

EN010158 Rosefield Solar Development

# CSAG Landscape Note for Deadline 3

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## 1. Introduction

- 1.1 This note sets out CSAG's position on landscape matters at Deadline 3, following ISH1. It summarises oral submissions made at ISH1, and responses to points raised in the oral submissions.
- 1.2 It also includes post-hearing submissions, and CSAG's Deadline 3 responses to / comments on material submitted at Deadlines 1 and 2.
- 1.3 Matters not raised in this note may be dealt with at Deadline 4 / later, and in the light of material submitted at Deadline 3 / later.

## 2. Summary Landscape Position at Deadline 3

- 2.1 The Applicant's Deadline 2 responses are helpful, as they have clarified several matters raised in my Deadline 1 *Landscape and Visual Report* ([**REP1-127**], Part 3 – Landscape and Visual).
- 2.2 For example, I queried whether the Applicant's *Landscape and Visual Impact Assessment* (LVIA) [**APP-053**] had factored in the adverse effects of mitigating measures such as tall hedges arising from loss of openness and view, and disruption of landscape patterns, and the Applicant confirmed that it does.

- 2.3 Notwithstanding this, however, a) the clarifications have **not changed the overall conclusions** set out in the *Landscape and Visual Report*, and b) certain points have not yet been clarified.
- 2.4 In summary, I **agree** with the LVIA's conclusion that broadly, the proposed development would result in **significant adverse effects on character and views for the duration of the operation**.
- 2.5 However, in my opinion, the LVIA has **underestimated** levels of adverse landscape and visual effects on certain receptors. The underestimations mean that the LVIA does not consider the levels of adverse effects to be 'significant', but the higher levels would breach the significance threshold.
- 2.6 The reasons for the underestimations are explained in my *Landscape and Visual Report*. They are mainly due to technical matters, and what I consider to be departures from / misinterpretation of the guidance.
- 2.7 For example, I do **not agree** that screen planting would reduce levels of adverse landscape and visual effects as much as the LVIA assumes, because a) screening does not mitigate non-visual experiential landscape and visual effects; b) many views could not be screened, for example at elevated locations; and c) it is very difficult to predict future visual effects with any certainty, but highly unlikely that all the vegetation which the LVIA relies upon to screen views would continue to screen for over 40 years.
- 2.8 I do **not agree** with the LVIA's conclusion that the development would result in **Moderate Beneficial** effects on landscape 'fabric'. The conclusion is the result of the LVIA having erroneously double-counted landscape / visual mitigation as landscape / visual enhancement – see Section 4 *Post-ISH1 Landscape Submissions* below. At best the effect would be Neutral, but the most likely reasonable worst-case scenario is high levels of adverse landscape / visual effects arising from the proposed mitigating measures, due to loss of openness / view, and disruption of field patterns.
- 2.9 Finally, as explained in my *Landscape and Visual Report*, at ISH1, and in Section 4 below, I have concerns about the Applicant's glint and glare assessment, especially in terms of the safety of users of minor roads and PRoWs.

### 3. Summary of Landscape Matters Raised at ISH1

Summaries of CSAG's landscape-related oral submissions made during ISH1, and responses to points raised in the oral submissions.

#### **Agenda Item 3: Ecology and Biodiversity**

- 3.1 During ISH1, the matter of grazing by sheep and / or cattle was discussed. This is proposed to occur within the Order Limits, including on sites containing solar arrays, both to mitigate adverse effects on bats, and to demonstrate 'continued agricultural use'.
- 3.2 In my opinion, grazing by sheep / other animals in fields containing solar arrays is neither practical nor viable on anything but a small scale, and on larger sites is rarely practised in the UK. I have produced a note (Appendix CT-1, appended to this note) explaining the reasons for my conclusions. See also Section 4 *Post-ISH1 Submissions*, and Section 7 *Comments on Responses to ExQ1* below.

#### **Agenda Item 5: Landscape and visual (including good design)**

- 3.3 During ISH1, it was agreed that the Applicant's landscape expert and I would arrange to meet to discuss matters of agreement and dispute, and report any changes to our respective current positions. It was also agreed that it would be helpful if Buckinghamshire Council's landscape

expert could attend the meeting, as some of the matters in dispute have been raised in the Council's reports and responses / comments. If necessary, technical matters that remain in dispute could be taken to the Landscape Institute's GLVIA Panel for clarification, so long as the query does not identify the project, individuals, or practices.

3.4 Also as mentioned in my *Landscape and Visual Report* and discussed at ISH1, clarification is still required from the Applicant about the difference between the proposed landscape and visual mitigation and enhancement measures. It would be helpful if the Applicant could explain where hedges and woodland are proposed as landscape / visual mitigation, and where landscape / visual enhancement. Ideally this information should be added to the indicative landscape plans.

3.5 Matters raised at ISH1 which are likely to be the subject of discussion at the landscape experts' meeting include the following:

i) **Landscape receptor sensitivity**

a) This matter is dealt with in Section 4 of my *Landscape and Visual Report*. In summary I do **not agree** with the LVIA's ascribed levels of sensitivity: in my opinion, in many cases, they have been underestimated.

b) Buckinghamshire Council's landscape expert **agrees** that the Applicant's LVIA's sensitivity levels are probably lower than they should be – see the Council's RR [RR-026] para. 78, which states, '*The sensitivity values for various character areas appear low and the Council consider that these require to be robustly checked*'.

ii) **Point scales**

a) This relates to the LVIA's use of three-point scales for reporting levels of sensitivity, and four-point scales for levels of magnitude, and overall effects. The matter is dealt with in my *Landscape and Visual Report* – see for example paras. 4.1.2 - 4.1.9; 4.2.1 – 4.2.4; and 5.2.2 – 5.2.6. I understand that Buckinghamshire Council's landscape expert also has concerns about the use of these scales.

b) During ISH1, the Applicant referred to GLVIA3, which (at para. 3.27 (2)), states that '*Word scales, with ideally three or four but a maximum of five categories, are preferred as the means of summarising judgements for each of the contributing criteria*'. I also referred to the Landscape Institute's Technical Guidance Note LITGN-2024-01 *Notes and Clarifications of Aspects of [GLVIA3]*, Issue 3(4), which states that more categories (five or six) may be useful.

c) However, as explained in my *Landscape and Visual Report* (eg para. 5.2.4) and at ISH1, there is a problem (of which the Landscape Institute is now aware) with using even-numbered point scales because Moderate is not in the middle, with implications for judgements about overall levels of effects, and 'significant' effects.

iii) **Mitigation / enhancement**

a) Clarification is sought regarding the difference between proposed mitigation and enhancement measures (see above).

b) As explained in my *Landscape and Visual Report* (see for example paras. 5.6.12 – 5.6.21), the LVIA has double-counted landscape / visual mitigation as landscape / visual enhancement.

During ISH1, I gave an example of the double-counting error, which occurs in [REP2-087] 8.13 *Applicant's Response to Written Representations, Table 7-1: Landscape and Visual (including Design) (SoCG Parties)*, ref 7.1.17, regarding my comments about the LVIA

predicting moderate beneficial effects on / arising from landscape 'fabric'. The Applicant's response states, 'Any **beneficial effects of the proposed mitigation** are considered only in the assessment of changes to landscape fabric' (emphasis added).

Also, at ref. 7.1.43, the Applicant's response states that 'the LVIA provides a clear distinction between mitigation measures required to reduce harmful effects and what can be considered as an enhancement'. However, as mentioned above, discussions during ISH1 suggest that the distinction is not clear, and the Applicant was asked to identify which hedges and woodland are enhancement, and which are mitigation.

During this discussion, the Examining Inspector asked for other examples of where double counting had occurred: see CSAG Post-ISH1 Submissions in Section 4 below.

- c) Clarification is required from the Applicant as to whether the 4.5m-high panels proposed in lower-lying areas could be effectively screened by 3 – 3.5m tall hedges (perhaps by way of long sections / visualisations) – also below.
- d) Query about the effectiveness of the proposed woodland screen planting at Year 10 of operation, and whether Year 15 or Year 25 would be more appropriate.

During ISH1 I explained it is generally accepted that by Years 10 – 12 of operation, hedges could grow up to 3 – 3.5m tall; however, 3.5m high hedges are usually proposed for solar schemes where panels would be up to 3.5m tall. On the Lime Down solar NSIP [EN010168], panels up to 4.5m high would be used, so the hedges are proposed to be up to 4.5m tall.

For the Byers Gill solar NSIP [EN010106] (consented), Year 15 was taken for hedges and woodland; for the Sunnica solar NSIP [EN010106], Year 10 was taken for hedges and Year 15 for woodland. For Cleve Hill [EN010085] and Great North Road Solar [EN010162] (consented), Year 10 was accepted for both hedges and woodland. As far as I am aware, all these schemes propose panels up to 3.5m high.

For the Norfolk Boreas Vanguard wind farm offshore substation NSIP [EN010087], the Examining Inspectors preferred 25 years for woodland, and the developer is now legally bound to replace plants for a period of 25 years after planting (for Rosefield, replacements would cease after Year 10 – this is concerning given the likelihood of plants failing over the longer term due to the increase in pests, diseases, and extreme weather events – see my *Landscape and Visual Report* paras. 7.3.31 – 7.3.45).

iv) **Non-visual / experiential effects**

As explained at various points in my *Landscape and Visual Report*, I do **not agree** that screen planting would reduce levels of adverse landscape and visual effects as much as the LVIA assumes, partly because screening cannot mitigate non-visual experiential landscape and visual effects for example sound, smell, awareness, security / safety, memories, associations and so on (see *Figure 1: What is landscape?* in Section 3.2 of my report – 'sight' only occupies a small proportion of the landscape wheel).

v) **ASI / USIs**

As explained during ISH1, CSAG had produced a plan for submission at Deadline 2 showing suggested public and private viewpoints / other locations which could be visited during the ASI on the 19<sup>th</sup> of May. Unfortunately, for various reasons, the plan was not submitted to PINS until shortly after the deadline, and I understand that PINS advised it should instead be submitted at Deadline 3, after the ASI.

CSAG will respond to the Examining Inspector's request for justification as to why additional ASIs / USIs should be carried out, and the locations, but in my opinion, not all of the public and private locations which were visited are good representations of reasonable worst-case scenario effects.

For this exercise, it would be helpful to know whether the Examining Inspectors have already been to the viewpoint on the Outer Aylesbury Ring long-distance trail where it crosses Hogshaw Hill, as suggested in my *Landscape and Visual Report*.

It was confirmed by the Examining Inspector that if additional residential properties were to be visited, they need not necessarily have been included in the RVAA (this is important because a) some properties were excluded from the RVAA due to the presence of existing screening vegetation which the LVIA assumes would remain as it is for the duration of the operation, which is unlikely; and b) some residential receptors would potentially be significantly adversely affected by non-visual experiential effects).

vi) **Visualisations / photomontages**

During ISH1, I mentioned that the LVIA did not include accurate visualisations / photomontages of views of the developed sites from PRowS which cross the solar array sites – see my *Landscape and Visual Report* paras. 7.3.11 – 7.3.14.

Whilst I can assess effects without such images, it would certainly be helpful for decision-makers and others to understand the nature and level of adverse effects that are likely to arise, especially along the narrower corridors.

However, it appears the Applicant does not agree – see comments on the Applicant's responses to ExQ1 in Section 7 below.

If the Applicant does produce the visualisations, they should include views along PRowS crossing the parts of the site where 4.5m high panels are proposed. Note that 4.5m is the height of a double-decker bus / an average bungalow. Images should also be produced to show people adjacent to / in front of the 4.5m high panels, to give an idea of scale.

vii) **Glint and glare effects**

This matter is dealt with in Section 8 of my *Landscape and Visual Report*. The Examining Inspector explained that this topic was not on the agenda for ISH1; however, it was raised again under Agenda Item 7. Transport and Access with reference to safety – see below.

## **Agenda Item 6: Cultural heritage**

- 3.6 Heritage / historic landscape character are an integral and important aspect of 'landscape'.
- 3.7 During ISH1, much emphasis was placed on existing and proposed vegetation to avoid / reduce intervisibility between the developed Scheme and heritage assets, and thus reduce levels of adverse effects on their settings.
- 3.8 I mentioned that this matter is dealt with in my *Landscape and Visual Report* (at para. 3.9), the issue being the same as that which applies to effects on character and views, ie adverse non-visual experiential effects cannot be mitigated by screening.
- 3.9 Historic England's publication *The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3* (Second Edition), page 2, 5<sup>th</sup> para. of *Part 1: Settings and Views* confirms that harm to the settings of heritage assets arise from non-visual experiential as well as visual effects.

## Agenda Item 7: Transport and Access

- 3.10 As mentioned above (Agenda Item 5 *Landscape and visual*), although the ExA stated that the issue of glint and glare effects was not on the agenda for ISH1, during discussions about highway safety, I briefly summarised my main concerns about the methods used for / assumptions made in the Applicant's *Glint and Glare Assessment*.
- 3.11 Since my report was submitted, additional information about the informal glint and glare assessment method used by the Applicant has come to light.
- 3.12 The ExA could not confirm whether glint and glare effects would be considered at future hearings, and glint / glare was not mentioned in ExQ1; therefore, I have produced a short note summarising a) my concerns; b) the new information; and c) the implications – see Section 4 *Post-ISH1 Submissions* below.

## 4. Post-ISH1 Landscape Submissions

### Soil fertility

- 4.1 During ISH1, the matter of soil fertility was discussed. I briefly mentioned this in my *Landscape and Visual Report*, for example at para. 5.6.17, but a longer summary is provided below. As noted above and in my report, soils are an important aspect of landscape: changes to the nature of soils can affect landscape character and visual amenity.
- 4.2 At para. 10.10.292, 4<sup>th</sup> bullet point, the Applicant's LVIA states that '*there would be wildflower rich grassland beneath the Solar PV modules*', and the LVIA was carried out on this assumption.
- 4.3 The problem with this proposal is that the existing arable soils are highly fertile, and pasture / meadow swards only establish on low-fertility soil. Also, pasture / meadow is an open habitat – the wild flower species associated with these habitats do not grow well in shade.
- 4.4 A 2016 study carried out at an operational solar site<sup>1</sup> found that '*panels reduce temperatures beneath them in summer by up to 5.2°C, and the ground under them is also dryer. It also found that **both species diversity and biomass were lower under panels**, attributed to differences in micro-climate and vegetation management. Under the panels there were **significantly fewer species, dominated by grasses**, with only one broadleaved flowering plant present, being yarrow (*Achillea millefolium*), which is both shade-and drought-tolerant*' (emphasis added).
- 4.5 During ISH1, the Applicant explained that factors such as the above had been taken into account. Processes such as topsoil stripping and soil inversion had been ruled out (both procedures are problematic for a number of reasons), so within the array areas, contrary to the LVIA's assumption, a seed mixture comprising just 8 species per m<sup>2</sup> would be applied (presumably all grasses not wild flowers), as opposed to 25 – 30 species per m<sup>2</sup> typically found in species-rich meadow seed mixtures.
- 4.6 However, it is not clear whether a species-rich seed mixture would be applied in the proposed buffer areas, corridors and field margins, and if so, how the Applicant proposes to establish the swards on the existing arable soils. **Clarification** of this point would be helpful.
- 4.7 Nor is it clear what procedures the Applicant proposes to restore soil fertility post-operation.
- 4.8 Firstly, in the UK, the long-term effects of solar (and / or BESS) developments on soils (and other receptors) are unknown, or at least, just becoming evident, due to this being a relatively new

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<sup>1</sup> A. Armstrong, N. J. Ostle, and J. Whitaker (2016) *Solar park microclimate and vegetation management effects on grassland carbon cycling*. Environ. Res. Lett. 11 074016

- industry<sup>2</sup>. Many of the adverse effects which have been recorded were not predicted in the applicants' assessments.
- 4.9 In one of its responses to the Mallard Pass solar NSIP Examination [EN010127], Natural England said that regarding solar development generally, *'there could be a disbenefit to the soil resource due to **unknowns** as a result of the solar development infrastructure. It is currently **unclear** as to what impact the solar panels may have on the soil properties such as carbon storage, structure and biodiversity. For example, as a result of changes in shading; temperature changes; preferential flow pathways; micro-climate; and vegetation growth caused by the panels. Therefore, it is **unknown** what the overall impact of a temporary solar development will have on soil health'* (emphasis added).
- 4.10 To this must be added pollutants such as petroleum hydrocarbons, Nitrite as N and Nitrite as NO<sub>2</sub>, which, according to the Gwent Wildlife Trust, were recorded during post-construction monitoring at the Llanwern solar site on the Gwent Levels SSSI (*the Trust also found that 'The diversity of bat species decreased markedly, and for the majority of locations, abundance of species has dropped dramatically (95- 100%)'*).
- 4.11 Indeed, the uncertainty is acknowledged at para. 12.11.2 of the Applicant's report on soils (ES Volume 2 Chapter 12: Soil [APP-055]), which states that *'There is potential that soil health could be enhanced over the 40 year period of operation of the Proposed Development (facilitated through the implementation of a detailed Soil Management Plan), due to the proposed planting of grassland and wildflowers, which would reduce the impact of soil erosion. However, there are very few studies on the long term impact of soil quality as a result of solar farms'*.
- 4.12 Also, see the report produced by ADAS for the Welsh Government (March 2023) called *The impact of solar photovoltaic (PV) sites on agricultural soils and land quality*<sup>3</sup>, which concludes that during construction, pollution incidents can result in longer-term detriment to soils, and the works *'can negatively impact the flexibility of agricultural land, potentially lowering quality and ALC grade'*.
- 4.13 Importantly, applicants often state that 'resting' arable soils for decades is beneficial for soil health and quality. This may be true from an **ecological** perspective, but not from an **agricultural** one, where the intention is to revert to arable use, as is the case here.
- 4.14 In fact, it is the **complete cessation** of arable use that is beneficial for soil health and quality in terms of **ecology**, because biodiversity increases as fertility reduces.
- 4.15 However, from an agricultural perspective, long periods of resting are **not** beneficial for soil health and quality, because of the **significant reduction in fertility**.
- 4.16 The concept of soil recovery, or 'resting', has been practiced for millennia: in summary, it involves cessation of intensive / depletory agricultural activities for a period of time, and either allowing plants to establish naturally, or sowing / planting a cover crop such as a grass ley or legumes, which helps the soil replenish its depleted resources.
- 4.17 Importantly, **the benefits of resting are only temporary**, and do not increase exponentially: studies show that the optimum resting period is around three years<sup>4</sup>. 'Resting' specifically relates to cultivated land which would be re-cultivated following the 'resting' period (as would be the

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<sup>2</sup> The first 'large-scale' solar development to be granted planning permission was the Wheal Jane site in Cornwall, which became operational in 2011: the application was for a generating capacity of 1.55MW on a c. 4ha brownfield site (an old tin mine). In July 2025, Cleve Hill Solar Park became the first solar NSIP in the UK to start operating. As far as I am aware, this is the only operational solar NSIP in the UK. The only other solar NSIPs where construction is, or soon will be, underway, are Longfield Solar Farm ([EN010118], in 'light preparation' phase), and Little Crow Solar Park ([EN010101]), works were due to start in spring 2026).

<sup>3</sup> <https://www.gov.wales/impact-solar-photovoltaic-sites-agricultural-soils-and-land-quality-summary>

<sup>4</sup> See for example Merfield, C. N. (2019). Rotations and their impact on soil health. Report number 03-2019. The BHU Future Farming Centre, Lincoln, New Zealand. 22.

- case here), as opposed to 'restoring' land to its pre-cultivated state (also 'rewilding'). In principle, the **long-term** ecological benefits of 'restoration' are greater than those of 'resting'.
- 4.18 Furthermore, it has been demonstrated that the most effective method of improving and maintaining good soil health (physical, chemical, and biological) for **food production** is through regular and diverse crop rotation **interspersed** with resting, as opposed to semi-permanent leys and / or grazing<sup>5</sup>.
- 4.19 It is **very difficult to restore soil fertility**, and can take decades (as confirmed by various Natural England Technical Information Notes on the subject<sup>6</sup>).
- 4.20 Also, the long-term ecological benefits of 'resting' soils are based on the establishment of species-rich meadow / pasture which is grazed and / or cut for hay. However, as mentioned previously, a) here, the Applicant is not proposing species-rich swards within the array areas, and b) grazing animals within solar arrays is rarely practiced because of the problems which include it being impractical / unviable (see Appendix CT-1).
- 4.21 In addition, if any ecological benefits arising from 'resting' and the successful establishment of hay meadow / pasture had accrued over time, they would be lost if / when the land was returned to productive arable use (currently, proposals to change pasture / meadow to arable use may have to be screened under the EIA (Agriculture) Regulations).

### **Double counting mitigation and enhancement**

- 4.22 As mentioned above (Section 3 *Summary of Landscape Matters Raised at ISH1* para. 3.4 iii) b)), during ISH1, the Examining Inspector asked if I could provide examples, other than that given at the time, of where double counting had occurred in the Applicant's submissions.
- 4.23 In the Applicant's LVIA, the double-counting error occurs where it is assumed that after 10 years of operation, the landscape 'fabric' (in this case, proposed hedges and those to be gapped up, woodland, and species-rich pasture / meadow) would have established and matured sufficiently to result in a **Moderate Beneficial** effect.
- 4.24 Firstly, as explained in my *Landscape and Visual Report* at para. 5.6.5, 'Moderate' is below the LVIA's threshold for significance, but professional judgement was applied and in this case, the threshold was lowered (see also previous comments about the Moderate level not being in the middle of the four-point scale).
- 4.25 Secondly, as explained in paras. 5.6 12 – 5.6.17 of my Report, with reference to GLVIA3 para. 3.39 and LITGN-2024-01, the LVIA confirms (see for example Section 10.7 and Table 10.9: *Embedded mitigation relevant to landscape and visual*) that the proposed landscape 'fabric' is required for landscape / visual **mitigation** purposes, to screen views. Therefore, it is **not** enhancement/ benefit (but note above request for clarification from the Applicant about which measures are mitigation and which enhancement).
- 4.26 In theory, at Year 10, the effect of the proposed 'fabric' would be at best **Neutral**. However, as the LVIA confirms, in many cases, the proposed mitigating measures would in themselves result in high levels of adverse effects, due to the loss of characteristic openness and / or views, and the disruption of field patterns.
- 4.27 See also ExQ1.15.5 regarding the '*DAD Project Principle: 6.2 in the DAD [REP1-018]* [which] refers to "**enhancing** field boundaries and retaining key views" towards the Quainton - Wing Hills Area of

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<sup>5</sup> See for example <https://gtr.ukri.org/projects?ref=BB%2FR021716%2F1>. Also <https://www.soilassociation.org/media/4672/7-ways-to-save-our-soils-2016.pdf>

<sup>6</sup> See for example Natural England Technical Information Notes TIN067 and TIN068

*Attractive Landscape (AAL). How and where has the applicant sought to **enhance** field boundaries in line with this principle?* (emphasis added).

- 4.28 The Applicant's response is that the OLEMP '... indicates an 'area of potential to provide ecological enhancement/ **screening** through provision of tree belts or woodland blocks', and 'lengths of hedgerow which require infilling of gaps or increasing in density to provide a reasonable degree of **screening to mitigate the visual effects** of the Proposed Development' (emphasis added, and note that ecological mitigation / enhancement measures can be counted as landscape / visual benefits, so long as they are not also required for landscape / visual mitigation).
- 4.29 This appears to indicate that the above proposals are mitigation, not enhancement as stated in the DAD.

### **Glint and glare**

- 4.30 As explained in Section 3 *Summary of Landscape Matters Raised at ISH1*, paras. 3.8 – 3.10, I have concerns about glint and glare effects, as set out in my *Landscape and Visual Report*, and raised during ISH1.
- 4.31 Glint / glare was not mentioned in ExQ1, and the ExA stated that glint and glare was not on the agenda for ISH1; nor could it be confirmed whether the topic would be considered at future hearings.
- 4.32 Since my report was submitted, additional information about the informal glint and glare assessment (GGA) method used by the Applicant has come to light.
- 4.33 This note summarises a) my concerns about the Applicant's GGA; b) the new information; and c) the implications.
- 4.34 The Applicant's GGA is [APP-082] ES Volume 4 Appendix 5.4: *Glint and Glare Assessment*.
- 4.35 The adverse effects which I consider likely to arise from glint and glare are set out in my *Landscape and Visual Report*, [REP1-127] Part 3 – Landscape and Visual, Section 8. The effects may be relevant to several topics, including landscape character; visual, recreational and residential amenity; highway safety; health and wellbeing; ecology; heritage; and socioeconomics.
- 4.36 NPS EN-3 para. 2.10.27 (of the previous version – in the current version, the para. is 2.10.19, but unchanged) explains that '*Utility-scale solar farms are large sites that may have a significant zone of visual influence. The two main impact issues that determine distances to sensitive receptors are therefore likely to be visual amenity and glint and glare...*'.
- 4.37 According to EN-3 para. 2.10.158 (currently 2.10.150, unchanged) GGAs should '*assess the potential impact of glint and glare on nearby homes, motorists, public rights of way, and aviation infrastructure*'. For PRoW users, the NPS is not clear whether glint and glare effects should be assessed in terms of safety or amenity or both, but in my opinion, it must be assumed to be both (the word 'impairment' is used in para. 2.10.158 (currently 2.10.96, unchanged)).
- 4.38 The NPS does not mention ecological receptors, heritage assets, or the local economy (the latter potentially affected if, for example, people are deterred from using local equestrian facilities which use minor roads and bridleways due to glint and glare effects). During the Green Hill solar Examination [EN010170], the Examining Authority specifically asked the applicant to assess effects on ecological and heritage receptors; people using lanes and PRoWs; agricultural workers; and equine establishments / businesses.
- 4.39 In their Relevant Representation for Rosefield [RR-020], the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT) mentions adverse ecological glint and glare effects.

- 4.40 My main concern is effects on people using local roads and PRoWs, mainly in terms of safety, but also on amenity.
- 4.41 Note that the Applicant's LVIA does not appear to consider the effects of glint and glare on character or visual / other amenity at all – at least, glint and glare is not mentioned.
- 4.42 There is no published guidance for GGA, so a company called Pager Power, which produces GGAs for the majority of solar applications including NSIPs, wrote their own (*Solar Photovoltaic and Building Development – Glint and Glare Guidance*, currently 4<sup>th</sup> Edition, September 2022). It is not clear whether Pager Power carried out the Applicant's GGA but I assume not, as Pager Power usually states authorship; however, the Applicant's consultants have followed Pager Power's informal guidance and methods.
- 4.43 As I explained at ISH1, regarding effects on people using local roads and PRoWs, according to the informal guidance, the logic is as follows:
- i) People travelling along local roads and PRoWs are categorised as **Low** sensitivity receptors, because it is assumed that low numbers of people use these routes (in my experience, no evidence nor analysis for this assumption is provided in GGAs).
  - ii) Because low numbers of people use these routes, GGAs always (in my experience) conclude that if glint and glare did cause an accident along a local road / PRoW, the number of casualties / fatalities would be **Low**. Therefore, the level of overall effect will always be **Low**.
  - iii) As the level of effect is Low and not significant, there is no need for a detailed assessment of effects.
- 4.44 In my opinion, just one fatality that could have been avoided is unacceptable.
- 4.45 For several years, I and others have questioned the above and other aspects of Pager Power's informal method, but without definitive resolution (although I have suggested to Pager Power that they may wish to collaborate with the Landscape Institute with a view to aligning their guidance with GLVIA3, and we are due to have a preliminary informal meeting soon). Also, I can only draw conclusions about landscape-related matters such as amenity, as I am not an expert in the technical aspects of glint and glare assessment.
- 4.46 However, recently, my concerns have been confirmed, as a result of conversations with an independent glint and glare expert who was appointed by a group of residents opposing the Lime Down solar NSIP [EN010168], with which I am involved. The expert's report is available for reference if required: see Stop Lime Down (SLD)'s [REP1-167] Section 6, and Appendix G [REP1-178].
- 4.47 The Lime Down applicant's GGA uses the same method as that used by the Rosefield Applicant (the Lime Down GGA was carried out by the company which produced the informal guidance).
- 4.48 SLD's glint and glare expert has concluded that the Lime Down GGA raises '**significant methodological and presentational concerns**', stating that the report is '*opinion-based rather than evidence-based*', and its conclusions '**cannot be independently verified from the information provided**'. Also, '*the absence of published quantitative thresholds against which individual glare durations are judged represents a **fundamental evidential deficit** in the submitted Environmental Statement*' (emphasis added throughout).
- 4.49 The absence of quantitative thresholds is directly relevant to the matter above, ie the GGA having categorised people using minor roads and PRoWs as **Low** sensitivity receptors due to the (erroneously assumed in this case) **Low** numbers of people the GGA (and informal method) assumes would use such routes. Therefore, according to this approach, glint / glare incidents would 'only' result in **Low numbers of fatalities / casualties**.

- 4.50 Under the heading *The Annex D Framework — Absence of Quantitative Thresholds*, Section 6.3 of SLD's glint and glare expert's paper **confirms** my analysis of Pager power's method in this regard.
- 4.51 It states, '*The critical deficiency of the Annex D framework as applied in this report is that it does not provide any quantitative thresholds that define the boundary between impact significance categories... The determination of impact significance is therefore a matter of professional judgement exercised by Pager Power, without providing the evidential basis for that judgement to the decision-maker... The consequence of this approach is that **the report cannot be independently verified***' (emphasis added).
- 4.52 In summary, the Rosefield Applicant's GGA is based on methods which, according to an industry expert, appear to be highly flawed.
- 4.53 In the light of the available evidence, my assessment and review concluded that many ground-based receptors using minor roads and PRoWs, and on private land, could potentially be **significantly adversely affected** by glint and glare in different ways, in terms of safety, amenity. There could also be adverse implications for the local economy, in that glint and glare is likely to contribute to the reasons why people may no longer enjoy visiting the area.
- 4.54 However, as with landscape and visual effects, the visual effects of glint and glare tend to reduce gradually with distance, so the highest levels of adverse effects (potentially significant) would be experienced by receptors within / in proximity to the Order Limits where the solar arrays are located, especially along the PRoWs which cross the sites where solar arrays are proposed.

## 5. Landscape Comments on Applicant Response to LIR

- 5.1 Broadly, I **agree** with the findings and conclusions set out in Buckinghamshire Council's *Local Impact Report* (LIR) [REP1-112] Section 4.4 *Landscape and Visual Impact*, subject to a few points of clarification which could be discussed during the suggested landscape experts' meeting (see para. 3.3 of Section 3 *Summary of Landscape Matters Raised at ISH1* above).
- 5.2 In particular, I agree with the conclusions at LIR para. 4.4.3, that '*Within an area recognised and protected for its rural character, the introduction of large-scale solar infrastructure would create a significant industrialising effect*'.
- 5.3 At this stage, I only have one comment on the *Applicant's Response to Buckinghamshire Council's Local Impact Report* [REP2-085], which relates to the above paragraph.
- 5.4 On page 74 of the Applicant's LIR Response report, Ref. 8.6, LIR para. 4.4.2, which relates to Buckinghamshire Council's '*Comment noting concern with the industrialising effect of the Proposed Development*', the Applicant's response states: '*The Applicant recognises the concerns regarding landscape change but **does not consider the terms 'industrialisation' and 'industrialised' applicable to the Proposed Development.***'
- 5.5 The same response was given in the Applicant's *Response to Relevant Representations* [PDA-006], on page 46 of the PDF under the Theme heading *General Comment*, addressing Buckinghamshire Council's RR [RR-26] which states that '*the Proposed Development would have an industrialising effect on a rural landscape*'.
- 5.6 As explained in my *Landscape and Visual Report* paras. 5.2.13 – 5.2.15, I am very surprised by and do **not agree** with this response.
- 5.7 Firstly, although the Applicant's LVIA does not use the term 'industrial', it does recognise that the landscape change would result in significant adverse effects, presumably mainly due to the stark contrast between the existing rural agricultural landuse, and the proposed large-scale power-generating / -storing use with associated infrastructure / elements. In my opinion, the latter can

only be defined as 'industrialisation' – it certainly does not describe the generally-accepted definition of a 'farm'.

- 5.8 Secondly, according to the EIA Regulations, solar projects of this nature are 'Industrial installations for the production of electricity, steam and hot water'.

## 6. Landscape Comments on Applicant Responses to WRs

- 6.1 In this document [REP2-086], the Applicant has responded to CSAG's WR, including my *Landscape and Visual Report*. Most of the landscape-related responses are in *Table 7-1: Landscape and Visual (including Design) (SoCG Parties)*.
- 6.2 As explained in Section 2 above, the Applicant's responses are helpful, as they have clarified several matters raised in my Report. However, a) the clarifications have not changed the overall conclusions set out in the Report, and b) certain points have not yet been clarified.
- 6.3 As explained in Section 3, during ISH1, it was agreed that the Applicant's landscape expert and I would arrange to meet to discuss matters of agreement and dispute – many of which are included in the *Applicant's Response to Written Representations* – and report any changes to our respective current positions. It was also agreed that it would be helpful if Buckinghamshire Council's landscape expert could attend the meeting, as some of the matters in dispute have been raised in the Council's reports and responses / comments.

## 7. Landscape Comments on Applicant Responses to ExQ1

- 7.1 In this document [REP2-087], the Applicant has responded to the ExA's first set of questions (ExQ1 [PD-010]). Some of the landscape-related matters raised in the Applicant's responses (mostly in Table 3-15: *Landscape and Visual*) are dealt with in the above sections.
- 7.2 **ExQ1.4.2** and **ExQ1.7.16** relate to grazing.
- 7.3 As mentioned in Section 3 *Summary of Landscape Matters Raised at ISH1* above, grazing was discussed at ISH1, with reference to the Applicant's proposals to mitigate adverse effects on bats and / or enable 'continued agricultural use'.
- 7.4 The Applicant's response to ExQ1.4.2 is that *'the management of grassland within the Order Limits will be undertaken by a combination of sheep (under panels) and cattle grazing (areas with no panels)'* (emphasis added). The Applicant's response to **ExQ1.7.16** is that *'whilst **some weight should be attached to the securing of grazing**, the Applicant considers **mitigation would still be effective in the absence of grazing** in case circumstances beyond the Applicant's control mean that grazing is not possible and a cutting regime is used instead'*.
- 7.5 It appears, therefore, that grazing by sheep or other animals is neither guaranteed nor necessary, so in my opinion, the effects of the Scheme should be assessed without grazing being practised.
- 7.6 However, should the Applicant / others decide that the grazing option is preferred / required, then clearly, if the Scheme was consented, there would need to be a robust and enforceable mechanism in place to ensure that the land would be used, maintained and managed as proposed, because if managed differently, the benefits (including ecological) are likely to be less than assumed.
- 7.7 Also, it is very important to understand why it may not be a viable or practical option. In my experience, applicants often have agreements with people who say they would be happy to keep

- the animals and manage the land, but they do not realise the problems associated with keeping and managing animals within solar arrays at scale.
- 7.8 These matters are dealt with in the appendix to this note, Appendix CT-1.
- 7.9 **ExQ1.15.3** asks the Applicant '*In the context of NPS EN-1 paragraph 5.10.27 [to] 'provide further details to explain the choice of colours referenced in the Design Approach Document (DAD) [REP1-018] and Design Commitments [REP1-020] in relation to the setting and landscape'.*
- 7.10 The Applicant's response is that there is no '*need to reference any specific guidance, such as colour studies or studies of local buildings, to confirm colour choices at the detailed design stage... due to the relatively simple built forms'.*
- 7.11 However, in my opinion, the ExA is right to ask for *details to explain the choice of colours*, and I do **not agree** with the Applicant's justification for there being no 'need'.
- 7.12 Firstly, the built forms may be *relatively simple*, but they are industrial in nature and scale, and entirely at odds with the prevailing rural / tranquil / historic landscape character.
- 7.13 Secondly, given the large size and scale of the Scheme, and its relatively high degree of visibility, the adverse effects resulting from inappropriate forms, colours and materials within the rural landscape would extend very widely.
- 7.14 Thirdly, colour contrast, for example white against a dark background, can result in far higher levels of adverse visual effects than when colour and tone are visually well-integrated.
- 7.15 I note that for the structures / units, the Applicant proposes a choice of white, grey, or green depending on the contextual backdrop colour. However:
- i) From different locations, the same built form / structures may be seen variously against sky, woodland, grass, crops, soil, water, solar panels, other built form / structures, and so on.
  - ii) The majority of solar and BESS structures / units are delivered as industry standard, and are usually either white, or the manufacturer's interpretation of green (which is surprisingly difficult to integrate successfully into a landscape backdrop). Substation design is the responsibility of the network operator, and in my experience it is not possible to deviate from the norm (which is relatively 'neutral', comprising metallic frameworks, galvanized steel security fencing / support structures, and battleship grey transformers / circuit breakers).
  - iii) Tonality is just as important as hue: for example, tones of 'grey' vary from almost black to almost white. If in doubt, accept silhouetting, and opt for black, or very dark grey or brown.
- 7.16 In my opinion, the Applicant should demonstrate how the adverse landscape and visual effects of colour would be mitigated. Environmental Colour Assessment (ECA) is the best form of assessment to ensure the most appropriate choices of colours and materials<sup>7</sup>, and perhaps the Applicant would consider this.
- 7.17 This may already have been noted, but in **[REP2-087]** Table 3-15: *Landscape and Visual*, from ExQ1.15.3 onwards, the Applicant's numbering has gone awry. The row for ExQ1.15.4, which is to Buckinghamshire Council and relates to *NPS EN-1 paragraph 5.10.30*, is not included, and the row for ExQ1.15.5, which is to the Applicant and relates to *Rosefield Substation*, is numbered ExQ1.15.4, so from that point, all the ExQ1 landscape questions are one step behind the original ExQ1 document.
- 7.18 Below I have used the numbering in **[REP2-087]**.

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<sup>7</sup> See the Landscape Institute's Technical Information Note (TIN) 04/2018 <https://www.landscapeinstitute.org/technical-resource/environmental-colour-assessment/>. An example of a condition requiring ECA can be provided if required.

- 7.19 **ExQ1.15.5** relates to Project Principle 6.2 in the DAD and '*enhancing field boundaries*' – see double counting in Section 4 *Post-ISH1 Landscape Submissions* above.
- 7.20 The Applicant's response to **ExQ1.15.6** explains that the adverse effects arising from the proposed screen planting have been factored in to the LVIA.
- 7.21 **ExQ1.15.7** asks the Applicant to '*... explain how the current selection [of photomontages] adequately considers viewpoints along public rights of way (PRoW) and those in the vicinity of the Rosefield substation and BESS*'.
- 7.22 As explained at para. 3.4 vi) in Section 3 *Summary of Landscape Matters Raised at ISH1* above, the LVIA did not include accurate visualisations / photomontages of views of the developed sites from PRoWs which cross the solar array sites.
- 7.23 The Applicant's response to ExQ1.15.7 is that '*the visualisations and photomontage provide a sufficiently robust sample of views*'.
- 7.24 In my opinion, accurate visualisations / photomontages of views of the developed sites from PRoWs which cross the solar array sites would be helpful for decision-makers and others to understand the nature and level of adverse effects that are likely to arise, especially along the narrower corridors.
- 7.25 **ExQ1.15.8 (2)** asks the Applicant to further justify the assumption that by Year 10 of operation, the proposed screen planting would have established and become fully effective. This matter is dealt with at para. 3.4 iii) d) in Section 3 *Summary of Landscape Matters Raised at ISH1* above.
- 7.26 **ExQ1.15.9** asks the Applicant, Buckinghamshire Council, and CSAG whether '*... the provision of additional hedgerow and/ or tree planting in the vicinity of the BESS serve to reduce landscape and visual effects, having regard to the topography? If not, why not?*'.
- 7.27 The Applicant's response is that '*any detailed design is most appropriately dealt with at discharge of requirements stage, as it would depend on the detailed BESS design*'.
- 7.28 CSAG's response to this question is in **[REP2-102]**: in summary, screen planting could potentially reduce levels of adverse effects on visual aspects of character and on certain views, but cannot reduce levels of adverse effects on the non-visual experiential aspects of character.
- 7.29 **ExQ1.15.12** is to the Applicant, Buckinghamshire Council, and CSAG, and relates to '*LVIA Visualisations Summer*'. CSAG's response to this question is in **[REP2-102]**. The Applicant's response is that '*The assessment... takes into account the worst-case winter scenario at both Year 1 and Year 10. The inclusion of the summer visualisations, as requested by Buckinghamshire Council, is not required to update any of the LVIA conclusions as there would no change to the significance of effects as outlined in the ES*'.
- 7.30 That may be the case, but as noted at para. 7.7.30 of my *Landscape and Visual Report*, the LVIA photomontages show Year 10 effects in what appears to be late spring, when trees and hedges have leafed-up, so the degree of visual screening is higher than during the winter months: here, deciduous vegetation is often leafless for almost half the year. In my opinion, the reasonable worst-case scenario of winter Year 10 should be adopted for the photomontages (or ideally, Year 15 for hedges, and Year 25 for woodland – see above).
- 7.31 **ExQ1.15.13** is to the Applicant, and relates to Buckinghamshire Council and CSAG's opinions that the LVIA has underestimated levels of adverse landscape and visual effects.
- 7.32 There are several points in the Applicant's response to this question with which I do not agree. For example, the Applicant states that '*moderate effects lie somewhere in the middle of the range of effects identified*'; however, as explained at para. 3.4 ii) c) of Section 3 *Summary of Landscape Matters Raised at ISH1* above, the LVIA uses even-numbered point scales so Moderate is not in

the middle, which has implications for judgements about overall levels of effects, and 'significant' effects.

- 7.33 **ExQ1.15.14** is to the Applicant, and relates to the Applicant's RVAA. I note the Applicant's response, but do not agree with the Applicant's RVAA's conclusions, as explained in Section 7.5 of my Landscape and Visual Report (see also comments on the RVAA elsewhere in CSAG's WR).
- 7.34 As mentioned previously, it is hoped that the technical matters involved in the above questions, the Applicant's responses, and elsewhere, will be discussed at a meeting between the landscape experts (ideally, including Buckinghamshire Council's expert).

# APPENDIX CT-1

## Grazing

# Grazing

- A1.1 During ISH1, the matter of grazing by sheep and / or cattle was discussed. This is proposed to occur within the Order Limits, including in the areas containing solar arrays, both to mitigate adverse effects on bats, and to demonstrate 'continued agricultural use'.
- A1.2 **ExQ1.4.2** relates to continued agricultural use and grazing. The Applicant's response states that *'the management of grassland within the Order Limits **will** be undertaken by a combination of sheep (under panels) and cattle grazing (areas with no panels)'* (emphasis added). The Applicant's response to **ExQ1.7.16** is that *'whilst **some weight should be attached to the securing of grazing**, the Applicant considers **mitigation would still be effective in the absence of grazing** in case circumstances beyond the Applicant's control mean that grazing is not possible and a cutting regime is used instead'*.
- A1.3 It appears, therefore, that grazing by sheep or other animals is neither guaranteed nor necessary, so in my opinion, the effects of the Scheme should be assessed without grazing being practised.
- A1.4 However, should the Applicant / others decide that the grazing option is preferred / required, then clearly, if the Scheme was consented, there would need to be a robust and enforceable mechanism in place to ensure that the land would be used, maintained and managed as proposed, because if managed differently, the benefits (including ecological and agricultural) are likely to be less than assumed.
- A1.5 Also, it is very important to understand why grazing may not be a viable or practical option. In my experience, applicants may have agreements with people who say they would be happy to keep the animals and manage the land, but they do not realise the problems associated with keeping and managing animals within solar arrays at scale. Some make a start then give up, with the sward being managed by mowing and evident use of herbicides.
- A1.6 I have undertaken a great deal of research on the subject of grazing sheep and other animals on solar sites.
- A1.7 Normally, applicants propose grazing sheep, although some mention keeping poultry. I have not found any examples of poultry-keeping on commercial solar sites (but see below), and it is likely to be impractical, for example:
- i) Where deer-proof fencing is proposed around the array areas, as is the case here, it is necessary to create gaps in the fence at ground-level (or install small, purpose made gates) to allow the continued passage of medium-sized mammals such as badger and hare across the site. Evidently, this would also allow poultry predators such as fox and mink to enter the compounds. Birds could be locked up at night, but finding them, rounding them up, and getting them all into the coops would be very time-consuming.
  - ii) Large numbers of free-ranging poultry can cause significant adverse effects, primarily due to the large volume of nutrient-rich manure produced (chicken manure is high in phosphates and nitrates), as well as the detrimental impact of the birds using the land.
  - iii) It is known that poultry (and other birds) perch on top of solar panels and excrete, requiring the panels to be cleaned more frequently than usual.
- A1.8 It is possible that goats could be kept, although they would require daily visits for health and safety checks, feeding, milking and so on, although they could cause damage to arrays / modules / panels / cables / fences and other scheme elements. I was advised that at one solar site, *"a large array had to be completely recabled after sheep were given access and chewed through the wires"*.

- A1.9 Here, for specific ecological mitigation reasons<sup>8</sup>, the Applicant is proposing / considering grazing cattle, but currently, not within the solar array areas (the evidence suggests that grazing cattle within solar array areas in the UK is technically feasible but highly challenging, and requires a completely different approach to scheme design and management).
- A1.10 Regarding sheep, most solar applicants' / promoters' publicity material shows photographs of sheep grazing on solar sites. Interestingly, the vast majority are stock images which are available online, and many are from the same sites, some of which are overseas (and feature goats). In fact, there appear to be **very few solar developments in the UK where currently, sheep are being grazed**. Reasons and evidence for why this may be the case are explained / provided below, but in summary, to date, the evidence indicates that in reality, grazing sheep within solar developments is neither feasible, practical nor viable, and is even **unwise**.
- A1.11 In one appeal [**APP/Y1138/W/22/3293104**], the Secretary of State's decision letter said, '*there is nothing to demonstrate that sheep grazing would be unlikely to occur, and this approach formed part of the proposal in line with national guidance*' (in that the co-location of agriculture (via sheep grazing) and renewable energy generation meant the land was not being permanently or totally lost to food production), However, so far, my research indicates that this is an **unfounded assumption**.
- A1.12 In a Westminster Hall debate held in June 2022, James Gray MP said, "*No shepherd worth his salt would graze his sheep on a solar farm. The grass is low quality. I do not think there is one single solar farm in the west of England currently being grazed, and the notion that they could be is nonsensical*".
- A1.13 Given the Applicant's claim that agricultural use could continue alongside energy generation, **it would be very helpful if the Applicant could produce a note for the ExA listing examples and providing details of operational solar sites in the UK where currently, sheep / other animals are regularly grazed**.
- A1.14 Last year, during the Byers Gill solar NSIP [**EN010139**], the ExA asked the applicant to provide examples '*of Solar Farms [the Applicant] is aware of where sheep or other animals graze*'.
- A1.15 This was subsequently provided. However, a) one site was not yet operational; and b) having looked closely on Google Earth, sheep could only be seen in one field of one of the solar array sites on the list (Newlands Farm in Devon). Importantly, **it was evident that the flock had access to an adjacent open field of pasture** (as can be seen on Google Earth, at EX13 5RX).
- A1.16 Of course the images may have been taken at times when sheep had been taken indoors.
- A1.17 According to the list, two of the sites were being used for keeping poultry: no hens or geese were visible on Google Earth, but they might not be so easy to spot.
- A1.18 The only other solar site I have identified to date where it appears certain that sheep are currently being grazed is Westmill Solar in Oxfordshire<sup>9</sup>. However, this is a co-operatively run, community-owned scheme and the site is very small (c. 12ha), with a generating capacity of c. 5MW. Most importantly, the website explains that the scheme was specifically designed with sheep-grazing in mind. Measuring off Google Earth, there is a c. **10m** gap between the panel rows, allowing open spaces for the sheep to roam in and crucially, shepherds to observe the flock (see below), whereas for large-scale solar developments, the separation distance between rows may be as little as **2.5m**.

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<sup>8</sup> As I understand it, the reason for the proposal to graze cattle is because during consultation with the Applicant, '*Natural England raised a query regarding the potential significant loss of cattle grazing across the Site to accommodate the Solar PV development which could result in the reduction of insect biomass leading to a significant reduction of bat foraging resources*', so the Applicant wanted to ensure at least some continuation of cattle grazing within the Order Limits [APP-050] Table 7.1: Summary of stakeholder engagement, page 14.

<sup>9</sup> <https://westmillenergy.coop/>

A1.19 I am aware of two other commercial solar sites in England where a few years ago, sheep were being grazed, but do not know if that is still the case. Both are relatively small (a c. 12ha site east of the M5 near Burnham-on-Sea, and a c. 6ha site near Worcester.

A1.20 Defra's Land Use statistics for England for 2024 appear to suggest that 50% of solar sites are grazed by sheep. However, I have seen emails on the subject (extracts below but I can make them available if required) in which Defra state that **the estimates exclude large-scale solar farms**.

*'It's important to note that our estimates exclude large-scale solar farms, those covering several hectares and designed primarily for energy generation.'*

*'Our survey covers only commercial agricultural holdings, i.e. those registered with the Rural Payments Agency for payment or livestock purposes, and which demonstrate significant farming activity as defined in her email below.'*

*'Our data should not be directly compared with figures from the Department for Energy Security and Net Zero, as their statistics include land used for solar farms/parks, which fall outside the scope of our survey.'*

A1.21 Regarding sheep-grazing on solar sites in practice, shepherds have told me (and explained at appeal hearings / inquiries) that not only is it extremely difficult, but also cruel to keep sheep in solar array areas. That is mainly because sheep need to be kept in open fields where shepherds can easily observe and monitor the flock. Daily inspections are critical for good animal husbandry, so that animals which are injured / lame / ill can be isolated / treated quickly.

A1.22 Sheep are particularly prone to getting cast and dying if not righted within hours – according to one shepherd, they *"wake up each morning trying to find a way to die"*. However, within the confines of solar array areas, all but near-distance views are completely blocked – see photo below – so it is very difficult for shepherds and sheepdogs to find their way around, and the use of quad bikes is apparently *"virtually impossible"*.

*Eye-level view within solar array in UK (sourced online, photographer / location unknown)*



A1.23 Shepherds also know that underneath solar arrays, due to shading from the panels, a healthy grass sward does not develop; thus, the grass does not provide the necessary amount of sugar and other nutrition that sheep require; a poor sward can also adversely affect sheep's health.

- A1.24 A 2016 study<sup>10</sup> carried out at the operational Westmill solar site mentioned above found that '*panels reduce temperatures beneath them in summer by up to 5.2°C, and the ground under them is also dryer. It also found that **both species diversity and biomass were lower under panels**, attributed to differences in micro-climate and vegetation management. Under the panels there were **significantly fewer species, dominated by grasses**, with only one broadleaved flowering plant present, being yarrow (*Achillea millefolium*), which is both shade-and drought-tolerant'* (emphasis added).
- A1.25 At an operational solar site (Llanwern), monitors noted that '*The ground appears compacted and the panels have large areas of bare earth under and around them, with brambles starting to take over the area*'.

*Grassland management at solar site in UK (sourced online, photographer / location unknown)*



*Weeds, left unmanaged, could become a problem for the panels*

- A1.26 As explained above, many solar site operators use herbicides (and fertilisers), even though as here, the ecological assessments in particular have assumed that sheep would be grazed or the sward would be cut for hay, and therefore, damaging chemicals would not be used (although they may not have been aware of the use of environmentally-toxic chemicals on sheep, such as endectocides<sup>11</sup>).

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<sup>10</sup> A. Armstrong, N. J. Ostle, and J. Whitaker (2016) *Solar park microclimate and vegetation management effects on grassland carbon cycling*. Environ. Res. Lett. 11 074016

<sup>11</sup> Endectocides are drugs often administered to sheep, which are effective against both endoparasites and ectoparasites, but they are environmentally toxic. Ivermectin, for example, has become notorious because of lethal and sublethal effects on beneficial coprophagic *Coleoptera* (eg dung beetles) and other invertebrates, disrupting biodiversity and ecosystem services. See eg <https://bit.ly/iverimpact>.

- A1.27 Another problem is that sheep-grazing does not appear to be financially viable. One shepherd said, "*Why go to all these additional costs to get an extra £50 per acre sheep-grazing rent when you are renting the land to the solar company for £1,000 per acre?!".*
- A1.28 Finally, deer-proof fencing may not be robust enough to a) keep animals such as sheep and cattle in the compounds, and b) thieves out.
- A1.29 Importantly, thieves may not only want to steal the stock: in the UK, solar crime is on the increase, especially theft of panels, cables, and construction equipment<sup>12</sup>. Police Designing Out Crime Officers (DOCOs) do not consider deer-proof fencing adequate, as it does not deter or prevent theft or vandalism (DOCOs have reported people throwing stones at panels to see how many they can break). Instead, they prefer to see more robust security fencing such as LPS 1175 Level 3, up to 2.8m high (also, I know of at least one insurance company that may not cover large-scale commercial solar developments which rely on deer-proof fencing for security).
- A1.30 In summary, currently, it cannot be assumed, and possibly not guaranteed, that during operation, fields where solar arrays were installed would be grazed by sheep, cattle, or other farm animals, and thus whether a) ecological mitigation / compensation measures would be delivered, and b) agricultural use would continue. It would be helpful if the Applicant could confirm whether the EIA is predicated on grazing being delivered, or otherwise.

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<sup>12</sup> See for example *Theft From Solar Farms* (February 2023), by Crime Intelligence and Opal (the 'Police unit for the United Kingdom developing intelligence to disrupt organised networks involved in acquisitive crime in partnership with the public / private sector'; a company called DeterTech produced the document.