

Appendix 6.1 Landscape and Visual Impact Assessment Methodology

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1. Introduction

1. This appendix describes in detail the methodology that has been used to carry out the Landscape and Visual Impact Assessment (LVIA) for the Proposed Development. The LVIA identifies and assesses the effects that the Proposed Development may have on the landscape and visual resource of the 40 km radius study area. This appendix is structured in the following sections:

- categories of effects;
- assessment of effects;
- assessment of physical landscape effects;
- assessment of effects on landscape character;
- assessment of effects on wild land;
- assessment of effects on views;
- assessment of cumulative effects;
- nature of effects;
- duration and reversibility of effects; and
- visualisation methodology.

2. The following sources have been used in the formulation of methodology for the assessment:

- Guidelines for Landscape and Visual Impact Assessment: Third Edition (Landscape Institute and IEMA, 2013) (GLVIA3);
- Landscape Institute (2019). Visual Representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19;
- Landscape Institute (2019). Technical Guidance Note 2/19 Residential Visual Amenity Assessment;
- NatureScot (2020). Assessing Impacts on Wild Land Areas Technical Guidance;
- Scottish Natural Heritage (SNH) (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments;
- SNH (2017). Visual Representation of Wind Farms, Version 2.2; and
- The Highland Council (July 2016). Visualisation Standards for Wind Energy Developments.

2. Categories of Effects

3. For the purpose of assessment, the potential effects on the landscape and visual resource are grouped into the following five categories.

Physical Effects

4. Physical effects are restricted to the area within the Proposed Development site boundary and are the direct effects on the existing fabric of the site, such as alteration to ground cover. This category of effects is made up of landscape elements, which are the components of the landscape such as rough grassland/moorland that may be directly and physically affected by the Proposed Development.

Effects on Landscape Character

5. Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that physically alter this pattern of elements, or through visibility of the Proposed Development, which may alter the way in which the pattern of elements is perceived. This category of effects is made up of landscape character receptors, which fall into two groups: landscape character types and landscape-related designated areas.

Effects on Wild Land Areas

6. The assessment of effects on wild land areas (WLAs) is carried out in accordance with NatureScot guidance (2020) 'Assessing Impacts on Wild Land Areas Technical Guidance'.

Effects on Views

7. The assessment of effects on views is an assessment of how the introduction of the Proposed Development will affect views throughout the study area. The assessment of effects on views is carried out in two parts:
 - an assessment of the effects that the Proposed Development will have on a series of viewpoints around the study area; and
 - an assessment of the effects that the Proposed Development will have on views from principal visual receptors, which are relevant settlements, routes and tourism features found throughout the study area.

Cumulative Effects

8. Cumulative effects arise where the study areas for two or more wind farms overlap so that both/all of the wind farms are experienced at a proximity where they may have a greater incremental effect, or where wind farms may combine to have a sequential effect. In accordance with GLVIA3 and NatureScot guidance (SNH, 2012), the LVIA assesses the effect arising from the addition of the Proposed Development to the cumulative situation, and not the overall effect of multiple wind farms.

3. Assessment of Effects

9. The objective of the assessment of the Proposed Development is to predict the likely significant effects on the landscape and visual resource. In accordance with the Environmental Impact Assessment (Scotland) Regulations 2017 (hereafter referred to as the 'EIA Regulations'), the LVIA effects are assessed to be either significant or not significant. The LVIA does not define intermediate levels of significance as the EIA Regulations do not provide for these.
10. The broad principles used in the assessment of the significance of effects on categories listed above are the same and are described below. The detailed methodology for the assessment of significance does, however, vary for each category, and the specific criteria used are described in this appendix.
11. The significance of effects is assessed through a combination of two considerations; the sensitivity of the landscape receptor or view and the magnitude of change that will result from the addition of the Proposed Development. The way that these two criteria may combine to result in a significant or not significant effect is shown in Table 1 below.
12. **Sensitivity** is an expression of the ability of a landscape receptor or view to accommodate the Proposed Development. Sensitivity is determined through a combination of the value of the receptor and its susceptibility to the Proposed Development.

13. **Magnitude of change** is an expression of the extent of the effect on landscape receptors and views that will result from the introduction of the Proposed Development. The magnitude of change is assessed in terms of a number of variables, including the size and scale of the impact and the geographical extent of the affected area.

Assessing Significance of Effects

14. The significance of effects is assessed through a combination of the sensitivity of the landscape receptor or view and the magnitude of change that will result from the addition of the Proposed Development. While this methodology is not reliant on the use of a matrix to arrive at the conclusion of a significant or not significant effect, a matrix is included below to illustrate how combinations of sensitivity and magnitude of change ratings can give rise to significant effects. The matrix also gives an understanding of the threshold at which significant effects may arise.

Table 1 – Illustrative Significance Matrix

Magnitude Sensitivity	High	Medium-High	Medium	Medium-Low	Low	Negligible
High	Significant	Significant	Significant	Significant/Not Significant	Not Significant	Not Significant
Medium-High	Significant	Significant	Significant/Not Significant	Significant/Not Significant	Not Significant	Not Significant
Medium	Significant	Significant/Not Significant	Significant/Not Significant	Not Significant	Not Significant	Not Significant
Medium-Low	Significant/Not Significant	Significant/Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Low	Significant/Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

15. Effects within the dark grey boxes in the matrix are considered to be significant in terms of the EIA Regulations. Effects within the light grey boxes may be significant or not significant depending on the specific relevant factors that arise at a particular landscape or visual receptor. In accordance with GLVIA3, experienced professional judgement is applied to the assessment of all effects and reasoned justification is presented in respect of the findings of each case.
16. A significant effect occurs where the Proposed Development will provide a defining influence on a landscape element, landscape character receptor or view. A not significant effect occurs where the effect of the Proposed Development is not material, and the baseline characteristics of the landscape element, landscape character receptor, view or visual receptor continue to provide the definitive influence. In this instance the Proposed Development may have an influence but this influence will not be definitive.
17. A significant cumulative effect may arise where a 'landscape with wind farms' is created as a result of the addition of the Proposed Development to other existing or proposed wind farms, resulting in wind turbines becoming sufficiently prolific that they become a prevailing or key landscape and visual characteristic.

18. This assessment assumes clear weather and optimum viewing conditions. This means that effects that are assessed to be significant may be not significant under different, less clear conditions.

4. Assessment of Physical Landscape Effects

19. Physical effects are the direct effects on the fabric of the site such as the removal of trees and alteration to ground cover and are restricted to the area of the site. The objective of the assessment of physical effects is to determine which landscape elements will be affected and whether these effects will be significant or not significant. The variables considered in the sensitivity of landscape elements, and the magnitude of change upon them, are described below.

Sensitivity of Landscape Elements

20. The sensitivity of a landscape element is an expression of its ability to accommodate the Proposed Development. This is dependent on the value of the landscape element and its susceptibility to the change that will arise from the addition of the Proposed Development:
- the value of a landscape element is a reflection of its importance in the pattern of elements which constitute the landscape character of the area. For example, the value of woodland is likely to be increased if it provides an important component of the local landscape character. If a landscape element is particularly rare - as a remnant of a historic landscape layout for example - its value is likely to be increased; and
 - the susceptibility of a landscape element is a reflection of the degree to which the element can be restored, replaced or substituted. For example, it may be possible to restore ground cover following the excavation required for the building of turbine foundations, and this would reduce the susceptibility of this element.
21. The sensitivity of each receptor is a product of the specific combination of value and susceptibility to the Proposed Development as evaluated by professional judgement. The evaluation of sensitivity is described for each receptor in the assessment, and levels of sensitivity (high, medium or low) are applied. Interim levels of sensitivity (medium-high and medium-low) may also be applied where appropriate for the combination of value and susceptibility.

Magnitude of Change on Landscape Elements

22. The magnitude of change on landscape elements is quantifiable and is expressed in terms of the degree to which a landscape element will be removed or altered by the Proposed Development. Definitions of magnitude of change are applied in order that the process of assessment is made clear. These are:
- **high**, where the Proposed Development will result in the complete removal of a landscape element or substantial alteration to a key landscape element;
 - **medium**, where the Proposed Development will result in the removal of a notable part of a landscape element or a notable alteration to a key landscape element;
 - **low**, where the Proposed Development will result in the removal of a minor part of a landscape element or a minor alteration to a key landscape element; and
 - **negligible**, where the alteration to the landscape element is barely discernible.
23. There may also be intermediate levels of magnitude of change (medium-high and medium-low) where the change falls between two of the definitions.

Significance of Effects on Landscape Elements

24. The significance of the effect on landscape elements is dependent on all of the factors considered in the sensitivity of the receptor and the magnitude of change upon it. A significant effect will occur where the degree of removal or alteration of the landscape element is such that the form of the element will be redefined. If the landscape element is of a high sensitivity, a significant effect can occur with a relatively limited degree of removal or alteration. A not significant effect will occur where the form of the landscape element is not redefined as a result of the Proposed Development. If the landscape element is of lower sensitivity, it may undergo a higher level of removal or alteration yet remain as a not significant effect.

5. Assessment of Effects on Landscape Character

25. Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character arise through the introduction of new elements that physically alter this pattern of elements, the removal of characterising elements, or through visibility of the Proposed Development, which may alter the way in which the pattern of elements is perceived. This category of effects is made up of landscape character receptors, which fall into two groups; landscape character types and designated areas.
26. The objective of the assessment of effects on landscape character is to determine which landscape character receptors will be affected by the Proposed Development, and whether these effects will be significant or not significant. The assessment of effects on landscape character involves an evaluation of sensitivity and magnitude of change, and the resultant assessment of significance.

Sensitivity of Landscape Character Receptors

27. The sensitivity of a landscape character receptor is an expression of its ability to accommodate the Proposed Development as part of its own character or as part of the visual setting or context to the character receptor. This is dependent on the value of the landscape receptor and its susceptibility to change.

Value of Landscape Character Receptors

28. The value of a landscape character receptor is a reflection of the value that is attached to that landscape. The landscape value is classified as high, medium or low, and the basis for this evaluation is determined through the application of professional judgement to the following factors.
- Landscape designations: a receptor that lies within a recognised landscape-related planning designation will generally have an increased value, depending on the proportion of the receptor that is covered and the level of importance of the designation (international, national, regional or local). It is important to note that the absence of designations does not preclude local resource value, as an undesignated landscape character receptor may be important as a resource in the local or immediate environment, particularly when experienced in comparison with other nearby landscapes.
 - Landscape quality: the quality of a landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness and the extent to which these attributes have remained intact. A landscape with consistent, intact and well-defined, distinctive attributes is generally considered to be of higher quality and, in turn, higher value, than a landscape where the introduction of inappropriate elements has detracted from its inherent attributes.

- Landscape experience: the experience of the landscape character receptor can add to its value and relates to a number of factors including the perceptual responses it evokes, the cultural associations that may exist in literature or history, or the iconic status of the landscape in its own right, the recreational value of the landscape for outdoor pursuits, and the contribution of other values relating to the nature conservation or archaeology of the area.

Susceptibility to Change of Landscape Character Receptors

29. The susceptibility of a landscape character receptor to change is a reflection of its ability to accommodate the changes that will occur as a result of the addition of the Proposed Development. The assessment of the susceptibility of the landscape receptor to change is classified as high, medium or low, as determined through the application of professional judgement to the following factors.

- The specific nature of the Proposed Development: the susceptibility of landscape receptors is specific to the change arising from the particular development that is proposed, including its individual components and features, and its size, scale, location, context and characteristics.
- Landscape character: the key characteristics of the existing landscape character of the receptor are considered in the evaluation of susceptibility as they determine the degree to which the receptor may accommodate the influence of the Proposed Development. For example, a landscape that is of a particularly wild and remote character may have a high susceptibility to the influence of the Proposed Development due to the contrast that it would have with the landscape, whereas a developed landscape where built elements and structures are already part of the landscape character may have a lower susceptibility. However, there are instances when the quality of a landscape may have been degraded to an extent whereby it is considered to be in a fragile state and therefore a degraded landscape may have a higher susceptibility to the Proposed Development.
- Landscape association: the extent to which the Proposed Development will influence the character of the landscape receptors across the study area also relates to the associations that exist between the landscape within which the Proposed Development is located and the landscape receptor from which the Proposed Development is being experienced. This association will be most important where the landscapes are directly related; for example, if the Proposed Development is located in an upland landscape that has a strong enclosing influence on an adjacent valley landscape. Elsewhere, the association may be less important; for example, where the Proposed Development lies inland of a coastal landscape that has its main focus outwards over the sea.

Levels of Sensitivity

30. The sensitivity of each receptor is a product of the specific combination of value and susceptibility to the Proposed Development as evaluated by professional judgement. The sensitivity of the landscape receptor is evaluated as high, medium or low. Interim levels of sensitivity (medium-high and medium-low) may also be applied where appropriate.

Magnitude of Change on Landscape Character Receptors

31. The magnitude of change that the Proposed Development will have on landscape receptors is assessed in terms of the size or scale of the change, the geographical extent of the area influenced and its duration and reversibility. The key elements of the Proposed Development that will influence the level of change on landscape character are the movement, form, material, colour and scale of the turbines, although infrastructure is also considered.

Size or Scale

32. This criterion relates to the size or scale of change to the landscape that will arise as a result of the addition of the Proposed Development, based on the following factors.
- The degree to which the pattern of elements that makes up the landscape character will be altered by the Proposed Development, through removal or addition of elements in the landscape. The magnitude of change will generally be higher if key features that make up the landscape character are extensively removed or altered, and if many new components are added to the landscape.
 - The extent to which the Proposed Development will change - physically or perceptually - the characteristics that may be important in the creation of the distinctive character of the landscape. This may include the scale of the landform, its relative simplicity or irregularity, the nature of the landscape context, the grain or orientation of the landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the Proposed Development with these key characteristics.
 - The distance between the landscape character receptor and the Proposed Development. Generally, the greater the distance, the lower the scale of change as the Proposed Development will constitute a less apparent influence on the landscape character.
 - The extent of the Proposed Development that will be seen from the landscape receptor. Visibility of the Proposed Development may range from one turbine blade tip to all of the turbines, and generally the greater the extent of the Proposed Development that can be seen, the greater the change.

Geographical Extent

33. The geographic area over which the landscape effects will be experienced is also evaluated. The extent of the effect will vary depending on the specific nature of the Proposed Development and is principally a reflection of the extent of the landscape receptor that will be affected by visibility of the Proposed Development.

Duration and Reversibility

34. The duration and reversibility of landscape effects are based on the period over which the Proposed Development is likely to exist and the extent to which the Proposed Development will be removed and its effects reversed at the end of that period. Duration and reversibility are not always incorporated into the overall magnitude of change, and may be stated separately.

Levels of Magnitude of Change

35. An evaluation of the magnitude of change on landscape receptors is made by combining the considerations of size or scale of change, geographical extent and, where relevant, duration and reversibility. The magnitude of change is assessed as high, medium, low or negligible according to the following definitions:
- **high:** where the Proposed Development will result in a major alteration to the baseline character of the landscape, providing a prevailing influence and/or introducing elements that are substantially uncharacteristic in the receiving landscape;
 - **medium:** where the Proposed Development will result in a moderate alteration to the baseline character of the landscape, providing a readily apparent influence and/or introducing elements that may be prominent but are not necessarily uncharacteristic in the receiving landscape;

- **low**: where the Proposed Development will result in a minor alteration to the baseline character of the landscape, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving landscape; and
 - **negligible**: where the alteration to landscape character is barely discernible.
36. There may also be intermediate levels of magnitude of change (medium-high and medium-low) where the change falls between two of the definitions.

Significance of Effects on Landscape Character Receptors

37. The significance of the effect on each landscape character receptor is dependent on the factors that are considered in the sensitivity of the receptor and the magnitude of change upon it. These factors are combined using professional judgement to arrive at an overall assessment as to whether the Proposed Development will have a significant or not significant effect on the receptor. The matrix shown in Table 1 above is also used to inform the threshold of significance when combining sensitivity and magnitude of change.
38. A significant effect will occur where the combination of the variables results in the Proposed Development having a defining effect on the receptor. A not significant effect will occur where the effect of the Proposed Development is not definitive, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics. In this instance, a not significant effect would indicate that the Proposed Development may have an influence on the landscape character of the receptor, but this influence will not be a defining one.

6. Assessment of Effects on Wild Land

39. Assessment of effects on wild land is carried out in accordance with NatureScot guidance (2020) 'Assessing Impacts on Wild Land Areas Technical Guidance'.

7. Assessment of Effects on Views

40. The assessment of effects on views evaluates how the introduction of the Proposed Development will affect views and visual amenity. The assessment of visual effects is carried out in two parts:
- An assessment of the effects that the Proposed Development will have on a series of viewpoints around the study area; and
 - An assessment of the effects that the Proposed Development will have on views from principal visual receptors, which are relevant settlements, routes and tourism features found throughout the study area.
41. The objective of the assessment of effects on visual receptors is to determine what the likely effects of the Proposed Development will be on views across the study area, and whether these effects will be significant or not significant. The assessment of effects on views involves an evaluation of sensitivity and magnitude of change, and the resultant assessment of significance.

Sensitivity of Visual Receptors

42. The sensitivity of views and visual receptors is determined by a combination of the value of the view and the susceptibility of the viewer or visual receptor to the Proposed Development.

Value of Views

43. The value of a view is a reflection of the recognition and the importance attached formally through identification as a viewpoint on mapping, by signposting or through planning designation; or

informally through the value which society attaches to the view. The value of a view is classified as high, medium or low, based on the following factors.

- **Formal recognition:** the value of views can be formally recognised through their identification on maps as formal viewpoints, are signposted and provide facilities to facilitate the enjoyment of the view such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy, where they are recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations; for example the value of a view may be increased if it presents an important vista from a designed landscape or lies within or overlooks a designated area such as a National Scenic Area (NSA), which implies a greater value to the visible landscape.
- **Informal recognition:** views that are well-known at a local level or have particular scenic qualities can have an increased value, even if there is no formal recognition or designation. Views or viewpoints are sometimes informally recognised through references in art or literature and this can also add to their value.
- **Scenic quality:** the value of the view is a reflection of the scenic qualities gained in the view. This relates to the content and composition of the landscape, whereby certain patterns and features can increase the scenic quality while others may reduce the scenic quality.

Susceptibility to Change

44. Susceptibility relates to the nature of the viewer and how susceptible they are to the potential effects of the Proposed Development. This is determined by the nature of the viewer, which is the occupation or activity in which the viewer is engaged at the viewpoint, and is classified as high, medium or low. The most common groups of viewers considered in the visual assessment include residents, road-users, workers and walkers.
45. Viewers whose attention is focused on the landscape – walkers or cyclists on recognised walking or cycling routes, for example - are likely to have a high susceptibility, as will residents of properties that gain views of the Proposed Development.
46. Viewers travelling in cars or on trains will tend to have a medium susceptibility as their view is transient and moving. However, people travelling in cars on a national tourist route can have a heightened susceptibility as they are likely to have an awareness of the surrounding landscape.
47. The least sensitive viewers, with a low susceptibility, are usually people at their place of work as they are often less sensitive to changes in the view, although this depends on the nature of their work.

Levels of Sensitivity

48. The sensitivity of each receptor is a product of the specific combination of value and susceptibility to the Proposed Development as evaluated by professional judgement. The sensitivity of the view or visual receptor is evaluated as high, medium or low by combining the value and susceptibility to change. Interim levels of sensitivity (medium-high and medium-low) may also be applied where appropriate for the combination of value and susceptibility.

Magnitude of Change on Views

49. The magnitude of change on visual receptors and views is assessed in terms of the size or scale of the change, the geographical extent of the visual effect and, in some situations, its duration and reversibility. The key elements of the Proposed Development that will influence the level of change on views are the movement, form, material, colour and scale of the turbines, although infrastructure is also considered.

Size or Scale

50. This criterion relates to the size or scale of change to the view that will arise as a result of the Proposed Development, based on the following factors.

- 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.
- The distance between the visual receptor and the Proposed Development. Generally, the greater the distance, the lower the magnitude of change as the Proposed Development will constitute a smaller-scale component of the view.
- The proportion of the Proposed Development that will be seen. Visibility may range from one blade tip to all of the turbines. Generally, the more of the Proposed Development that can be seen, the higher the magnitude of change.
- The field of view available and the proportion of the view that is affected by the Proposed Development. Generally, the more of a view that is affected, the higher the magnitude of change will be. If the Proposed Development extends across the whole of the open part of the outlook, the magnitude of change will generally be higher. Conversely, if the Proposed Development covers just a part of an open, expansive and wide view, the magnitude of change is likely to be reduced as the Proposed Development will not affect the whole open part of the outlook.
- The scale and character of the context within which the Proposed Development will be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture. The scale of the landform and the patterns of the landscape, the existing land use and vegetation cover, and the degree and type of development and settlement seen in the view will be relevant.
- The consistency of the appearance of the Proposed Development. If the Proposed Development appears in a similar setting and form, and from a similar angle each time it is apparent, it will appear as a single, familiar site, and this can reduce the magnitude of change. If, on the other hand, it appears from a different angle and is seen in a different form and setting, the magnitude of change is likely to be higher.

Geographical Extent

51. The extent of effects on views is based on the following factors.

- The extent of a receptor (a road, footpath or settlement, for example) from which the Proposed Development may be seen. If the Proposed Development is visible from extensive areas, the overall magnitude of change is likely to be higher than if it is visible from a limited part of a receptor.
- The extent to which the change would affect views; whether this is unique to a particular viewpoint or if similar visual changes occur over a wider area represented by the viewpoint.
- The position of the Proposed Development in relation to the principal orientation of the view and activity of the receptor. If the Proposed Development is seen in a specific, directional vista, the magnitude of change will generally be greater than if it were seen in a glimpsed view at an oblique angle of view.

Duration and Reversibility

52. The duration and reversibility of effects on views are based on the period over which the Proposed Development is likely to exist and the extent to which it will be removed and its effects reversed at

the end of that period. Duration and reversibility are not always incorporated into the overall magnitude of change, and may be stated separately.

Levels of Magnitude of Change

53. The magnitude of change on views and visual receptors is evaluated by combining the considerations of size or scale of change, geographical extent and, where relevant, duration and reversibility. The magnitude of change is assessed as high, medium, low or negligible according to the following definitions:
- **high:** where the Proposed Development will result in a major alteration to the baseline view, providing a prevailing influence and/or introducing elements that are substantially uncharacteristic in the view;
 - **medium:** where the Proposed Development will result in a moderate alteration to the baseline view, providing a readily apparent influence and/or introducing elements that may be prominent but are not necessarily uncharacteristic in the view;
 - **low:** where the Proposed Development will result in a minor alteration to the baseline view, providing a slightly apparent influence and/or introducing elements that are characteristic in the view; and
 - **negligible:** where the alteration to the view is barely discernible.
54. There may also be intermediate levels of magnitude of change (medium-high and medium-low) where the change falls between two of the definitions.

Significance of Effects on Views

55. The significance of the effect on each view or visual receptor is dependent on the factors that are considered in the sensitivity of the view or receptor and the magnitude of change upon it. These factors are combined using professional judgement to arrive at an overall assessment as to whether the Proposed Development will have a significant or not significant effect on the view or visual receptor. The matrix shown in Table 1 above is also used to inform the threshold of significance when combining sensitivity and magnitude of change.
56. A significant effect will occur where the combination of the variables results in the Proposed Development having a defining effect on the view or visual receptor. A not significant effect will occur where the effect of the Proposed Development is not definitive, and the view continues to be characterised principally by its baseline characteristics. In this instance, a not significant effect would indicate that the Proposed Development may have an influence on the view, but this influence will not be a defining one.

8. Assessment of Cumulative Effects

57. The objective of the assessment of cumulative effects is to describe, illustrate and assess the ways in which the Proposed Development will interact with other relevant operational, consented or proposed wind farms. The outcome of this is the identification of any significant cumulative effects that may arise from the addition of the Proposed Development to the cumulative situation, in accordance with NatureScot guidance (Assessing the Cumulative Impact of Onshore Wind Energy Developments, SNH, 2012), which states that cumulative assessment should "*focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process.*"

58. The LVIA assesses the incremental effect arising from the addition of the Proposed Development to the cumulative situation, and not the overall accumulation of wind farms across the study area. This accords with GLVIA3, which notes (para 7.18):

“Some of those involved may tend to favour a limited view focussed on the additional effects of the project being assessed, on top of the cumulative baseline. Some stakeholders may however be more interested in the combined effects of all the past, present and future proposals, including the proposed scheme...Assessing combined effects of different proposals at different stages in the planning process can be very complex. Furthermore the assessor will not have assessed the other schemes and cannot therefore make a fully informed judgement. A more comprehensive overview of the cumulative effects must rest with the competent authority.”

59. The cumulative development of wind farms within a particular area may build up to create different types of landscape or visual context. Significant cumulative landscape or visual effects may arise where a 'landscape with wind farms' is created as a result of the addition of the Proposed Development to other existing or proposed wind farms, resulting in wind turbines becoming sufficiently prolific that they become a prevailing or key landscape and visual characteristic.

Cumulative Magnitude of Change

60. The cumulative magnitude of change is an expression of the degree to which landscape character receptors and visual receptors/views will be changed by the addition of the Proposed Development to wind farm developments that are already operational, consented or at application stage. The cumulative magnitude of change is assessed based on a number of criteria, as follows.

- The location of the Proposed Development in relation to other wind farm developments. If the Proposed Development is seen in a part of the view or setting to a landscape receptor that is not affected by other wind farm development, this will generally increase the cumulative magnitude of change as it will extend wind farm influence into an area that is currently unaffected. Conversely, if the Proposed Development is seen in the context of other sites, the cumulative magnitude of change may be lower as wind farm influence is not being extended to otherwise undeveloped parts of the outlook or setting. This is particularly true where the scale and layout of the Proposed Development is similar to that of the other sites as where there is a high level of integration and cohesion with an existing wind farm site the various developments may appear as a single site.
- The extent of the developed skyline. If the Proposed Development will add notably to the developed skyline in a view, the cumulative magnitude of change will tend to be higher as skyline development can have a particular influence on both views and landscape receptors.
- The number and scale of wind farm developments seen simultaneously or sequentially. Generally, the greater the number of clearly separate developments that are visible, the higher the cumulative magnitude of change will be. The addition of the Proposed Development to a view or landscape where a number of smaller developments are apparent will usually have a higher cumulative magnitude of change than one or two large developments as this can lead to the impression of a less co-ordinated or strategic approach.
- The scale comparison between wind farm developments. If the Proposed Development is of a similar scale to other visible wind farms, particularly those seen in closest proximity to it, the cumulative magnitude of change will generally be lower as it will have more integration with the other sites and will be less apparent as an addition to the cumulative situation.

- The consistency of image of the Proposed Development in relation to other wind farm developments. The cumulative magnitude of change of the Proposed Development is likely to be lower if its turbine height, arrangement and layout design are broadly similar to other wind farms in the landscape, as they are more likely to appear as relatively simple and logical components of the landscape.
 - The context in which the wind farm developments are seen. If developments are seen in a similar landscape context, the cumulative magnitude of change is likely to be lower due to visual integration and cohesion between the sites. If developments are seen in a variety of different landscape settings, this can lead to a perception that wind farm development is unplanned and un-coordinated, affecting a wide range of landscape characters and blurring the distinction between them.
 - The magnitude of change of the Proposed Development as assessed in the main assessment. The lower this is assessed to be, the lower the cumulative magnitude of change is likely to be. Where the Proposed Development itself is assessed to have a negligible magnitude of change on a view or receptor there will not be a cumulative effect as the contribution of the Proposed Development will equate to the 'no change' situation.
61. Definitions of cumulative magnitude of change are applied in order that the process of assessment is made clear. These are:
- **high:** the addition of the Proposed Development to other wind energy developments in the landscape or view will result in a major change to the cumulative wind farm situation;
 - **medium:** the addition of the Proposed Development to other wind energy developments in the landscape or view will result in a moderate change to the cumulative wind farm situation;
 - **low:** the addition of the Proposed Development to other wind energy developments in the landscape or view will result in a minor change to the cumulative situation; and
 - **negligible:** where the alteration to the cumulative situation is barely discernible, or there may be 'no change'.
62. There may also be intermediate levels of cumulative magnitude of change (medium-high and medium-low) where the change falls between two of the definitions.

Significance of Cumulative Effects

63. Significant cumulative landscape and visual effects arise where a 'wind farm' landscape is created as a result of the addition of the Proposed Development to other existing or proposed wind farms, which results in wind turbines becoming apparent to the extent that they may become a prevailing landscape and visual characteristic. The creation of a 'wind farm landscape' may evolve as follows.
- A small-scale, single wind farm will often be perceived as a new or 'one-off' landscape feature or landmark within the landscape. Except at a local site level, it will not usually change the overall existing landscape character, or become a new characteristic element of a wider landscape.
 - With the addition of further wind farm development, wind farms can become a characteristic element of the landscape, as the wind farms appear as repeated landscape elements. Providing there is sufficient separation, physically, visually and perceptually, between each development, coalescence is avoided and the wind farms are likely to appear as a series of wind farms within the landscape, without becoming the dominant or defining characteristic of the landscape.

- The next stage is to consider larger commercial wind farms or an increase in the number of wind farms that appear to physically, visually and perceptually coalesce. This may lead to a 'wind farm landscape' where multiple wind farms are the prevailing or defining characteristic of the landscape. A wind farm landscape may already exist as part of the baseline landscape context.
64. It is important to remember that the objective of the cumulative assessment is different from the assessment of effects of the Proposed Development itself. The assessment of the effects of the Proposed Development itself focusses on the effect that the Proposed Development will have on the viewpoints, principal visual receptors and landscape character receptors, taking baseline wind farms into consideration but not assessing the contribution of the Proposed Development to the cumulative situation. In the cumulative assessment, the intention is to establish whether or not the addition of the Proposed Development, in combination with other relevant operational and proposed wind farms, may lead to wind turbines becoming a prevailing landscape and visual characteristic.

9. Nature of Effects

65. The 'nature of effects' relates to whether the effects of the Proposed Development are beneficial or adverse. Effects may also be neutral. Guidance provided in GLVIA3 states that "*thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity*". The nature of effect is therefore one that requires interpretation and reasoned professional opinion.
66. In relation to many forms of development, the EIA Report will identify beneficial and adverse effects under the term 'nature of effect'. The landscape and visual effects of wind farms are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which these effects can be measured as being categorically beneficial or adverse. For example, in disciplines such as noise or ecology it is possible to identify the nature of the effect of a wind farm by objectively quantifying its effect and assessing the nature of that effect in prescriptive terms. However, this is not the case with landscape and visual effects, where the approach combines quantitative and qualitative assessment.
67. In this assessment, beneficial, neutral and adverse effects are defined as follows.
- Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components.
 - Neutral effects occur where the Proposed Development neither contributes to nor detracts from the landscape and visual resource and is accommodated with neither beneficial nor adverse effects, or where the effects are so limited that the change is hardly noticeable. A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation.
 - Adverse effects are those that detract from or weaken the landscape and visual resource through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.
68. This assessment adopts a precautionary approach, which assumes that significant landscape and visual effects will be weighed on the negative side of the planning balance, although positive or neutral effects may arise in certain situations. Unless it is stated otherwise, the effects of the Proposed Development on landscape and visual amenity are considered to be negative.

10. Duration and Reversibility

69. The effects of the Proposed Development are of variable duration, and are assessed as short-term or long-term, and permanent or temporary/reversible. It is anticipated that the operational life of the Proposed Development will be 30 years. The turbines, site access tracks and substation compound will be apparent during this time, and these effects are considered to be long-term.
70. Other infrastructure and operations such as the construction processes and plant (including tall cranes for turbine erection) and construction compound will be apparent only during the initial construction period of the Proposed Development and are considered to be short-term effects. Borrow pit excavation will also be short-term as the borrow pit will be restored at the end of the construction process.
71. The reversibility of effects is variable. The most apparent effects on the landscape and visual resource, which arise from the presence of the turbines, are temporary/reversible as the turbines will be removed on decommissioning, as will the substation compound. The effects of the tall cranes and heavy machinery used during the construction and decommissioning periods are also temporary.
72. Reprofiting of landform at the site access off the A838 will, however, be permanent as will any reprofiled landform at the borrow pit search area.
73. The access tracks may be left in situ at decommissioning at the request of the landowners, or they will otherwise be covered with topsoil and left to naturally regenerate. Turbine foundations (except for the top 1 m which would be removed) and underground cabling will be left in-situ below ground with no residual landscape and visual effects.

11. Visualisation Methodology

74. The viewpoint assessment comprises 23 viewpoints, the locations of which have been agreed with The Highland Council (THC) and NatureScot.
75. The viewpoint assessment is illustrated by a range of tools including wirelines, photographs and photomontages. The photographs used to produce the photomontages have been taken in RAW format using a Canon EOS 5D Mark II Digital SLR camera with fixed 50 mm lens. This camera has a full-frame (35 mm negative size) CMOS sensor. The viewpoint visualisations are based on theoretical visibility from 1.5 m above ground level.
76. Wireline representations that illustrate the Proposed Development model, set within a computer-generated image of the landform, are used in the assessment to predict the theoretical appearance of the turbines. In the wirelines, the turbines are shown with the central turbines facing the viewer directly, with the full rotor diameter visible at its tallest extent. In the photomontages, the turbine rotors are shown with a random appearance with the blades facing the viewer.
77. Photomontages have been produced for every viewpoint, using Resoft Windfarm software, to provide a more realistic image of how the Proposed Development might look. In all views the photomontages include the turbines. Where there is significant visibility of site infrastructure from with a radius of 10 km this is also shown in the photomontages. The infrastructure that is illustrated in the photomontages is based on the proposed alignment indicated in the site layout and has been overlaid onto the surface of the terrain model to provide an indication of the likely visual effects, but does not attempt to show the actual vertical alignment, including cut and fill that may be required. This cut and fill may increase or reduce the actual visibility of the infrastructure.
78. The photographs and other graphic material such as wirelines and photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. There are

limitations in these theoretical productions, and these should be borne in mind in the consideration and use of wireline images. Firstly, the wirelines illustrate the 'bare ground' situation, not taking into account the screening effects of vegetation, buildings, or other local features that may prevent or reduce visibility. Secondly, there may be local, small-scale landform that is not reflected in the wirelines but may alter the real visibility of the Proposed Development, either by screening theoretical visibility or revealing parts of the Proposed Development that are not theoretically visible. Where descriptions within the assessment identify the numbers of turbines visible this refers to the theoretical illustrations generated and therefore the reality may differ to a degree from these impressions.

Software Packages

- Resoft Windfarm v.4.2.5.3
- Adobe Photoshop 2020
- Adobe Indesign 2020
- PTGUI v10.0.17 Pro
- DxO Optics Pro v8
- ESRI ArcGIS v10.3
- AutoCAD Map 3D 2018
- Autodesk 3ds Max Design 2018
- Topos R2

Photographic Details

79. Photographers: Optimised Environments Ltd, Quartermile Two, 2 Lister Square, Edinburgh, EH3 9GL
80. Camera information:
 - Canon EOS 5D Mark II Digital SLR camera;
 - Canon fixed 50 mm f/1.4 USM lens;
 - camera set to RAW image format;
 - Nodal Ninja panoramic head with Adjust Leveller (set to 20°);
 - tripod; and
 - height to the centre of the camera lens above ground: 1.5 m.
81. Terrain data: Ordnance Survey Terrain 5, NextMap Britain 5 m (DTM).
82. Turbine model information: turbine dimensions are in accordance with those stated in the EIA Report.
83. Two separate sets of visualisations have been produced for the Proposed Development; one in accordance with NatureScot guidance (Visual Representation of Wind Farms, Version 2.2 (SNH, 2017)) and one in accordance with THC guidance (Visualisation Standards for Wind Energy Developments (July 2016)).

NatureScot Guidance

84. Baseline photographs and wireline (90° horizontal field of view): the photographs used for these are taken with a 50 mm lens and are stitched together to form 90° cylindrically projected images. When printed at an image size of 820 mm x 130 mm, these have a 90° horizontal field of view x 14.2° vertical

field of view. The photographs and wirelines are generally centred on the visible turbines of the Proposed Development. The images have a principal viewing distance of 522 mm and are provided to illustrate the wider landscape and visual context only.

85. 53.5° wirelines and photomontages: these are produced for every viewpoint using Resoft Windfarm software, to provide a more realistic image of how the Proposed Development might look. When printed at an image size of 820 mm x 260 mm they have a 53.5° horizontal field of view and have a principal viewing distance of 812.5 mm. All 53.5° wirelines and photomontages are planar projected.

THC Guidance

86. Images for landscape assessment: the photographs used for these are taken with a 50 mm lens and when printed at an image size of 390 mm x 140 mm have a focal length of 50 mm, vertical field of view of 46.4° and horizontal field of view of 65.5°. The photographs and wirelines are generally centred on the visible turbines of the Proposed Development.
87. Images for visual impact assessment: the photographs used for these are taken at the standard focal length of 50 mm with a 39.6° horizontal field of view and 27° vertical field of view. The photographs are generally centred on the visible turbines of the Proposed Development. However, if the Proposed Development cannot be contained within the full extent of the horizontal field of view of the frame, the nearest visible turbine is included in the view.
88. The 39.6° horizontal field of view single frame photomontages, are reproduced at a size of 390 mm x 260 mm. As noted on the figures, “*when viewed at a comfortable arm’s length, these images are representative of the maximum field of view of clear vision but are not representative of scale and distance*”.
89. A set of single frame photomontages with a 75 mm focal length is also included. These images are extracted from the 50 mm focal length photomontage and conform to a 27° horizontal field of view x 18° vertical field of view. When reproduced at a size of 390 mm x 260 mm this image should be viewed at a comfortable arm’s length (approx. 500 mm) in order to gain as accurate an impression as possible of the real effect on the views.

12. References

Landscape Institute (2019). *Technical Guidance Note 2/19 Residential Visual Amenity Assessment*. Landscape Institute.

Landscape Institute (2019). *Visual Representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19*. Landscape Institute.

Landscape Institute and IEMA (2013). *Guidelines for Landscape and Visual Impact Assessment: Third Edition*. Landscape Institute and IEMA.

NatureScot (2020). *Assessing Impacts on Wild Land Areas Technical Guidance*. NatureScot.

SNH (2012). *Assessing the Cumulative Impact of Onshore Wind Energy Developments*. SNH.

SNH (2017). *Visual Representation of Wind Farms, Version 2.2*. SNH.

The Highland Council (July 2016). *Visualisation Standards for Wind Energy Developments*. The Highland Council.