4 Landscape & Visual Impact Assessment Technical Appendices

Technical Appendix 4.1: LVIA Plates, Table and Figures, Glossary and References

List of Plates and Tables in Chapter 4

- Plate 4.1 The LVIA Process
- Table 4.1 The Proposed Development's Zone of Theoretical Visibility
- Table 4.2 Summary of Visual Effects on Viewpoints
- Table 4.3 Summary of Cumulative Baseline
- Table 4.4 The Proposed Development's Cumulative Zone of Theoretical Visibility
- Table 4.5 Summary of Cumulative Visual Effects on Viewpoints

List of Figures Accompanying Chapter 4

Baseline Assessment Figures

- Figure 4.1 Landscape Designations and Classifications
- Figure 4.2 Landscape Character Areas
- Figure 4.3 Viewpoint Selection
- Figure 4.4 Cumulative Baseline

Zone of Theoretical Visibility Diagrams

- Figure 4.5 Comparative Zone of Theoretical Visibility, 180 m vs. 150 m blade tip, 30 km radius
- Figure 4.6 Zone of Theoretical Visibility, 15 km radius, blade tip and hub height scenarios (2-page figure)
- Figure 4.7 Zone of Theoretical Visibility, 30 km radius, blade tip and hub height scenarios (2-page figure)
- Figure 4.8 Reverse Zone of Theoretical Visibility, 15 km and 30 km radii, blade tip (2-page figure)
- Figure 4.9 Cumulative Zone of Theoretical Visibility scenarios including: Gruig Cluster; Existing and Consented Wind Farms; Proposed Wind Farms, 30 km radius, blade tip (3-page figure)

Viewpoint Visualisations

Category A: Locations primarily representing views from settlements and rural roads with residential properties within 5 km of the Proposed Development

- Figure 4.10 Viewpoint 1: Corkey Village at Reservoir Road junction
- Figure 4.11 Viewpoint 2: Corkey Village at Ballyweeny Road junction
- Figure 4.12 Viewpoint 3: Junction of Ballyweeny and Ballyveely Roads
- Figure 4.13 Viewpoint 4: Omerbane Road near Tullykittagh Road
- Figure 4.14 Viewpoint 5: Skerry West at Omerbane Road junction

Category B: Locations primarily representing views from settlements and the connecting road network within 5 – 10 km of the proposed Development

- Figure 4.15 Viewpoint 6: Altarichard Road, Magherahoney
- Figure 4.16 Viewpoint 7: Dunloy Village
- Figure 4.17 Viewpoint 8: Killygore Road near A43 at Martinstown
- Figure 4.18 Viewpoint 9: Glen's Brae, Lisbreen near Martinstown
- Figure 4.19 Viewpoint 10: Layby on B94 at edge of Cloughmills

Category C: Locations primarily representing views from within the Antrim Coast and Glens Area of Outstanding Natural Beauty

- Figure 4.20 Viewpoint 11: Altnahinch Road at Skerry Hill
- Figure 4.21 Viewpoint 12: Old Cushendun Road to north of Altnahinch Road
- Figure 4.22 Viewpoint 13: Moyle Way near Trostan summit
- Figure 4.23 Viewpoint 14: Slemish summit

Category D: Locations primarily representing views from the A26 and A44 road corridors

- Figure 4.24 Viewpoint 15: A26 Crankill Road near Ballymena
- Figure 4.25 Viewpoint 16: Bridge over A26 near Logan's, Cloughmills
- Figure 4.26 Viewpoint 17: A26 Frosses Road near Ballymoney
- Figure 4.27 Viewpoint 18: Drones Road, A44 at Ballynagashel

  Figure 4.28 Viewpoint 19: Armoy village at GAA carpark, A44

Category E: Locations primarily representing views from the Causeway Coast and Glens Area of Outstanding Natural Beauty

- Figure 4.29 Viewpoint 20: A2 at Magheraboy near Ballintoy

  Viewpoint 21: Causeway Coast scenic drive near Giant's Causeway

  Viewpoint 22: Round Hill near Portballintrae and Dunluce

Category F: Locations primarily representing views of the Development from the wider Study Area beyond 15 – 20 km

- Figure 4.30 Viewpoint 23: Granagh Road near Cullybackey
- Figure 4.31 Viewpoint 24: Seacon Beg near Ballymoney
  Viewpoint 25: Tildarg Hill near Wolf Bog
  Viewpoint 26: Tardree Mountain

List of Technical Appendices Accompanying Chapter 4

- Technical Appendix 4.1 LVIA Figure List, Glossary and References
- Technical Appendix 4.2 LVIA Methodology
- Technical Appendix 4.3 Landscape Character Areas
- Technical Appendix 4.4 Viewpoint Selection
- Technical Appendix 4.5 Cumulative Baseline

Abbreviations used in the Landscape and Visual Impact Assessment

- AONB Area of Outstanding Natural Beauty
- EIA Environmental Impact Assessment
- ES Environmental Statement
- LCA Landscape Character Area
- LDP Local Development Plan
  LVIA Landscape and Visual Impact Assessment
- NIEA Northern Ireland Environment Agency
- NILCA Northern Ireland Landscape Character Assessment
- NIRLCA Northern Ireland Regional Landscape Character Assessment
- PPS Planning Policy Statement; various PPSs published by the Department of the Environment are referred to in this Chapter
- PVP Provisional Viewpoint
- RES RES Limited; the Applicant
- RLCA Regional Landscape Character Area
- SPPS *'Strategic Planning Policy Statement for Northern Ireland (SPPS): Planning for Sustainable Development'*, Department of the Environment (September 2015)
- SPG *'Supplementary Planning Guidance 'Wind Energy Development in Northern Ireland's Landscapes*', Northern Ireland Environment Agency (August 2010)

- VP Viewpoint; final viewpoint shortlisted as part of viewpoint selection process described in methodology
- ZTV Zone of Theoretical Visibility diagram

Best Practice Guidance publications used in the formulation of the LVIA Methodology

The Landscape Institute / Institute of Environmental Management and Assessment (2013) 'Guidelines for Landscape and Visual Impact Assessment, Third Edition'

4.1 The aim of these guidelines (GLVIA) is to encourage high standards for the scope and content of landscape and visual impact assessments, based on the opinion and practice of members of the Landscape Institute and the Institute of Environmental Management and Assessment.

4.2 The guidelines establish principles to assist in achieving consistency, credibility and effectiveness in LVIA, when carried out as part of an EIA. The following general principles of good practice are adhered to in the methodology for this LVIA:

- Clearly describe the methodology and the specific techniques that have been used;
- Use clearly defined and agreed terminology;
- Avoid generalisations about designated landscapes and their ability to accommodate change;
- Be as impartial as possible;
- Draw upon the advice and opinions of others and carry out consultations;
- Organise and structure the assessment to focus upon the key issues of relevance to decision-making;
- Openly acknowledge any deficiencies or limitations that may have constrained the assessment;
- Consider the most significant effects in all instances.

Scottish Natural Heritage[1] (August 2017) 'Siting and Designing Wind Farms in the Landscape. Version 3a'

4.3 This guidance provides principles for the design and location of wind farms with the aim of ensuring that wind farm developments appear appropriate within the landscape and reflects a development in the understanding of issues such as appropriate layouts for different locations, turbine size and design, wind farm extensions and cumulative development. The guidance acknowledges that understanding of these issues is constantly evolving and this guidance will be regularly reviewed and updated to reflect this.

[1] Scottish Natural Heritage became Nature Scotland in August 2020

Nature Scotland (March 2021) 'Assessing the Cumulative Impact of Onshore Wind Energy Developments'

4.4 This guidance, first published by Scottish Natural Heritage in 2021, has been re-published by the new Nature Scotland agency (see footnote) in a more accessible form online. It sets out recommended principles for the assessment of cumulative landscape and visual impacts arising from wind farms. As per the guidance above, it is acknowledged that understanding of cumulative issues is constantly evolving and this guidance would be regularly reviewed and updated to reflect this. The only content changes between the 2012 and 2021 versions are the removal of guidance relating to ornithology and to some outdated contextual information.

Scottish National Heritage (February 2017) 'Visual Representation of Wind Farms, Version 2.2'

4.5 This guidance was originally published in 2006 to summarise and explain what was feasible, available and reasonable in terms of current good practice in the production of illustrations such as photomontages, wirelines and ZTV figures for use within an LVIA. It was revised in 2014 and 2017 to reflect developing experience and to ensure that visualisations are easier for the public and decision makers to use whilst also stressing that they are only a tool to aid decision making and must be considered alongside other information. SNH also recognise that different approaches may be appropriate for different types of developments, in different countries and for small scale projects. The prescriptive aspects of the guidance, and how they are interpreted in this LVIA, are included in Technical Appendix 4.2, paragraph 4.47.

4.6 Cognisance has been taken of the new guidance in this LVIA and its recommended methodology for taking photographs has been followed. However, the visualisations that accompany this LVIA are not printed at the large scale recommended by the guidance to allow for the practical and cost-effective distribution of public consultation material. SNH advises that printed visualisations should be produced at A1 size and viewed at a comfortable arm's length distance to facilitate easy comparison between viewpoints. In this LVIA the visualisations have been produced at A3 and, for clarity, the finished photomontages are presented on the same page as their corresponding wirelines for all shortlisted viewpoints.

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

4.7 This guidance aims to help landscape professionals, planning officers and other stakeholders to select types of visualisations which are appropriate to the circumstances in which they will be used. It provides guidance as to appropriate techniques to capture site photography and produce appropriate visualisations for all types of development but recognises that, for some types of development, including wind energy, that more specific guidance may also be appropriate. In

particular, this Technical Guidance Note is broadly consistent with and supportive of Scottish Natural Heritage guidance referred to in the preceding paragraphs.

Northern Ireland Environment Agency (August 2010) 'Wind Energy Development in Northern Ireland's Landscapes: Supplementary Planning Guidance to Accompany Planning Policy Statement 18 Renewable Energy'

4.8 The SPG provides broad strategic guidance on appropriate locations for wind energy development based on the definition of Landscape Character Areas (LCAs) within the NILCA. It is described in detail in Chapter 4, paragraph 4.69.

The Countryside Agency and Scottish Natural Heritage (2004) 'Landscape Character Assessment Guidance for England and Scotland. Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity'

4.9 The topic paper provides an overview of current thinking about landscape sensitivity and landscape capacity in terms of the concept involved and the practical techniques that are being used. Its aim is to set out some of the key principles, clarifying some of the issues, helping with definitions of key terms and providing examples of the approaches that are currently being used.

Technical Appendix 4.2: LVIA Methodology

4.10 This LVIA methodology has been specifically developed for wind farm development in Northern Ireland in accordance with the relevant best practice guidance where applicable (see Technical Appendix 4.1). The LVIA makes reference to mapped information, planning policy and existing landscape character assessment documents, and uses photographs and field survey work, together with the professional judgement of an experienced Landscape Architect. It combines existing desktop information, such as maps and documents, with detailed site surveys of the Study Area. The desktop study includes a review of relevant planning policies in order to identify any elements or parts of the Study Area which are recognised for their landscape or visual qualities and any preferred locations for wind farms that may already have been identified. It also evaluates likely levels of acceptable change for various parts of the Study Area in accordance with current definitions of landscape and visual sensitivity.

4.11 Potential landscape and visual effects are assessed as separate but linked issues. Both require a combination of quantitative and qualitative evaluation. The 'Magnitude' of landscape effects is derived from the extent to which physical changes cause changes in landscape character and value. The 'Magnitude' of visual effects relates to changes in the composition of views and people's perception of/responses to these physical changes.

4.12 For both landscape and visual effects the 'Significance' of effect is derived from the assessment of 'Landscape Value', the nature of the receptors in question (hereafter referred to as 'Sensitivity') and the nature of the effects on these receptors (hereafter referred to as the 'Magnitude' of change that will be experienced) and also by using professional judgement in relation to site circumstances. It is important to recognise that the landscape is constantly evolving and that opinions on the beneficial or adverse effects of wind farms are highly subjective. Therefore, whilst a judgement is made on the significance of effects, no judgement is made on whether these effects are beneficial or adverse.

Baseline Characterisation: Landscape Character

4.13 The meaning of landscape in this LVIA is in accordance with the SPPS definition as "*an area, as perceived by people, whose character is the result of the action and interaction of natural and / or human factors*"[2]. The first stage of this LVIA establishes the existing landscape character of the Study Area. It includes a description of landform, land cover, seasonal elements and historical and cultural associations. Landscape character is the result of unique interactions between different elements such as geology, soils, vegetation and historical and current human influences. Natural, man-made, physical and aesthetic attributes are

[2] section 4.2.1 of SPPS

considered alongside the physical condition, frequency and rarity of these attributes. Areas of distinct, recognisable or common character are defined individually as LCAs. Existing definitions of LCAs and RLCAs are analysed by site survey.

4.14 Defining landscape character allows landscape value to be analysed. An understanding of landscape character and value requires an understanding of the processes that have created this character and future processes that may alter it. The overall value to society of each LCA is evaluated against defined criteria and their Sensitivity to development and change is established. The LVIA notes if/where existing definitions of landscape character have been amended. Some LCAs may not be considered in detail following the Baseline Assessment if they are not judged to be significantly affected by the Proposed Development. For example, LCAs on the periphery of the Study Area, or those from which there are few or no views of the Proposed Development. Such LCAs are clearly identified in the Baseline Assessment section of ES Chapter 4, Technical Appendix 4.3 and Figure 4.2.

Landscape Value

4.15 Values are attached to landscapes by different stakeholders for a variety of reasons. The LVIA process seeks to establish a definition of 'Landscape Value' that reflects both this range of opinions and each particular landscape's contribution to the overall landscape character of the Study Area. Defining the value of a particular landscape to society requires the recognition of 'sense of place' through consideration of factors such as condition, scenic quality, tranquillity, remoteness, rarity, cultural associations, history, conservation and recreational interests, and broader social, economic and environmental aspects.

4.16 The definition of landscape value has been derived from best practice guidance and the SPG, which defines Landscape Value as "*the intrinsic value that is attached to a landscape, often reflected in designation or recognition. It expresses national or local consensus as to the (degree of) importance of a landscape, for reasons including landscape quality, scenic (or visual) quality, wildness and tranquillity, natural and cultural heritage interests, cultural associations and recreational opportunities*."

4.17 The following criteria outline the general principles that are used to inform and guide the assessment of Landscape Value:

- ***Outstanding Landscape Value***: Such landscapes may be outstanding because of factors such as dramatic scenic quality, or unspoilt beauty. They may also contain rare cultural or historic features, have notable cultural associations, important geological features or contain a large proportion of high quality habitats. They are likely to be in good condition, with a distinctive sense of place, and may be of national or international importance that is evidenced by statutory designation;

- ***High Landscape Value***: Such landscapes may be aesthetically pleasing and have positive characteristics including features that are unspoilt and in good condition, a high proportion of sites that are of geological or ecological interest, notable historic associations and a strong sense of place. These areas may be of national or regional importance that is evidenced by relevant statutory designations;
- ***Moderate Landscape Value***: Such landscapes may have overall good aesthetic qualities, with some intact characteristic features, but with other features that are not in optimum condition, or which are fragmented or spoilt. These areas may contain a smaller number of features of interest and may be of local importance;
- ***Low Value***: Such landscapes may be in poor condition, or have undergone change to the extent that they do not have a distinctive or coherent character, aesthetic quality or strong sense of place. Few characteristic features are likely to remain intact and features may be highly fragmented or spoilt. These areas may contain a limited number of notable features or associations and are unlikely to be statutorily designated.

Landscape Sensitivity

4.18 The SPG defines 'Landscape Sensitivity' as a term based on the inherent sensitivity of landscape receptors to changes in both landscape character and visual terms, and which, in EIA terms, can also be used to encompass the value placed upon landscape. This definition has been updated by the GLVIA[3] which advises that sensitivity should be clearly separate from value. It should combine judgements on the susceptibility of landscape receptors to change caused specifically by the Proposed Development with the Value attached to the landscape in question. Therefore, in the context of this LVIA judgements on Landscape Sensitivity consider the susceptibility of landscape receptors to the changes caused specifically by the Proposed Development. The LVIA takes account of the stability and resilience of LCAs to withstand change and recuperate from loss or damage to their character elements resulting from the Proposed Development without unacceptable detrimental effects on overall character. An understanding of how different landscape attributes interact assists in defining if, and how, wind farm development may be suitably placed in the landscape. It also allows choices to be made on suitable turbine layouts and sizes of wind farms, which vary according to the characteristics of the receiving landscape. Key landscape attributes that are likely to influence sensitivity to wind farm developments include:

- ***Scale and Enclosure:*** The perception of the size and presence of various character elements, such as landform, trees and houses, against which the relative scale of larger features such as wind turbines are perceived. Consideration is given to whether the landscape is open or enclosed, the

[3] The Landscape Institute and IEMA (April 2013) *'Guidelines for Landscape and Visual Impact Assessment 3rd Edition' section 5.39*

range of views (e.g. close, medium or long range), and the extent to which elements such as topography and vegetation provide screening. Landscapes that are visually contained may be less sensitive, although close range views from populated areas may increase sensitivity. A Proposed Development should be of a size and layout that is in keeping with the receiving landscape character;

- ***Skyline:*** The extent to which people's eyes are drawn towards the skyline depends on the simplicity or complexity of the skyline and whether there are other elements or foci distributed in the view and/ or along the skyline. Where they are visible, skylines are often important character components, and wind farm developments should relate well to them;
- ***Landscape Pattern:*** Understanding the complexity of a landscape can help to determine how a development might relate or conflict with the character of the receiving landscape. A landscape may have a simple composition, such as open moorland, or be more complex, for example, a rugged landscape containing many peaks, or a mosaic of land uses. New development should be designed to relate well to any strong existing landscape patterns, such as hedgerow networks or drainage ditches;
- ***Remoteness and Tranquillity:*** The introduction of turbines may not only result in physical effects on the landscape but, together with the movement of blades, may impact on the perceived sense of remoteness and tranquillity. The extent to which a landscape is remote or tranquil is considered in the assessment of Sensitivity;
- ***Features of Interest:*** The presence of natural and cultural heritage features, such as designated habitats, archaeological sites, and specific cultural associations, which serve to make a landscape particularly special or unique. New developments should not diminish the enjoyment of these features;
- ***Manmade Influence:*** Some landscapes may contain existing, sometimes large-scale elements, such as buildings and structures, commercial forestry and transport infrastructure, which indicate the extent to which the character is already shaped by man. This may influence how the landscape would be affected by wind farm development. A mix of different man-made elements may lead to visual confusion or interruption. Landscapes which are already heavily influenced by man-made elements may also be less sensitive to wind farm development, although close proximity to settlement may also increase sensitivity;
- ***Rarity*** is the frequency, or density of rare or unusual landscape features which serve to make a landscape particularly special or unique;
- ***Quality*** is influenced by the physical state of the existing landscape, its intactness and its ability to repair after loss. High quality landscapes may

be more or less sensitive to change depending on the robustness of their individual character elements;

- ***Value:*** The value attributed to the landscape is an important factor to be considered when assessing the sensitivity of a given landscape.

4.19 The consideration of each of the key landscape attributes described above enables a considered judgement to be made on the level of sensitivity to be apportioned to each defined LCA within the Study Area. The level of sensitivity relates specifically to the Proposed Development. The following criteria outline the general principles that are used to inform and guide the assessment of Landscape Sensitivity:

- ***High Landscape Sensitivity:*** A landscape where the majority of attributes are unlikely to withstand change without causing a change to overall landscape character to the extent that it would be difficult or impossible to restore. The frequency and sensitivity of receptors may be high but not exclusively so;
- ***Medium Landscape Sensitivity:*** A landscape with a combination of attributes that is capable of absorbing some degree of change without affecting overall landscape character. There are unlikely to be large numbers of sensitive receptors;
- ***Low Landscape Sensitivity:*** A landscape where the majority of attributes are robust and/ or tolerant of change to the extent that change or development would have little or no effect on overall landscape character. It is likely to be easily restored and the frequency and sensitivity of receptors may be Low but not exclusively so.

Baseline Characterisation: Visual Character

4.20 The visual context of the site is described and a ZTV is established to indicate where all, or part of, the Proposed Development is likely to be visible from. A ZTV is a map-based diagram of where and how many wind turbines, or wind farms, would theoretically be visible from all parts of the Study Area. The ZTV is first used to assist the identification of areas with theoretical visibility and the location of viewpoints as part of the Baseline Assessment. It is then used to aid the assessment of visual effects because the turbines would be the most visible element of the Proposed Development, particularly during the operational period.

4.21 The ZTV is created using computer-generated contour data at 50 m intervals (Ordnance Survey of Northern Ireland's digital terrain model, or 'DTM'). A three-dimensional computer model of the Proposed Development is created and accurately located within the DTM. Categories of theoretical visibility are indicated using different colours, for example, areas with theoretical visibility of all the proposed turbines would be indicated by one colour, and areas with visibility of lesser numbers of turbines would be indicated by contrasting colours. The computer model takes account of the effect the curvature of the earth would have on visibility, and is based on a viewing height of 2 m.

4.22 ZTV diagrams are based on the visibility of either the turbine blade tips or hub height. Blade tip visibility means that any area where the tip of the blade is theoretically visible is indicated on the diagram. It shows the highest potential levels of theoretical visibility. This approach is in accordance with the SNH recommendation to err on the side of over-representation of potential effects. However, it does not necessarily illustrate the most realistic levels of visibility because blade tips may be counted even where they protrude only a small amount above a skyline and this type of visibility will alter as the turbines rotate. Hub height diagrams represent a more realistic illustration because they show theoretical visibility of all points of the turbines to the hub/ nacelle, and therefore also include the upper parts of the turbine blades as a minimum. A Reverse ZTV diagram is used as a clear means of illustrating the parts of the Study Area where no turbines would be visible.

Viewpoint Selection

4.23 Viewpoints are chosen as part of the Baseline Assessment to provide a representative sample of viewers (receptors) and types of views of the Proposed Development across the Study Area and, most importantly, to demonstrate potential views of the Proposed Development rather than to show the screening effect of landscape features. Viewpoints are always selected in publicly accessible locations and those frequented by members of the public, such as public rights of way, car parks, popular visitor attractions and views from settlements, as well as viewpoints located in particularly scenic areas, are favoured because these are likely to represent a greater concentration of sensitive visual receptors. Viewpoints from which the Proposed Development is likely to be prominent are also favoured if they are available. Private residential views are represented where relevant and possible by the selection of appropriate viewpoints on public roads in proximity to residential receptors. This is in accordance with current best practice guidance. A selection of Provisional Viewpoints (PVPs) is identified through the Baseline Assessment. These are assessed through an initial site survey and those that are most representative of typical views, locations and receptors across all parts of the Study Area that fall within the ZTV are retained from more detailed assessment in the LVIA. The viewpoint selection process for this project is described in Technical Appendix 4.4 and illustrated on Figure 4.3.

4.24 When carrying out viewpoint surveys, the nature of the view is noted, whether partial or full views of the Proposed Development would be experienced, whether views are static or transitory, how prominent the Proposed Development may be, and whether large numbers of properties or viewers would experience such views. In many cases finding an uninterrupted view can be difficult and viewpoint locations where there is a significant amount of existing screening or no safe stopping place (e.g. on a busy road) are generally not shortlisted. This is to ensure the safety of both the surveyor and any third parties, such as the planning authority and members of the public, who may wish to visit the viewpoints. Therefore, although

the views chosen are representative they cannot always be typical of the whole Study Area.

4.25 Viewpoint locations are illustrated in all the Figures which accompany the LVIA and the process for producing these illustrations is described in detail in paragraph 4.41 below.

Summary Description of the Proposed Development

4.26 Details of the Proposed Development and its associated infrastructure are described in detail in Chapter 1 of this ES and summarised briefly in relation to landscape and visual effects in Chapter 4, paragraph 4.20. To ensure that visual effects are minimised, factors such as layout and turbine specification, colour scheme, rotation pattern of blades, uniformity and infrastructure design may be considered. The Proposed Development is considered from the perspective of the shortlisted viewpoints.

Assessment of Effects on Landscape Character

4.27 Landscape effects may include direct physical changes to landscape elements caused by the Proposed Development or indirect effects, such as effects on the setting of a particular landscape that may arise as a consequence of the Proposed Development. The potential landscape effects across the Study Area are identified by the on-site analysis and verification of landscape character information gathered as part of the Baseline Assessment. The landscape assessment criteria described below provides a framework for the assessment of landscape effects. It must be noted that there may be exceptions to these broad categories due to specific local characteristics that may apply in individual circumstances. This LVIA does not seek to determine whether the potential landscape effects of the Proposed Development would be beneficial or adverse because this is a subjective matter that depends very much on the viewer's own opinion.

Magnitude of Landscape Effects

4.28 The Magnitude of effect on landscape character is defined as the degree of change that would result from the introduction of the Proposed Development in terms of size or scale, geographical extent of the area that would be influenced, and the duration and reversibility of the proposed change. It is dependent on a number of factors, including:

- The degree to which landscape character elements would be altered by the Proposed Development;
- The number of turbines and their prominence within the landscape;
- Whether effects would have a direct physical effect on a landscape or indirectly affect its character by having an effect on its setting;
- The distance of the Proposed Development from the LCA in question;
- The duration, permanence and extent of the effect in physical terms.

4.29 The following criteria outline the general principles that are used to inform and guide the assessment of the Magnitude of landscape effects:

- ***High Landscape Magnitude***: The Proposed Development would be immediately apparent and would result in substantial loss or major alteration to key elements of landscape character to the extent that there is a fundamental and permanent, or long-term, change to landscape character. The change may occur over an extensive area;
- ***Medium Landscape Magnitude***: The Proposed Development would be apparent in the view and would result in loss or alteration to key elements of landscape character to the extent that there is a partial long-term change to landscape character. The change may occur over a limited area;
- ***Low Landscape Magnitude***: The Proposed Development would result in minor loss or alteration to key elements of landscape character to the extent that there may be some slight perception of change to landscape character. The change may be temporary and occur over a limited area;
- ***Negligible Landscape Magnitude***: The Proposed Development would result in such a minor loss or alteration to key elements of landscape character that there would be no fundamental change.

Significance of Landscape Effects

4.30 The EIA Directive requires the LVIA to identify and assess the acceptability of significant effects. Best practice guidance recognises that the significance of effects is not absolute and is related specifically to the Proposed Development. It is also dependent on the points considered within the landscape sensitivity appraisal, the factors that influence the Magnitude of change, and the relationship between Landscape Sensitivity and Magnitude of Landscape Effect.

4.31 This LVIA uses the following criteria to inform and guide the assessment of the Significance of Landscape Effects:

- ***Significant Landscape Effects:*** Effects that would occur when the majority of landscape attributes are deemed to be highly sensitive and the magnitude of change would alter landscape character to the extent that it would become defined, or considerably influenced, by the presence of the Proposed Development;
- ***No Significant Landscape Effects***: Effects would not be significant when the majority of landscape attributes are not deemed to be highly sensitive and where the Proposed Development would have little, or no, effect on existing landscape character. This would also occur where the Proposed Development can be integrated into the existing Study Area without the loss of key landscape attributes landscape effects. Where the Proposed Development is easily noticeable but the number and sensitivity of landscape attributes decreases, so landscape character will become less

defined by the Proposed Development and more so by other landscape attributes.

Assessment of Visual Effects

4.32 Visual effects relate to changes in the composition of views and people's responses to these changes. It is evident from research, and publications on public attitudes to wind farms, that opinions vary greatly, ranging from strongly adverse to strongly positive, depending on the type and nature of effects and individual perceptions. This LVIA does not seek to determine whether the potential visual effects of the Proposed Development would be beneficial or adverse because this is a subjective matter that depends very much on the viewer's own opinion. The assessment criteria described in this section below provides a framework for the assessment of visual effects. It is noted that there may be exceptions to these broad categorisations due to specific characteristics that may apply to individual circumstances.

4.33 The potential visual effects across the Study Area are identified in four stages:

i. ZTV diagrams are created. A desk-based analysis of these is carried out in order to gain a broad understanding of the nature of visibility in the Study Area, and to identify provisional viewpoint locations. Wirelines are created as working drafts for all provisional viewpoints;

ii. The ZTVs and viewpoint locations are verified on site. The presence of screening elements, such as vegetation, is noted because this is not reflected by the ZTVs bare-ground representation of visibility. Key visual receptors within the Study Area are identified during the site survey, and the assessment of potential visual effects on each of these receptor groups is made. Visual receptors may include, for example, people within settlements, on vehicular routes, at tourist destinations, etc. The viewpoints are assessed for the extent to which they provide truly representative views of the key visual receptors and typical views within the Study Area.

iii. In most cases photographs are taken from each viewpoint location. However, in accordance with SNH guidance, viewpoint locations beyond 20 km from the Proposed Development may not require photomontages where the proposed turbines are below 150 m in height and where they are unlikely to be perceptible features in the view. A judgement on which viewpoints require photomontages is made on a case-by-case basis in each LVIA;

iv. Finally, a detailed assessment of visual effects is made from each viewpoint. This is assisted by computer-generated wirelines (all viewpoints) and photomontages (for most viewpoints with the exception of those described in point iii above), which provide as realistic as possible visualisations of how the Proposed Development would appear within each

viewpoint, and which are presented as Figures in the Environmental Statement.

Assessment of Viewpoints

4.34 From each viewpoint a description is provided of the existing view and potential changes that would result from the Proposed Development. The effect of the Proposed Development on the existing view is then assessed. The following elements are considered in the description and assessment of visual effects from each viewpoint:

- The existing visual character and quality of the viewpoint (including whether it is within a designated landscape, the presence of visual detractors, etc.);
- The character of the existing landscape against which the turbines would be viewed including any screening provided by existing surface features, vegetation and local topography;
- The viewpoint location, the presence and concentration of receptors, and receptor sensitivity (for example, would people view the site during work or leisure activities, whilst in transit, etc.);
- The number of turbines that would be visible, their scale, distance from the viewpoint and their position in the view in relation to other features in the viewpoint;
- The duration of the potential effect, i.e. is it long term or temporary, continuous or transitory (the latter meaning that the receptor would be exposed to the effect for a short time);
- Whether effects would occur during construction and decommissioning of the Proposed Development.
- The presence of existing wind farms, particularly those in close proximity to the Proposed Development, are considered as part of the assessment of visual effects as well as the assessment of cumulative visual effects.

Sensitivity of Visual Receptors

4.35 The Sensitivity of visual receptors is dependent on the nature of the receptor and the value of the view, including other landscape elements within it. The following criteria, which are drawn from current best practice guidance (Technical Appendix 4.1), outline the general principles that are used to inform and guide the assessment of visual sensitivity at each viewpoint:

- ***High Visual Sensitivity***: would typically include residents of individual dwellings within the countryside which may be located in order to take advantage of high quality landscapes or views. Views from such properties are likely to be static and the main view may be orientated towards the Proposed Development and likely to be experienced for long periods of

time; people undertaking recreation where the landscape within which the Proposed Development is seen is the primary reason for attraction (for example, walkers, cyclist and drivers on classified scenic driving routes). Receptors are more likely to be within a designated landscape and could be attracted to visit more frequently, or stay for longer, by virtue of the view;

- ***Medium Visual Sensitivity***: would typically include people undertaking active recreational pursuits where the wider landscape within which the Proposed Development is not seen as the primary reason for attraction (e.g. golf, water sports, theme and adventure parks, historic sites, parks and gardens). Receptors are less likely to be within a designated landscape and could be attracted to visit more frequently or stay for longer by virtue of the facilities and features of the particular attraction rather than by the value of the view;
- ***Low Visual Sensitivity***: would typically include receptors in vehicles that would experience transitory views whilst travelling at speed for reasons other than the enjoyment of landscape or visual quality (excluding those using scenic driving routes). Their use of the road network may be enhanced by landscape and visual quality but would also be heavily influenced by manmade elements, the roads themselves and the traffic on them. These may themselves be of detriment to landscape quality, particularly where road corridors are in poor physical quality or where noise from busy traffic detracts from the tranquillity of the landscape; outdoor workers (e.g. farm and forestry workers) who are mobile and engaged in active work. The quality of landscape and visual character would not influence their presence or length of stay although they are likely to spend prolonged periods of time outdoors; people in indoor workplaces and community facilities who would spend only short periods of time in the landscape for reasons that are not related to or significantly affected by landscape and visual quality. They would experience temporary or transitory views whilst engaged in other activities. This group of receptors may include churchgoers, customers at petrol stations and garages, public houses, leisure centres and other community facilities; residents within larger settlements. Their locations are unlikely to be governed by landscape and visual quality and their views may be heavily dominated by manmade urban and suburban elements. Receptors are unlikely to be within a designated landscape and are most likely to be present at a given viewpoint by virtue of some other need or necessity unrelated to the appreciation of the landscape or visual value.

Magnitude of Visual Effects

4.36 The Magnitude of effect on visual character is defined as the degree of change that would result from the introduction of the Proposed Development. It is dependent on a number of factors, including:

- The prominence of the Proposed Development within the view;
- The number of turbines and extent of the Proposed Development that would be visible;
- The angle and elevation of the view;
- The proportion of the view that is affected by the Proposed Development;
- The scale and character of the landscape in which the Proposed Development would be viewed;
- The duration, permanence and frequency of available views.

4.37 Factors such as the distance of a wind farm from a viewpoint, weather conditions, time of day/year, angle of view, and composition of other elements in the view, all contribute to the assessment of visual effects. This LVIA uses these factors to define levels of visual prominence as follows:

- ***Visually Dominant***: The Proposed Development would occupy a commanding or elevated position and would seem to tower above the surrounding landscape from the viewpoint in question and/or from the surrounding landscape. The Proposed Development would become more important or noticeable than anything else in the view.
- ***Visually Prominent***: The Proposed Development would be immediately noticeable and likely to attract attention due to its size or position within the view.
- ***Visible***: The Proposed Development would be evident and perceptible from the viewpoint in question and/or from the surrounding landscape but would not be a prominent feature.
- ***Not Visible***: The Proposed Development would not be seen or would not be immediately apparent to the naked eye.

4.38 The following criteria outline the general principles that are used to inform and guide the assessment of the Magnitude of visual effects:

- ***High Visual Magnitude***: The Proposed Development would be a dominant and immediately apparent feature that would affect and change the overall character of the view and to which other features would become subordinate;
- ***Medium Visual Magnitude***: The Proposed Development would form a visible and recognisable new element within the overall view and would be readily noticed without changing the overall nature of the view;

- ***Low Visual Magnitude***: The Proposed Development would form a component of the wider view that might be missed by the casual observer. Awareness of the Proposed Development would not have a marked effect on the overall quality of the view;
- ***Negligible Visual Magnitude***: The Proposed Development would be barely perceptible, or imperceptible, and would have no marked effect on the overall quality of the view.

Significance of Visual Effects

4.39 The EIA Directive requires the LVIA to identify and assess the acceptability of significant effects. Best practice guidance recognises that the significance of effects is not absolute and is related specifically to the Proposed Development. It is also dependent on the points considered within the appraisal of sensitive visual receptors, the factors that influence the magnitude of change, and the relationship between Visual Sensitivity and Magnitude of Visual Effect.

4.40 This LVIA uses the following criteria to inform and guide the assessment of the Significance of Visual Effects:

- ***Significant Visual Effects***: Effects that would occur when the majority of visual receptors are deemed to be highly sensitive and the magnitude of change would alter visual character to the extent that it would become defined, or considerably influenced, by the presence of the Proposed Development;
- ***No Significant Visual Effects***: Effects would not be significant when the majority of visual receptors are not deemed to be highly sensitive and where the Proposed Development would have little or no effect on existing views. The Proposed Development would be likely to constitute a minor component of the wider view, which might be missed by the casual observer, and awareness of the Proposed Development would not have a marked effect on the overall quality of the view. Where the Proposed Development is easily noticeable but the number and sensitivity of visual receptors decreases, so overall visual character will remain less defined by the Proposed Development and more so by other elements of the existing view.

Production of Viewpoint Visualisations: Wirelines and Photomontages

4.41 Computer-generated wirelines and photomontages are used to assist the assessment of potential visual effects by providing an accurate impression of the scale, size and appearance of the turbines from the chosen viewpoints.

4.42 A wireline model of the Proposed Development and surrounding terrain is generated from each viewpoint using specialist software - RESoft Wind Farm R4, map tiles and digital terrain data provided by Ordnance Survey of Northern Ireland, the proposed turbine layout, and individual turbine geometry. Turbine blades are displayed at an

angle of 0º, i.e. the uppermost blade is always shown pointing directly upwards, in order to demonstrate the highest possible level of blade tip visibility. Cumulative wind farms and single turbines within the Study Area are shown on the wirelines. The wireline model is an accurate model of the bare-ground topography. Land cover elements are then overlaid onto this model in the form of photographs, which are taken at each viewpoint location. Both the wireline and photograph cover a minimum 80º - 180º angle of view depending on the actual extent of the view on site. For example, the view on site may be constrained on both sides by tall vegetation or be part of a wider panorama. A 50º - 53.5º view is generally accepted as the normal viewing angle of the human eye[4].

4.43 In accordance with best practice guidance all photographs are taken with a full frame digital Single Lens Reflex (SLR) camera and a digital lens focal length of 50 mm (to provide as accurate a representation of the human eye as possible). The largest possible aperture setting is used to ensure the maximum level of detail in the view is shown. A panoramic tripod head is used to obtain true horizontal alignment of the photographs and maintain a constant height above ground (1.5 m).

4.44 Accurate records are taken on site of weather conditions and time of day. Viewpoint coordinates are recorded using a hand-held Global Positioning System (GPS, accurate to 3.65 m). These are refined through the use of GIS software and Google Maps to achieve a greater degree of accuracy.

4.45 The photographs are merged together and the resulting image is imported into the software programme where it provides the backdrop to the wireline. The wireline terrain data may differ slightly from that pictured in the photograph due to deficiencies in the digital terrain model data (DTM). This can cause the turbines to appear slightly above or below the ground. Therefore minor adjustments may be made to the software settings to ensure that the photograph and wireline match before the turbines are rendered consistently with model data. The wireline is then hidden so that only the finished photomontage is visible.

4.46 Visualisations are prepared in accordance with the SNH and Landscape Institute best practice guidance as far as practical. SNH's best practice guidance recommends that the following information on the limitations of visualisations is included in all LVIA methodologies[5]:

- *"Visualisations of wind farms have a number of limitations which you should be aware of when using them to form a judgement on a wind farm proposal. These include:*
- *A visualisation can never show exactly what the wind farm will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;*

[4] Paper presented to British Wind Energy Association Conference by K. Hawkins of E4environment Ltd and Dr P. Marsh of Environmental Data Analysis (2001) 'The Camera Never Lies' and Scottish National Heritage (2017) 'Visual Representation of Wind Farms'

[5] Scottish National Heritage (2017) 'Visual Representation of Wind Farms', Annex A: Information on limitations of visualisations

- *The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate;*
- *A static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move;*
- *The viewpoints illustrated are representative of views in the area, but cannot represent visibility at all locations;*
- *To form the best impression of the impacts of the wind farm proposal these images are best viewed at the viewpoint location shown;*
- *The images must be printed at the right size to be viewed properly (The visualisations in this LVIA are 130 mm x 42 mm at A3);*
- *You should hold the images flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, you should stand at arm's length from the image presented to gain the best impression.*
- *It is preferable to view printed images rather than view images on screen. If you do view images on screen you should do so using a normal PC screen with the image enlarged to the full screen height to give a realistic impression. Do not use a tablet or other device with a smaller screen to view the visualisations described in this guidance*."

4.47 In many scenarios wind farms are visible as elements of wide angle views which can only be appreciated if viewers turn their heads from side to side or move through the landscape. Wirelines and photomontages show the turbines in accurate proportion to other visual elements. However, the overall scale of the view is reduced by the practical need to illustrate the view on a single sheet of paper that allows as many people as possible to have fair and easy access to the published Environmental Statement. Features that are of note in wider views, but which are beyond the angle that can be illustrated in the viewpoint figures, such as other wind farms, are included in the detailed written descriptions of viewpoints in the LVIA report. Photomontage figures should be reproduced at a minimum of 300 pixels per inch to ensure best quality representation of the viewpoints.

4.48 It must be noted that the purpose of wirelines and photomontages is to help the assessor establish what the Proposed Development's visual effect might be by providing a 'snapshot' of what the Proposed Development would look like within the landscape. They should always be viewed in conjunction with the LVIA report which provides a detailed written assessment of visual effects, as well as a visit to all of the viewpoints in appropriate weather conditions. Wirelines are not intended to be visually representative images but they are generally accepted as an illustrative digital imaging tool. They provide a good indication of the location of turbines within the landscape and their relationship with the Cumulative Baseline of other wind farms in the Study Area. If these limitations are recognised,

visualisations can be accepted as adequate representations for the purpose of the LVIA.

Assessment of Effects of the Proposed Layout on the Site

4.49 This LVIA is primarily concerned with the operational phase of the Proposed Development. However, consideration is also given to the potential effects during construction and decommissioning. During the construction period a number of activities would occur that may temporarily or permanently affect the physical landscape or visual amenity of the Study Area. Temporary effects may only last for the duration, or part of, the construction period and may include effects such as the visibility of construction traffic, plant, and stockpiled materials. If managed adequately these construction effects can be minimised or avoided. Permanent effects would result from irreversible physical changes to the site such as the removal of vegetation, alteration of landform and new access arrangements.

4.50 Details of the Proposed Development and its associated infrastructure are described briefly, starting at paragraph 4.20 and in more detail in Chapter 1. Mitigation measures to avoid or minimise both temporary and permanent effects are proposed from paragraph 4.226.

Design Evolution and Mitigation Measures

4.51 During the course of the EIA the layout of the Proposed Development may change as part of an iterative assessment and design process. Liaison between all parties involved in the EIA is a key part of this process and the LVIA takes cognisance of the findings of other chapters, such as Archaeology and Cultural Heritage. Mitigation measures which seek to avoid, reduce, or compensate for landscape and visual effects would generally be implemented as part of this process and may include, for example, changes to layout and turbine specification, colour, uniformity of layout, under-grounding of onsite power cables, and infrastructure design. Following the implementation of mitigation measures in relation to physical site constraints (e.g. the presence of protected species, hydrological features, etc.) the Proposed Development would be considered from the perspective of the identified viewpoints. The computer-generated wirelines would be used to examine initial designs and identify opportunities to improve the layout in visual terms where necessary.

4.52 Further mitigation proposals, including any potential enhancement of landscape and visual character, will be made, where possible and appropriate, to address any potential effects which would remain with the final layout. It is important to note that the scope for mitigating the visual effect of wind farms is greatly restricted by the functional siting requirements, the scale of the turbines, and the characteristic movement of the blades.

Assessment of Residual Landscape and Visual Effects

4.53 Where mitigatory design proposals are implemented in order to reduce significant landscape and visual effects, the resulting reduction in effects is assessed and described.

Assessment of Cumulative Effects

4.54 In relation to LVIAs of individual developments, cumulative effects are taken to mean *"the additional changes caused by a proposed wind farm in conjunction with other similar developments*"[6].

4.55 "*The purpose of a Cumulative Landscape and Visual Impact Assessment (CLVIA) is to describe, visually represent and assess the ways in which a wind farm would have additional impacts when considered in addition to other existing, consented or proposed windfarms. It should identify the significant cumulative effects arising from the proposed wind farm*"[7]. In other words, the purpose of the cumulative impact assessment is to measure the incremental effect of the Proposed Development on the Cumulative Baseline rather than to assess the combined effects of all, or some, of the Cumulative Baseline with the Proposed Development.

4.56 The Cumulative Baseline comprises existing, consented and proposed (in-planning) wind farms in an appropriate cumulative Study Area. In this LVIA the cumulative Study Area extends to a 30 km radius (see Technical Appendix 4.5 and Figure 4.4). Particular attention is paid to clusters of wind farms because these are already likely to be prominent features. Existing single turbines are noted as features within the existing landscape and visual baseline, and in particular if they appear within selected viewpoints. Existing and consented turbines are included on the wirelines and ZTV diagrams where they are located within 5 km of the Proposed Development.

4.57 It must be noted that cumulative effect of some magnitude is largely unavoidable in any Study Area which contains existing wind farms and a judgement must be made on the relative and appropriate weight that is given to the various elements of the actual and assumed Cumulative Baseline. Current best practice guidance[8] makes it clear that this baseline should extend to operational and consented schemes but not necessarily to those which are the subject of undetermined applications for planning permission. Existing and consented wind farms are generally considered to be part of baseline landscape and visual character and the effects of the Proposed Development take consideration of their presence, or anticipated presence. The incremental effect of the Proposed Development on a Cumulative Baseline which includes other proposed wind farms is also considered. However, it is noted that

[6] Scottish Natural Heritage (March 2012), '*Assessing the Cumulative Impacts of Onshore Wind Energy Developments*' paragraph 7, paraphrased from the GLVIA para 7.12

[7] Scottish Natural Heritage (March 2012), '*Assessing the Cumulative Impacts of Onshore Wind Energy Developments*', paragraph 55

[8] Including PPS18 at paragraph 1.3.37 and the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017

applications for planning permission may be rejected and therefore, if a scheme is not yet approved, relatively limited weighting should be afforded to it when assessing the incremental effects of the Proposed Development. This LVIA includes existing, consented and proposed wind farms in its cumulative assessment but the weight afforded to individual schemes is a matter for the decision maker based on the evidence presented in the LVIA.

4.58 The assessment criteria described in this section provides a framework for the assessment of cumulative landscape and visual effects. It is noted that there may be exceptions to these broad categorisations due to specific characteristics that may apply to individual circumstances.

Assessment of Cumulative Landscape Effects

4.59 Cumulative landscape effects relate to the incremental degree of change to the existing landscape character or physical fabric of the Study Area that would result from the introduction of the Proposed Development over and above that of the Cumulative Baseline. The magnitude of cumulative change to landscape character is dependent on a number of factors, including:

- The presence, appearance and interrelationship of other cumulative wind farms and turbines in the Cumulative Baseline, and the degree to which this already influences landscape character;
- The incremental change to landscape character elements that would be caused by the Proposed Development;
- The incremental effect of the Proposed Development on the overall number of turbines, their prominence within the landscape, and their effect on landscape scale;
- Whether effects are direct or indirect;
- The distance of the Proposed Development from the LCA in question, and from other cumulative wind farms that may also affect the LCA in question;
- The duration, nature, permanence and extent of the effect in physical and visual terms;
- The value attached to the landscape in question, including any landscape designations.

Magnitude of Cumulative Landscape Effects

4.60 The following criteria outline the general principles that are used to inform and guide the assessment of the Magnitude of Cumulative Landscape Effects:

- ***High Cumulative Landscape Magnitude***: The introduction of the Proposed Development to the Cumulative Baseline would be immediately apparent and would result in substantial incremental loss of, or major alteration to, key elements of landscape character to the extent that

there would be a fundamental and permanent, or long-term, change to landscape character. The change may occur over an extensive area;

- ***Medium Cumulative Landscape Magnitude***: The introduction of the Proposed Development to the Cumulative Baseline would be immediately apparent and would result in the incremental loss of, or alteration to, key elements of landscape character to the extent that there would be a partial long-term change to landscape character. The change may occur over a limited area;
- ***Low Cumulative Landscape Magnitude***: The introduction of the Proposed Development to the Cumulative Baseline would result in minor incremental loss of, or alteration to, key elements of landscape character to the extent that there may be some slight perception of change to landscape character. The change may be temporary and occur over a limited area;
- ***Negligible Cumulative Landscape Magnitu***de: The introduction of the Proposed Development to the Cumulative Baseline would result in such a minor incremental loss of, or alteration to, key elements of landscape character that there would be no fundamental change to landscape character.

Significance of Cumulative Landscape Effects

4.61 The Significance of Cumulative Landscape Effects is dependent on the points considered within the landscape sensitivity appraisal, the factors that influence the Magnitude of change upon it, and the relationship between landscape Sensitivity and Magnitude of cumulative landscape effect. The following criteria outline the general principles that are used to inform and guide the assessment of the Significance of cumulative landscape effects:

- ***Significant Cumulative Landscape Effects***: Effects that would occur when the majority of landscape attributes are deemed to be highly sensitive and the incremental effects of the Proposed Development would alter landscape character to the extent that it would become defined or considerably influenced by the presence of wind farms, taking account of Cumulative Baseline conditions;
- ***No Significant Cumulative Landscape Effects***: Effects would not be significant when the majority of landscape attributes are not deemed to be highly sensitive and where the Proposed Development would have little or no incremental effect on the existing landscape character. Where the Proposed Development can be integrated into the existing Cumulative Baseline, without the loss of key landscape attributes, cumulative landscape effects would also be deemed as Not Significant. This level of significance would also occur where the Proposed Development is easily noticeable but its incremental effects would not cause the landscape

character to become more defined by wind farms than it currently is, or to become more defined by wind farms than by other landscape attributes.

Assessment of Cumulative Visual Effects

4.62 Cumulative visual effects relate to the degree to which wind energy developments feature in particular views or sequences of views, and the resulting effects of this upon visual receptors. Current best practice guidance advises that the potential receptors of cumulative visual effects should be identified and the most significant receptors selected for detailed assessment. This LVIA considers simultaneous and sequential cumulative visual effects that may arise within the Study Area, and in relation to the selected viewpoints. The presence of existing wind farms and turbines, particularly those that are closely related to the Proposed Development, are considered as part of the assessment of visual effects as well as the assessment of cumulative visual effects.

4.63 Simultaneous cumulative visibility is the extent to which the Proposed Development would be visible with one or more other cumulative wind farms from a single location, either in the same or different directions. Sequential cumulative visibility is the extent to which the Proposed Development would be viewed in succession with one or more other cumulative wind farms by receptors travelling through the landscape, regardless of whether or not the sites themselves are inter-visible.

4.64 The LVIA principally considers the degree to which the Proposed Development would contribute to wind energy development becoming a significant or defining characteristic of visual character. The sensitivity of visual receptors remains the same as that already defined in the visual effect assessment because the visual resource is unaltered. Different criteria are used for assessing Magnitude and Significance of Cumulative Visual Effects.

Magnitude of Cumulative Visual Effect

4.65 The Magnitude of cumulative visual effect is dependent on a number of factors, including:

- The nature of the Cumulative Baseline, i.e. the presence, appearance and intervisibility of existing, consented and proposed developments;
- The incremental effect that the Proposed Development would have on the prominence and distance of wind farms from visual receptors;
- The incremental effect that the Proposed Development would have on the number of turbines and the extent of wind farms that can be seen simultaneously, or sequentially;
- The incremental effect that the Proposed Development would have on the proportion of the view that is affected by wind turbines and the number of wind farms and turbines that would be visible in their entirety or otherwise;

- The visual relationship between the Proposed Development and other wind farms and turbines, including separation distances between wind farm developments;
- The scale and character of the landscape in which the Proposed Development would be viewed alongside the Cumulative Baseline;
- The nature of available views, including angle of view, prominence, screening elements, elevation, and distance from the viewpoint location.
- The duration, frequency and permanence of available views, including whether the potential cumulative effect is likely to be frequent (i.e. it would occur regularly, repetitively, or with short time lapses between occurrences) or occasional (i.e. it would occur infrequently, with long time lapses or distances between occurrences);
- Whether the viewer would need to look in the same direction or different directions to obtain cumulative views;
- The speed and mode of travel of visual receptors, and duration of cumulative views.

4.66 The following criteria outline the general principles that are used to inform and guide the assessment of the Magnitude of cumulative visual effects:

- ***High Cumulative Visual Magnitude***: The Proposed Development would increase the scale of wind turbines in the landscape to a level at which the view would become dominated by wind farms;
- ***Medium Cumulative Visual Magnitude***: The Proposed Development would result in a noticeable increase in turbines but this increase would not result in wind farms being the dominant feature of the view;
- ***Low Cumulative Visual Magnitude***: The Proposed Development would be visible but would constitute a component of the view that might be easily missed by the casual observer and/ or would not contribute to the overall prominence of wind farms within the view;
- ***Negligible Cumulative Visual Magnitude***: The Proposed Development would be barely perceptible, or imperceptible, and/ or would have no effect on the perception of wind turbines within the view.

Significance of Cumulative Visual Effect

4.67 The Significance of cumulative visual effects is dependent on the points considered within the appraisal of sensitive receptors, the factors that influence the Magnitude of cumulative visual effects, and the relationship between visual Sensitivity and Magnitude of cumulative visual effect. The following general principles are used to inform and guide the assessment of the Significance of Cumulative Visual Effects:

- ***Significant Cumulative Visual Effects***: Effects that would occur when the majority of visual receptors are deemed to be highly sensitive and the addition of the Proposed Development to the Cumulative Baseline would

result in the view becoming defined, or considerably influenced, by wind turbines;

- ***No Significant Cumulative Visual Effects***: Effects would not be significant when the majority of visual receptors are not deemed to be highly sensitive and where the Proposed Development would have little or no incremental effect on existing views. The Proposed Development is likely to constitute a barely perceptible, or imperceptible, component of the wider view, which might be missed by the casual observer. Awareness of the Proposed Development would not have a marked effect on the overall quality of the view. Where the Proposed Development may be a noticeable addition to views containing wind farms in the cumulative baseline but it would not cause the overall visual character of the view to become defined by wind turbines rather than by other elements of the existing view the overall effects would also be deemed to be Not Significant.

Technical Appendix 4.3: Landscape Character Areas

4.68 Detailed descriptions of the LCAs are contained within the Northern Ireland Landscape Character Assessment (NILCA) and the SPG to PPS 18. The NILCA classifies the landscape into areas of distinct and separate character called Landscape Character Areas (LCAs), and defines overall Landscape Value. The SPG provides further broad guidance on the LCAs that are defined in the NILCA, including their overall Sensitivity, specifically in relation to wind energy developments. The detailed descriptions of the LCAs that are contained in the NILCA and SPG are not reproduced in this LVIA but Table 4.3.1 summarises the Value and Sensitivity of these areas in relation to the Proposed Development. The location of all LCAs is shown on Figure 4.2.

4.69 There are twenty five Landscape Character Areas (LCAs) within the Study Area. The Proposed Development is located within LCA 118 Moyle Moorlands and Forest. A detailed description of this LCA is contained within the Baseline Assessment of the LVIA, Chapter 4. There are seven other LCAs in close proximity to the Proposed Development or which contain shortlisted viewpoints.

Technical Appendix Table 4.3.1: Summary of Landscape Value and Sensitivity

Landscape Character Area	Value	Overall sensitivity to wind energy development noted in SPG	Sensitivity to the Proposed Development
LCA 118 Moyle Moorlands and Forest	Outstanding to High	High to Medium	Medium
LCA 54 Coleraine Farmland	High	High	Low
LCA 56 Dervock Farmlands	Moderate	Medium	Low
LCA 57 Causeway Coast and Rathlin Island	Outstanding	High	Low
LCA 58 Long Mountain Ridge	Low	Medium	Low
LCA 59 Cullybackey and Clough Mills Drumlins	Low	High to Medium	Medium
LCA 117 Central Ballymena Glens	High	High	High to Medium
LCA 125 Tardree Upland Pastures	Low	Medium	Low

4.70 The following 17 LCAs have not been assessed in detail because the Baseline Assessment, including site assessment and analysis of provisional viewpoint locations, indicates that they are on the periphery of the Study Area and the ZTV, and/or because they do not contain shortlisted Viewpoints. Such LCAs would not be

significantly affected by the Proposed Development and have therefore not been subject to further detailed assessment.

Technical Appendix Table 4.3.2: LCAs not assessed in this LVIA

Landscape Character Area
LCA 38 Eastern Binevenagh Slopes
LCA 39 Glenshane Slopes
LCA 51 Garvagh Farmland
LCA 52 Lower Bann Valley
LCA 53 Lower Bann Floodplain
LCA 55 Garry Bog
LCA 60 River Main Valley
LCA 115 Tardree and Six Mile Water Slopes
LCA 116 Ballymena Farmland
LCA 119 Ballycastle Glens
LCA 120 Fair Head
LCA 121 Moyle Glens
LCA 122 Garron Plateau
LCA 123 Larne Glens
LCA 124 Larne Basalt Moorland
LCA 126 Larne Coast
LCA 127 Larne Ridgeland

Northern Ireland Regional Landscape Character Assessment

4.71 A Regional Landscape Character Assessment has also been prepared for Northern Ireland (NIRLCA) and is intended to provide a strategic overview of landscape character that can be used to inform future detailed local studies and that will be updated on a more regular basis than the NILCA. It divides the province into 26 regional landscape character areas (RLCAs) that update the previous 130 LCAs. However the NIRLCA has yet to be reflected in the Proposed Development of detailed local studies via the Local Development Plan process and, therefore, the NILCA still provides a greater level of detail and is used as a direct reference point for the SPG.

4.72 The Proposed Development is located on the westerns side of Regional LCA 18: Antrim Plateau and Glens overlooking RLCA 17 Maine and Braid River Valleys. The boundaries of these RLCAs are indicated on Figure 4.2. RLCA 18 is described in the

NIRLCA as comprising upland plateaus and hills dissected by nine scenic glacial glens that run down to the sea. The combination of upland edges and river mouths creates a distinct and remarkably scenic coastline. It is noted that this characteristic is physically remote from the Proposed Development and would not be affected by it. The A2 coast road is a popular tourist route which is more accessible than the remote landscape of moorland and bog formed by the plateau. Slemish is noted as being a prominent landmark on the south western edge of this RLCA which provides a point of orientation in the landscape. There are long views from various parts of this RLCA towards the Antrim and Scottish coast, the Bann Valley, Lough Neagh and the Sperrin Mountains and the Proposed Development would appear in conjunction with some such views.

4.73 Visual interest is created by the varied underlying geology in this RLCA with black basalt cliffs and coastal chalk outcrops. There is long standing evidence of human settlement and visible time depth in the landscape from Neolithic sites to present-day settlement, farming, mineral extraction and forestry. The Proposed Development itself is located in close proximity to a large coniferous forest, a reservoir, quarry and several existing wind farms and would utilise some of the infrastructure of the latter.

4.74 Renewable energy is described as one of the "Past, present and future forces for change" in this RLCA and this is already evidenced by three clusters of operational wind farms located along its western edge overlooking the adjacent pastoral lowlands around Clough Mills and Ballymena, including the Gruig cluster within which the Proposed Development would be located. There is also a consented wind farms located on the south eastern edge of the RLCA (Ballykeel wind farm) and three proposed wind farms within the southern half of the AONB at Ballygilbert, Carnalbanagh and Unshinagh. The RLCA notes the need for further landscape sensitivity studies to determine the potential for further development within the RLCA without adverse impacts on its character or the AONB.

4.75 Other forces for change in this RLCA include: the effects of climate change on landform, sea levels and coastal processes, woodland cover, the loss of upland bog habitats, and pressures from increased tourist numbers related to warmer drier summers; marine developments including marine renewables; changes to the appearance of traditional field boundaries and land cover as a result of changes to farming practices and new houses; the proposed development of second homes in the countryside and the effects of development related to recreational use of the countryside particularly along the coast; the integrity of peat bogs resulting from historic cutting of peat; forestry; light pollution; mineral extraction including restoration of disused sites.

4.76 In addition to landscape character as a largely aesthetic quality, the NIRLCA defines a number of 'Ecosystem Services'[9]. Whilst wind farms are recognised as being a

[9] The UK National Ecosystem Assessment (UK-NEA, 2011) defines ecosystem services as "*the benefits provided by ecosystems that contribute to making human life both possible and worth living*".

past, present and future force for change in RLCA 18 they are also recognised as 'provisioning' ecosystem service that is of benefit to us terms of energy production. Their contribution to mitigating the effects of climate change is not acknowledged in the description of this particular RLCA although it is referred to as such in other RLCA descriptions and is a relevant consideration.

Technical Appendix 4.4: Viewpoint Selection

Desk-based selection of Provisional Viewpoint Locations

4.77 The Baseline Assessment stage of the LVIA identified locations most likely to experience visibility of the Proposed Development and contain key visual receptors due the theoretical levels of visibility indicated by the ZTV diagrams, the potential sensitivity of either the location and / or the visual receptors likely to be present at these locations. The following were identified as being potential key receptors and key parts of the Study Area which should be considered in the search for Provisional Viewpoint locations (PVPs):

- Residential properties and the rural road network in close proximity to the Proposed Development where viewers may either be static or obtain views for prolonged periods of time and where the Proposed Development may form a key element in these views;
- Areas of settlement where viewers may also be static and obtain views for long periods of time and where the landscape in proximity to the Proposed Development is likely to form a key element within the landscape setting for these settlements;
- Locations from public rights of way, scenic drives and cycling routes where viewers are likely to be present for the primary purpose of appreciating scenic views. Such locations include: the Ulster Way network of waymarked trails across the Antrim Plateau; the National Cycle Network; the upland section of the A2 which is designated as the Causeway Coast scenic drive;
- Primary routes taking visitors to and from the two AONBs which transect the central section of the Study Area where the ZTV diagrams indicate the majority of theoretical visibility;
- A limited number of locations within the two AONBs. However, these are statutorily designated as nationally recognised high quality landscapes and will attract visitors by virtue of this designation and contain various visitor amenity sites and attractions. Visual receptors present at these locations are likely to be highly sensitive;
- Locations from which the Proposed Development would be seen within the wider landscape context of the Study Area, i.e. other upland parts of the Antrim Plateau, Long Mountain and the Belfast Hills from where there are views across the pastoral lowlands in the centre of the Study Area and the wider landscape including Lough Neagh and the Sperrins.

4.78 Using this search criteria, 60 PVPs were identified and analysed through the production of a preliminary ZTV diagram, preliminary wirelines and map-based research. These PVPs are listed in Table 4.4.1 below.

Initial site assessment and viewpoint 'shortlisting'

4.79 PVP locations where the preliminary wirelines indicated potential visibility were visited as part of an initial site assessment (PVP locations are indicated on Figure 4.3). Levels of actual visibility, the nature of visual receptors present at each location, and the overall viability of each viewpoint location were analysed (see Table 4.4.1 below). Where clearer views were identified on site in proximity to a pre-selected PVP location these were also added to the list of PVPs for further consideration. A shortlist of 26 viewpoint locations was made which included a proportionate number of locations representing typical views of the Proposed Development, key visual receptors and key locations within the Study Area. For ease of analysis these shortlisted viewpoints were categorised as follows:

A. Locations primarily representing views from settlements and rural roads with residential properties within 5 km of the Proposed Development;

B. Locations primarily representing views from settlements and the connecting road network within 5 – 10 km of the proposed Development;

C. Locations primarily representing views from within the Antrim Coast and Glens Area of Outstanding Natural Beauty;

D. Locations primarily representing views from the A26 and A44 road corridors; primarily

E. Locations representing views from the Causeway Coast and Glens Area of Outstanding Natural Beauty;

F. Locations primarily representing views of the Development from the wider Study Area beyond 15 – 20 km.

4.80 A number of PVPs were not shortlisted because they were found to provide no actual view of the Proposed Development when visited. The reasons for this usually arose from differences between theoretical and actual visibility which is explained in Technical Appendix 4.2. Other PVPs were not shortlisted if a more typical/ representative view was demonstrated elsewhere, where no safe stopping place was possible to take a photograph or where the viewpoint location would not be easily accessible to the public. In all instances the clearest possible views of the Proposed Development were selected whilst taking into account the aforementioned considerations. It is noted that there is a distinct lack of visibility or clear visibility of the Proposed Development across much of the two AONBs within the Study Area and limited visibility to the west beyond Long Mountain ridge which effectively screens some parts of the Study Area. Slievenahanaghan and Skerry Hill, which are the hills located directly to the north and south of the Proposed Development have a similar effect on medium-range viewpoints in these directions.

4.81 Wirelines and photomontages have been prepared to illustrate the majority of shortlisted viewpoint locations but wireline-only figures have been used to illustrate viewpoints located beyond 20 km from the Proposed Development. These are

included to assist the written analysis but visibility of the Proposed Development would, in all cases, be negligible at these distances and in the context of the extensive nature of the views available from these locations.

Technical Appendix Table 4.4.1: Provisional and Shortlisted Viewpoints

See over page…

Technical Appendix Table 4.4.1: Provisional and Shortlisted Viewpoints

Provisional Viewpoint (p) / Shortlisted Viewpoint (VP, shown in bold)			Provis. Grid Ref.		Approx. dist. to nearest turbine	Reason for provisional selection and shortlisting decision
			Easting	Northing		
p1		A43 Cushendall Road, north east of McGregor's Corner	312450	41210	7 km	Used in Gruig Wind Farm LVIA so initially reviewed for comparison purposes. However, apparent new arrangement of residential access points and verges mean this is no longer a safe place to stop. It is also not strictly representative of typical views from this stretch of the A43. Other laneways in proximity to this location provide clear views westwards towards the Long Mountain wind farm cluster but less frequently in the direction of the Gruig cluster. Views in this direction are more usually glimpsed and occur occasionally rather than continuously. In proximity to Martinstown views are screened by Skerry Rock. Alternative locations also looked at: p52 Carncoagh Road junction with A43; p49 Rathsherry; p53 Glen's Brae, Lisbreen overlooking Martinstown and A43 road corridor. The latter has been shortlisted. Provides clearer views which are more typical of elevated landscape to the south of the main road and where rural residential properties are frequent.
p2	**VP 11**	**Altnahinch Road at Skerry Hill**	**313604**	**421481**	**0.5 km**	**Used in Gruig Wind Farm LVIA so initially reviewed for comparison purposes. Provides view from relatively well trafficked road directly to east of site near Altnahinch reservoir and is located within the AONB.**
p3	**VP 1**	**Corkey Village at Reservoir Road junction**	**309094**	**421639**	**2 km**	**Used in Gruig Wind Farm LVIA and retained for comparison purposes. However, views towards Carnbuck from this particular location would be screened by school buildings located in foreground. A less obstructed viewpoint is located on approach into village near Ballyweeny Road and represents similar views from surrounding houses - refer to p58. PVP 11 on the eastern side of the village was also considered.**
p4		Slieveanorra Nature Reserve	313400	426600	5 km	Used in Gruig Wind Farm LVIA as a wireline-only visualisation so initially reviewed for comparison purposes. No means of access to this location was identified during the site assessment. It is likely to be accessible on foot but is not clearly marked as a footpath. Views from the Altarichard Road on approaches to this location are screened by Altaveedan hill and Slieveannorra Forest. There are no views from the marked viewing area and carpark at Altarichard although, from this location there are extensive south westerly views including a number of single turbines and existing wind farms. P32 and p33 provide views from more accessible parts of Slieveanorra area; p14 provides similar elevated view from the Ulster Way over Trostan. P4 and p32 are shortlisted.
p5	**VP 7**	**Dunloy Village**	**302448**	**419977**	**8.5 km**	**Used in Gruig Wind Farm LVIA so initially reviewed for comparison purposes; provides indication of views from Dunloy village on exit from village when travelling towards A26; p23 was considered as an alternative location but views are less clear/ at an oblique angle beyond the main focus of views from this location.**
p6	**VP 3**	**Junction of Ballyweeny and Ballyveely Roads**	**306916**	**421384**	**4 km**	**Used in Gruig Wind Farm LVIA so initially reviewed for comparison purposes. Shortlisted to represent typically clear views from a number of roads and rural properties occurring throughout this part of the study area. PVP 56 is an alternative location offering similar views.**
p7	**VP 18**	**Drones Road, A44 at Ballynagashel**	**305077**	**427522**	**8.5 km**	**Similar location to that used in original Gruig LVIA so initially reviewed for comparison purposes. Shortlisted to represent views from one of two road corridors within the Study Area which provide primary access into the AONBs.**
p8	**VP 15**	**A26 near Ballymena**	**307281**	**410595**	**10 km**	**Used in Gruig Wind Farm LVIA so initially reviewed for comparison purposes; Very busy road with fast-moving traffic but also represents similar views from residents of nearby rural dwellings. As per p7, also shortlisted to represent views from one of two road corridors within the Study Area which provide primary access into the AONBs.**
p9	**VP 17**	**A26 Frosses Road near Ballymoney**	**299143**	**424161**	**12 km**	**Used in Gruig Wind Farm LVIA so initially reviewed for comparison purposes and, as above, shortlisted to represent views from one of two road corridors within the Study Area which provide primary access into the AONBs.**
p10	**VP 4**	**Omerbane Road near junction with Tullykittagh Road**	**311099**	**417932**	**2 km**	**Used in Gruig Wind Farm LVIA so initially reviewed for comparison purposes. Shortlisted because it provides clear views of the Development in relation with the existing Gruig cluster and is representative of similar views from other surrounding rural roads and properties.**
p11		Corkey Road south at Gruig Lane	309242	419489	1.9 km	Initially used as part of iterative design to analyse tip height choice. Not shortlisted due to limited views of proposed turbines. PVPs 3 and p58 are shortlisted because they provide clearer/ more representative views from other parts of Corkey village.
p12		Tullykittagh Road	310532	418312	1.8 km	Initially used as part of iterative design to analyse tip height choice. Residential properties on this road are likely to experience clear views in the direction of Carnbuck but they also screen views from much of the road corridor itself so it was difficult to find an appropriate publicly accessible viewpoint from which to take photographs. Not shortlisted because clearer view from a similar location are represented by p10.
p13	**VP 5**	**Skerry West at Omerbane Road junction**	**313336**	**418032**	**2 km**	**Initially used as part of iterative design to analyse tip height choice. Not located in very close proximity to residential properties which tend to be located on the southern part of this road (see p31) but shortlisted to represent views from rural road network in close proximity to the Development and on approaches to areas of settlement.**
p14	**VP13**	**Moyle Way near Trostan summit**	**317567**	**422922**	**4.5 km**	**Elevated location on Ulster Way near summit of Trostan which is the highest point in the AONB and marginally more accessible than PVP 2 on Slieveannorra summit to which no clear access was identified during site assessment. Representative of views from remote summits within the AONB from which extensive panoramic views across the AONB/ wider landscape are also available.**

p15		Upper section of Skerry West road	313190	419111	1 km	Initially used as part of iterative design to analyse tip height choice. There are two properties located at upper end of road, one of which is on an elevated site orientated in the opposite direction with views towards Carnbuck being partially screened by a stand of conifers. The other is closely surrounded by trees and shrubs with no apparent views beyond its curtilage. There is also a third property located lower down the road which is orientated south westwards with walls and vegetation around its curtilage that are likely to obscure clear views in the direction of Carnbuck.
p16		Top end of Skerry West road	313622	419966	0.9 km	As above. Not shortlisted because this is a remote section at the end of the road with no residential properties and is not a through- road. Visual receptors are likely to occur in very small numbers.
p17		South end of Old Cushendun Road near Newtown Crommelin	314272	417860	2.5 km	Initially used as part of iterative design to analyse tip height choice. Not shortlisted because residential properties are set into the side of Skerry Hill on the north side of the road corridor overlooking Glenariff to the east with no views towards Carnbuck.
p18		Middle section of Old Cushendun Road	314339	419427	1.8 km	as above
p19		North end of Old Cushendun Road near junction with Altnahinch Road	314650	421150	1.2 km	Similar to above and also located within the AONB. This end of the road is more remote with no properties. The provisional wireline indicates visibility of two blade tips but these are unlikely to be noticeable. The primary focus of views is elevated south-easterly views which include Elginny Hill and Rathsherry wind farms.
p20		Old Cushendun Road at Wee Slievenanee picnic area	315755	422233	2.7 km	Initially selected because it is within the AONB boundary at a marked picnic area and provisional wireline indicated visibility. However, no picnic area is evident on site and views in the direction of Carnbuck are obscured by forestry and foreground topography.
p21	**VP 16**	**Bridge over A26 near Logan's Department Store, Cloughmills**	**305199**	**418374**	**6 km**	**Identified during initial site survey. There are sequential views of the Development from the A26 between Ballymena & Cloughmills but it is difficult to find a safe stopping place from which to obtain clear views from the road corridor itself, from most parts of the hard shoulder or dedicated picnic areas, the latter which tend to be sheltered by screen planting. Bridges over the main road, such as this, provide safer stopping places with clearer views due to their elevation.**
p22		A26 at Glarryford	306524	413238	8 km	Identified during initial site survey because the Gruig cluster is visible behind two large single turbines located in farmland directly to the east of road corridor. This location illustrates cumulative effects in relation to depth of views of turbines across valley which provides setting to west-facing edge of AONB. Not shortlisted because a safe stopping place from which to obtain clear photography could not be found. However, this PVP is considered in the analysis of visual effects from the A26 road corridor more generally and represented by p8 and 21.
p23		A26, Lay-by at Ballynaloob South near junction with A44	302994	421025	7.5 km	Initially selected as an alternative to p5 from a more heavily used route to and from the AONBs. Not shortlisted because views are less clear/ at a more oblique angle and more frequently screened by roadside vegetation in proximity to this part of the road corridor.
p24		Tullaghans Road on Long Mountain Ridge near Dunloy	299040	419072	12 km	Relatively clear and elevated but similar to p5 which was shortlisted because it is closer to the Development.
p25	**VP 12**	**Old Cushendun Road to north of Altnahinch Road**	**315039**	**421403**	**1.5 km**	**Alternative to p19 and p20. Elevated location on bend of road providing a natural and safe stopping place and clear panoramic views of both Corkey & Gruig to the west and Elginny Hill / Rathsherry to the south.**
p26		Altnahinch Road	312497	422506	1.4 km	Initially selected to assess potential views from roads in immediate proximity to the Development site where it is likely to be visible in conjunction with a number of other existing and consented wind farms. Not shortlisted because provisional wireline indicates very limited visibility of only turbines T10 and T12.
p27		North section of Reservoir Road	311547	423378	2.5 km	As above
p28		Middle section of Reservoir Road	310319	423011	2 km	As above - provisional wireline indicates that visibility of Carnbuck would be entirely screened by foreground topography.
p29		South section of Reservoir Road	309663	422395	1.8 km	As above. This part of road is the descent into Corkey village with views around the southern side slopes of the hills on which the Gruig cluster is located. There are also more residential properties in proximity to this location than PVPs 26 - 28. However, the provisional wireline indicates relatively limited views of only a few of the proposed turbines and initial site assessment revealed high levels of screening from roadside vegetation. The nature of this view is considered as part of the analysis of views from Corkey village but this specific location has not been shortlisted due to lack of clear or extensive views of the proposed turbines.
p30		Altnahinch Reservoir	311836	423539	2.5 km	As above and also initially selected because this is a recreational amenity site offering walks and angling. However, but views relatively restricted by topography and are also orientated northwards towards Altaveedan wind farm rather than towards the Gruig cluster.
p31		South section of Skerry West road	313025	417211	2.5 km	Initially selected to assess potential visibility from lower part of road where there cluster of residential properties. Not shortlisted in favour of p13 because initial site assessment found that properties are typically orientated to take advantage of south eastward-facing views which are panoramic and attractive. Views in the direction of Carnbuck appear on to be largely screened by rising foreground and vegetation around properties although the provisional wireline suggested similar levels of visibility to that represented by p13. The latter has been shortlisted because it provides less obstructed views but this location is considered in the analysis of views from Skerry West.
p32	**VP 6**	**Orra Scenic Drive, Altarichard Road, Magherahoney**	**308632**	**429213**	**8 km**	**Scenic driving route in proximity to the edge of the AONB with some residential properties in proximity. Also represents views from p33.**
p33		Shelton Road near Altaveedan	309362	427954	7 km	Difficult to obtain clear views at a safe stopping place due to roadside vegetation. PVP 32 provides a similar view from a better stopping location and is representative of views from this part of the Study Area.
p34	**VP 19**	**Armoy village at GAA carpark, A44**	**307011**	**432023**	**11.5 km**	**Settlement and main road corridor providing primary access to AONB; cumulative effects in conjunction with Altaveedan**
p35		Cycle network at Kanestown, Glentaisie	305675	438366	18 km	Initially selected to represent views of cyclists and other road users within one of the glens within the AONB. Not selected because views likely to be typically screened and too distant for Development to be a clearly visible feature.

p36		Benvarden House and Gardens, Dervock	294346	433473	20 km	Initially selected to represent longer range views from north western part of Study Area. Specific location chosen because it is a Registered Park and Garden. Not shortlisted because views from this part of landscape typically screened by vegetation in foreground and middle distance. PVP 40 selected to represent clearer views from similar part of the Study Area.
p37	**VP 20**	**A2 at Magheraboy near Ballintoy**	**303604**	**443143**	**23 km**	**Shortlisted as one of several locations within Causeway AONB that are also within the ZTV; on Causeway Coast Scenic Drive and likely to be frequented by relatively high numbers of tourists. Illustrated by a wireline-only visualisation because Development is unlikely to be easily discernible.**
p38	**VP 21**	**Causeway Coast Scenic Drive near Giant's Causeway**	**296445**	**444313**	**27 km**	**As above**
p39	**VP 22**	**Round Hill near Portballintrae and Dunluce**	**291676**	**440942**	**27.5 km**	**As above**
p40	**VP 24**	**Seacon Beg near Ballymoney**	**292584**	**428581**	**19.5 km**	**Shortlisted to represent longer range views from north western part of Study Area; part of National Cycle Network; rural residential properties located on elevated position and frequently orientated to take advantages of panoramic views in the direction of the Development.**
p41		Agivey Bridge	290974	422904	20 km	Initially selected to represent longer range views from north western part of Study Area. Not selected because initial site assessment revealed that, although views are possible, they are diminished in scale and prominence by the extensive pastoral lowlands in the foreground. PVP 40 selected to represent clearer views from similar part of the Study Area.
p42		A29 between Swatragh and Garvagh	284725	411188	28 km	Initially selected for similar reasons to PVPs 36 and 41. Not shortlisted due to distance from Development but used to inform assessment of wider landscape character of Study Area.
p43	**VP 26**	**Tardree Mountain carpark and viewing area**	**319086**	**394439**	**26 km**	**Shortlisted to provide information on views from wider Study Area which are not located within an AONB but where there are visitor amenities which indicate the presence of potentially sensitive visual receptors. Also used to inform the assessment of wider landscape character and cumulative visual effects due to its proximity to Elliot's Hill cluster of wind farms.**
p44	**VP 14**	**Slemish summit**	**322201**	**405386**	**17 km**	**Shortlisted to represent views from specific location which is a popular landscape attraction within the AONB and from where extensive views across the AONB can be appreciated.**
p45		Straid village between Ahoghill and Ballymena	307211	399116	21 km	Initially selected for similar reasons to PVPs 36, 41 and 42. Not shortlisted due to distance from Development and presence of substantial screening by foreground vegetation which restricts longer range views. Used to inform assessment of wider landscape character of Study Area.
p46	**VP 25**	**Picnic area at Tildarg Hill near Wolf Bog**	**323697**	**397337**	**25 km**	**As per PVP 43**
p47		Ulster Way at Agnews Hill, Starbog Road	332981	402752	27 km	Initially selected for its location within the AONB and on the Ulster Way. Not shortlisted due to limited nature of views of Development.
p48		Ulster Way at Agnews Hill, Cappagh Wood	328947	405667	22 km	As above
p49		Rathsherry	314176	411745	8 km	Initially selected because this location was likely to offer similar but slightly more elevated view than that obtained from A43 around Martinstown and to illustrate cumulative effects with Elginny Hill and Rathsherry wind farms. However, site analysis revealed that views along this section of the road were often screened by foreground vegetation. Clearer views are provided at PVPs 53 & 54 which have been shortlisted instead.
p50		Mount Pleasant near Cullybackey	303861	407247	14.5 km	Not shortlisted because views typically screened or partially filtered by vegetation and foreground topography. PVP 57 offers clearer views from a slightly more elevated position in this part of the Study Area and has been shortlisted instead.
p51		B94 road corridor between Cloughmills and Clough	308511	415686	5 km	Initially selected to represent views from countryside in this part of the Study Area. Not shortlisted in favour of PVP 55 which is on same road corridor but in closer proximity to Cloughmills town and therefore likely to represent a greater range of visual receptors.
p52		Carncoagh Road junction with A43 near Martinstown	311844	410148	9 km	Identified on site as a potential alternative location to PVP 1 but wireline revealed that views of proposed Development are largely screened by rising slopes of Skerry Hill.
p53	**VP 9**	**Glen's Brae, Lisbreen near Martinstown**	**314392**	**412926**	**7 km**	**Represents typically occurring views from the relatively well-trafficked and populated tertiary road network overlooking Martinstown and A43 road corridor. Rural residential properties occur frequently in the surrounding landscape and the elevated topography allows clearer views that those along the A43 road corridor itself although the latter is visible in the middle ground. Alternative locations also looked at: p1; p49; p52 and p54. Shortlisted in addition to p54 because this location provides greater simultaneous visibility of cumulative wind farms and single turbines.**
p54	**VP 8**	**Killygore Road near A43 at Martinstown**	**312801**	**411771**	**8 km**	**Shortlisted in addition to p53 because it provides a better indication of views from a similar elevation to A43 road corridor and from a greater number of residential properties.**
p55	**VP 10**	**Layby on B94 at edge of Cloughmills village**	**307053**	**417128**	**5 km**	**Shortlisted in favour of PVP 51. See reasoning above.**
p56		Mount Hamilton Road to north of Cloughmills	306183	419942	4.5 km	Similar to PVP 6 which was used in original LVIA but with a clearer view of Altaveedan rather than the Gruig cluster of wind farms. This is also a less populated road so not shortlisted in favour of PVP 6.
p57	**VP 23**	**Granagh Road near Loan Road junction, Cullybackey**	**303329**	**406772**	**15 km**	**Shortlisted over PVP 50 to represent views from rural landscape in this part of the Study Area including rural properties.**
p58	**VP 2**	**Corkey Village at Ballyweeny Road junction**	**308997**	**421871**	**2 km**	**Alternative to PVP 3 where views are screened by school buildings. This location offers a less obstructed view and in combination these locations.**
p59		Junction of Loughill and Lislaban Roads to north east of Cloughmills	308199	419394	2.9 km	Location added following public consultation response. Provisional wireline indicates no visibility of existing Gruig wind farm and visibility of only the upper parts of 6 of the proposed turbines. Not shortlisted in favour of PVP 6 which is located slightly further to the north and which offers clearer and more extensive views of the Development. However, the analysis of the latter will include consideration of the nature of views from surrounding roads such as this.

p60		Junction of Rosdermott and Moneyduff Roads to south east of Cloughmills	309805	417627	2.8 km	Location added following public consultation response. Not shortlisted because the provisional wireline indicates similar visibility to that represented by PVP 10, which is located slightly closer to the Development, and by PVP 55 which is located slightly further away. Both are located in the same part of the Study Area and analysis will include consideration of the nature of views from surrounding roads such as this.

Final Viewpoint Selection

4.82 A total of 26 final Viewpoints have been selected for consideration in this LVIA. Detailed descriptions of the final Viewpoints are an integral part of the Visual Impact Assessment section of the LVIA (Chapter 4). Their locations are indicated on all map-based Figures (Figures 4.1 – 4.9) and visualisations to accompany the detailed written analysis of these Viewpoints are provided in Figures 4.10 – 4.31.

4.83 The baseline assessment, including the viewpoint selection process, identified a number of key visual receptors including; residents of rural properties and settlements located in close proximity to the Proposed Development but also elsewhere in the Study Area; tourists on scenic routes, footpaths and cycle routes throughout the Study Area; receptors located within the AONB with views ranging from close range to those located at greater distances with an appreciation of the wider landscape setting and visibility of the Proposed Development in the context of this setting. Planning policy guidance recognises that wind farms will, by their nature, often be clearly visible from close range viewpoints but that this will not necessarily equate to adverse visual effects. Therefore, the final Viewpoints presented in this LVIA are intended to represent typical views of the Proposed Development that are likely to be obtained in different parts of the Study Area, from key locations and by key visual receptors. They have been grouped into categories so that the different types of views, receptors, and specific areas they represent can be accurately described and understood without unnecessary repetition. A complete list of the final Viewpoints and categories are provided in Table 4.4.2 below. Detailed descriptions of these Viewpoints are provided in the LVIA, Chapter 4.

Technical Appendix Table 4.4.2: Final Viewpoints

Final Viewpoint no. and location		PVP number	Final Grid Reference	
Category A: Locations primarily representing views from settlements and rural roads with residential properties within 5 km of the Proposed Development				
1	Corkey Village at Reservoir Road junction	3	309094	421639
2	Corkey Village at Ballyweeny Road junction	58	308997	421871
3	Junction of Ballyweeny and Ballyveely Roads	6	306916	421384
4	Omerbane Road near Tullykittagh Road	10	311099	417932
5	Skerry West at Omerbane Road junction	13	313336	418032
Category B: Locations primarily representing views from settlements and the connecting road network within 5 – 10 km of the proposed Development				
6	Altarichard Road, Magherahoney	32	308632	429213
7	Dunloy Village	5	302448	419977

Final Viewpoint no. and location		PVP number	Final Grid Reference	
8	Killygore Road near A43 at Martinstown	54	312801	411771
9	Glen's Brae, Lisbreen near Martinstown	53	314392	412926
10	Layby on B94 at edge of Cloughmills	55	307053	417128
Category C: Locations primarily representing views from within the Antrim Coast and Glens Area of Outstanding Natural Beauty				
11	Altnahinch Road at Skerry Hill	2	313604	421481
12	Old Cushendun Road to north of Altnahinch Road	25	315039	421403
13	Moyle Way near Trostan summit	14	317567	422922
14	Slemish summit	44	322201	405386
Category D: Locations primarily representing views from the A26 and A44 road corridors				
15	A26 Crankill Road near Ballymena	8	307281	410595
16	Bridge over A26 near Logan's, Cloughmills	21	305199	418374
17	A26 Frosses Road near Ballymoney	9	299143	424161
18	Drones Road, A44 at Ballynagashel	7	305077	427522
19	Armoy village at GAA carpark, A44	34	307011	432023
Category E: Locations primarily representing views from the Causeway Coast and Glens Area of Outstanding Natural Beauty				
20	A2 at Magheraboy near Ballintoy	37	303604	443143
21	Causeway Coast scenic drive near Giant's Causeway	38	296445	444313
22	Round Hill near Portballintrae and Dunluce	39	291676	440942
Category F: Locations primarily representing views of the Development from the wider Study Area beyond 15 – 20 km				
23	Granagh Road near Cullybackey	57	303329	406772
24	Seacon Beg near Ballymoney	40	292584	428581
25	Tildarg Hill near Wolf Bog	46	323697	397337
26	Tardree Mountain	43	319086	394439

Technical Appendix 4.5: Cumulative Baseline

4.84 This Technical Appendix provides details of the wind farms that are considered to form the 'Cumulative Baseline' for this LVIA as described in the LVIA, Chapter 4. The Cumulative Baseline refers to all existing, consented and proposed wind farms within the 30 km Study Area. There are a total of 25 wind farms considered to be part of the Cumulative Baseline for this LVIA, of which 16 are existing and account for a total of 96 turbines. A further 5 are consented which account for a further 24 turbines. A further 4 wind farms are proposed (i.e. in-planning) and these account for 39 turbines. There are also 5 existing or consented single turbines located within 5 km of the Proposed Development which have also been included in the Cumulative Baseline. There are currently a total of 125 existing and consented turbines in the Study Area.

Technical Appendix Table.4.5.1 Wind Farms included in the Cumulative Baseline

See over page…

Technical Appendix Table.4.5.1 Wind Farms included in the Cumulative Baseline

Name of wind farm	Status	Approx. distance from Development (km)*	No. of turbines	Rotor dia. (m)	Hub height (m)	Blade tip height (m)	Visible from which shortlisted Viewpoints		Additional notes
Wind Farms within 30 km Study Area									
Gruig Cluster									
Altaveedan	Ex	5.32 km to N of T1	9	80	60	100	3, 6, 7, 11, 13, 17 - 24	13 no.	
Corkey	Ex	0.93 km to NE of T1	10	37	35	53.5	all except VP 5	25 no.	
Corkey Extension	Ex	1.90 km to NW of T1	1	44	45	67	1, 3, 6, 7, 10, 13, 15 - 17, 19, 21- 24	14 no.	aka Slievenahanaghan; planning ref. D/2013/0081/F
Corkey Re-Power	Cons	0.74 km to N of T1	5	117	78.5	137	all	26 no.	
Gruig	Ex	0.36 km to E of T1	10	80	60	100	all	26 no.	
Long Mountain Cluster									
Craigs & Ext.	Cons	13.8 km to SW of T3	2	93	80	126.5	1, 4 - 7, 14, 16, 17, 23, 25, 26	11 no.	
Garves	Ex	11.23 km to SW of T2	5	90	80	125	1, 4 - 9, 13, 14, 16, 17, 21 - 26	17 no.	
Glenbuck 1	Ex	10.9 km to SW of T2	1	90	75	120	as above	17 no.	
Glenbuck 2	UC	10.9 km to SW of T2	3	93	63	109.5	as above	17 no.	
Long Mountain	Ex	10.3 km to SW of T2	12	71	65	100.5	1, 4 - 9, 13, 14, 16, 17, 21 - 26	17 no.	
Elginny Hill Cluster									
Elginny Hill	Ex	7.9 km to S of T5	10	71	64	91.5	2, 5, 7, 9, 12, 14, 18, 21 - 26	13 no.	
Rathsherry	Ex	8.76 km to S of T5	9	90	60	105	2, 5, 7, 9, 12, 14, 22 - 26	11 no.	
Elliot's Hill Cluster									
Castlegore	Cons	24 km to SE of T5	4	100	75	125	17, 23, 26	3 no.	
Elliot's Hill	Ex	24.6 km to SE of T5	10	39	39	58.5	17, 22, 23, 26	4 no.	
Whappstown	Prop	23.85 km to SE of T5	4	71	85	120.5	17, 23, 25, 26	4 no.	
Wolf Bog	Ex	24.6 km to SE of T5	5	80	60	100	17, 22, 23, 25, 26	5 no.	
Wind Farms not within a cluster									
Ballygilbert	Prop	21.55 km to SE of T12	14	117	91.5	150	14, 23	2 no.	
Ballykeel	Cons	27.07 km to SE of T10	7	71	64	99.5	14	1 no.	
Ballymena Wind Park	Ex	14.77 km to S of T5	2	82	78	119	14, 23, 26	3 no.	
Cam Burn	Cons	27.62 km to W of T1	6	71	85	120.5	1, 6, 14, 17, 25, 26	6 no.	
Carnalbanagh (Re-Submission)	Prop	17 km to SE of T6	7	105	52.5	105	14, 23	2 no.	
Cloonty	Ex	19.8 km to NW of T1	4	82.4	70	111.2	1, 2, 4 - 6, 11, 13, 14, 18, 21, 22, 26	12 no.	
Connaught Road	Ex	26.3 km to SW of T5	2	26	44	57	12, 14, 26	3 no.	
Corby Knowe	Ex	26 km to NE of T5	3	80	59.5	99.5	14, 22, 23, 26	4 no.	
Unshinagh	Prop	12.43 km to SE of T12	14	136	112	180	14, 23, 26	3 no.	
Single turbines within approx. 5 km of the Development (existing & consented, excluding any lapsed applications)									
ST 1	Ex	1.56 km to NW of T1	1	32	32	48	1, 3, 7, 10, 15, 16 - 18, 20, 21, 23 - 26	14 no.	200m East of, 15 Reservoir Road; currently in planning, ref. LA01/2020/0078/F to replace existing with larger turbine 55 m rotor & 52 m hub but not yet approved so existing dimensions used
ST 2									*Not used - refer instead to Corkey Extension above*
ST 3	Cons	1.01 km to SW of T2	1	40	52	72	1 - 4, 7 - 9, 14 - 18, 20 - 22, 24 - 26	18 no.	Location approx. 1700 m west of Carnbuck proposed turbine T4; planning consent ref. LA01/2017/0016/F to replace existing 30 m rotor/ 27 m hub with larger turbine; larger dimensions used
ST 4	Ex	1.29 km to SW of T5	1	30	40	55	3 - 5, 7 - 10, 14, 15, 17, 22 - 26	15 no.	248m north of 24 Omerbane Road; currently in planning, ref. LA02/2021/0791/F to replace existing with larger turbine 40 m rotor, 54 m hub but not yet approved so existing dimensions used
ST 5	Ex	1.26 km to SW of T5	1	30	40	55	3 - 5, 7 - 10, 14, 15, 17, 21 - 26	16 no.	276m north of 29 Omerbane Road; currently in planning, ref. LA02/2021/0788/F to replace existing with larger turbine 40 m rotor, 54 m hub but not yet approved so existing dimensions used
ST 6	Cons	2.73 km to SE of T5	1	30	24	39	5, 7 - 10, 14, 15, 17, 23, 24, 26	11 no.	300m east of 7 Skerry West Rd, ref. LA02/2021/0237/F

** Distance is measured between nearest turbines unless otherwise stated*

Total no. within the Study Area:			
Existing Wind Farms:	16	Existing Turbines:	96
Consented Wind Farms:	5	Consented Turbines:	24
Existing and Consented Single Turbines	5	Single Turbines, 5km:	5
Sub total	***26***		***125***
Proposed Wind Farms:	4	Proposed Turbines:	39
Total no. wind farms & single turbines	***30***	***Total no. of wind turbines:***	***164***