

Gate Burton Energy Park Environmental Statement

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10. LVIA Methodology

10.1 Introduction

10.1.1 This appendix sets out the methodology for the landscape and visual impact assessment (LVIA), including the Zone of Theoretical Visibility (ZTV) and the visualisations of the Scheme.

10.2 Landscape and Visual Impact Assessment Methodology

10.2.1 Landscape and visual effects are interrelated but assessed separately.

10.2.2 Landscape effects relate to changes to the landscape as a resource, including physical changes to the fabric or individual elements of the landscape, its aesthetic or perceptual qualities and landscape character.

10.2.3 Visual effects relate to changes to existing views of the landscape of identified visual receptors (people), from the loss or addition of features within their view due to the Scheme.

10.2.4 GLVIA3 (Ref 1, para 2.21) summarises this by stating that the two components of LVIA are:

- assessing effects on the landscape as a resource in its own right;
- assessing effects on specific views and on the general visual amenity experienced by people.

10.2.5 The LVIA has been undertaken in accordance with:

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3), (Ref 1);
- Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals, (Ref 2);
- An Approach to Landscape Character Assessment, (Ref 3);
- Landscape Institute Technical Guidance Note 04/20: Infrastructure, (Ref 4);
- Landscape Institute Technical Information Note 01/17: Tranquillity, (Ref 5);
- Landscape Institute Technical Guidance Note 02/19: Residential Visual Amenity Assessment, (Ref 6);
- Landscape Institute Technical Guidance Note 02/21: Assessing landscape value outside national designations, (Ref 7); and
- Council of Europe Landscape Convention, 2000 (Ref 8).

10.2.6 The LVIA methodology involves the following stages:

- A baseline review of published landscape character assessments, studies, relevant supporting evidence base documents, aerial photography, mapping and fieldwork to determine the extent of the study area in which there is potential for significant landscape and visual effects;

- Identify the landscape and visual baseline and the landscape and visual receptors. Following the identification of the proposed representative viewpoints these were presented to Nottinghamshire County Council and Lincolnshire County Council for agreement;
- Ongoing review of the emerging design, seeking to embed mitigation measures into the Scheme in order to avoid or otherwise minimise adverse landscape and visual effects;
- An assessment of the sensitivity (nature of the receptor) of landscape and visual receptors, via an assessment of the value of the landscape, the value attached to views and susceptibility to change as set out below;
- An assessment of the magnitude of impact (nature of effect) of the Scheme during the construction, year 1 year 15 of operation and decommissioning. The magnitude of impact has been assessed in relation to the size, scale, geographical extent, duration and reversibility of the effect; and
- An assessment of the significance of the effect to the landscape and visual receptors for the above phases of the Scheme.

10.2.7 The assessment of the Scheme has been undertaken for:

- Peak construction activity in winter, representing the worst case;
- Year 1 of operation, assuming the Scheme is built out and in winter, representing the worst case;
- Year 15 of the operation, assuming the proposed planting has established, and the season is summer, demonstrating the effectiveness of mitigation: and
- The process of decommissioning in summer.

10.3 Methodology for the assessment of receptor sensitivity

Study area

- 10.3.1 The initial 'Area of Search' extended 5km from the Order limits to the north, south and west and 10km to the east. This was informed by consideration of the location and scale of the Scheme and desk based analysis of mapping and aerial photography. A Zone of Theoretical Visibility (ZTV) (refer to **ES Volume 2: Figures 10-9 ZTV (Bare Earth) – All Features** and **10-10 ZTV (With Surface Features) – All Features [EN01031/APP/3.2]**) was used to determine the potential visibility of the Scheme. Fieldwork was subsequently undertaken to verify the findings of the desk study. This analysis determined the study area, defined as the extent in which the Scheme may result in significant landscape or visual effects.
- 10.3.2 With reference to **ES Volume 2: Figure 10-1 LVIA Study Area [EN01031/APP/3.2]**, the study area extends approximately 2 kilometres (km) around the Order limits of the Grid Connection Corridor, 3km west of the Order limits and 5km to the north, east and south. The varying radii respond to the topographical setting of the Scheme. However, elevated ground further to the east within approximately 10km from the Order limits of the Scheme has been included to assess long distance landscape and visual effects as well as cumulative effects.

10.3.3 Extensive review within the study area was undertaken in order to identify landscape and visual receptors that have potential to be affected by the Scheme including the Grid Connection Corridor.

Establishing the baseline

Desk study

10.3.4 Reference has been made to the prevailing policy framework including National Policy Statements, the National Planning Policy Framework, local plans and evidence base documents (refer to **ES Volume 3, Appendix 10-A: Legislation and Planning Policy [EN01031/APP/3.3]**). Online mapping was also reviewed to identify any designated landscapes or features or views of value and their relationship to the Scheme.

10.3.5 Other information sources referenced as part of the baseline review include 1:25,000 and 1:10,000 scale Ordnance Survey mapping, 3-dimensional topographical data, and site photographs and aerial photography.

Fieldwork surveys

10.3.6 Initial fieldwork surveys have been undertaken by qualified and experienced landscape architects in January and February 2022, representing winter conditions. The purpose of this fieldwork was to review the boundaries and key characteristics defined in the published landscape character assessments and to identify, record and map the following aspects and characteristics of the landscape:

- Landcover, pattern and texture;
- Scale and appearance;
- Tranquillity;
- Cultural associations; and
- Human interaction.

10.3.7 Attributes recorded as part of the fieldwork surveys included features and elements associated with the built environment and historic landscape and areas of managed landscape. Perceptual qualities of the landscape, such as tranquillity have also been recorded.

10.3.8 Fieldwork surveys have also been used to identify visual receptors and associated viewpoints and to clarify the extent of views, taking account of the screening effect of intervening features such as buildings and vegetation.

10.3.9 Further fieldwork was undertaken between June and September 2022 to determine the effectiveness of existing deciduous vegetation in screening views of the site and the Scheme as well as to consult with a number of residential receptors located adjacent to the Scheme.

Landscape baseline

10.3.10 Landscape is defined by the European Landscape Convention as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (Ref 8).

10.3.11 GLVIA3 defines landscape receptors as “*aspects of the landscape resource that have the potential to be affected by a proposal*” (Landscape Institute and

the Institute of Environmental Management and Assessment, 2013). Landscape receptors have been identified via a review of published landscape character assessments, maps and aerial photography, relevant planning policy and fieldwork surveys.

10.3.12 Landscape character is defined by GLVIA3 as “a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.”

10.3.13 Published landscape character assessments at the national, regional, county, district and neighbourhood levels have been reviewed to identify relevant Landscape Character Types (LCT) and Landscape Character Areas (LCA). The assessment has identified that the geographical extent of LCAs in published assessments are generally large and may extend beyond the study area. To enable a more detailed assessment of the existing landscape character at a scale more relevant to the Scheme, Local Landscape Character Areas (LLCA) have been defined by the Applicant via desk study and fieldwork surveys in line with Natural England’s An Approach to Landscape Character Assessment (Ref 3). These LLCA form the basis of the assessment of landscape effects and will inform the development of the masterplan and landscape design. They are generally sub-divisions of existing LCAs identified in published landscape character assessments to allow an assessment of effects at various scales.

Visual baseline

10.3.14 Visual receptors are defined in GLVIA3 as “individuals and/or defined groups of people who have the potential to be affected by a proposal” (Ref 1). This includes residents, recreational users including those on public rights of way (PRoW), workers (including those outdoors) and motorists/vehicle users.

10.3.15 A computer-generated ZTV has been prepared based on 3-dimensional models of existing terrain and the Scheme. The purpose of the ZTV is to:

- Identify the theoretical extents of the Scheme visibility i.e. the locations from which it could potentially appear in existing views;
- Assist in the identification of the study area;
- Identify visual receptors likely to be affected by the Scheme;
- Identify locations that are representative of the views experienced by visual receptors at different locations within the study area (representative viewpoints);
- Specific viewpoints, identified on Ordnance Survey maps; and
- Inform the design, including the extent and type of proposed mitigation.

10.3.16 GLVIA3 defines the ZTV as “a map, usually digitally produced, showing areas of land within which a development is theoretically visible.” As the ZTV indicates only theoretical visibility, the actual potential for views and the extent of views has been determined through fieldwork. The ZTV has been updated as the design of the Scheme has progressed.

Visual receptors and representative viewpoints

10.3.17 Visual receptors likely to experience views of the construction, operation or decommissioning of the Scheme have been identified through interrogation of

the ZTVs and fieldwork surveys, and subsequently categorised into the following types:

- Residents;
- Workers/people engaged in commercial activity, including farm workers;
- Users of PRow;
- Designated specific viewpoints; and
- People traveling through the area on roads.

10.3.18 Where a collection of visual receptors in the same category are likely to experience similar views, they have been grouped.

10.3.19 A total of 38 representative viewpoints have been identified within the study area as a result of consultations with Lincolnshire County Council. The viewpoints assisted describing the baseline views and the effects likely to be experienced by associated visual receptors. These representative viewpoints have been selected on the basis that they cover a range of viewing distances, elevations and orientations from locations with different viewing experiences of the Scheme. The selection of representative viewpoints has been informed by the following criteria:

- Accessibility to the public;
- Designated specific viewpoints;
- Number and sensitivity of viewers who can be affected;
- Viewing direction, distance (i.e. short, medium or long-distance views) and elevation;
- Nature of the viewing experience;
- View type; and
- Cumulative views in conjunction with other development projects.

10.3.20 These photographs and visualisations have been prepared in accordance with best practice guidance published by the Landscape Institute (Ref 6). Photographs are presented as Type 1 annotated viewpoint photographs and visualisations as Type 4 photomontages.

Sensitivity of receptors

Landscape sensitivity

10.3.21 Paragraph 5.39 of GLVIA3 states that “landscape receptors need to be assessed firstly in terms of their sensitivity, combining judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape”.

Landscape Value

10.3.22 With reference to GLVIA 3, landscape value refers to the relative value that is attached to different landscapes by society. The definition and application of landscape value has also been informed by the Landscape Institute Technical Guidance Note 02/21: Assessing landscape value outside national designations.

10.3.23 The assessment of the value of each landscape receptor has been informed by the information set out in the baseline, including any relevant landscape

designations, geographic criteria and valued attributes as set out in GLVIA3 Box 5.1, e.g. aesthetic, perceptual or experiential value.

10.3.24 Landscape value is assessed on a five point scale of very high, high, medium, low and very low, applying professional judgement and with reference to the criteria in Table 1.

Table 1 Criteria for the Assessment of Landscape Value

Classification	Criteria
Very High	<p>The landscape is likely to be valued for one or more of its attributes at a national or regional level, and may be protected by a statutory landscape designation, e.g. National Park or Area of Outstanding Natural Beauty (AONB). The landscape may contain elements/features which are rare or perceived as very representative of the national or regional attributes and cultural associations.</p> <p>The landscape may provide a high scenic and landscape quality as well as many recreational opportunities.</p>
Medium	<p>The landscape is likely to be valued for one or more of its attributes at a community or local level and may be designated by a landscape policy designation, e.g. Area of Great Landscape Value.</p> <p>The landscape may contain elements/features which are representative of the community or local level attributes and cultural associations.</p> <p>The landscape may provide some scenic and landscape quality and some recreational opportunities.</p>
Very Low	<p>The landscape is likely to be valued at a limited level only and not covered by any landscape designations.</p> <p>The landscape may contain features which are common and therefore do not specifically contribute to the wider landscape or cultural association.</p> <p>The landscape may provide a limited scenic and landscape quality and few recreational opportunities.</p>

Landscape Susceptibility

10.3.25 GLVIA3 paragraph 5.40 defines landscape susceptibility as:

“the ability of the landscape receptor (whether it be overall character or condition of a particular landscape type or area, or an individual element and/or features, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies” (paragraph 5.40).



10.3.26 The following aspects of the landscape are considered to be particularly susceptible to the change proposed:

- Overall agricultural character of the landscape;
- Sense of remoteness from development;
- Openness of landscape;
- Landscapes with sloping or elevated topography;
- Intricate, historic landscapes;

- Vegetation patterns formed by the network of hedgerows and blocks of woodland; and
- Sense of separation between existing settlements.

10.3.27 Landscape susceptibility is assessed on a five point scale of very high, high, medium, low and very low applying professional judgement and with reference to the criteria set out in Table 2.

Table 2 Criteria for Landscape Susceptibility

Susceptibility Classification	Susceptibility Criteria
Very High 	The receptor has a low capacity to accommodate the proposed development without effects upon its overall integrity. The landscape is likely to have a strong pattern/texture or is a simple but distinctive landscape and essentially intact. Undue consequences are likely to arise from the Scheme.
Medium 	The receptor has some capacity to accommodate the proposed development without effects upon its overall integrity. The pattern of the landscape is mostly intact and/or with a degree of complexity and with features mostly in reasonable condition. Undue consequences may arise from the Scheme.
Very Low	The receptor is robust; it can accommodate the proposed development without effects upon its overall integrity. The landscape is likely to be simple, monotonous and/or partially degraded with common/indistinct features and minimal variation in landscape pattern. Undue consequences are unlikely to arise from the Scheme.

Landscape Sensitivity

10.3.28 Landscape value and landscape susceptibility is assessed separately and then combined to define the sensitivity of the landscape receptor, with reference to the criteria set out in Table 3.

Table 3 Assessment of landscape Value and susceptibility.

Sensitivity	Description
Very High	Landscapes of international or national value with distinctive and rare elements with a very high susceptibility to the Scheme.
High	Landscape of national or regional value with distinctive elements and characteristics, with a high susceptibility to the Scheme. Typically these would be landscape receptors: <ul style="list-style-type: none"> • With distinctive elements and features making a positive contribution to character and sense of place. • Likely to be designated or are adjacent to the designated area but exhibit elements which underpin the designation, especially at the local scale. • Areas of special recognised landscape value through use (e.g. visitors), perception or historic and cultural associations. • Likely to contain features and elements that are rare and could not be replaced.
Medium	Landscape of local or community value, with mostly common elements and characteristics, which by nature of their character would be able to accommodate some change. Typically these would be landscape receptors:

Sensitivity Description

	<ul style="list-style-type: none"> • Comprised of mostly common elements and features, creating a generally unremarkable character but with some sense of place. • Locally designated, or value may be expressed through non-statutory local publications. • Containing some features of value through use, perception or historic and cultural associations. • Likely to contain some features and elements that could not be replaced.
Low	<p>Landscape of community or limited value and relatively inconsequential elements and characteristics, the nature of which is potentially tolerant of substantial change of the type proposed. Typically these would be;</p> <ul style="list-style-type: none"> • Comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place. • Not designated. • Containing few, if any, features of value through use, perception or historic and cultural associations. • Likely to contain few, if any, features and elements that could not be replaced.
Very Low	<p>Landscape of very low or limited value, which is damaged, degraded or a substantially modified landscape pattern with few or no natural or original features remaining, such that it is tolerant of change.</p>

Visual sensitivity

10.3.29 Paragraph 6.31 of GLVIA3 states that “each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, should be assessed in terms of both their susceptibility to change in views and visual amenity and also the value attached to particular views.” The sensitivity of visual receptors results from a combination of parameters, such as:

- the activity/occupation/ pastime of the receptors at particular locations;
- the extent to which their attention or interest may be focused on the views; and
- the visual amenity they experience.

10.3.30 Consideration has been given to the:

- location, relative focus and orientation of particular views;
- quality or importance of the existing view and its attractiveness / or scenic quality;
- principal or secondary interest in that particular view;
- static or sequential nature of views;
- ability of the view to accommodate the type of development and the frequency; and
- duration of the view.

Value attached to views

10.3.31 GLVIA3 stresses the importance of considering the value attached to views, for example in relation to heritage assets within the view, or through planning designations. It provides a list of indicators of the value of views in paragraph 6.37, including:

- Appearance in guidebooks or tourist maps;
- Provision of facilities, such as parking places, sign boards and interpretive materials; and
- References in literature or art.

10.3.32 The assessment of the value attached to views is also informed by the location of the viewing place and the quality or designation of the existing elements in the view, with reference to the criteria set out in Table 4 below.

Table 4 Classification of Views.

Classification	Value of View
Very High	Recognised or iconic views within nationally/internationally designated landscapes, such as National Parks, Areas of Outstanding Natural Beauty (AONB) and/or national/international landmarks with views recognised in planning policy and/or management plans.
High	Views or viewing places identified in regional strategies.
Medium	Views across high quality landscape which might include features of interest, such as landmarks, which may be identified in the Local Plan.
Low	Views of relatively common landscape elements, likely to be valued by the communities which experience the view.
Very Low	Views across poor quality landscape with a high degree of detracting or common elements.

Susceptibility of visual receptors to change

10.3.33 GLVIA3 notes that visual receptors “most susceptible to change”, include residents and visitors engaged in outdoor recreation “*whose attention or interest is likely to be focused on the landscape and on particular views*” (para 6.33).

10.3.34 Table 5 sets out the criteria referenced in determining the susceptibility of visual receptors to the change proposed.

Table 5 Classification of Visual Susceptibility.

Classification	Visual Susceptibility
Very High	People visiting areas where the view is a very important part of the experience and specific to the reason for visiting the location.
High	People visiting areas where the view is an important part of the experience and/or residents with an expectation of enjoyment of the view.
Medium	People passing through the area where views are relevant to the experience of the journey but are not specific to the reasons for visiting.

Classification Visual Susceptibility

Low	People passing through the area on secondary roads, where the view is not relevant to the activity. People working outdoors where the view is not relevant to the activity but may enhance it.
Very Low	People working in buildings where the view is not relevant to the activity or passing through the area of main road and rail networks, such that views are variable and expectation of enjoyment of them is secondary.

10.4 Sensitivity of visual receptors

10.4.1 The following criteria, as set out in Table 6 have been referred to in determining the sensitivity of visual receptors from the combination of value and susceptibility. The criteria are included as an indicative example rather than definitive categories;

Table 6 Indicative Classification of Sensitivity of Visual Receptors.

Classification Sensitivity of Visual Receptors

Very High	Viewers specifically visiting a designated view or highly promoted view of a designated landscape or international or national feature, in order to enjoy it.
High	Viewers with or undertaking activity with a particular interest or appreciation of the view (e.g. residents with principal private views, or people engaged in outdoor recreation whose attention is focused on the landscape and where people might visit purely to experience the view, such as promoted viewpoints) and/or a view of national value (e.g. within/towards a designated landscape).
Medium	Viewers with or undertaking activity with general interest or appreciation of the view (e.g. residents or people engaged in outdoor recreation that does not focus on an appreciation of the landscape, outdoor workers, people in schools or other institutional buildings and hotels and people passing through the landscape on defined scenic routes) and/or a view of local or community value (e.g. suburban residential areas, or agricultural land or urban areas).
Low	Activity where interest or appreciation of the view is secondary to the activity or the period of exposure to the view is limited (e.g. people at work, motorists travelling through the area or people engaged in outdoor recreation that does not focus on an appreciation of the landscape) and/or a view of limited value (e.g. featureless agricultural landscape, poor quality urban fringe).
Very Low	Activity where interest or appreciation of the view is inconsequential (e.g. people at work, or drivers of vehicles on main roads) and/or very low value of existing view (e.g. industrial areas or derelict land).

10.5 Magnitude of effects

10.5.1 GLVIA3 notes that magnitude is informed by combining considerations relating to the “*scale, extent and duration*” of effect (para 3.28). This includes the geographical extent of influence, the spatial extent of the effect, the level of integration of new features with existing elements, its duration and degree to which the effect is reversible.

10.5.2 The assessment considers the duration of effects, defined as short, medium and long term. Durations have been defined as:

- Short term: 0 – 2 years;
- Medium term: 2 – 10 years; and
- Long term: 10 years +.

Magnitude of landscape effects

- 10.5.3 The indicative criteria applied to determine the magnitude of landscape effects are set out in Table 7. These are indicative and provide an example of considerations, supported and modified by explanative text in the LVIA.

Table 7 Indicative Criteria for Magnitude of Landscape effects

Magnitude	Typical Criteria Descriptors
High	Large alteration to the landscape receptor or may impact an extensive area or unique characteristics at a local level. May be longer term impacts, permanent or reversible.
Medium	Partial alteration to the landscape receptor or may impact a wide area or characteristics at a local level. May be medium term impacts, permanent or reversible.
Low	Slight alteration to the landscape receptor or may impact a restricted area and few key characteristics. May be short to medium term impacts, permanent or reversible
Very Low	Very slight alteration to the landscape receptor or may impact a limited area or no key characteristics. May be short term impacts, permanent or reversible.
None	No change to the landscape receptor.

Magnitude of visual effects

- 10.5.4 The magnitude of visual effect results from changes in the composition of views or changes to the overall visual amenity. It includes combinations of the degree of change, the extent over which the change has been visible, the period of exposure to the view and reversibility or permanence of the change and is classified in Table 8. These are indicative and provide an example of considerations, supported and modified by explanative text in the LVIA.

Table 8 Indicative Criteria Descriptors for Visual Magnitude.

Magnitude	Typical Criteria Descriptors
High	The Scheme will cause a pronounced change to the composition of the view or may be viewed in the foreground or directly. May be longer term effects, permanent or reversible and could include glint and glare effects.
Medium	The Scheme will cause a noticeable change to the composition of the view or may be viewed in the middle ground or indirectly. May be medium term effects, permanent or reversible and could include glint and glare effects.
Low	The Scheme will cause an unobtrusive change in the composition of the view or may be viewed in the background or obliquely. May be short to medium term effects, permanent or reversible and is not likely to include glint and glare effects.
Very Low	The Scheme will cause a barely perceptible change in the composition of the view or may be viewed in the background and very obliquely. May be short term effects, permanent or reversible and would not include glint and glare effects.
None	No change to the view.

10.6 Significance of Effect

10.6.1 The significance of landscape and visual effects has been determined by considering the relationship between the sensitivity of the receptor and the magnitude of effect.

10.6.2 A guide to this relationship is set out in the matrix in Table 9. However, should professional judgement consider that the effect is different to that in the matrix, then a reasoned justification is presented in the LVIA. Similarly, where the matrix allows for different levels of significance of effect (e.g. major or moderate) a reasoned explanation is provided in the assessment as to the conclusion.

Table 9 Sensitivity of Receptor in Relation to Magnitude of Effect

Sensitivity or value of resource/receptor	Magnitude of Effect				
	High	Medium	Low	Very Low	None
Very High	Major	Major or Moderate	Moderate or Minor	Minor or Negligible	Neutral
High	Major or Moderate	Moderate	Moderate or Minor	Minor or Negligible	Neutral
Medium	Major or Moderate	Moderate or Minor	Minor or Negligible	Negligible	Neutral
Low	Moderate or Minor	Minor	Minor or Negligible	Negligible	Neutral
Very Low	Minor	Minor or Negligible	Negligible	Negligible	Neutral

10.6.3 Following the classification of an effect, clear statements has been made within the LVIA as to whether that effect is significant or not significant.

10.6.4 As a general rule, major and moderate (adverse or beneficial) effects are considered to be significant, whilst minor, negligible and neutral effects are considered not to be significant.

10.7 Relationship to the Glint and Glare Assessment

10.7.1 The LVIA process includes a review of the conclusions of the Glint and Glare Assessment, which is included in **ES Volume 3: Appendix 15-D [EN01031/APP/3.3]**. These are considered within assessment of the magnitude of landscape and visual effects as set above for the visual magnitude of effect.

10.8 Relationship to Residential Visual Amenity

10.8.1 The LVIA has assessed the potential visual effects to different types of visual receptor, including residents, i.e. private views.

- 10.8.2 With reference to the Landscape Institute's Technical Guidance Note 2/19: 'Residential Visual Amenity Assessment' (Ref 6), the Residential Visual Amenity Threshold is considered as to whether:
- 10.8.3 *"the effect of the development on Residential Visual Amenity of such nature and / or magnitude that it potentially affects 'living conditions' or Residential Amenity."*
- 10.8.4 The guidance is based upon a 'four' stage approach. Stages 1 to 3 accord with the above LVIA methodology, whereby, in line with GLVIA3, visual receptors are identified, along with the magnitude of effect and the significance of effect.
- 10.8.5 The fourth step is a more detailed examination of views from residential properties, where appropriate, when the highest 'significance of effect' levels are identified via stages 1 to 3. Although, as stated by the guidance, there are no '*hard and fast rules*' as to making a judgement on the Residential Visual Amenity Threshold.
- 10.8.6 The PEI Report identified potential for residual significant adverse visual effects on residents living in proximity to the Order limits. Therefore, visits to private land surrounding the properties were undertaken. Consultations with residents was undertaken between July and September 2022. This site analysis and consultation informed a series of design changes to mitigate the potential for significant adverse visual effects on residents.
- 10.8.7 Following these design changes, the LVIA has not identified the likelihood of significant adverse effects at year 15 of operation on residents. As such the RVAT was not reached and therefore a RVAA has not been carried out.

10.9 Zone of Theoretical Visibility Methodology

- 10.9.1 ZTVs have been modelled using the 'Viewshed' tool in ESRI ArcMap GIS Software.
- 10.9.2 A bare earth ZTV was prepared using Environment Agency Lidar digital terrain model (DTM) data of 1m resolution.
- 10.9.3 The ZTV that accounts for surface features, such as existing buildings and woodland, was prepared using Environment Agency digital surface model (DSM) of 2m resolution.
- 10.9.4 For all of the ZTVs an assumed viewing height of 1.6m above ground level has been used to simulate the eye level of a person of average height.
- 10.9.5 The proposed PV Panels, BESS, Gate Burton Substation and permanent plant buildings have been modelled as part of the ZTV.
- 10.9.6 Cumulative ZTVs have been prepared assuming a viewing height of 1.6m above ground level showing the Scheme (all components) in conjunction with the PV panels of the 3rd party solar farms (based on information available at the time of writing the ES in September 2022).

10.10 Visualisations (Photomontage) Methodology

- 10.10.1 Visualisations of the Scheme which superimpose the Scheme onto existing photographs for publication with the Environmental Statement. These visualisations have been prepared in accordance with Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals and represent 'Type 4' visualisations.
- 10.10.2 Photographs have been captured using a digital camera with a field of view to accommodate the necessary scope of the Scheme and relevant context. The camera has been positioned 1.60m above ground level and mounted on a tripod, sliding plate and levelling base.
- 10.10.3 A professional surveyor has used GPS equipment to record the camera position and several survey points within each view, and the focal length, date and time the photograph is taken.
- 10.10.4 The camera outputs has been captured in a standard compressed file-type (JPEG). The compressed photographs will then be processed and stitched using the software package Hugin; which re-projects and blends multiple source images into panoramas with exposure, vignetting and white balance correction.
- 10.10.5 Details have been added using CAD data to a three-dimensional computer model of the Scheme to achieve a realistic representation of the Scheme.
- 10.10.6 Once this model is created it has been positioned in 3D software using the general arrangement drawings.
- 10.10.7 A virtual camera was then be placed within the scene at the correct surveyed location. The virtual 3D camera has been rotated to the correct position with the captured photography as a backplate and the survey points has been used to verify the alignment.
- 10.10.8 To obtain photo-realism, physically accurate lighting is required alongside materials and textures. V-RaySun and V-RaySky reproduce the real life Sun and Sky environment of the earth. Both are coded so that they change their appearance depending on several factors, such as the direction of the V-RaySun; which was dynamically linked and georeferenced to the real-world position of the Site, the time, day and month.
- 10.10.9 Using this lighting system, alongside the physically accurate material properties, the software calculates the effects of the sun and sky conditions on the appearance of the Scheme, illustrating the anticipated effects.
- 10.10.10 Once the rendering stage is complete, the images have been brought into Adobe Photoshop to superimpose the Scheme onto the digital images of the Site. The foreground details such as trees, buildings or topography will then be overlaid as masks; ensuring the depth of the various items is represented correctly. If required, the rendered image will then be further edited to accurately match the colour, saturation and environmental effects shown in the original photograph.

11. References

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