



Sporad na Mara Offshore Wind Farm

Offshore Project

Environmental Impact Assessment Report

Appendix 18.1: SLVIA Methodology, Volume, 2c

Document Reference No.: SNM-SNM-PAC-APP-1181

Date: February 2026



Quality Control Page

Document details	
Document title	Offshore Project Environmental Impact Assessment Report
Document subtitle	Appendix 18.1: SLVIA Methodology
Document Reference No.	SNM-SNM-PAC-APP-1181
Date	February 2026
Version	1.0
Author	SLR Consulting
Client Name	Spiorad na Mara Limited

Document history						
Version	Revision	Issued	Checked	Approved	Date	Comments
1.0	A	SLR Consulting	WSP	SnM Ltd	February 2026	Final for submission

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1 INTRODUCTION

1.1 OVERVIEW

1.1.1.1 This appendix of the Environmental Impact Assessment Report (EIAR) details the methodology that has been used to carry out the Seascape, Landscape and Visual Impact Assessment (SLVIA) of the proposed Spiorad na Mara Offshore Wind Farm (hereafter referred to as 'the Offshore Project'). This methodology has been prepared by chartered landscape architects at SLR Consulting Limited.

1.1.1.2 This appendix should be read in conjunction with **Chapter 18: Seascape, Landscape and Visual Impact Assessment, Volume 2a**, **Chapter 17: Military and Civil Aviation, Volume 2a**, and the project description provided in **Chapter 3: Project Description, Volume 1a**.

1.1.2 PROJECT BACKGROUND

1.1.2.1 Spiorad na Mara Limited (hereafter referred to as 'the Applicant') is proposing to develop the Project. The Project is an offshore wind farm (OWF) that will consist of up to 60 fixed-bottom wind turbine generators (WTGs).

1.1.2.2 The Project will include both offshore and onshore infrastructure. This Offshore EIAR supports the application for the offshore components of the Project as outlined in **Chapter 1: Introduction, Volume 1a**. The offshore components of the Project (the Offshore Project) includes all infrastructure and activities located seaward of Mean High Water Springs (MHWS) within the Array Area and Offshore Cable Area of Search (OCAS) (**Figure 1.2: Offshore Project Location, Volume 1b**). Further detailed information is provided in **Chapter 3, Volume 1a**.

1.1.2.3 The Offshore Project is situated off the northwest coast of Isle of Lewis/*Eilean Leòdhais* and the Array Area is located approximately 5-13 km offshore and is approximately 161 km² in size. It will comprise WTGs, foundations, Offshore Cables, Offshore Substation Platform (OSP) (if required), and Landfall. The Array Area combined with the OCAS is defined as the Offshore Project Boundary. The water depths across the Array Area range from 37 m-67 m with the southwest corner of the Array Area reaching 72 m. The proposed WTGs and fixed foundations will be located within a Turbine Area of approximately 140 km², within the Array Area.

1.2 PURPOSE OF THIS APPENDIX

1.2.1.1 The SLVIA identifies and assesses the significance of changes resulting from the Offshore Project (i.e. components of the Project seaward of MHWS including the Array Area and the OCAS on both the seascape/landscape as an environmental resource and on people's views and visual amenity).

1.2.1.2 **Chapter 18, Volume 2a** of the EIAR presents the results of the assessment of the likely significant effects of the Offshore Project with respect to seascape, landscape and visual receptors. It assesses

effects arising from the maximum design scenario defined in Section 18.7 of **Chapter 18, Volume 2a**, particularly the proposed WTGs situated within the Turbine Area of the Offshore Project Boundary, located to the northwest of the Isle of Lewis/*Eilean Leòdhais*.

1.2.1.3 This appendix describes the methodology used to undertake the SLVIA.

1.3 KEY GUIDANCE DOCUMENTS

1.3.1.1 The assessment has been undertaken in accordance with Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3) (Landscape Institute, 2013) and published clarifications in Technical Guidance Note LITGN-2024-01 (Landscape Institute, 2024).

1.3.1.2 Key sources of guidance used and referenced in the SLVIA include the following:

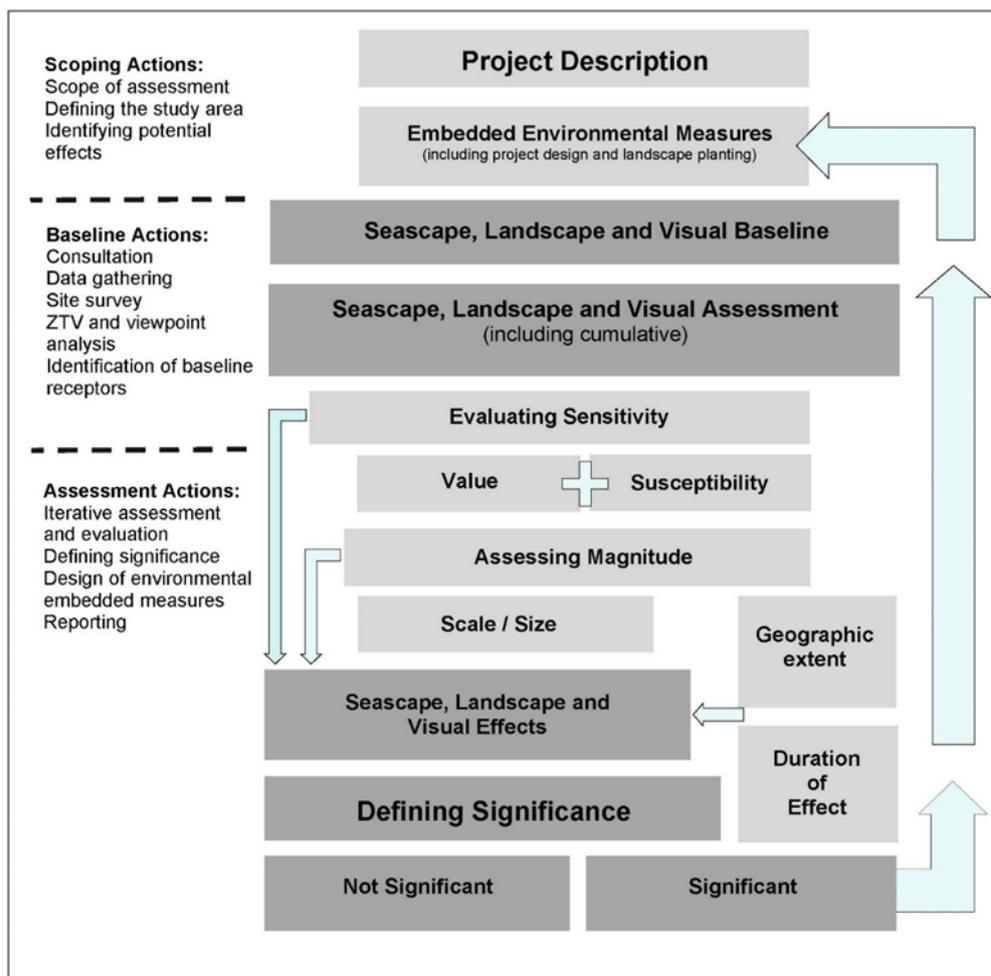
- Landscape Institute and Institute for Environmental Management and Assessment (2013). 'Guidelines for Landscape and Visual Impact Assessment: Third Edition' ('GLVIA3');
- Landscape Institute (2019). Visual Representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19;
- Landscape Institute (2019). Technical Guidance Note 2/19 Residential Visual Amenity Assessment;
- Landscape Institute (2021). TGN 02-21: Assessing landscape value outside national designations;
- Landscape Institute (2024). Technical Guidance Note LITGN-2024-01;
- NatureScot and The Countryside Agency (TCA) (2002). Landscape Character Assessment Guidance for England and Scotland;
- NatureScot (2017). Visual Representation of Wind Farms Version 2.2;
- NatureScot (2017). Siting and Designing of Windfarms in the Landscape: Version 3a;
- NatureScot (2017). Guidance Note. Coastal Character Assessment;
- NatureScot (2020). Assessing Impacts on Wild Land Areas Technical Guidance;
- NatureScot (2021). Assessing the Cumulative Impact of Onshore Wind Energy Developments;
- NatureScot (2024). NatureScot pre-application guidance for onshore wind farms;
- NatureScot (2024). Guidance on Aviation Lighting Impact Assessment;
- NatureScot (2025). Special Landscape Qualities - Guidance on Assessing Effects.

1.4 OVERVIEW OF THE SLVIA METHODOLOGY

1.4.1.1 The SLVIA assesses the likely effects of the construction, operation and maintenance (O&M), and decommissioning of the Offshore Project on the seascape, landscape and visual resource, encompassing effects on coastal character, landscape character, designated landscapes, visual effects and cumulative effects on these receptors.

1.4.1.2 An overview of the SLVIA process is illustrated, diagrammatically in **Table 1-1**.

Table 1-1: Overview of approach to SLVIA



1.4.1.3 The SLVIA is based on the project design described in **Chapter 3, Volume 1a**. In compliance with Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017, the likely significant effects of a realistic maximum design scenario are assessed and illustrated in the SLVIA. This maximum design scenario is described in **Chapter 18, Volume 2a**.

1.4.1.4 By combining assessments of sensitivity and magnitude of change, the level of seascape, landscape or visual effect can be evaluated and determined. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the Offshore Project. This is combined with an assessment of the magnitude of change which takes account of the size and scale of the proposed change. 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.

1.4.1.5 The assessment has also considered the whole project effects of the Offshore Project and Onshore Transmission Works (OTW) Project, as well as the cumulative effects likely to result from the Offshore Project and other similar 3rd party projects.

- 1.4.1.6 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).
- 1.4.1.7 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. Engagement with relevant consultees on the methodology has been undertaken, and is summarised in Section 18.3 of **Chapter 18, Volume 2a**, which has shaped the adopted approach to the SLVIA.

1.5 INFORMATION, DATA SOURCES AND SURVEYS

1.5.1 DESK STUDY

- 1.5.1.1 The assessment is initiated through a desk study of the Offshore Project and the SLVIA Study Area. This desk study identifies aspects of the seascape, landscape and visual resource that are considered in the SLVIA, including character typology, landscape related planning designations, wild land areas, operational and potential cumulative wind farms, and views from routes and settlements.
- 1.5.1.2 The desk study utilises Geographic Information System (GIS) and ReSoft Wind Farm software to explore the potential visibility of the Offshore Project. The resultant Zone of Theoretical Visibility (ZTV) diagrams and wirelines provide an indication of which receptors are likely to be key in the assessment. Landscape characterisation information and data have been obtained from the NatureScot (2019) Landscape Character Assessment in Scotland online database.
- 1.5.1.3 The data sources that have been collected and used to inform this SLVIA is summarised in **Table 1-2**.

Table 1-2: Data sources used to inform the SLVIA

Source	Summary	Coverage of study area
European Marine Observation and Data Network (EMODnet) - EMODnet Bathymetry Consortium	Bathymetry	Full coverage
Ordnance Survey (OS) 1:50,000 scale mapping	Mapping	Full coverage
OS County Region, Local Unitary Authority, Railways, Road and Settlements	Mapping	Full coverage
OS Terrain 50 Digital Terrain Model (DTM)	DTM	Full coverage
OS Terrain 5 DTM	DTM	Full coverage
Google Earth Pro	Aerial Photography	Full coverage

Source	Summary	Coverage of study area
<p><u>National Coastal Character Types</u>. Available online at: https://www.nature.scot/professional-advice/landscape/coastal-character-assessment</p>	<p>Mapping and description of coastal characterisation in Scotland and a Guidance Note on Coastal Character Assessment.</p>	<p>Full coverage</p>
<p><u>Scottish Landscape Character Types Map and Descriptions</u>. Available online at: https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions</p>	<p>Mapping and descriptions of areas of consistent and recognisable landscape character within Scotland.</p>	<p>Full coverage</p>
<p><u>SNH Review 92 - Western Isles landscape character assessment</u>. Available online at: https://www.nature.scot/doc/naturescot-review-92-western-isles-landscape-character-assessment</p>	<p>Mapping and description of the Western Isles' landscape character.</p>	<p>Full coverage</p>
<p><u>National Scenic Areas - Scotland</u>. Available online at: https://www.data.gov.uk/dataset/8d9d285a-985d-4524-90a0-3238bca9f8f8/national-scenic-areas-scotland</p>	<p>GIS dataset of National Scenic Areas.</p>	<p>Full coverage</p>
<p><u>The special qualities of the National Scenic Areas. Scottish Natural Heritage Commissioned Report No.374 (iBids and Project no 648)</u>. Available online at: https://www.nature.scot/professional-advice/landscape/coastal-character-assessment</p>	<p>Descriptions of the Special Qualities of the National Scenic Areas.</p>	<p>N/A</p>
<p><u>Wild Land Areas</u>. Available online at: https://www.data.gov.uk/dataset/6bf02e7c-c3d6-4866-85ab-92471f73b2a3/wild-land-areas</p>	<p>GIS dataset of Wild Land Areas.</p>	<p>Full coverage</p>
<p><u>Gardens and Designed Landscapes</u>. Available online at: https://www.historicenvironment.scot/advice-and-support/listing-scheduling-and-designations/gardens-and-designed-landscapes/</p>	<p>Mapping of Historic Environment Scotland's Inventory of Gardens and Designed Landscapes.</p>	<p>Full coverage</p>
<p><u>National Trust for Scotland</u>. Available online at: https://www.nts.org.uk/visit/places</p>	<p>Mapping of specific visitor attractions/tourist destinations.</p>	<p>N/A</p>
<p><u>Outer Hebrides Core Paths Plan</u>. Available online at: https://www.cne-siar.gov.uk/leisure-sport-and-culture/community-life-and-leisure/countryside-access/core-paths-planning-in-the-hebrides/</p>	<p>Mapping of core paths within the Western Isles.</p>	<p>Full coverage</p>
<p><u>National Cycle Network</u>. Available online at: https://data-sustrans-uk.opendata.arcgis.com/</p>	<p>GIS dataset of signed on-road and traffic free cycling routes across the United Kingdom (UK).</p>	<p>Full coverage</p>

Source	Summary	Coverage of study area
<u>Marine and Coastal Mapping Data, Ferry Routes.</u> Available online at: https://www.oceanwise.eu/data/	GIS dataset of marine and coastal activity around the UK, including ferry routes.	Full coverage
<u>UK Coastal Atlas of Recreational Boating.</u> Available online at: https://www.rya.org.uk/knowledge/planning-licensing/uk-coastal-atlas-of-recreational-boating	GIS dataset of recreational boating activity around the UK, including indicators of intensity of use and general boating areas.	Full coverage

1.5.2 SITE SURVEYS

- 1.5.2.1 For those receptors where a detailed assessment is required, primary data acquisition has been undertaken through a series of surveys. These surveys include field survey verification of the ZTV from coastal character areas (CCAs) and landscape character types (LCTs), micro-siting of viewpoint locations, panoramic baseline photography and visual assessment survey from all representative viewpoints. Viewpoints for the SLVIA site surveys were agreed with Comhairle nan Eilean Siar (CnES) and NatureScot following the Scoping Opinion being received and comments received from all parties regarding viewpoint locations. Attendance at 2 rounds of public consultation events (PC1 and PC2) also provided further understanding of the key receptors and sensitivities.
- 1.5.2.2 Field surveys were conducted in November 2023, July 2024, September 2024, October 2024, and March 2025 as set out in **Table 1-3**. Most of the baseline viewpoint photography was undertaken in excellent conditions in September 2024. Sea-based offshore surveys have not been undertaken as part of the SLVIA.

Table 1-3: Site surveys undertaken

Survey type	Scope of survey	Coverage of study area
Viewpoint photography surveys November 2023	Viewpoint photography	Viewpoint locations and receptors within SLVIA Study Area
Viewpoint photography surveys July 2024	Viewpoint photography	Viewpoint locations and receptors within SLVIA Study Area
Viewpoint photography surveys 04-06 September 2024	Viewpoint photography	Viewpoint locations and receptors within SLVIA Study Area

Survey type	Scope of survey	Coverage of study area
Viewpoint photography and public exhibitions 25-27 September 2024	Viewpoint photography, night-time viewpoint photography and attending public exhibitions	Viewpoint locations and receptors within SLVIA Study Area
Viewpoint photography and public exhibitions 01-03 October 2024	Viewpoint photography, night-time viewpoint photography and attending public exhibitions	Viewpoint locations and receptors within SLVIA Study Area
Viewpoint photography surveys March 2025	Viewpoint photography in National Scenic Area (NSA) and night-time viewpoint photography	Viewpoint locations and receptors within SLVIA Study Area

1.5.2.3 Field surveys included visits to several viewpoints as well as travel around the study area to consider potential effects on coastal character, landscape character, and on the experience of views seen from travel routes through the landscape. These visits have allowed the landscape character and the visual amenity of the study area to be experienced in a range of different conditions and seasonal variation. Viewpoint locations were also micro-sited in the field by the surveyor to ensure they are sited in an optimal location on the ground and accurately reflect the receptor. The field survey allows the assessors to judge the likely scale, distance, extent, and prominence of the Offshore Project directly.

1.6 STUDY AREA

- 1.6.1.1 The SLVIA Study Area covers a radius of 60 km from the boundary of the Array Area, as illustrated in **Appendix 18.6: SLVIA Figures and Photomontage Visualisations, Volume 2c - Figure 18.3: Site Location and SLVIA Study Area**. The SLVIA Study Area is measured from Array Area, which was defined at an earlier stage of work prior to the Turbine Area, and has been retained as a precautionary approach for the assessment (rather than redefining the study area to be measured from the Turbine Area).
- 1.6.1.2 The SLVIA Study Area is defined to extend far enough to include all areas within which significant effects could occur, informed by the ZTV (**Appendix 18.6, Volume 2c - Figure 18.6: Blade Tip ZTV (A3) (overview and detailed maps)**) and professional judgement. It is an outer limit to where significant effects could occur. Significant effects are unlikely to arise beyond the 60 km study area and are scoped out of the SLVIA.
- 1.6.1.3 IEMA Guidance (IEMA, 2015 and 2017) recommends a proportionate Environmental Statement focused on the significant effects and a proportionate ES topic chapter. An overly large SLVIA study area may be considered disproportionate if it makes understanding the key impacts of the Offshore Project more difficult.

- 1.6.1.4 This is supported by GLVIA3 (Landscape Institute, 2013) (para 3.16), which recommends that *“The level of detail provided should be that which is reasonably required to assess the likely significant effects”*.
- 1.6.1.5 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”*.
- 1.6.1.6 Other wind farm specific guidance, such as NatureScot’s Visual Representation of Wind Farms Guidance (NatureScot, 2017) recommends that ZTV distances are used for defining study area based on WTG height. This guidance recommends a 45 km radius for WTGs greater than 150 m to blade tip (para 48, p12), however it does not go beyond turbines above 150 m 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 Offshore Project.
- 1.6.1.7 In considering the SLVIA study area, the sensitivity of the receiving seascape, landscape and visual receptors has also been reviewed, taking account of the landscape designations shown in **Appendix 18.6, Volume 2c - Figure 18.5: Landscape Designations**, in particular the South Lewis, Harris and North Uist NSA/ *Siorrachd Leòdhais a Deas, na Hearadh agus Uibhist a Tuath* and associated visual receptors.
- 1.6.1.8 The SLVIA study area has been reviewed and refined in response to design refinements of the Offshore Project, the identification of impact pathways and feedback from consultation.
- 1.6.1.9 A number of consultees in their consultation responses referred to a precautionary approach that might consider a wider radius to include St Kilda/*Hiort* (World Heritage Site and NSA) as well as the Flannan Isles/*Na h-Eileanan Flannach*. The SLVIA study area includes the Flannan Isles/*Na h-Eileanan Flannach*, which are within 60 km of the Array Area (**Appendix 18.6, Volume 2c - Figure 18.3: Site Location and SLVIA Study Area**) and a wireline viewpoint is presented in **Appendix 18.6, Volume 2c - Figure 18.46: Viewpoint 22**.
- 1.6.1.10 With respect to St Kilda/*Hiort*, the closest point of the St Kilda NSA (the island of Boreray/*Boraraigh*) is approximately 105 km from the Turbine Area. The ZTV (**Appendix 18.6, Volume 2c - Figure 18.7: Blade Tip ZTV (A3) (overview and detailed maps)**), at A3, and **Appendix 18.6, Volume 2c - Figure 18.8: Blade Tip ZTV (A1)** indicates that there will be no theoretical visibility at sea level beyond approximately 75 km from the Turbine Area (due to the influence of earth curvature). While there may be theoretical visibility from more elevated areas of St Kilda/*Hiort* at heights well above sea level, at distances of 105 km and beyond, it is unlikely that WTGs within the Turbine Area would be distinguishable to the eye to any significant degree, prevailing visibility conditions are likely to entirely prevent visibility at such range, and it is assessed there would be no potential for significant effects on the St Kilda NSA special qualities at such range and for that reason, St Kilda NSA has been scoped out of the SLVIA Study Area.

1.6.1.11 The spatial scope of the SLVIA is therefore defined by the SLVIA study area covering a radius of 60 km from the Array Area, as illustrated in **Appendix 18.6, Volume 2c - Figure 18.3**. Potential impacts on seascape, landscape, and visual amenity from the Offshore Project outside of the 60 km study area are scoped out of this assessment as they are considered unlikely to result in significant effects.

1.7 INTERFACE BETWEEN OFFSHORE SLVIA AND ONSHORE LVIA

1.7.1.1 'Seascape, landscape and visual' effects of the Offshore Project have been assessed as an offshore technical aspect (in the SLVIA **Chapter 18, Volume 2a**) and 'landscape and visual' effects of the OTW Project have been assessed as an onshore technical aspect (in the EIAR for the OTW Project). This approach was discussed and agreed with relevant consultees and provides clarity on the impacts arising from the Offshore Project and the OTW Project. Further assessment of impacts on the same receptor arising from both the Offshore Project and OTW Project are also described in the whole project effects assessment (Section 18.13 of **Chapter 18, Volume 2a**).

2 TYPES OF SEASCAPE, LANDSCAPE AND VISUAL EFFECT

2.1 APPROACH TO ASSESSMENT OF SEASCAPE AND LANDSCAPE EFFECTS

- 2.1.1.1 The Marine Policy Statement (MPS) (UK Government, 2011) states *"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"*.
- 2.1.1.2 In England, seascape characterisation includes both the sea surface and what lies below the waterline, however in Scotland, *"the focus is on the coast and its interaction with the sea and hinterland, relationships that are quite distinctive in the Scottish context"* (NatureScot, 2017).
- 2.1.1.3 Given the definition in the MPS and the NatureScot coastal character assessment guidance, the assessment of seascape character effects in this SLVIA focuses on areas of onshore landscape with views of the coast or seas/marine environment, in other words the 'coastal character', on the premise that the most important effect of offshore wind farms is on the perception of the character of the coast.
- 2.1.1.4 Coastal character is the *"distinct, recognisable and consistent pattern of elements on the coast, land and sea that makes one part of the coast different from another"* (NatureScot, 2017) and is made up of the margin of the coastal edge, its immediate hinterland and areas of sea.
- 2.1.1.5 The extent of the coast is principally influenced by the dominance of the sea in terms of physical characteristics, views and experience. The landward extent of the coast can be narrow where edged by cliffs or settlement; or broad where it includes raised beaches, dunes, or more open coastal pasture or machair. The major determinant in defining the landward and seaward components of the coast is the sea – the key characteristic. The term 'seascape' is used in broad terms for the type of assessment undertaken, however 'coastal character' is used when assessing the effects of the Offshore Project on defined receptors.
- 2.1.1.6 CCAs, as defined in the NatureScot Coastal Character Assessment Guidance (NatureScot, 2017), have been defined for the assessment of effects on coastal character. CCAs are defined and described using the approach in NatureScot, 2017 and are represented as a simple colour line along the coast in **Appendix 18.6, Volume 2c - Figure 18.4: Landscape and Coastal Character**.
- 2.1.1.7 The effect of the Offshore Project on coastal character is considered within the boundaries of defined CCAs and the immediately adjacent LCT covering its hinterland, as defined in **Appendix 18.6, Volume 2c - Figure 18.4**, where there is a strong visual relationship with the sea/tidal waters and coastal landscapes such as dunes or cliffs.
- 2.1.1.8 Due to its scale, distance from shore, and extent of visibility, it is necessary to consider the effects of the Offshore Project on both coastal character and landscape character.

2.1.1.9 The effect of the Offshore Project on landscape character is considered on LCTs outside and inland of these CCAs and coastal LCTs, where there may be some intervisibility of the Offshore Project, but where the land is unlikely to have a strong visual relationship with the sea/tidal waters. These LCTs are identified in **Appendix 18.6, Volume 2c - Figure 18.4**. In general, they are considered unlikely to experience significant character effects as a result of the Offshore Project because it is located in the sea, and these landscapes do not have a strong visual relationship with the sea and their character is fundamentally defined by other characteristics.

2.1.1.10 Where detailed assessment of CCAs is required, effects are assessed on the discrete aspects of coastal character as defined in the coastal character assessment guidance (NatureScot, 2018) follows:

- Maritime influences and experience from the sea;
- Character of the coastal edge and its immediate hinterland;
- Extent of human activity;
- Views and visibility (visual assessment).

2.1.1.11 The assessment of effects on coastal character focuses upon the experiential characteristics that may be affected by Offshore Project, rather than physical characteristics (which will not be affected by offshore development).

2.2 CATEGORIES OF EFFECT

2.2.1.1 The SLVIA is intended to determine the effects that the Offshore Project would have on the seascape, landscape and visual resource. For the purpose of assessment, the potential effects on the seascape, landscape and visual resource are grouped into 3 categories: seascape/landscape effects, visual effects, and cumulative effects, each of which is briefly described as follows.

2.2.2 SEASCAPE/LANDSCAPE EFFECTS

2.2.2.1 In respect of the Offshore Project, the potential seascape/landscape effects, occurring during the construction, O&M, and decommissioning periods of the Offshore Project may include, but are not restricted to the following:

- Changes to coastal character/landscape character and qualities: coastal/landscape character may be affected through the incremental effect on the perception of characteristic elements, landscape patterns and qualities (including experiential characteristics) and the addition of new features, the magnitude of which is sufficient to alter the perceived coastal character/landscape character within a particular area;
- Changes to the perceived character of designated landscapes: that will affect the perceived special landscape qualities underpinning the designation and potentially its integrity;

2.2.2.2 Effects on coastal character and landscape character arising from the Offshore Project will be indirect effects, which will be perceived from the wider landscape, outside the Array Area.

2.2.3 VISUAL EFFECTS

2.2.3.1 The SLVIA considers the effect of the Offshore Project on views and visual amenity. Visual effects include effects on visual receptors, i.e. groups of people that may experience an effect, and views (viewpoints). The visual assessment is carried out as follows:

- An assessment of the effects of the Offshore Project on views from principal visual receptors, including residents of settlements, motorists using roads, people using recreational routes, features and attractions throughout the study area (as ascertained through the baseline study);
- An assessment of the effects of the Offshore Project on representative viewpoints that have been selected to assess the effect on locations relevant to these visual receptors and from specific viewpoints, chosen because they are key or promoted viewpoints in the landscape.

2.2.4 CUMULATIVE EFFECTS

2.2.4.1 The cumulative effects assessment (CEA) assesses the cumulative impacts of the Offshore Project in combination with other (3rd party) developments (and the contribution of the Offshore Project to those impacts) on the same single receptor or resource. Cumulative seascape, landscape, and visual effects arise where the study areas for 2 or more projects overlap so that both are experienced at proximity where they may have a greater incremental effect, or where projects may combine to have a sequential effect, irrespective of any overlap in study areas. This means that the addition of the Offshore Project to a situation where other projects are apparent in a potential future baseline context (such as with consented and application stage projects) may result in a greater effect than where the Offshore Project is seen in isolation. The main assessment of the effects of the Offshore Project takes into account its addition to a baseline landscape that contains the operational/under construction projects.

2.2.5 COMBINED EFFECTS

2.2.5.1 The combined effects assessment undertaken in Section 18.13 of **Chapter 18, Volume 2a** considers likely significant effects from multiple impacts and activities from the construction, operation and maintenance, and decommissioning phases of the Offshore Project on the same receptor, or group of receptors.

2.2.5.2 Combined effects could potentially arise in one of two ways. The first type of combined effect is a Project lifetime effect, where multiple phases of the Project (construction, operation and maintenance, and decommissioning) interact to create a potentially more significant effect on a receptor than in one phase alone.

2.2.5.3 The second type of combined effect is receptor-led effects. Receptor-led effects are where effects from different environmental aspects combine spatially and temporally on a receptor. These effects may be short-term, temporary, transient, or longer-term. Effects on seascape, landscape and visual receptors also have the potential to have secondary effects on other receptors and these effects are fully considered in the topic-specific chapters.

2.2.6 WHOLE PROJECT EFFECTS

2.2.6.1 A separate application for the Project's onshore elements (infrastructure landwards of Mean Low Water Springs (MLWS)) within the OTW Project is being made under the Town and Country Planning (Scotland) Act 1997 to CnES.

2.2.6.2 A separate EIAR is being prepared for the OTW Project which will provide a description of the onshore elements of the Project landward of MLWS, that will include an assessment of the associated likely significant effects.

2.2.6.3 The Offshore Project infrastructure and activities are the focus of the SLVIA. However, there is the potential for pathways to exist for the OTW Project to impact receptors that are also affected by the Offshore Project, and these have been assessed in the Whole Project Assessment in Section 18.14 of **Chapter 18, Volume 2a**.

2.3 SIGNIFICANCE OF EFFECTS

2.3.1.1 The objective in assessing the effects of the Offshore Project is to predict the significant effects on the seascape, landscape, and visual resource. The Environmental Impact Assessment (EIA) Regulations require that the direct and indirect significant effects of the Offshore Project are identified, described and assessed, and therefore the SLVIA effects are assessed to be either significant or not significant. The SLVIA does not define intermediate levels of significance as the EIA Regulations do not provide for these. GLVIA3 also provides guidance on this, noting that (paragraphs 3.32 and 3.33): *'LVIA's should always distinguish clearly between what are considered to be the significant and non-significant effects...it is not essential to establish a series of thresholds for different levels of significance of landscape and visual effects, provided that it is made clear whether or not they are considered significant'*.

2.3.1.2 The significance of effects is assessed through a combination of the sensitivity of the coastal character/landscape character receptor or view and the magnitude of change that would result from the addition of the Offshore Project. While this methodology is not reliant on the use of a matrix to determine the conclusion of a significant or not significant effect, a matrix is included in

- 2.3.1.3 **Table 2-1** to illustrate how combinations of sensitivity and magnitude of change ratings can give rise to significant effects. On this basis, potential impacts are assessed as of Negligible, Minor, Moderate-Minor, Moderate, Major-Moderate, and Major significance. In those instances where the magnitude has been assessed as 'no change', the level of effect is recorded as 'no effect'.
- 2.3.1.4 For the purposes of this assessment, any effects with a significance level of Major and Major-Moderate have been deemed significant (red shaded boxes in **Table 2-1**). Moderate levels of effect have the 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 (orange shaded boxes in **Table 2-1**). GLVIA3 clarification note 3(5) supports this approach and states that *"moderate effects may or may not be significant and justification would be needed in the methodology or receptor assessment as to whether a moderate effect is significant or not"*. The assessments of significance for Moderate levels of effect are therefore explained as part of the assessment, where they occur.
- 2.3.1.5 Significance thresholds can therefore vary depending on the sensitivity and magnitude, however in all cases, a significant effect is considered more likely to occur where a combination of the variables results in the Offshore Project having a defining effect on the coastal/landscape character or view. Definitions are not provided for the individual categories of significance shown in the matrix and the reader should refer to the detailed definitions provided for the factors that combine to inform sensitivity and magnitude. Effects assessed as being either Moderate-Minor, Minor, or Negligible level are deemed as not significant (white boxes in **Table 2-1**).
- 2.3.1.6 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.

Table 2-1: Matrix used to guide determination of effect significance

	Magnitude of Change					
Sensitivity to Change	Negligible	Low	Medium-low	Medium	High-medium	High
Low	Negligible (Not Significant)	Negligible (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Moderate - minor (Not Significant)	Moderate (either Significant or Not Significant)
Medium-low	Negligible (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Moderate - minor (Not Significant)	Moderate (either Significant or Not Significant)	Moderate (either Significant or Not Significant)
Medium	Minor (Not Significant)	Minor (Not Significant)	Moderate-minor (Not Significant)	Moderate (either Significant or Not Significant)	Moderate (either Significant or Not Significant)	Major - Moderate (Significant)
High-medium	Minor (Not Significant)	Moderate - minor (Not Significant)	Moderate (either Significant or Not Significant)	Moderate (either Significant or Not Significant)	Major - Moderate (Significant)	Major (Significant)
High	Minor (Not Significant)	Moderate - minor (Not Significant)	Moderate (either Significant or Not Significant)	Major - Moderate (Significant)	Major (Significant)	Major (Significant)

2.3.1.7 A significant effect occurs where the Offshore Project would provide one of the defining influences on a landscape element, coastal/landscape character receptor or view; or where changes of a lower magnitude occur on a landscape element, landscape character receptor, or view that is of particularly high sensitivity. A not significant effect occurs where the effect of the Offshore Project is not material, whereby the baseline characteristics of the landscape element, coastal/landscape character receptor or view continue to provide the definitive influence, or where the small scale of change experienced by a high sensitivity receptor is such as to be considered not significant.

2.3.1.8 Significant cumulative effects occur where the addition of the Offshore Project to various scenarios of other relevant existing and proposed wind farms would lead to wind farm development becoming one of the prevailing characteristics of a view or landscape or where the Offshore Project adversely contrasts with the scale or design of an existing or proposed development.

3 ASSESSMENT OF SEASCAPE/LANDSCAPE EFFECTS

3.1 ASSESSMENT OF EFFECTS ON SEASCAPE/LANDSCAPE CHARACTER

3.1.1 OVERVIEW

3.1.1.1 The purpose of assessing the effects on seascape and landscape character is to identify the potential effects of the Offshore Project, determine which coastal and landscape character receptors might be affected, and evaluate whether these impacts would be significant or not significant. The methodology for the assessment of effects on coastal character and landscape character involves the undertaking of a baseline study, evaluation of sensitivity, magnitude of change, and an assessment of significance.

3.1.2 SEASCAPE/LANDSCAPE BASELINE AND SCOPE OF ASSESSMENT

3.1.2.1 The seascape/landscape baseline provides an understanding of the seascape/landscape in the area that may be affected - its constituent elements, its character, distinctiveness, condition, value and qualities, and the way this varies spatially. The seascape/landscape baseline describes aspects of the seascape/landscape that may be significantly affected. Establishing the seascape/landscape baseline will, when reviewed alongside the description of the Offshore Project, form the basis for the identification and description of the effects of the Offshore Project on that baseline. The baseline description of the landscape that may be affected is primarily determined by the physical footprint of the Offshore Project components and their ZTV.

3.1.2.2 An overview of the seascape/landscape baseline is described, and a preliminary assessment identifies landscape receptors that may experience significant effects, which are then required to be assessed in full. A detailed description of the baseline is provided for each landscape receptor that may experience significant effects. Those receptors for which significant effects and significant cumulative effects are not predicted are scoped out of the subsequent detailed assessment but are noted with reasons given for their exclusion.

3.1.2.3 The baseline study of each seascape/landscape character receptor collates and presents information relevant to the assessment drawn from a combination of desk study and fieldwork. The baseline study covers the following issues:

- The description of the coastal character and landscape character receptor drawn from the relevant documentation such as the Landscape Character Assessment or citations in respect of landscape designations;
- A description of the coastal character or landscape character receptor based on fieldwork to determine the strength of character displayed and how typical or not the coastal character or landscape character receptor is in relation to documented descriptions;

- Those features and patterns of the landform, land-cover, and land use which make the coastal character or landscape character receptor distinctive, or individually or in combination can be judged to have particular qualities worth considering further;
- The visual and sensory experience of the landscape and how it associates with other landscapes including, in particular, the landscape character receptor where the Offshore Project is located;
- How change in this coastal character or landscape character receptor, either through natural or human processes, is presently affecting character and how they are predicted to affect character in the future. This may include operational wind farms where they are a feature of the baseline landscape context.

3.1.2.4 The seascape/landscape baseline also describes current pressures that may cause change in the landscape in the future, for example, with respect to renewable energy, drawing on information for wind energy developments that are not yet present in the landscape but are at other stages in the consenting process. Operational and under construction wind energy developments are regarded as part of the baseline landscape character of the area. Any changes resulting from the Offshore Project are assessed within this context in the assessment of landscape and visual effects.

3.1.3 SENSITIVITY OF SEASCAPE/LANDSCAPE CHARACTER RECEPTORS

3.1.3.1 The sensitivity of a coastal character or landscape character receptor is an expression of the combination of the judgements made about the susceptibility of the receptor to the type or nature of change proposed and the value related to that receptor.

Value of the Seascape/Landscape Receptor

3.1.3.2 The value of a seascape/landscape character receptor is classified as high, high-medium, medium, medium-low, or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following range of factors:

- Seascape/landscape designations: A receptor that lies within the boundary of a recognised seascape/landscape related planning designation will be of increased value, depending on the proportion of the receptor that is covered and the level of importance of the designation; international, national, regional, or local. It is important to note that the absence of designations does not preclude local resource value, as an undesignated seascape/landscape character receptor may be important as a resource in the local or immediate environment, particularly when experienced in comparison with other nearby landscapes;
- Seascape/landscape quality: The quality of a seascape/landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place and distinctiveness, rarity and representativeness and the extent to which these attributes have remained intact. A seascape/landscape with consistent, intact and well-defined, distinctive attributes is generally considered to be of higher quality and in turn, higher value than a landscape where the introduction of uncharacteristic elements has detracted from its inherent attributes;

- Seascap/landscap expericnc: Thc expericnc of thc seascap/landscap charactcr rcccptor can add to its valuc and rclatcs to a numbcr of factors including thc pcrccptual rcsponscs it cvokcs, thc cultural associat ions that may exist in litcraturc or history, or thc iconic status of thc landscapc in its own right, thc rccrcational valuc of thc landscapc for outdoor pursu its, and thc contribut ion of othcr valucs rclating to thc naturc conservation or archaicology of thc arc.

Susceptibility to Change

3.1.3.3 Thc suscept ibility of a seascap/landscap charactcr rcccptor to changc is a rcflect ion of its ability to accommodatc thc changcs that would occur as a rcsult of thc typc or naturc of changc proposcd. Thc assessmct of thc suscept ibility of thc seascap/landscap rcccptor to changc is classificd as high, high-mcdium, mcdium, mcdium-low, or low and thc basis for this assessmct is madc clcar using cvidcncc and profcssional judgcmct, bascd on thc following critcria:

- Thc typc or naturc of changc proposcd: Thc suscept ibility of landscap rcccptors is assesscd in rclation to changc arising from thc spccific typc and naturc of dcvclopmct proposcd;
- Coastal/landscap charactcr: Thc key charactcristics of thc exist ing seascap/landscap is considcrd in thc cvaluat ion of suscept ibility as thc dcgrcc to which thc rcccptor may accommodatc thc influcncc of thc typc or naturc of changc proposcd is dctcrmincd. For examplc, a landscapc that is of a particularly wild and rcmotc charactcr may havc a highcr suscept ibility to thc influcncc of thc typc or naturc of changc proposcd duo to thc contrast that it would havc with thc landscapc, whcrcas a dcvclopcd, industrial landscapc, whcrc built clcmcnts and structurcs arc alrcady part of thc coastal/landscap charactcr, may havc a lowcr suscept ibility. Howcvcr, thcrc arc instanccs whcn thc quality of a landscapc may havc bccn dcvgradcd to an extcnt whcrcby it is considcrd to bc in a fragilc statc and thcrcforc a dcvgradcd landscapc may havc a highcr suscept ibility to thc typc or naturc of changc proposcd;
- Seascap/landscap associat ion: Thc extcnt to which thc typc or naturc of changc proposcd would influcncc thc charactcr of thc coastal/landscap charactcr rcccptors across thc study arc, rclatcs to thc associat ions that exist bctwccn thc landscapc rcccptor whcrc thc Offshorc Projct is locatcd and thc landscapc rcccptor from which thc typc or naturc of changc is bcing expericncd. In somc situat ions, this associat ion would bc strong whcrc thc seascapcs/landscapcs arc directly rclatcd, for examplc thc influcncc on a valley landscapc by an enclosing upland landscapc whcrc thc Offshorc Projct is set along thc skyline, and in othcr situat ions weak whcrc thc landscapc associat ion is less important; for examplc, whcrc thc Offshorc Projct lies inland of a coastal landscapc that has its main focus outwards ovcr thc sca.

Sensitivity Rating

3.1.3.4 An overall sensitivity assessmct of thc seascap/landscap rcccptor is madc by combining thc assessmct of thc valuc of thc seascap/landscap charactcr rcccptor and its suscept ibility to changc. An overall lcvcl of sensitivity is applicd for each seascap/landscap rcccptor: high, high-

medium, medium, medium-low, and low; by combining individual assessments of the value of the receptor and its susceptibility to change. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table 3-1**.

Table 3-1: Sensitivity to Change – Seascape/Landscape Receptors

Criteria tending towards higher or lower sensitivity			
Value	High —————▶	Medium —————▶	Low
	<ul style="list-style-type: none"> • Designated seascapes/landscapes with national policy level protection or defined for their natural beauty; • Higher quality seascapes/landscapes with consistent, intact and well defined, distinctive attributes; • Rare or unique seascape/landscape character types or features; • Aesthetic or perceptual aspects of designated wildlife, ecological, geological or cultural heritage features that contribute to landscape character and local/regional identity; • Evidence that the seascape/landscape is valued or used substantially for recreational activity; • Seascape/landscape with perceptual qualities of wildness, remoteness or tranquillity; • Seascape/landscape with strong cultural associations that contribute to perceptions of scenic quality. 		<ul style="list-style-type: none"> • Seascapes/landscapes without formal designation; • Despoiled or degraded seascape/landscape with little or no evidence of being valued by the community; • Lower quality seascapes/landscapes with indistinct elements or features that detract from its inherent attributes; • Widespread or ‘common’ landscape/seascape character types or features; • Limited or no wildlife, ecological, geological or cultural heritage features, or limited contribution to landscape/seascape character and identity; • No evidence that the seascape/landscape is used for recreational activity; • Seascape/landscape with inherent character has been changed by human activity; • Seascape/landscape with few cultural associations.
Susceptibility to change	High —————▶	Medium —————▶	Low
	<ul style="list-style-type: none"> • Seascape/landscape key characteristics which are likely or liable to be influenced by the type or nature of change proposed; 		<ul style="list-style-type: none"> • Seascape/landscape characteristics which are unlikely or not liable to be influenced by the type or nature of change proposed;

Criteria tending towards higher or lower sensitivity		
	<ul style="list-style-type: none"> Seascape/landscape vulnerable or fragile to change through the loss or addition of features that would alter key seascape/landscape characteristics; Seascape/landscape which lacks the ability to resist/accommodate the change that is likely to occur as a result of the type or nature of change proposed; Seascape/landscape of high quality/in good condition; Aesthetic or perceptual aspects of landscape are susceptible to changes associated with the type or nature of change proposed; Strong or direct association between Offshore Project and the landscape receptor; Seascape/landscape which is directly exposed to the type or nature of change proposed and has highest degree of exposure. 	<ul style="list-style-type: none"> Robust landscape, able to accommodate change or loss of features without altering key characteristics; Seascape/Landscape which has the ability to resist/accommodate the change that is likely to occur as a result of the type or nature of change proposed; Seascape/landscape of low quality/in poor condition; Aesthetic or perceptual aspects of landscape may accommodate changes associated with features of type or nature of change proposed; Weak and indirect association between the landscape receptor and the type or nature of change proposed; Seascape/landscape which is not directly exposed to the type or nature of change proposed and has degree of concealment/screening.
Sensitivity to change	High —————> Medium —————> Low	

3.1.4 MAGNITUDE OF CHANGE ON SEASCAPE/LANDSCAPE CHARACTER RECEPTORS

3.1.4.1 The magnitude of change on views is primarily an expression of the scale of the change that would result from the Offshore Project and is dependent on a number of variables regarding the size or scale of the change. An assessment is also made of the geographical extent of the area over which this would occur and the duration and reversibility of such changes. The basis for this assessment is made clear using evidence and professional judgement, based on the following criteria.

Size or Scale of Change

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

- The degree to which the pattern of elements that makes up the seascape/landscape character would be altered by the Offshore Project, through removal or addition of elements in the

seascape/landscape, in this instance. The magnitude of change would generally be higher if key features that make up the landscape character are extensively removed or altered, and if many new components are added to the landscape;

- The extent to which the Offshore Project would change, physically or perceptually, the characteristics, and any qualities identified that may be important in the creation of the distinctive character of the seascape/landscape. This may include the scale of the landform, its relative simplicity or irregularity, the nature of the landscape context, the grain or orientation of the seascape/landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the Offshore Project with these key characteristics;
- The degree to which seascape/landscape character receptors would be changed by the addition of the Offshore Project, in place of or in addition to, baseline wind energy developments that are already present in the seascape/landscape. If the Offshore Project is located in a seascape/landscape receptor that is already affected by wind energy development, this may reduce the magnitude of change, particularly if there is a high level of integration and the developments form a unified and cohesive feature in the landscape. The converse could also be applicable;
- The seascape/landscape context in which the Offshore Project and other wind energy development are located. If the Offshore Project is located in a similar seascape/landscape context, the magnitude of change is likely to be lower as they relate consistently to key seascape/landscape characteristics. If developments are located in different seascape/landscape settings, this can lead to a perception that wind energy development affects a wide range of seascapes/landscapes;
- In relation to designated seascape/landscapes, the degree of change is considered against the special landscape qualities, which underpin the designation and the impact 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;
- The scale of the seascape/landscape, landform and patterns of the landscape. A large-scale landscape can provide a more appropriate receiving environment than a more intimate, small-scale setting where development may result in uncomfortable scale comparisons and increase the magnitude of change;
- The distance between the seascape/landscape character receptor and the Offshore Project. Generally, the greater the distance, the lower the scale of change as the Offshore Project would constitute a less apparent influence on the seascape/landscape character;
- The extent of the Offshore Project that would be seen from the seascape/landscape receptor. Visibility of the Offshore Project may range from 1 turbine blade tip to all of the turbines, and generally the greater the extent of the Offshore Project that can be seen, the greater the change.

Geographical Extent

3.1.4.3 The geographical extent over which the seascape/landscape effects would be experienced is also assessed as a modifier of the magnitude of change, which is distinct from the size or scale of effect. The extent of the effects varies depending on the specific nature of the Offshore Project and is principally assessed through analysis of the extent of physical change to the landscape or the extent to which the experience of that seascape/landscape character would change through visibility of the Offshore Project. This evaluation expresses the extent of the receptor that would experience a particular magnitude of change and can affect the geographical extents of the significant and non-significant effects.

Duration and Reversibility

3.1.4.4 The duration and reversibility of landscape effects are based on the period over which the Offshore Project is likely to exist and the extent to which the Offshore Project would be removed, and its effects reversed at the end of that period. Where relevant, duration and reversibility are stated separately in relation to the assessed effects.

Magnitude of Change Rating

3.1.4.5 An overall assessment of the magnitude of change resulting from the Offshore Project on the landscape receptor is made by combining the assessments of size or scale of change and geographical extent. The basis for the assessment of magnitude for each receptor is made clear using evidence and professional judgement. The levels of magnitude of change that can occur are defined as follows:

- High: the Offshore Project would result in a major alteration to the baseline characteristics of the seascape/landscape, providing the prevailing influence and/or introducing elements that are uncharacteristic in the receiving seascape/landscape;
- Medium-high: intermediate rating with combination of criteria from high magnitude (described above) and medium magnitude (described below);
- Medium: the Offshore Project would result in a moderate alteration to the baseline characteristics of the seascape/landscape, providing a readily apparent influence and/or introducing elements potentially uncharacteristic in the receiving seascape/landscape;
- Medium-low: intermediate rating with combination of criteria from medium magnitude (described above) and low magnitude (described below);
- Low: the Offshore Project would result in a minor alteration to the baseline characteristics of the seascape/landscape, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving seascape/landscape;
- Negligible: the Offshore Project would result in a negligible alteration to the baseline characteristics of the seascape/landscape, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the receiving seascape/landscape;

- None: the Offshore Project would result in no change to the baseline characteristics of the landscape.

3.1.4.6 Criteria that tend towards higher or lower magnitude of change are set out in **Table 3-2**.

Table 3-2: Magnitude to Change Criteria – Seascape/Landscape Receptors

Criteria tending towards higher or lower sensitivity			
Size of scale of change	High	Medium	Low
		<ul style="list-style-type: none"> • Major loss of existing seascape/landscape elements which contribute to the landscape character; • Major alteration to pattern of elements, or perception of seascape/landscape pattern, through removal or addition of seascape/landscape elements; • Major change to key characteristics which define the distinctive character of the seascape/landscape; • Offshore Project located within or close to seascape/landscape receptor and results in large scale change to its seascape/landscape character; • Large amount of Offshore Project visible resulting in higher scale of change; • Offshore Project contrasts with other existing wind farms in pattern, scale and relationship to key characteristics, creating a confusing or inconsistent image or relationship to key characteristics. 	
Geographic extent	High	Medium	Low
	<ul style="list-style-type: none"> • Wide extent of physical change to the landscape; • Offshore Project is visible over long distances; 		<ul style="list-style-type: none"> • Limited extent of physical change to the seascape/landscape; • Offshore Project is visible only at short range;

Criteria tending towards higher or lower sensitivity		
	<ul style="list-style-type: none"> Offshore Project is visible from widespread areas/extensive parts of seascape/landscape receptor; Visibility/views of Offshore Project occur over a wider area represented by multiple seascape/landscape receptors. 	<ul style="list-style-type: none"> Offshore Project is visible from restricted areas/limited parts of seascape/ landscape receptor; Visibility/view of Offshore Project is unique to a particular location of seascape/landscape.
Magnitude of change	High —————> Medium —————> Low	

3.1.5 SIGNIFICANCE OF EFFECTS ON SEASCAPE/LANDSCAPE CHARACTER RECEPTORS

3.1.5.1 The effect on each seascape/landscape character receptor is dependent on all of the factors considered in the sensitivity of the receptor, and the magnitude of change resulting from the Offshore Project. These judgements on sensitivity and magnitude are then combined to arrive at an overall assessment as to whether the Offshore Project would have an effect that is significant or not significant on the seascape/landscape character receptor. An assessment of the factors considered in the evaluation of the sensitivity of each seascape/landscape character receptor and the magnitude of the change resulting from the Offshore Project are presented in the assessment in order that the relevant considerations which have informed the significance can be considered transparently. The matrix shown in **Table 2-1** helps to inform the threshold of significance when combining sensitivity and magnitude to assess significance.

3.1.5.2 A significant effect would occur where the combination of the variables results in the Offshore Project having a defining effect on the seascape/landscape character receptor, or where changes of a lower magnitude occur on a seascape/landscape character receptor that is of particularly high sensitivity. A not significant effect would occur where the effect of the Offshore Project is not definitive, and the seascape/landscape character of the receptor continues to be characterised principally by its baseline characteristics, or where the small scale of change experienced by a high sensitivity receptor is such as to be considered not significant. A major loss or irreversible effect over an extensive area, on elements and/or perceptual aspects that are key to the character of nationally valued landscapes are likely to be of greatest significance. Reversible effects, over a restricted area, on elements and/or perceptual aspects that contribute to but are not key characteristics of the character of seascape/landscapes that are of lower value, are likely to be of least significance.

3.1.6 ASSESSMENT OF EFFECTS ON SPECIAL LANDSCAPE QUALITIES (AELSQ)

3.1.6.1 The methodology for the Assessment of Effects on Special Landscape Qualities (AELSQ) of the South Lewis, Harris and North Uist NSA follows guidance produced jointly by NatureScot, the

Cairngorm National Park Authority (CNPA) and the Loch Lomond and Trossachs National Park Authority (LLTNPA) (Special Landscape Qualities - Guidance on assessing effects, January 2025). The AESLQ arising from the Offshore Project is undertaken in **Appendix 18.4, Volume 2c**.

3.1.6.2 The following section sets out the four steps of the assessment process. A checklist covering these steps is included as Annex 1 to this guidance, including markers for what needs to be produced by the end of each step.

3.1.6.3 The assessment process follows four main steps:

- Step 1 – The Offshore Project is described (see the project description in **Chapter 3, Volume 1a** and the MDS for the SLVIA in **Chapter 18, Volume 2a**).
- Step 2 – The study area for the AESLQ is defined within the NSA and the SLQs that may be affected by the Offshore Project are identified (these were agreed in consultation with NatureScot).
- Step 3 – Assessment of effects on SLQs is undertaken within defined 'sub-areas' within the NSA (**Appendix 18.4, Volume 2c**).
- Step 4 – The significant effects on SLQs are summarised (**Chapter 18, Volume 2a**).

3.1.6.4 The AESLQ focuses on likely significant effects on relevant SLQs, is proportionate to the scale and nature of the Offshore Project and provides a clear explanation of the reasoning underpinning judgements on effects.

3.1.6.5 The significance of effects on SLQs is assessed, in the same way as other landscape receptors, through a combination of judgements on sensitivity and magnitude to arrive at an overall assessment as to whether the Offshore Project would have an effect that is significant or not significant on the SLQ.

4 ASSESSMENT OF VISUAL EFFECTS

4.1.1 OVERVIEW

4.1.1.1 The assessment of visual effects is an assessment of how the introduction of the Offshore Project would affect the views available to people and their visual amenity. The assessment of visual effects is carried out in 2 parts:

- An assessment of the effects that the Offshore Project would have on a series of viewpoints that have been selected to represent the views available to people from representative or specific locations within the study area;
- An assessment of the effects that the Offshore Project would have from principal visual receptors, including residents of settlements, motorists using roads and people using recreational routes, features and attractions throughout the study area.

4.1.1.2 The objective of the assessment of effects on visual receptors is to determine what the likely effects of the Offshore Project would be on the people experiencing views across the study area, and whether these effects would be significant or not significant. The methodology for the assessment of visual effects involves the undertaking of a baseline study, evaluation of sensitivity, magnitude of change and an assessment of significance.

4.1.2 VISUAL BASELINE AND PRELIMINARY ASSESSMENT

4.1.2.1 The visual baseline establishes the area in which the Offshore Project may be visible, the different groups of people who may experience views of the Offshore Project, the viewpoints where they would be affected and the nature of the views at those points. The baseline description of the groups of people (referred to as visual receptors) and viewpoints that may be affected is primarily determined by the ZTV (**Appendix 18.6, Volume 2c - Figure 18.6**). An overview of the visual baseline is described, and a preliminary assessment identifies visual receptors that may experience significant effects, which are then required to be assessed in full. A full description of the baseline is provided for each visual receptor that may experience significant effects. Those receptors for which likely significant effects which are not predicted are scoped out of further detailed assessment but are noted with reasons given for their exclusion. The baseline study establishes the visual baseline in relation to the following matters:

- The area from which the Offshore Project may be visible, that is land from which it may potentially be seen, is established and mapped using an initial ZTV of the Offshore Project;
- The location, type and number of visual receptors experiencing visibility of the Offshore Project, the likely views experienced and the activity/occupation they are engaged in;
- Selection of viewpoints from within the ZTV, including representative viewpoints selected to represent the experience of different types of visual receptor and specific viewpoints selected because they are key/promoted viewpoints in the landscape;

- The location, character and type of each viewpoint with an indication of the type of visual receptor likely to be experiencing the view from each viewpoint;
- The nature of the view in terms of both the direction of view towards the Offshore Project as well as the wider available view, making reference to the principal orientation, focal features, and visible extents in terms of both horizontal degrees and distance;
- The character of the view in terms of its content and composition, its horizontal and vertical scale as well as depth and sense of perspective, important attributes such as prominent skylines and focal points and ultimately identifying the defining patterns and features which characterise the view;
- Scenic qualities of the view in terms of an individual or combination of characteristics, in the view that contribute to distinctiveness and identify;
- The influence of human intervention and how the addition of artefacts and modification through land use affect the baseline situation. This may include operational wind farms where they are a feature of the baseline visual context.

4.1.2.2 The visual baseline also describes current pressures that may cause change to the visual amenity of the area in the future, in particular drawing on information for wind energy developments that are not yet present in the landscape but are at other stages in the project and consenting process. Operational and under construction wind energy developments are regarded as part of the baseline visual context. Any changes resulting from the Offshore Project are assessed within this context in the assessment of landscape and visual effects.

4.1.3 SENSITIVITY OF VISUAL RECEPTORS

4.1.3.1 The sensitivity of visual receptors is determined by a combination of the value of the view and the susceptibility of the visual receptors to the change in views and visual amenity.

Value of the View

4.1.3.2 The value of a view or series of views is a reflection of 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 high strength of which is assessed and verified through field work. The value of a view is classified as high, high-medium, medium, medium-low, or low and the basis for this assessment is 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 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 would be increased if it presents an

important vista from a designed landscape, lies within or overlooks a designated landscape area such as an NSA, or an area of scenic quality which implies a greater value to the visible landscape;

- Informal recognition: Views that are well-known at a local level 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 used by a large number of people would tend to have greater importance than one gained by very few people, although this is not always the case. Specific or sequential views that from a particular combination of key landscape characteristics, have a defined scenic quality or qualities can also add to the value assessed.

Susceptibility to Change

4.1.3.3 Visual susceptibility is a function of:

- The occupation or activity of people (visual receptors) experiencing the view. The occupation or activity which receptors are engaged in is described for viewpoints and principal visual receptors. The most common groups of receptors considered in the visual assessment include residents, road-users, workers and walkers;
- The extent to which their attention or interest may be focused on views. Viewers whose attention is focused on the surrounding landscape, walkers, for example are likely to have a higher sensitivity, as would residents of properties who have a heightened appreciation of surrounding views. Viewers travelling in cars or on trains would tend to have a lower sensitivity as their view is transient and moving. The least susceptible receptors are usually people at their place of work as they are less susceptible to changes in the view;
- The visual amenity they experience. The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility to change of the viewer may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory position and over a long or short duration. For example, if the outlook from a route is open and unobstructed, the experience of the visual receptor would be altered more notably than if the experience related to a glimpsed view from a car travelling at high speed. The visual amenity experienced by the viewer also varies depending on the presence and relationship of visible elements, features or patterns experienced in the view.

4.1.3.4 In line with the Landscape Institute GLVIA3 clarifications, visual susceptibility is not influenced by the type of development proposed, which is assessed as part of magnitude of change.

Sensitivity Rating

4.1.3.5 An overall level of sensitivity is applied for each visual receptor or view: high, high-medium, medium, medium-low, low; by combining individual assessments of the value of the receptor and its susceptibility to change. Each visual receptor, meaning the person or group of people likely to

be affected, is assessed in terms of their sensitivity. The basis for the assessments is 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 4-1**.

Table 4-1: Sensitivity to change – visual receptors

Criteria tending towards higher or lower sensitivity			
Value	High —————▶	Medium —————▶	Low
	<ul style="list-style-type: none"> • Specific viewpoint identified in OS maps and/or tourist information and signage; • Facilities provided at viewpoint to aid the enjoyment of the view; • View afforded protection in planning policy; • View is within or overlooks a designated landscape or has high scenic quality, which implies a higher value to the visible landscape; • View has informal recognition and well-known at a local level; • View or viewpoint is recognised through references in art or literature. 		<ul style="list-style-type: none"> • Viewpoint not identified in OS maps or tourist information and signage; • No facilities provided at viewpoint to aid enjoyment of the view; • View is not afforded protection in planning policy; • View is not within, nor does it or overlook, a designated landscape or have high scenic quality; • View has no informal recognition; • View or viewpoint is not characteristic through references in art or literature.
Susceptibility to change	High —————▶	Medium —————▶	Low
	<ul style="list-style-type: none"> • People, whether residents or visitors, who are engaged in outdoor recreation whose attention and interest are likely to be focused on the landscape or on particular views; • Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience; • Residents that gain static, long-term views of the surrounding landscape in their principal outlook or communities where views contribute to the landscape setting enjoyed by residents; • A view that is focused on a specific directional vista, with notable features 		<ul style="list-style-type: none"> • Viewers whose main attention is not focused on the landscape or on particular views, such as people at work whose attention is likely to be focused on their work, or specific forms of recreation that do not involve or depend upon appreciation of views of the landscape; • Viewers whose main attention is not focused on their surroundings, particular assets or attractions; • Travellers on road, rail, or other transport routes, where the view is of short duration, transient and dynamic. Where travel involves recognised scenic routes, awareness of views and

Criteria tending towards higher or lower sensitivity		
	<p>of interest in a particular part of the view;</p> <ul style="list-style-type: none"> Viewers experience a high level of visual amenity at the location. A view of an undeveloped landscape with little or no built development and/or human influence. 	<p>susceptibility to change is likely to be higher;</p> <ul style="list-style-type: none"> Open views with no specific point of interest; Viewers experience a low level of visual amenity at the location. A view of a developed, industrial landscape where built elements and structures are present.
Sensitivity to change	<p>High —————▶ Medium —————▶ Low</p>	

4.1.4 MAGNITUDE OF CHANGE ON VIEWS

4.1.4.1 The magnitude of change on views is primarily an expression of the scale of the change that would result from the Offshore Project and is dependent on a number of variables regarding the size or scale of the change. An assessment is also made of the geographical extent of the area over which this would occur and the duration and reversibility of such changes.

Size or Scale

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

- The distance between the visual receptor or viewpoint and the Offshore Project. Generally, the greater the distance, the lower the magnitude of change, as the Offshore Project would constitute a smaller scale component of the view. For the purpose of this assessment, the following descriptors of distance are used:
 - Very long distance – greater than 35 km;
 - Long distance – 20 km to 35 km;
 - Middle/intermediate distance – 10 km to 20 km;
 - Short distance – 5 km to 10 km;
 - Close proximity – less than 5 km;
- The amount and size of the Offshore Project that would be seen. Visibility may range from 1 blade tip to all of the turbines. Generally, the larger the Offshore Project appears in the view, and the more of the Offshore Project that can be seen, the higher the magnitude of change;
- 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 Offshore Project may appear in a similar part of the view to that which includes an operational wind farm, or it may appear close to or as an extension to an existing wind farm and its scale of change is assessed in the context of these existing views;

- The field of view available and the proportion of the view that is affected by the Offshore Project. Generally, the more of a view that is affected, the higher the magnitude of change would be. If the Offshore Project extends across the whole of the open part of the outlook, the magnitude of change would generally be higher as the full view would be affected. Conversely, if the Offshore Project covers just a part of an open, expansive and wide view, the magnitude of change is likely to be reduced as the Offshore Project would not affect the whole open part of the outlook;
- The scale and character of the context within which the Offshore Project would be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour, and motion. Contrasts and changes may arise particularly as a result of the more notable rotation movement of the wind turbine blades, as a characteristic that gives rise to effects of the Offshore Project;
- The consistency of image of the Offshore Project in relation to other developments. The magnitude of change of the Offshore Project is likely to be lower if its wind turbine height, arrangement and layout design are broadly similar to other wind farm developments in the views, as they are more likely to appear as relatively simple and logical components of the landscape;
- The uniformity of appearance of the Offshore Project in different views. If the Offshore Project appears relatively uniform and consistent in appearance from different viewpoints and viewing angles, in a similar setting and familiar form, this tends to reduce the magnitude of change. If, on the other hand, it appears inconsistent in image, scale and appearance, or from a variety of different angles, and is seen in a different form and setting, the magnitude of change is likely to be higher as it would be a variable and less familiar component of views;
- The extent of the wind energy developed skyline. If the Offshore Project would add notably to the wind energy developed skyline in a view, extending the lateral spread of development or increasing the perceived connection between other wind farms, the magnitude of change would tend to be higher;
- Where a particular scenic quality or combined scenic qualities are strongly expressed, the extent to which the Offshore Project would erode or detract from the appreciation of those qualities;
- 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 magnitude of change would be, whereas an extension to an existing wind farm would tend to result in a lower magnitude of change than a separate, new wind farm;
- The scale and form comparison between developments. If the Offshore Project is of a similar scale and form to other visible developments, particularly those seen in closest proximity to it, the magnitude of change would generally be lower as it would have more integration with the other wind farm projects and would be less apparent as an addition.

Geographical Extent

4.1.4.3 The geographic area over which the visual effects would be experienced is also assessed as a modifier of the magnitude of change, which is distinct from the size or scale of effect. The extent of

the effects would vary depending on the specific nature of the Offshore Project and is principally assessed through analysis of the extent of visibility of the Offshore Project from visual receptors. For example - the extent of the visual receptor (a road, footpath, or settlement for example) that would experience changes through visibility of the Offshore Project; and/or the extent to which the change would affect views, whether this is unique to a particular viewpoint or if similar visual changes occur over a wider area represented by the viewpoint. If the Offshore Project is visible from extensive areas, the overall change is likely to be higher than if it is visible from a limited part of a receptor.

Magnitude of Change Rating

- 4.1.4.4 An overall assessment of the magnitude of change resulting from the Offshore Project on each visual receptor is made by combining the assessment of size or scale and geographical extent. The basis of the assessment is made clear using evidence and professional judgement. The levels of magnitude of change that can occur on views are defined as follows:
- High: the Offshore Project would result in a high level of alteration to the baseline view, providing the prevailing influence and/or introducing elements that are substantially uncharacteristic in the receiving view;
 - High-medium: intermediate rating with combination of criteria from high magnitude (described above) and medium magnitude (described below);
 - Medium: the Offshore Project would result in a moderate alteration to the baseline view, providing a readily apparent influence and/or introducing elements potentially uncharacteristic in the receiving view;
 - Medium-low: intermediate rating with combination of criteria from medium magnitude (described above) and low magnitude (described below);
 - Low: the Offshore Project would result in a minor alteration to the baseline view, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving view;
 - Negligible: the Offshore Project would result in a negligible alteration to the baseline view, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the receiving view;
 - None: the Offshore Project would in no way change to the baseline characteristics of the view.
- 4.1.4.5 Criteria that tend towards higher or lower magnitude of change are set out in **Table 4-2**.

Table 4-2: Magnitude of Change Criteria – Visual Receptors

Criteria tending towards higher or lower sensitivity			
Size of scale of change	High	Medium	Low
		<ul style="list-style-type: none"> • Large scale change in the view resulting from loss and/or addition of features and changes in its composition; • Offshore Project located in close proximity to the viewpoint and would form large scale component of the view; • All or majority of the Offshore Project would be visible in the view e.g. full towers and rotor sweep; • Offshore Project affects large proportion of available field of view; • Offshore Project has high degree of contrast/low degree of integration with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture; • Offshore Project appears inconsistently, in a different setting and/or form each time it is visible; • Offshore Project contrasts with other existing wind farms in pattern, scale and relationship to key characteristics, creating a confusing or inconsistent image or relationship to key characteristics. 	
Geographic extent	High	Medium	Low
	<ul style="list-style-type: none"> • Offshore Project is visible over long distances; • Offshore Project is visible from widespread areas/extensive parts of visual receptor; 		<ul style="list-style-type: none"> • Offshore Project is visible only at short range; • Offshore Project is visible from restricted areas/limited parts of visual receptor;

Criteria tending towards higher or lower sensitivity		
	<ul style="list-style-type: none"> • Visibility/views of the Offshore Project occur over a wider area represented by multiple viewpoints. 	<ul style="list-style-type: none"> • Visibility/view of the Offshore Project is unique to a particular location or viewpoint.
Magnitude of change	High —————▶ Medium —————▶ Low	

4.1.5 SIGNIFICANCE OF EFFECTS ON VIEWS

- 4.1.5.1 The significance of the effect on each view is dependent on all of the factors considered in the sensitivity of the view, and the magnitude of change resulting from the Offshore Project. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the Offshore Project would have an effect that is significant or not significant on the visual receptor.
- 4.1.5.2 The matrix shown in **Table 2-1** helps to inform the threshold of significance when combining sensitivity and magnitude to assess the significance of effect. A significant effect would occur where the combination of the variables results in the Offshore Project having a defining effect on the view or where changes of a lower magnitude occur on a view or visual receptor that is of particularly high sensitivity. A not significant effect would occur where the appearance of the Offshore Project is not definitive, and the view continues to be defined principally by its baseline characteristics; or where the small scale of change is experienced by a high sensitivity receptor. Irreversible, long-term effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant, as are effects on people at recognised viewpoints or views judged to have high scenic quality. Large-scale changes which introduce new, non-characteristic or discordant elements into the view are also more likely to be significant than small changes or changes involving features already present within the view.
- 4.1.5.3 The assessment of visual effects assumes clear weather and optimum viewing conditions. This means that effects that are assessed to be significant may be not significant under different, less clear conditions. Viewing conditions and visibility tend to vary considerably and therefore the likelihood of effects resulting from the Offshore Project would vary according to the prevailing viewing conditions.

5 ASSESSMENT OF CUMULATIVE EFFECTS

5.1 INTRODUCTION

5.1.1.1 The Cumulative Effect Assessment (CEA) takes into account the impact associated with the Offshore Project together with other relevant plans, 3rd party projects and activities. Cumulative effects are therefore the additional or combined effect of the Offshore Project in combination with the effects from a number of different projects, on the same receptor or resource.

5.1.1.2 GLVIA3 (Landscape Institute and IEMA 2013, para 7.8) defines cumulative landscape and visual effects as those that *"may result from an individual project that is being assessed interacting with the effects of other proposed developments in the area"* and that cumulative effects (para 3.22) *"are additional effects caused by the proposed development when considered with other proposed developments of the same or different types"*.

5.1.1.3 NatureScot's guidance, 'Assessing the Cumulative Impact of Onshore Wind Energy Developments' (2021) is widely used to inform the specific assessment of the cumulative effects of wind farms. This guidance states that *"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 wind farms"* (NatureScot, 2021). The guidance also defines cumulative landscape effects and cumulative visual effects as follows:

- *"Cumulative impacts can change either the physical fabric of character of the landscape, or any special values attached to it"* (NatureScot 2021, p7);
- *"Cumulative impacts on visual amenity can be caused by 'combined visibility' and/or 'sequential impacts"*. (NatureScot 2021, p7).

5.1.1.4 Cumulative effects are assessed in this SLVIA as the additional changes caused by the Offshore Project in conjunction with other similar developments arising in a number of relevant cumulative development scenarios (and not the combined totality of the cumulative effect of all past, present and future proposals together with the Offshore Project).

5.1.1.5 The degree to which cumulative effects occur, or may occur, as a result of more than 1 wind farm/development being constructed/becoming operational are a result of:

- The distance between individual wind farms/relevant developments;
- The interrelationship between their ZTVs;
- The overall character of the seascape/landscape and its sensitivity to wind farms/other relevant development;
- The siting, scale and design of the wind farms/developments themselves;
- The way in which the seascape/landscape is experienced.

5.2 APPROACH AND SCOPE OF CUMULATIVE EFFECT ASSESSMENT

- 5.2.1.1 The CEA assesses the combined impacts of the Offshore Project in combination with other (3rd party) developments (and the contribution of the Offshore Project to those impacts) on the same single receptor or resource. The overall method followed in identifying and assessing potential cumulative effects is set out in **Chapter 5, Volume 1a** and **Appendix 5.3: Cumulative effects assessment detailed search and screening criteria, Volume 1c**. The methodology for the CEA undertaken as part of this SLVIA chapter is set out fully in this appendix.
- 5.2.1.2 The CEA methodology is divided into four stages:
- Stage 1: Establishing the long list of 'other developments';
 - Stage 2: Establishing the short list of 'other developments';
 - Stage 3: Information gathering;
 - Stage 4: Assessment.
- 5.2.1.3 The first stage of the CEA is to produce a 'long list' of other relevant projects, plans and activities ('other developments'). For offshore specifically, 'other developments' on the 'long list' include those in Scotland, England and adjoining international jurisdictions and is based on publicly available information at the time of preparation.
- 5.2.1.4 A screening evaluation of the long list to determine the potential for cumulative effects was then undertaken for seascape, landscape and visual effects, ensuring that the potential for relevant receptor-impact pathways is identified.
- 5.2.1.5 A topic specific Zone of Influence (ZOI) is then applied at Stage 2 with impact-specific screening ranges for individual topics applied to define a short-list of 'other developments' relevant to the SLVIA. For seascape, landscape and visual, a ZOI for the CEA covering a 60 km radius 'search area' has been applied, to ensure direct and indirect cumulative effects can be appropriately identified and assessed. The seascape, landscape and visual ZOI is shown in **Appendix 18.6, Volume 2c - Figure 18.19**.
- 5.2.1.6 A short list of 'other developments' that may interact with the Project ZOIs during their construction, operation or decommissioning is presented in **Appendix 5.3, Volume 1c**. This list has been generated applying criteria set out in **Chapter 5, Volume 1a** and **Appendix 5.3, Volume 1c** and has been collated up to the finalisation of the EIA through desk study, consultation, and engagement.
- 5.2.1.7 Only those 'other developments' in the short list that are screened into the topic specific assessment for the SLVIA and fall within the seascape, landscape and visual ZOI (**Appendix 18.6, Volume 2c - Figure 18.19**) have the potential to result in cumulative effects with the Offshore Project on seascape, landscape and visual receptors. All 'other developments' screened out of the long-list due to lack of receptor-impact pathways, and falling outside the seascape, landscape and visual ZOI, are excluded from this assessment.

- 5.2.1.8 A cut-off date of 1 October 2025 has been applied to the establishment of the short-list of other developments. Any changes in the status of other development after this date are not incorporated in the CEA.
- 5.2.1.9 For seascape, landscape and visual, the CEA focuses on the addition of the Offshore Project to other onshore and offshore wind farm development, based on NatureScot's guidance, which highlights that *"the focus of the cumulative assessment will be on the additional effect of the project in conjunction with other developments of the same type (as for example, in the case of wind farms)"* (GLVIA3, Landscape Institute and IEMA, 2013).
- 5.2.1.10 NatureScot guidance also highlights that *'The assessment should be proportionate to the likely impacts and all CLVIA should accord with the guidelines within GLVIA3. The emphasis should be on the production of relevant and useful information, highlighting why the proposals assessed have been included and why others have been excluded, rather than the provision of a large volume of information.'* (NatureScot 2021, p8).
- 5.2.1.11 On the basis of the approach described above, the 'other developments' that are screened into the CEA for seascape, landscape and visual are shown in **Appendix 18.6, Volume 2c - Figure 18.19**, and set out in Section 18.14 of **Chapter 18, Volume 2a**, with projects categorised according to their tier. All of these short-listed 'other developments' are illustrated in the wireline visualisations in **Appendix 18.6, Volume 2c - Figure 18.25 to Figure 18.66**.

5.3 TIERED APPROACH TO CEA

- 5.3.1.1 In undertaking this CEA for the VE array areas, 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 Offshore Project. Therefore, a tiered approach has been 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 employs the following tiers (as defined fully in **Chapter 5, Volume 1a**):
- Tier 1 assessment – all consented and submitted applications, but not yet implemented;
 - Tier 2 assessment – projects where a scoping report has been submitted;
 - Tier 3 assessment – pre-planning projects where a scoping report has not been submitted; identified in the relevant Development Plan; and identified in other plans and programmes that set the framework for future development consents/approach, where such development is reasonably likely to come forward (recognising that there will be limited information available on the relevant proposals). No pre-planning projects are screened into the short-list for the CEA for seascape, landscape and visual.

- 5.3.1.2 In line with GLVIA3 (Landscape Institute and IEMA 2013, para 3.3 and 7.8) and NatureScot (2021), the cumulative SLVIA focuses on the cumulative effects arising from the Offshore Project interacting with the effects of other proposed developments under the Tier 1 (Consented and Application Stage) and Tier 2 (Scoping Stage) scenarios. Operational wind energy developments are included as part of the topic baseline, with consideration of the effects of the Offshore Project in the context of these operational wind energy developments undertaken in the main assessment of **Chapter 18, Volume 2a**.
- 5.3.1.3 GLVIA3 (para 7.13) advises in relation to the baseline, that *“taking ‘the Project’ to mean the main proposal that is being assessed, it is considered that existing schemes and those which are under construction should be included in the baseline for both landscape and visual effects assessments (the SLVIA baseline). The baseline for assessing cumulative landscape and visual effects should then include those schemes considered in the SLVIA and in addition potential schemes that are not yet present in the landscape but are at various stages in the development and consenting process”*.
- 5.3.1.4 The SLVIA follows this approach, with the cumulative effects assessed arising from the addition of the Offshore Project into a context that includes existing or under construction wind farms, with the effects considered against the landscape and visual baseline.
- 5.3.1.5 The CLVIA separately assesses the cumulative effects of the Offshore Project arising in each of the following relevant scenarios:
- Tier 1 (Consented and Application Stage scenario): the CEA assesses the effect of the Offshore Project in addition to all consented and submitted applications (but not yet implemented). The Tier 1 CEA identifies the magnitude of change that would arise due to the contribution of the Offshore Project, when considered with consented and application stage ‘other developments’ in the seascape/landscape. The effects identified are considered as having some likelihood to arise, on the assumption that consented wind farms will be built and become operational, however, it is sometimes the case that consented wind farms are not ultimately built, which reduces the likelihood of consented scenario effects arising.
 - Tier 2 (Scoping Stage scenario): a further hypothetical scenario is also assessed, that not only takes into the account the operational, consented and application stage wind farms, but also those that have submitted Scoping Reports (but are as yet not submitted planning applications). The cumulative assessment in the application stage scenario identifies the magnitude of additional cumulative change that would arise due to the contribution of the Offshore Project, when considered with operational, consented, application and scoping stage ‘other developments’. A high level assessment is undertaken due to layout and design uncertainties at the pre-application stages meaning that the potential cumulative impacts of Scoping Stage sites are generally not reasonably foreseeable or uncertain due to a lack of data confidence.

5.4 TYPES OF CUMULATIVE EFFECT

5.4.1.1 The aim of the cumulative assessment is to identify the additional changes which would be brought about by the Offshore Project when considered in conjunction with other wind farms. In accordance with guidance (NatureScot, 2021), the SLVIA for each receptor considered assesses the effect arising from the addition of the Offshore Project to the cumulative situation, and not the overall effect of multiple wind farms. 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 cumulative assessment.

5.4.2 CUMULATIVE LANDSCAPE EFFECTS

5.4.2.1 The cumulative development of wind farms within a particular area may build up to create different types of seascape/landscape. Significant cumulative seascape/landscape effects may arise where a 'Landscape with wind farms' is created, as a result of the addition of the Offshore Project to other existing or proposed wind farms, which results in wind turbines becoming sufficiently prolific that they become a prevailing or key seascape/landscape and visual characteristic.

5.4.2.2 The significance of the cumulative landscape effect from the addition of the Offshore Project reflects the intensification of wind farms within the landscape, which is assessed as follows:

- The Offshore Project forms a separate isolated feature from other wind farms within the seascape/landscape, too infrequent and of insufficient influence to be perceived as a characteristic of the area. The cumulative seascape/landscape effect of the Offshore Project is unlikely to be significant;
- The addition of the Offshore Project results in wind farms forming a key characteristic of the seascape/landscape, exerting sufficient presence as to establish or increase the extent of a 'seascape/landscape with wind farms', but not of sufficient dominance to be a defining characteristic of the area. The cumulative seascape/landscape effect of the Offshore Project may be significant or not significant, depending on the sensitivity of the receptor, magnitude of the change and specific effects arising from the Offshore Project;
- The addition of the Offshore Project results in wind farms forming the prevailing characteristic of the seascape/landscape, seeming to define the seascape/landscape as a 'wind farm seascape/landscape' character type. The cumulative seascape/landscape effect of the Offshore Project is likely to be significant.

5.4.2.3 These effects can occur at varying scales, for example, effecting a local character type, or at a regional level, which is assessed as part of the geographic extent assessment in the SLVIA.

5.4.3 CUMULATIVE VISUAL EFFECTS

5.4.3.1 Cumulative visual effects consist of combined and sequential effects:

- Combined visibility occurs where the observer is able to see 2 or more developments from one viewpoint. Combined visibility may either be 'in combination', where several wind farms are within the observer's main angle of view at the same time, or 'in succession', where the observer has to turn to see the various wind farms. The cumulative visual effect of the Offshore 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 wind farms in combined views; and the position of the development relative to other wind farms and the seascape/landscape context in successive views;
- 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 of the Offshore Project is more likely to be significant when frequently sequential.

5.4.3.2 The methodology for the assessment of cumulative seascape/landscape and visual effects involves the undertaking of a baseline study of the existing and potential future wind farm/other relevant development influence, an evaluation of sensitivity, magnitude of change and the resulting significance of cumulative effects.

Cumulative Sensitivity of Landscape and Visual Receptors

5.4.3.3 In evaluating cumulative sensitivity, the value component of the assessments of sensitivity would not change, however, in an evolving wind farm/other relevant development context, the susceptibility of a seascape/landscape and visual receptor to the introduction of the Offshore Project may increase or decrease. This is therefore re-evaluated based on the criteria contained in the seascape/landscape and visual susceptibility criteria sections of this methodology.

Cumulative Magnitude of Change

5.4.3.4 The cumulative magnitude of change is an expression of the degree to which seascape/landscape character receptors and visual receptors/views would be changed by the addition of the Offshore Project to wind farms/other relevant developments that are already operational, consented, or at application stage. Where required, scoping stage wind farms and other early stage developments may exceptionally be included. The cumulative magnitude of change is assessed according to a number of criteria, described as follows:

- The location of the Offshore Project in relation to other wind farm developments. If the Offshore Project is seen in a part of the view or setting to a seascape/landscape receptor that is not affected by other development, this would generally increase the cumulative magnitude of change as it would extend influence into an area that is currently unaffected by development. Conversely, if the Offshore Project is seen in the context of other sites, 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 Offshore Project is similar to that of the other sites 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. If the Offshore Project would add notably to the developed skyline in a view, the cumulative magnitude of change would tend to be higher as skyline development can have a particular influence on both views and seascape/landscape receptors;
- 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 would be. The addition of the Offshore Project to a view or seascape/landscape where a number of smaller developments are apparent would usually have a higher cumulative magnitude of change than 1 or 2 large developments as this can lead to the impression of a less co-ordinated or strategic approach;
- The scale comparison between developments. If the Offshore Project is of a similar scale to other visible developments, particularly those seen in closest proximity to it, the cumulative magnitude of change would generally be lower as it would have more integration with the other sites and would be less apparent as an addition to the cumulative situation;
- The consistency of image of the Offshore Project in relation to other developments. The cumulative magnitude of change of the Offshore Project is likely to be lower if its turbine height, arrangement and layout design are broadly similar to other developments in the seascape/landscape, as they are more likely to appear as relatively simple and logical components of the seascape/landscape;
- The context in which the developments are seen. If developments 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 developments are seen in a variety of different seascape/landscape settings, this can lead to a perception that wind farm development is unplanned and uncoordinated, affecting a wide range of seascape/landscape characters and blurring the distinction between them;
- The magnitude of change of the Offshore Project as assessed in the main assessment. The lower this is assessed to be, the lower the cumulative magnitude of change is likely to be. Where the Offshore Project itself is assessed to have a negligible magnitude of change on a view or receptor there would not be a cumulative effect as the contribution of the Offshore Project would equate to the 'no change' situation.

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

- High: where the addition of the Offshore Project to the seascape/landscape or view would result in a high incremental change, loss or addition to the cumulative situation;
- Medium: where the addition of the Offshore Project would result in a medium incremental change, loss or addition to the cumulative situation;
- Low: where the addition of the Offshore Project would result in a low incremental change, loss or addition to the cumulative situation;
- Negligible: where the addition of the Offshore Project to other wind energy developments in the seascape/landscape or view would result in a negligible incremental change, loss or addition to the cumulative situation;
- None: where the addition of the Offshore Project to other wind energy developments in the seascape/landscape or view would have no change to the cumulative wind farm situation and its addition equates to a 'no change' situation.

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

5.4.4 SIGNIFICANCE OF CUMULATIVE EFFECTS

5.4.4.1 The objective of the cumulative assessment is to determine whether any effects that the Offshore Project would have on seascape/landscape receptors and visual receptors, when seen or perceived in combination with other existing and proposed sites, would be significant or not significant. Significant cumulative seascape/landscape and visual effects arise where the addition of the proposed wind turbines or other similar/large scale development to a specific baseline, leads to wind farms becoming a prevailing seascape/landscape and visual characteristic of a receptor that is sensitive to such change. Cumulative effects may evolve as follows:

- A small scale, single wind farm would often be perceived as a new or 'one-off' seascape/landscape feature or landmark within the seascape/landscape. Except at a local site level, it usually cannot change the overall existing seascape/landscape character, or become a new characteristic element of a seascape/landscape;
- With the addition of further wind farm development, wind farms can become a characteristic element of the seascape/landscape, as they appear as elements or components that are repeated. Providing there was sufficient 'space' or undeveloped seascape/landscape skyline between each wind farm, or the overlapping of several wind farms was not too dense; the Offshore Projects or other similar/large scale developments would appear as a series of developments within the seascape/landscape and would not necessarily become the dominant or defining characteristic of the seascape/landscape nor have significant cumulative effects;
- The next stage would be to consider larger commercial wind farms/developments and/or an increase in the number of wind farms/developments within an area that either overlap or

coalesce and/or 'join-up' along the skyline. The effect is to create a seascape/landscape where the wind farm element is a prevailing characteristic of the seascape/landscape. The result would be to materially change the existing seascape/landscape character of a seascape/landscape type, or the landscape in a view and resulting in a significant cumulative effect. A seascape/landscape characterised by wind farm development may already exist as part of the baseline seascape/landscape context.

- 5.4.4.2 In relation to the significance of cumulative landscape effects, GLVIA3 notes (paragraph 7.28) that *"the most significant cumulative landscape effects are likely to be those that would give rise to changes in the landscape character of the study area of such an extent as to have major effects on its key characteristics and even, in some cases, to transform it into a different landscape type. This may be the case where the project being considered itself tips the balance through its additional effects"*.
- 5.4.4.3 GLVIA3 (paragraph 7.38) goes on to state the following in relation to the significance of cumulative visual effects:
- 5.4.4.4 *"Higher levels of significance may arise from cumulative visual effects related to:*
- *developments that are in closer proximity to the main project and are clearly visible together in views from the elected viewpoints;*
 - *developments that are highly inter-visible, with overlapping ZTVs – even though the individual developments may be at some distance from the main project and from individual viewpoints, and when viewed individually not particularly significant, the overall combined cumulative effect on a viewer at a particular viewpoint may be more significant"*.
- 5.4.4.5 It should be noted that if the Offshore Project itself is assessed to have a significant effect, it does not necessarily follow that the cumulative effect would also be significant.
- 5.4.4.6 Less extensive, but nevertheless significant cumulative seascape/landscape and visual effects may also arise as a result of the addition of the Offshore Project where it results in a seascape/landscape or view becoming defined by the presence of more than 1 wind farm or similar/large scale development, so that other patterns and components are no longer definitive, or where the Offshore Project contrasts with the scale or design of an existing or proposed development.
- 5.4.4.7 Higher levels of significance may arise from cumulative seascape/landscape and visual effects related to the Offshore Project being in close proximity to other wind farms when they are clearly visible together in views, however, provided that the Offshore Project is designed to achieve a high level of visual integration, with few notable visual differences between wind farms, these effects may not necessarily be significant. In particular, the effects of a wind farm extension are often less likely to be significant, where the effect is concentrated, providing that the design of the wind farms are compatible, and that the capability of the seascape/landscape to accommodate the change is not exceeded.

- 5.4.4.8 The capability of the seascape/landscape or view to accommodate the change proposed may be assessed as being exceeded where the seascape/landscape or visual receptor becomes defined by wind farm development, or if the Offshore Project extends across coastal/landscape character types or clear visual/topographic thresholds in a view. More substantial cumulative effects may result from wind farms that have some geographical separation, but remain highly inter-visible, potentially resulting in extending effects into new areas, such as an increased presence of wind farm development on a skyline, or the creation of multiple, separate wind farm defined seascape/landscapes.
- 5.4.4.9 In accordance with guidance (NatureScot, 2021), the SLVIA for each receptor considered assesses the effect arising from the addition of the Offshore Project to the cumulative situation, and not the overall effect of multiple wind farms.

6 ASSESSMENT OF LIGHTING EFFECTS

6.1 INTRODUCTION AND GUIDANCE

- 6.1.1.1 The Civil Aviation Authority (CAA) requires that 'en route obstacles' at or above 150 m above ground level are lit with visible lighting to assist their detection by aircraft. As such, there is potential that lighting of the Offshore Project may be visible at night.
- 6.1.1.2 An assessment of the effects of aviation lighting and marine 'aid to navigation' lighting (herein 'marine navigation' lighting) of the Offshore Project has been undertaken in **Chapter 18, Volume 2a**, which evaluates the potential impact on the qualities of the seascape/landscape (as an environmental resource in its own right), and the views and visual amenity of visual receptors (people) from the introduction of visible lighting associated with the Offshore Project.
- 6.1.1.3 The assessment of visible aviation lighting and marine navigation lighting has been undertaken in accordance with Guidance on Aviation Lighting Impact Assessment (NatureScot, 2024), in distinct steps:
- Step 1: Defining the lighting proposal (Section 8.2);
 - Step 2: Understanding the baseline (Section 8.3);
 - Step 3: Assessing the effects of the lighting (Section 8.4).
- 6.1.1.4 The assessment of effects of the lighting of the Offshore Project has also been undertaken in accordance with other relevant regulations and guidance contained in the following:
- Annex 14 to the Convention on International Civil Aviation (Volume 1 - Aerodrome Design and Operations) (Eighth Edition) (International Civil Aviation Organisation, 2018);
 - Civil Aviation Publication (CAP) 764 CAA Policy and Guidance on Wind Turbines Version 6 (CAA, 2016);
 - CAP 764 Version 7 (Draft) issued for comment in (CAA, 2020);
 - CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at, or in excess of, 150m Above Ground Level (CAA, 2017).;
 - General pre-application and scoping advice for onshore wind farms (NatureScot, September 2020);
 - Guidance Note 1 for the Reduction of Obtrusive Light (Institute of Lighting Professionals (ILP), 2021);
 - The Air Navigation Order 2016 (ANO) (CAA, 2016(a));
 - International Organization for Marine Aids to Navigation (IALA) Recommendation R0139 The Marking of Man-Made Structures (IALA, 2021);
 - IALA Guideline G1162 The Marking of Offshore Man-Made Structures (IALA, 2022);
 - IALA Recommendation R1001 The IALA Maritime Buoyage System (MBS) (IALA, 2023);

- IALA Guideline G1185 Enhancing the Safety and Efficiency of Navigation Around Offshore Renewable Energy Installations (OREI) (IALA, 2024);
- Marine Guidance Note (MGN) 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response and its annexes (Maritime and Coastguard Agency (MCA), 2021).

6.1.1.5 GLVIA3 (page 103) provides the following guidance on the assessment of lighting effects: *“For some types of development the visual effects of lighting may be an issue. In these cases it may be important to carry out night-time ‘darkness’ surveys of the existing conditions in order to assess the potential effects of lighting and these effects need to be taken into account in generating the 3D model of the scheme. Quantitative assessment of illumination levels, and incorporation into models relevant to visual effects assessment, will require input from lighting engineers, but the visual effects assessment will also need to include qualitative assessments of the effects of the predicted light levels on night-time visibility”.*

6.1.1.6 GLVIA3 (page 60) also provides the following guidance with regards to mitigation of obtrusive light: *“lighting for safety or security purposes may be unavoidable and may give rise to significant adverse effects; in such cases, consideration should be given to different ways of minimising light pollution and reference should be made to appropriate guidance, such as that provided by the Institution of Lighting Professionals (ILP, 2011)”.*

6.1.1.7 Guidance produced by ILP (2011) (GN01:2011) is useful in setting out some key terminology that is used in this visual assessment of WTG lighting:

- *“Obtrusive light - whether it keeps you awake through a bedroom window or impedes your view of the night sky, is a form of pollution, which may also be a nuisance in law and which can be substantially reduced without detriment to the lighting task;*
- *Skyglow – the brightening of the night sky;*
- *Glare – the uncomfortable brightness of a light source when viewed against a darker background;*
- *Light intrusion – the spilling of light beyond the boundary of the property or area being lit, are all forms of obtrusive light which may cause nuisance to others”.*

6.1.1.8 CPRE also identifies these same broad terms as the 3 types of light pollution:

- *“Skyglow – the pink or orange glow we see for miles around towns and cities, spreading deep into the countryside, caused by a scattering of artificial light by airborne dust and water droplets;*
- *Glare – the uncomfortable brightness of a light source;*
- *Light intrusion – light spilling beyond the boundary of the property on which a light is located, sometimes shining through windows and curtains”.*

6.2 TYPES OF EFFECT AT NIGHT

- 6.2.1.1 The effect of the visible lights will be dependent on a range of factors, including the intensity of lights used, the clarity of atmospheric visibility, the degree of negative/positive vertical angle of view from the light to the receptor and vary with the time of year and geographic location, as described further in **Appendix 18.5, Volume 2c**.
- 6.2.1.2 The assessment of the lighting of the Offshore Project is primarily intended to determine the likely significant effects on the visual resource, i.e. it is primarily an assessment of the visual effects of aviation and marine navigation lighting on views experienced by people at night. The matter of visible aviation and marine navigation lighting assessment is primarily a visual matter, and the assessment presented focusses on that premise.
- 6.2.1.3 As seascape/landscape features become less distinct in low light conditions, at twilight, during the night and at dawn, perceptions of darkness and remoteness may become heightened as constituent elements of seascape/landscapes, where they are uninterrupted by artificial light. The assessment therefore also considers effects of the aviation and marine navigation lighting on perceived character, focusing on how distinctive landforms and enclosing skylines, which remain perceptible at dusk and during hours of darkness, add to the perception of night-time character and how these may be affected. With respect to seascape/landscape character, the assessment focuses on effects on perceived seascape/landscape sensitivities, in particular where qualities of wildness, remoteness and lack of man-made elements are features of the seascape/landscape; and on areas where a particularly distinctive landform or characteristic may be perceived at night with lights on the skyline (i.e. where a perceived character effect may occur as a component of visual effects); and for designations where dark skies are a specific 'special quality' defined in their citation.
- 6.2.1.4 Table 6-1 of Annex 14 to the Convention on International Civil Aviation (International Civil Aviation Organization (ICAO), 2018) indicates a requirement for medium-intensity (type C) lighting to be switched on when 'night' has been reached (below 50 cd/m²). It does not require aviation lighting to be on during 'day' (above 500 cd/m²) or during 'twilight' (50-500cd/m²), which is the period when seascape/landscape character may be most discernible.
- 6.2.1.5 Schedule 1 of the Air Navigation Order 2016 also defines night as "*the time from half an hour after sunset until half an hour before sunrise (both times inclusive), sunset and sunrise being determined at surface level*". This equates to approximately the end of civil twilight and beginning of nautical twilight.
- 6.2.1.6 In order to consider a possible worst-case, it is assumed that aviation lighting may be seen for a short time towards the end of the twilight period (during nautical and astronomical twilight) when some recognition of seascape/landscape features/profiles/shapes and patterns may be possible. It is considered, however, that a level of recognition after the end of civil twilight, when it is technically 'night' (and aviation lighting is switched on), does not amount to an ability to appreciate

in any detailed seascape/landscape character differences and subtleties, nor does it provide sufficient natural light conditions to undertake a full seascape/landscape character assessment.

6.3 DEFINING THE LIGHTING PROPOSAL

- 6.3.1.1 The assessment of effects arising from visible lighting requirements (aviation and marine navigation lighting) of the Offshore Project are based on the project design parameters set out in **Chapter 3, Volume 1a** and the **Outline Lighting and Marking Plan, Volume 3** and the requirement for aviation lighting is set out and assessed within **Chapter 17, Volume 2a**.
- 6.3.1.2 Under 222(1) The Air Navigation Order 2016 requires en route obstacles to be *"fitted with medium intensity steady red lights positioned as close as possible to the top of the obstacle and at intermediate levels spaced so far as practicable equally between the top lights and ground level with an interval of not more than 52 metres"*. Schedule 1 clarifies that medium intensity steady red light should comply with the characteristics described for a Type C light as specified in Annex 14 to the Convention on International Civil Aviation (Volume 1 - Aerodrome Design and Operations) (ICAO, 2018). According to Table 6-1 of Annex 14, the intensity of fixed red lights of medium intensity is defined as 2000 candela (cd).
- 6.3.1.3 The lowest permissible lighting intensity for onshore wind turbines is further defined in The 2017 CAA Policy Statement (CAA, 2017), which states that *"If the horizontal meteorological visibility in all directions from every wind turbine generator in a group is more than 5 km, the intensity for the light positioned as close as practicable to the top of the fixed structure required to be fitted to any generator in the windfarm and displayed may be reduced to not less than 10% of the minimum peak intensity specified for a light of this type"*.
- 6.3.1.4 Based on the relevant regulations, guidance and project description (**Chapter 3, Volume 1a**), the visual assessment of aviation and marine navigation lighting in **Chapter 17, Volume 2a** is therefore based on the following key parameters:
- Red, medium intensity aviation warning lights (2,000 cd) will be located on top of the nacelle of peripheral WTGs marking a regular outline around the perimeter of the layout as shown indicatively on 25 WTGs in **Appendix 18.6, Volume 2c - Figure 18.2**. These warning lights will conform to the ICAO specification as set out in Annex 14 Table 6-3 (ICAO, 2018);
 - The red, medium intensity aviation warning lights will be controlled with sensor-controlled dimming, such that when the visibility is greater than 5 km in all directions from all turbine hubs, the brightness of the lights will be reduced to 200 cd (10% of normal intensity). As dimming is included as embedded mitigation, the assessments (and photomontage visualisations) are based on reduced 200 cd intensity aviation lights (rather than 2000 cd) in line with guidance (NatureScot, 2024, para 82). The assessments are based on a worst-case assumption of 200 cd light at each viewpoint, but also separately indicate how vertical

directional intensity might reduce lighting intensity experienced by viewers at that location, based on the calculations provided in **Appendix 18.5, Volume 2c**;

- Directional intensity is provided for in Air Navigation Order 2016 article 223 (5), which requires that when displayed on offshore WTGs, the angle of the plane of the beam of peak intensity emitted by the light must be elevated to between 3° and 4° above the horizontal plane. This will mean that the intensity of the aviation lights experienced will be less when viewed at or below the horizontal plane (i.e. from below the lights). These light intensity reductions are not, however, factored into the MDS assessed in the SLVIA or shown in the photomontages presented, as the precise model of aviation light to be used for the Offshore Project is not known at this time. Whilst aviation lighting manufacturers must meet the minimum requirements, their products may vary in relation to recommended limits, and the lighting characteristics of different light fittings may therefore vary outside the minimum requirements stipulated. Further consideration of the potential mitigation afforded by this directional intensity is described in the assessment and **Appendix 18.6, Volume 2c - Figure 18.18: Aviation Lighting Intensity ZTV (larger WTG type)** helps to illustrate the potential reduction in lighting intensity within different parts of the study area;
- Marine navigation lights will be fitted at platform level on the external platform of significant peripheral structures (SPS) as shown indicatively on 12 SPS in **Appendix 18.6, Volume 2c - Figure 18.2**. The marine navigation lights on each SPS will have 360° visibility, with synchronised flashing IALA special mark characteristics (Fl.Y.5 s) and range of not less than 5 nautical miles (nm). Intermediate Peripheral Structures (IPS) will also be marked with marine navigation lights with a minimum 2nm range. As stated in the **Outline Lighting and Marking Plan, Volume 3** and **Chapter 16, Volume 2a**, NLB have agreed that it is acceptable for shore-facing SPS lights to use a range of 2nm rather than the nominal range of 5 nm, subject to the final layout. Other parameters such as flash sequence can also be considered further to reduce visual impacts.

6.4 UNDERSTANDING THE BASELINE

- 6.4.1.1 The night-time lighting baseline presented in Section 18.6.3 of **Chapter 18, Volume 2a** of the study area establishes the baseline lighting environment, selection of proposed viewpoints, identifies the key features / characteristics of the seascape/landscape that are sensitive to introduction of lighting, and identifies the sensitivity of people who perceive the landscape at night.
- 6.4.1.2 The study area for the visual assessment of WTG lighting is shown in **Appendix 18.6, Volume 2c - Figure 18.3**.
- 6.4.1.3 Satellite imagery provides an understanding of existing light conditions across the study area at night (**Appendix 18.6, Volume 2c - Figure 18.14: Baseline lighting**) and is described in the baseline.

- 6.4.1.4 An aviation lighting ZTV (**Appendix 18.6, Volume 2c - Figure 18.16**) identifies the likely geographical extent of theoretical visibility of the aviation lights and is representative of the worst-case ZTV for the lighting of the Turbine Area due to the height of the lights on the turbine nacelle. The aviation lighting ZTV has been reviewed to inform relevant representative viewpoints. Viewpoints that represent night-time impacts were discussed and agreed with the relevant planning/consenting authority and refined during the EIA process. Representative viewpoints are accompanied by night-time photomontage visualisations to represent the key impacts and enable detailed assessment at these locations.
- 6.4.1.5 Desk-based surveys have been conducted as part of the baseline. To inform both the study area and viewpoint selection, aspects of the seascape/landscape which increase or decrease its sensitivity to the introduction of visible lighting are identified and described, including those seascape/landscapes that are identified as displaying dark sky qualities, such as identified Dark Sky Parks, or where particular special qualities related to dark night skies are referred to in the citations for designated landscapes. Baseline information related to seascape/landscape character and designated landscapes (where relevant) has been reviewed and any qualities or characteristics that may be susceptible to lighting are identified.
- 6.4.1.6 Fieldwork has been undertaken as a component of the baseline evaluation. Relevant parts of the study area have been visited at night to gain an appreciation of aspects of the seascape/landscape which may become less perceptible or imperceptible, or more perceptible (i.e. the appreciation of dark skies) during hours of darkness. The presence of existing baseline visible lighting (both permanent and temporary) in the seascape/landscape has been recorded and described, particularly where it may influence the appreciation of susceptible characteristics and/or receptors.

6.4.2 NIGHT-TIME SENSITIVITY

- 6.4.2.1 The sensitivity of the baseline environment and receptors, as experienced by people at night, is established, applying principles set out in GLVIA3 (Landscape Institute, 2013) and the SLVIA Methodology set out earlier in this Appendix. The sensitivity of seascapes/landscapes varies depending on the susceptibility of their underpinning characteristics. Where an area has been recognised on the basis of its night sky or darkness qualities, such as Dark Sky Parks, susceptibility and value are likely to be elevated.
- 6.4.2.2 In relation to the sensitivity of visual receptors, this is defined through the application of professional judgement in relation to the interaction between the 'value' of the view experienced by the visual receptor and the 'susceptibility' of the visual receptor (or 'viewer', not the view) to the particular form of change likely to result from the Offshore Project.

Susceptibility

- 6.4.2.3 For designated landscapes, which have recognised special qualities, the degree to which the special qualities might be expressed or enhanced after dark is considered. Susceptibility is judged based on the degree to which they are currently characterised by darkness.
- 6.4.2.4 The susceptibility of visual receptors also differs at night reflecting the different activities people undertake during the hours of darkness. For example, drivers using roads at night tend to be more focused on the road and the area illuminated by headlights than during the day and may have oncoming headlights or other reflective signage and dashboard lighting drawing their attention, resulting in lower susceptibility. On the other hand, people taking part in activities where darkness is essential, such as stargazing, are of higher susceptibility. Viewpoints are identified which represent these different categories of receptor.
- 6.4.2.5 Examples of the relative susceptibility of different receptors at night are provided in Guidance on Aviation Lighting Impact Assessment (NatureScot, 2014) (Table 1). The susceptibility of people experiencing night-time views will depend on the degree to which their perception is affected by existing baseline lighting. In brightly lit areas, or when travelling on roads from where sequential experience of lighting may be experienced, the susceptibility of receptors is likely to be lower than from within areas where the baseline contains no, or limited, existing lighting.

Value

- 6.4.2.6 Value is judged the same as for the day-time assessment unless specific factors suggest otherwise – for example identification as a Dark Sky Park which would increase value at night; or where factors that contribute to value during daytime are irrelevant or imperceptible at night – which may reduce value at night.
- 6.4.2.7 The factors weighed in reaching a decision on ‘value’ of the view in the daytime are not all applicable at night-time, in the same way they may be during the day. It is not appropriate, for example, to attribute value to views at night when the detail of the view, or of elements that add value to it within a seascape/landscape, cannot readily be discerned at night. Furthermore, the popularity of a viewpoint during the day may be different to its use at night. Value factors assessed for day-time viewpoints may, therefore, be of less relevance to the value judgement for night-time viewpoints, which is factored into the assessments.
- 6.4.2.8 Dark Sky Discover Sites, as defined in supporting publications for Dark Sky Parks, are especially valued as people are encouraged to use them to appreciate dark skies at night.

6.5 ASSESSING THE EFFECTS OF THE LIGHTING

6.5.1 NIGHT-TIME MAGNITUDE OF CHANGE

6.5.1.1 The magnitude of change arising from the visible aviation and marine navigation lights is established so that conclusions around the significance of the lighting effects can be drawn.

6.5.1.2 As dimming is included as embedded mitigation, the assessments (and photomontage visualisations) are based on reduced 200 cd intensity aviation lights only, rather than 2000 cd intensity in line with guidance (NatureScot, 2024, para 82).

6.5.1.3 The definitions used to describe the magnitude of change that may arise at night as a consequence of the appearance of visible lights are set out below:

- High, where the addition of aviation and marine navigation lighting results in large scale of change/large intrusion to the existing night-time baseline conditions/darkness in the view, due to a full and/or close-range view of visible lighting and/or a high degree of contrast/low degree of integration with level of baseline lighting in the view. Results in obtrusive light which compromises or diminishes the view of the night sky;
- Medium, where the addition of aviation and marine navigation lighting results in moderate scale of change/moderate intrusion to the existing night-time baseline conditions/darkness in the view, due to partial and/or middle-distance view of visible lighting and/or moderate level of contrast/integration with level of baseline lighting in the view. Results in light that may partially compromise or diminish the view of the night sky, but which is not considered obtrusive;
- Low, where the addition of aviation and marine navigation lighting results in small scale of change/minor intrusion to the existing night-time baseline conditions/darkness in the view, due to limited and/or distant view of lighting and/or low degree of contrast/high degree of integration with level of baseline lighting in the view. Results in light that does not compromise or diminish the view of the night sky, nor is it considered obtrusive;
- Negligible, where the addition of aviation and marine navigation lighting results in a largely indiscernible change/negligible intrusion to the existing night-time baseline conditions/darkness in the view, due to glimpsed view of lighting and/or slight degree of contrast/very high degree of integration with level of baseline lighting in the view. Results in light that does not compromise or diminish the view of the night sky, nor is it considered obtrusive.

6.5.1.4 Intermediate levels of effect may be identified between these levels where, on the application of professional judgement, a level of change lies between two definitions.

6.5.2 SIGNIFICANCE OF EFFECTS

- 6.5.2.1 The significance of effects reflects the degree of change to the prevailing baseline lighting conditions and involves the application of professional judgement in reaching decisions around the sensitivity of receptors and magnitude of change (effect).
- 6.5.2.2 The significance of effects of aviation and marine navigation lighting is assessed through a combination of the sensitivity of the visual receptor and the magnitude of change that would result from the visible lighting, taking into account the considerations described above, and informed by the matrix in **Table 2-1**, which gives an understanding of the threshold at which significant effects may arise.
- 6.5.2.3 Significant effects relate to all those effects that result in a 'Major' or a 'Major/Moderate' level of effect (shaded red in **Table 2-1**). Moderate levels of effect (shaded orange) may be significant or not significant subject to the assessor's professional judgement. A significant effect occurs where the aviation and marine navigation lighting would provide a defining influence on a view or visual receptor. A not significant effect would occur where the effect of the aviation and marine navigation lighting is not material, and the baseline characteristics of the view or visual receptor continue to provide the definitive influence. In this instance, the aviation and marine navigation lighting may have an influence, but this influence would not be definitive.
- 6.5.2.4 In determining significance, particular attention is paid to the potential for 'Obtrusive Light', i.e. whether the lighting impedes a particular view of the night sky; creates sky glow, glare or light intrusion (Institute of Lighting Professionals, 2021) in a prominent, incongruous, or intrusive way.
- 6.5.2.5 The following assessments of significance are provided in the night-time aviation and marine navigation lighting impact assessment:
- Assessment of night-time effects for each relevant receptor, in particular where qualities of wildness, darkness, remoteness and lack of man-made elements are features or characteristics of the seascape/landscape;
 - An appraisal of all viewpoints within the study area where there may be significant effects, informed by wireline visualisations;
 - Detailed assessment of key representative viewpoints accompanied by photomontage visualisations.
- 6.5.2.6 A proportionate approach, with a focus on likely significant effects, is undertaken focusing on the relevant seascape/landscape and visual receptors and how they may be affected.

7 NATURE, DURATION AND REVERSIBILITY OF EFFECTS

7.1 NATURE OF EFFECTS

- 7.1.1.1 The nature of effects refers to whether the landscape and/or visual effect of the Offshore Project is positive or negative (herein referred to as 'beneficial' and 'adverse').
- 7.1.1.2 Guidance provided by the Landscape Institute on the nature of effect in GLVIA3 states that *"in the SLVIA, 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.
- 7.1.1.3 The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion. In relation to many forms of development, the SLVIA will identify 'beneficial' and 'adverse' effects by assessing these under the term 'Nature of Effect'.
- 7.1.1.4 The landscape and visual effects of wind farms are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which the effects of wind farms 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 wind farm in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected by the Offshore Project 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.
- 7.1.1.5 Generally, in the development of 'new' wind farms, a precautionary approach is adopted, which assumes that significant landscape and visual effects will be weighed on the adverse side of the planning balance. Unless it is stated otherwise, the effects considered in this assessment are considered to be adverse. Beneficial or neutral effects may, however, arise in certain situations and are stated in the assessment where relevant, based on the following definitions:
- Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The Offshore Project contributes to the landscape by virtue of good design, even if it contrasts with the existing character. 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 Offshore Project fits with the existing landscape character or visual amenity. The Offshore Project neither contributes to nor detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, or where the effects are so limited that the change is hardly noticeable. A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation;

- Adverse effects are those that detract from the 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 landscape and visual resource, or through the removal of elements that are key in its characterisation.

7.2 DURATION AND REVERSIBILITY

- 7.2.1.1 The EIA Regulations require a description of the likely significant effects on factors including (among other things) 'short-term, medium-term, and long-term, permanent and temporary effects'.
- 7.2.1.2 Duration (short, medium, or long-term) and reversibility (permanent or temporary) are separate but linked considerations. Duration of effects are judged on a scale as long-term, medium-term, and short-term effects, defined in this methodology as follows:
- Long-term – more than 10 years;
 - Medium-term – 5-10 years;
 - Short-term – 0-5 years.
- 7.2.1.3 Reversibility is a judgement about the degree of permanence or temporary nature of an effect, determined by the prospects and the practicality of the particular effect being reversed and the time period over which this may occur. Some forms of development can be considered permanent, while others can be considered temporary or reversible since they have a limited operational life and would be removed and/or the land reinstated.
- 7.2.1.4 The effect of the Offshore Project is considered to be long term and reversible, in that the wind turbines and infrastructure can be removed and their effects largely reversed at the end of the 35-year operational period. The effect of the construction of the Offshore Project is assessed as temporary and short-term in this SLVIA. Other infrastructure and operations such as the construction processes and plant (including tall cranes and heavy machinery for turbine erection) and construction and storage compounds would be apparent only during the initial construction period of the Offshore Project and are assessed as short-term and reversible effects. Should decommissioning of any part of the Offshore Project be required, e.g. failure of a wind turbine beyond economic repair, it is considered that any effects would be less than those resulting from construction of the Offshore Project, and as such this potential for decommissioning has been scoped out of further assessment.

8 VISUAL REPRESENTATIONS

8.1 OVERVIEW

8.1.1.1 ZTVs and visualisations, including wirelines and photomontages, are graphical images produced to assist and illustrate the SLVIA and the cumulative assessment. Viewpoint photography and photomontages have been produced in accordance with the NatureScot guidance on 'Visual Representation of Wind Farms - Version 2.2' (SNH, 2017), GLVIA 3 (Landscape Institute and IEMA, 2013) and the Landscape Institute Technical Guidance Note on Visual Representation of Development Proposals (Landscape Institute, 2019).

8.2 ZONE OF THEORETICAL VISIBILITY

8.2.1.1 The ZTVs have been generated using GIS software to demonstrate the number of turbines that may theoretically be seen from any point in the study area. The ZTVs, show the number of turbines (blade tips) that are theoretically visible around the study area. The Hub Height ZTVs, show the number of turbine hubs theoretically visible in the study area. When used in conjunction with the Blade Tip ZTV, the Hub Height ZTV provides an indication of the degree to which the wind turbines may be visible.

8.2.1.2 There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTVs:

- The ZTVs illustrate the 'bare ground' situation, and do not take into account the screening effects of vegetation, buildings, or other local features that may prevent or reduce visibility;
- The ZTVs are based on theoretical visibility from 2 m above ground level;
- The ZTVs are based on a 5 m data grid (OS Terrain 5), therefore relatively small changes in elevation may not be accounted for;
- The Blade Tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the Offshore Project. The nature of what is visible from 3 km away would differ markedly from what is visible from 10 km away, although both are indicated on the Blade Tip ZTV as having the same level of visibility;
- 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 large numbers of turbines may gain views of the smallest extremity of blade tips, or of many full turbines. This can make a considerable difference in the effects of the Offshore Project on that area. The Hub Height ZTV should be used in conjunction with the Blade Tip ZTV to provide an indication of the degree to which the wind turbines are visible.

8.2.1.3 These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the Offshore Project would theoretically be visible, the information drawn

from the ZTV is checked in the field, to ensure that the assessment conclusions represent the visibility of the Offshore Project reasonably accurately. The Horizontal Angle ZTV shows the horizontal field of view (HFOV) (in degrees) that may be affected by views of the turbines.

8.3 METHODOLOGY FOR BASELINE PHOTOGRAPHY

8.3.1.1 The following photographic information is recorded in line with NatureScot guidance:

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to ~5-10 m;
- GPS recorded Above Ordnance Datum (AOD) height data;
- Use of a fixed 50 mm focal length lens is confirmed;
- HFOV (in degrees);
- Bearing to target site.

8.3.1.2 The photographs used to produce the photomontages are taken at the agreed locations using Canon electro-optical system (EOS) 5D and 6D digital single-lens reflex (DSLR) cameras, with a fixed lens and a full-frame (35 mm negative size) complementary metal oxide semiconductor (CMOS) sensor. The photographs are taken on a tripod with a pano-head at a height of approximately 1.5 m above ground.

8.3.1.3 GLVIA3 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"*.

8.3.1.4 In preparing photomontages for the SLVIA, baseline photographs have been taken in favourable weather conditions. Weather conditions shown in the photographs for all viewpoints have, where possible, been taken during periods of 'very good' or 'excellent' visibility conditions seeking to represent a maximum visibility scenario when the developments may be highly visible.

8.4 SUPPORTING VISUALISATION AND GRAPHICS MATERIALS

8.4.1.1 Photographs and other graphic material such as wirelines and photomontages used in the assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what would be apparent to the human eye. A photomontage is a visualisation which superimposes an image of the Offshore 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.

8.4.1.2 NatureScot provides the following information on the limitations of visualisations that are produced according to the NatureScot guidance 'Visual Representation of Windfarms' (February

2017): “Visualisations of wind farms have a number of limitations which you should be aware of when using them to form a judgement on a wind farm proposal. These include:

- A visualisation can never show exactly what the wind farm will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;
- The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines but can never be 100% accurate;
- A static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move;
- The viewpoints illustrated are representative of views in the area but cannot represent visibility at all locations;
- To form the best impression of the impacts of the wind farm proposal these images are best viewed at the viewpoint location shown;
- The images must be printed at the right size to be viewed properly (260 mm by 820 mm); and
- You should hold the images flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, you should stand at arm's length from the image presented to gain the best impression”.

8.4.1.3 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 would 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° HFOV but appears essentially as a flat plane. Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined.

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

8.4.1.5 Wireline representations that illustrate the Offshore Project model set within a computer-generated image of the landform are used in the assessment to predict the theoretical appearance of the turbines. These are produced with Resoft Wind Farm software and are based on OS Terrain 5 terrain model. There are limitations in the accuracy of DTM data so that landform may not be picked up precisely and may result in turbines 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 turbines visible this refers to the illustrations generated and therefore the reality may differ to a degree from these impressions.

8.4.1.6 Photomontages have been produced for the majority of views, again using ReSoft Wind Farm software, to provide a more realistic image of the appearance of the Offshore Project. In most views these include the introduction of the turbines only as these are the elements that create the greatest change in views and are likely to be most visible from the surrounding area. Where there is

notable visibility of site infrastructure (within 5 km), this is shown in the photomontages and is generated using a combination of 3D software such as Topos, Visual Nature Studio, Sketchup and 3D Studio Max.

- 8.4.1.7 The baseline photographs and cumulative wireline visualisations shown for each viewpoint cover a 90° HFOV (or in some cases, up to 360°), which accords with NatureScot guidance. These are cylindrically projected images and should be viewed flat at a comfortable arm's length.
- 8.4.1.8 In the wirelines, the turbines are shown with the central turbines facing the viewer directly, with the full rotor diameter visible at its tallest extent. In the photomontages, the turbine rotors are shown with a random appearance with the central turbines facing the viewer directly. In the night-time photomontages, lights are shown as visible and without obstruction from turbine blades.
- 8.4.1.9 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 would be 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.
- 8.4.1.10 The 53.5-degree field of view NatureScot photomontages are prepared using a planar projected image and should also be viewed flat at a comfortable arm's length. These planar photomontage views do not always include a view of key existing wind farms in the view, and it is important therefore that the NatureScot 90° baseline panoramas provided are reviewed alongside these visualisations so that these existing wind farms are properly taken into account.

8.4.2 VISUAL AND GRAPHIC MATERIALS FOR NIGHT-TIME LIGHTING IMPACT ASSESSMENT

8.4.2.1 In line with guidance (NatureScot, 2024), the following plans and ZTV maps have been produced to inform the assessment of aviation and marine navigation lighting:

- Plan showing the wind farm layout with numbered turbines and a corresponding schedule of visible lights;
- Plan showing the extent of the night time study area;
- A hub height ZTV map which shows the areas from which the nacelle lights are theoretically visible;
- Lighting intensity ZTV to indicate where vertical directional intensity mitigation may be effective and the different lighting intensities that may be experienced at different elevations relative to the lights.

8.4.2.2 The following wireline and photomontage visualisations have also been produced to inform the assessment of aviation and marine navigation lighting:

- Wireline visualisations with an identification of turbine lighting as a separate note at the foot of the wirelines. This applies to all the SLVIA 53.5° (degree) wirelines;

- Night-time photomontage visualisations from several key representative viewpoints, selected based on sensitivity of potential receptors and frequency of visitors at night or dusk/dawn, and as agreed with the Planning Authority (in consultation with NatureScot);
- Photomontage visualisations illustrate the maximum case lighting intensity scenario (e.g. 200 cd where dimming of aviation lights proposed as embedded mitigation, and 2000 cd only where this mitigation is not proposed).

- 8.4.2.3 The limitations of night-time lighting visualisations are described in Appendix 4 of Guidance on Aviation Lighting Impact Assessment (NatureScot, 2024).
- 8.4.2.4 Night-time visualisations are produced from key viewpoints, to visually represent visible aviation and marine navigation lighting at night. Visualisations produced in support of the assessment provide a reasonable indicative illustration of the lighting effects. Digital visualisations cannot however replicate the additional variable influence which distance (between the light and the viewpoint/observer) or atmospheric attenuation can have on the observed illuminance (brightness or brilliance) of the lights. Visualisations seek to represent a reasonable maximum case effects likely to arise so that these can be considered as part of the EIA process (where such assessment is necessary).
- 8.4.2.5 Where possible, baseline photography for night-time viewpoints has been undertaken approximately 30 minutes after sunset around the end of civil twilight (start of nautical twilight), to represent a worst-case when ICAO/CAA regulations require the lights to be switched on and landscape features (such as distinctive landforms and enclosing skylines) may be appreciable during twilight.
- 8.4.2.6 The appearance of baseline lighting in the night-time photomontages may have a slight 'halo' (or bokeh) around it due to the way a camera lens renders out-of-focus points of light. This is not the way lights are seen, as they tend to be much more defined as point sources.
- 8.4.2.7 Night-time visualisations are produced using a combination of using Resoft's WindFarm software's aviation module software for positioning of the lights, 3D modelling software that can simulate lighting conditions, referencing existing lighting from the baseline photographs and professional judgement using photoshop. The lighting represented in the viewpoint visualisations has been calibrated using examples of existing, equivalent, turbine lighting observed in the field in other parts of the UK, during similar periods of dusk/darkness.
- 8.4.2.8 The turbine blades, when they intermittently pass in front of the aviation lights may cause flickering when the lights are switched 'on'. The turbines used in the night-time visualisations have been positioned so that their blades face away from the viewpoint so that all the lights are visible and on within the visualisations, representing a worst-case scenario.

8.5 TECHNICAL METHODOLOGY - VISUALISATIONS

- 8.5.1.1 In accordance with the requirements of Landscape Institute (2019) Technical Guidance Note 06/19, **Table 8-1** sets out the technical information for the preparation of the photomontage visualisation figures.

Table 8-1: Technical methodology – Visualisations

Category	Details
Photography	
Visualisation type	Type 4 – where survey of viewpoint locations is not required
Camera location	Established via hand-held Garmin Global Positioning System (GPS)
Level of accuracy of location	1-3 m (depending on satellites)
Camera	Canon EOS 5D Mark II and Canon EOS 6D DSLR. Full-frame (35 mm negative size) CMOS sensor.
Lens	50 mm fixed f1.4 lens
Tripod	Set to approximately 1.5 m. Nodal Ninja panoramic head with Adjust Leveller. Nodal Ninja panoramic head set to take photographs at 20° increments. Photographs of tripod positions are shown where available.
Photography process	Camera used on fully manual settings. Photographs taken in RAW image format. Bracketed exposures are taken for each view 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/Visualisations	
Topographic height data	OS Terrain 5 (5 m resolution). OS Terrain 50 (50 m 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 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 (offshore substations platforms, 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.

9 GLOSSARY OF TERMS AND ABBREVIATIONS

9.1.1.1 A list of key terms and acronyms used in this appendix are provided in **Table 9-1** and **Table 9-2**.

Table 9-1 Acronyms and Abbreviations

Term	Definition
AOD	Above Ordnance Datum
AELSQ	Assessment of Effects on Special Landscape Qualities
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CCA	Coastal Character Area
CEA	Cumulative Effect Assessment
CLVIA	Cumulative Landscape and Visual Impact Assessment
CMOS	Complementary Metal Oxide Semiconductor
CnES	Comhairle nan Eilean Siar
CNPA	Cairngorm National Park Authority
DSLR	Digital single-lens reflex
DTM	Digital Terrain Model
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMODnet	European Marine Observation and Data Network
EOS	Electro-Optical System
GIS	Geographic Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, 3rd Edition
GPS	Global Positioning System
HFOV	Horizontal Field of View
ICAO	International Civil Aviation Organization
ILP	Institute of Lighting Professionals
LCT	Landscape Character Type
LLTNPA	Loch Lomond and Trossachs National Park Authority
LVIA	Landscape and Visual Impact Assessment
MCA	Maritime and Coastguard Agency
MLWS	Mean Low Water Springs
MHWS	Mean High Water Springs
MPS	Marine Policy Statement
NSA	National Scenic Area
O&M	Operation and Maintenance
OCAS	Offshore Cable Area of Search
OREI	Offshore Renewable Energy Installations
OS	Ordnance Survey
OSP	Offshore Substation Platform
OTW	Onshore Transmission Works
OWF	Offshore Wind Farm

Term	Definition
PC	Public Consultation
SLVIA	Seascape, Landscape and Visual Impact Assessment
UK	United Kingdom
WTG	Wind Turbine Generator
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

Table 9-2 Glossary

Term	Meaning
The Applicant	Sporad na Mara Limited (the Project owner)
Array Area	The offshore area within which the offshore wind turbine generators (WTGs), associated foundations, Offshore Cables, and Offshore Substation Platform (OSP) (if required), will be located. This area encompasses the Turbine Area that will contain all above water surface infrastructure (WTGs/OSP) and an additional area within which further below water infrastructure (foundations and cables) may also be located.
Embedded or 'Designed-in' Mitigation	Mitigation measures to avoid or reduce environmental effects that are directly incorporated into the preferred design for the Project. This can include standard practice in accordance with or without guidance. Embedded mitigation is considered as part of the impact assessment, before effect significance is identified.
Future Baseline	Refers to the situation in future years without the Offshore Project.
Offshore Cable Area of Search	The area within which the offshore electrical and communication cables between the Array Area and Landfall up to Mean High Water Springs (MHWS) will be located.
Offshore Project	The offshore components of the Sporad na Mara offshore wind farm (the Project) located seaward of MHWS.
Offshore Project Boundary	The 'red line boundary' encompassing the Offshore Project.
Offshore Substation Platform (OSP)	The optional offshore substation located within the Turbine Area. Includes the platform and associated components which allows the voltage to be increased to meet onward transmission requirements.
Project	The Sporad na Mara offshore wind farm development. This term describes the whole development, including all offshore and onshore components.
Turbine Area	A reduced area within the Array Area where above water surface infrastructure would be located i.e. WTG or OSP (if required). This area has been developed and refined through stakeholder consultation and environmental assessment.
Wind Turbine Generators (WTG)	The wind turbines that generate electricity consisting of tubular towers and blades attached to a nacelle housing mechanical and electrical generating equipment.

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