APPENDIX 13-1

LVIA METHODOLOGY

Appendix 13-1: LVIA Methodology

Maughanaclea Renewable Energy Development, Co. Cork

Table of Contents

1. LANDSCAPE AND VISUAL IMPACT ASSESSMENT METHODOLOGY

1.1 Introduction

This appendix reports the comprehensive methodology for Landscape and Visual Impact Assessment (LVIA) conducted for the Proposed Project in Chapter 13; Landscape and Visual, of this EIAR. Chapter 13 follows the naming conventions and definitions detailed in Section 1.1.1 as per Chapter 1 of this EIAR. For terminology used in this appendix relating to the Proposed Project, see Section 13.1.2.1 of the main chapter.

1.2 Essential Aspects of LVIA

The Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (Landscape Institute & Institute of Environmental Management and Assessment [LI & IEMA], 2013) state that:

> *'It is important to make sure that the project description provides all the information needed to identify its effect on particular aspects of the environment. For LVIA, it is important to understand, from the project description, the essential aspects of the scheme that will potentially give rise to its effect on the landscape and visual amenity'.*

For the Proposed Project assessed in Chapter 13 of this EIAR, it is deemed that the tall, vertical nature of the proposed turbines make them the most prominent elements from a landscape and visual perspective, having the most potential to give rise to significant landscape and visual effects. In this regard, the proposed turbines are deemed to be the 'essential aspect' of the development which will give rise to effects on the landscape and visual amenity and therefore are the primary focus of the LVIA.

Additional elements of the Proposed Project are deemed to be less visually prominent than the proposed turbines; however, these components may also potentially give rise to localised landscape and visual effects. Although not the primary focus of the LVIA, these additional elements are also given due consideration and assessment in the chapter.

1.3 Relevant LVIA Guidance

While the legislation and general guidance on Environmental Impact Assessment (EIA) is set out in Chapter 1; Introduction, of this EIAR, only the guidance specifically pertaining to landscape and visual impact are outlined below.

In 2002, Ireland signed and ratified the European Landscape Convention (ELC), which introduced a pan-European concept centring on the quality of landscape protection, management, and planning. In 2015, the Department of Arts, Heritage and the Gaeltacht accordingly published a National Landscape Strategy for Ireland, aiming to ensure compliance with the ELC and containing six main objectives, which included developing a 'National Landscape Character Assessment' as well as 'Landscape Policies'.

In 2000, the Department of the Environment, Heritage, and Local Government (DoEHLG, formerly Department of Environment and Local Government) published the 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities' (hereafter, Landscape Assessment Guidance (DoEHLG, 2000)), which recommended that all Local Authorities adopt a standardised approach to landscape assessment for incorporation into Development Plans and consideration as part of the planning process. However, at the time of writing this report, the Landscape Assessment Guidance (DoEHLG, 2000) remains in draft form.

Therefore, the LVIA in this report is primarily based on the following guidance, published in the UK:

- GLVIA3 (LI & IEMA, 2013).
- 'Notes and Clarifications on Aspects of GLVIA3: Landscape Institute Technical Guidance Note 2024-01' (hereafter, LI TGN 24-01) published by the Landscape Institute (LI) (2024).

For guidelines pertaining to the siting and design of wind energy developments, this LVIA focuses on the best-practice guidance of:

- 'Wind Energy Development Guidelines for Planning Authorities' (hereafter, **the Guidelines (DoEHLG, 2006)**;
- 'Draft Revised Wind Energy Development Guidelines' (Department of Housing, Local Government and Heritage, 2019). (hereafter, **the Draft Guidelines (DoHPLG, 2019)**;

Eight additional guidance documents also informed the framework preparation of this LVIA, as follows (arranged from most recent):

- 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (Environmental Protection Agency of Ireland [EPA], 2022);
- 'Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments' (Nature Scot, 2021; includes methodology published in 2012);
- 'Visual Representation of Development Proposals' (Landscape Institute Technical Guidance Note 06/19, 2019) (LI TGN 06/19);
- 'Siting and Designing Wind Farms in the Landscape, Version 3a' (Scottish Natural Heritage [SNH], 2017) (SNH Guidance v.3a);
- 'Visual Representation of Wind Farms, Version 2.2' (SNH, 2017) (SNH Guidance v.2.2);
- 'Spatial Planning for Onshore Wind Turbines: Natural Heritage Considerations' (SNH, 2015);
- 'Visual Representation of Wind Farms, Version 2' (SNH, 2014) (SNH Guidance v.2)
- 'Visual Assessment of Wind Farms: Best Practice' (SNH, 2002).

1.4 Scope and Definition of LVIA Study Area

The Site is delineated by a green line labelled 'EIAR Site Boundary' in all relevant maps and figures from Ch.13 of the EIAR as well as *Appendix 13-4 A0 LVIA Baseline Map*.

The geographical parameters for this LVIA were determined by desktop study, field survey work undertaken and experience from other relevant projects, as well as the professional judgement of the assessment team and the following relevant policy guidance:

- GLVIA3 (LI & IEMA, 2013);
- Appendix 3 'Landscape Impact Assessment of Wind Energy Development Proposals' of the Guidelines (DoEHLG, 2006);
- Appendix 3 'Landscape and Visual Impact Assessment of Wind Energy Development Proposal' of the Draft Guidelines (DoHPLG, 2019).

1.4.1 LVIA Study Area for Effects on Landscape and Visual Receptors: 25km Radius

The impact assessments in Chapter 13 assess the effects of the Proposed Project on landscape and visual receptors within a 25km radius from the proposed turbines, an area called the **'LVIA Study Area'.** The rationale for the 25km LVIA Study Area is explained below.

GLVIA3 refers to the identification of the area of landscape that is to be covered while assessing landscape and visual effects:

> *"The study areas should include the site itself and the full extent of the wider landscape around it which the Proposed Project may influence in a significant manner."*

The assessment of landscape visibility was conducted by calculating the Zone of Theoretical Visibility (ZTV) (see below, Section 1.5 Visibility Mapping: ZTV). The distance at which a ZTV is set from a proposed wind farm development usually defines the parameters of the LVIA Study Area. The LVIA Study Area was chosen to 25km from the proposed turbines for landscape and visual effects, due to the proximity of 'West Cork Peninsula', a landscape of very high sensitivity in the Cork County Development Plan 2022-2028. This landscape may also be classified of international renown due to its high scenic value along the Cork coastline. Therefore, the 25km LVIA Study Area was chosen as per Guidance:

> *'In areas where landscapes of national or international renown are located within 25km of a proposed wind energy development, the Zone of Theoretical Visibility should be extended as far (and in the direction of) that landscape. This reflects the fact that highly sensitive landscapes deserve extra special treatment by developers and planners" (the Guidelines (DoEHLG, 2006) Page 95; Page 152, the Draft Guidelines (DoHPLG, 2019))."*

1.4.2 LCA Study Area for Effects on Designated Landscape Character Areas: 15km Radius

Through extensive experience conducting LVIA for other wind energy development projects, the assessment team determined that no significant effects on landscape character are likely to arise beyond distances of 15km from the proposed turbines. The turbines of a wind farm are unlikely to significantly impact the key characteristics of a designated Landscape Character Area (LCA) beyond 15km, even for the most sensitive designated LCAs. Therefore, a study area of 15km, hereafter referred to as the '**LCA Study Area'**, is deemed appropriate for effects on landscape character in relation to the assessment of effects upon designated Landscape Character Areas. The assessment and sensitivity of landscape character was conducted based on the designated LCAs within the LCA Study Area in the relevant local policies (see below, Section 1.7.3: Sensitivity of Designated LCAs).

1.4.3 Topics Scoped Out of Assessment

Furthermore, as prescribed by best practice guidance, the professional judgement of the assessment team, in addition to the desk studies and survey work undertaken, and experience from other relevant projects, the following topic areas have been scoped out of the assessment:

- Effects on landscape and visual receptors that have minimal or no theoretical visibility (as predicted by the ZTV) and/or very distant visibility, and are therefore unlikely to be subject to significant effects;

- Effects on designated landscape receptors beyond 25km from the proposed turbines, from where it is judged that potential significant effects on key characteristics and/or special qualities, or views are judged unlikely to occur;
- Effects on visual receptors beyond 25km from the proposed turbines, where it is judged that potential significant effects are unlikely to occur;
- Effects on designated LCAs beyond 15km from the proposed turbines, where it is judged that potential significant effects on landscape character are unlikely to occur;
- Cumulative landscape and visual effects beyond 25km from the proposed turbines, where it is judged that potential significant cumulative effects are unlikely to occur.
- Cumulative effects in combination with single turbines with a tip height less than 50 metres which are located at distances greater than 5km from the Proposed Project, where it is deemed no significant cumulative effects are likely to occur in combination with the Proposed Project.

1.5 Visibility Mapping: Zone of Theoretical Visibility

The ZTV represents the area over which a development can theoretically be seen as a result of surrounding landform characteristics in the landscape. The ZTV is modelled using the turbine locations and size specifications in combination with a Digital Terrain Model (DTM). The DTM is a three-dimensional computerised visual representation of a piece of topography, in the form of a digital model. The associated ZTV map, constructed based on the details of the DTM, is overlaid onto a base map and indicates the following:

- Broad areas where visibility of a wind energy development is most likely to occur;
- How many of the proposed turbines of the wind energy development are likely to be visible in those areas (using different coloured bands for different numbers of turbines);
- The geographic extent and pattern of theoretical visibility.

The production of the ZTV map is one of the first steps of LVIA, as it determines the boundaries of the LVIA Study Area in which impacts will be considered in more detail, and (ii) informs the identification of sensitive vantage points (SNH Guidance v.2.2, 2017). Importantly, the ZTV shows areas in the LVIA Study Area where **no visibility** of the proposed turbines will occur, enabling landscape and visual receptors to be scoped out of the impact assessment.

1.5.1 ZTV Methodology

The Guidelines (DoEHLG, 2006) (p.94) and Draft Guidelines (DoHPLG, 2019) (p.152) note that:

> *"It is recommended that the Zone of Theoretical Visibility should assess the degree of visibility based on the numbers of turbines visible to half the blade length in addition to hub-height".*

Furthermore, as well as per the guidance, a Half-Blade ZTV is considered more appropriate and useful than a Full-Blade ZTV for analysing visibility of the proposed turbines and scoping receptors in and out for assessment, particularly when using an elevation model representing a bare earth scenario. The decision to use a Half-Blade ZTV is based upon the guidance as well as the professional judgement and the extensive experience the assessment team have ground truthing ZTVs against the reality of turbine visibility within landscapes where turbines already exist.

Therefore, the ZTV maps presented in Chapter 13 shows visibility of the proposed turbines using the 'half-blade' height of the proposed turbines as the point of reference, thus it is referred to as the Half-Blade ZTV, or ZTV.

The Guidelines (DoEHLG, 2006) (p.94) and Draft Guidelines (DoHPLG, 2019) (p.159) require that:

> *'...in areas where landscapes of national or international renown are located within 25km of a proposed wind energy development, the Zone of Theoretical Visibility should be extended as far (and in the direction of) that landscape'.*

For this report, a mapping investigation determined that a ZTV radius of 25km from the proposed turbines is deemed to be an appropriate boundary given the renowned landscape of West Cork Peninsula, as mentioned in Section 1.4.1 above.

It should be emphasised that ZTV maps assume a worst-case or 'bare ground' scenario, i.e. no land-cover. In other words, they represent visibility of the proposed turbines in the absence of all natural and manmade features from the landscape, including vegetation and the built environment. In reality, such features largely restrict or limit visibility of the wind turbines, due to the screening effects from vegetation; for example, forestry and road-side hedgerows and trees, and buildings, particularly within towns and villages. The ZTV is modelled using a DTM of relatively coarse resolution (20m per pixel) due to the large scale of the LVIA Study Area, an area typically greater than 2,298 km^2 covering 25km from the proposed turbines in all directions. As a result of this resolution, the ZTV does not account for small scale localised landforms which, in reality, further restrict the actual visibility of turbines than is presented in the ZTV.

On all ZTV maps in Chapter 13 and *Appendix 13-4 LVIA A0 Baseline Map*, separate colour bands are used to indicate the number of turbines potentially visible to half-blade height, i.e. only half of one blade might potentially be visible over the topography, as opposed to seeing a full turbine. The legend on each map shows the number of visible turbines for each corresponding colour, as follows:

- Orange: 1-3 turbines theoretically visible
- Teal: 4-7 turbines theoretically visible
- Yellow: 8-11 turbines theoretically visible
- Navy: 12-14 turbines theoretically visible

Cumulative Comparative of the Two Clusters

In addition to the standard Half-Blade ZTV maps, a Cumulative Comparative ZTV was created to illustrate the theoretical visibility of the northern and southern turbine clusters both independently and in combination with one another.

The comparative ZTV applies the same Half-Blade methodology described above assuming a 'bare ground' scenario, in the absence of all natural and manmade features from the landscape. Figure 13-21 presented in Chapter 13, uses the following separate colour bands to differentiate between each turbine cluster:

- Pink: Only southern turbine cluster theoretically visible
- Green: Only northern turbine cluster theoretically visible
- Navy: Both turbine clusters theoretically visible

1.5.2 Limitations of ZTV Mapping

The SNH Guidance v.2.2 (2017) acknowledges the following limitations inherent to the use of theoretical visibility mapping:

- The ZTV presents a 'bare ground' scenario, i.e. visibility of the proposed turbines in a landscape without screening structures or vegetation, such as trees, hedgerows, buildings and small-scale landform or ground surface features;
- The ZTV does not take into account the effects of weather or atmospheric conditions, and therefore can be said to represent a 'worst-case' scenario, that is, one in which the

wind turbines could potentially be seen given the combination of no intervening obstructions and favourable weather conditions;

- A ZTV is only as accurate as the data on which it is based. Accordingly, is not viable to test the accuracy of a ZTV in the field, although some verification does occur during the assessment of viewpoints;
- In order to handle relatively large areas of terrain, the DTM data are based on information that does not allow detail to be distinguished below a certain level of resolution. There are also differences in the way that the software package 'interpolates' between heights in the calculations made; and finally,
- While the ZTV indicates areas from which a wind farm may be visible, it cannot show how the turbines will actually look, nor can it indicate the nature or magnitude of visual impacts. For example, the visibility of turbines naturally decreases with the distance from which they are viewed, yet this is not accounted for in the ZTV. Figure 1-1 below provides an illustration of the differences in view relative to the distance of the viewer from the turbine; in this illustrative example, all turbines shown in the image would be considered 'visible' in the ZTV map, though they have differing magnitudes of visibility:

Figure 1-1: Effect of Distance on the Visibility of Wind Turbines (illustrative purposes only).

1.5.3 On-Site Visibility Appraisal: Route Screening Analysis

As the ZTV does not account for localised undulations in topography and other screening factors, actual visibility is often far less than is indicated by the ZTV. Therefore, whilst the ZTV is a useful tool to aid analysis of likely visibility of the proposed turbines and scope out areas where impacts will not occur, the LVIA is also informed by visibility appraisals conducted from sensitive receptors throughout the LVIA Study Area.

During site visits conducted for this LVIA in 2025, the likely visibility of the proposed turbines was appraised from receptors where the ZTV indicated theoretical visibility. This included an analysis of visibility towards the proposed turbines from the local road network immediately surrounding the site during an exercise called 'Route Screening Analysis' (RSA), a methodology developed by MKO.

RSA comprehensively demonstrates the varying characteristics of visual screening existent on roads proximate to the Proposed Wind Farm site and directly records the actual visibility in comparison to the theoretical visibility. As its name suggests, RSA considers the actual visibility based on the currently existing roadside 'screen' of vegetation, topography or built structure.

RSA was undertaken from all public roads within 3km of the proposed turbines and on all major roads extending to 5km. In some instances, where designated scenic routes or renowned walking/cycling trails are present (e.g. Gougane Barra Cycling Route) on a local road beyond 3km, have also been included in the RSA. Where roads continued beyond 3km from the proposed turbines, the RSA survey continued to record the visual screening until encountering an appropriate termination point or junction. In cases where the road travels directly in the direction of the Proposed Project or between the two turbine clusters, screening of the lowest classification was recorded (least amount of screening where most visibility occurs). For this LVIA, RSA surveys was conducted in May 2025.

As the route was driven in real-time, the extent of visual screening between the road and the Proposed Wind Farm site was recorded digitally on a tablet/GPS device; in addition, dashcam video footage was recorded to allow later confirmation of mapping, and to methodically record the views along the route. All routes were driven at a sufficiently slow speed so as to allow reasonable viewing towards the direction of the site.

Overall, care was taken to ensure that the recording of visual screening accounted for seasonal variation, particularly the condition of deciduous vegetation (lack of leaves and growth) in winter months. The visual screening data were then mapped and validated against the georeferenced dashcam footage.

Using the tablet device, screening was logged as one of three categories:

- 'Little/No' visual screening;
- 'Intermittent/Partial' visual screening;
- 'Dense/Full' visual screening.

These categories are defined as follows, and example photographs from the RSA are presented in Chapter 13. 'Little/No' visual screening indicates areas that are mainly open with very light vegetation and/or built structures and none or very little intervening topography; 'Intermittent/Partial' visual screening indicates areas of light deciduous roadside vegetation and short-gapped vegetation and/or built structures, or a degree of topographical screening allowing intermittent or partial views; 'Full/Dense' visual screening indicates vegetation and/or built structures dense enough to block the views and/or topography dense enough to effectively enclose the viewer.

1.6 Photomontage Visualisations

'Photomontages' are visualisations that superimpose an image of a Proposed Project upon a photograph or series of photographs from a specific location, termed the 'viewpoint'. The photomontage is intended as a graphical representation of how a Proposed Project will appear in the existing landscape and is used as an important tool in the LVIA process. A series of photomontages have been prepared as part of this LVIA and are presented in a separate volume, *EIAR Volume 2: Photomontage Booklet*, submitted as part of this EIAR.

The following two guidance documents are considered the industry benchmarks for producing photomontages specifically for wind energy developments and were the standards adhered to during the production of photomontages for the *EIAR Volume 2: Photomontage Booklet*:

- LI TGN 06/19 (2019);
- SNH Guidance v.2.2 (2017).

The verified photomontages produced for this EIAR are classified as 'Type 4 Visualisations' in the LI TGN 06/19 (2019), meaning that the visualisations adhere to stringent verification standards with regards to data collection protocols, graphics production and presentation. The proposed turbines modelled in the photomontages are proportionately scaled within a topographic model from the specific locations where the photographic imagery is captured, i.e. the 'viewpoints'. The proposed turbines and topographic model are then carefully positioned and scaled within the landscape view presented in each photomontage (to 90° and 53.5° horizontal fields of view, as prescribed by the SNH Guidance v.2.2 (2017) and LI TGN 06/19 (2019). The modelling of the proposed turbines in the topographical model (known as the 'wireline') is generated by software using input co-ordinates of the turbine locations, viewpoint locations and the turbine specifications of the proposed turbines presented.

The views presented in the *EIAR Volume 2: Photomontage Booklet* include a range of distances and geographic perspectives, and the images used for photomontages represent differing atmospheric conditions. Although it is not reasonable to control the weather, all images were captured when weather was sufficient to enable clear and long-ranging visibility in the direction of the Proposed Project from selected viewpoints.

It is expected that the proposed turbines should appear differently in the landscape depending on factors such as time of day, weather conditions and the location of the observer. Accordingly, the photomontages produced for this LVIA aimed to realistically represent the Proposed Project while considering the proposed turbines contrast against the backdrop of the sky and landscape. The proposed turbines presented in the photomontages have been coloured in such a way that ensures sufficient contrast for purposes of visual impact assessment, whilst at the same time balancing the intention to present the photomontages as 'life-like' visualisations.

As reported previously in Section 1.2 the essential aspect of the Proposed Project are the proposed turbines. The Photomontages visualisations in the *EIAR Volume 2: Photomontage Booklet* focus on the proposed turbines and met mast only and do not include other infrastructure elements, as they are generally not seen at this scale.

1.6.1 Viewpoint Selection

The viewpoints, or locations of photomontage imagery capture, were selected following the Guidelines (DoEHLG, 2006) and the Draft Guidelines (DoHPLG, 2019), GLVIA3 (LI & IEMA, 2013) and SNH Guidance v.2.2 (2017). The selection of viewpoints is designed to provide a representative range of views of the proposed turbines.

Viewpoints were chosen after compiling the 'Visual Baseline' (Section 13.5 of Chapter 13). The main purpose of establishing the visual baseline was to identify the key visual receptors that should be considered for viewpoint selection. To this end the following seven types of receptors were identified:

- Designated Scenic Routes and Views;
- OSi Viewing Areas
- Settlements;
- Recreational Routes:
  - Waymarked Walking Routes;
  - Cycle Routes;
  - Scenic Drives;
  - Tourist Routes;
- Recreational, Cultural Heritage and Tourist Destinations;
- Transport Routes;
- Residential Receptors.

These visual receptors are listed in tables under the sections identified above in Chapter 13, along with theoretical visibility at those locations indicated by ZTV mapping. After all key visual receptors were identified, a Visual Receptor Preliminary Analysis was carried out to scope out selected visual receptors from further assessment due to the following reasons:

- Receptors have no or very limited theoretical visibility according to ZTV mapping;
- Receptors comprise designated Views and Scenic Routes, as well as OSI Viewing Points, that are not directed towards the Proposed Project;
- Receptors visited on-site have views towards the turbines that were either entirely or substantially screened from view (by elements such as forestry and road-side hedgerows and trees, and buildings, as noted in Section 1.5.1 previously), or for which the distance from the Proposed Project in combination with screening would mitigate any potential for 'Significant' visual effects.

Views from all other key visual receptors were represented in the final selected viewpoint locations. Viewpoints were chosen having regard to the SNH Guidance v.2.2 (2017) which advises that a range of views should be shown at a range of distances, aspects and varying elevations, and that images should illustrate instances where the Proposed Project will be completely visible as well as partially visible. Consideration was also given to ensure that photomontages captured other wind farm developments in the LVIA Study Area in order to assess cumulative landscape and visual effects.

1.6.2 Photomontage Fieldwork: Data Collection Methods

Photographic and GPS data was collected from each viewpoint in the field. Under the LI TGN 06/19 Type 4 visualisation standards, photomontages are produced using quantifiable data with procedural transparency and a high level of accuracy. These visualisations involve using a defined camera and lens combination, with the camera location accurately established with a GNSS GPS to enable precise scaling and correct placement of the 3D model within the view.

As per best practice guidance, a tripod is set up and levelled at each viewpoint with the camera lens positioned 1.5 metres above the ground. In line with guidance, the tripod and camera height can be raised above this height by up to 20cm (a worse-case scenario) to ensure an unobstructed shot of the landscape if this is required due to interference in the foreground.

The camera and lens combination used for data collection, as specified in the guidance standards is a Full Frame Sensor (FFS) camera with a 50mm focal length prime lens. This approach ensures that the photomontages are survey and scale verifiable, reliable, and meet industry standards for visual accuracy.

SNH Guidance v.2.2 (2017) prescribes presentation of photomontages of wind energy developments within wide angle panoramic views. Panoramic imagery is captured by turning the camera on the tripod and capturing imagery in a 360º field of view with sufficient overlap for photo stitching. To eliminate parallax distortion errors and ensure image alignment during panorama creation, a Nodal Ninja panoramic tripod head was used. This equipment is specifically designed to minimise parallax distortion (the distortion of panoramic image when multiple individual images are stitched), ensuring that the images are seamlessly stitched together, thus preserving the integrity of the visual representation.

In adherence with best practice verification standards, a GNSS GPS device is used to capture the exact position of the camera lens with a vertical and horizontal accuracy of +/- 3cm.

1.6.3 Wireline Visualisations

The photomontages in the *EIAR Volume 2: Photomontage Booklet* are accompanied by 'wireline' views. These show the proposed turbines (and other existing, permitted and proposed turbines) scaled within a topographic model without background photography. They show the location, scale and layout of turbines from each viewpoint in a bare-earth scenario where no above ground visual screening occurs other than that caused by landform. The wireline views in the *EIAR Volume 2:* Photomontage Booklet show turbines which are coloured to correspond with their planning status: 'existing' (grey), 'permitted' (red) or 'proposed' (blue), with the Proposed Project turbines in green. In addition, the name and extent of different wind farms are labelled in the wireline views to enable understanding of the cumulative scenario experienced from each viewpoint.

1.6.4 Photomontage Presentation

The photomontage visuals contained in the *EIAR Volume 2: Photomontage Booklet* are devised to be viewed at arm's length. The existing views, photomontages and wireline views are panoramas presented on banner sheets of paper of size 'A1'. More specifically, the horizontal field of view presented in the visualisations are spread across 84.1cm, the equivalent of the maximum horizontal field of an A1 sheet of paper. In line with best practice guidance for the production of photomontages for wind energy development (SNH Guidance v.2.2, 2017; LI TGN 06/19, 2019) the A1 banners present the Proposed Project enlarged to fit within a 53.5° horizontal field of view.

The viewpoints presented in the *EIAR Volume 2: Photomontage Booklet* show several views from each viewpoint location. These include:

- **(1) Overview Sheet:** Viewpoint details include location description, grid reference, distance from nearest turbine and technical data in relation to photography. Three maps at various scales show the viewpoint location. A 120-degree existing-view image without any proposed or permitted turbines is called the 'Key Image'. Existing turbines visible in the landscape may appear within this image, and the horizontal extent of the 90-degree and 53.5-degree images to be presented in subsequent images is also framed;
- **(2) Existing View at 90°:** A 90-degree visual baseline image without any proposed or permitted turbines and a matching wireline image of the same view which includes any existing turbines visible in the landscape. If turbines are already existing in the landscape, these will be visible on the photograph and are rendered into the wireline view;
- **(3) Proposed Photomontage with Cumulative at 90°:** A 90-degree photomontage image with the proposed wind farm and all other existing, permitted, and proposed wind farms within the view. A matching wireline image shows the turbines of all proposed, permitted, and existing wind farms individually coloured and labelled for ease of identification;
- **(4) Proposed Photomontage with Cumulative at 53.5°:** A photomontage image of the proposed turbines and any existing, permitted, and proposed turbines in a 53.5-degree horizontal field of view;
- **(5) Proposed Wireline with Cumulative at 53.5°:** A wireline image of the proposed turbines and any existing and permitted turbines in a 53.5-degree horizontal field of view. The proposed turbines and any other existing, permitted, and proposed wind farms are individually labelled for ease of identification.

Presentation of Wireline Views

The SNH Guidance v.2.2 (2017) suggests that all turbine blades should be presented in the same orientation when presented within a wireline view with one blade completely vertical. The rationale for this method proposes that the singular vertical blade will show the greatest turbine tip height for all turbines. Using this method, the orientation of the turbine blades do not match what is presented in the corresponding photomontage. Conversely, guidance in the Guidelines (DoEHLG, 2006) (p.97) and Draft Guidelines (DoHPLG, 2019) (p.97) state the following in relation to wirelines (they refer to wireframes – equivalent of a wireline):

> *"Related to the above, the photomontage should be accompanied by a wire frame computer generated perspective view of the landscape, or shaded-relief model, illustrating all theoretically visible turbines. These wire frame diagrams may also be used to indicate turbines that are not visible in whole or in part due to screening, simply to prove that point.* ***Wire frames and photomontages should be at the same scale and presented in unison so that direct comparison/correlation can be made."***

This LVIA has been cognisant of the guidance from both sources (the Guidelines (DoEHLG, 2006) and Draft Guidelines (DoHPLG, 2019), as well as SNH v.2.2 (2017). However, it is considered that the guidance in the Guidelines (DoEHLG, 2006) and Draft Guidelines (DoHPLG, 2019) is a preferable option. Wireline views showing the turbines in irregular orientation with each other, but in unison with the corresponding photomontage is an optimal method of presentation for the following reasons:

- Enables direct correlation and comparison with the photomontages;
- If all turbines are oriented the same way this is an unnatural and unrealistic representation, there is no scenario where this would occur in reality;

- Although the single vertical blade shows greatest tip height, it doesn't necessarily show the greatest visual exposure of turbines in the landscape, as there could potentially be two blades (instead of one) seen above a feature of the landform when using a non-regular orientation;
- Non-regular orientations are preferable and optimal for demonstrating turbine range with comparative wireline views when they are required – see Section 1.6.5 below.

For the reasons outlined above, the turbines in the wireline views within the *EIAR Volume 2: Photomontage Booklet* are presented in unison with the orientation of the turbines in the photomontages, in line with the Guidelines (DoEHLG, 2006) and Draft Guidelines (DoHPLG, 2019).

1.6.5 Limitations of Photomontage Visualisation

Photographs, and therefore photomontages, are subject to a range of limitations, as stated in the SNH Guidance v.2 (2014):

- Visualisations provide a tool for assessment that can be compared with an 'actual' view in the field; they should never be considered as a substitute to visiting a viewpoint in the field;
- Neither photographs nor visualisations can replicate a view as seen in reality by the human eye;
- Visualisations are only as accurate as the data used to construct them;
- Visualisations can only represent the view from a single location at a particular time and in particular weather conditions;
- Static visualisations cannot convey the effect of turbine blade movement.

Although the scale, siting and geometry of photomontages are based on technical data, the other qualities of the image are open to judgement. The guidance also notes that interpretation of visualisations must be taken into account as well as additional information including variable lighting, the movement of turbine blades, seasonal differences, and the movement of the viewer through the landscape. However, accepting these limitations, the SNH Guidance v.2 (2014) and v.2.2 (2017) state that photomontages are useful tools in the visual impact assessment of wind turbines.

Furthermore, with regard to the representation of cumulative visual effects, the photomontages were constructed to also show existing, permitted, and proposed turbines. The representation of existing turbines relies on the photographic imagery captured on-site, while permitted and proposed turbines are images of turbines that have been modelled and rendered into the image. As such, there can be a discrepancy in the lighting and sharpness between these two different representations.

Photomontages (classified as 'Type 4 Visualisations' of Development Proposals according to the LI TGN 06/19, 2019) are two-dimensional representations of three-dimensional views and thus cannot convey the actual perspective or depth of view when seeing the objects with the naked eye. One of the ways in which this limitation affects the assessment of cumulative visual effects is where turbines have been proposed to be cited in front of or behind existing or permitted turbines. In the field, this physical separation may be obvious, while in the photomontage, the turbines may appear as one collective wind farm.

1.6.6 Photowires (Early-Stage Draft Photomontages): Alternative Viewpoints

All imagery captured from viewpoints for the LVIA were progressed to a draft stage called - 'Photowires'. Photowires are early-stage draft photomontage visualisations (classified as 'Type 3 Visualisations' in the LI TGN 06/19, 2019) presenting a combination of photographic imagery and a 'wireline'. A wireline is the model of the proposed turbines accurately scaled and positioned within a digital elevation model (topography) as seen from a viewpoint. Photowires are produced by positioning and overlaying the wireline on top of the stitched photographic imagery captured from a viewpoint location.

Of the total of VPs captured for this LVIA, 18no. viewpoints were selected for inclusion in the Photomontage Booklet, named VP01-VP18. Imagery captured from 6 other no. viewpoints are presented as Photowires in *Appendix 13-5 Photowire Visualisation Booklet*. The photowires are used as tools both to select the best viewpoints for assessment in the Photomontage Booklet, and also as part of discussion in the LVIA chapter to demonstrate the locations where very limited visibility might occur. A photowire may not have been selected for the Photomontage Booklet as another nearby viewpoint was felt to be a better representation of views from receptors in a particular area or felt to represent a greater number of sensitive receptors.

The photowire imagery in Appendix 13-5 are draft, therefore:

- No rendering is applied to the imagery to make the turbines photorealistic – hence the bright orange colour;
- Photowires do not include cumulative modelling, i.e. modelling and rendering of other permitted and proposed wind farms;
- The wireline element of the photowire only accounts for visual screening by topography in the elevation model;
- The wireline overlaid on the photograph is shown in front of above-ground elements of the landscape, e.g. vegetation and the built environment. Therefore, the photowire shows where the turbines are located relative to the viewpoint but are seen in front of above-ground features which, in reality, would visually screen them on the ground.

The 6 no. photowires presented within Appendix 13-5 and are useful visual aids for the discussion of visual effects included in Section 13.7 of Chapter 13: Likely Significant Landscape and Visual Effects. The location of photowire viewpoints in Appendix 13-5 are marked as orange icons in Figure 13-17, labelled as 'PW' (e.g., PW-A – PW-H).

As per the LI TGN 06/19 (2019) guidance, all photowires presented in *Appendix 13-5* on A3 paper within a 27-degree field of view including a 150% enlargement factor as the proposed turbines are presented It should be emphasised that photowires are useful visual aids to inform the impact assessment; however, they do not include modelling of other existing, permitted, or proposed wind energy developments and are therefore not used for the assessment of cumulative effects.

1.7 Assessing Landscape Effects

In line with the GLVIA3 (LI & IEMA, 2013), the potential impacts on landscape receptors and visual receptors are assessed separately. This section details the methods used to determine the likely significant landscape effects of the Proposed Project on landscape receptors.

The methodology for assessing landscape effects uses qualitative methods in order to arrive at an overall impact assessment, based on the Landscape Assessment Guidance (DoEHLG, 2000) as well as the GLVIA3, the Guidelines (DoEHLG, 2006) and Draft Guidelines (DoHPLG, 2019).

'Landscape effects' are described as changes which affect the landscape as a resource. This includes how the Proposed Project will affect the physical elements that make up the landscape, as well as its aesthetic and perceptual aspects and its landscape character. Landscape effects also relate to changes in the structure of the landscape. Under the GLVIA3, the assessment of likely significant effects on landscape receptors includes a judgement on both the 'sensitivity' of the receptor as well as the 'magnitude of change'.

1.7.1 Identifying Landscape Receptors

Section 13.4 'Landscape Baseline' of Chapter 13 reports relevant policy pertinent to the LVIA along with a description of the receiving landscape of the Proposed Project and its wider setting. As well as establishing the key sensitivities and key characteristics of the baseline landscape, this part of the LVIA focusses on identifying the key sensitive landscape receptors assessed later in Chapter 13. The following landscape receptors were identified in the landscape baseline:

(1) Landscape Designations based on:

- Cork County Development Plans 2022-2028;

(2) Landscape Character of the Proposed Project Site and its immediate environment based on:
- Site surveys undertaken throughout 2024 and 2025 (December 2024, and May 2025);
- 'Landscape Character Types' identified in Section 6.9 'Landscape Character Types as a Basis for Guidelines' of the Guidelines (DoEHLG, 2006) and Draft Guidelines (DoHPLG, 2019);

(3) Landscape Character of the LVIA Study Area based on:
- *Draft Cork County Landscape Strategy 2007'* (hereafter, the *Draft Landscape Strategy*), designating both 'Landscape Character Types' (LCTs); and Landscape Character Areas (LCAs);
- Site Surveys undertaken throughout 2024-2025.

After all landscape receptors were identified, the Landscape Receptor Preliminary Analysis was carried out to eliminate the landscape receptors where no or very limited theoretical visibility was indicated by ZTV mapping, or those having a combination of distance, sensitivity and limited visibility such that significant effects are unlikely to occur. All remaining landscape receptors were included for further assessment of landscape effects.

The assessment of landscape effects considers the landscape 'Sensitivity' balanced with the 'Magnitude of Change' of the effect to determine the 'Significance' of the effect. Mitigating factors are then taken into consideration to arrive at a 'Residual' landscape effect. Residual landscape effects are graded upon an 'impact assessment classification of significance' scale, as defined by the 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, 2022), included below in Table 1-4 of Section 1.7.5 Landscape Effects Assessment Matrix of this appendix.

1.7.2 Landscape Sensitivity: Value & Susceptibility to Change

Landscape 'Sensitivity' is described in the GLVIA3 (LI & IEMA, 2013) as a combination of the landscape's 'Susceptibility to Change' as well as the 'Value' attached to the landscape.

Landscape susceptibility to change is described as the ability of the landscape receptor (either the overall character, quality of the landscape or a particular landscape feature) to accommodate the proposed turbines without undue consequences for the maintenance of the baseline (existing) landscape and/or the aims of landscape planning policies and strategies. Susceptibility to change in this case accounts for the specific development type of wind energy, which presents change on a different scale and magnitude than other development types. Table 1-1 below presents differing assessment criteria for susceptibility to change.

Table 1-1: Assessment Criteria for Landscape Susceptibility to Change

Susceptibility of Landscape Receptor to Change	Description and Example Criteria
'High'	Landscape receptors where the overall character of the landscape receptor or the nature of the individual landscape receptor causes it to have a high susceptibility to change considering its inherent characteristics and where the landscape receptor has a low ability to accommodate the proposed change without undue consequences for the maintenance of its landscape character, and/or its quality or condition, and/or its particular aesthetic and perceptual aspects, and where such change is not in compliance with planning policies/strategies.
'Medium'	Landscape receptors where the overall character of the landscape receptor or the nature of the individual landscape receptor causes it to have a medium susceptibility to change considering its inherent characteristics and where the landscape receptor has a moderate ability to accommodate the proposed change without undue consequences for the maintenance of its landscape character, and/or its quality or condition, and/or its particular aesthetic and perceptual aspects, with consideration given to planning policies/strategies.
'Low'	Landscape receptors where the overall character of the landscape receptor or the nature of the individual landscape receptor causes it to have a low susceptibility to change considering its inherent characteristics and where the landscape receptor has a Strong ability to accommodate the proposed change without undue consequences for the maintenance of its landscape character, and/or its quality or condition, and/or its particular aesthetic and perceptual aspects, and where such change may be in compliance with planning policies/strategies.

Landscape 'Value' is a combination of values which are assessed in the 'Landscape Baseline' (Section 13.4 of Chapter 13), combining any formal landscape designations, and, where there are no designations, judgements based on individual elements of the landscape receptor, for example particular landscape features, notable aesthetic, perceptual or experiential qualities, and combination of these contributors.

Notably, the GLVIA3 (p.89) states that:

> *'…there should not be over-reliance on designations as the sole indicator of value'.*

Accordingly, the assessments of landscape value undertaken in the LVIA included consideration of various elements that contribute to landscape value of specific receptors, using best practice standards and professional judgement. Where this occurred, landscape value was judged based on clearly stated criteria. Table 1-2 below presents differing assessment criteria for landscape value.

Table 1-2: Assessment Criteria for Landscape Value

Value Attached to Landscape Elements	Description and Example Criteria
'High'	Landscape receptors forming part of designations (e.g. areas of amenity, scenic routes/views) in the development plan, or at a national or international level, or landscape receptors not designated but where the receptor is judged to be of equivalent value using clearly stated criteria including wildness, naturalness, very strong cultural heritage, or natural heritage associations and/or very high recreational value.
'Medium'	Landscape receptors where value is not formally designated but are of value as good examples of high quality, intact landscapes or landscape features and are deemed to be of relatively high scenic quality. Landscapes or landscape receptors that contain some rare elements, include areas or features which are wild or have a sense of naturalness, have strong cultural associations or which have recreational value.
'Low'	Landscapes that are not formally designated and considered as modified. Areas which do not have particularly scenic qualities, do not include rare elements or landscape features, and do not have strongly evident cultural or heritage associations.

The 'Landscape Baseline' (Section 13.4 of Chapter 13) describes and determines the landscape value of the Site and its wider landscape setting in order to establish the capacity of the immediate landscape in which the proposed turbines will be built, as is prescribed by best practice guidance (GLVIA3, p.80):

> *'...as part of the baseline description the value of the potentially affected landscape should be established'.*

Comprehension of landscape value and its susceptibility to change enables determination of the sensitivity of the landscape at a micro-level, as well as for the Site itself and the wider landscape setting.

In combining the assessment of the landscape value of a landscape receptor with the susceptibility to change of that receptor, it is noted here that a judgement of 'High' landscape value does not necessarily imply that this receptor has a 'High' susceptibility to change, and it is emphasised that this relationship can be complex. The combination of these two judgements, which determines the overall landscape 'Sensitivity', is undertaken using professional judgement with the rationale for judgements clearly explained in the description of the assessment of effects or in the baseline study. On this basis, landscape receptors have been assigned one of the four following 'Sensitivity' ratings:

- Very High;
- High;
- Medium;
- Low.

No table is provided for the description of these different classifications of landscape sensitivity as the relationship between susceptibility to change and landscape value is inherently complex and not suitable to concise definitions. It is noted that sensitivity classifications are generally guided by local and national planning policy, particularly for LCAs and county policy in relation to these, as well as county wind energy policy, where available.

However, it is noted that in cases where local variations in landscape receptors merit a smaller-scale-focused assessment that may differ from the policy, this was undertaken using professional judgement and is clearly explained in Section 13.4.3 of the main chapter.

1.7.3 Sensitivity of Designated Landscape Character Areas

In Ireland, there is currently no standardised classification criteria for the landscape sensitivity of LCAs and there is no National or Regional Landscape Character Assessment. Importantly there is no classification criteria for the landscape sensitivity of LCAs with respect to wind energy specifically. Sensitivity designations within local county development plans are extremely inconsistent from county to county with respect to naming conventions, hierarchies, specific criteria used, and designations are often incompatible across county boundaries. Many sensitivity classifications are very outdated and very few include a specific sensitivity to wind energy development. Local LCA sensitivity designations are often highly incompatible with the National direction for deployment of onshore wind energy in the current climate action plan. Sensitivity designations in local planning policy are reported in the Landscape and Visual Chapter of this EIAR and are given due consideration in the LVIA. However, the sensitivity classification used in the assessment of impacts on designated LCAs in this EIAR is specifically focussed on sensitivity to wind energy development. Factors such as the specific landscape characteristics, values, qualities and susceptibility to change and importantly how sensitive the specific LCA is within a regional and national context.

The 'Sensitivity' of designated LCAs is comprehensively assessed in *Appendix 13-2: LCA Assessment Tables*. The LCAs scoped in for assessment in Chapter 13 are all located in County Cork and use a scale of four classes from "Low Value" to "Very High Value". For the purposes of this LVIA, a rating of sensitivity was assigned to each LCA within the following classification scale:

- Very High;
- High;
- Medium;
- Low.

The sensitivity classification assigned to each LCA takes into account key characteristic and sensitivity descriptions (and where applicable, the sensitivity ratings) in the respective county development plans, as well as any relevant wind energy capacity designations and policy. A rationale for the sensitivity classification of each LCA is provided in the assessment tables included in *Appendix 13-2*. LCAs at the 'Very High' end of the scale would include very sensitive landscapes of national importance, whilst LCAs at the 'Low' end of the scale might be locally important landscapes but are those which do not comprise receptors or characteristics of unique or national value.

1.7.4 Magnitude of Landscape Change

The 'Magnitude of Change', both within a given LCA or for a specific landscape receptor, is defined by a combination of the visual presence—that is, the size and scale—of the change, the extent of the area to be affected and the duration and reversibility of the effect. It should be emphasised that all LVIA guidance documents generally agree that windfarm developments themselves are considered 'reversible'. As part of the impact assessment process, the magnitude of change for each LCA and landscape receptor was assessed using the definitions outlined below in Table 1-3.

Table 1-3: Assessment Criteria for Magnitude of Landscape Change

Magnitude of Change	Description
'Substantial'	Where a landscape will experience the loss of key landscape features or the introduction of uncharacteristic additions over a large area. The changes to the landscape are prominent and large in scale. The level of change has an

Magnitude of Change	Description
	effect on the overall landscape character. The effects are likely long term and may be irreversible.
'Moderate'	A more limited loss of or change to landscape features over a medium extent which will result in some change to landscape features and aesthetics. Could include the addition of some new uncharacteristic features or elements that would lead to the potential for change in landscape character in a localised area or part of a landscape character area. Would include moderate effects on the overall landscape character that do not affect key characteristics. The effects could be long- to medium-term and/or partially reversible.
'Slight'	The loss of or change to landscape features of limited extent, or changes to landscape character in smaller areas. Changes would not affect key characteristics. The addition of any new features or elements to the landscape would only result in low-level changes to the overall aesthetics of the landscapes. Changes to the landscape are more evident at a local level and not over a wide geographical area. The effects could potentially be medium- to short-term and/or reversible.
'Negligible'	A change affecting smaller areas of landscape character including the loss of some landscape elements or the addition of features or elements which are either of low value or hardly noticeable. The effects could be short-term and/or reversible.

1.7.5 Landscape Effects Assessment Matrix

The overall 'Significance' of landscape effects is determined by combining the landscape receptor 'Sensitivity' and the 'Magnitude of Change' classifications, according to the Landscape Effects Assessment Matrix shown below in Table 1-4.

In the matrix, landscape receptor sensitivity is shown in the first, left-hand column and magnitude of landscape change is shown in the first row at the top. This matrix is used as an indicative tool to assist in determining the significance of landscape effects. In different circumstances, differing levels of mitigating factors may ultimately result in a different determination of the final rating of significance. The 'Significance' of a landscape effect is based on a balance between the 'Sensitivity' of the receptor and the 'Magnitude of Change' of the effect.

Table 1-4: Landscape Effects Assessment Matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Medium	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The final 'Significance' rating of the landscape effect is then arrived at using a combination of the matrix and the EPA, 2022 classification definitions, shown below in Table 1-5.

The determination of significance uses a seven-point scale, ranging from 'Major' to 'Negligible'. This seven-point scale is then translated to the EPA, 2022 impact assessment classifications of 'Significance', as outlined in the table.

Table 1-5: Impact Assessment Significance Classification from EPA, 2022 for Landscape Effects

Matrix Classification Significance	EPA Significance Classification	EPA, 2022 Definition of Significance
Major	**Profound**	An effect which obliterates sensitive characteristics.
Major/Moderate	**Very significant**	An effect, which by its character, magnitude, duration, or intensity alters most of a sensitive aspect of the environment.
Moderate	**Significant**	An effect, which by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Moderate/Minor	**Moderate**	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends.
Minor	**Slight**	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Minor/Negligible	**Not Significant**	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Negligible	**Imperceptible**	An effect capable of measurement but without significant consequences.

1.8 Assessing Visual Effects

'Visual effects' relate to the changes in views and visual amenity of the surroundings of individuals or groups of people, brought about by the development of the proposed wind farm. These may result from changes in content and character of views as a result in changes to the landscape. The assessment of visual effects is based on the views shown in the photomontages and the potential visibility indicated by ZTV mapping, as well as the actual visibility on the ground.

It should be noted that, in assessing visual effects, there are different types of effects:

- **Visual obstruction:** Occurs when there is an impact on a view which blocks the view;
- **Visual intrusion:** Occurs when there is an impact on a view, but which does not block the view.

Due to the nature of the development and the appearance of wind turbines, 'visual intrusion' occurs more frequently than 'visual obstruction'. Therefore, the 'Significance' of the effect on visual receptors is a combination of the 'Sensitivity' of the receptor as well as the 'Magnitude of Change' of the effect.

Mitigating factors are then taken into consideration to arrive at a 'Residual' visual effect. Residual visual effects are graded upon the same 'impact assessment classification of significance' scale used for landscape effects, as defined by EPA, 2022, which is included below in Table 1-8 of Section 1.8.4 'Visual Effects Assessment Matrix'.

1.8.1 Visual Impact Assessment: Wind Energy Context

Given Irelands renewable energy targets which have been set by the State for on-shore renewable wind energy development (targets noted are detailed in Chapter 2: Background to the Proposed Project, Section 2.2 and Section 2.3), wind turbines will form a new component in the working landscape for the foreseeable future. The focus for visual impact assessment of wind energy developments is therefore distance, arrangement, location and potential disruption to key scenic sensitivities rather than a commonly misconceived focus on whether turbines are visible or not from a particular vantage point. The outcome of the visual impact assessment, with regards to the EPA, 2022 definition of significance, is calibrated in the overall context of LVIA of wind energy developments in Ireland and what is acceptable in the context of emerging baseline trends and the acceptability of wind turbines within views as a result of national policy.

Over time, wind turbines have, and will continue to become, a more familiar and accepted component of the Irish landscape, particularly in working rural contexts. Accordingly, their presence may not carry the same level of perceived visual intrusion as less common or incongruous forms of development. In this context, the calibration of visual impact significance reflects both the policy-driven imperative for renewable energy development and the evolving visual baseline in parts of the Irish landscape. While the visibility of turbines remains an important consideration, it does not in itself equate to significant visual impact.

Key factors of focus in the overall impact assessment on visual receptors in relation to photomontages are:

- The scale of the turbines as a result of setback distance;
- The number of turbines visible;
- Full or partial visibility of turbines e.g. are they partially screened by features;
- The horizontal extent of the proposed turbines in the field of view;
- Overall visual coherency with regards to form and arrangement and how the turbines correspond to the landscape from a particular vantage point as per best practice siting and design guidance;
- How do the turbines effect the key sensitive qualities and aspects of views;

1.8.2 Visual Receptor Sensitivity

The 'Sensitivity' of a visual receptor depends on the occupation or activity of the people involved, as well the extent to which the attention is focused on views and visual amenity, according to the GLVIA3. Visual receptor sensitivity is assessed as being 'Very High', 'High', 'Medium', or 'Low', based on the definition of descriptions and examples set out below in Table 1-6.

Table 1-6: Assessment Criteria for Visual Receptor Sensitivity

Sensitivity of Visual Receptor(s)	Description
'Very High'	Included in this category are viewers primarily focused on views from this particular location, such as visitors to popular destinations identified for their outstanding views.
'High'	Includes viewers at designated views or landscapes, such as residents in close proximity to the viewpoint who have primary views in the direction of the proposed turbines, viewers at well-known heritage or popular tourist or recreational areas and viewers along scenic or tourist routes.
'Medium'	Includes viewers who may have some susceptibility to a change in view, such as residents in medium proximity but who do not have views focused on the direction of the proposed turbines or whose views are not of a particularly scenic quality, those from views which are not designated but may have local recreational uses or those travelling along routes or at views which are considered moderately scenic.
'Low'	Includes viewers engaged in activities where the focus is not on the landscape or view. This includes those travelling along a busy route, viewers at work or engaged in sport not related to views or the experience of the landscape.

As described earlier in Section 1.6 Photomontage Visualisations, the photomontage viewpoints are selected as specific locations representative of the key visual receptors. The viewpoint assessment tables in *Appendix 13-3: Photomontage Assessment Tables* consider all receptors represented in the determination of the visual receptor sensitivity rating for each viewpoint. This determination takes a balanced approach considering the types, sensitivities, and quantities of visual receptors represented. The sensitivity rating given to each photomontage viewpoint in *Appendix 13-3* considers both the susceptibility of the visual receptors represented as well as the value attached to the available views at that particular location.

1.8.3 Magnitude of Visual Change

The 'Magnitude of Change' in terms of the visual change resulting at each viewpoint is determined by assessing a combination of scale of the change, the extent of the area to be affected and the duration and reversibility of the effect, determined by reviewing the photomontage and wireframe images for each viewpoint. The 'Magnitude of Change' is determined in accordance with the definitions and descriptions included below in Table 1-7. Examples are provided of how the magnitude of change is interpreted in the context of impact assessment of Photomontage Viewpoints.

Table 1-7: Assessment Criteria for Magnitude of Visual Change

Magnitude of Change	Description
'Substantial'	Substantial change, where the proposal would result in large-scale, prominent, or very prominent change, leading to substantial obstruction of an existing view or complete change in character and composition of the baseline through removal of key elements or the addition of uncharacteristic elements which may or may not be visually discordant. This includes viewpoints where the Proposed Project may be fully or almost fully visible over a wide extent, at close proximity to the viewer. The Proposed Project may cause substantial change to scenic sensitivities of the view. *Photomontage Example: Turbines may be of a large scale and very prominent within views, comprising large vertical and/or horizontal extent of views, turbines might typically comprise all of, or greater than the 90-degree field of view shown in the EIAR Volume 2: Photomontage Booklet.*
'Moderate'	The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the Proposed Project is partially visible over a moderate or medium extent, and where receptors are setback from the proposal. The Proposed Project may cause moderate change to key scenic sensitivities of the view. *Photomontage Example: Turbines are seen of a moderate and/or large scale comprising a large vertical and/or horizontal extent of views, typically comprising all of the 53.5-degree field of view shown in the EIAR Volume 2: Photomontage Booklet.*
'Slight'	The proposal would be partially visible or visible at sufficient distance to be perceptible and result in a slight level of change in the view and its composition. The character of the view may be altered but will not affect key scenic sensitivities. *Photomontage Example: Turbines are seen but clearly set back from the viewpoint and are of small scale, or they are partially visible, they typically comprise a relatively small portion of the 53.5-degree field of view shown in the EIAR Volume 2: Photomontage Booklet.*
'Negligible'	Any change would only be barely distinguishable from the status quo 'do-nothing scenario' in the surroundings. The composition and character of the view would be preserved in most respects, approximating to little or very distant change. The proposed turbines may cause negligible change to key scenic sensitivities of the view. *Photomontage Example: Turbines are seen as small features at great distance from the viewpoint or partially visible, typically comprising a very small portion of the 53.5-degree field of view shown in the EIAR Volume 2: Photomontage Booklet.*

1.8.4 Visual Effects Assessment Matrix

The final 'Significance' rating of visual effects is determined by combining the visual receptor 'Sensitivity' and the 'Magnitude of Change' classifications, according to the Visual Effects Assessment Matrix shown below in Table 1-8.

In the matrix, visual receptor sensitivity is shown in the first, left-hand column and magnitude of the visual change is shown in the first row at the top of the table. This matrix is used as an indicative tool to assist in determining the significance of visual effects. In different circumstances, differing levels of mitigating factors may ultimately result in a different determination of the final rating of significance. The 'Significance' of a visual effect is based on a balance between the 'Sensitivity' of the receptor and the 'Magnitude of Change' of the effect.

Table 1-8: Visual Effects Assessment Matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Medium	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The significance of the visual effect is arrived at using a combination of the above matrix and what is known as the 'Visual Effect Significance Graph' from the EPA, 2022 (shown in Figure 1-2, see next section).

The determination of significance uses a seven-point scale, ranging from 'Major' to 'Negligible'. This seven-point scale is then translated to the EPA, 2022 impact assessment classifications of 'Significance', as outlined in the table.

Table 1-9: Impact Assessment Significance Classification from EPA, 2022 for Visual Effects

Matrix Classification Significance	EPA Significance Classification	EPA, 2022 Definition of Significance
Major	**Profound**	An effect which obliterates sensitive characteristics.
Major/Moderate	**Very significant**	An effect, which by its character, magnitude, duration, or intensity alters most of a sensitive aspect of the environment.
Moderate	**Significant**	An effect, which by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Moderate/Minor	**Moderate**	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends.
Minor	**Slight**	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Minor/Negligible	**Not Significant**	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Negligible	**Imperceptible**	An effect capable of measurement but without significant consequences.

1.9 Determining Residual Landscape and Visual Effects

After determining the 'Significance' of landscape and visual effects using the above assessment matrices (and significance graph in the case of visual effects), mitigating factors are then taken into consideration to arrive at the final 'Residual' effect rating, translated to the EPA classification scheme. In some cases, mitigating factors merit a reduction in classification.

The matrices and tables above are excellent tools to aid professional judgement in the determination of the significance of an effect. They are useful in that they provide a transparent, objective structure to the process of balancing 'Sensitivity' and 'Magnitude of Change'.

Particularly for determining residual visual effects, the formulaic process created by the use of the above matrices (Table 1-4 and Table 1-8) does provide an indicative initial assessment, which can be seen clearly in the assessment of photomontages in *Appendix 13-3: Photomontage Assessment Tables*.

However, over-reliance on the formulaic process, which is heavily influenced by the definitions of 'Sensitivity' and 'Magnitude of Change' contained in the matrices can lead to a failure of properly accounting for the full range of circumstances and factors at play in the determination of the final significance rating of a visual effect (see para.3.35 in '*Step 3: Judging the Overall Significance of the Effects*' of the GLVIA3 (p.41).

In actuality, a wide range of factors, mitigating or otherwise, can factor into the final determination, and it is not possible to capture the complexity involved in balancing all considerations within the necessarily limited definitions contained in the matrices.

This then naturally results in circumstances whereby the process of the determination of significance using the formulaic method involved with the matrices shown above can result in misrepresentations of the overall significance of visual effects. It is only by applying professional judgement and composing narrative descriptions of the effect, that such complexity can be integrated into the final determination of significance.

Therefore, the formulaic methods based upon the matrices presented above are combined with professional judgement in the determination of significance. This is shown by the 'Visual Effects Significance Graph' below in Figure 1-2 (adapted from the EPA 2022) which illustrates how the professional judgement of the competent expert is used to properly determine the significance of an effect taking all considerations into account.

Accordingly, in this LVIA, focus is placed upon the narrative description of effects (see para.3.36 of the GLVIA3, p.41) given the naturally subjective nature of the significance determination process, particularly in relation to visual effects, ensuring that the rationale for the overall judgement is clear (see para.3.28 and 3.29 in '*Step 2: Combining the Judgments*', GLVIA3, p.40). The comprehensive assessment of photomontages included in *Appendix 13-3* aims to provide a transparent and robust determination of residual visual effects utilising the graph in Figure 1-2 in combination with a clear and logical narrative.

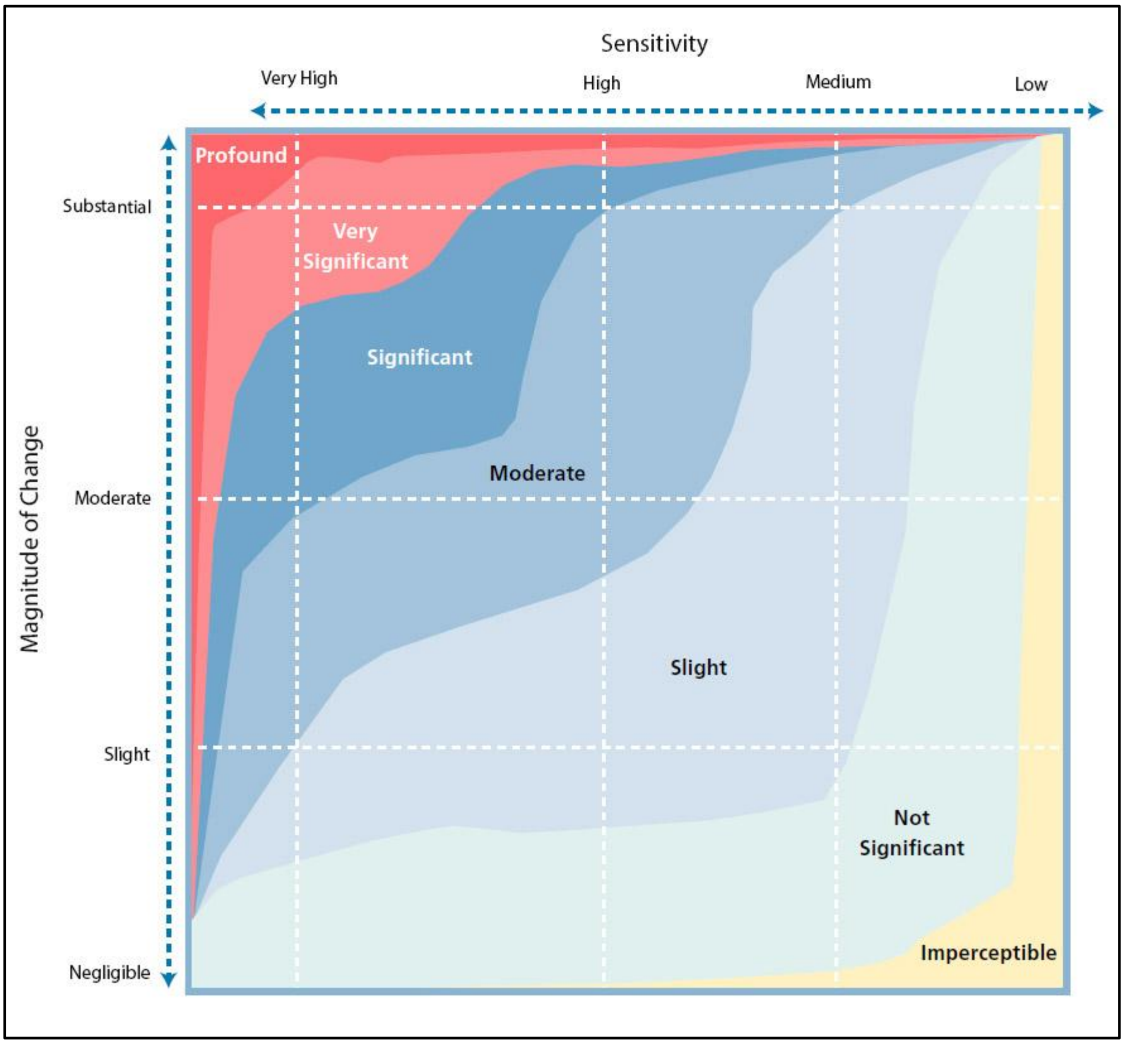

Figure 1-2: Visual Effects Significance Graph (adapted from EPA, 2022)

1.10 Assessing Cumulative Effects

1.10.1 Rationale of Cumulative Assessment

The Proposed Project is assessed in combination with the 'likely future receiving environments' according to the EPA, 2022, which includes all existing and permitted wind farm developments in the LVIA Study Area, as well as those proposed or under construction at the time of conducting this LVIA. The assessment of cumulative landscape and visual effects considers all wind farm developments identified in the LVIA Study Area.

Whilst the categories of **Existing**, **Permitted** and **Proposed** provide clarity in the presentation of visuals considering the scope of potential development in this landscape, the discussion of cumulative interactions on specific landscape and visual receptors is relative to the effects on that receptor and proportionate to the likelihood of significant landscape and visual effects occurring.

In terms of cumulative landscape and visual effects, only wind energy projects have been considered, as only these would be described as very tall vertical elements in the landscape and therefore have the most potential to give rise to significant cumulative effects. Other wind energy developments within 25km of the Proposed Project were identified by searching past planning applications lodged through the online planning portals of relevant planning authorities (i.e. Cork County Council, and An Coimisiún Pleanála).

The information identified in the initial planning search was then used to verify, by means of a desk-based study and ground-truthing, whether the permitted wind energy developments had been constructed. The effects reported in Chapter 13 and assessment appendices (*Appendix 13-2: LCA Assessment Tables* and *Appendix 13-3: Photomontage Assessment Tables*) uses appropriate and logical narrative to discuss cumulative interactions between the Proposed Project and all other wind energy developments irrespective of which category they occur.

Assessment of cumulative landscape and visual effects need to be proportional. The focus is always on the extent to which the Proposed Project will contribute towards the cumulative effects on the particular receptors under assessment, these contributions are clearly explained in narrative in the cumulative impact assessments included in the chapter, as well as the impact assessment appendices (*Appendix 13-2* and *Appendix 13-3).*

1.10.2 Cumulative Visualisation in Photomontage Booklet

In general, photomontages are an informative tool for assessing potential cumulative landscape and visual impacts. All other existing, permitted, and proposed wind farms are included in the visualisations in the *EIAR Volume 2: Photomontage Booklet* as follows:

- **Existing View, and Existing Wireline View**: Turbines of existing wind energy developments currently operational in the baseline landscape at the time of conducting this LVIA.
- **Proposed with Cumulative View and Proposed with Cumulative Wireline View**: As well as the proposed turbines, turbines of all other existing, permitted and under construction are presented in the photomontages and wireline views. Also, well-developed wind farm proposals* with project details in the public domain are included in these views.

**Cumulative effects between the proposed turbines and other proposed wind farms (not permitted) are more uncertain and is reliant on an outcome of the planning and consenting system.*

1.10.3 Cumulative Landscape Effects

The Nature Scot online publication 'Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments' (2021) identifies two principal areas of cumulative landscape effects, on the physical fabric of the landscape and on the landscape character, which state:

- *'**Physical Fabric:** Cumulative effects on the physical fabric of the landscape arise when two or more developments affect landscape components such as woodland, dykes, rural roads or hedgerows. Although this may not significantly affect the landscape character, the cumulative effect on these components may be significant – for example, where the last remnants of former shelterbelts are completely removed by two or more developments'*;
- *'**Landscape Character:** Cumulative effects on landscape character arise when two or more developments introduce new features into the landscape. In this way, they can change the landscape character to such an extent that they create a different landscape character type, in a similar way to large scale afforestation. That change need not be adverse; some derelict or degraded landscapes may be enhanced as a result of such a change in landscape character'.*

Potential changes to the physical fabric outlined above are predominantly restricted to the Proposed Wind Farm site and the LCAs in which the Site is located. Therefore, the landscape receptors are to be assessed for cumulative landscape effects on the physical fabric of the landscape arising from the proposed turbines and all other components of the Proposed Project.

Cumulative effects on the landscape character were assessed in the identified LCAs with theoretical visibility of the proposed turbines, with particular emphasis on the LCA in which the proposed turbines will be located.

Cumulative landscape effects are included in *Appendix 13-2: LCA Assessment Tables* and summarised in Section 13.7 Likely Significant Landscape and Visual Effects of this EIAR.

1.10.4 Cumulative Visual Effects

Nature Scot (2021) defines cumulative effects as *'additional changes caused by a Proposed Project in conjunction with other similar developments'*. Whilst this assessment considers other types of developments, the focus is always on assessing the greatest potential for 'Significant' cumulative visual effects. In this regard, the greatest cumulative effects with the Proposed Project are most likely to occur in conjunction with other wind energy developments, therefore the focus of cumulative visual effects assessment in Chapter 13 is on the interactions with other wind turbines. The definition in the Guidelines (DoEHLG, 2006) defines cumulative impacts in terms of wind farms, as the perceived effect on the landscape of two or more wind energy developments visible from any one place.

The GLVIA3 and Nature Scot (2021) guidance also note that cumulative visual effects can be experienced **in combination**, where two or more developments are visible from one viewpoint, either **simultaneously** or **in succession**, and these are considered in the assessment of visual effects from photomontage viewpoints in *Appendix 13-3: Photomontage Assessment Tables.*

Another type of cumulative visual effect includes where two or more developments are seen **sequentially**, where a viewer moves to another viewpoint or along a transport or recreational route and sees the same or different developments. The photomontage viewpoints illustrate the combined visibility and analysis of the photomontages, route screening, site visits and field work undertaken, thereby allowing sequential visibility to be assessed.

The guidance on cumulative effects given in the Guidelines (DoEHLG, 2006) relating to the Proposed Wind Farm site is as follows:

- *'Similarity in the siting and design approach is preferred where a number of wind energy developments are located in the same landscape character area, particularly within the same viewshed. However, an alternative approach where a particular aesthetic effect is sought may be acceptable;*
- *Different wind energy developments can appear as a single collective unit if located near each other;*
- *It is preferable to avoid locating turbines where they can be seen one behind another, when viewed from highly sensitive key viewpoints (for example, viewing points along walking or scenic routes, or from designated views or prospects), as this results in visual stacking and, thus, confusion. This may not be critical, however, where the wind energy development to the rear is in the distant background;*
- *Wind energy developments within relatively close proximity to one another, while in different landscape character contexts, may be so close as to be within the same visual unit and, therefore, should involve the same siting and design approach'.*

The SNH Guidance v.3a (2017) states that:

> *'...introducing turbines that are not similar in form, design, colour and scale may increase visual complexity and clutter'.*

Therefore, the cumulative assessment concentrates on the following topics:

- Whether the proposed turbines increase the spatial extent of turbines in the view;
- Whether the different wind energy developments can appear as a single collective unit or there is separation;
- Whether 'visual stacking' occurs; and
- Whether the contrast of different size and design between different wind developments creates visual clutter.

As cumulative visual effects depend on the aspect from which the turbines will be seen, various viewpoints were selected to give a thorough overview of how the proposed turbines will be seen in conjunction with other existing, permitted or proposed turbines.

The assessment of cumulative effects is included in *Appendix 13-3* and summarised in Section 13.7 Likely Significant Landscape and Visual Effects of Chapter 13.

1.10.5 Reporting of Cumulative Effects in Chapter 13 and Appendices

Discussion and assessment of cumulative landscape and visual effects are reported in the following locations of Chapter 13 in this EIAR:

Section 13.6 of Chapter 13 – Cumulative Context: Other Wind Farms

- Provides an overview of the other developments likely to contribute to cumulative effects in combination with the Proposed Project in the LVIA Study Area and the various cumulative scenarios which are likely to occur in existing and future receiving environments.
- Provides an overview of the assessment methodology.

Section 13.7.3.1.4 of Chapter 13 –Cumulative Landscape Effects

- Discussion of interactions of the Proposed Project with other wind energy developments within the landscape including an overview of relevant of the cumulative assessments on LCAs reported in *Appendix 13-2*.

Section 13.7.3.7 of Chapter 13 – Discussion of Cumulative Visual Effects

- Discussion of visual interactions of the Proposed Project with other wind energy developments including an overview of relevant of the cumulative assessments as shown in the photomontages reported in *Appendix 13-3*.

Appendix 13-2: LCA Assessment Tables

- Assesses the likely significant effects of the Proposed Project on designated LCAs, with a specific assessment table for each designated LCA screened in for assessment.
- One row in each table is dedicated to the likely cumulative landscape effects arising in each LCA in combination with the Proposed Project and is factored into the overall rating of significance of impacts on each LCA.

Appendix 13-3: Photomontage Impact Assessment Tables

- Assesses the likely significant visual effects of the Proposed Project from photomontage viewpoints, with a specific assessment table for each viewpoint.
- One row in each assessment table ('Cumulative Effects') are dedicated to the discussion and assessment of likely cumulative visual effects as seen in the photomontages from each viewpoint.
- Potential for cumulative visual effects are factored into the 'Magnitude of Change' determination for each viewpoint which has the potential to alter the outcome of the visual impact assessment and the determination of likely significant effects for each viewpoint (see methodology criteria previously in Section 1.6.2 and 1.6.3).