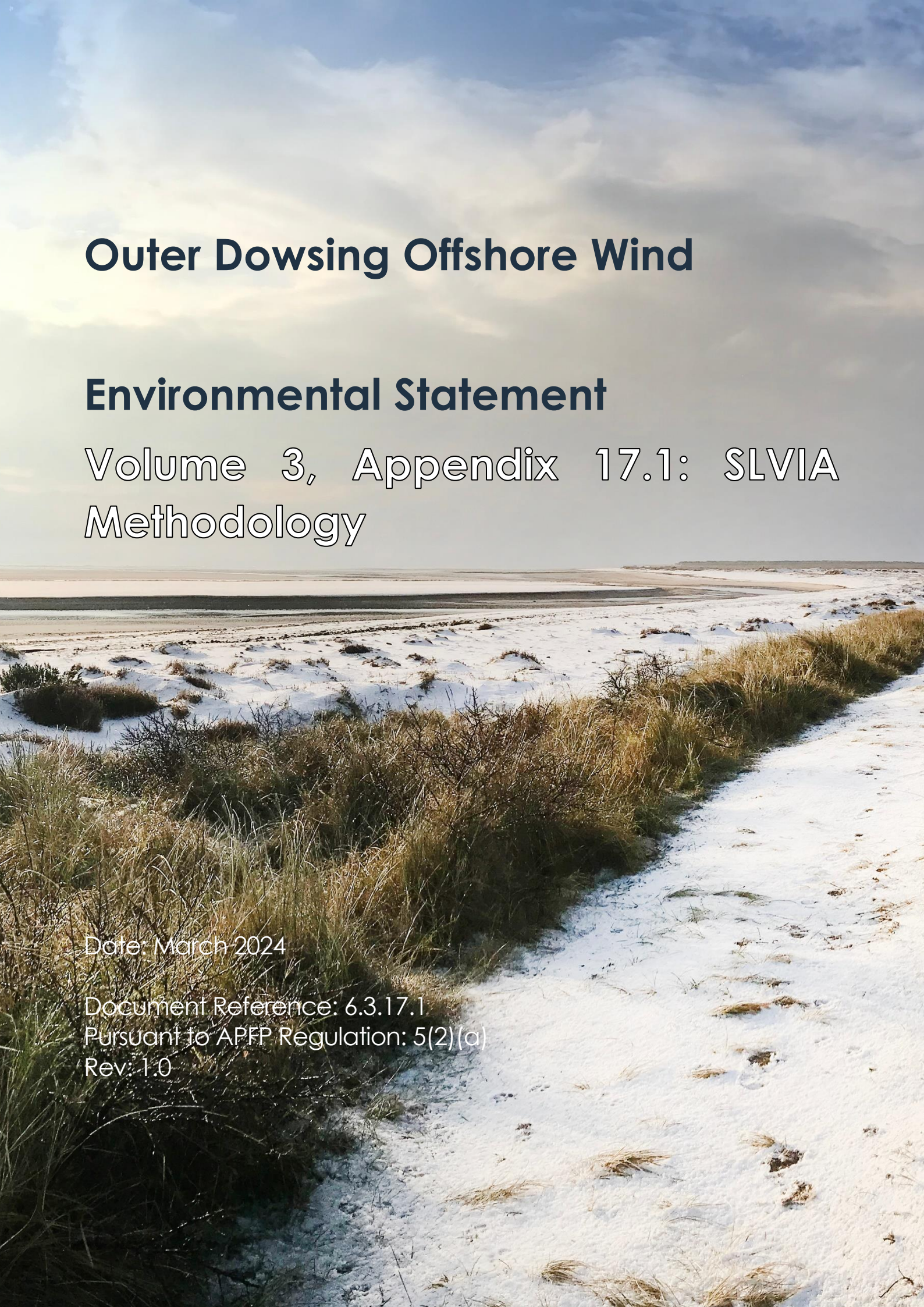

# Outer Dowsing Offshore Wind

# Environmental Statement

## Volume 3, Appendix 17.1: SLVIA Methodology

Date: March 2024

Document Reference: 6.3.17.1
Pursuant to APFP Regulation: 5(2)(a)
Rev: 1.0

| | | | |
|---|---|---|---|
| Company: | **Outer Dowsing Offshore Wind** | Asset: | **Whole Asset** |
| Project: | **Whole Wind Farm** | Sub Project/Package: | Whole Asset |
| Document Title or Description: | Appendix 17.1 SLVIA Methodology | | |
| Internal Document Number: | PP1-ODOW-DEV-CS-REP-0180 | 3rd Party Doc No (If applicable): | N/A |
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| Rev No. | Date | Status/Reason for Issue | Author | Checked by | Reviewed by | Approved by |
|---|---|---|---|---|---|---|
| 1.0 | March 2024 | DCO Application | OPEN | GoBe | Shepperd & Wedderburn | Outer Dowsing |

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# Acronyms & Terminology

## Abbreviations/Acronyms

| Acronym | Expanded name |
|---|---|
| AONB | Area of Outstanding Natural Beauty |
| ANS | Artificial Nesting Structure |
| CEA | Cumulative Effects Assessment |
| CMOS | complementary metal oxide semiconductor |
| DCO | Development Consent Order |
| DTM | Digital Terrain Model |
| ECC | Export Cable Corridor |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| ETG | Expert Topic Group |
| FoV | Field of View |
| GLVIA | Guidelines for Landscape and Visual Impact Assessment |
| GPS | Global Positioning System |
| GT R4 Ltd | The Applicant. The special project vehicle created in partnership between Corio Generation (a wholly owned Green Investment Group portfolio company), Gulf Energy Development and TotalEnergies |
| LAT | Lowest Astronomical Tide |
| LCA | Landscape Character Area |
| LVIA | Landscape and Visual Impact Assessment |
| MCA | Marine Character Area |
| MDS | Maximum Design Scenario |
| METAR | Meteorological Aerodrome Report |
| MHW | Mean High Water |
| MLW | Mean Low Water |
| MMO | Marine Management Organisation |
| NSIP | Nationally Significant Infrastructure Project |
| ODOW | Outer Dowsing Offshore Wind (The Project) |
| ORCP | Offshore Reactive Compensation Platform |
| OS | Ordnance Survey |
| OSS | Offshore Substation |
| OWF | Offshore Wind Farm |
| PEIR | Preliminary Environmental Information Report |
| SEA | Strategic Environmental Assessment |
| SLR | Single Lens Reflex |
| SLVIA | Seascape, Landscape and Visual Impact Assessment |
| WTG | Wind Turbine Generator |
| ZoI | Zone of Influence |
| ZTV | Zone of Theoretical Visibility |

## Terminology

| Term | Definition |
|---|---|
| **Array area** | The area offshore within which the generating station (including wind turbine generators (WTG) and inter array cables), offshore accommodation platforms, offshore transformer substations and associated cabling will be positioned. |
| **Baseline** | The status of the environment at the time of assessment without the development in place. |
| **Cumulative effects** | The combined effect of the Project acting additively with the effects of other developments, on the same single receptor/resource. |
| **Cumulative impact** | Impacts that result from changes caused by other past, present or reasonably foreseeable actions together with the Project. |
| **Effect** | Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the sensitivity of the receptor, in accordance with defined significance criteria. |
| **Environmental Impact Assessment (EIA)** | A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Regulations, including the publication of an Environmental Statement (ES). |
| **Environmental Statement (ES)** | The suite of documents that detail the processes and results of the EIA. |
| **Impact** | An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial. |
| **Intertidal** | The area between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS) |
| **Landfall** | The location at the land-sea interface where the offshore export cables and fibre optic cables will come ashore. |
| **Maximum Design Scenario** | The project design parameters, or a combination of project design parameters that are likely to result in the greatest potential for change in relation to each impact assessed |
| **Mitigation** | Mitigation measures are commitments made by the Project to reduce and/or eliminate the potential for significant effects to arise as a result of the Project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects. |
| **Offshore Reactive Compensation Station (ORCP)** | A structure attached to the seabed by means of a foundation, with one or more decks and a helicopter platform (including bird deterrents) housing electrical reactors and switchgear for the purpose of the efficient transfer of power in the course of HVAC transmission by providing reactive compensation |
| **Outer Dowsing Offshore Wind (ODOW)** | The Project. |

| Term | Definition |
|---|---|
| **Offshore Export Cable Corridor (ECC)** | The Offshore Export Cable Corridor (Offshore ECC) is the area within the Order Limits within which the export cables running from the array to landfall will be situated. |
| **Offshore Substation (OSS)** | A structure attached to the seabed by means of a foundation, with one or more decks and a helicopter platform (including bird deterrents), containing— (a) electrical equipment required to switch, transform, convert electricity generated at the wind turbine generators to a higher voltage and provide reactive power compensation; and (b) housing accommodation, storage, workshop auxiliary equipment, radar and facilities for operating, maintaining and controlling the substation or wind turbine generators |
| **Preliminary Environmental Information Report (PEIR)** | The PEIR was written in the style of a draft Environmental Statement (ES) and provided information to support and inform the statutory consultation process during the pre-application phase. |
| **Project Design envelope** | A description of the range of possible elements that make up the Project's design options under consideration, as set out in detail in the project description. This envelope is used to define the Project for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach. |
| **Receptor** | A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc. |
| **Study area** | Area(s) within which environmental impact may occur – to be defined on a receptor-by-receptor basis by the relevant technical specialist. |
| **The Applicant** | GT R4 Ltd. The Applicant making the application for a DCO.<br>The Applicant is GT R4 Limited (a joint venture between Corio Generation, TotalEnergies and Gulf Energy Development (GULF)), trading as Outer Dowsing Offshore Wind. The Project is being developed by Corio Generation (a wholly owned Green Investment Group portfolio company), TotalEnergies and GULF. |
| **The Project** | Outer Dowsing Offshore Wind including proposed onshore and offshore infrastructure. |
| **Transboundary impacts** | Transboundary effects arise when impacts from the development within one European Economic Area (EEA) state affects the environment of another EEA state(s). |
| **Wind Turbine Generator (WTG)** | A structure comprising a tower, rotor with three blades connected at the hub, nacelle and ancillary electrical and other equipment which may include J-tube(s), transition piece, access and rest platforms, access ladders, boat access systems, corrosion protection systems, fenders and maintenance equipment, helicopter landing facilities and other associated equipment, fixed to a foundation. |

## Reference Documentation

| Document Number | Title |
|---|---|
| 6.1.17 | Seascape, Landscape and Visual Impact Assessment |
| 6.1.28 | Landscape and Visual Assessment |
| 6.1.5 | Environmental Impact Assessment Methodology |

# 17 Seascape, Landscape and Visual Methodology

## 17.1 Introduction

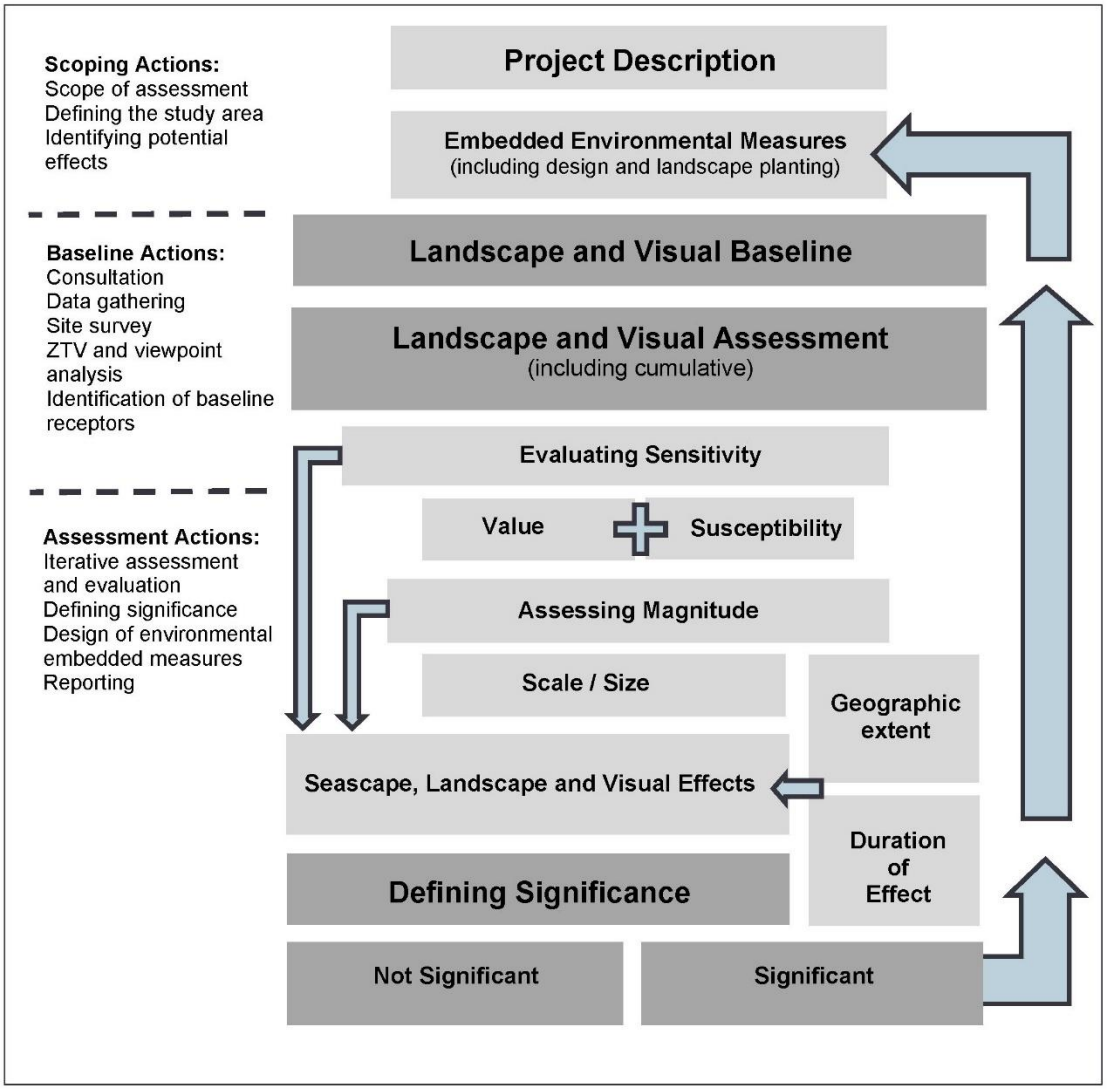
1. This appendix describes the methodology used within the seascape, landscape and visual impact assessment (SLVIA) of the Environmental Impact Assessment (EIA) for Outer Dowsing Offshore Wind ('the Project'). The SLVIA in Volume 1, Chapter 17: Seascape, Landscape and Visual Impact Assessment (SLVIA) (Document Reference 6.1.17) of the Environmental Statement (ES) assesses the array area, within which the wind turbine generators (WTGs) and offshore substations (OSS) will be situated, the offshore export cable corridor (ECC), offshore reactive compensation platforms (ORCPs) and the artificial nesting platforms (ANSs).
2. This SLVIA methodology appendix has been structured as follows:
   - Overview of SLVIA methodology;
   - Iterative assessment and design;
   - Guidance, data sources and site surveys;
   - Assessing seascape/landscape effects;
   - Assessing visual effects;
   - Assessing cumulative seascape, landscape and visual effects;
   - Evaluation of significance;
   - Nature of effects; and
   - Visual representations.

## 17.2 Overview of the SLVIA Methodology

3. The assessment has been undertaken in accordance with the Landscape Institute and Institute of Environmental Management and Assessment (IEMA) (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3), and other best practice guidance. An overview or summary of the SLVIA process is provided here and illustrated, diagrammatically in Figure 17.1.
4. The SLVIA assesses the likely effects that the construction, operation and maintenance, and decommissioning of the Project on the seascape, landscape and visual resource, encompassing effects on seascape/landscape character, designated landscapes, visual effects and cumulative effects.
5. The SLVIA is based on the Project design envelope described in Chapter 17 (Document Reference 6.1.17)(section 17.5). In compliance with EIA regulations, the likely significant effects of a realistic 'worst case scenario' or maximum design scenario (MDS) are assessed and illustrated in the SLVIA. This MDS is described in Chapter 17 (Document Reference 6.1.17).

6. The SLVIA comprises a relatively concise chapter in the ES. This proportionate approach to the SLVIA has been influenced by the long distance between the array area and the coastline, where the highest concentration of landscape and visual receptors occur.
7. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the Project. This is combined with an assessment of the magnitude of change which takes account of the size and scale of the proposed change. By combining assessments of sensitivity and magnitude of change, a level of seascape, landscape or visual effect can be evaluated and determined. The resulting level of effect is described in terms of whether it is significant or not significant, and the geographical extent, duration and the type of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse.

Figure 17.1: Overview of approach to Seascape, Landscape and Visual Impact Assessment




8. The assessment has also considered the whole project or combined effects of the Project, as well as the cumulative effects likely to result from the Project and other similar developments.

9. In each case an appropriate and proportionate level of assessment has been undertaken and agreed through consultation at the scoping stage. The level of assessment may be 'preliminary' (requiring desk-based data analysis) or 'detailed' (requiring site surveys and investigations in addition to desk-based analysis).
10. The SLVIA unavoidably, involves a combination of quantitative and qualitative assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

### 17.2.1 Interface Between Seascape and Landscape Assessment

11. Together, the SLVIA and the onshore Landscape and Visual Impact Assessment (LVIA) provide a whole project assessment of the effects of the Project. The offshore elements of the Project are assessed in the SLVIA chapter (Chapter 17 (Document Reference 6.1.17)). The onshore infrastructure of the Project (the onshore substation, onshore export cables, and landfall location) are assessed in the onshore LVIA (Volume 1, Chapter 28: Landscape and Visual Assessment (Document Reference 6.1.28)).
12. The SLVIA also refers to potential interrelated effects likely to result from any areas where the construction, operation and decommissioning of the onshore and offshore elements combined (or inter-related) affect receptors within the SLVIA study area. A high-level assessment of the potential for such effects to occur has been undertaken and is reported in Section 17.9 of Chapter 17 (Document Reference 6.1.17).

### 17.2.2 Assessment of the Foreshore

13. The SLVIA seeks to take account of the definition of 'seascape', as set out in the United Kingdom (UK) Marine Policy Statement (UK Government, 2011) which states that *"…references to seascape should be taken as meaning landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other"*.
14. In order to address this and avoid under-valuing the intertidal area between the mean low water (MLW) and mean high-water (MHW) mark, the SLVIA assesses 'offshore' seascape effects on Marine Character Areas (MCAs) where they are seaward of the MHW mark; and the effect on terrestrial landscape character has been assessed on landscape character areas (LCAs) lying to the landward side of the MLW mark.
15. This approach means that the 'foreshore', which includes beaches, intertidal areas and coastlines between MHW and MLW, has been considered in both the landscape and seascape character assessments. This ensures adequate consideration has been given to assessing the relationship between terrestrial and marine areas and interactions across the land/sea interface. This is consistent with the published Marine Management Organisation's (MMO) Seascape Assessment (MMO, 2018) which extends to the MHW mark; and published landscape character assessments.

## 16. Defining the SLVIA study area

17. The study area for the SLVIA is defined as the Development Consent Order (DCO) Order Limits together with the Zone of Theoretical Visibility (ZTV) for the Project array area and the ZTV of the ORCPs.
18. The SLVIA study area covers a radius of 60km from the array area and also a radius of 30km from the ORCP areas, as illustrated in Figure 17.1 of Volume 2, Appendix 17.2. Broadly, the SLVIA study area is defined by the southern North Sea and the offshore waters, coastline and hinterland of eastern England, within the county of Lincolnshire, together with parts of the East Riding of Yorkshire and Norfolk. The SLVIA study area is defined to extend far enough to include all areas within which significant effects could occur, using professional judgement. It is an outer limit to where significant effects could occur. ZTVs have also been prepared for the ANSs, which show the main areas of theoretical visibility associated with these structures are within the
19. IEMA Guidance (IEMA, 2015 and 2017) recommends a proportionate ES focused on the significant effects and a proportionate ES topic chapter. An overly large SLVIA study area may be considered disproportionate if it makes the understanding the key impacts of the Project more difficult.
20. This is supported by LVIA Guidance produced by the Landscape Institute (GLVIA3) (Landscape Institute, 2013) (para 3.16). This guidance recommends that *"The level of detail provided should be that which is reasonably required to assess the likely significant effects".* Para 5.2 and p70 also states that *"The study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner".*
21. Other windfarm specific guidance, such as NatureScot's Visual Representation of Windfarms Guidance (NatureScot, 2017) recommends that ZTV distances are used for defining study area based on WTG height. This guidance recommends a 45km radius for WTGs greater than 150m to blade tip (para 48, p12), however it does not go beyond turbines above 150m in height. The height of current offshore WTG models has now exceeded the heights covered in this guidance. The NatureScot guidance recognises that greater distances may need to be considered for larger WTGs used offshore, as is the case for the SLVIA study area for the Project.
22. Whilst many of these guidance documents have been prepared by NatureScot for projects in Scotland, in the absence of alternative guidelines they have become best practice across the UK. The preparation of visual representations that accord with this NatureScot guidance has been agreed with consultees.
23. A study area of 30km from the ORCPs is considered appropriate based on the assessment judgements reached in the ES (Chapter 17 (Document Reference 6.1.17)).
24. Beyond the DCO Order Limits, the SLVIA generally focuses on locations from where it may be possible to see the Project, as defined by the Blade Tip ZTV (Figure 17.3 of Volume 2, Appendix 17.2) and the ZTV for the ORCPs (Figure 17.13 of Volume 2, Appendix 17.2).

25. The ZTVs for the array area prepared as part of the SLVIA, e.g. Figure 17.3 of Volume 2, Appendix 17.2, are based on turbines of 403m to blade tip (above Lowest Astronomical Tide (LAT)) located around the perimeter of the windfarm site and represents the MDS considered in the assessment. The ZTVs illustrate where there will be no visibility of these WTGs, as well as areas where there will be lower or higher numbers of WTGs visible. The ZTV for the ORCPs is based on similar principles, applying a maximum height of 90m above LAT for these structures.
26. Consideration of the blade tip ZTV (e.g. Figure 17.3 of Volume 2, Appendix 17.2) indicates that theoretical visibility of the Project mainly occurs within 60km and that beyond 60km, the geographic extent of visibility becomes very restricted. At distances over 60km, the lateral (or horizontal) spread of the Project also occupies a small portion of available views and the apparent height (or 'vertical angle') of the WTGs will also appear very small, therefore significant visual effects are unlikely to arise at greater than this distance, even if the WTGs are visible.
27. The influence of earth curvature begins to limit the apparent height and visual influence of the WTGs visible at long distance (such as over 60km), as the lower parts of the turbines may be partially hidden behind the apparent horizon, leaving only the upper parts visible above the skyline.
28. The variation of weather conditions influencing visibility off the English coast has also informed the SLVIA study area. Visibility analysis in the Offshore Energy SEA (White Consultants, March 2020), which considered Met Office visibility data for eight coastal stations, recorded a visual range just under 24km around 50% of the time, just under 30km 33% of the time, around 34km for 20% of the time, and 40km 10% of the time. Further visibility data, specific to the study area, is included in Chapter 17 (Document Reference 6.1.17) of the ES.
29. In considering the SLVIA study area, the sensitivity of the receiving seascape, landscape and visual receptors has also been reviewed, taking particular account of the landscape designations shown in Figure 17.10 of Volume 2, Appendix 17.2 and other principal visual receptors.
30. Potential cumulative effect interactions with other offshore windfarms have also influenced the definition of the SLVIA study area. Other offshore windfarms within the SLVIA study area are shown in Figure 17.2 of Volume 2, Appendix 17.2.
31. The SLVIA study area has been reviewed and amended in response to such matters as refinement of the offshore project components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation and has been agreed with the Planning Inspectorate through the Scoping Opinion as a 60km radius study area from the array area.
32. ZTVs have also been prepared for the ANSs. These ZTVs show the main areas of theoretical visibility associated with the ANSs are within the 60km radius study area from the array area.

## 17.3 Iterative Assessment and Design

33. The SLVIA is part of an iterative EIA process which aims to 'design out' significant effects via a range of environmental measures including avoidance and designs that aim to reduce or eliminate significant effects. Design is an integrated part of the SLVIA process and environmental measures related to landscape design and management can be an important tool to mitigate significant effects. The EIA process can also call on a range of environmental and technical specialists that contribute other forms of mitigation that may also bring a range of benefits. Potentially significant seascape, landscape and visual effects and the constraints and opportunities connected with their resolution are identified through the SLVIA process. Where possible embedded environmental measures (Commitments) are incorporated into the Project in order to mitigate seascape, landscape and visual effects.

### 17.3.1 Potential Effects During Construction and Decommissioning

34. Potential effects on the seascape, landscape and visual resource are likely during the construction and decommissioning of the Project during the construction and decommissioning periods, including:

- Seascape effects:
  - Effects on perceived seascape character, arising as a result of the construction and decommissioning activities (including laying new offshore export cables to shore) and structures located within the windfarm site, which may alter the seascape character of the windfarm site itself and the perceived character of the wider seascape through visibility of these changes.
- Landscape effects:
  - Effects on perceived landscape character, arising as a result of the construction and decommissioning activities and structures that will be visible from the coast and may therefore affect the perceived character of the landscape.
  - Effects on the special landscape qualities and integrity of designated landscapes as a result of the above construction and decommissioning activities.
- Visual effects:
  - Effects on views and visual amenity experienced by people from principal visual receptors and representative viewpoints, arising as a result of the construction and decommissioning activities and structures, that will be visible from the coast.
- Cumulative effects:
  - Effects of construction of the Project that have the potential to contribute to cumulative seascape, landscape and visual effects including effects on seascape, landscape and visual amenity due to inter-visibility with other planned developments.

### 17.3.2 Potential Effects During Operation

35. Potential effects on the seascape, landscape and visual resource are likely during the operation of the Project over its operational lifetime, including:

- Seascape effects:
  - Effects on perceived seascape character (MCAs), arising as a result of the Project, including operational WTGs, substations and maintenance activities located within the array area, and the ORCPs, which may alter the seascape character of the windfarm site itself and the perceived character of the wider seascape.
- Landscape effects:
  - Effects on perceived landscape character (LCAs and Designations), arising as a result of the Project, including operational WTGs, OSSs and maintenance activities, and the ORCPs, which will be visible from the coast and may therefore affect the perceived character of the landscape. Effects on defined special qualities of designated landscapes.
- Visual effects:
  - Effects on views and visual amenity experienced by people as principal visual receptors and representative viewpoints, arising as a result of the Project, including operational WTGs, OSSs and maintenance activities, and ORCPs.
- Cumulative effects:
  - Effects of operation of the Project that have the potential to contribute to cumulative seascape, landscape and visual effects including effects on seascape, landscape and visual amenity due to inter-visibility with other planned developments.

## 17.4 Guidance, Data Sources and Site Surveys

### 17.4.1 Guidance on Methodology

36. This methodology accords with GLVIA3. Where it diverges from specific aspects of the guidance, in a small number of areas, reasoned professional justification for this is provided as follows.
37. GLVIA3 sets out an approach to the assessment of magnitude of change in which three separate considerations are combined within the magnitude of change rating. These are the size or scale of the effect, its geographical extent and its duration and reversibility. This approach is to be applied in respect of both landscape and visual receptors. It is considered that the process of combining all three considerations in one rating can distort the aim of identifying significant effects of windfarm development. For example, a high magnitude of change, based on size or scale, may be reduced to a lower rating if it occurred in a localised geographical area and for a short duration. This might mean that a potentially significant effect could be overlooked if effects are diluted down due to their limited geographical extents and/or duration or reversibility.

38. The consideration of the size or scale of the effect, its geographical extent and its duration and reversibility are kept separate, by basing the magnitude of change primarily on size or scale to determine where significant and non-significant effects occur, and then describing the geographical extents of these effects and their duration and reversibility separately. Duration and reversibility are stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent) and are considered as part of drawing together conclusions about significance and combining with other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether each effect is significant or not significant.
39. The SLVIA assessment methodology utilises six word scales of magnitude of change – high, medium-high, medium, medium-low, low and negligible; which are preferred to the 'maximum of five categories' suggested in GLVIA3 (para 3.27), as a means of clearly defining and summarising magnitude of change judgements.
40. These are not new diversions and follow practice established on other Nationally Significant Infrastructure Projects (NSIP) such as East Anglia TWO, Norfolk Vanguard and Thanet Extension.
41. A full list of references, providing guidance on methodology and a glossary is provided in Chapter 17 (Document Reference 6.1.17**)**.

### 17.4.2 Data Sources

42. A list of the data sources used for this assessment is provided in Chapter 17 (Document Reference 6.1.17 )(Section 17.4) of the ES.

### 17.4.3 Appropriate Level of Assessment

43. The assessment of whether an effect has the potential to be of likely significance has been based upon review of existing evidence base, consideration of commitments made (embedded measures), professional judgement and where relevant, recommended aspect specific methodologies and established practice. In applying this judgement, use has been made of a simple test that to be significant an effect must be of sufficient importance that it should be taken into consideration when making a development control decision.
44. The Scoping Report (ODOW, 2022) presented a scoping assessment of the likely seascape, landscape and visual effects scoped in and scoped out of the SLVIA. The Scoping Opinion (the Planning Inspectorate, September 2022) provided the opinion of the Secretary of State as to the scope, and level of detail, of the information to be provided in the ES. The Scoping Opinion is summarised in Table 17.2 of Volume 1, Chapter 17 . The effects of the Project on certain seascape, landscape and visual receptors were agreed as scoped out of the SLVIA in agreement with the Planning Inspectorate and are not assessed any further in the ES.
45. Subsequent consultation feedback from Natural England (06 April 2023), in response to the ETG meeting held on 12 October 2022, identifies that their primary concerns relate to the ORCPs rather than development within the array area. This is explained in more detail in Table 17.2 of Volume 1, Chapter 17.

46. To ensure the provision of a proportionate EIA and an ES that is focused on likely significant effects, the SLVIA takes into account the considerable levels of existing environmental information available and extensive local geographical knowledge and understanding of the study area gained from ongoing site selection analysis and environmental surveys.

### 17.4.4 Desk-Based and Site Survey Work

47. The SLVIA undertaken as part of the ES has been informed by desk-based studies and field survey work undertaken within the SLVIA study area. The landscape, seascape and visual baseline has been derived from a desk-based review of landscape and seascape character assessments and the ZTV, to identify receptors that may be affected by the Project and produce concise written descriptions of their key characteristics and value.
48. Interactions identified between the Project and seascape, landscape and visual receptors have been used to predict potentially significant effects arising.
49. For those receptors where field-based assessment has been required, primary data acquisition has been undertaken through a series of surveys. These surveys include field survey verification of the ZTV from terrestrial LCAs, micro-siting of viewpoint locations, panoramic baseline photography and visual assessment survey from representative viewpoints. The viewpoint photography and visual assessment surveys were undertaken in November to December 2022 and January 2023. Sea-based offshore surveys have not been undertaken as part of the SLVIA.

## 17.5 Assessing Seascape/Landscape Effects

50. Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

    *"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character."*

51. In accordance with GLVIA 3 the term 'landscape' encompasses areas of 'townscape' and coastal areas of 'seascape'. Areas of landscape and seascape are relevant to this assessment and are described within the following sections.

### 17.5.1 Landscape Character

52. GLVIA 3, paragraph 5.4, advises that Landscape Character Assessment should be regarded as the main source for baseline studies and identifies the following factors which combine to create areas of distinct landscape character:
    - *"the* elements *that make up the landscape in the study area including:*
    - *physical influences – geology, soils, landform, drainage and water bodies;*
    - landcover*, including different types of vegetation and patterns and types of tree cover; and*
    - *the influence of human activity, including land-use and management, the character of settlements and buildings, and pattern and type of fields and enclosure.*

- *The aesthetic and perceptual aspects of the landscape – such as, for example, its scale, complexity, openness, tranquillity or wildness;*
- *The overall character of the landscape in the study area, including any distinctive Landscape Character Types or Areas that can be identified, and the particular combinations of elements and aesthetic and perceptual aspects that make each distinctive, usually by identification as key characteristics of the landscape."*

### 17.5.2 Seascape Character

53. GLVIA 3 paragraph 5.6, advises that where LVIA is carried out in coastal or marine locations baseline studies must take account of seascape. Seascape is defined in the UK Marine Policy Statement, (UK Government, 2011) as *"landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other."*

54. GLVIA 3 paragraph 5.6, identifies the following different factors which together determine seascape character:

*"coastal features; views to and from the sea; particular qualities of the open sea; the importance of dynamic changes due to weather and tides; changes in seascapes due to coastal processes; cultural associations; and contributions of coastal features to orientation and navigation at sea."*

### 17.5.3 Seascape/Landscape Effects

55. In respect of the Project, the potential seascape/landscape effects, occurring during the construction, operation and decommissioning periods of the Project may therefore include, but are not restricted to the following:

- Changes to seascape/landscape character and qualities: seascape/landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new features, the magnitude of which is sufficient to alter the overall seascape/landscape character within a particular area;
- Changes to the perceived character of designated landscapes, including the National Parks and areas of Outstanding Natural Beauty (AONB) that will affect the special landscape qualities underpinning the designation and its integrity; and
- Cumulative seascape/landscape effects: where more than one development of a similar type may lead to a cumulative effect.

56. Development may have a direct effect on the seascape, however all landscape effects arising from the Project on landscape character will be indirect effects, which will be perceived from the wider landscape, outside the DCO Order Limits and its seascape/landscape.

### 17.5.4 Evaluating Seascape/Landscape Sensitivity to Change

#### 17.5.4.1 Overview

57. The assessment of sensitivity takes account of the seascape/landscape value and the susceptibility of the receptor to the Project.

58. Seascape/landscape sensitivity often varies in response to both the type and phase of the development proposed and its location, such that sensitivity needs to be considered on a case-by-case basis. It should not be confused with 'inherent sensitivity' where areas of the landscape may be referred to as inherently of 'high' or 'low' sensitivity. For example, an AONB may be described as inherently of high sensitivity on account of its designation and value, although it may prove to be less susceptible (and therefore sensitive) to a particular development. The susceptibility of seascape/landscape receptors has been assessed in relation to change arising from the Project.

59. The sensitivity of a seascape/landscape character receptor is an expression of the combination of the judgements made about the susceptibility of the receptor to the specific type of change resulting from the Project and the value related to that receptor.

#### 17.5.4.2 Seascape/Landscape Susceptibility to Change

60. The susceptibility of a seascape/landscape character receptor to change is a reflection of its ability to accommodate the changes that will occur as a result of the addition of the Project (i.e. change relating to the specific development proposal) without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. Some landscape/seascape receptors are better able to accommodate development than others due to certain characteristics that are indicative of capacity to accommodate change. These characteristics may or not also include special landscape qualities that underpin designated landscapes.

61. The assessment of the susceptibility of the seascape/landscape receptor to change has been classified as high, medium-high, medium, medium-low or low and the basis for this assessment has been made clear using evidence and professional judgement. Indicators of landscape/seascape susceptibility to the type of development proposed (construction, operation and decommissioning of the Project) are based on the following criteria. Indicators of higher and lower susceptibility are described further in Table 17.1.

- Natural – form/topography/character of hinterland (relevant landscape character type), coastal edge (cliffs, coastal mashes, upper beach, dunes, intertidal etc) and tidal range;
- Cultural/social – use of the sea (navigation, fishing, leisure, energy etc), coast and hinterland (settlement, industry, marine related development such as harbours, ports, industry, agriculture etc) and historic features on the coast (forts, castles, lighthouses etc);
- Quality/condition – intactness (degree of completeness or fragmentation visually, presence of detractors) and state of repair (condition of natural and built features/elements);
- Aesthetic and perceptual – scale of sea (in relation to coastal form or offshore areas); openness/enclosure (the degree and nature of enclosure of the sea by land and framing of views); exposure (degree of shelter/exposure); aspect (relationship with the sun); seascape pattern and foci (features and element on sea surface, coast and hinterland); tranquillity (movement, man-made structures, dark skies); wildness (sense of natural character uninfluenced by man); and remoteness (perceived distance from population and human interventions);

- Visual characteristics – key views from land to sea, sea to land and sea to sea, including nature of views and elevation, presence of iconic features; intervisibility of area with important receptors (amount, length, extent, nature of intervisibility and distance from development); and how seascape is experienced; and
- Relationship between seascape area and adjacent coast – contribution of seascape to the setting of an important coast/hinterland or character area; and key relationships between hinterland, coastal edge, intertidal area and sea.

#### 17.5.4.3 Value of the Seascape/Landscape Receptor

62. The value of a seascape/landscape character receptor is a reflection of the value that society attaches to that seascape/landscape. The assessment of the seascape/landscape value has been classified as high, medium-high, medium, medium-low or low and the basis for this assessment has been made clear using evidence and professional judgement, based on the following range of factors. Indicators of higher and lower value are described further in Table 17.1.

- Seascape/landscape designations - A receptor that lies within the boundary of a recognised landscape related planning designation, or within its immediate setting, will be of increased value, depending on the level of importance of the designation which may be international, national, regional or local. The absence of designations does not however preclude value, as an undesignated landscape character receptor may be valued as a resource in the local or immediate environment, however the absence of a landscape designation and location outside the immediate setting of a designation, may be an indicator of lower value;
- Seascape/landscape quality - The quality of a seascape/landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness and the extent to which its valued attributes have remained intact. A seascape/landscape with high scenic quality that contributes to special qualities, with consistent, intact, well-defined and distinctive attributes is considered to be of higher quality and, in turn, higher value, than a landscape where the introduction of elements has detracted from its character, has low scenic qualities and does not contribute to special qualities; and
- Seascape/landscape experience - The experiential qualities that can be evoked by a landscape receptor can add to its value and relates to a number of factors including the perceptual responses it evokes (for example wildness, remoteness, tranquillity), the cultural associations that may exist in literature or history, or the iconic status of the seascape/landscape in its own right, the recreational value of the seascape/landscape, and the contribution of other values relating to the nature conservation or archaeology of the area.

#### 17.5.4.4 Seascape/Landscape Sensitivity Rating

63. An overall sensitivity assessment of the seascape/landscape receptor has been made by combining the assessment of the value of the seascape/landscape character receptor and its susceptibility to change. The evaluation of seascape/landscape sensitivity has been applied for each seascape/landscape receptor - high, medium-high, medium, medium-low and low - by combining assessments of the value of the receptor and its susceptibility to the proposed change. The basis for the assessments has been made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor, informed by criteria that tend towards higher or lower sensitivity that inform judgements on the visual sensitivity assessed are set out in Table 17.1 below.

64. When combining assessments of value and susceptibility to establish sensitivity, the assessment considers the criteria in Table 17.1 holistically to establish an overall judgement of the sensitivity of seascape/landscape receptors to the type of change arising from the specific proposal. In some circumstances, the value of a seascape/landscape receptor may be given greater weight in the overall sensitivity judgement, however the sensitivity judgements in the SLVIA tend to be weighted more towards susceptibility to change, because this provides for an assessment of the sensitivity of receptors to changes arising from the 'specific nature of the proposed development' (Landscape Institute, 2013, para 546), and therefore a highly valued landscape/seascape 'does not automatically, or by definition, have high susceptibility' (and therefore sensitivity) to a particular development, despite its high value established in the baseline.

Table 17.1: Seascape/landscape sensitivity to change

| Higher Sensitivity | Lower Sensitivity |
|---|---|
| Value | |
| **Designation**: Presence of designated seascape/landscapes with national policy level protection or defined for their natural beauty. Perceived as lying within immediate seascape setting of a designation. | Seascape/landscapes without formal designation. Despoiled or degraded seascape/landscape with little or no evidence of being valued by the community. Not within seascape setting of a landscape designation. |
| **Aesthetic/scenic qualities**: Higher quality seascape/landscapes with consistent, intact and well-defined, distinctive attributes. A seascape/landscape with high scenic quality that contributes to special qualities. Aesthetic/scenic or perceptual aspects of designated wildlife, ecological or cultural heritage features that contribute to seascape/landscape character. | Lower quality seascape/landscapes with indistinct elements or features that detract from its inherent attributes. A seascape/landscape with low scenic qualities that does not contribute to special qualities. Limited wildlife, ecological or cultural heritage features, or limited contribution to seascape/landscape character. |
| **Perceptual qualities**: Seascape/landscape with perceptual qualities with high level of perceived wildness, high level of remoteness or high tranquillity. | Seascape/landscape with no apparent wildness, low levels of perceived remoteness or low tranquillity, often as a result of existing development influences. |

| Higher Sensitivity | Lower Sensitivity |
|---|---|
| **Cultural associations**: Seascape/landscape with strong/rich cultural associations that contribute to scenic quality. Presence of heritage designations overlooking or within area of potential development. | Seascape/landscape with few/limited cultural associations. Absence of heritage designations overlooking or within area of potential development. |
| **Recreational and community value**: Area used extensively for leisure especially related to enjoying seascape character and views. Highly valued area and features/elements by people, communities of interest and place. | Area with limited use for leisure, or where leisure relates mainly to pursuing that activity and not the enjoyment of seascape character or views, or where leisure is dynamic/at speed. Area or features with attributed limited value by people. |
| **Rarity**: Rare or unique seascape/landscape character types, features or elements. | Widespread or 'common' seascape/landscape character types, features or elements. |
| Susceptibility to Change | |
| Natural: | |
| **Hinterland**: Mountainous or hilly hinterland i.e. long slopes rising from coast, high elevation. | Plateau or flat hinterland.<br>Highly enclosed by topography or land cover. |
| **Coastal edge**: Intricate, complex, rugged forms and dramatic headlands/ends of peninsulas. | Flat, horizontal or gently undulating or largely straight coast. Simple forms. Man-made interventions/structures in area. |
| **Tidal range**: Where tidal range or streams add to the seascape qualities. | The tidal range or streams make a limited contribution to seascape qualities. |
| Cultural/Social: | |
| **Use of the sea**: Uses with limited infrastructure. Rural uses or semi-natural land.<br>Small scale, traditional, historic settlements and harbours. Little association with other contemporary development. | Presence of energy production and large shipping vessels/trade routes nearby (not through area). Strong or direct association with other similar contemporary developments. |
| **Use of the coast/hinterland**: Uses with limited infrastructure. Rural uses or semi-natural land.<br>Small scale, traditional, historic settlements and harbours. Little association with other contemporary development. | Presence of industry/energy production/dock infrastructure. Urban form. Strong or direct association with other similar contemporary developments. |
| **Historic features on coast**: Presence of coastal and island historic features such as forts, castles, chapels, monasteries, other buildings and structures and other heritage features which have a strong relationship with the coast and sea visually, physically or culturally. | Limited number or no heritage features |
| Quality/Condition: | |

| Higher Sensitivity | Lower Sensitivity |
|---|---|
| **Intactness**: Intact and consistent character of seascape. Few or no detractors. Fragile seascape/landscape lacking ability to accommodate change. | Seascape character fragmented. Presence of detractors. Robust landscape capable of accommodating change. |
| **State of repair**: Well-maintained seascape or landscape character at coast. | Poorly maintained seascape or landscape character at coast. |
| Aesthetic and Perceptual: | |
| **Scale**: Small scale, enclosed, views to horizon limited by landform. Introduction of an element of scale into previously un-scaled area. | A seascape of large scale, with simple, broad and homogenous coastal landforms. Large scale views. |
| **Openness and enclosure**: Openness may increase susceptibility if there is wide visibility, however open seascape/landscape may also be larger scale and simple which would decrease susceptibility. Where openness is a key characteristic and introduction of built elements may compromise this. | Enclosed seascape/landscape can offer more screening potential, limiting visibility to a smaller area, however they may also be smaller scale and more complex which would increase susceptibility. Unframed open views unimpeded by natural elements or features. |
| **Exposure**: Sheltered and calm seascapes. Where seascape is extremely exposed such that the perceived wild, elemental nature is a key characteristic | Open, exposed seascapes which does not provide a perception of elemental or wild seascape character. |
| **Aspect**: Development would interfere with notable views of sunrises and particularly sunsets. Development seen from higher level views, where viewer elevation results in geometric layout pattern perceived as closer than on the horizon line. | Development located away from sunrise and sunset positions. Development seen from lower level views, where viewer elevation results in skyline development, on or over the horizon line. |
| **Seascape pattern and foci**: Complex or unified pattern which would be disrupted by development. Important focal points e.g. islands, islets, headlands, distinctive sweeping beaches, and high hills. | Presence of existing vertical or other elements at sea including shipping/ferries and offshore WTGs. Lack of intact pattern. Lack of natural or historic feature focal points. |
| **Tranquillity**: Where stillness is a key feature, or where/when movement is highly natural, irregular or dramatic. Very limited or no industrial/semi-industrial structures. Where the area is unlit at night and is classified as such in a dark skies study. | Busier areas where development movement relates to other forms of mechanical movement present e.g. commercial shipping, ferries, boats, vehicles, WTGs. Presence of industrial/semi-industrial structures especially at sea, or on coast. Coast is already well lit at night. Lights at sea and land. |
| **Wildness**: Undeveloped seascape Wild character<br>Highly natural, semi-natural, unmanaged. | Highly developed seascape. Highly modified/managed |

| Higher Sensitivity | Lower Sensitivity |
|---|---|
| **Remoteness**: Remote or isolated. Receptor perceived to be at distance from centres of population and human interventions. | Not remote. Receptor perceived to be close to centres of population and human interventions. |
| Visual Characteristics: | |
| **Key views (land to sea, sea to land, sea to sea)**: Open or framed views from key viewpoints. Views to key features e.g. islands, other coasts, headlands. Views from well used sea area for leisure focussed on seascape/scenic quality. Distinctive undeveloped skylines with landmark features. | Few or no views from key viewpoints. Sea not used for leisure sailing. Developed, non-distinctive skylines without landmark features. |
| **Intervisibility and associations of the development area with receptors**: Strong intervisibility with coast in terms of length and/or area and/or relatively close to. Adjacent seascape/landscape character context connected by associated character and views. | Poor intervisibility with coast in terms of length and/or area and/or relatively far away. Host landscape character is separate from surrounding/adjacent seascape/landscape character with weak association. |
| **Typical receptors – type and number**: Coast path and users of paths and access land. Visitors to heritage features. Promenade and pier users. Leisure sailors. | Users of ferries. Shipping. People in urban areas at work. Users of roads (unless corniche). Users of railways. |
| **How seascape is experienced**: From remote or little used stretch of sea with little shipping or boat use. From secluded coastline, intimate coastal roads and footpaths. From important viewpoints and elevated positions where the focus is the view and not the activity. | From ferry/shipping. From main coastal, busy roads. Crowded beaches where focus is on beach activities (rather than enjoyment of seascape character). |
| Relationship Between Seascape Area and Adjacent Coast: | |
| **Contribution to setting**: Is perceived from a sensitive/designated coast or seascape character area, within its immediate setting, at close range and in the foreground seascape. | Is perceived from a less sensitive/non-designated coast or seascape character area and/or is located outside the immediate setting, at distance in the background seascape. |
| Sensitivity to Change: | |
| High → | Medium / Low → |

## 17.5.5 Seascape/Landscape Magnitude of Change

### 17.5.5.1 Overview

65. The magnitude of change affecting seascape/landscape receptors is an expression of the scale of the change that will result from the Project and is dependent on a number of variables regarding the size or scale of the change.

### 17.5.5.2 Size or Scale of Change

66. This criterion relates to the size or scale of change to the seascape/landscape that will arise as a result of the Project, based on the following factors:

- Seascape/landscape elements: The degree to which the pattern of elements that makes up the seascape/landscape character will be altered by the Project, by removal or addition of elements in the seascape/landscape. The magnitude of change will generally be higher if the features that make up the seascape/landscape character are extensively removed or altered, and/or if many new offshore elements are added to the seascape/landscape;
- Seascape/landscape characteristics: This relates to the extent to which the effect of the Project changes, physically or perceptually, the key characteristics of the seascape/landscape that may be important to its distinctive character. This may include, for example, the scale of the landform, its relative simplicity or irregularity, the nature of the seascape/landscape context, the grain or orientation of the seascape/landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the Project in relation to these key characteristics. If the Project is located in a seascape/landscape receptor that is already affected by other similar development, this may reduce the magnitude of change if there is a high level of integration and the developments form a unified and cohesive feature in the seascape/landscape;
- Seascape/landscape designation: In the case of designated landscapes, the degree of change is considered in light of the effects on the special landscape qualities which underpin the designation and the effect on the integrity of the designation. All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation' of development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape receptors and their overall integrity;
- Distance: The size and scale of change is also strongly influenced by the proximity of the Project to the receptor and the extent to which the development can be seen as a characterising influence on the landscape. Consequently, the scale or magnitude of change is likely to be lower in respect of landscape receptors that are distant from the Project and/or screened by intervening landform, vegetation and built form to the extent that the scale of their influence on landscape receptors is small or limited. Conversely, landscapes closest to the development are likely to be most affected. Host landscapes (where the development is located within a 'host' landscape character unit) will be directly affected whilst adjacent areas of landscape character will be indirectly affected; and
- Amount and nature of change: The amount of the Project that will be seen. Visibility of the Project may range from one WTG blade tip to all of the WTGs; generally, the greater the amount of the Project that can be seen, the higher the scale of change. The degree to which the Project is perceived to be on the horizon or 'within' the seascape/landscape. Generally, the magnitude of change is likely to be lower if the Project is largely perceived to be on the horizon at distance, rather than 'within' the seascape/landscape.

#### 17.5.5.3 Seascape/Landscape Magnitude of Change Rating

67. The 'magnitude' or 'degree of change' resulting from the Project is described as 'High', 'High-medium', 'Medium', 'Medium-low' 'Low' or 'Negligible'. In assessing magnitude of change, the assessment focuses on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e., as short/medium/long-term and temporary/permanent). The basis for the assessment of magnitude for each receptor has been made clear using evidence and professional judgement. The levels of magnitude of change that can occur are defined in Table 17-2

Table 17-2: Seascape/landscape magnitude of change

| Magnitude of Change | Description/Reason |
|---|---|
| High | **Size/Scale:** A large-scale change and major loss of key landscape elements/characteristics or the addition of large scale or numerous new and uncharacteristic features or elements that will affect the seascape/landscape character and the special landscape qualities/integrity of a landscape designation. Directly affecting a host seascape/landscape receptor or indirectly affecting a nearby receptor. |
| -High-medium | Intermediate rating with combination of criteria from high or medium magnitude. |
| Medium | **Size/Scale:** A medium scale change and moderate loss of some key landscape elements/characteristics or the addition of some new medium scale uncharacteristic features or elements that could partially affect the seascape/landscape character and the special landscape qualities/integrity of a landscape designation. Directly affecting a host seascape/landscape receptor or indirectly affecting a nearby receptor. |
| Medium-low | Intermediate rating with combination of criteria from medium or low magnitude. |
| Low | **Size/Scale:** A small-scale change and minor loss of a few landscape elements/non key characteristics, or the addition of some new small-scale features or elements of limited characterising influence on seascape/landscape character/designations. |
| Negligible | **Size/Scale:** A very small- scale change that may include the loss or addition of some landscape elements of limited characterising influence. The seascape/landscape characteristics and character will be subject to negligible levels of change. |

### 17.5.6 Evaluating Seascape/Landscape Effects and Significance

68. The level of seascape/landscape effect is evaluated through the combination of seascape/landscape sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by the relevant EIA Regulations. This process is assisted by the matrix in Table 17.6 (and Table 17.10 of Volume 1, Chapter 17), which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the Project and their conclusion, has been presented in a comprehensive, clear and transparent manner.

#### 17.5.6.1 Geographical Extent

69. Further information is also provided about the nature of the effects (whether these will be direct/indirect; temporary/permanent/reversible; beneficial/neutral/adverse or cumulative).
70. The geographic extent over which the seascape/landscape effects would be experienced is also assessed, which is distinct from the size or scale of effect. This evaluation is not combined in the assessment of the level of magnitude, but instead expresses the extent of the receptor that will experience a particular magnitude of change and therefore defines the geographical extents of the significant and non-significant effects.
71. The extent of the effects will vary depending on the specific nature of the Project and is principally assessed through analysis of the extent of perceived changes to the seascape/landscape character through visibility of the Project.
72. Landscape effects are described in terms of the geographical extent or physical area that will be affected (and may be described as a linear or area measurement, or by features in the landscape that are affected). This should not be confused with the scale of the development or its physical footprint. The manner in which the geographical extent of the seascape/landscape effect is described for different seascape/landscape receptors is explained as follows:

- Seascape/landscape character: The extent of the effects on seascape/landscape character will vary depending on the specific nature of the Project. This is not simply an expression of visibility or the extent of the ZTV, but also includes a specific assessment of the extent of landscape character that will be changed by the Project in terms of its character, key characteristics and elements; and
- Landscape Designations: In the case of a designated landscape, this refers to the extent the special landscape qualities of the designation are affected and whether this can be defined in terms of area or linear measurements, or subjectively through professional judgement (with the support of an expert topic group and/or peer review) and whether the integrity of the designation is affected.

#### 17.5.6.2 Duration and Reversibility

73. The duration and reversibility of seascape/landscape effects has been based on the period over which the Project is likely to exist (during construction and operation) and the extent to which these elements would be removed (during decommissioning) and the effects reversed at the end of that period. Long-term, medium-term and short-term seascape/landscape effects are defined as follows:

    - Long-term – more than ten years (may be defined as permanent or reversible);
    - Medium-term – six to ten years; and
    - Short-term – one to five years.

#### 17.5.6.3 Significant Seascape/Landscape Effects

74. A significant effect will occur where the combination of the variables results in the Project having a defining effect on the seascape/landscape receptor, or where changes of a lower magnitude affect a seascape/landscape receptor that is of particularly high sensitivity. A major loss or irreversible effect over an extensive area or seascape/landscape character, affecting landscape elements, characteristics and/or perceptual aspects that are key to a nationally valued landscape are likely to be significant.

#### 17.5.6.4 Non-Significant Landscape Effects

75. A non-significant effect will occur where the effect of the Project is not defining, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics. Equally a small-scale change experienced by a receptor of high sensitivity may not significantly affect the special landscape quality or integrity of a designation. Reversible effects, on elements, characteristics and character that are of small-scale or affecting lower value receptors are unlikely to be significant.

## 17.6 Assessing Visual Effects

### 17.6.1 Overview

76. Visual effects are concerned wholly with the effect of the Project on views, and the general visual amenity and are defined by the Landscape Institute in GLVIA 3, paragraphs 6.1 as follows:

    *"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views."*

77. Visual effects are identified for different receptors (people) who will experience the view at their place of residence, within their community, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

    - Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view; and

- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

78. The level of visual effect (and whether this is significant) is determined through consideration of the sensitivity of each visual receptor (or range of sensitivities for receptor groups) and the magnitude of change that will be brought about by the construction, operation, and decommissioning of the Project.

### 17.6.2 Zone Of Theoretical Visibility (ZTV)

79. Plans mapping the ZTV are used to analyse the extent of theoretical visibility of the Project, across the study area and to assist with viewpoint selection. The ZTV does not however, take account of the screening effects of buildings, localised landform and vegetation, unless specifically noted (see individual figures in Volume 2, Appendix 17.2 (Document Reference 6.2.17.2)). As a result, there may be roads, tracks and footpaths within the study area which, although shown as falling within the ZTV, are screened or filtered by built form and vegetation, which will otherwise preclude visibility.

80. The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'worst case' or greatest calculation of the theoretical visibility.

### 17.6.3 Viewpoint Analysis

81. Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints within the study area. The purpose of this is to assess both the level of visual effect for particular receptors and to help guide the design process and focus the assessment. A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect will occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer geographical limit, beyond which significant effects will be unlikely.

82. The assessment involves visiting the viewpoint location and viewing wirelines and prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with good visibility and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.

### 17.6.4 Evaluating Visual Sensitivity to Change

#### 17.6.4.1 Significant Seascape/Landscape Effects

83. In accordance with paragraphs 6.31 to 6.37 of GLVIA3 (Landscape Institute, 2013), the sensitivity of visual receptors has been determined by a combination of the value of the view and the susceptibility of the visual receptors to the change likely to result from the Project on the view and visual amenity.

#### 17.6.4.2 Value of the View

84. The value of a view or series of views reflects the recognition and the importance attached either formally through identification on mapping or being subject to planning designations, or informally through the value which society attaches to the view(s). The value of a view has been classified as high, medium-high, medium, medium-low or low and the basis for this assessment has been made clear using evidence and professional judgement, based on the following criteria:

- Formal recognition - The value of views can be formally recognised through their identification on Ordnance Survey (OS) or tourist maps as formal viewpoints, sign-posted and with facilities provided to add to the enjoyment of the viewpoint such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy and recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations, for example the value of a view has been increased if it presents an important vista from a designed landscape or lies within or overlooks a designated area, which implies a greater value to the visible landscape; and
- Informal recognition - Views that are well-known at a local level and/or have particular scenic qualities can have an increased value, even if there is no formal recognition or designation. Views or viewpoints are sometimes informally recognised through references in art or literature, and this can also add to their value. A viewpoint that is visited or appreciated by a large number of people will generally have greater importance than one gained by very few people.

#### 17.6.4.3 Susceptibility to Change

85. Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the potential effects of the Project. A judgement to determine the level of susceptibility therefore relates to the nature of the viewer and their experience from that particular viewpoint or series of viewpoints, classified as high, medium-high, medium, medium-low or low and based on the following criteria:

- Nature of the viewer - The nature of the viewer is defined by the occupation or activity of the viewer at the viewpoint or series of viewpoints. The most common groups of viewers considered in the visual assessment include residents, motorists, and people taking part in recreational activity or working. Viewers, whose attention is focused on the landscape, or with static long-term views, are likely to have a higher sensitivity. Viewers travelling in cars or on trains will tend to have a lower sensitivity as their view is transient and moving. The least sensitive viewers are usually people at their place of work as they are generally less sensitive to changes in views.

86. An overall level of sensitivity has been applied for each visual receptor or view – high, medium-high, medium, medium-low or low – by combining individual assessments of the value of the view and the susceptibility of the visual receptor to change. Each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, is assessed in terms of their sensitivity. The basis for the assessments has been made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity are set out in Table 17.3 below.

#### 17.6.4.4 Visual Sensitivity Rating

87. An overall level of sensitivity has been applied for each visual receptor or view – high, medium-high, medium, medium-low or low – by combining assessments of the value of the view and the susceptibility of the visual receptor to the proposed change. Each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, is assessed in terms of their sensitivity. The basis for the assessments has been made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity that inform judgements on the visual sensitivity assessed are set out in Table 17.3 below.

88. When combining assessments of value and susceptibility to establish sensitivity, the assessment considers the criteria in Table 17.3 holistically to establish an overall judgement of the sensitivity of visual receptors/views to the type of change arising from the specific proposal. In some circumstances, the value of a view/visual receptor may be given greater weight in the overall sensitivity judgement, however the sensitivity judgements in the SLVIA tend to be weighted more towards susceptibility to change, because this provides for an assessment of the sensitivity of receptors to changes arising from the 'specific nature of the proposed development' (Landscape Institute, 2013, para 546), and therefore a highly valued landscape/view 'does not automatically, or by definition, have high susceptibility' (and therefore sensitivity) to a particular development, despite its high value established in the baseline.

Table 17.3 Visual sensitivity to change

| Higher Sensitivity | Lower Sensitivity |
|---|---|
| **Value** | |
| Specific viewpoint identified in OS maps and/or tourist information and signage. | Viewpoint not identified in OS maps or tourist information and signage. |
| Facilities provided at viewpoint to aid the enjoyment of the view. | No facilities provided at viewpoint to aid enjoyment of the view. |
| View afforded protection in planning policy. | View is not afforded protection in planning policy. |
| View is within or overlooks a designated landscape, which implies a higher value to the visible landscape. | View is not within, nor does it overlook, a designated landscape. |
| View has informal recognition and well- known at a local level, as having particular scenic qualities. | View has no informal recognition and is not known as having particular scenic qualities. |
| View or viewpoint is recognised through references in art or literature. | View or viewpoint is not recognised in references in art or literature. |
| **Susceptibility to Change** | |
| Viewer who is likely or liable to be influenced by the Project. | Viewer who is unlikely or not liable to be influenced by the Project. |

| Higher Sensitivity | Lower Sensitivity |
|---|---|
| Viewers such as walkers, or tourists, whose main attention and interest are on their surroundings. | Viewers whose main attention is not focused on their surroundings, such as people at work, or specific forms of recreation. |
| Residents that gain static, long-term views of the Project in their principal outlook. | Viewers who are transient and dynamic, such as those travelling in cars or on trains, where the view is of short duration. |
| Viewpoint is visited or used by a large number of people. | View is visited or gained by very few people. |
| A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view. | Open views with no specific point of interest, or specific directional vista away from direction of the Project. |
| Viewers where the experience is of a high level of visual amenity at the location due to its overall pleasantness as an attractive visual setting or backdrop to activities. | The visual amenity experienced at the location by viewers is less pleasant or attractive than might otherwise be the case. |

| Sensitivity to Change: | | |
|---|---|---|
| High → | Medium | → Low |

## 17.6.5 Visual Magnitude of Change

### 17.6.5.1 Overview

89. The visual magnitude of change is an expression of the scale of the change that will result from the Project and is dependent on a number of variables regarding the size or scale of the change and the geographical extent over which the change will be experienced. A separate assessment is also made of the duration and reversibility of visual effects.

### 17.6.5.2 Size or Scale of Change

90. An assessment has been made about the size or scale of change in the view that is likely to be experienced as a result of the Project, based on the following criteria:

- Distance: the distance between the visual receptor/viewpoint and the Project. Generally, the greater the distance, the lower the magnitude of change, as the Project will constitute a smaller scale component of the view;
- Size: the amount and size of the Project that will be seen. Visibility may range from small or partial visibility of the Project, to all of the offshore elements being visible. Generally, the larger and greater number of elements within the Project that appear in the view, the higher the magnitude of change. This is also related to the degree to which the Project may be wholly or partly screened by landform, vegetation (seasonal) and/or built form. Conversely open views are likely to reveal more of the Project, particularly where this is a key characteristic of the landscape;
- Scale: the scale of the change in the view, with respect to the loss or addition of features in the view and changes in its composition. The scale of the Project may appear larger or smaller relative to the scale of the receiving seascape/landscape;

- Field of view: the vertical/horizontal field of view (FoV) and the proportion of the view that is affected by the Project. Generally, the more of the proportion of a view that is affected, the higher the magnitude of change will be. If the Project extends across the whole of the open part of the outlook, the magnitude of change will generally be higher as the full view will be affected. Conversely, if the Project covers just a narrow part of an open, expansive and wide view, the magnitude of change is likely to be reduced as they will not affect the whole open part of the outlook. This can in part be described objectively by reference to the horizontal/vertical FoV affected, relative to the extent and proportion of the available view;
- Contrast: the character and context within which the Project will be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour, luminance and motion. Contrasts and changes may arise particularly as a result of the rotation movement of the WTG blades, as a characteristic that gives rise to effects. Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and have a higher magnitude of change;
- Consistency of image: the consistency of image of the Project in relation to other developments. The magnitude of change of Project is likely to be lower if its WTG height, arrangement, and layout design are broadly similar to other developments in the seascape, in terms of its scale, form and general appearance. New development is more likely to appear as logical components of the landscape with a strong rationale for their location;
- Skyline/background: Whether the Project will be viewed against the skyline or a background seascape may affect the level of contrast and magnitude. If the Project add to an already developed skyline the magnitude of change will tend to be lower;
- Number: generally, the greater the number of separate developments seen simultaneously or sequentially, the higher the magnitude of change. Further effects will occur in the case of separate developments and their spatial relationship to each other will affect the magnitude of change. For example, development that appears as an extension to an existing development will tend to result in a lower magnitude of change than a separate, new development; and
- Nature of visibility: the nature of visibility is a further factor for consideration. The Project may be subject to various phases of development change and the manner in which the Project may be viewed could be intermittent or continuous and/or seasonally, due to periodic management or leaf fall.

#### 17.6.5.3 Visual Magnitude of Change Rating

91. The ‘magnitude’ or ‘degree of change’ resulting from the Project is described as ‘High’, ‘High-medium’, ‘Medium’, ‘Medium-low’ ‘Low’ and ‘Negligible’ as defined in Chapter 17 (Document Reference 6.1.17). In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e., as short/medium/long-term and temporary/permanent). The basis for the assessment of magnitude for each receptor has been made clear using evidence and professional judgement. Examples of criteria that tend towards higher or lower magnitude of change that can occur on views and visual receptors are set out in Table 17.4.

Table 17.4: Visual magnitude of change ratings

| Magnitude of Change | Magnitude of Change | Description/Reason |
|---|---|---|
| High | The Project will result in a high level of alteration to the baseline view, forming the prevailing influence and/or introducing elements that are substantially uncharacteristic in the existing view. The addition of the Project will result in a high change, loss or addition to the baseline view. | ▪ Size and Scale: A large, prominent and/or prevailing change to the view.<br>▪ Number: Involving the loss/addition of a large number of features/elements.<br>▪ Distance: Typically appearing closer to the viewer in the fore to middle ground.<br>▪ FoV: Affecting a large vertical angle and wide horizontal FoV.<br>▪ Nature of Visibility: Multiple phase development, continuously and sequentially visible.<br>▪ Contrast: Strong degree of contrast with surroundings with little or no screening.<br>▪ Skyline: Visible on the skyline as a new feature.<br>▪ Consistency of Image: Contrasting with other developments, lacking in visual rationale. |
| -High-Medium | Intermediate rating with combination of criteria from high or medium magnitude of change category. | |
| Medium | The Project will result in a medium level of alteration to the baseline view, forming a readily apparent influence and/or introducing elements that are potentially uncharacteristic in the existing view. The addition of the Project will result in a medium change, loss or addition to the baseline view. | ▪ Size and Scale: A moderate, readily apparent and/or noticeable change to the view.<br>▪ Number: Involving the loss/addition of a number of features/elements.<br>▪ Distance: Typically appearing in the middle ground.<br>▪ FoV: Affecting a medium vertical angle and moderate horizontal FoV.<br>▪ Nature of Visibility: Multiple phase development, intermittently and sequentially visible.<br>▪ Contrast: Contrast with surroundings and may benefit from some screening.<br>▪ Skyline: Visible on the skyline along with other features.<br>▪ Consistency of Image: Different from other developments, some visual rationale. |
| Medium-low | Intermediate rating with combination of criteria from high or medium magnitude of change category. | |
| Low | The Project will result in a low level of alteration to the baseline view, providing a slightly apparent influence and/or introducing elements that are characteristic in the | ▪ Size and Scale: A small, slightly apparent and/or perceptible change.<br>▪ Number: Involving the loss/addition of a small number of features/elements.<br>▪ Distance: Typically appearing in the background. |

| Magnitude of Change | Magnitude of Change | Description/Reason |
|---|---|---|
| | existing view. The addition of the Project will result in a low change, loss or addition to the baseline view. | ▪ FoV: Affecting a small vertical angle and narrow horizontal FoV.<br>▪ Nature of Visibility: Simple, single development, intermittently and infrequently visible.<br>▪ Contrast: Some parity/'fits' with surroundings and may benefit from screening.<br>▪ Skyline: Partly visible on a developed skyline or not visible on the skyline.<br>▪ Consistency of Image: Similar to other developments with visual rationale, appearing reasonably well accommodated within its surroundings. |
| Negligible | The Project will result in a negligible alteration to the existing view. If visible it may form a barely discernible influence and/or introduce elements that are substantially characteristic in the baseline view. The addition of the Project will result in negligible incremental change, loss or addition to the baseline view. | ▪ Size and Scale: A negligible, barely discernible and/or inconspicuous change.<br>▪ Number: Involving the loss/addition of a small number of features/elements.<br>▪ Distance: Typically appearing in the far distance.<br>▪ FoV: Affecting a very small vertical and narrowest horizontal FoV.<br>▪ Nature of Visibility: Simple, single development, intermittently and infrequently visible.<br>▪ Contrast: Blends with surroundings and/or is well screened.<br>▪ Skyline: Partly visible on a developed skyline or not visible on the skyline.<br>▪ Consistency of Image: Similar from other developments with strong visual rationale, appearing well accommodated within its surroundings. |

## 17.6.6 Evaluating Visual Effects and Significance

### 17.6.6.1 Overview

92. The level of visual effect is evaluated through the combination of visual sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by the relevant EIA Regulations. This process is assisted by the matrix in Table 17.6 (and Table 17.10 of Volume 1, Chapter 17), which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the Project and their conclusion, have been presented in a comprehensive, clear and transparent manner.

93. Further information is also provided about the nature of the effects (whether these will be direct/indirect; temporary/permanent/reversible; beneficial/neutral/adverse or cumulative).

#### 17.6.6.2 Geographical Extent

94. The geographic extent over which the visual impacts will be experienced has also been assessed. This is distinct from the size or scale of effect and is described in terms of the physical area or location over which it will be experienced (described as a linear or area measurement). The extent of the effects will vary according to the specific nature of the Project and is principally assessed through ZTV, field survey and viewpoint analysis of the extent of visibility likely to be experienced by visual receptors. The geographical extent of visual effects is described as per the following examples.
95. The geographical extent can be described as an area measurement or proportion of the total area of the receptor affected. For example, effects on people within a particular area such as a golf course or area of common land can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people within that area. The geographical extent of that visual effect can be expressed as approximately '5 hectares' or '10%' of an area of common land or defined recreational area.
96. The geographical extent can be described as a linear measurement (m or km) according to the length of route affected. For example, effects on people travelling on a route through the landscape such as a road or footpath can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people along that route. The geographical extent of that visual effect can be expressed as approximately '2km' or '10%' of the total length of the route.
97. The geographical extent of a visual effect experienced from a specific viewpoint may be limited to that location alone. An example of a 'specific viewpoint' is a public viewpoint recommended in tourist literature such as a well visited hill summit. An example of an 'illustrative viewpoint' is a particular location within a built up or well vegetated area where an uncharacteristically open or restricted view exists.

#### 17.6.6.3 Duration and Reversibility

98. The duration and reversibility of visual effects are based on the period over which the Project are likely to exist (during construction and operation) and the extent to which the Project will be removed (during decommissioning), with effects reversed at the end of that period.
99. Long-term, medium-term and short-term visual effects are defined as follows:
    - Long-term – more than ten years (may be defined as permanent or reversible);
    - Medium-term – six to ten years; and
    - Short-term – one to five years.

#### 17.6.6.4 Significant Visual Effects

100. A significant effect is more likely to occur where a combination of the variables results in the Project having a defining effect on the view or visual amenity or where changes affect a visual receptor that is of high sensitivity.

#### 17.6.6.5 Non-Significant Visual Effects

101. A non-significant effect is more likely to occur where a combination of the variables results in the Project having a non-defining effect on the view or visual amenity or where changes affect a visual receptor that is of low sensitivity.

#### 17.6.6.6 Weather Conditions

102. The assessment of visual effects is undertaken in clear weather with good to excellent visibility. This means that the viewpoint assessment represents a maximum effect assessment of the likely visual effects. The same viewpoint may be experienced under less optimal viewing conditions resulting in a significant effect appearing as non-significant, due to the change in the variable weather conditions. Due to the conditions of the assessment the reverse (a non-significant effect appearing as significant) is unlikely to occur.

## 17.7 Assessing Night-Time Seascape, Landscape and Visual Effects

103. The Planning Inspectorate has agreed that lighting within the array area can be scoped out (3.11.6 and 3.11.7 of the Scoping Opinion). Potential effects of Lighting associated with the ORCPs is assessed in Section 17.7 of Volume 1, Chapter 17.

## 17.8 Assessing Cumulative Seascape, Landscape and Visual Effects

### 17.8.1 Methodology

#### 17.8.1.1 Approach to Additional or Combined Cumulative Effects

104. The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Project together with other relevant plans, projects and activities. Cumulative effects are therefore the additional or combined effect of the Project in combination with the effects from a number of different projects, on the same receptor or resource. Further detail on CEA methodology is set out in Volume 1, Chapter 5: Environmental Impact Assessment Methodology (Document Reference 6.1.5).

105. GLVIA3 (Landscape Institute and IEMA 2013, p120) defines cumulative landscape and visual effects as those that *"result from additional changes to the landscape and visual amenity caused by the proposal in conjunction with other developments (associated with or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future."*

106. NatureScot's guidance, Assessing the Cumulative Impact of Onshore Wind Energy Developments (NatureScot, 2021) is widely used across the UK to inform the specific assessment of the cumulative effects of windfarms. Both GLVIA3 and NatureScot's guidance provide the basis for the methodology for the cumulative SLVIA undertaken in the SLVIA. The NatureScot (2021) guidance defines:

*"The aim of the cumulative assessment is to identify the magnitude of additional cumulative change which would be brought about by the proposed development when considered in conjunction with other windfarms." (NatureScot, 2021);*

*"Cumulative impacts on the physical fabric of the landscape arise when two or more developments affect landscape components" (NatureScot, 2021);*

*"Cumulative impacts on landscape character arise when two or more developments introduce new features into the landscape" (NatureScot, 2021);*

*Cumulative impacts on visual amenity can be caused by 'combined visibility' and/or 'sequential impacts'" (NatureScot, 2021); and*

*"The purpose of a Cumulative Landscape and Visual Impact Assessment (CLVIA) is to describe, visually represent and assess the ways in which a proposed wind farm would have additional impacts when considered with other consented or proposed windfarms. It should identify the significant cumulative impacts arising from the proposed windfarm." (NatureScot, 2021, ).*

107. In line with NatureScot guidance and GLVIA3, cumulative effects are assessed in this SLVIA as the additional changes caused by the Project in conjunction with other similar developments (not the totality of the cumulative effect). The CEA assesses the cumulative effect of the Project with other projects (Section 17.8 of Volume 1, Chapter 17) against the baseline (Section 17.4 of Volume 1, Chapter 17), with the assessment of significance apportioning the amount of the effect that is attributable to the Project.

108. The contribution of the Project to the cumulative effect upon the baseline character/view is assessed and information provided on *"how the effects of the applicant's proposal would combine and interact with the effects of other development"* (the Planning Inspectorate, 2019). Adjacent developments may complement one another, or may be discordant with one another, and it is the increased or reduced level of significance of effects which arises as a result of this change that is assessed in the CEA, such as through design discordance or proliferation of multiple developments affecting characteristics or new geographic areas, and ultimately if character changes occur because of multiple developments becoming a prevailing characteristic of the seascape or view.

#### 17.8.1.2 Tiered Approach to CEA

109. In accordance with NatureScot guidance and GLVIA3 (para 7.13), existing projects and those which are under construction are included in the SLVIA baseline and described as part of the existing environment (Section 17.7 of Volume 1, Chapter 17), including the extent to which these have altered character and views, and affected sensitivity to windfarm development. Guidance on a tiered approach to CEA is also provided in Advice Note Seventeen: Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects (Planning Inspectorate, 2019). Table 2 in this advice note provides specific guidance on what developments should fall within which tier. An assessment of the additional effect of the Project is undertaken in conjunction with a baseline that includes operational and under-construction projects as part of the main assessment in Section 17.7 of Volume 1, Chapter 17. This includes assessment of the Project against magnitude factors such as its size, scale, spread and landscape context, as well as cumulative effect factors relating to the operational and under-construction windfarms, such as its increase in spread, aesthetic relationship, and contrasts of size and spacing of turbines of the projects.

110. A further assessment of the additional cumulative seascape, landscape and visual effects of the Project with other potential future projects is undertaken in Section 17.8 of Volume 1, Chapter 17.

111. In undertaking this CEA for the Project, it is important to bear in mind that other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside the Project. Therefore, a tiered approach has be adopted. This provides a framework for placing relative weight upon the potential for each project/plan to be included in the CEA to ultimately be realised, based upon the project/plan's current stage of maturity and certainty in the projects' parameters. The tiered approach which will be utilised within the CEA of the Project employs the following tiers as set out in Table 17.5.

Table 17.5: Tiered approach to CEA

| Tier | Description |
|---|---|
| Tier 1 | ▪ Permitted (consented) application(s), whether under the PA2008 or other regimes, but not yet implemented; and<br>▪ Submitted application(s) whether under the PA2008 or other regimes but not yet determined. |
| Tier 2 | ▪ Projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted. |
| Tier 3 | ▪ Projects on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted.<br>▪ Identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that there will be limited information available on the relevant proposals;<br>▪ Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward. |

#### 17.8.1.3 Projects for Inclusion in the CEA for Seascape, Landscape and Visual

112. The projects and plans selected as relevant to the CEA presented within the SLVIA are based upon the results of a screening exercise (see Section 17.8 of Volume 1, Chapter 17). Each project or plan has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved. A comprehensive 'long list' of projects was reviewed, and projects within the cumulative sarea base plan compiled within the 60km SLVIA study area from the array area (Figure 17.2 of Volume 2, Appendix 17.2), with potential for cumulative impact interactions. The specific projects scoped into the CEA for seascape, landscape and visual receptors, are set out in Section 17.8 of Volume 1, Chapter 17.

113. The range of potential cumulative effects that are identified and included in the CEA, is a subset of those considered for the Project alone assessment. This is because some of the potential impacts identified and assessed for the Project alone, are localised and temporary in nature and will therefore have limited or no potential to interact with similar changes associated with other plans or projects.

## 17.8.2 Types of Cumulative Effect

### 17.8.2.1 Cumulative Visual Effects

114. Similarly, some of the potential impacts considered within the Project alone assessment are specific to a particular phase of development (e.g. construction, operation and maintenance or decommissioning). Where the potential for cumulative effects with other plans or projects only have potential to occur where there is spatial or temporal overlap with the Project during certain phases of development, impacts associated with a certain phase may be omitted from further consideration where no plans or projects have been identified that have the potential for cumulative effects during this period.

115. Cumulative visual effects consist of combined and sequential effects:

- Combined visibility - occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be where several developments are within the observer's main angle of view at the same time, or, where the observer has to turn to see the various developments. The cumulative visual effect of the Project may be significant, or not significant, depending on factors influencing the cumulative magnitude of change, such as the degree of integration and consistency of image with other developments in combined views; and its position relative to other developments and the landscape context in successive views; and
- Sequential visibility - occurs when the observer has to move to another viewpoint to see different developments. Sequential effects are assessed along regularly used routes such as major roads, railway lines and footpaths. The occurrence of sequential effects range from 'frequently sequential' (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to 'occasionally sequential' (long time lapses between appearances, because the observer is moving slowly and/or there are large distances between the viewpoints). The cumulative visual effect is more likely to be significant when frequently sequential.

### 17.8.2.2 Cumulative Seascape/Landscape Effects

116. Cumulative development within a particular area may build up to create different types of seascape/landscape effect. The significance of the cumulative seascape/landscape effects of the addition of the Project will be assessed as follows:

- If the Project form a separate isolated feature from other developments within the seascape/landscape, too infrequent and of insufficient significance to be perceived as a characteristic of the area, then the cumulative seascape/landscape effect of the Project is unlikely to be significant;

- If the addition of the Project results in offshore windfarms and/or energy generation/transmission developments forming a key characteristic of the seascape/landscape, exerting sufficient presence as to establish or increase the extent of a 'seascape/landscape with windfarms', then the cumulative seascape/landscape effect of the proposal may be significant or not significant, depending on the sensitivity of the receptor and magnitude of the change; and
- If the addition of the Project results in offshore windfarms forming the prevailing characteristic of the seascape/landscape, seeming to define the seascape/landscape as a 'windfarm seascape/landscape character type' then the cumulative seascape/landscape effect of the Project is likely to be significant.

### 17.8.3 Assessing Cumulative Seascape, Landscape and Visual Effects

#### 17.8.3.1 Cumulative Sensitivity of Landscape and Visual Receptors

117. In evaluating cumulative sensitivity in the cumulative SLVIA (Section 17.8 of Volume 1, Chapter 17), the sensitivity to change of seascape, landscape and visual receptors are retained from the environmental assessment during the operational phase in Section 17.7 of Volume 1, Chapter 17.

#### 17.8.3.2 Cumulative Magnitude of Change

118. The cumulative magnitude of change is an expression of the degree to which seascape, landscape and visual receptors will be changed by the addition of the Project cumulatively. The cumulative magnitude of change is assessed according to a number of criteria, described below.

- The location, position and visual relationship of the Project: Depending on the viewpoint/viewing angle from the coast, the Project may be viewed adjacent to other developments on the skyline, covering a wider lateral spread; they may form one grouping or could be viewed separately on the skyline (separated by space on the skyline); or could be viewed with one project being 'behind' the other project. The overall magnitude of change will vary depending on this visual relationship at different viewpoints and is likely to be higher when two projects are viewed adjacent to each other over a wider lateral spread; and lower when one project is viewed behind the other project;
- The location of the Project in relation to other developments: If the Project is seen in a part of the view or setting to a landscape receptor that is not affected by other development, this will generally increase the cumulative magnitude of change as it will extend influence into an area that is currently unaffected by development. Conversely, if the Project is seen in the context of other developments, the cumulative magnitude of change may be lower as development is not being extended to otherwise undeveloped parts of the outlook or setting. This is particularly true where the scale and layout of the proposal is similar to that of the other developments as where there is a high level of integration and cohesion with an existing site the various developments may appear as a single site;
- The extent of the developed skyline: the proportion (or horizontal angle) of the view that is affected by the combined lateral spread of the Project and other projects on the horizon. If the lateral spread/horizontal angle of the Project will add notably to the developed horizon in a view, the cumulative magnitude of change will tend to be higher;

- The number and scale of developments seen simultaneously or sequentially: Generally, the greater the number of clearly separate developments that are visible, the higher the cumulative magnitude of change will be. The addition of the Project to a view or seascape/landscape where a number of smaller developments are apparent will usually have a higher cumulative magnitude of change than one or two large developments as this can lead to the impression of a less co-ordinated or strategic approach;
- The scale comparison between developments: If the Project is perceived to be of a similar scale to other visible developments, particularly those seen in closest proximity to it, the cumulative magnitude of change will generally be lower as it will have more integration with the other sites and will be less apparent as an addition to the cumulative situation;
- The consistency of image of the proposal in relation to other developments: The cumulative magnitude of change of the Project is likely to be lower if its turbine height, arrangement, layout design and visual appearance/aesthetics are broadly similar to other developments in the seascape, as they are more likely to appear as relatively simple and logical components of the seascape;
- The context in which the developments are seen: If projects are seen in a similar seascape/landscape context, the cumulative magnitude of change is likely to be lower due to visual integration and cohesion between the sites. If projects are seen in a variety of different settings, this can lead to a perception that development is unplanned and uncoordinated, affecting a wide range of landscape character and blurring the distinction between them; and
- The magnitude of change of the Project as assessed in the project alone assessment: Where the Project is assessed to have a negligible or low magnitude of change on a view or seascape/landscape.

119. Definitions of cumulative magnitude of change are applied in order that the process of assessment is made clear. These are:

- High - where the magnitude of change arising from the addition of the Project will result in a high cumulative change, loss or addition to the seascape/landscape receptor or view;
- Medium - where the magnitude of change arising from the addition of the Project will result in a medium change, loss or addition to the seascape/landscape receptor or view;
- Low - where the magnitude of change arising from the addition of the Project will result in a low change, loss or addition to the seascape/landscape receptor or view; and
- Negligible - where the magnitude of change arising from the addition of the Project will result in a negligible incremental change, loss or addition to the seascape/landscape receptor or view.

120. There may also be intermediate levels of cumulative magnitude of change - medium-high and medium-low - where the change falls between two of the definitions.

### 17.8.3.3 Significance of Cumulative Effects

121. The objective of the cumulative assessment is to determine whether any effects that the construction and operation of the offshore infrastructure will have on seascape, landscape and visual receptors, when seen or perceived cumulatively with the construction and operation of the other projects, will be significant or not significant. Significant cumulative seascape, landscape and visual effects arise where the addition of the Project, leads to offshore windfarms becoming a prevailing seascape, landscape or visual characteristic of a receptor that is sensitive to such change. Cumulative seascape/landscape effects may evolve as follows:

- A small scale, single development will often be perceived as a new or 'one-off' landscape feature or landmark within the seascape. Except at a local site level, it usually cannot change the overall existing seascape character, or become a new characteristic element of a landscape/seascape;
- With the addition of further development, it can become a characteristic element of the landscape/seascape, as they appear as elements or components that are repeated. Providing there was sufficient 'space' or undeveloped landscape/seascape between each development, or the overlapping of several developments is not too dense; they would appear as a series of developments within the landscape/seascape and would not necessarily become the dominant or defining characteristic of the seascape nor have significant cumulative effects; and
- The next stage would be to consider larger scale developments and/or an increase in the number of developments within an area that either overlap or coalesce and/or 'join-up' along the skyline. The effect is to create a landscape/seascape where the offshore windfarm and/or energy generation/transmission element is a prevailing characteristic of the landscape/seascape. The result would be to materially change the existing seascape/landscape character and resulting in a significant cumulative effect. A landscape/seascape characterised by offshore windfarm or energy generation/transmission development may already exist as part of the baseline seascape context.

122. Less extensive, but nevertheless significant cumulative seascape, landscape and visual effects may also arise as a result of the addition of the Project where it results in a seascape, landscape or view becoming defined by the presence of more than one offshore windfarm or similar/large scale development, so that other patterns and components are no longer definitive, or where the proposal contrasts with the scale or design of an existing or development.

123. Higher levels of cumulative effect may arise when projects are clearly visible together in views, however provided that the projects are designed to achieve a high level of visual integration, with few notable visual differences between developments, these effects may not necessarily be significant. In particular, the effects of an extension to an existing development are often less likely to be significant, where the effect is concentrated, providing that the design of the developments are compatible and that the overall capacity of the seascape is not exceeded.

124. The capacity of the seascape/landscape or view may be assessed as being exceeded where the seascape, landscape and visual receptor becomes defined by a particular type of development, or if the Project extend across seascape/landscape character areas or clear visual/topographic thresholds in a view.

125. More substantial cumulative effects may result from developments that have some geographical separation, but remain highly inter-visible, potentially resulting in extending effects into new areas, such as an increased presence of development on a skyline, or the creation of multiple, separate offshore windfarm defined seascape/landscapes.

## 17.9 Evaluation of Significance

126. The matrix presented in Table 17.6 below (and Table 17.10 in Volume 1, Chapter 17) is used as a guide to illustrate the SLVIA process. In line with the emphasis placed in GLVIA3 upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor. Such narrative assessments provide a level of detail over and above the outline assessment provided by use of the matrix alone.

127. The landscape and visual assessment unavoidably, involves a combination of quantitative and qualitative assessment and wherever possible cross references have been made to objective evidence, baseline figures and/or to photomontage visualisations to support the assessment conclusions. Often a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach. Importantly each effect results from its own unique set of circumstances and have been assessed on a case-by-case basis. The matrix as presented in Table 17.6 (and Table 17.10 in Volume 1, Chapter 17) should therefore be considered as a guide; where deviations from this guide have been made, this is clearly explained in the assessment.

128. Significant landscape and visual effects are identified in Table 17.6 below (and Table 17.10 in Volume 1, Chapter 17). They relate to all those effects that result in a ‘Major’ or a ‘Major/Moderate’ level of effect. Moderate levels of effect have potential, subject to the assessor’s professional judgement, to be considered as significant or not significant, depending on the sensitivity and magnitude of change factors evaluated. Some moderate levels of effect may be considered significant, while others can be justified as not significant. There is a threshold here that hinges around professional judgement, which is applied to the relevant assessments and is explained with further justification in the narrative assessment of relevant receptors where moderate effects occur. White or un-shaded boxes in Table 17.6 indicate a non-significant effect.

129. In those instances where there will be no effect, the magnitude has been recorded as ‘Zero’ and the level of effect as ‘None’.

Table 17.6: Matrix to determine effect significance

| | | Magnitude of change | | | | | |
|---|---|---|---|---|---|---|---|
| | | *Negligible* | *Low* | *Medium-low* | *Medium* | *Medium-high* | *High* |
| **Sensitivity of receptor** | *Low* | Negligible (not significant) | Negligible (not significant) | Minor/negligible (Not significant) | Minor (Not significant) | Moderate/ minor (Not significant) | Moderate/ minor (Not significant) |
| | *Medium-low* | Negligible (not significant) | Minor/negligible (Not significant) | Minor (Not significant) | Moderate/ minor (Not significant) | Moderate (potentially significant) | Moderate (potentially significant) |
| | *Medium* | Minor/negligible (Not significant) | Minor (Not significant) | Moderate/ minor (Not significant) | Moderate (potentially significant) | Moderate (potentially significant) | Major/moderate (Significant) |
| | *Medium-* | Minor (Not significant) | Moderate/ minor (Not significant) | Moderate (potentially significant) | Moderate (potentially significant) | Major/moderate (Significant) | Major (Significant) |
| | *High* | Minor (Not significant) | Moderate/ minor (Not significant) | Moderate (potentially significant) | Major/moderate (Significant) | Major (Significant) | Major (Significant) |

## 17.10 Nature of Effects

### 17.10.1 Overview

130. The nature of effects refers to whether the landscape and/or visual effect of the Project is positive or negative (herein referred to as 'beneficial' and 'adverse').

131. Environmental Impact Assessment Infrastructure Planning Regulations 2017 (the EIA Regulations) state that the ES should define *"the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development"*.

132. Cumulative effects have been described in Section 17.7, and 'short-term, medium-term and long-term, permanent and temporary' effects are described in Section 17.6 under the heading 'Duration and Reversibility'. Transboundary effects concern the potential effects of the Project on seascape, landscape and visual receptors in countries outside UK territorial waters.

### 17.10.2 Direct and Indirect Effects

133. The definition of the remaining terms used in this assessment are defined here.

- Direct landscape effects relate to the host landscape and concern both physical and perceptual effects on the receptor;
- Indirect landscape effects relate to those landscapes and receptors which separated by distance or remote from the development and therefore are only affected in terms of perceptual effects. The Landscape Institute also defines indirect effects as those which are not a direct result of the development but are often produced away from it or as a result of a complex pathway.; and
- Visual effects are considered as direct effects, as the view itself may be directly altered by the Project.

### 17.10.3 Positive and Negative Effects

134. Guidance provided by the in GLVIA3 on the nature of effect (i.e., beneficial or adverse) states that *"in the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity",* but it does not provide guidance as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.

135. The seascape, landscape and visual effects of windfarms are difficult to categorise as either beneficial or adverse because, unlike other disciplines, there are no definitive criteria by which the effects of windfarms can be measured as being categorically 'beneficial' or 'adverse'. In some disciplines, such as noise or ecology, it is possible to quantify the effect of a windfarm in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected and assessing the nature of that effect in justifiable terms. However, this is not the case in relation to landscape and visual effects where the approach combines quantitative and qualitative assessment.

136. Generally, in the development of 'new' windfarms, a precautionary approach has been adopted, which assumes that significant landscape and visual effects are weighed on the adverse side of the planning balance. Unless it is stated otherwise, the effects considered in the assessment have been considered to be adverse. Beneficial or neutral effects may, however, arise in certain situations and are stated in the assessment where relevant. The following definitions have been used.

- Beneficial effects - contribute to the seascape, landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The development contributes to the landscape by virtue of good design or the introduction of new landscape planting. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components;
- Neutral effects - occur where the development fits with the existing seascape/landscape character or visual amenity. The development neither contributes to nor detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, nor where the effects are so limited that the change is hardly noticeable. A change to the seascape, landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation; and

- Adverse effects - are those that detract from the seascape/landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the seascape, landscape and visual resource, or through the removal of elements that are key in its characterisation.

### 17.10.4 Frequency and Likelihood of Visual Effects – Weather Conditions

137. The judgements made in the SLVIA are based on optimum 'very good' to 'excellent' visibility of the Project. This assumption is assessed as the worst-case scenario, but in reality, the degree and extent of visual effects arising from the construction and operation of the offshore infrastructure is a combination of several different factors, including the prevailing weather conditions. The prevailing weather can determine changes in character and visibility, with varied wind, light and tidal movements and the clarity or otherwise of the atmosphere. Collectively, these will combine to reduce the number of days over which views of the Project will be available from the coastline and hinterland, or to inhibit views, rendering them more visually recessive within the wider seascape. Viewing conditions and visibility has been found to vary in the study area, and the effects of the windfarm will vary greatly according to the weather. This means that effects that are assessed to be significant may be not-significant under different, less clear conditions.

138. Although the SLVIA is based on 'very good' to 'excellent' visibility conditions, a description of visibility frequency is provided using METAR visibility data from the nearest Met Office stations that record visibility highlight potential trends in the visibility conditions of the study area. The visibility data obtained is presented in Table 17.7 of Volume 2, Chapter 17, together with associated analysis. Both GLVIA3 (8.15) and NatureScot guidance (NatureScot 2017, para 39) refer to use of Met Office visibility data to assess typical visibility conditions within an area. Most synoptic observing stations have sensors which provide a measurement of visibility. Visibility sensors measure the meteorological optical range which is defined as the length of atmosphere over which a beam of light travels before its luminous flux is reduced to 5% of its original value. The use of light within the visible spectrum allows the sensor to most accurately simulate human perception of visibility. Reasonably accurate measurements are possible over a range of visibility extending from a few tens of metres to a few tens of kilometres.

139. Although there are limitations to how this data can be applied to judgements about offshore windfarm visibility, the visibility data provides some understanding and evidence basis for evaluating the visibility of the WTGs against their background.

140. Met Office visibility data has been assessed from the nearest weather station that records visibility, at Donna Nook weather station (the closest weather station to the Project, located in Lincolnshire, to the south of the SLVIA study area). Visibility is categorised into distance ranges, and a frequency table has been compiled revealing the total number of observations within each distance category at hourly intervals for each month. The data has been summarised and mapped to highlight trends in the visibility conditions of the study area, such as the distance category which has the most visibility observations recorded, and approximate number of viewing days lost to low visibility weather conditions. Visibility data is then assessed to set out the frequency of visibility (over a 10 year period) at different distance ranges, based on Met Office visibility definitions: < 1km Very Poor; 1 – 4km Poor; 4 -10km Moderate; 10 – 20km Good; 20 – 40km Very Good; 40km > Excellent.

141. The Met Office visibility data is then interpreted to allow more specific quantification of the likely frequency of visibility of the Project from the coastal viewpoints (as a % and average number of days per year), based on the distance of each viewpoint location from the windfarm site. The Met Office visibility frequency data is used to inform an assessment of the 'likelihood of effect' from each viewpoint, in order to qualify any significant effects assessed in optimum visibility conditions with how likely they are to actually occur given the prevailing weather/visibility conditions.

## 17.11 Visual Representations

### 17.11.1 Overview

142. ZTVs and visualisations (wirelines or wirelines and photomontages) are graphical images produced to assist and illustrate the SLVIA and the cumulative assessment. The methodology used for viewpoint photography and photomontages has been produced in accordance with the NatureScot guidance on Visual Representation of Windfarms, Version 2.2 (2017), GLVIA 3 and the Landscape Institute Technical Guidance Note on Visual Representation of Development Proposals (2019).

### 17.11.2 Zone Of Theoretical Visibility (ZTV)

143. The ZTVs in Volume 2, Appendix 17.2, Figure 17.3 to Figure 17.14 have been calculated using computer software to generate a ZTV of the Project, to demonstrate the theoretical extent of visibility from any point in the study area.

144. A 3D computer model has been developed of the existing landscape using digital terrain data as follows:

- Ordnance Survey Terrain 50 is used to produce the main or standard bare ground ZTV plot and wirelines, these tiles provide a digital record of the existing landform of Great Britain, or Digital Terrain Model (DTM) at 10m elevation intervals based on 50m grid squares and models representing the specified geometry and position of the offshore elements. The computer model will include the entire study area and takes account of the effects caused by atmospheric refraction and the Earth's curvature;

- Ordnance Survey Terrain 5 is used to produce more detailed ZTV plots within the SLVIA study area, where required to assess particular effects, such as along the coastline, or within a detailed part of the study area. The computer model includes the entire study area and takes account of atmospheric refraction and the Earth's curvature;
- The resulting ZTV plots have been overlaid on Ordnance Survey mapping at an appropriate scale and presented as figures using desktop publishing or graphic design software; and
- Cumulative ZTV plots based on the intervisibility of the Project and other relevant developments within the study area have also been produced.
- There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTV as follows:
- Where the ZTV has been calculated using Ordnance Survey Terrain 50 or Terrain 5 digital terrain data, this will not account for the screening effects of vegetation or built form unless added in the form of OS Vectormap data or digitally added and stated on the figure;
- The ZTVs are based on theoretical visibility from 2m above ground level;
- The Blade Tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the windfarm site. The nature of what is visible from 10km away will differ markedly from what is visible from 40km away, although both are potentially indicated on the Blade Tip ZTV as having the same level of visibility; and
- There is a wide range of variation within the visibility shown on the ZTV, for example, an area shown on the blade tip ZTV as having visibility of 12-20 WTGs may gain views of the smallest extremity of blade tips, or of 20 full WTGs. This can make a considerable difference in the effects of the Project on that area. The hub height ZTV has been used in conjunction with the blade tip ZTV to provide an indication of the degree to which the WTGs are visible.

145. These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the Project will be theoretically visible and tending to present a worst-case or over-estimate the actual visibility. The information drawn from the ZTV is checked by field survey observation.

146. The SLVIA includes a Horizontal Angle ZTV to show the horizontal field of view (in degrees) that may be affected by views of the WTGs.

## 17.11.3 Methodology For Baseline Photography

### 17.11.3.1 Overview

147. Once a view has been selected, the location is visited, confirmed, and assessed with the aid of a wireline in the field. A photographic record is taken to record the view and the details of the viewpoint location and associated data are recorded to assist in the production of visualisations and to validate their accuracy.

148. The following photographic information is recorded and provided:

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to ~1-3 m;

- GPS recorded Above Ordnance Datum height data;
- Use of a fixed 50 mm focal length lens is confirmed;
- Horizontal field of view (in degrees); and
- Bearing to Target Site.

149. The viewpoint photographs were taken at the proposed locations using a Nikon D750 Digital SLR camera, with a fixed lens and a full-frame (35 mm negative size) complementary metal oxide semiconductor (CMOS) sensor. The photographs were taken on a tripod with a panoramic head at a height of approximately 1.5m above ground.

150. All the resulting visualisations have been prepared to indicate other cumulative development in order that they may assist the cumulative assessment as well as the LVIA.

151. Whilst no two-dimensional image can fully represent the real viewing experience, the visualisation aims to provide a realistic representation of the offshore elements, based on current information and photomontage methodology.

### 17.11.4 Weather Conditions

152. GLVIA 3 para 8.22 states:

*"In preparing photomontages, weather conditions shown in the photographs should (with justification provided for the choice) be either:*

*representative of those generally prevailing in the area; or*

*taken in good visibility, seeking to represent a maximum visibility scenario when the development may be highly visible".*

153. In preparing photomontages for the SLVIA, photographs have been taken in favourable weather conditions during periods of 'very good' or 'excellent' visibility conditions - seeking to represent a maximum visibility scenario when the Project may be most visible.

### 17.11.5 Methodology for Production of Visualisations

154. Visualisations have been produced in accordance with NatureScot Visual Representation of Windfarms Guidance (NatureScot, 2017) and Landscape Institute (2019) Technical Guidance Note (TGN) 06/19 Visual Representation of Development Proposals.

155. To create the baseline panorama, the frames are individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop or PTGui software. This process avoids the wide-angle effect that will result should these frames be arranged in a perspective projection, whereby the image is not faceted to allow for the cylindrical nature of the full 360-degree view but appears essentially as a flat plane.

156. Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined.

157. The baseline photographs and cumulative wireline visualisations shown for each viewpoint cover a 90-degree field of view (or in some cases, up to 360-degree), which accords with NatureScot guidance. These are cylindrically projected images and should be viewed flat at a comfortable arm's length.

158. The photographs are also joined to create planar projection panoramas using PTGui software. These are used in the creation of the 53.5 degree field of view photomontages.

159. Wireline representations that illustrate the Project and set within a computer-generated image of the landform are used in the assessment to predict theoretical appearance of the WTGs. These are produced with Resoft WindFarm software and are based on a terrain model with a 50m data grid (OS Panorama) with a more detailed area of terrain modelling (OS terrain 5) used for the coastal parts of the study area, which includes the majority of viewpoints used in the SLVIA. There are limitations in the accuracy of DTM data so that landform may not be picked up precisely and may result in WTGs being more or less visible than is shown, however, the use of OS Terrain 5 minimises these limitations. Where descriptions within the assessment identify the numbers of WTGs visible this refers to the illustrations generated and therefore the reality may differ to a degree from these impressions.

160. Daytime visualisations and wirelines show a WTG model which represents the maximum development scenario of the Project and allow the potential proportions of the WTGs and ORCPs to be understood from the visualisations.

161. A photomontage is a visualisation which superimposes an image of a Project upon a photograph or series of photographs. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed, within known views of the 'real' landscape. At present only wireline visualisations have been prepared for the Project. Photomontages will be prepared for the ES where required.

162. The 53.5 degree field of view wirelines are prepared using a planar projected image and should also be viewed flat at a comfortable arm's length. These images are each printed on paper 841 x 297mm (half A1) which provides for a relatively large scale image. Images viewed on a monitor screen should be viewed so that the image height of the 53.5 degree photomontage measures 26cm on the screen (as per the printed image height).

163. In the wirelines, the WTGs are shown with the central WTGs facing the viewer directly, with the full rotor diameter visible at its tallest extent. In the photomontages, the WTG rotors are shown with a random appearance with the central WTGs facing the viewer directly.

### 17.11.6 Information on Limitations of Visualisations

164. The photographs and other graphic material such as wirelines and photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what has been apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs. Limitations of photomontages are set out further below.

165. The photomontage visualisations of the Project (and any windfarm proposal) have a number of limitations when using them to form a judgement on visual impact. These include the following:

- A visualisation can never show exactly what the Project 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;
- The images provided give a reasonable impression of the scale of the WTGs and the distance to the WTGs 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 Project proposal these images are best viewed at the viewpoint location shown;
- The images must be printed and viewed at the correct size (260 mm by 820mm);
- Images should be held flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, 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. Images on screen should be viewed using a normal PC screen with the image enlarged to the full screen height to give a realistic impression; and
- There are practical limitations to shooting viewpoint photographs only in very good or excellent visibility and at particular times of day. The photographs shown in the visualisations show the most favourable weather conditions available during photographic survey work.

### 17.11.7 Technical Methodology - Visualisations

166. In accordance with the requirements of Landscape Institute (2019) TGN 06/19, Table 17-7 below sets out the technical information for the preparation of the photomontage visualisation figures.

Table 17-7: Technical methodology – visualisations

| Category | Details |
|---|---|
| Visualisation type | Type 4 – where survey of viewpoint locations is not required |
| Camera location | Established via hand-held Garmin GPS |
| Level of accuracy of location | c.3m (depending on satellites) |
| Camera | Nikon D750 Digital SLR. Full-frame (35 mm negative size) CMOS sensor. |
| Lens | 50 mm fixed f1.8 lens |
| Tripod | Set to approximately 1.5m. Manfrotto panoramic head set to take photographs at 20 degree increments. |

| Category | Details |
|---|---|
| Photography process | Camera used on fully manual settings. Photographs taken in RAW image format. Alternative exposures are taken for each view where necessary and those depicting the clearest images are selected to prepare the panoramic image |
| Preparation of panoramic photographs | PTGUI v12.8 is used to join and cylindrically project the images. Adobe Photoshop 2021 used to correct tonal alterations and create an even range of exposure across the photographs so that the individual photographs are not apparent. Planar panoramic images are prepared using Resoft Windfarm software or Hugin Panorama Stitcher |
| 3D Model/Visualisation | |
| Topographic height data | Ordnance Survey Terrain 5 (5m resolution). Ordnance Survey Terrain 50 (50m resolution) |
| Use of coordinates in software | Coordinates are brought in from the surveyed GPS coordinates. Positions checked using aerial photography. |
| Markers for horizontal alignment | Existing Offshore Windfarm (OWF) WTGs and their known coordinates. |
| Markers for vertical alignment | Existing OWF WTGs and their known coordinates. |
| Rendering software | Resoft Windfarm v.5.2.5.3 (WTGs in wirelines and photomontages). Sketchup or AutoCAD Map 3D 2018 (OSPs, Met Mast and jacket foundations). Autodesk 3ds Max 2018. Visual Nature Studio V 3.10. |
| Limitations | |
| Terrain data | There may therefore be local, small-scale landform that is not reflected in the data and subsequently the visualisation but may alter the real visibility of the Project, either by screening theoretical visibility or revealing parts of the Project that are not theoretically visible. |
| Movement | Static images are unable to capture the movement within the view or of the WTGs |

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