilst the mounting structures are visible there is some potential for glint to be reflected back towards receptors, but this will be a temporary effect for a short period of time, so it is not considered necessary to further mitigate against it.

17.9.33 The assessment has confirmed that, provided the above mitigation is applied, there are not expected to be any significant effects during this phase of development.

Mitigation and Enhancement

17.9.34 Mitigation measures have been developed and incorporated throughout the design process. The selection of fixed panels reduced the potential for any effects to be visible at OPs to the north of the Energy Park.

17.9.35 Screening in the form of hedgerow planting and improvement has been proposed which will significantly reduce potential effects.

17.9.36 Due to this screening, for all the OPs and roads, the significance of effects will be considerably reduced.

Cumulative and In-combination Effects

17.9.37 There will be no cumulative effects as the potential cumulative solar developments that have been identified all lie further than 5km away and will not have an effect at this distance.

17.9.38 The solar panels identified within 5km have screening to the receptors and so will have no effects.

Conclusion

17.9.39 The glint effects from the Energy Park can be made acceptable with the mitigation measures identified. Once adopted, they are acceptable and result in no adverse significant effects.

17.9.40 **Table 17.18** provides a summary of effects, mitigation and residual effects. This must be provided for each Technical Chapter.

Table 17.18: Summary of Effects, Mitigation and Residual Effects

Receptor/ Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation/ Enhancement Measures	Residual Effects ****
Construction								
Rail Receptors	Reflection from metal frames and construction equipment. Potential safety issue from driver dazzle	Temporary Direct	High	Not quantifiable but low visibility	Regional	Minor Adverse	Site Screening	Negligible
Road Receptors	Reflection from metal frames and construction equipment. Potential safety issue from driver dazzle	Temporary Direct	High	Not quantifiable But low visibility	District	Minor Adverse	Site Screening	Negligible
Aviation	Reflection from metal frames and construction equipment. Potential safety issue from pilot dazzle or air traffic control tower dazzle	Temporary Direct	High	None expected	National	Negligible	N/A	Negligible
Dwellings	Reflection from metal frames and construction equipment. Nuisance caused by glint reflections visible from house	Temporary Direct	Medium	Not quantifiable but low visibility	Local	Minor Adverse	Screening	Negligible
Operation								
Rail Receptors	Reflection of sunlight from panels in array. Potential safety issue from driver dazzle	Temporary Direct	High	N/A	Regional	Minor Adverse	Site Screening	Negligible
Road Receptors	Reflection of sunlight from panels in array.	Permanent	High	Yellow Glint predicted in	District	Moderate Adverse	Site Screening	Negligible

Receptor/ Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation/ Enhancement Measures	Residual Effects ****
	Potential safety issue from driver dazzle	Direct		absence of screening				
Dwellings	Reflection of sunlight from panels in array. Nuisance caused by glint reflections visible from house	Permanent Direct	Medium	Yellow Glint predicted in absence of screening	Local	Minor Adverse	Site Screening	Negligible
Aviation	Reflection of sunlight from panels in array. Potential safety issue from pilot dazzle or air traffic control tower dazzle	Permanent Direct	High	None predicted	National	Negligible	N/A	Negligible
Cumulative and In-combination	Reflection of sunlight from panels in array in conjunction with Potential issues to other receptors	Permanent Direct	Medium/High	None predicted	District	Negligible	Site Screening	Negligible
Decommissioning								
Rail receptors	Reflection from metal frames and deconstruction equipment. Potential safety issue from driver dazzle	Temporary Direct	High	Not quantifiable but low visibility	Regional	Minor Adverse	Site Screening	Negligible
Road Receptors	Reflection from metal frames and deconstruction equipment. Potential safety issue from driver dazzle	Temporary Direct	High	Not quantifiable but low visibility	District	Minor Adverse	Site Screening	Negligible

Receptor/ Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation/ Enhancement Measures	Residual Effects ****
Dwellings	Reflection from metal frames and deconstruction equipment. Nuisance caused by glint reflections visible from houses	Temporary Direct	Medium	Not quantifiable but low visibility	Local	Minor Adverse	Screening	Negligible
Aviation	Reflection from metal frames and deconstruction equipment. Potential safety issue from pilot dazzle or air traffic control tower dazzle.	Temporary Direct	High	None expected	National	Negligible	N/A	Negligible