Technical Appendix

Drummarnock Wind Farm

Technical Appendix 5-1: Landscape and Visual Methodology

Drummarnock Wind Farm Limited

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1 Introduction

This appendix sets out the detailed methodology used for the Landscape and Visual Impact Assessment (LVIA) including the cumulative assessment contained in **Chapter 5: Landscape and Visual Impact Assessment**, Volume 2 of the Environmental Impact Assessment (EIA) Report. The methodology for the Residential Visual Amenity Assessment (RVAA) is set out in **Appendix 5-2: Residential Visual Amenity Assessment**.

Landscape and visual assessments are separate, although linked, processes. LVIA therefore considers the likely effects of the Proposed Development on:

- Landscape as a resource in its own right (caused by changes to the constituent elements of the landscape, its specific aesthetic or perceptual qualities and the character of the landscape); and
- Views and visual amenity as experienced by people (caused by changes in the appearance of the landscape).

LVIA deals with landscape and visual effects separately, followed by an assessment of cumulative landscape and visual effects where relevant.

2 Guidance

This methodology was developed by Chartered Landscape Architects (Chartered Members of the Landscape Institute (CMLI)) at LUC, who have extensive experience in the assessment of landscape and visual effects arising from wind energy developments.

The methodology was developed primarily in accordance with the principles contained within the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition Guidelines for Landscape and Visual Impact Assessment (GLVIA3)[1]. NatureScot cumulative guidance[2] also informs the approach to the assessment of cumulative landscape and visual effects in relation to onshore wind energy development.

[1] The Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment, 3rd Edition. Routledge.

[2] NatureScot (2021). Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments.

3 Scope of Assessment

LVIA considers direct physical changes to the landscape as well as direct and indirect changes in landscape character. It also considers changes to areas designated for their scenic or landscape qualities, and the visual impacts of the Proposed Development as perceived by people.

All potentially significant landscape and visual effects (including cumulative effects) are examined, including those relating to construction and operation.

Where it is judged that significant effects are unlikely to occur, the assessment of likely effects on some receptors may be '*scoped out*'. For an EIA development this is usually agreed at Scoping stage.

An assessment of the effects during the decommissioning phase is not undertaken in the EIA Report as the baseline against which to assess the likely significant effects arising from decommissioning is not yet known. Decommissioning effects will also be similar in nature to construction stage effects, which are considered.

4 Assessment Methodology

4.1 Study Area

The study area for a LVIA is determined by the nature and scale of the Proposed Development and the nature of the study area. Complex topography or extensive tree cover leading to visually enclosed areas may limit the extent of likely significant effects. The study area for the assessment was defined as 45 kilometres (km) from the outermost turbines that form part of the Proposed Development, in all directions. This is recommended in current guidance for turbines over 150 metres (m) to blade tip, and was agreed with the following statutory consultees: NatureScot and Stirling Council (SC).

4.2 Methodological overview

The key steps in the methodology for assessing landscape and visual effects are as follows:

- The landscape of the study area is analysed, and landscape receptors identified, informed by desk and field-survey;
- The area over which the Proposed Development will potentially be visible is established through the creation of an initial ZTV plan[3];
- The visual baseline is recorded in terms of the different receptors (groups of people) who may experience views of the Proposed Development (informed by the initial ZTV) and the nature of their existing views and visual amenity;
- Potential assessment viewpoints are selected, as advocated by GLVIA3 to represent a range of different receptors and views, in consultation with statutory consultees;
  - "***Representative viewpoints***, *selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ – for example, certain points may be chosen to represent the views of users of particular public footpaths and bridleways;*
  - ***Specific viewpoints***, *chosen because they are key and sometimes promoted viewpoints within the landscape, including for example specific local visitor attractions, viewpoints in areas of particularly noteworthy visual and/or recreational amenity such as landscapes with statutory landscape designations, or viewpoints with particular cultural landscape associations; and*
  - ***Illustrative viewpoints***, *chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations" (GLVIA3, Para 6.19, Page 109).*
- Likely significant effects on both the landscape as a resource and visual receptors are identified; and

[3] A bare ground ZTV indicates areas from where a development is theoretically visible, but does not account for screening from vegetation and/or buildings.

- The level (and significance) of landscape and visual effects are judged with reference to the **nature of the receptor** (commonly referred to as the sensitivity of the receptor), which considers both susceptibility and value, and the **nature of the effect** (commonly referred to as the magnitude of effect), which considers a combination of judgements including scale, geographical extent, duration and reversibility.

4.3 Direction of Effects

As required by the EIA Regulations[4] and GLVIA3, the assessment must identify the direction of effect as either being beneficial, adverse (also referred to as positive or negative) or neutral.

The direction of landscape and visual effects is determined in relation to the degree to which the proposal fits with the existing landscape character or views, and the contribution to the landscape or views that the Proposed Development makes, even if it is in contrast to the existing character of the landscape or views.

With regard to wind energy development, whilst there is a broad spectrum of response from the strongly positive to the strongly negative, an assessment is required to take an objective approach. Therefore, to cover the 'worst case' situation, likely landscape and visual effects, including cumulative effects, relating to commercial scale wind farms are generally assumed to be adverse (negative).

[4] Scottish Government (2017). The Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2017.

5 Method for Assessing Landscape Effects

As outlined in GLVIA3: *"An assessment of landscape effects deals with the effects of change and development on landscape as a resource"* (GLVIA3, Para 5.1, Page 70). Changes may affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.

An assessment of landscape effects requires consideration of the nature of landscape receptors (sensitivity of receptor) and the nature of the effect on those receptors (magnitude of effect). GLVIA3 states that the nature of landscape receptors, commonly referred to as their sensitivity, should be assessed in terms of the susceptibility of the receptor to the type of change proposed, and the value attached to the receptor. The nature of the effect on each landscape receptor, commonly referred to as its magnitude, should be assessed in terms of scale of effect, geographical extent, duration and reversibility.

The judgements of sensitivity and magnitude are then combined to reach an overall determination of the level of effect, and its significance (GLVIA3, Figure 5.1 Page 71). The following sections set out the methodology used to evaluate sensitivity and magnitude.

5.1 Significance of Landscape Effects

As outlined in GLVIA3: *"An assessment of landscape effects deals with the effects of change and development on landscape as a resource."* (GLVIA3, Para 5.1, Page 70). The introduction of a development could affect the elements which make up the landscape, the aesthetic or perceptual aspects of the landscape or its distinctive character.

Landscape receptors are the constituent elements of the landscape, its specific aesthetic or perceptual qualities and the character of the landscape in different areas (GLVIA3, Para. 3.21, Page 36).

5.2 Sensitivity of Landscape Receptors

The sensitivity of a landscape receptor to change is defined as **high**, **medium** or **low** and is based on weighing up professional judgements regarding susceptibility and value, as set out below.

Table 5-1-1: Sensitivity of Landscape Receptors

	Higher		Lower
Susceptibility	Attributes that make up the character of the landscape offer very limited opportunities for the accommodation of change without key characteristics being fundamentally altered by wind energy development, leading to a different landscape character.	⟷	Attributes that make up the character of the landscape are resilient to being changed by wind energy development.

	Higher		Lower
Value	Landscape with high scenic quality, high conservation interest, recreational value, important cultural associations or a high degree of rarity. Areas or features designated at a national level e.g. National Parks or National Scenic Areas or key features of these with national policy level protection.	⟷	Landscape of poor condition and intactness, limited aesthetic qualities, or of character that is widespread. Areas or features that are not formally designated.

5.2.1 Susceptibility of Landscape Receptors

Susceptibility is defined by GLVIA3 as *"the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies"* (GLVIA3 paragraph 5.40).

A series of criteria are used to evaluate the susceptibility of Landscape Character Types (LCTs) or Landscape Character Areas (LCAs) to wind energy development as set out in the table below. These are drawn from a range of published sources relating to wind farm development, including NatureScot's Siting and Designing Windfarms in the Landscape[5] and GLVIA3.

Table 5-1-2: Susceptibility of Landscape Receptors

	Aspects indicating reduced susceptibility to wind energy development		Aspects indicating greater susceptibility to wind energy development
Landscape scale	Large scale	⟷	Small scale
Landscape terrain	Absence of strong topographical variety; featureless, convex or flat	⟷	Presence of strong topographical variety or distinctive landform features
Landscape pattern and complexity	Simple, regular or uniform	⟷	Complex, rugged and irregular
Settlement and man-made influence	Presence of extensive settlement and/or contemporary structures e.g. utility, infrastructure or industrial elements	⟷	Absence of modern development; presence of small scale, historic or vernacular settlement
Skylines	Non-prominent/ screened skylines; presence of existing	⟷	Distinctive, undeveloped

[5] Scottish Natural Heritage (2017). Siting and Designing Windfarms in the Landscape, Version 3a.

	Aspects indicating reduced susceptibility to wind energy development		Aspects indicating greater susceptibility to wind energy development
	modern man-made features		skylines; skylines that are highly visible over large areas; skylines with important historic landmarks
Inter-visibility with adjacent landscape	Little inter-visibility with adjacent sensitive landscape or viewpoints		Strong inter-visibility with sensitive landscape; forms an important part of view from sensitive viewpoints
Perceptual aspects	Close to visible or audible signs of human activity and development; weak sense of place or local distinctiveness		Remote from visible or audible signs of human activity and development; strong sense of place or local distinctiveness

Published landscape capacity or sensitivity studies (where they exist) are reviewed to inform the evaluation of susceptibility, in addition to fieldwork undertaken across the study area. This review includes an evaluation as to the relevance of the publication to the assessment being undertaken (e.g. consideration of the purpose and scope of the published studies and whether they have become out of date).

Landscape susceptibility is described as being **high**, **medium** or **low**.

5.2.2 Value of Landscape Receptors

The European Landscape Convention advocates that all landscape is of value, whether it is the subject of defined landscape designation or not: *"The landscape is important as a component of the environment and of people's surroundings in both town and country and whether it is ordinary landscape or outstanding landscape"* (Explanatory Report to the European Landscape Convention, Page 6). The value of a landscape receptor is recognised as being a key contributing factor to the sensitivity of landscape receptors.

The value of landscape receptors is determined with reference to:

- Review of relevant designations and the level of policy importance that they signify (such as landscape designated at international, national or local level); and/or
- Application of criteria that indicate value (such as scenic quality, rarity, recreational value, representativeness, conservation interests, perceptual aspects and artistic associations) as described in GLVIA3, paragraphs 5.44 - 5.47.

Internationally and nationally designated landscapes would generally indicate landscape of higher value whereas those without formal designation (such as a widespread or common landscape type without high scenic quality) are likely to be of lower value, bearing in mind that all landscape is valued at some level. There is however variation across both designated and undesignated areas, and so judgements regarding value are also informed by fieldwork.

Landscape value is described as being **high, medium** or **low**.

5.2.3 Combining Landscape Susceptibility and Value Judgements

There may be a complex relationship between the value attached to a landscape and the susceptibility of the landscape to a specific change. Therefore, the rationale for judgements on the sensitivity of landscape receptors needs to be clearly set out for each receptor. It should be noted that whilst landscape designations at an international or national level are likely to be accorded the highest value, it does not necessarily follow that such areas all have a high susceptibility to all types of change. Conversely, landscape which is undesignated may also have high value and susceptibility to change (GLVIA3, Page 90).

5.3 Magnitude of Landscape Effect

The overall judgement of magnitude of landscape effect is based on combining professional judgements on scale, geographical extent, duration and reversibility. Further information on the criteria is provided below.

5.3.1 Scale of Effect

For landscape elements/features this depends on the extent of existing landscape elements that would be lost or changed, the proportion of the total extent that this represents, and the contribution of that element to the character of the landscape.

In terms of landscape character, this reflects the degree to which the character of the landscape would change as a result of removal or addition of landscape components, and how the changes would affect key characteristics.

The scale of the effect is described as being **large, medium, small**, or **barely perceptible**.

5.3.2 Geographical Extent of Effect

The geographical extent over which the landscape effect would arise is described as being **large** (scale of the LCT, or widespread, affecting several landscape types or character areas), **medium** (more immediate surroundings) or **small** (site level). Geographical extent is always referenced to actual areas over which an effect would occur.

5.3.3 Duration of Effect

GLVIA3 states that "*Duration can usually be simply judged on a scale such as short term, medium term or long term*" (GLVIA3, Page 91). Frequency, and whether an effect is intermittent or continuous is also a consideration. For the purposes of this assessment, duration is determined in relation to the phases of the Proposed Development, as follows:

- **Short-term** effects are those that occur during construction and decommissioning, and may extend into the early part of the operational phase, e.g. construction activities, generally lasting 0 - 5 years;
- **Medium-term** effects are those that occur during part of the operational phase, generally lasting 5 - 10 years; and

- **Long-term** effects are those which occur throughout the operational phase (in this instance 40 years), e.g. presence of turbines, or are permanent effects which continue after the operational phase, generally lasting over 10 years.

5.3.4 Reversibility of Effect

In accordance with the principles contained within GLVIA3, reversibility is reported as **reversible**, **partially reversible** or **irreversible** (i.e. permanent), and is related to whether the change can be reversed at the end of the phase of development under consideration (i.e. at the end of construction or at the end of the operational lifespan of the development).

5.3.5 Combining Magnitude of Change Judgements

Judgements on the magnitude of landscape effect (nature of landscape effect) are recorded as **high**, **medium** or **low** and are guided by the table below.

Table 5-1-3: Magnitude of Landscape Effect

	Higher		Lower
Scale	Extensive loss of landscape features and/or elements, and/or change in, or loss of key landscape characteristics, and/or creation of new key landscape characteristics	⟷	Limited loss of landscape features and/or elements, and/or change in or loss of some secondary landscape characteristics
Geographical Extent	Change in landscape features and/or character extending considerably beyond the immediate site and potentially affecting multiple LCTs/areas	⟷	Change in landscape features and/or character extending contained within or local to the immediate site and affecting only a small part of the LCT/area
Duration	Changes experienced for a period of around 10 years or more Continuous or frequent	⟷	Changes experienced for a shorter period of up to 5 years. Intermittent or occasional
Reversibility	Change to features, elements or character which cannot be undone or are only partly reversible after a long period	⟷	A temporary landscape change which is largely reversible following the completion of construction, or decommissioning of the development

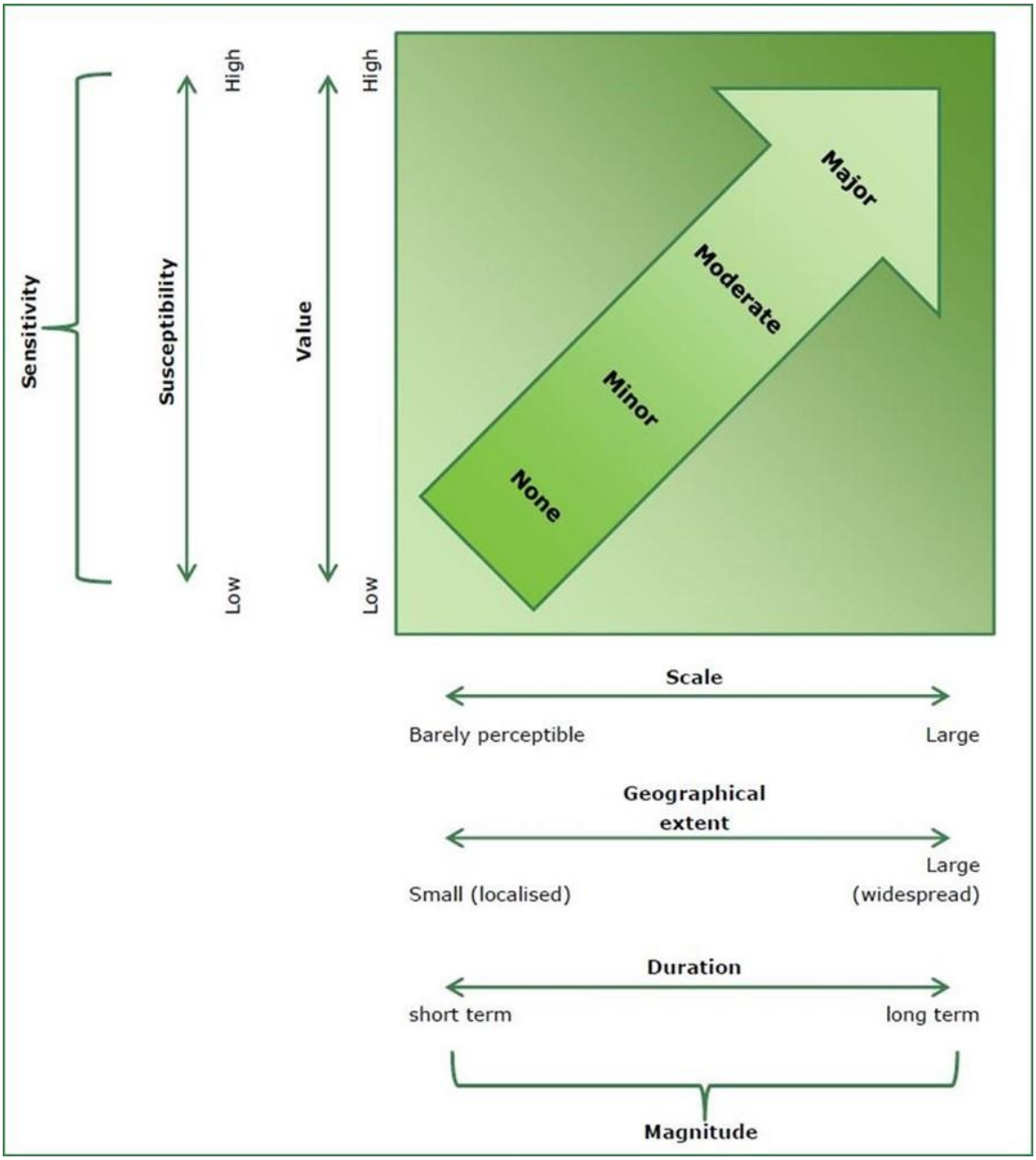
5.4 Judging Levels of Landscape Effect and Significance

The final step in the assessment process requires the judgements of sensitivity and magnitude of effect to be combined to make an informed professional assessment on the significance of each landscape effect (GLVIA3, Figure 5.1, Page 71).

A numerical or formal weighting system is not applied, therefore enabling consideration of the relative importance of each aspect to feed into the overall decision. Levels of effect are identified as **Negligible**, **Minor**, **Moderate** or **Major** where **Moderate** and **Major** effects are considered **significant** in the context of the EIA Regulations.

This determination requires the application of professional judgement and experience to take on board the many different variables which need to be considered, and which are given different weight according to site-specific and location-specific considerations in every instance. Judgements are made on a case-by-case basis, guided by the principles set out in **Diagram 1** below. A rigid matrix-type approach, which does not allow for the application of professional judgement and experience, and where the level of effect is defined simply based on the level of sensitivity (nature of receptor) combined with the magnitude of change (nature of effect), is not used.

Diagram 5-1-1: Judging levels of effect – Landscape or Visual (including cumulative)



6 Method for Assessing Visual Effects

6.1 Significance of Visual Effects

As outlined in GLVIA3: "*An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity*" (GLVIA3, Para 6.1, Page 98). Changes in views may be experienced by people at different locations within the study area including from static locations (normally assessed using representative viewpoints) and whilst moving through the landscape (normally referred to as sequential views, e.g. from roads and walking routes).

Visual receptors are individuals or groups of people who may be affected by changes in views and visual amenity. They are usually grouped by their occupation or activity (e.g. residents, motorists, recreational users) and the extent to which their attention is focused on the view (GLVIA3, Paras. 6.31 – 6.32, Page 113).

GLVIA3 states that the sensitivity of visual receptors should be assessed in terms of the susceptibility of the receptor to change in views and/or visual amenity and the value attached to particular views. The magnitude of effect should be assessed in terms of the scale, geographical extent, duration and reversibility of the effect.

The judgements of sensitivity and magnitude are then combined to reach an overall determination of the level of effect, and its significance (GLVIA3, Figure 6.1 Page 99). The following sections set out the methodology used to evaluate sensitivity and magnitude.

6.2 Sensitivity of Visual Receptor

The sensitivity of a visual receptor to change is defined as **high**, **medium** or **low** and is based on weighing up professional judgements regarding susceptibility and value, and each of their component considerations, as set out below.

Table 5-1-4: Sensitivity of Visual Receptors

Higher		Lower
Viewers whose attention or interest is focused on their surroundings, including communities/ individual residential receptors/ people engaged in outdoor recreation/ visitors to heritage assets or other attractions where views of surrounding area are a very important contributor.		People whose attention is not on their surroundings (and where setting is not important to the quality of working life) such as commuters/ people engaged in outdoor sports/ people at their place of work.
Views may be recorded in management plans, guidebooks, and/or which are likely to be experienced by large numbers of people.		People whose attention is not on their surroundings (and where setting is not important to the quality of working life) such as commuters/ people engaged in outdoor sports/ people at their place of work.

6.2.1 Susceptibility of Visual Receptor

The susceptibility of visual receptors to changes in views/visual amenity is a function of the occupation or activity of people experiencing the view and the extent to which their attention is focused on views (GLVIA 3, para 6.32). This is recorded as **high**, **medium** or **low** informed by the table below.

Table 5-1-5: Susceptibility of Visual Receptors

Susceptibility	Receptor Group
High	Viewers whose attention or interest is focussed on their surroundings, including: Communities where views contribute to the landscape setting enjoyed by residents. Visitors to heritage assets or other attractions/ landscape features where views of surrounding are a very important contributor to experience (such as promoted viewpoints and well frequented hill summits).
Medium	People engaged in outdoor recreation (for example users of rights of way whose interest is likely to be focused on the landscape). People travelling on scenic routes and tourist routes, where attention is focused on the surrounding landscape.
Low	People travelling more rapidly on major road, rail or transport routes (not recognised as scenic routes). People travelling on local road routes, where attention may be focused on the surrounding landscape, but is transitory. People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape. People at their place of work whose attention is not on their surroundings (and where setting is not important to the quality of working life).

6.2.2 Value of View or Visual Amenity

GLVIA3 also requires evaluation of the value attached to the view or visual amenity and relates this to planning designations and cultural associations (GLVIA3, Para. 6.37, Page 114).

Recognition of the value of a view is determined with reference to:

- Planning designations specific to views;
- Whether it is recorded as important in relation to designated landscapes (such as views specifically mentioned in the special qualities of a National Scenic Area);
- Whether it is recorded as important in relation to heritage assets (such as designed views recorded in citations of Gardens and Designed Landscapes (GDL) or views recorded as of importance in Conservation Area Appraisals); and
- 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 and art.

A designated viewpoint or scenic route advertised on maps and in tourist information, or which is a significant destination in its own right, such as a notable summit, is likely to indicate a view of higher value. High value views may also be recognised in relation to the special qualities of a designated landscape or heritage asset, or it may be a view familiar from photographs or paintings.

Views experienced from viewpoints or routes not recognised formally or advertised in tourist information, or which are not provided with interpretation, or, in some cases formal access, are likely to be of lower value.

Judgements on the value of views or visual amenity are recorded as **high**, **medium** or **low**.

6.2.3 Combining Landscape Susceptibility and Value Judgements

An overall judgement of visual sensitivity is derived by combining the separate judgements on visual susceptibility and the value of views experienced from the visual receptor. The sensitivity of visual receptors may involve a complex relationship between a visual receptor's (e.g. person's) susceptibility to change and the value attached to a view. Therefore, the rationale for judgements of sensitivity is clearly set out for each receptor in relation to both its susceptibility (to the type of change proposed) and its value.

6.3 Magnitude of Visual Effect

The overall judgement of magnitude of visual effect (nature of visual effect) is based on weighing up professional judgements on scale, geographical extent, duration and reversibility. Further information on the criteria is provided below.

6.3.1 Scale

The scale of a visual change depends on:

- The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the Proposed Development;
- The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour and texture; and
- The nature of the view of the Proposed Development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpses.

All changes are assumed to be during winter, representing a 'worst case' scenario with minimal screening by vegetation and deciduous trees. Note that wireframes and ZTVs prepared to illustrate potential visual effects are calculated on the basis of bare ground and therefore demonstrate the maximum extent of visibility possible, in the absence of buildings or vegetation. Where forestry is present, consideration is given to felling regimes if levels of screening by forestry are likely to change notably during the lifetime of the Proposed Development.

In this assessment scale of visual change is described as being **large**, **medium**, **small** or **barely perceptible**.

6.3.2 Geographical Extent

The geographical extent of a visual change records the extent of the area over which the changes will be visible e.g. whether this is a unique viewpoint from where the proposed wind farm can be glimpsed, or whether it represents a large area from which

similar views are gained. Geographical extent is described as being **large**, **medium** or **small**, with reference to the actual areas where views are likely to be affected.

6.3.3 Duration of Effect

The duration of visual effects is reported as **short-term**, **medium-term** or **long-term**, as defined for the duration of landscape effects (see above as set out in landscape methodology). Frequency, and whether an effect is intermittent or continuous is also a consideration.

6.3.4 Reversibility

Reversibility is reported as **irreversible** (i.e. permanent), **partially reversible** or **reversible**, and is related to whether the visual change can be reversed at the end of the phase of development under consideration (i.e. at the end of construction or at the end of the operational lifespan of the development). Operational visual effects are generally considered to be partially reversible as the decommissioning phase will remove turbines and most infrastructure at the end of the operational phase.

6.3.5 Combining Magnitude of Visual Change Judgements

Judgements on the magnitude of visual effect are recorded as high, medium or low guided by the table below.

Table 5-1-6: Magnitude of Visual Effects

	Higher		Lower
Scale	A large visual change resulting from the Proposed Development is the most notable aspect of the view, perhaps as a result of the development being in close proximity, or because a substantial part of the view is affected, or because the development introduces a new focal point and/or provides contrast with the existing view and/or changes the scenic qualities of the view.	⟷	A small or some visual change resulting from the Proposed Development as a minor or generally unnoticed aspect of the view, perhaps as a result of the development being in the distance, or because only a small part of the view is affected, and/or because the Proposed Development does not introduce a new focal point or is in contrast with the existing view and/ does not change the scenic qualities of the view.
Geographical Extent	The assessment location is clearly representative of similar visual effects over an extensive geographic area.	⟷	The assessment location clearly represents a small geographic area.
Duration	Visual change experienced over around 10 years or more. Continuous or frequent	⟷	Visual change experienced over a short period of up to 5 years. Intermittent or infrequent
Reversibility	A permanent visual change which is not reversible or only partially reversible following decommissioning of the	⟷	A permanent visual change which is not reversible or only partially reversible following decommissioning

	Higher		Lower
	Proposed Development.		of the Proposed Development.

6.3.6 Direction of Visual Effects

The direction of visual effects (**beneficial**, **adverse** or **neutral**) is determined in relation to the degree to which the Proposed Development fits with the existing view and the contribution to the view that the Proposed Development makes, even if it is in contrast to the existing character of the view.

With regard to wind energy development there is a broad spectrum of response from the strongly positive to the strongly negative. However, to cover the 'worst case' situation, potential visual effects relating to commercial scale wind energy developments are generally assumed to be adverse.

6.4 Judging the Level of Visual Effects and Significance

As for landscape effects, the final step in the assessment requires the judgements of sensitivity of visual receptor and magnitude of visual effect to be combined to make an informed professional assessment on the significance of each visual effect.

A numerical or formal weighting system is not applied, therefore enabling consideration of the relative importance of each aspect to feed into the overall decision. Levels of effect are identified as **Negligible**, **Minor**, **Moderate** or **Major** where **Moderate** and **Major** effects are considered significant in the context of the EIA Regulations.

This determination requires the application of professional judgement and experience to take on board the many different variables which need to be considered, and which are given different weight according to site-specific and location-specific considerations in every instance. Judgements are made on a case-by-case basis, guided by the principles set out in **Diagram 1** above. A rigid matrix-type approach, which does not allow for the application of professional judgement and experience, and where the level of effect is defined simply based on the level of sensitivity (nature of receptor) combined with the magnitude of change (nature of effect), is not used.

7 Assessment of Cumulative Effects

The purpose of cumulative assessment is to "*describe, visually represent and assess the ways in which a proposed wind farm would have additional impacts when considered with other consented or proposed wind farms*"[6].

The cumulative assessment therefore focuses on any additional cumulative change which may result from the introduction of the Proposed Development in an alternative future theoretical baseline which includes other development which is not currently present. Cumulative interactions with existing wind farms, which form part of the current baseline, are addressed as part of the primary LVIA, with the cumulative assessment then focusing on the potential future interactions of the Proposed Development against alternative future baselines.

Cumulative assessment for wind farm proposals focuses on potential future interactions with other proposed wind farms, but it may also consider the potential interactions between different types of development (e.g. transmission infrastructure, other energy generation stations or other built development), if these are likely to result in significant cumulative landscape and visual impacts.

GLVIA3 also makes reference to 'combined cumulative effects', i.e. an assessment which considers the effects if all current, past and future proposals are deemed present, including the Proposed Development. GLVIA3 (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*". Therefore, this type of cumulative effect is only described where it is considered likely to be a relevant consideration in the determination of the Proposed Development. Given the term 'combined' effects is also used in the NatureScot guidance to describe a certain type of cumulative effect (i.e. wind farms seen within the same field of view), then these effects are referred to as 'total' or 'in-combination effects'.

7.1 Baseline Scenarios

The baseline for the LVIA is the current landscape at the time of writing the assessment. This is referred to as the 'primary assessment'. In the case of the present LVIA, the Proposed Development is being introduced into an area where wind farms and wind turbines are already a feature of the baseline. Wind farms that are under construction are also considered within the primary assessment. As such, many effects considered within the primary assessment are cumulative effects, or include a cumulative component. Where this is the case, the cumulative elements are described.

In order to consider potential future cumulative effects, it is also necessary to assess the effects of the addition of the Proposed Development into one or more speculative future landscape baselines. This includes wind farm proposals that are consented but not yet built, and/or undetermined planning applications. Two future baseline scenarios are defined, based on the level of certainty associated with the proposals. These scenarios are defined below.

[6] NatureScot (2021). Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments.

1. Scenario 1 – assessment against a baseline including that used for the primary LVIA (wind farms that are operational and under construction) plus those which are **consented** (the presence of which have a higher level of certainty, given they have planning consent); and
2. Scenario 2 – assessment against the primary LVIA and Scenario 1 baseline, plus the inclusion within the baseline of projects at **application stage** and wind farms at **appeal** (the presence of which have a lower level of certainty, given they are as yet undetermined).

Wind farms at scoping stage have less certainty attached, and limited information may be available about these proposals. They are not generally included in scenario 2 unless there is a high likelihood of significant cumulative effects, or at the specific request of statutory consultees.

A cut-off date of 30th April 2024 was applied for the inclusion of developments within the cumulative assessment.

7.2 Types of Cumulative Effects

The NatureScot cumulative guidance states that "*Cumulative landscape impacts can change either the physical fabric or character of the landscape, or any special values attached to it. For example:*

- *Cumulative impacts on the physical fabric of the landscape arise when two or more developments affect landscape components such as woodland, dykes, rural roads or hedgerows. Although this may not significantly affect the landscape character, the cumulative effect on these components may be significant – for example, where the last remnants of former shelterbelts are completely removed by two or more developments.*
- *Cumulative impacts on landscape character arise when two or more developments introduce new features into the landscape. In this way, they can change the landscape character to such an extent that they create a different landscape character type*."

Three types of cumulative effects on visual amenity are considered in the assessment: combined, successive and sequential:

- **Combined** effects occur where a static viewer is able to view two or more wind farms from a viewpoint within the viewers' same arc of vision (assumed to be about 90 degrees for the purpose of the assessment);
- **Successive** effects occur where a static viewer is able to view two or more wind farms from a viewpoint, but needs to turn to see them; and
- **Sequential** effects occur when a viewer is moving through the landscape from one area to another, for instance when a person is travelling along a road or footpath, and is able to see two or more wind farms at the same, or at different times as they pass along the route. Frequently sequential effects occur where wind farms appear regularly, with short time lapses between points of visibility. Occasionally sequential effects occur where long periods of time lapse between views of wind farms, depending on speed of travel and distance between viewpoints.

7.3 Assessment of Cumulative Effects

For each of the three baseline scenarios (primary assessment – which is the existing baseline, scenario one, and scenario two – which are potential future baselines) consideration of the potential different effects is made. The approach does not assess the 'difference' between scenarios, but treats each as a separate potential situation. It is important to note that in practice only one situation will arise at any one time, so **effects as set out should be interpreted as an either/or situation, and should not be double counted**.

Cumulative effects are assessed in accordance with the methodology presented in the preceding sections, and guided by the principles set out in **Diagram 1**. Where the potential for cumulative effects needs to be determined, the following additional factors are considered as part of the scale of effect:

- The pattern and arrangement of wind farms in the landscape or view, e.g. developments seen in one direction or part of the view (combined views), or seen in different directions (successive views in which the viewer must turn) or developments seen sequentially along a route;
- The relationship between the scale of the wind farms, including turbine size and number, and if wind farms appear balanced in views in terms of their composition, or at odds with one another;
- The position of the wind farms in the landscape, e.g. in similar landscape or topographical context;
- The position of the wind farms in the view, e.g. on the skyline or against the backdrop of land; or how the Proposed Development will be seen in association with another development (separate, together, behind etc.); and
- The distances between wind farms, and their distances from the viewer.

More significant cumulative landscape effects are likely where:

- The Proposed Development extends or intensifies a landscape effect;
- The Proposed Development 'fills' an area such that it alters the landscape resource; and / or
- The interaction between the Proposed Development and other wind farms means that the total effect on the landscape is greater than the sum of its parts.

GLVIA 3 states *"The most significant cumulative landscape effects are likely to be those that would give rise to changes in the landscape character of the study area of such an extent as to have major effects on its key characteristics and even, in some cases, to transform it into a different landscape type. This may be the case where the project being considered itself tips the balance through its additional effects. The emphasis must always remain on the main project being assessed and how or whether it adds to or combines with the others being considered to create a significant cumulative effect"* (GLVIA 3, Para 7.28).

More significant cumulative visual effects are likely where:

- The Proposed Development extends or intensifies a visual effect;
- The Proposed Development 'fills' an area such that it alters the view/ visual amenity;
- The interaction between the Proposed Development and other developments means that the total visual effect is greater than the sum of its parts; and/or

- The Proposed Development will lengthen the time over which effects are experienced (sequential effects).

8 Supporting Graphics

8.1.1 Approach

The LVIA is supported by a range of figures including viewpoint photography. These have been prepared in adherence to the principles presented in the GLVIA 3, the Landscape Institute's Advice Note 06/19 '*Visual Representation of Development Proposals*' (LI, September 2019), and the *Visual Representation of Windfarms: Guidance*, Version 2.2, (NatureScot, 2017).

8.1.2 Data

Topographical modelling is based on the 5m resolution Ordnance Survey (OS) Terrain 5 Digital Terrain Model (DTM), available for the whole of the UK mainland. OS Terrain 5 data has a typical accuracy level greater than 2m Route Mean Square Error (RMSE).

8.1.3 Visibility Mapping

The visibility mapping or ZTV maps have been prepared through the use of Resoft's Windfarm computer software. The ZTV uses OS Terrain 5 digital terrain data which provides a representation of the bare-earth ground surface, in combination with a model of the wind turbine. The terrain model does not account for areas of tall vegetation and buildings which may in actuality screen the development; therefore, the model may overstate visibility of the turbines.

When calculating the extent of visibility, the software accounts for earth curvature and atmospheric refraction and provides the results in bands of colour. These are set to be clearly recognisable and distinct, however typically for cumulative visibility mapping, blue, yellow and green are adopted, green being the product of where the visibility of two developments overlap.

View height is also factored into the calculation, for the purposes of this assessment; the view height has been set at 2m above ground level.

While the ZTV provides a useful indication of where visibility of the wind turbines might be experienced, it should be noted that a very small portion of the wind turbine model used in the modelling may give rise to the indication of visibility, i.e., visibility to a small component of one wind turbine might indicate visibility of the whole turbine. In some instances, it may be useful to confirm the nature of visibility with wireframe views as part of the analysis of the visibility mapping.

8.1.4 Photography

All photography was undertaken through the use of a full frame digital Single Lens Reflex (dSLR) (Canon EOS 5d) camera mounted with a 50 millimetre (mm) 'fixed' lens (Canon EF 50mm - f/1.4 USM). The camera was mounted on a tripod with a panoramic head in order to obtain a stable platform for the single frame and panoramic views. The position of the tripod was recorded with a handheld GPS device. In addition to recording the location of the viewpoint, observations with regard to time of day, weather, cloud cover, and visibility were recorded.

Following completion of the fieldwork, the photography was reviewed, and the clearest images selected for the production of panoramic images. In some cases, small adjustments are made to the images through the use of Adobe Photoshop/CS3 software in order to improve clarity.

The panoramas were then prepared through the joining of multiple images (typically five) in Photoshop.

8.1.5 Visualisations

The visualisations supporting the LVIA have been presented in order to provide a view of the proposed development within its landscape context and assist the assessor in determining the change and resultant effect on the viewpoint location.

The photomontages have been prepared through the use of Adobe Photoshop and Resoft Windfarm software. Use of Windfarm allows wind turbines to be accurately positioned in the photograph/panorama and rendered so as to account for cloud cover, sun position and colour of the proposed wind turbines. While every effort is undertaken to render the turbines to account for the prevailing lighting conditions, where they may appear indistinct against the background, manipulation of the rendering has been applied in order to make the turbine appear more distinct.

The presentation of graphics material requires careful consideration in order to prepare a visualisation that provides an accurately scaled depiction of the Proposed Development for use at the viewpoint location. In this instance, where a photomontage has been prepared for a viewpoint, the photomontage has been presented in accordance with the NatureScot standards. These comprise:

- The following images at A3 height and A1 width
  - 1) Baseline panorama and matching wireline. A panorama, using an angle of view of 90°, illustrating the existing view presented alongside an identically sized matching wireframe. The size of the image and matching wireframe is 820 mm by 130 mm, with a 90° horizontal field of view and a 14.2° vertical field of view. To accommodate the required field of view the image is presented as a cylindrical projection. To facilitate the verification process, the horizontal extent of the central 50mm frame is indicated beneath the image, along with the extent of the 53.5° panorama. This format shows the wider landscape context within which the Proposed Development will sit and allows direct comparison of the changes to be made in addition to providing a useful aid memoire. The recommended viewing distance for these visualisations is at a comfortable arm's length, as set out on the visualisation figure.
  - 2) An illustration of the proposal using an angle of view of 53.5° at the equivalent of a 50mm lens. The image size is 260mm high by 820mm wide. The horizontal field of view is 53.5° and the vertical field of view is 18.2° in the centre of the image. The image is presented as a planar projection. The recommended viewing distance for these visualisations is a comfortable arm's length. This format allows for direct comparison of the effects in the field at a comfortable viewing distance as recommended by NatureScot.

Due to the presence of multiple operational turbines adjacent to the Proposed Development, photography from some viewpoints contains existing turbines at a range of orientations in relation to the viewer. For selected viewpoints, where the orientation of operational turbines in the baseline photography was notably different to that of the

proposed turbines, the existing turbines were erased and re-montaged into the view. Where this step has been undertaken, it is noted on the photomontage sheets.

In views where a photomontage has not been prepared, a wireframe view has been submitted. As with the photomontages, the turbines have been accurately positioned and the wireframe outputted so as to match the field of view to the panorama/photograph.

It should be noted that the LVIA has not been solely conducted on the visualisations presented within the EIA Report (Volume 3) but has included analysis of a range of wireframe views and other visualisations in addition to review of computer modelling of the Proposed Development Site in addition to other materials not presented in this assessment.

8.1.6 Aviation Lighting

Additional aviation lighting photomontage sheets have been created for selected viewpoints to illustrate proposed turbine lighting.

Low light photographs, captured approximately 30 minutes after sunset, are stitched in Hugin and photomontages created in Resoft Windfarm using the same processes as daytime photographs described above. Lighting is then modelled within Resoft Windfarm.

Two scenarios for lighting are displayed on separate photomontage sheets to demonstrate the lighting range between 200 and 2000 candela intensity that would apply during different visibility conditions. The locations of the lights are also highlighted on accompanying wireframes for each viewpoint.

9 References

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