

Rosefield Solar Farm

Environmental Statement

Volume 4
Appendix 10:1: LVIA Methodology and
Assessment Criteria

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Rosefield Energyfarm Limited

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1. Introduction

1.1. Purpose of the Report

- 1.1.1. This Landscape and Visual Impact Assessment (LVIA) Methodology and Assessment Criteria has been prepared on behalf of Rosefield Energyfarm Limited ('the Applicant') to set out the methodology and criteria against which the assessment of landscape and visual effects has been undertaken in relation to the Development Consent Order (DCO) application for the construction, operation and decommissioning of Rosefield Solar Farm (hereafter referred to as the 'Proposed Development').

1.2. The Order Limits

- 1.2.1. The extent of the Order Limits are shown in **Location, Order Limits and Grid Coordinate Plans [EN010158/APP/2.1]** and the Proposed Development is described in full in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]** and shown spatially on the **Works Plans [EN010158/APP/2.3]**.

1.3. The Proposed Development

- 1.3.1. The Proposed Development comprises the construction, operation (including maintenance), and decommissioning of Solar photovoltaic ('PV') development and energy storage, together with associated infrastructure and an underground cable connection to the National Grid East Claydon Substation.
- 1.3.2. The Proposed Development would include a generating station with a total exporting capacity exceeding 50 megawatts ('MW').
- 1.3.3. The location of the Proposed Development is shown on **ES Volume 3, Figure 1.1: Site Location Plan [EN010158/APP/6.3]**. The Proposed Development would be located within the Order Limits (the land shown on the **Works Plans [EN010158/APP/2.3]** within which the Proposed Development can be carried out). The Order Limits plan is provided as **ES Volume 3, Figure 1.2: Order Limits [EN010158/APP/6.3]**. Land within the Order Limits is known as the 'Site'.
- 1.3.4. The principal components of the Proposed Development include:
- Solar PV development consisting of:
 - Ground mounted Solar PV generating station. The generating station would include Solar PV modules and mounting structures; and

- Balance of Solar System (BoSS) which comprises: Inverters; Transformers; Switchgear; Combiner Boxes; acoustic barriers and cabling.
- A project substation (the 'Rosefield Substation') compound comprising: Transformers; Switchgear; reactive power compensation bays; disconnectors; circuit breakers; busbars; control equipment; lightning surge arrestors; building(s) including office, control, functions, material storage, material laydown areas and welfare facilities; firewalls; fencing and acoustic barriers; a security cabin; parking as well as wider monitoring, maintenance and emergency equipment;
- A Main Collector Compound and two Satellite Collector Compounds comprising: Switchgear; Transformers; ancillary equipment; operation and maintenance and welfare facilities; material storage; material laydown areas; fencing and acoustic barriers; and security cabins;
- Battery Energy Storage System (BESS) compound comprising: batteries and associated Inverters; Transformers; Switchgear, ancillary equipment and their containers; office, control and welfare buildings; fencing and acoustic barriers; monitoring, maintenance and emergency systems; air conditioning; electrical cables; fire safety infrastructure; operation (including maintenance) security facilities; material storage; and material laydown areas;
- Interconnecting Cabling Corridor(s) to connect the Solar PV modules and the BESS to the Satellite and Main Collector Compounds to the Rosefield Substation;
- A Grid Connection Cable Corridor to connect the Rosefield Substation to the National Grid East Claydon Substation via 400kV cabling;
- Ancillary infrastructure works comprising: boundary treatment; security equipment; lighting; fencing; landscaping; internal access tracks; works to facilitate vehicular access; earthing devices; earthworks; surface water management; utility connections and diversions; and any other works identified as necessary to enable the Proposed Development;
- Green and blue infrastructure, recreation and amenity works comprising: landscaping; habitat management; biodiversity enhancement; the creation of three permissive footpaths; and works to permanently divert four PRow Footpaths in five instances;
- Site-wide operational monitoring and security equipment; and
- Highways infrastructure improvements and safety works comprising: minor junction improvement works; road widening; passing places; and works to facilitate vehicular access to the Site.

1.4. Landscape and Visual Context

- 1.4.1. The purpose of an LVIA when produced in the context of an EIA is to identify and report any likely significant landscape and visual effects.
- 1.4.2. This appendix sets out the methodology and criteria against which the assessment of landscape and visual effects, within the defined study area of the Proposed Development as shown on **ES Volume 3, Figure 10.1: Landscape Study Area, Context and Designations [EN010158/APP/6.3]**.

1.5. Structure of this Report

- 1.5.1. The methodology and criteria for the LVIA is set out in **Section 2** of this report.
- 1.5.2. A glossary of the terms used in the LVIA is provided in **Section 3** of this report.

1.6. Legislation and Planning policy

- 1.6.1. Relevant legislation is detailed within **Section 2** of this report as appropriate.

1.7. References

- 1.7.1. The references for this methodology are contained within **Section 4** of this report.

2. LVIA Methodology and Assessment Criteria

2.1. Introduction

- 2.1.1. The Guidelines for Landscape and Visual Impact Assessment (Third Edition) (GLVIA3) **[Ref 1]** and associated clarifications **[Ref 2]** are widely recognised as the primary source of guidance for LVIA in the UK but clearly state that:
- *“The guidance concentrates on principles while also seeking to steer specific approaches where there is a general consensus on methods and techniques. It is not intended to be prescriptive, in that it does not provide a detailed ‘recipe’ that can be followed in every situation. It is always the primary responsibility of any landscape professional carrying out an assessment to ensure that the approach and methodology adopted are appropriate to the particular circumstances.”* (paragraph 1.20)
- 2.1.2. GLVIA 3 also states that: *“professional judgement is a very important part of the LVIA”* (paragraph 2.23) and that *“in all cases there is a need for the judgements that are made to be reasonable and based on clear and transparent methods so that the reasoning applied at different stages can be traced and examined by others.”* (paragraph 2.24).
- 2.1.3. It goes on to state that *“there are no hard and fast rules about what effects should be deemed significant but LVIA should always distinguish clearly between what are considered to be the significant and non-significant effects.”* (paragraph 3.32)
- 2.1.4. This appendix sets out the methodology and criteria against which the assessment of landscape and visual effects has been undertaken in **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**.
- 2.1.5. Wherever possible, identified effects are quantified, but as noted above, the nature of landscape and visual assessment requires interpretation using professional judgement. In order to provide a level of consistency to the assessment, the prediction of magnitude and the assessment of significance of the residual landscape and visual effects are based on pre-defined criteria as set out in this appendix.
- 2.1.6. Landscape and visual assessments are separate, though linked processes, which GLVIA3 notes are *“related but very different considerations”*. The assessment of the potential effect on the landscape is carried out as an effect on the environmental resource (i.e. the landscape). Visual effects are assessed as the inter-related effect on people.

2.1.7. Landscape effects derive from changes in the physical landscape elements which may give rise to changes in its distinctive character and how this is experienced, including consideration of aesthetic and perceptual aspects.

2.1.8. Visual effects relate to changes that arise in the composition of available views as a result of changes to the landscape, to people's responses to the changes and to the overall effects with respect to visual amenity.

2.2. Establishing the Baseline

2.2.1. The baseline for consideration of landscape and visual effects is evaluated through desk study and site work and is the current situation at the time of the assessment, unless noted otherwise. Other operational developments and those under construction are considered as part of the baseline and included as part of the assessment of landscape and visual effects.

2.3. Direct and Indirect Effects

2.3.1. Direct and indirect effects are defined in GLVIA3. Direct effects may be defined as resulting "*directly from the development itself*" (paragraph 3.22). An indirect (or secondary) effect is one that results "*from consequential change resulting from the development*" (paragraph 3.22) and is often produced away from the site of the proposed development or as a result of a complex pathway or secondary association.

2.4. Landscape Effects

2.4.1. The starting point for an assessment of landscape effects is a desk-based assessment of published landscape studies, which may include landscape character assessments, sensitivity and capacity studies and/or landscape designation reviews. Relevant documents are listed as appropriate in the LVIA, and relevant extracts may be included where this is judged appropriate. Desk-based assessment is supplemented by field work to verify the key characteristics of the landscape.

2.4.2. In accordance with GLVIA3, the significance of landscape effects is determined by combining judgements regarding the sensitivity of the receiving landscape and the magnitude of the landscape effects arising from the Proposed Development.

2.4.3. An assessment of the degree to which the Proposed Development changes the distinct and recognisable pattern of elements, or characteristics, in the landscape that make one landscape different from another enables a judgement to be made as to the significance of the effect in landscape character terms.

2.4.4. In order to reach an understanding of the effects of development upon the landscape resource it is necessary to consider different aspects of the landscape baseline including:

- Landscape fabric/elements: The individual features of the landscape, such as hills, valleys, woods, hedges, tree cover, vegetation, buildings and roads for example which can usually be described and quantified.
- Landscape key characteristics: The particularly notable elements or combinations of elements which make a particular contribution to defining or describing the character of an area, which may include experiential characteristics such as wildness and tranquillity.

Landscape Sensitivity

2.4.5. It should be noted, as stated in GLVIA3, “*LVIA sensitivity is similar to the concept of landscape sensitivity used in the wider arena of landscape planning but is not the same as it is specific to the particular project or development that is being proposed and to the location in question*”. (paragraph 5.39)

2.4.6. In LVIA, landscape sensitivity is assessed by combining judgements about the value attached to a landscape and its susceptibility to the type of change and nature of the development proposed. The overall sensitivity of the landscape to a particular development is described in **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]** as **High, Medium or Low**.

- **Landscape Value:** This is the relative value or importance attached to different landscapes by society on account of their landscape qualities. Sometimes it is used as a basis for designation or recognition, which expresses national or local authority consensus, because of its special qualities/attributes. Whilst the presence of formal designations are an important component when determining landscape value, other aspects are also considered as part of the judgement process as explained in Landscape Institute Technical Guidance Note 02-21 *Assessing Landscape Value Outside National Designations [Ref 3]*, especially when considering the value of landscapes outside of national designations. These include factors related to natural and cultural heritage (for example ecological, geological or heritage matters), landscape condition, cultural associations (in terms of connections with people, arts or events), distinctiveness (i.e. a sense of unique identity in the landscape), recreational opportunities, perceptual aspects (including scenic quality, wildness and tranquillity) and landscapes with a clearly identifiable role or function. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, the value attributed to the landscape is described as: **National, Regional, or Community**.

- **Landscape Susceptibility:** Landscape Susceptibility according to GLVIA3 means “*the ability of the landscape receptor to accommodate the proposed development without undue consequences for maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*” (paragraph 5.40). The susceptibility of the landscape varies depending on the type of development proposed and the particular site location. Judgements on landscape susceptibility include references to both the physical and aesthetic characteristics and the potential scope for mitigation. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, the susceptibility of the landscape is described as **High, Medium** or **Low**.

- 2.4.7. The criteria and the detailed judgements regarding susceptibility and value of landscape receptors are identified within the sensitivity tables included in **ES Volume 4, Appendix 10.3: Landscape Sensitivity Appraisal [EN010158/APP/6.4]** to this assessment.
- 2.4.8. Sensitivity is judged taking into account the component judgments about the value and susceptibility of the receptor as illustrated by **Table A10.1** below. Where sensitivity is judged to lie between levels, an intermediate assessment will be adopted. Note that equal weighting is attributed to susceptibility and value when determining overall landscape sensitivity.

Table A10.1 Landscape Sensitivity Criteria

		Susceptibility		
		High	Medium	Low
Value	National	High	High/medium	Medium
	Regional	High/Medium	Medium	Medium/Low
	Community	Medium	Medium/Low	Low

Magnitude of Landscape Effect

- 2.4.9. The magnitude of landscape effect arising from the Proposed Development at any particular location is assessed in terms of “*size or scale, the geographic extent of the area or receptor that is influenced and its duration and reversibility*” (paragraph 5.48).
- 2.4.10. Judgements concerning the **Scale** of the change take account of:

- Degree of loss or alteration to key landscape features/elements; characteristics; and for designated areas – special qualities and/or purposes of designation.
- Distance from the Proposed Development.
- Landscape context to the Proposed Development.

- 2.4.11. The approach to assessing effects on landscape character is to consider the key characteristics for the Landscape Character Area (LCA) within which the Proposed Development is located (the host LCA) and if relevant the adjacent LCA's (non-host) and identify which of these the Proposed Development would affect. A large scale change in landscape character is likely to occur where key characteristics would be lost or substantially changed. A small scale change is likely to occur where key characteristics are altered to a lesser degree and this can be influenced by distance and surrounding context.
- 2.4.12. Where particular views are a key characteristic of a LCA, large or medium scale landscape character effects may occur where the Proposed Development becomes a key feature of those views. A similar approach applies to designated landscapes, for which the effects on the defined purposes of designation and special qualities are considered.
- 2.4.13. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, the scale of landscape change is described as: **Large, Medium, Small or Negligible**.
- 2.4.14. Having established the scale of change to the landscape baseline, the **Geographic Extent** of the change can be identified. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, the geographical extent of landscape change is described as: **Wide, Intermediate, Localised or Limited**.
- 2.4.15. **Duration and Reversibility** can be linked depending on the nature of the development. Reversibility is a judgement about the practicality of reversing the landscape effects of the Proposed Development (for example, solar farms are ultimately largely reversible whilst housing is permanent). Duration reflects how long the change will last. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, the duration of the change would be considered:
- short term when lasting less than 2 years;
 - medium term when lasting between 2 and 10 years;
 - long term when lasting between 10 and 40 years, and
 - permanent for more than 40 years.

- 2.4.16. Magnitude is considered taking into account the three contributory factors as illustrated by the diagrams presented in **Plate A10.1**.

2.5. Visual Effects

- 2.5.1. In accordance with GLVIA3, the significance of visual effects is determined by combining judgements regarding the sensitivity of visual receptors (people who view the landscape) and the magnitude of the effect they experience arising from the Proposed Development.

Visual Receptor Sensitivity

- 2.5.2. In LVIA, visual receptor sensitivity is assessed by combining judgements about the value attached to views and the susceptibility of the viewer to the type of change and nature of the development proposed. The overall sensitivity of the visual receptor to a particular development is described in **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]** as **High, Medium or Low**.
- **Value of Views:** The value of public views, which is the focus of GLVIA3, will vary depending on the nature, location and context of the view and the recognised importance of the view. Considerations include cultural associations; designation or policy protection; views of or from landmarks; and/or the scenic quality of the view. It should be noted that the value attributed relates to the value of the view only (e.g. a National Trail is nationally valued for access, but not always for the available views from every section). In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, the value attributed to visual amenity is described as: **National, Regional, or Community**.
 - **Susceptibility of Visual Receptors:** Those living within view of the Proposed Development are usually regarded as the highest susceptibility group as well as those engaged in outdoor pursuits for whom landscape experience is the primary objective. The susceptibility of potential visual receptors will also vary depending on the activity of the receptor. For visual receptors, susceptibility and value are closely linked - the most valued views are also likely to be those where viewer's expectations will be highest. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, visual receptor susceptibility is defined in accordance with the criteria below.
 - **High** - Local residents; users of outdoor recreation focussed on the appreciation of views including footpaths, beauty spots and picnic areas and people experiencing views to or from important features of physical, visual, cultural or historic interest.
 - **Medium** - Local road users and travellers on trains. People engaged in outdoor recreation with some appreciation of the landscape e.g. road cycling, nature conservation, golf and water based recreation.

- **Low** - Workers, users of facilities and commercial buildings (indoors) experiencing views from buildings. Road and rail users on fast moving commuting or trunk routes. Visual receptors where views are incidental to the activity and/or location.

2.5.3. Sensitivity is judged taking into account the component judgments about the value and susceptibility of the receptor, as illustrated by **Table A10.2** below. Where sensitivity is judged to lie between levels, an intermediate assessment will be adopted. Note that a greater weight is intentionally attributed to the susceptibility of the visual receptor than to value. This is in recognition of the fact that relatively few views are specifically recognised through designation or cultural reference. This approach still acknowledges that value associations influence sensitivity.

Table A10.2 Visual Sensitivity Criteria

		Susceptibility		
		High	Medium	Low
Value	National	High	High/medium	Medium
	Regional	High/Medium	High/Medium	Medium/Low
	Community	High/Medium	Medium	Low

Magnitude of Visual Effect

- 2.5.4. The magnitude of visual effect arising from the Proposed Development is assessed in terms of its size or scale, geographic extent of the area or receptor that is influenced and its duration.
- 2.5.5. Representative viewpoints are used in the LVIA as ‘samples’ on which to base judgements of the scale of change on visual receptors. The wider extent of the effect and its duration are not captured in the viewpoint analysis (as a viewpoint cannot capture these factors for an entire route or area). As duration and extent are necessary considerations in determining magnitude of effect, judgements concerning magnitude and significance are provided for visual receptors and not for representative viewpoints. The only exception to this rule would be a specific viewpoint – where people visiting that location to look at the view are assessed as a visual receptor group in its own right.
- 2.5.6. With the exception of specific viewpoints (as noted above), each route (e.g. a footpath or road) and receptor group (e.g. a community or village) will encompass a range of possible views, which might vary from no view of the development to very clear, close views. Therefore effects are described in such a way as to identify where views towards the

development are likely to arise and what the scale and duration and extent of those views is likely to be. In some cases this will be further informed by a nearby viewpoint and in others it will be informed with reference to ZTV studies, aerial photography and site visits. Each of these individual effects are then considered together in order to reach a judgement of the effects on the visual receptors along that route, or in that place.

- 2.5.7. The **Scale** of change arising from the Proposed Development as experienced by a visual receptor group reflects the degree to which the nature of the views from that location would be changed taking into account:
- the distance of the viewpoint from the Proposed Development;
 - the degree to which the Proposed Development is visible or screened;
 - the angle of view in relation to main receptor activity or main focus of the view;
 - the horizontal and vertical field of view occupied by the Proposed Development ; and
 - the extent and nature of other built development visible.
- 2.5.8. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, the scale of change in view is described as: **Large, Medium, Small or Negligible**.
- 2.5.9. The approach to assessing effects on views is to consider the full 360 degree view from any given receptor – not just those towards the development and/or shown in visualisations. It is assumed that the change would be seen in clear visibility and the assessment is carried out on that basis. Seasonal variations in visibility due to varying vegetation cover is also taken into account in all judgements.
- 2.5.10. For visual receptors moving through the landscape (e.g. road and rail users), the length of their journey during which they would see the Proposed Development is reflected in the judgement of the **Geographic Extent** of effects. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, the geographical extent of visual change is described as: **Wide, Intermediate, Localised or Limited**.
- 2.5.11. **Duration** reflects how long the change will last and judgements are framed in the same way as described above for landscape effects. In this LVIA, the duration of the change would be considered:
- short term when lasting less than 2 years;
 - medium term when lasting between 2 and 10 years;
 - long term when lasting between 10 and 40 years, and

- permanent for more than 40 years.

2.5.12. Magnitude is considered taking into account the three contributory factors as illustrated by the diagrams presented in **Plate A10.1** below.

2.6. Combining Scale of Change, Extent and Duration to Determine Magnitude of Landscape and Visual Effects

- 2.6.1. Scale of change is the first and primary factor in determining magnitude. Geographical extent and duration of the effect are modifying factors to the overall magnitude judgement which may be higher if the effect is particularly widespread and/or long lasting, or lower if it is constrained in geographic extent and/or timescale.
- 2.6.2. The diagrams presented below in **Plate A10.1** illustrate in outline how these two modifying factors are considered in a two-stage process. A judgement is first formed about the scale of the change to the landscape or visual receptor. The geographic extent of the effect is then considered as a modifying influence in the first part of **Plate A10.1 (Stage 1)**. The result or outcome of Stage 1 is then considered again in relation to the duration of the effect as illustrated in the second part of **Plate A10.1 (Stage 2)**. The outcome of Stage 2 is the overall magnitude of effect judgement reported in the assessment. **Plate A10.1** is not intended to be interpreted rigidly as a chart to provide definitive answers; professional judgement is employed as appropriate to arrive at an overall magnitude judgement.
- 2.6.3. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**, the magnitude of effects is described as **Substantial, Moderate, Slight or Negligible**. Where magnitude is judged to lie between levels, an intermediate assessment will be adopted. In **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]** the judgments are justified as necessary.

Stage 1 - Modifying Influence of Geographic Extent on Magnitude of Effect

		Scale of Change			
		Large	Medium	Small	Negligible
Geographic Extent	Wide	Substantial			
	Intermediate		Moderate		
	Localised			Slight	
	Limited				Negligible

Stage 2 - Modifying Influence of Duration on Magnitude of Effect

		Stage 1 Result			
		Substantial	Moderate	Slight	Negligible
Duration	Permanent	Substantial			
	Long-term		Moderate		
	Medium-term			Slight	
	Short-term				Negligible

Plate A10.1 Combining Scale of Change, Extent and Duration to Determine Magnitude of Landscape and Visual Effects

2.7. Significance of Landscape and Visual Effects

- 2.7.1. The significance of any identified landscape or visual effect is assessed as **Major, Moderate, Minor** or **Negligible**. These categories are based on the consideration of sensitivity with the predicted magnitude of change. **Table A10.3** below is not used as a prescriptive tool and illustrates the typical outcomes, allowing for the exercise of professional judgement. In some instances, a particular parameter may be considered as having a determining effect on the analysis.

Table A10.3 Significance of effect criteria

		Magnitude of Change			
		Substantial	Moderate	Slight	Negligible
Receptor Sensitivity	High	Major	Major/ Moderate	Moderate	Minor
	Medium	Major/ Moderate	Moderate	Moderate/ Minor	Minor/Negligible
	Low	Moderate	Moderate/ Minor	Minor	Negligible

2.7.2. Where the effect has been classified as **Major** or **Major/Moderate**, this is considered to be equivalent to likely significant effects. Where **Moderate** effects are predicted, professional judgement is applied to determine whether the effect is significant or not ensuring that the potential for significant effects to arise has been thoroughly considered and justification is provided for the judgement reached as appropriate.

2.7.3. Effects of **Moderate/ Minor**, **Minor**, **Minor/ Negligible** or **Negligible** significance are considered to be not significant.

2.8. Beneficial/Adverse

2.8.1. Landscape and visual effects can be beneficial or adverse and in some instances may be considered neutral. Neutral effects are those which overall are neither adverse nor beneficial but may incorporate a combination of both. Whether an effect is beneficial, neutral or adverse is identified based on professional judgement. GLVIA3 indicates at paragraph 2.15 that this is a “*particularly challenging*” aspect of assessment, especially in the context of a changing landscape.

2.8.2. However, for the avoidance of doubt, in **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]** it has been assumed that where new infrastructure is introduced into the landscape or views, this will generally constitute an adverse effect. Any variation from this stance will be clearly justified in **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]**.

2.9. Cumulative Effects

2.9.1. The Overarching National Policy Statement for Energy (NPS EN-1) **[Ref 4]** paragraph 5.10.16 states that “*The applicant should carry out a landscape and visual impact assessment and report it in the ES, including cumulative effects*”.

- 2.9.2. Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment [Ref 5] states that *“In this advice, ‘other existing development and, or approved development’ is taken to include existing developments and existing plans and projects that are ‘reasonably foreseeable’.”*
- 2.9.3. The Advice states *“there may be variation in the approach to identifying and assessing ‘existing and, or approved development’.* This advice suggests 4 stages to CEA: establishing the long list (stage 1); establishing the short list (stage 2); information gathering (stage 3); assessment (stage 4).” At the Stage 4 stage the Advice states “Assessments should: be undertaken at a level of detail proportionate to the information available... The assessment will move from a qualitative to a more quantitative assessment as the availability of information increases.” The cumulative LVIA presented in **ES Volume 2, Chapter 17: Cumulative Effects [EN010158/APP/6.2]** adopts this guidance and assesses cumulative landscape and visual effects depending on the status of *‘other existing development and, or approved development’* at the time of submission.
- 2.9.4. An assessment of cumulative effects should focus on whether there are any potential significant cumulative impacts which are reasonably foreseeable and which are likely to influence the decision making of the Proposed Development, rather than an assessment of every potential cumulative effect, which in practice means focussing on other nearby development proposals and the effects that might arise from the combined influence of those developments on landscape and visual receptors.
- 2.9.5. The cumulative assessment is based on the same landscape and visual baseline and receptor groups as the main LVIA, and the methodology is also the same in terms of forming and expressing judgements.
- Cumulative effects on landscape receptors arise from combined direct and/or indirect effects on the same receptor – such as two developments within the same character area; or one development within, and one visible from, a designated area.
 - Cumulative effects on visual receptors arise either from two (or more) developments both being visible from the same place; or from sequential views as people travel through the landscape.
- 2.9.6. In order to simplify what may otherwise be a complex assessment, where appropriate, the following approaches are also used:
- Receptors judged to receive Negligible or Slight-Negligible magnitude of effects from the Proposed Development are not considered for cumulative effects on the basis that any significant effects arising would primarily be caused by the other existing and/or approved development(s) and would be unlikely to be contributed to by the Proposed Development.

- Only those receptors judged likely to experience effects from the other existing and/or approved development(s) being considered within a given scenario are described within that scenario.

2.10. Methodology for Production of ZTV Plans and Visualisations

- 2.10.1. All Zone of Theoretical Visibility Maps (ZTVs), photography, visualisations (wirelines and photomontages) and their graphical presentation has been undertaken in line with the Landscape Institute's Technical Guidance Note 06/19, *Visual Representation of Development Proposals* [Ref 6].

Visibility Maps: Zone of Theoretical Visibility (ZTV)

- 2.10.2. ZTV maps are presented in **ES Volume 3, Figures 10.7 – 10.12 [EN010158/APP/6.3]**. ZTV maps have been generated using GIS to assist in identifying areas where visibility would not occur as well as viewpoint selection, illustrate areas from where part or all of Proposed Development may be visible and to indicate its potential influence in the wider landscape.
- 2.10.3. In each case, the ZTV illustrates the maximum parameters of the Proposed Development and assumes all development would be at the maximum possible height indicated on **ES Volume 3, Figure 3.1: Height Parameters Plan [EN010158/APP/2.3]**, **Works Plans [EN010158/APP/2.3]** and secured in the **Design Commitments [EN010158/APP/5.11]**.
- 2.10.4. Specifically, the ZTVs have been generated using the Viewshed routine in the Visibility Analysis plugin for QGIS software.
- 2.10.5. Three types of ZTV have been presented in **ES Volume 3, Figures 10.7 – 10.12 [EN010158/APP/6.3]**:
- **Bare Earth ZTVs** – which only take account of topography/landform
 - **Standard Screening ZTVs** – which take account of buildings and significant blocks of woodland in the landscape; and
 - **Detailed Screening ZTVs** – which also take account of hedgerows and other vegetation over 2.5m in height.
- 2.10.6. In all cases, the viewer's eye height has been set at 2m above ground level and in all cases, the ZTVs include an adjustment that allows for the Earth's curvature and light refraction.
- 2.10.7. The Bare Earth ZTVs show the maximum theoretical extent of visibility for the structures modelled, taking account of the topography of the surrounding landscape, but do not take account of any built or vegetative screening in the landscape. They tend to considerably overestimate the actual extent of visibility. Visibility on these ZTV outputs is illustrated using

a 5m x 5m grid size. The actual extent of visibility on the ground will be considerably less than suggested on the plan.

- 2.10.8. The Standard Screening ZTVs show the maximum theoretical extent of visibility for the structures modelled (as indicated on the individual ZTVs) taking into account the screening effect of topography, principal woodlands and buildings. In order to generate the Standard Screening ZTVs, a digital surface model (DSM) has been derived from the DEFRA LIDAR 2020 2m digital terrain model (DTM) with the locations of woodland and buildings taken from the OS Open Map Local dataset. Heights of buildings and woodland are taken from the DEFRA LIDAR 2020 2m DSM height data. Visibility on these ZTV outputs is illustrated using a 5m x 5m grid size. These ZTVs do not take into account some localised features such as hedgerows or individual trees, and therefore tend to give an exaggerated impression of the extent of visibility. The actual extent of visibility on the ground will be less than suggested on the plan.
- 2.10.9. The Detailed Screening ZTVs provide an extra layer of detail as they take account of additional vegetation in the landscape (over 2.5m in height) not captured in the Standard Screening ZTVs. This typically includes hedgerows, tree belts, small clusters of trees and also individual trees. In order to generate the Detailed Screening ZTVs a detailed digital surface model (DSM) has been derived from the DEFRA LIDAR 2020 2m digital terrain model (DTM). The locations of buildings are again taken from the OS Open Map Local dataset, but woodland and other vegetation (over 2.5m in height) is taken from the Environment Agency's Vegetation Object Model (VOM) dataset. Heights of buildings and woodland are taken from the DEFRA LIDAR 2020 2m DSM height data. Visibility on these ZTV outputs is illustrated using a 2m x 2m grid size. Whilst these ZTVs still do not take into account some localised features such as vegetation below 2.5m in height, ground truthing in low lying landscapes has consistently found these ZTVs to be considerably more accurate than the Bare Earth and Standard Screening ZTVs. Nevertheless, it is important to understand their limitations. Firstly, it should be noted that hedgerows in the UK are typically deciduous and in winter months may not act as an absolute visual barrier – filtered views through hedgerows are sometimes possible. Secondly, it should also be noted that hedgerows are often cut lower (below 2.5m) in winter months and depending on when the LIDAR data was captured visibility may extend further in winter months.
- 2.10.10. The actual extent of visibility on the ground will still typically be less than suggested on the plan. However, at Rosefield, the Detailed Screening ZTVs have been extensively tested/ground truthed in the field in winter, and it is the professional opinion of the assessors that they provide a reasonable and accurate reflection of the potential visibility of the Proposed Development.

Viewpoint Photography

- 2.10.11. All photography presented in **ES Volume 4, Appendix 10.6: LVIA Visualisations [EN010158/APP/6.4]** has been taken in accordance with guidance outlined in Landscape Institute Technical Guidance Note 06/19. This was agreed in consultation with Buckinghamshire Council, including the use of winter photography, which was requested as the basis for all photomontages to demonstrate worst-case scenario.
- 2.10.12. All photography has been taken using a Canon EOS 5D MK III or IV digital SLR camera with a high quality fixed 50 mm focal length lens. This camera has a Full Frame Sensor (FFS).
- 2.10.13. For all viewpoints, the camera has been mounted on a panoramic head equipped tripod, levelled and set up with the camera at 1.5m height Above Ground Level (AGL).
- 2.10.14. At each viewpoint, a series of photographs (landscape orientation) have been taken to capture a 360 degree panorama. The panoramic head has been set to 20 degrees between shots giving a 50% overlap between adjacent shots.
- 2.10.15. At each viewpoint the OS grid coordinates have been captured using a hand held GPS system.

Stitching of Photographic Panoramas

- 2.10.16. For each of the viewpoints, photographs have been stitched and presented as panoramas. Photographs have been stitched using PTGui software.

Visualisations: Annotated Photographs (LI Type 1)

- 2.10.17. Most of the viewpoints in the ES are illustrated as Type 1 Visualisations as outlined in Landscape Institute Technical Guidance Note 06/19. The purpose of Type 1 visualisations is to represent context to the viewpoint, communicate the extent of the development and highlight any notable features in the view.
- 2.10.18. In each case the viewpoints are presented to illustrate, as a minimum, a 90 degree horizontal field of view and are presented in cylindrical projection. Where the horizontal extent of the Proposed Development extends beyond 90 degrees, a series of 90 degree annotated visualisations may be presented to illustrate the panoramic views obtained at the viewpoint. The photographs are annotated to indicate the maximum extent of the Proposed Development and highlight any important features within the view. The visualisations therefore demonstrate the maximum parameters of the Proposed Development and assumes all development

would be at the maximum possible height indicated on **ES Volume 3, Figure 3.1: Height Parameters Plan [EN010158/APP/6.3]**, **Works Plans [EN010158/APP/2.3]** and secured in the **Design Commitments [EN010158/APP/5.11]**.

Visualisations: Photomontages and Photowires (LI Type 3)

- 2.10.19. A selection of the viewpoints has been selected to be used as photomontages. For each chosen viewpoint, a montage has been produced for Year 1 (showing the site immediately after construction) and at Year 10 (showing the effects of any mitigation strategies).
- 2.10.20. The photographs are matched to features in the landscape which are observable in either aerial photography or 1m LIDAR DSM data and thus conform to the requirements of Type 3 Visualisations as outlined in Landscape Institute Technical Guidance Note 06/19.
- 2.10.21. For the photomontages, a 3D model of the site is constructed from the site plan in Sketchup. This model includes the panels alongside any site infrastructure (fences, tracks, battery storage, CCTV etc). Where visible the substations are also included in the montages.
- 2.10.22. Cameras are then set up in the 3D model to match the location and time of the photography. The 3D model is rendered in V-Ray for Sketchup and then composited into the photograph in Adobe Photoshop. Mitigation is also added to the Sketchup model and rendered to provide the Year 10 montages.

2.11. Assumed Vegetation Growth Rates

- 2.11.1. The following assumptions have been made in **ES Volume 2, Chapter 10: Landscape and Visual [EN010158/APP/6.2]** about the growth rate of newly planted hedgerows and trees. These assumptions are also used in the Type 4 visualisation photomontages presented in **ES Volume 4, Appendix 10.6: LVIA Visualisations [EN010158/APP/6.4]**:
- Newly planted hedgerows and woodland/shrub would be planted as young transplants or 'whips'. In Year 1 after construction, the planting stock would typically be approximately 0.6m to 0.8m high and contained within tree protected tubes.
 - Hedgerows in Year 10 would be 3.5m in height. This makes an assumption that the plants do not put on much growth in the first planting season and then put on an average of 0.4m growth each subsequent year to be at full maturity in Year 10 and are maintained at 3.5m by ongoing management.

- New woodland/scrub planting established as transplants would be 4m in height, as it is not maintained at a lower height, as is the case for hedgerows.
- Where hedgerow trees are planted as taller specimens or where mature stock is planted elsewhere, it is assumed that the trees would be planted as extra heavy standards and in Year 1, these would have a height of 3m to 3.5m. By Year 10, it is assumed that these trees would have a height of approximately 6m.
- Except where vegetation is managed at a specific height (e.g. hedgerows), it is assumed that trees and scrub would continue to grow naturally over the remaining period of the Proposed Development.

3. Glossary of Terms Used in the LVIA

Term	Definition
CLVIA	Cumulative Landscape and Visual Impact Assessment
Direct Effect	A direct (or primary) effect may be defined as an effect that is directly attributable to the development
GLVIA3	'Guidelines for Landscape and Visual Impact Assessment, Third Edition', published jointly by the Landscape Institute and Institute of Environmental Management and Assessment 2013.
Indirect Effect	An indirect (or secondary) effect is an effect that results indirectly from the proposed project as a consequence of the direct effect, often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects.
Key Characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
LVIA	Landscape and Visual Impact Assessment.
Landscape Capacity	The amount of change which a particular landscape character type or area is able to accommodate without significant detrimental effects on its character. Capacity is likely to vary according to the type and nature of change proposed.
Landscape Character	The distinct and recognisable pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape Character Areas	These are single unique areas which are the discrete geographical areas of a particular landscape type
Landscape Character Types	These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur, they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes.
Landscape Effects	Effects on the landscape as a resource in its own right

Landscape Elements	Individual components which make up the landscape such as trees and hedges.
Landscape Features	Particularly prominent or eye-catching elements, like tree clumps, church towers or wooded skylines.
Landscape Quality or Condition	This is a measure of the physical state of the landscape. It may include the extent to which a typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements
Landscape Receptor	Defined aspects of the landscape resource that have the potential to be affected by a proposal.
Landscape Resource	The combination of elements that contribute to landscape context, character and value.
Landscape Value	The relative value or importance attached to different landscapes by society on account of their landscape qualities
Level of Effect	Determined through the combination of sensitivity of the receptor and the proposed magnitude of effect brought about by the development.
Magnitude (of effect)	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.
Mitigation	Measures including any process, activity or design to avoid, reduce, remedy or compensate for adverse environmental impact or effects of a development.
Photomontage	A visualisation which superimposes an image of a proposed development upon a photograph or series of photographs.
Residential Visual Amenity	A collective term describing the views and visual amenity from a residential property, relating to the type, nature, extent and quality of views that may be experienced from the property and its 'domestic curtilage' including gardens and access driveway. Residential Visual Amenity is only one component of the overall Residential Amenity, others being for example noise, shadow flicker and access amongst others.
Residual Effects	Potential environmental effects remaining after mitigation.
Sense of Place	The essential character and spirit of an area: genius loci literally means 'spirit of the place'.

Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.
Significant Effects	It is a requirement of the EIA Regulations to determine the likely significant effects of development on the environment which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated. The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and sensitivity of the receptor) that should be attached to the impact described. Whether an effect should be considered significant is not absolute and requires the application of professional judgement.
Type or Nature of Effect	Whether an effect is direct, indirect, temporary or permanent, positive (beneficial), neutral or negative (adverse) or cumulative.
Visual amenity	Value of a particular place in terms of what is seen by visual receptors taking account of all available views and the total visual experience.
Visual Effect	Effects on specific views and on the general visual amenity experienced by people.
Visual Receptors	Individuals and/or defined groups of people who have the potential to be affected by a proposal
Visualisation	Computer simulation, photomontage or other technique to illustrate the appearance of a development.
Zone of Theoretical Visibility (ZTV)	Area within which a proposed development may have an influence or an effect on visual amenity.

4. References

Ref 1: *Guidelines for Landscape and Visual Impact Assessment, Third Edition* (GLVIA3) (2013). Landscape Institute and Institute of Environmental Management and Assessment.

Ref 2: *Technical Guidance Note LITGN-2024-01: Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third edition* (GLVIA3) (2024). Landscape Institute. Available online: [LITGN-2024-01-GLVIA3-NC_Aug-2024.pdf \(landscapeinstitute.org\)](https://www.landscapeinstitute.org/publication/litgn-2024-01-glvia3-nc-aug-2024.pdf)

Ref 3: Technical Guidance Note 02/21: Assessing landscape value outside national designations. Landscape Institute (2021). Available online: <https://www.landscapeinstitute.org/publication/tgn-02-21-assessing-landscape-value-outside-national-designations/>

Ref 4: Overarching National Policy Statement for Energy (NPS EN-1) (2023) (designated in January 2024). Available online: <https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1>.

Ref 5: Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment (updated 20 September 2024). Available online: <https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-cumulative-effects-assessment>

Ref 6: Technical Guidance Note 06/19: Visual Representation of Development Proposals. Landscape Institute (2019). Available online: <https://www.landscapeinstitute.org/visualisation/>



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