

Appendix 6.1

Landscape Visual Impact Assessment Methodology

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Glossary

Term	Definition
Cumulative effects	Cumulative effects are the additional effects arising from changes caused by a development in conjunction with other past, present or reasonably foreseeable actions.
Direct Effect	A direct (or primary) effect may be defined as an effect that is directly attributable to the development.
GLVIA3	' <i>Guidelines for Landscape and Visual Impact Assessment, Third Edition</i> ', published jointly by the Landscape Institute and Institute of Environmental Management and Assessment 2013.
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.
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 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 change brought about by the development.
LVIA	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.
Magnitude (of effect)	Measures including any process, activity or design to avoid, reduce, remedy or compensate for adverse environmental impact or effects of a development.
Mitigation	Determined through the combination of sensitivity of the receptor and the proposed magnitude of effect brought about by the development.
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.

Term	Definition
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.
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 Receptor	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.
Wildness	A quality of appearing to be remote, inaccessible and rugged with little evidence of human influence.
Zone of Theoretical Visibility (ZTV)	Area within which a Proposed Development may have an influence or an effect on visual amenity.

List of Abbreviations

Abbreviation	Description
CAA	Civil Aviation Authority
EIA	Environmental Impact Assessment
GLVIA3	Guidelines for Landscape and Visual Impact Assessment (Third Edition)
LCA	Landscape Character Area
LVIA	Landscape and Visual Impact Assessment
ZTV	Zone of Theoretical Visibility

A6.1. LVIA Methodology

- A6.1.1. The purpose of a Landscape and Visual Impact Assessment (LVIA) when produced in the context of an Environmental Impact Assessment (EIA) is to identify and report any likely significant landscape and visual effects.
- A6.1.2. The following appendix sets out the methodology and criteria against which the assessment of landscape and visual effects has been undertaken.
- A6.1.3. The Guidelines for Landscape and Visual Impact Assessment (Third Edition) (GLVIA3)¹ 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).
- A6.1.4. 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).
- A6.1.5. It goes on to state that *“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 the significant and non-significant effects.”* (paragraph 3.32).
- A6.1.6. 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.
- A6.1.7. 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 an inter-related effect on people.
- 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.
 - 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.

Establishing the Baseline

- A6.1.8. 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. Existing operational/ built development and development under construction is considered as part of the baseline.

¹ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment Third Edition*; Spon; 2013

- A6.1.9. The **future baseline**, where relevant, incorporates any anticipated natural change to the landscape (eg change to land cover through natural regeneration or forestry rotation), and also in the case of built development, changes which are considered certain or likely to happen (including consented proposals which are not yet present in the landscape but which are expected to be constructed). These may or may not be included as part of the landscape and visual baseline depending on individual project circumstances. Where the future baseline differs from the current baseline, it is clearly stated in the LVIA which baseline has been adopted for the assessment of effects and a rationale for the approach taken is provided as necessary.

Direct and Indirect Effects

- A6.1.10. 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.

Landscape Effects

- A6.1.11. 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 assessment and relevant extracts may be included as appendices where this is judged appropriate. Desk based assessment is supplemented by field work to verify the key characteristics of the landscape.
- A6.1.12. 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.
- A6.1.13. An assessment of the degree to which the Proposed Development changes “*distinct and recognisable pattern of elements, or characteristics, in the landscape that make one landscape different from another, rather than better or worse*” (‘An Approach to Landscape Character Assessment’, Natural England, 2014), enables a judgement to be made as to the significance of the effect in landscape character terms.
- A6.1.14. 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

- A6.1.15. 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).

A6.1.16. 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 the assessment 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 02-21², 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 this assessment, 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 this assessment, the susceptibility of the landscape is described as **High, Medium or Low**.

A6.1.17. The criteria and the detailed judgements regarding susceptibility and value of landscape receptors are identified within the sensitivity tables included within **Volume 3, Appendix 6.4: Viewpoint Assessment** to this assessment.

A6.1.18. Sensitivity is evaluated taking into account the component judgements about the value and susceptibility of the receptor as illustrated in **Table A6.1.1: Determining Landscape Sensitivity** below. Where sensitivity is judged to lie between levels, an intermediate assessment is adopted. Note that equal weighting is attributed to susceptibility and value when determining overall landscape sensitivity.

Table A6.1.1: Determining Landscape Sensitivity

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

² Landscape Institute Technical Guidance Note 02-21: Assessing Landscape Value Outside National Designations

Magnitude of Landscape Effects

- A6.1.19. The magnitude of landscape effects 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).
- A6.1.20. 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 development; and
 - landscape context to the development.
- A6.1.21. 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.
- A6.1.22. Where particular views are a key characteristic of a landscape type, 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.
- A6.1.23. In this assessment, the scale of landscape change is described as: **Large, Medium, Small or Negligible**.
- A6.1.24. Having established the scale of change to the landscape baseline, the **Geographic Extent** of the change can be identified. In this assessment, the geographical extent of landscape change is described as: **Wide, Intermediate, Localised or Limited**.
- A6.1.25. **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 and can include frequency the effect would be experienced. In this assessment, 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 over 10 years; and
 - **permanent** not reversible or time limited.
- A6.1.26. Magnitude is considered taking into account the three contributory factors: scale of change, geographical extent and duration of effect.

Visual Effects

- A6.1.27. 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

A6.1.28. In visual assessment, 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 this assessment 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 this assessment, 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 this assessment, visual receptor susceptibility is defined in accordance with the criteria below.
 - **High** - Local residents; tourists; people engaged in outdoor recreation focused on an appreciation of views including users of footpaths and quiet country lanes, 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.

A6.1.29. Sensitivity is evaluated taking into account component judgements about the value and susceptibility of the receptor as illustrated in **Table A6.1.2: Determining Visual Receptor Sensitivity** below. Where sensitivity is judged to lie between levels, an intermediate assessment is 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 A6.1.2: Determining Visual Receptor Sensitivity

		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 Effects

- A6.1.30. The magnitude of visual effects 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.
- A6.1.31. Representative viewpoints are used in the LVIA as ‘samples’ on which to base judgements of the scale of change experienced by 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 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.
- A6.1.32. 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.
- A6.1.33. 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 development;
 - the degree to which the 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 development; and
 - the extent and nature of other built development visible.
- A6.1.34. In this assessment, the scale of change in view is described as: **Large, Medium, Small** or **Negligible**.
- A6.1.35. 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 variation in visibility due to varying vegetation cover is also taken into account in all judgements. Where there are operational (and consented) developments considered as part of the baseline, the visual effects consider the effects of adding the Proposed Development to that baseline. Where appropriate, comment may be made on lighting and weather conditions.
- A6.1.36. For visual receptors moving through the landscape (e.g. road and footpath 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 this assessment, the geographical extent of visual change is described as: **Wide, Intermediate, Localised** or **Limited**.
- A6.1.37. **Duration** reflects how long the change will last and judgements are framed in the same way as described above for landscape effects. In this assessment, 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 over 10 years; and
- **permanent** not reversible or time limited.

A6.1.38. Magnitude is considered taking into account the three contributory factors: scale of change geographical extent and duration of effect. described in the section below.

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

A6.1.39. 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.

A6.1.40. The diagrams presented below in Image 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 Image 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 Image 1 (Stage 2). The outcome of Stage 2 is the overall magnitude of effect judgement reported in the assessment. Image 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.

A6.1.41. In this assessment, 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.

Image 1 Combining Scale of Change, Extent and Duration to Determine Magnitude of Landscape and Visual Effects

Scale / extent		Large	Medium	Small	Negligible
Wide		Substantial			
Intermediate			Moderate		
Localised				Slight	
Limited					Negligible

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

Significance of Landscape and Visual Effects

- A6.1.42. The significance of any identified landscape or visual effect is described as **Major**, **Moderate**, **Minor** or **Negligible**. These categories are based on the consideration of receptor sensitivity with the predicted magnitude of effect. **Table A6.1.3:** Determining Significance of Effects 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 A6.1.3: Determining Significance of Effects

		Magnitude of Effect			
		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

- A6.1.43. Where the effect has been classified as Major or Major/Moderate, this is considered to be equivalent to a likely significant effect. 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. Effects of Moderate/Minor, Minor, Minor/Negligible or Negligible significance are considered to be not significant.

Beneficial/Adverse

- A6.1.44. 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 positive 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.
- A6.1.45. However, for the avoidance of doubt, in this assessment 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.

Cumulative Effects

- A6.1.46. In a broad generic sense, cumulative impacts "*result from the incremental changes caused by other past, present or reasonably foreseeable actions together with the project*"³ However, an assessment of cumulative effects should focus on whether there are any potential 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 effect⁴, which in practice means focusing on other nearby development proposals and the effects that might arise from the combined influence of those developments on landscape and visual receptors.

³ GLVIA3 page 120, paragraph 7.1 quoting Hyder, 1999 ' *Guidelines for the assessment of indirect and cumulative impacts as well as impact interactions*'

⁴ GLVIA3 page 121 paragraph 7.5.

- A6.1.47. As recommended by the NatureScot cumulative guidance, this assessment focusses on the “*additional cumulative change which would be brought about by the Proposed Development*”⁵.
- A6.1.48. As noted above, operational developments are included in the baseline, Consented development which are expected to be constructed, form part of the future baseline and will be included as such. However, where there is some uncertainty regarding the future construction of consented developments, they may be considered as the first scenario of the cumulative assessment.
- A6.1.49. Proposals in planning are considered where there is good reason to assume that the timing of decisions may be similar and significant cumulative effects are likely. The assessment of effects is considered within the cumulative assessment.
- A6.1.50. Proposals in scoping are noted but not considered within the cumulative assessment, as there is no certainty that these proposals will progress to planning submissions and the nature of the proposed schemes may be subject to change.
- A6.1.51. The 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.
- A6.1.52. 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.
- A6.1.53. 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.
- A6.1.54. In order to simplify what may otherwise be a complex assessment, where appropriate, the following approaches are also used:
- The cumulative assessment considers scenarios within which developments may be ‘grouped’ - for instance two nearby cumulative proposals may be considered in one scenario if it is considered that the cumulative effects arising if one or both are developed are likely to be similar.
 - Receptors judged to receive Negligible or Slight-Negligible magnitude effects are not considered for cumulative effects on the basis that any significant effects arising would primarily be caused by the cumulative developments and would be unlikely to be contributed to by the Proposed Development.
 - Only those receptors judged likely to experience effects from the cumulative development(s) being considered within a given scenario are described within that scenario.

Night-Time Effects of Aviation Lighting

Approach and Scope

- A6.1.55. There is a distinction between light pollution or nuisance and the effect of lighting on the character and amenity of the landscape at night. This is part of the assessment is not a technical lighting assessment but focusses on the night-time effects as a result of the introduction of new artificial lighting, with consequent effects.
- A6.1.56. This part of the assessment is still an emerging area of assessment regarding the scope and receptors which would be impacted as a result of the aviation lighting. It is clear that night-time impacts would occur on the visual amenity of the area, but there is some debate regarding the extent of impact on surrounding landscape

⁵ Assessing the Cumulative Impact of Onshore Wind Energy Developments, NatureScot, 2021

character. One of the most recent and relevant determinations by Scottish Ministers (Page 12 of Crystal Rig Wind Farm Phase IV Scottish Ministerial Determination Letter dated 24 March 2021) stated that:

"Reporters conclude that proposed aviation lighting would be a visual impact alone and consider that without being able to see and fully appreciate the features of the landscape and the composition of views, it is not possible to carry out a meaningful landscape character assessment. The Scottish Ministers concur with this conclusion."

- A6.1.57. In terms of the potential for landscape character effects at night, these are almost exclusively concerned with perceptions of darkness and an absence of development, as the key characteristics of landscapes which distinguish the landscape character areas described in character assessments are generally obscured after dark.

Potential Effects

- A6.1.58. The aviation lights would be visible as points of light, especially where there would be a high degree of contrast at the viewpoint (i.e. the lights were seen against a dark sky / dark landmass or where there would be little or no existing artificial light sources present).
- A6.1.59. During periods of greater ambient light, (e.g. sunset, twilight, dusk, dawn) there would be a reduced effect as the contrast of the aviation lighting against the background would be reduced. The lights would only be required at 'night' (ambient lighting levels at or below 50 cd/m²) which the CAA defines as 30 minutes after sunset until 30 minutes before sunrise. This variation means that in summer the lighting may not be switched on when people are predominantly active and contrast with the background would be reduced. However, in winter the lighting would be switched on during peak active times.
- A6.1.60. Due to the location of the lighting on the turbines nacelles which can be either in front of or behind, relative to the rotating blades, this can result in a low frequency blinking effect caused by the screening effect of blades as they travel past the lights. These effects are dependent upon the rotation speed of the blades, direction of wind and the location of the receptor. Where a number of lit turbines are present in the view, such blinking is likely to be at the same frequency but uncoordinated.
- A6.1.61. In views within a couple of kilometres of the turbines, it may be possible to see a reflection of the red light on the rotating blades as they pass. However, this would be limited by the non-reflective surface of the blades themselves and only occur in relatively nearby locations.

Sensitivity of Receptors

For landscape receptors, susceptibility is judged based on the degree to which they are currently characterised by darkness. Value is judged based on similar factors as for the daytime assessment unless suggested otherwise. For example, identification of a Dark Sky Park which would increase value; or if value is based on scenic qualities which are not appreciable at night, the value may decrease.

For visual receptors, the value attached to night-time views are considered to be low unless there is a particular feature that can be best appreciated in the hours of darkness. This may include views of stars and the night sky that are only possible in particularly dark areas or views of well-known landmarks that are lit up at night. The susceptibility of visual receptors also differs at night reflecting the different activities people undertake in the hours of darkness. For example, drivers using roads at night tend to be more focused on the road and the area illuminated by their headlights than during the day and may have oncoming headlights, cats eyes or other reflective signage drawing their attention, resulting in lower susceptibility. This is particularly

the case on unlit rural roads that may be narrow and winding. On the other hand, people taking part in activities requiring darkness, such as stargazing, would be of higher susceptibility.

Annex 1: Glossary of Terms

Title	Comments
CLVIA	Cumulative Landscape and Visual Impact Assessment.
Cumulative Effects	Cumulative effects are the additional effects arising from changes caused by a development in conjunction with other past, present or reasonably foreseeable actions.
Direct Effect	A direct (or primary) effect may be defined as an effect that is directly attributable to the development. ⁶
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. ⁷
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. ⁸
Landscape Character Areas	These are single unique areas which are the discrete geographical areas of a particular landscape type. ⁹
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

⁶ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p155

⁷ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p156

⁸ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p156

⁹ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p157

Title	Comments
	historical land use and settlement pattern, and perceptual and aesthetic attributes.
Landscape Effects	Effects on the landscape as a resource in its own right. ¹⁰
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. ¹¹
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. ¹²
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: <i>genius loci</i> literally means 'spirit of the place'.

¹⁰ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p157

¹¹ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p157

¹² The Landscape Institute; Technical Guidance Note 02/21 Assessing Landscape Value Outside National Designations

Title	Comments
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. ¹³
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. ¹⁴
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. ¹⁵
Wildness	A quality of appearing to be remote, inaccessible and rugged with little evidence of human influence.
Wireframe or Wireline	A computer-generated line drawing of the DTM (Digital Terrain Model) and the Proposed Development from a known location.
Zone of Theoretical Visibility (ZTV)	Area within which a Proposed Development may have an influence or an effect on visual amenity. ¹⁶

¹³ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p157

¹⁴ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p158

¹⁵ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p158

¹⁶ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p158