WHITESTONE
solar farm

WHITESTONE SOLAR FARM

Volume 6: Environmental Statement

6.20 Appendix 7.2: Landscape and Visual Impact Assessment Methodology

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Glossary

Term	Meaning
Cable Corridors	Corridors within which the high voltage cables would be constructed.
Digital Surface Model	Referring to a digital topographical model of the landform including buildings and vegetation that may screen views.
Environment Statement (ES)	Environmental Statement which presents the environmental information relating to the Proposed Development and assessment of potential effects. The ES has been prepared as part of the Application.
Photomontage	Where the Proposed Development model is superimposed onto existing baseline photography in accordance with TGN 06/19.

Order Limits	Maximum extent of the Proposed Development comprising the Site and Cable Corridors
The Applicant	Whitestone Net Zero Ltd
The Application	The Application to be submitted to the Secretary of State for a Development Consent Order.
The Proposed Development	The proposed Whitestone Solar Farm.
The Site	The land planned to be used for solar PV array and associated infrastructure, BESS, substations, and landscaping and habitat enhancement. The Site is split into W1, W2, and W3.
Whitestone 1 (W1)	The northern parcels of the Whitestone Solar Farm.
Whitestone 2 (W2)	The middle parcels of the Whitestone Solar Farm.
Whitestone 3 (W3)	The southern parcels of the Whitestone Solar Farm.

Acronyms

Acronym	Meaning
AOD	Above Ordnance Datum
DEFRA	Department for Environment Food and Rural Affairs
DSLR	Digital Single Lens Reflex
DSM	Digital Surface Model
EIA	Environmental Impact Assessment
ES	Environmental Statement
GIS	Geographical Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Edition
ISEP	Institute of Environmental Management and Assessment
LSE	Likely Significant Effects
LVIA	Landscape and Visual Impact Assessment
RMSE	Root-Mean-Square-Error
TGN	Technical Guidance Note
ZTV	Zone of Theoretical Visibility

Units

Units	Meaning
cm	Centimetre
m	Metre

7.2 Landscape and Visual Impact Assessment Methodology

Methodology

7.2.1 Landscape and Visual Impact Assessment (LVIA) is a tool used to systematically identify and assess the nature and significance of the effects of a proposed development upon both the landscape and views and visual amenity. The purpose of the LVIA is to identify the level and nature of effect arising from a proposed development and if necessary, through an iterative design process, to inform changes to the development and evolution of mitigation strategies which minimise significant effects wherever possible.

7.2.2 The methodology for this LVIA was informed by the Guidelines for Landscape and Visual Impact Assessment (The Landscape Institute and Institute of Environmental Assessment, 3rd Edition, 2013 (GLVIA3)[1]), including Landscape Institute Notes Technical Guidance Notes (LITGN-2024-01) as required. The LVIA aims to establish the following:

- A clear understanding of the development site and its context, in respect of the physical and perceived landscape and of views and visual amenity
- An understanding of the Proposed Development in terms of how this would relate to the existing landscape and views
- An identification of significant effects of the Proposed Development upon the landscape and upon views, throughout the life cycle of the development, including cumulative interactions with other developments
- Identification of the mitigation measures that have been adopted in order to reduce or eliminate any potential adverse effect on the landscape or views arising because of the solar PV array, associated infrastructure, BESS, and substations; and
- A conclusion as to the residual significant effects of the Proposed Development.

7.2.3 Professional judgment plays a critical role throughout the LVIA process. This judgment should be applied within a clearly defined assessment framework that transparently outlines the steps taken in the evaluation process leading to the final conclusions. This principle is highlighted in Box 3.1 (page 37) of the GLVIA3, which advocates for a structured methodology that takes into account both the sensitivity of the receptor and the magnitude of the effect when assessing the significance of an impact.

7.2.4 To ensure the transparency of the assessment process and professional judgements involved, the LVIA adheres to a standardised methodology encompassing the following key steps:

- Establishing baseline conditions, through desktop studies and field surveys, which serve as the reference point for evaluating the effects of the Proposed Development
- Determining the sensitivity of the receptor likely to be affected
- Predicting the nature of the effects that are likely to arise; and

- Assessing the potential for significant effects on any receptor, by evaluating the predicted magnitude of change in conjunction with the sensitivity of the receptor, while also considering any proposed mitigation measures.

7.2.5 Landscape and visual matters are closely related and interlinked subject areas but are separate issues and are dealt with as such throughout the LVIA. The methodologies for assessing both are outlined separately below.

Landscape Assessment

7.2.6 The landscape assessment considers the potential impacts of the Proposed Development on various landscape components. The landscape receptors that may be affected include:

- Individual physical landscape elements and features e.g., trees, woodlands water bodies, field patterns, topography and built structures (sometimes referred to as landscape fabric)
- Specific aesthetic and perceptual qualities of the landscape e.g. scenic quality, sense of place, cultural association, tranquillity, wilderness; and
- The character and key characteristics of the landscape within each area i.e. landscape character areas or types e.g. moorland, historic parkland, urban fringe.

Landscape Sensitivity

7.2.7 Landscape sensitivity refers to the degree to which a host landscape can accommodate change or development without significant adverse effects on its character, or features. The characteristics of a landscape receptor that may be impacted, along with its sensitivity, are determined by evaluating two key factors:

- Susceptibility to change; and
- The value.

7.2.8 These factors are assessed in conjunction. Professional judgement ultimately informs the final decision of sensitivity, acknowledging the non-linear and complex relationship between susceptibility and value. A reasoned narrative is provided to justify the specific sensitivity assigned to each receptor and the rationale on how the judgement has been made. This evaluation is typically represented on a three-point scale with classifications) of Low, Medium, and High or intermediate levels, as necessary.

7.2.9 The overall landscape sensitivity is assessed by considering both the susceptibility to change and value together to form the overall sensitivity of a landscape receptor. It is noted that the relationship between susceptibility to change and value can be complex and is not linear. While a highly valued landscape may have a low susceptibility to change. Professional judgement is used to determine the overall landscape sensitivity. The judgement is presented as a three-point scale, with the possibility of utilising intermediate sensitivity evaluations (for instance, high to medium). The standard criteria are presented in **Table 7.2.1**.

Table 7.2.1 – Landscape Sensitivity Typical Criteria

Typical Criteria	Classification
Landscapes of high value, with high susceptibility and higher values or nationally designated landscapes with limited ability to accommodate development	High
Landscapes of medium value, with moderate levels of susceptibility and moderate value, typically locally designated landscape with some ability to accommodate development	Medium
Landscapes of low vale, with lower levels of susceptibility and low value, typically not designated landscapes with opportunities to accommodate development	Low

Susceptibility to Change

7.2.10 Susceptibility is defined in GLVIA3 (para 5.40) as:
"The ability of a defined landscape or visual receptors to accommodate the specific proposed development without undue negative consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies."

7.2.11 To understand susceptibility to change, the various characteristics/components that make up a particular landscape must first be identified and then consideration given as to how these would be affected by the Proposed Development. Consideration is given to physical and perceptual factors which are considered together to derive an overall susceptibility to change. The factors influencing the susceptibility of a landscape to change are set out below:

- Scale: A larger scale landscape (relative to the development proposed) will typically be less susceptible than a smaller scale landscape
- Pattern/Complexity: The susceptibility of a receiving landscape to change will be influenced by the specific pattern of features and elements present and by the complexity of this pattern
- Landform: Landscapes with an absence of strong topographical variety will be less susceptible than those with strong topographical variety or distinctive landforms, including skylines
- Land cover: landscapes that are previously developed, continuous monoculture or large arable would less susceptible than natural or semi natural landcover such as moorlands, large area of woodland or historic parkland landscapes
- Settlement and Human Influence: A landscape that includes obvious alterations to natural ground levels, contemporary development, or that is clearly functional/utilitarian in land use will typically be less susceptible than one where development is more traditional in style, or where natural influences and natural or long-established landforms are predominant
- Tranquillity and sense of remoteness: Landscapes with lots of human activity would be less susceptible than those with a sense of isolation or are remote and empty of human activity

- Connections with adjacent areas: A landscape which has a clear relationship with other surrounding landscapes, for example in relation to views in and out, will typically be more susceptible than one where such relationships are not present; and
- Visual Interruption: A landscape where views are frequently interrupted by screening features, for example vegetation cover or variations in landform, will typically be less susceptible than one where there are few / no screening features.

7.2.12 A particular landscape may have distinctive characteristics that are susceptible to change. As such, the overall susceptibility to change is allocated using professional judgement based upon consideration of the range of factors outlined above and the relative weight attached to these (which will vary from landscape to landscape). The assessment of susceptibility is expressed using a three-point verbal scale of high, medium, or low. Where appropriate, intermediate levels such as medium/high or low/medium are used to refine the assessment. The rationale in support of the assessment of susceptibility is set out for each receptor in the assessment, so that it is clear how each judgement has been made. Typical criteria are set out in **Table 7.2.2**.

Table 7.2.2 – Landscape Susceptibility

Typical Criteria	Rank
A landscape which would be unlikely to accommodate change without undue negative consequences. The scale or development would be uncharacteristic. Mitigation would be unlikely to reduce impacts	High
A landscape which would be reasonably able to accommodate change without major negative consequences. The scale or development would not be wholly uncharacteristic. Mitigation would be possible but may take time and not fully restore or enhance the baseline condition.	Medium
A landscape that is able to accommodate change with minimal negative impacts. The scale of development would align with the existing character of the area. Mitigation measures would be easily implementable and could even enhance the overall environment.	Low

Landscape Value

7.2.13 Landscape value is defined in the GLVIA3 glossary as:

"The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of different reasons."

7.2.14 The absence of a formal landscape designation does not necessarily imply that a landscape is of lower value. In accordance with relevant guidance (Technical Guidance Note 02/21) the following factors that influence value are:

- Presence/absence of statutory landscape designations
- Presence/absence of local landscape designations and associated policies

- Landscape quality and condition
- Scenic quality
- Sense of place/ distinctiveness
- Rarity of particular elements/features
- Representativeness
- Conservation interest
- Recreation value
- Historical landscape features e.g. monuments and ruins
- Perceptual aspects
- Functionality; and
- Cultural associations.

7.2.15 The assessment of value is determined on a similar basis to that for susceptibility of change. **Table 7.2.3** presents the standard factors used to determine value. Where appropriate, intermediate levels such as Medium / High or Low / Medium are used to refine the assessment.

Table 7.2.3 – Landscape Value

Typical Criteria	Rank
A landscape with important components or has distinctive character and/or strong sense of identity, typically, a nationally designated landscape or it may be undesignated but would have very limiting detracting features. Such landscape may feature elements that are nationally rare but locally abundant. The overall condition of the landscape would be very good, typically, and or would have a perceptual or cultural association and high recreational value.	High
A landscape with moderately important positive characteristics and a sense of identity. It may include elements recognised under national designations/ local designations or it may be undesignated while exhibiting some detracting features. The landscape features are generally not considered rare. The landscape condition would be considered to be fair or good and may possess some cultural associations and offer recreational value.	Medium
A landscape of low importance, with weak character, typically, lacking in a sense of place. It would also be unlikely to be designated. The overall condition of the landscape would be considered as fair or poor although it may offer some recreational value.	Low

Landscape Magnitude

7.2.16 The assessment of magnitude of change is established using the following:

- Size or scale - refers to the extent of existing landscape elements that would be lost, the proportion of the total extent that this represents and contribution of that element to the wider character. It also relates to whether the change affects key characteristics and includes the removal or addition of new landscape components; and

- Geographical extent – this considers the geographical area over which the landscape effects may been experienced. This is at site level; level of the immediate setting; at the scale of the local landscape character area; and may be on a larger scale affected a number of local landscape areas or a regional landscape area. It is not the same as size and scale, as small-scale change may be experiences over a wider area, or vice-versa.

7.2.17 In addition to the above the following are considered to be modifiers to the size or scale and geographical extent which are the most important factors:

- Duration – This refers to the length of time for which an effect would be experienced which is defined on the following scale:
  - Short term (0-5 years)
  - Medium term (5-15 years); and
  - Long term (over 15 years).
- Reversibility – This refers to whether an effect can be reversed either wholly or partially, or whether the change cannot realistically be reversed, i.e. it is permanent. For instance, how easily it is to reinstate the previous conditions.

7.2.18 Size or scale and geographical extent are considered together to determine the overall magnitude of change for each landscape receptor, through professional judgement. The evaluation utilises a four-point scale of High, Medium, Low or Negligible. If appropriate intermediate levels such as small to medium may be used. **Table 7.2.4** sets out typical criteria for determining the magnitude of change. However, there must be a reasoned narrative as is set out in GLIVA3 to substantiate the magnitude of change assigned to each receptor.

Table 7.2.4 – Landscape Magnitude of Change

Typical Criteria	Rank
A substantial change in landscape characteristics and/or over extensive geographical area and/or which may result in an irreversible landscape impact. Typically of long-term duration.	High
A moderate change in landscape characteristics and/or which may occur over a large geographical area. Typically of medium to long term duration.	Medium
A small change in landscape characteristics and/or which may be over a relatively localised geographical area. Typically of short duration.	Low
A barely perceptible change in landscape characteristics and/or which is focused on a small geographical area. Typically of short or very short duration.	Negligible

Visual Assessment

7.2.19 Visual assessment is concerned with the potential effects upon visual receptors (namely people) likely to be affected (i.e. the views experienced by people). As is the case for the landscape assessment, the sensitivity of each visual receptor s identified, as is the magnitude of the change that would occur. These are then considered together to determine the level of effect and whether the effect is significant or not.

7.2.20 The key focus of the visual assessment is the assessment of effects from several viewpoints, which reflect views available to different groups of people and thus consider the sensitivity of receptors. The viewpoint itself is not the receptor, rather it is the people that would be experiencing the view. These people will generally have different responses to a change in view depending upon their location, their occupation or activity and other factors, including weather and time of day or year. Viewpoints fall into three categories (as set out in GLVIA3):

- Representative Viewpoints (which represent the experience of different types of receptors nearby)
- Specific viewpoints (a particular view, e.g., a promoted view); and
- Illustrative viewpoints (which illustrate a particular effect or issue, which may include limited or lack of visibility).

7.2.21 Private viewpoints, such as from specific residential properties are not typically included in the LVIA. It is often impractical to visit all impacted properties and access to private land may not be permitted. However, representative, or specific viewpoints from nearby publicly accessible locations can provide a reasonable indication of the potential effects that may arise from private land close by.

Visual Sensitivity

7.2.22 The sensitivity of a visual receptor, which is likely to be impacted, is influenced by two key factors.

- Susceptibility to change; and
- Value.

7.2.23 Susceptibility to change and value are considered together as discussed above for landscape sensitivity. Professional judgment plays a critical role in determining the final sensitivity rating of the receptor, given the intricate and non-linear relationship between susceptibility and value. A well-reasoned narrative is provided to justify the sensitivity assigned to each receptor and to clarify the basis for the judgment made. This assessment, akin to the landscape evaluation, is categorised using a three-point scale Low, Medium, and High along with the potential for intermediate levels if necessary.

7.2.24 The typical criteria to determine visual sensitivity is presented in **Table 7.2.5**.

Table 7.2.5 – Visual Sensitivity Typical Criteria

Typical Criteria	Classification
Typically, individuals with an interest or appreciation of the views, and experience views across highly valued landscapes, or promoted routes or lookouts, or associated with cultural aspects	High
Typically, individuals with general interest in appreciation of views, e.g. private views or those looking over medium valued landscapes or those walking along public rights of way	Medium
Typically, individuals whose interest or appreciation of views is secondary to their activity such as outdoor workers, those engaged in sport or those looking over landscapes with low value.	Low

Visual Susceptibility to Change

7.2.25 Visual susceptibility to change is defined within GLVIA3 as

"6.32 mainly a function of:

- *The occupation of activity of people experiencing the view at particular locations; and*
- *The extent to which their attention or interest may therefore be focused on the views and visual amenity they experience at particular locations."*

7.2.26 Susceptibility to change is, in part based upon indicative criteria, provided in GLVIA3. The typical criteria are set out in **Table 7.2.6**.

7.2.27 It is important to note, that the table addresses only the first bullet above and part of the second bullet as defined in GLVIA3 paragraph 3.1.5 (which are focussed on the occupation or activity of the people and the extent to which their attention is focussed on the view).

7.2.28 As such, the assessment of susceptibility in **Table 7.2.6** and within GLVIA3 (pages 113 & 114) requires adjustment to reflect the requirements of the final part of the second bullet point above, namely the visual amenity that people currently experience. GLVIA3 identifies clearly that the division between categories of susceptibility to change:

"6.35. is not black and white and in reality, there will be a gradation in susceptibility to change. Each project needs to consider the nature of the groups of people who will be affected and the extent to which their attention is likely to be focussed on views and visual amenity."

7.2.29 As such, the presence of existing detracting features in any given view may reduce the value and associated visual amenity of those experiencing the view. This may therefore reduce their susceptibility to certain types of change and ultimately their sensitivity.

7.2.30 The assessment of visual susceptibility adopts a three-point scale (with intermediate levels where appropriate), supported by a reasoned narrative that explains the judgement made.

Table 7.2.6 – Visual Susceptibility

Typical Criteria	Rank
• Residents at home; • Individuals engaged in outdoor recreation, whose attention/interest is likely to be focused on the landscape or particular views, including from promoted public rights of way; • Visitors to heritage assets or other attractions, where views of the surroundings are an important contributor to the experience; and • Travellers on scenic routes.	High
Individuals engaged in outdoor recreation, or travelling along local public rights of way or local roads, which are not promoted but where there is an appreciation of the surrounding landscape relevant to the experience; and Individuals working outdoors	Medium

Typical Criteria	Rank
Individuals engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape; and Individuals at their place of work whose attention may be focused on their work / activity and not their surroundings	Low

Visual Value

7.2.31 As set out in GLVIA3, paragraph 6.37, when considering value, this should take account of:

- *"Recognition of the value attached to particular views, for example in relation to heritage assets or through planning designations; and*
- *Indicators of the value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment and references to them in literature or art."*

7.2.32 The assessment of value adopts a 3-point scale as set out in **Table 7.2.7**.

Table 7.2.7 – Visual Value

Typical Criteria	Rank
A recognised view within, towards or across a designated landscape or heritage asset, or a locally important feature of key importance to defining or appreciating the local context e.g. a local landmark. Published or promoted views within guidebooks or sign boards.	High
A view within, towards or across a locally important landscape or heritage feature, or important to the local context. Viewpoints may be promoted or contain signage locally.	Medium
A view of little intrinsic merit in the local context, has many detracting features and does not add to the appreciation of the locality.	Low

Visual Magnitude of Change

7.2.33 Visual magnitude of change can be described as the nature of the effect that is likely to occur to the visual receptor. It is determined by the following four separate factors, the first two are considered to be the most important factors with duration and reversibility considered to be modifiers (refer to TGN 2024-01):

- Size or scale – the effect is determined by considering the following:
  - the scale of change in the view, in respect of the loss of or addition of features, and change in composition, including the proportion of the view occupied by the development.
  - The degree of contrast or integration of new features or other changes
  - The nature of the view, the relative amount of time it would be experienced for and whether the views would be full, partial, or glimpsed.
- Geographical extent – the effect will vary from view to view and will reflect the following:

  - The angle of the view in relation to the main occupation of the receptor
  - The distance from the Proposed Development
  - The extent over which change in the view would be visible
- Duration – the length of time over which the effect would be experienced e.g.:
  - Short term (0-5 years) or experienced for a short period of time in views from a route
  - Medium term (5-15 years) or experienced for a moderate period of time in views from a route; and
  - Long term (over 15 years) or experienced for a substantial period of time in views from a route/is persistent.
- Reversibility - whether the change can be reversed, is wholly or partially reversible or is permanent.

7.2.34 These four factors are then considered together to determine the overall visual magnitude of change for each visual receptor, through professional judgement. The assessment of visual magnitude of change is expressed using a four-point scale of High, Medium, Low, or Negligible. If appropriate, intermediate levels such as small to medium may be used. **Table 7.2.8** sets out typical criteria for determining the visual magnitude of change.

Table 7.2.8 – Visual Magnitude of Change

Typical Criteria	Rank
A change affecting a large proportion of a view, which may be seen across an extensive area or experienced as a persistent feature from a long section of a route, and/or contrasting with the existing view. May be short to long term and may be reversible.	High
A change affecting a moderate proportion of a view, which may be seen across a wider area or experienced from a moderate section of a route, and/or broadly compatible with the existing view. May be short to long term and may be reversible.	Medium
A change affecting a smaller proportion of a view, which may be seen from a limited area or experienced from a short section of a route, and/or compatible with the existing view. May be short to long term and may be reversible.	Low
A change which is barely perceptible in the view, and/or which is only briefly glimpsed from a route. May be short to long term and may be reversible.	Negligible

Level of Effect and Significance

7.2.35 The purpose of LVIA within the Environmental Impact Assessment (EIA) is to determine the likely significant effects (LSE) of the Proposed Development on the host/receiving landscape and the changes it makes to existing views. Not all landscape and visual effects arising because of the Proposed Development will be significant.

7.2.36 As highlighted by the Institute of Sustainability and Environmental Professionals (ISEP) (formerly the Institute of Environmental Management and Assessment), there are several other key factors that should also be considered when evaluating the significance of effect that are of relevance to LVIA. These relate to:

- Knowledge and experience of significance from previous assessments
- Details of the Proposed Development, such as construction and operational activities, and the nature of the effect associated with such activity
- Details about the environmental sensitivity of the area that will be affected;
- Feedback from scoping and consultation; and
- The wider legal and policy context, which offers protection to the environment and community.

7.2.37 Consequently, the level of effect and whether it is Significant or not can only be defined in relation to the Proposed Development and its specific location. Each LVIA is responsible for determining how judgments regarding receptor sensitivity and the magnitude of change should be combined to establish the level of effect and to clearly explain how the assessment has been made through professional judgment, and whether the level of effect is considered Significant.

7.2.38 **Table 7.2.9** provides a guide as to how sensitivity and magnitude can be combined to identify the level of effect upon a receptor. Where magnitude of change is assessed as 'Negligible,' effects are automatically considered to be Not Significant due to the minimal level of change from the baseline, which typically would not be readily perceptible. If appropriate, intermediate levels such as Minor/Negligible, Moderate/Minor or Major/Moderate may be used.

7.2.39 GLVIA3 identifies that:

- *"3.32. The regulations require that a final judgement is made about whether or not each effect is likely to be significant. There are no hard and fast rules about what effects should be deemed 'significant' but LVIA's should always distinguish clearly between what are considered to be significant and non-significant effects..."*
- *3.33. It is not essential to establish a series of thresholds for different levels of significant of landscape and visual effects, provided that it is made clear whether or not they are considered significant. The final overall judgement of the likely significance of the predicted landscape and visual effects is however, often summarised in a series of categories of significance reflecting combination of sensitivity and magnitude. These tend to vary from project to project but they should be appropriate to the natures, size and location of the proposed development and should as far as possible be consistent across the different topic areas of the EIA."*
- *5.56 & 6.44. There are no hard and fast rules about what makes a significant effect, and there cannot be a standard approach since circumstances vary with the location and {landscape} context and with the type of proposal."*

7.2.40 The judgement for this LVIA is that moderate and above effects are more likely to be considered Significant and are shaded grey in **Table 7.2.9.** This is because they would generally result from large magnitude of change on higher sensitivity receptors. This does not preclude a "Moderate" effect or lower being significant or a greater than "Moderate" effect not being significant. This judgement will depend on the specific circumstances being considered.

7.2.41 A significant effect occurring upon a receptor does not necessarily mean that such an effect will be unacceptable to decision-makers. This is a matter to be weighed in the planning balance alongside other factors. What is important is that the likely effects of any proposal are transparently assessed and described in order that the relevant determining authority can bring a balance and well-informed judgement to bear as part of the decision-making process.

7.2.42 It is also important to note that effects may be either Adverse (Negative) or Beneficial (Positive). An effect can be Significant and Adverse, or Significant and Beneficial. If change occurs with no obvious deterioration of improvement, this can be said to be neutral.

Table 7.2.9 – Level of Effect, Typical Correlations

	Landscape Sensitivity or Visual Sensitivity		
Magnitude of Change	**Low**	**Medium**	**High**
High	Moderate	Major/Moderate	Major
Medium	Moderate/Minor	Moderate	Major/Moderate
Low	Minor	Moderate/Minor	Moderate
Negligible	Negligible	Negligible	Minor

7.2.43 Where the level of effect is classed as Major, and Major/Moderate, this is considered to be 'Significant' and are shaded in dark grey above. Where 'Moderate' effects are predicted (shaded in light grey above), these have been concluded as 'Significant' in the assessment presented in **ES Volume 2, Chapter 7: Landscape and Visual Impact Assessment [EN0110020/APP/6.7]**, however, professional judgement can be used to determine whether the Moderate effects are Significant or Not Significant.

Cumulative Landscape and Visual Effects

7.2.44 The methodology to the cumulative assessment follows the guidance provided within GLVIA3. The landscape and visual baseline for the LVIA considers existing development, whereas the cumulative assessment considers the potential baseline of consented (unbuilt) and proposed developments.

7.2.45 The cumulative assessment is a high-level exercise. GLVIA3 (Ref. 1) (Paragraph 7.13) acknowledges that:

"assessing combined effects involving a range of different proposals at different stages in the planning process can be very complex".

7.2.46 GLVIA3 also acknowledges that there is a high degree of uncertainty regarding when undertaking a combined approach as it is not the role of this LVIA to assess the effects of other projects. Paragraph 7.13 notes that:

"the assessor will not have assessed the other schemes and cannot therefore make a fully informed judgement".

7.2.47 An assessment of the additional cumulative landscape and visual effects of the Ot alongside other similar cumulative developments has been undertaken for each of the landscape and visual receptors identified within the LVIA.

Magnitude of Cumulative Effects

7.2.48 The cumulative assessment for each landscape and visual receptor considers the additional effects of the Proposed Development in combination with other developments when judged against the baseline.

7.2.49 The sensitivity of each receptors remains the same as was reported in the LVIA. The magnitude of cumulative effect is judged against the same criteria defined in **Table 7.2.4** and **Table 7.2.8**.

7.2.50 Given the uncertainty associated with the programme of cumulative developments, it has been assumed that construction of cumulative developments would be concurrent with the construction of the Proposed Development. This would represent an unlikely worst-case scenario. If construction were to not occur simultaneously, then the cumulative effect would be likely less than reported.

Significance of Cumulative Effects

7.2.51 Similar to the LVIA, the assessment of cumulative landscape and visual effects results from consideration of the sensitivity of the receptor and the magnitude to change. Where a cumulative landscape and visual effect is identified over and above those set out in the LVIA, this is identified and described as major, moderate, minor, negligible or neutral. Effects are also identified as being beneficial or adverse.

Visualisation Methodology

Introduction

7.2.1 The purpose of this methodology is to provide an understanding of how visualisation material prepared to support the LVIA has been produced. The methodology addresses the production of Zone of Theoretical Visibility (ZTV) mapping and viewpoint visualisations.

7.2.2 It is important to acknowledge that the creation of visualisations represents only one aspect of a LVIA. This assessment encompasses a variety of factors when evaluating changes to the landscape and the views it offers. While visualisations serve as a valuable tool in the LVIA process, the overall assessment is not reliant solely on them. It is feasible to conduct a LVIA without visual materials; however, for major developments, the integration of visualisations is considered standard practice.

7.2.3 Current good practice regarding the production of visualisations is set out in GLVIA3 and the Landscape Institute (2019), Technical Guidance Note 06/19 (TGN 06/19) Visual Representation of Development Proposals.

7.2.4 Details of how the Viewpoint locations were selected, and which 'Type' of visualisation has been provided at each Viewpoint are set out in **ES Volume 1, Chapter 7: Landscape and Visual Assessment [EN0110020/APP.6.7]**.

7.2.5 Visual material that has been generated to support this LVIA include:

- ZTV plans; and
- Baseline photography, computer generated wirelines and computer-generated photomontage visualisations.

Zone of Theoretical Visibility

7.2.6 ZTV maps have been generated in order to better understand the likely extent of the surrounding landscape across which the Proposed Development would be visible.

Data Source

7.2.7 The ZTV was produced using a Department for Environment Food & Rural Affairs (DEFRA) composite 2m First Return Digital Surface Model (DSM) which is freely available. This model is derived from aerial photography captured in 2022 and takes account of screening features such as buildings and vegetation. Full details are set out in **ES Volume 1, Chapter 7: Landscape and Visual Assessment [EN0110020/APP/6.7]**.

7.2.8 The DSM is based upon a series of spot levels at 2m intervals. The declared 'root-mean-square-error' (RMSE) of this data is 15cm, i.e. the degree of error between the actual ground height of any particular location and the height as indicated by the DSM is between 0cm and 15cm.

ZTV Creation

7.2.9 The ZTV has been produced using Geographical Information System (GIS) software and takes account of the curvature of the earth's surface and light refraction. The eye height of the receptor in the computer model was set at 1.6m (the average height of an individual) above ground level in accordance with guidance set out in GLVIA3.

7.2.10 The ZTV illustrates the theoretical visibility of Proposed Development, at the heights set out in the assessment scenario as set out in **ES Volume 1, Chapter 7: Landscape and Visual Assessment [EN0110020/APP/6.7]**.

Limitations

7.2.11 A ZTV, as use of the term theoretical implies, is not an absolute indication of the extent of visibility but rather a computer-generated aid that utilises available relative data to indicate areas of inter-visibility and screening in relation to a specific modelled object. ZTVs are tools to assist the LVIA. The technique aims to give a better understanding of the areas where visibility is likely and unlikely but imperfections in data are such that it must only be seen as an aid to understanding. This limitation needs to be recognised when interpreting the ZTVs.

7.2.12 An additional caveat is that the ZTVs simply illustrates that part of a structure would be theoretically visible. As such, it makes no distinction between a clear view of all or most of a proposed feature and a view of a very small proportion of a feature (for example one corner of a building roof, or the top of a stack). This is especially relevant in the case of the Proposed Development, where views from the surrounding area are often limited by vegetation cover.

7.2.13 The ZTV produced using the DSM does reflect the presence of screening features in the landscape. However, it should be recognised that the DSM reflects a single moment in time (i.e. when the underlying aerial photography was taken). In reality, the extent and / or height of vegetation cover is dynamic and changes as vegetation inevitably increases in stature over time and / or is planted, trimmed, or

removed. Similarly, there is potential for buildings to have been erected, demolished or modified, subsequent to the data being captured.

7.2.14 Additionally, the DSM tends to assume that vegetation captured forms a solid visual barrier, when in reality, views can sometimes be available through leaves and branches, especially in winter when deciduous foliage is absent. As such, the real- world visibility of the Proposed Development could potentially be underestimated in places. To address this, field work has been undertaken as part of the LVIA to confirm that the ZTV is a relatively accurate depiction of visibility, whilst recognising that glimpsed views through bare vegetation may not be modelled.

7.2.15 Finally, the DSM does not distinguish between the ground surface and the surface of structures and vegetation. As a consequence, the ZTV may indicate visibility from areas known to be occupied by woodland and buildings. Whilst in theory it may be possible for individuals to experience views from such locations (by climbing onto roofs, or into the tops of trees), this is not representative of typical day to day visibility, and as such there is the potential to overstate the actual visibility of the Proposed Development.

Representative Viewpoints

7.2.16 In line with GLVIA3, viewpoints were selected to represent typical views experienced by visual receptors and illustrate the views from within the local landscape character areas. The representative viewpoints were identified using the following criteria:

- Accessibility to the public
- Number and sensitivity of people who could be affected
- Viewing direction, distance, and elevation; and
- Nature of the viewing experience.

Photography

7.2.17 Photographs have been captured from each representative viewpoint in line with the requirements as set out in the Landscape Institute's TGN 06/19.

7.2.18 Photography for this assessment was conducted using a Canon EOS 6D Mark II digital single lens reflex (DSLR) camera, equipped with a full-frame sensor and a 50mm lens. To ensure stability and minimise camera shake, the camera was mounted on a tripod. Additionally, a panoramic tripod head featuring a built-in spirit level was employed, allowing for precise rotation of the camera at fixed intervals around a designated point, ensuring vertical alignment with the camera lens and effectively eliminating parallax error. A levelling device was utilised to achieve proper levelling of the camera. The standard camera height was set at approximately 1.6m above ground; refer to the photo sheets for specific height Above Ordnance Datum (AOD) information for each viewpoint, as this may vary.

7.2.19 Photographs were typically taken over a full 360-degree panorama from each viewpoint location. The precise location of each photograph was recorded using a GPS device (which has an accuracy of approximately 1m or less). Following site visits, the GPS data was checked for locational accuracy, where necessary to reflect the tripod location. Additionally, pertinent information regarding each viewpoint was recorded.

Visualisations

General

7.2.20 TGN 06/19 defines the following types of visualisations, each with their own specific technical requirements:

- Type 1: annotated viewpoint photographs
- Type 2: 3D wireline / model
- Type 3: photomontage / photowire; and
- Type 4: photomontage / photowire (survey / scale verifiable).

7.2.21 Type 3 photomontages have been produced for representative viewpoints to demonstrate a variety of views and receptors in addition to additional wireline views. Where applicable, photomontages have been chosen to demonstrate the worst-case scenario for visual receptors. Type 3 photomontages have been produced at Year 1 (winter) and Year 15 (summer) to demonstrate the effects of mitigation planting.

Photography Post Processing

7.2.22 The relevant images for each viewpoint were stitched using PTGui to create a cylindrical panorama up to 90°. The stitched panoramas were then edited in Adobe Photoshop to adjust the levels and exposure if necessary.

The Development Proposals

7.2.23 A 3D computer generated model of the Proposed Development proposals (including mitigation planting and fencing) was prepared using the current design. The model was aligned to DEFRA LIDAR 1m DTM using existing ground levels.

7.2.24 The 3D model along with the viewpoint locations, topographic survey, LIDAR 1m DTM and 1m DSM were imported into AutoCAD and geo-referenced. These combined data sets were then imported into 3ds Max.

Photographic Alignment

7.2.25 A virtual camera was created within 3ds Max using the provided camera location, recorded target point and field of view (FOV) based on the camera and lens combination selected for the shot.

7.2.26 The baseline photograph was attached as a background to this view, to assist the Visualiser in aligning the point cloud or target points to each corresponding background point, based on the Camera Matching Technique. When using a wide-angle lens, observations outside the circle of distortion are given less weighting.

7.2.27 Open source LIDAR DSM point cloud data sets were used for alignment. At this stage a second member of the visualisation team cross-checked the camera alignment to verify the view was correctly set. Using this virtual camera, a render was created of the aligned model at a resolution to match the baseline photograph.

Final Rendering and Post-Production

7.2.28 The final renders were exported at the same resolution as the baseline photography. Multi- pass renders are exported to give the visualiser more control in enhancements of the final image. These multi- passes may included but not limited to Reflections, Refractions, Shadows, Lighting, Ambient Occlusion and Global Illumination.

7.2.29 The multi- pass renders are layered within Adobe Photoshop and blended together to produce the correct level of detail and photo-realistic feel. Finally, masking is applied to the image. Endless aesthetic effects can be applied to the rendered image to enhance the realism of the final image and/or make adjustments as a result of proposed material changes. However, the visualiser always attempts to be faithful to the proposed design within the local environment.

7.2.30 The final image was verified by a second visualiser to check the appearance, masking and form of the development.

7.2.31 The final photomontages were then saved in an appropriate format for inclusion within the InDesign document. The renders were set out in accordance with the LI TGN 06/19 with the relevant data on each sheet.

Limitations

7.2.32 It is essential to recognise that photography and computer-generated visualisations cannot deliver an exact representation of real-life experiences. Visualisations serve as valuable tools within the assessment process; however, they operate independently of it. They depict a perspective relevant to a specific date, time, and weather conditions, reflecting what would be captured in a photograph rather than what is perceived by the human eye. Therefore, visualisations should be utilised alongside site visits and considered within the broader context of all views experienced from the viewpoint, rather than solely concentrating on the Proposed Development.

Presentation & Viewing

7.2.33 The viewpoint photography and visualisations are presented in **ES Volume 2, Figures 7.4.7 to 7.4.59: Representative Viewpoints [EN0110020/APP/6.19]**. Each viewpoint sheet includes information about the viewpoint, including the date and time of photography, and details of the camera used.

7.2.34 The images presented on each sheet are displayed at an enlargement factor in accordance with the guidance set out in TGN 06/19.

7.2.35 The field of view displayed for each Viewpoint is in accordance with TGN 06/19 and is stated on each sheet.

7.2.36 Each sheet should be printed at the size stated on it, or view at 100% on digital viewers. All printed sheets should be viewed held flat at a comfortable arm's length.

References

[1] The Landscape Institute (2019) Technical Guidance Note 06/19 Visualisation of development [Online] https://www.landscapeinstitute.org/visualisation/ (Accessed March 2026)

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