

Working together for a
cleaner energy future



Environmental Impact Assessment – Scoping Report
MarramWind Offshore Wind Farm

MarramWind

A joint venture between ScottishPower and Shell UK

January 2023



Executive Summary

In January 2022, as part of Crown Estate Scotland's ScotWind Leasing Round, ScottishPower Renewables and Shell were successfully awarded an Option Agreement (granting exclusive rights) to jointly develop a floating offshore wind farm within the northeast 7 (NE7) Plan Option – located off the northeast coast of Scotland (as set out within the Sectoral Marine Plan for Offshore Wind). The NE7 Option Agreement Area (OAA) is located between 75-110 kilometres (km) offshore of the northeast Aberdeenshire coast and is 684km² in size.

MarramWind Ltd has been created as a 50/50 Joint Venture company between ScottishPower Renewables and Shell to progress the proposals for an offshore wind farm in the NE7 Plan Option, which will be named MarramWind Offshore Wind Farm (the 'Project').

Working together for a cleaner energy future, ScottishPower Renewables and Shell have 70 years of combined experience in Scotland and over 50 years' experience in the North Sea. In addition, the partners have over 15 years of combined experience in floating wind. The combined portfolio includes more than 2 gigawatts (GW) of operational wind with more than 11GW of offshore wind in development.

The Project will help support the Scottish Government's target of net-zero emissions of all greenhouse gases by 2045 and will also help drive ambitions for green energy independence.

The Terms of the Option Agreement are dependent upon MarramWind Ltd being awarded all key consents and permissions to construct and operate the Project from the relevant regulatory authorities. This process will be subject to Environmental Impact Assessment (EIA), with an EIA Report covering both onshore and offshore elements to be prepared to underpin any applications.

MarramWind Offshore Wind Farm will have a total grid connection capacity of up to 3GW. The generating capacity of the offshore wind array depends upon a range of wind turbine generators (WTG) specifications, which are not yet agreed. For the basis of assessment, each WTG will have an individual generation capacity of up to 25 megawatts (MW). Depending on the final WTG size selected, the Project is expected to have in the region of 126 to 225 WTGs (assuming a typical overplanting of around 5%).

MarramWind Offshore Wind Farm will utilise floating technology for the WTGs, to be installed within the OAA where water depths range from 87 to 117.5 metres (m). While floating offshore wind is a relatively novel technology, WTG floating units have already been successfully proven off the Aberdeenshire coast. The current and projected rate of floating technology development and the volume effect of a 3GW project is anticipated to decrease costs. Therefore, there is a high confidence in the feasibility of this technology for MarramWind Offshore Wind Farm, which has the potential to become the largest floating offshore wind project in the world.

As the EIA process progresses, the Project design will be refined as further information is gained from surveys and responses from stakeholder and public engagement.

MarramWind secured a connection to the National Electricity Transmission System (NETS) prior to the ScotWind Leasing process. National Grid Electricity System Operator (NGESO) stated that the grid connection point for 3GW would be at New Deer. However, this has subsequently been revised following the publication of NGESO's Holistic Network Design (HND) report in July 2022. The HND report confirmed that 1.5GW would be connected in the vicinity of Peterhead, with the remaining capacity to be confirmed as part of the HND Follow Up Exercise (HND FUE), anticipated to be available at the end of Q1 2023. MarramWind Ltd has been in discussions with NGESO and the grid connection offer is being prepared at present, accepting Peterhead as the point of connection for 1.5GW at this time. MarramWind Ltd will also continue to liaise and engage with NGESO and Scottish and Southern Electricity Networks (SSEN) on the remaining capacity and the findings of HND FUE.

It is currently anticipated that the full 3GW will be connected in the vicinity of Peterhead. While the Project's contracted grid connection to Peterhead remains unfinalised, the Scoping Report is based on the following two distinct options:

- A full 3GW connection in the vicinity of Peterhead; or
- A 1.5GW connection in the vicinity of Peterhead, with the residual assumption of a 1.5GW connection to New Deer.

While this Scoping Report currently presents the technical scope, which is applicable to both connection scenarios, it clearly differentiates where necessary in response to any specific environmental and social features. Following the HND FUE review and confirmation of the remaining 1.5GW capacity and its associated grid connection point, the Project will be refined accordingly, and discussions with the relevant stakeholders will be undertaken to confirm the refined scope within the technical assessments.

Grid connection dates are still to be confirmed but are anticipated to be provided between 2030 and 2035, subject to confirmation from both NGESO and SSSEN.

The offshore elements of the Project will incorporate WTGs with floating units and mooring systems within the OAA, as well as offshore transmission infrastructure including array export cables between the OAA and landfall location(s). The Project will also include onshore transmission infrastructure to facilitate connection of the MarramWind Offshore Wind Farm to the NETS.

This Scoping Report covers both onshore and offshore aspects of the Project. As such, it is submitted to Aberdeenshire Council and Marine Scotland Licensing Operations Team (MS-LOT) with a request for a formal EIA Scoping Opinion from both regulatory bodies. The purpose of the Scoping Report is as follows:

- to establish the people and environmental resources likely to be significantly affected by the Project, and the work required to take forward the assessment of potentially significant effects. Impacts that are unlikely to have a significant effect on relevant receptors are identified and proposed to be scoped out of the EIA where there is clear justification for doing so;
- to summarise key legislation and policy relevant to the Project; and
- to provide stakeholders with information on the Project in order to refine the scope of the assessment; focus on the key issues and engagement on the key topics to be addressed, plus provide the baseline data sources and assessment methodologies to be used in the EIA Report.

Scoping occurs before the Project is at an advanced or fixed stage of engineering design. This allows the stakeholder feedback obtained via the Scoping Opinion to be used to inform the ongoing design evolution of the Project. Within this Scoping Report, additional studies and surveys are proposed in order to inform the EIA process and preliminary discussions on potential mitigation measures are also included.

The resultant EIA Report will be based upon the Scoping Opinion received in response to the formal request for Scoping Opinion.



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1. Introduction

1.1 MarramWind

- 1.1.1 MarramWind Limited (hereafter referred to as 'the Applicant') is a 50/50 Joint Venture company between ScottishPower Renewables (SPR) UK Limited and Shell New Energies Holding Limited (Shell). The Joint Venture is formalised by way of a Shareholder Agreement.
- 1.1.2 In January 2022, Crown Estate Scotland (CES) awarded SPR and Shell an exclusivity agreement to jointly develop a project (MarramWind) within the northeast 7 (NE7) Plan Option. This is located in the northeast region as defined in the Scottish Government's Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020). An Option Agreement (OA) for the Project was signed in April 2022.
- 1.1.3 The MarramWind Offshore Wind Farm (the 'Project') is a proposed floating offshore wind farm located in the North Sea, with a grid connection capacity of up to 3 gigawatts (GW).

1.2 Purpose of this Scoping Report

- 1.2.1 This Scoping Report covers both onshore and offshore aspects of the Project and as such, it supports requests to the relevant competent authorities (Marine Scotland Licensing and Operations Team (MS-LOT) and Aberdeenshire Council) for Environmental Impact Assessment (EIA) Scoping Opinions.
- 1.2.2 Establishing which aspects of the environment are likely to be significantly affected by the Project is captured in the EIA Scoping process, which involves identifying the following:
- the people and environmental resources (collectively known as 'receptors' or 'features') that could be significantly affected by the Project; and
 - the work required to take forward the assessment of these potentially significant effects.
- 1.2.3 The potential environmental impacts that are proposed to be scoped into the EIA are based on the existing evidence base. Impacts that are unlikely to have a significant effect on relevant receptors are identified and proposed to be scoped out of the EIA where there is clear justification for doing so. It is recognised that a number of items cannot be scoped out until further information is known about the Project and the existing environment and this is highlighted accordingly.
- 1.2.4 This Scoping Report aims to provide stakeholders with information on the Project to refine the scope of the assessment; focus on the key issues and engagement on the key topics to be addressed, plus provide the baseline data sources and assessment methodologies to be used in the Environmental Impact Assessment Report (EIA Report).
- 1.2.5 Scoping occurs before the Project is at an advanced or fixed stage of engineering design. This allows the stakeholder feedback obtained via the Scoping Opinion to be used to inform the ongoing design evolution of the Project. The resultant EIA Report will be based upon the Scoping Opinion received in response to the formal request for Scoping Opinion.

- 1.2.6 The Scoping Report has been prepared in accordance with the following EIA Regulations (hereafter referred to as the EIA Regulations):
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
 - The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
 - The Marine Works (Environmental Impact Assessment) Regulations 2007 (applies to applications that require an EIA, for a marine licence from 12-200 nautical miles (nm)); and
 - The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017.
- 1.2.7 EIA Scoping is not mandatory, under the EIA Regulations; however, it is considered good practice to request a Scoping Opinion. The purpose of this Scoping Report is to request a formal Scoping Opinion from the Scottish Ministers in accordance with Requirement 12 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, Regulation 14 of the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and Regulation 13 of the Marine Works (Environmental Impact Assessment) Regulations 2007; and from Aberdeenshire Council in accordance with Regulation 17 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. Therefore, in accordance with the EIA Regulations, the Applicant is providing this Scoping Report to help refine the scope of the assessment and focus on the key issues.
- 1.2.8 **Table 1.2.1** sets out the requirements for scoping under the EIA Regulations. The table also describes where in this Scoping Report the requirements have been addressed.

Table 1.2.1 The EIA Regulations requirements for Scoping

Requirement	Location in the Scoping Report
A description of the location of the development and a plan sufficient to identify the land.	Figure 1.1: Scoping Boundary in Appendix 1A, Section 1.4 , and Section 2.3 in Chapter 2: Project Description .
A brief description of the nature and purpose of the development and its likely significant effects on the environment.	Chapter 2: Project Description for a description of the nature and purpose of the development. Chapter 5: Environmental Aspects Offshore, Chapter 6: Environmental Aspects Onshore and Chapter 7: Environmental Aspects Whole Project for the descriptions of the likely significant effects on the environment with regards to offshore, onshore and whole project effects respectively.
Such other information or representations as the developer may wish to provide or make.	Contained within: Chapter 5: Environmental Aspects Offshore, Chapter 6: Environmental Aspects Onshore and Chapter 7: Environmental Aspects Whole Project .

- 1.2.9 The Applicant hereby requests that Scottish Ministers and Aberdeenshire Council state in writing their respective opinions, the scope and level of detail of information to be provided in the EIA Report, as stipulated in Regulation 2 of the four sets of EIA Regulations.

1.3 Key consents, licences and permissions

1.3.1 **Table 1.3.1** summarises the key consents, licences and permissions that are required to construct and operate the Project.

Table 1.3.1 Key consents

Licence/permit/ consent	Regulatory body	Consent requirements
Electricity Act 1989, Section 36 (s.36) Consent	Marine Scotland (on behalf of Scottish Ministers)	<p>Scottish Ministers are responsible for determining applications under s.36 of the Electricity Act 1989 for offshore generating stations with an installed capacity exceeding 1 megawatt (MW) in Scottish territorial waters, and over 50MW in the Scottish Renewable Energy Zone (REZ). Such applications are processed on behalf of Scottish Ministers by MS-LOT.</p> <p>s.36 consent is required for the generating station and ancillary infrastructure, including the offshore wind array and inter-array cables, as well as to establish the overall principle of the Project.</p> <p>The requirement for an EIA for electricity generation projects requiring consent under s.36 of the Electricity Act 1989 is provided for in Scotland by The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (herein referred to as 'Electricity Works EIA Regulations 2017').</p>
Marine licences under the Marine and Coastal Access Act 2009 (between 12 and 200nm) and the Marine (Scotland) Act 2010 (between 0 and 12nm)	Marine Scotland	<p>The Marine and Coastal Access Act 2009 introduces a framework for sustainable management of the United Kingdom (UK) seas, including around Scotland, beyond 12nm. The Marine (Scotland) Act 2010 introduces a duty to protect and enhance the marine environment, including measures to help boost economic investment and growth in areas such as marine renewables.</p> <p>Marine licences will be required to undertake prescribed marine licensable activities for the Project, including deposition of cables or other objects on or within the seabed, installation of any necessary cable protection, installation of mooring lines and anchors, and the installation of any wider infrastructure or substructures required.</p> <p>To facilitate the expected future transfer of offshore electricity transmission infrastructure to a third-party operator (OFTO) the Project will require two separate but related marine licence applications: one marine licence for the offshore generating station (comprising windfarm array and ancillary infrastructure) in association with the required s.36 consent; and a separate marine licence for the export cable and associated infrastructure up to Mean High Water Spring (MHWS). The Scottish Ministers are the decision maker for marine licences under both 2009 and 2010 Acts.</p> <p>The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 are applicable to applications made to MS-LOT for marine licences.</p>

Licence/permit/ consent	Regulatory body	Consent requirements
Town and Country Planning (Scotland) Act 1997	Aberdeenshire Council	<p>Full planning permission for the onshore infrastructure above Mean Low Water Spring (MLWS) will be sought from Aberdeenshire Council in accordance with the Town and Country Planning (Scotland) Act 1997.</p> <p>This Scoping Report therefore includes a request for a Town and Country Planning (Scotland) Act EIA Scoping Opinion to be adopted by Aberdeenshire Council in respect of proposed onshore works above MLWS.</p> <p>The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 are applicable to applications made to Aberdeenshire Council for planning permission.</p>

- 1.3.2 Consent for the onshore aspects of the Project can be sought either via a planning permission application made in accordance with the Town and Country Planning (Scotland) Act 1997 to Aberdeenshire Council, or through ‘deemed’ planning permission as part of a single application for consent for the Project under s.36 of the Electricity Act 1989, as permitted by the Growth and Infrastructure Act 2013. The Applicant has considered these potential consenting options and consequently intends that separate offshore and onshore applications will be made to MS-LOT and Aberdeenshire Council, respectively, the latter being a single application for full planning permission, in accordance with the Town and Country Planning (Scotland) Act 1997.
- 1.3.3 An EIA Report (in accordance with the EIA Regulations) will be required to support the consents and licences identified in **Table 1.3.1**. An EIA Report will be prepared that covers the entire Project, including both the offshore and onshore generating and connection infrastructure. The EIA Report will be informed by a Scoping Opinion based on responses to this Scoping Report from key statutory and non-statutory consultees.

1.4 Overview of the Project

- 1.4.1 The Project’s generating infrastructure will be located in the North Sea, within the ‘Scottish Zone’ (as defined in the Scotland Act 1998) of the UK Exclusive Economic Zone (EEZ). It will be located within the Option Area Agreement (OAA), which is the spatial boundary of the NE7 Plan Option, as defined in the Scottish Government’s Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020). The OAA is located northeast of Rattray Head on the Aberdeenshire coast in northeast Scotland. The OAA (and therefore the Project’s generating infrastructure) is located approximately 75 kilometres (km) at its nearest point to shore and 110km at its furthest point. The location of the Project is illustrated in **Figure 1.1** in **Appendix 1A**.
- 1.4.2 The Project will have a grid connection capacity of up to 3GW. Electrical export cables will connect the offshore wind farm array to the mainland, making landfall at a location between Sandhaven on the Aberdeenshire coast (west of Fraserburgh) and Sandford Bay (south of Peterhead)
- 1.4.3 The Holistic Network Design (HND) report (National Grid, 2022) published in July 2022 confirmed that 1.5 gigawatt (GW) from the Project would be connected in the vicinity of Peterhead with the remaining capacity to be confirmed as part of the HND Follow Up Exercise (HND FUE), anticipated to be available at the end of Q1 2023. It is anticipated that

the full 3GW will be connected in the vicinity of Peterhead, but whilst the Project's contracted 1.5GW connection to Peterhead remains unfinalised, the Scoping Report is based on the following two distinct options:

- A full 3GW connection in the vicinity of Peterhead; or
- A 1.5GW connection in the vicinity of Peterhead with the residual assumption of a 1.5GW connection to New Deer.

1.4.4 Following confirmation of the remaining 1.5GW as part of HND FUE the design envelope will be refined accordingly. Grid connection dates are still to be confirmed, but are anticipated to be provided between 2030 and 2035, subject to confirmation from both National Grid Electricity System Operator (NGESO) and the Transmission Operator (TO), Scottish & Southern Electricity Networks (SSEN).

1.4.5 The Project offshore infrastructure, located seaward of Mean High Water Springs (MHWS), includes the following:

- wind turbine generators (WTGs), including floating units (platforms and station keeping system);
- array cables;
- accommodation platform(s) (if required);
- offshore substations;
- reactive compensation platform(s) (if required); and
- offshore export cables to connect the wind farm area to the landfall(s).

1.4.6 The Project's onshore infrastructure, located landward of MLWS includes:

- landfall(s) – the infrastructure associated with landfall located above MLWS;
- onshore export cables running from the landfall(s) to the onshore substation(s);
- onshore substation(s);
- grid connection cables (connecting the onshore substation to the grid connection point). The cables are likely to be to underground and this forms the basis for the Scoping Report; and
- grid connection point (an SSEN substation, which does not form part of the planning application).

1.4.7 The Scoping Boundary, within which the offshore wind farm and associated offshore and onshore infrastructure will be located, is presented in **Figure 1.1** in **Appendix 1A** and described in **Section 2.3** in **Chapter 2: Project Description**.

1.5 Applicant and EIA project team



The Applicant

1.5.1 The Applicant is MarramWind Limited, a 50/50 Joint Venture company between SPR and Shell. SPR and Shell have extensive experience in the industry as highlighted in **Table 1.5.1**.

1.5.2 Working together for a cleaner energy future - SPR and Shell have 70 years' combined experience in Scotland, with over 50 years' experience offshore in the North Sea. In

addition, the partners have over 15 years of combined experience in floating offshore wind. The combined SPR and Shell portfolio includes more than 2GW of operational offshore wind with more than 11GW of offshore wind in development.

Table 1.5.1 SPR and Shell’s energy experience

SPR	Shell
<p>SPR is part of the Iberdrola group, one of the world’s largest utilities and the leading wind energy producer. Responsible for progressing Iberdrola’s renewable energy projects in the UK, SPR manages the development, construction and operation of offshore windfarms throughout the world and currently has over 40 operational windfarm sites generating more than 3GW of renewable energy generation across the UK. This includes the recently completed 714MW East Anglia ONE which supported approximately 3,500 jobs at the peak of construction. SPR has created a pathway of development in the East Anglia region with a pipeline of three further projects, known as the East Anglia Hub. SPR secured 7GW of OAs for seabed lease from the 2022 ScotWind leasing round, 5GW of floating wind projects in joint venture partnership with Shell (MarramWind and CampionWind) and a 2GW solo fixed-bottom project, MachairWind.</p> <p>SPR is a Principal Partner for the Conference of the Parties 26 (COP26) United Nations Climate Change Conference. It is developing an energy model that will play a significant role towards reaching the UK’s world-leading climate change targets and is investing a total of £10 billion between 2020-2025 in the clean energy generation and networks infrastructure needed to help the UK decarbonise and reach Net Zero emissions.</p> <p>Iberdrola is a world leader in the development of offshore wind energy, with an operational capacity portfolio and early-stage developments of approximately 35GW. Focused on countries with ambitious targets, the company expects to have 12GW of offshore wind power in operation by 2030.</p>	<div data-bbox="544 546 767 658">  </div> <p>Shell has a long history in Scotland and today employs around 1,200 people in the north-east of Scotland. In 2018, an analysis suggested that Shell’s activity in Scotland created around 11,700 full-time equivalent jobs in the wider Scottish economy and generated £775 million gross value added. Through investing in the local supply chain Shell has also supported more than 3,000 jobs in the Scottish services sector.</p> <p>Today Shell has more than 2.2 gigawatts (Shell equity share) of offshore wind capacity in operation or under construction across Europe, North America and Asia. Shell is a major shareholder in TetraSpar (Shell interest 46.2%), which is developing an innovative floating wind demonstration project off the coast of Norway. We are also developing a project with CoensHexicon that could bring 1.4 GW of floating wind power to South Korea.</p> <p>Globally, Shell is building an integrated power business that will provide customers with low-carbon and renewable energy solutions. Shell Renewables and Energy Solutions spans trading, generation and supply. We offer integrated energy solutions including hydrogen, solar, wind and electric vehicle charging at scale, while buying nature-based carbon credits and using technology to capture emissions from hard-to-abate sectors of the energy system.</p> <p>Shell’s target is to become a net-zero emissions energy business by 2050. For more information on its net-zero emissions customer-first strategy visit here.</p> <div data-bbox="1270 546 1422 674">  </div>

EIA project team

- 1.5.3 The preparation of the EIA for the Project is being led by WSP Environment & Infrastructure Solutions UK Limited (formerly known as Wood Environment & Infrastructure Solutions UK Limited, and hereafter referred to as ‘WSP’).
- 1.5.4 WSP is registered with the Institute of Environmental Management and Assessment (IEMA) and its Environmental Impact Assessment Quality Mark scheme. The scheme allows

organisations that lead the co-ordination of EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.

- 1.5.5 A number of specialist consultancies are also providing expert input into the EIA aspect assessments, as indicated in **Table 1.5.2**. Pursuant to the EIA Regulations, the EIA Report will be prepared by competent experts and the EIA Report will outline the relevant expertise or qualifications of the experts.
- 1.5.6 For this Scoping Report, the term offshore refers to the receptors on the seaward side of MHWS and onshore refers to receptors landward side of MLWS Project-wide refers to activities, impacts and/or receptors that exist both onshore and offshore.

Table 1.5.2 EIA project team

	Aspect	Author
Introductory chapters	Introduction	WSP
	The Project Description	WSP
	Legislative and Policy Context	WSP
	Approach to Scoping and EIA	WSP
Offshore aspects	Marine geology, oceanography, and physical processes	WSP and ABP Marine Environmental Research Ltd (ABPmer)
	Marine water and sediment quality	WSP
	Underwater noise and vibration	WSP and Subacoustech Environmental Ltd
	Electromagnetic field (EMF)	WSP
	Benthic, epibenthic, and intertidal ecology	WSP and APEM Ltd
	Marine mammals	WSP and APEM Ltd
	Offshore and intertidal ornithology	APEM Ltd
	Fish and shellfish ecology	WSP
	Commercial fisheries	WSP and Poseidon Aquatic Resource Management Ltd
	Shipping and navigation	WSP and Anatec Ltd
	Marine archaeology and cultural heritage	WSP and Coastal and Offshore Archaeological Research Services (COARS)
	Seascape, landscape and visual	WSP
	Infrastructure and other marine users	WSP
Onshore aspects	Ground conditions and contamination	WSP
	Air quality	WSP
	Water resources and flood risk	WSP
	Land use	WSP
	Terrestrial ecology and ornithology	WSP and APEM Ltd
	Onshore archaeology and cultural heritage	WSP
	Onshore noise and vibration	WSP
	Traffic and transport	WSP
	Landscape and visual	WSP
Whole project aspects	Climate resilience	WSP
	Greenhouse gases	WSP
	Socio-economics	WSP
	Military and civil aviation and telecommunications	WSP
Summary	Summary and Next Steps	WSP

1.6 Structure of this Scoping Report

1.6.1 The remainder of this Scoping Report is structured as follows:

- **Chapter 2** provides a description of the Project;
- **Chapter 3** provides an overview of the legislation and policies relevant to the Project;
- **Chapter 4** explains the approach that has been taken to identify the scope of the EIA;
- **Chapter 5** sets out the proposed scope and methodology for offshore environmental aspects, where a significant environmental effect is likely to arise as a result of the Project;
- **Chapter 6** sets out the proposed scope and methodology for onshore environmental aspects, where a significant environmental effect is likely to arise as a result of the Project;
- **Chapter 7** set out the proposed scope and methodology for project-wide environmental aspects, where a significant environmental effect is likely to arise as a result of the Project;
- **Chapter 8** summarises those effects that are scoped in and out of the EIA and sets out the proposed content of the EIA Report and an overview of next steps;
- **Appendix 1A** provides figures that support this Scoping Report; and
- **Appendix 1B** and **Appendix 1C** provides abbreviations and a glossary, respectively that have informed this Scoping Report.

1.6.2 The Scoping Report is also supported by additional Appendices, which are referenced throughout this Scoping Report.

1.7 Accessing the EIA Scoping Report

1.7.1 This Scoping Report is available online via the Project website at the following link:

www.marramwind.co.uk/scoping

1.7.2 Hard copies and pen drives can be made available on request from the Applicant via the website.

1.7.3 Responses and comments on this Scoping Report should be made directly to Aberdeenshire Council or MS-LOT, and not to the Applicant.

1.8 References

Electricity Act 1989. (c.29). [online] Available at:
<https://www.legislation.gov.uk/ukpga/1989/29/contents> [Accessed 23 June 2022].

Marine (Scotland) Act 2010. (asp. 5). [online] Available at:
<https://www.legislation.gov.uk/asp/2010/5/contents> [Accessed 23 June 2022].

Marine and Coastal Access Act 2009. (c. 23). [online] Available at:
<https://www.legislation.gov.uk/ukpga/2009/23/contents> [Accessed 23 June 2022].

National Grid, (2022). *Pathway to 2030 Holistic Network Design July 2022*. [online] Available at:
<https://www.nationalgrideso.com/document/262681/download> [Accessed: 20 July 2022].

Scotland Act 1998. (c. 46). [online] Available at:
<https://www.legislation.gov.uk/ukpga/1998/46/contents> [Accessed 8 July 2022].

Scottish Government, (2020). *Sectoral Marine Plan for Offshore Wind Energy*. [online] Available at:
<https://www.gov.scot/publications/sectoral-marine-plan-offshore-wind-energy/> [Accessed 6 July 2022].

SPR and Shell, (2021) *SPR and Shell ScotWind Application Part A*. [online] Available at:
<https://www.crownestatescotland.com/resources/documents/scotwind-area-11-scds-outlook>
[Accessed 7 July 2022].

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (SI 2017 101). [online] Available at: <https://www.legislation.gov.uk/ssi/2017/101/made> [Accessed: 23 June 2022].

The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (SI 2017 115). [online] Available at: <https://www.legislation.gov.uk/ssi/2017/115/made> [Accessed: 23 June 2022].

The Marine Works (Environmental Impact Assessment) Regulations 2007 (SI 2017 1518). [online] Available at: <https://www.legislation.gov.uk/uksi/2007/1518/contents/made> [Accessed: 23 June 2022].

The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 [SI 2017 102]. [online] Available at: <https://www.legislation.gov.uk/ssi/2017/102/made> [Accessed 23 June 2022].

Town and Country Planning (Scotland) Act 1997. (c. 8). [online] Available at:
<https://www.legislation.gov.uk/ukpga/1997/8/contents> [Accessed 23 June 2022].

2. Project Description

2.1 Introduction

- 2.1.1 This Chapter of the Scoping Report provides an outline description of the Project and summarises the key design components including the offshore wind farm and associated infrastructure both onshore and offshore. It also describes the key activities that will be undertaken during construction, operation and maintenance (O&M), and decommissioning, in addition to key parameters and indicative timescales.

2.2 Design envelope

- 2.2.1 At this early stage the Project description should be considered indicative to allow the appropriate design development to progress. In accordance with industry standard practices, a parameter-based 'design envelope' approach has been adopted. The indicative design envelope is intended to identify key parameters that are suitable to enable initial environmental appraisals to be carried out in a robust and proportionate manner. This will also enable the subsequent EIA to be based on a description of the location, design and size of the Project that is suitable to allow a comprehensive assessment of its likely significant environmental effects, whilst retaining sufficient flexibility to accommodate further refinement during detailed design. Further details of this approach are provided in **Chapter 4: Approach to Scoping and EIA**.
- 2.2.2 The Project design envelope will be refined as the Project continues to evolve through the key subsequent stages of the iterative design and EIA process, culminating in the EIA Report that will accompany the applications for consent.

2.3 Description of Project

Scoping Boundary

- 2.3.1 The Scoping Boundary (illustrated in **Figure 1.1: Scoping Boundary** in **Appendix 1A**) used to inform this Scoping Report combines the search areas currently for the offshore and onshore infrastructure associated with the Project. It is defined as the area within which the Project and associated infrastructure will be located, including the temporary and permanent construction and operational work areas.
- 2.3.2 The offshore element of the Scoping Boundary includes both the Option Agreement Area (OAA) where the wind farm array will be located and the search area for a planned offshore export cable corridor route. The OAA covers an area of 684km², and the offshore export cable corridor search area covers an area of 3,847km².
- 2.3.3 The OAA is the spatial boundary of the NE7 Plan Option, as defined in the Scottish Government's Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020a).
- 2.3.4 The OAA is located between 75-110km offshore (at its nearest and farthest points from shore respectively) of the north-east Aberdeenshire coastline, in Scotland. A marine area between the OAA and the coastline encompasses the offshore export cable corridor search area and the landfall search area.
- 2.3.5 As shown in **Figure 1.1** in **Appendix 1A**, the landfall search area runs from Sandhaven on the north coast (west of Fraserburgh) to Sandford Bay (south of Peterhead). The Scoping

Boundary includes an additional 2.5km buffer at either end of the landfall search area to allow for future design flexibility. The offshore export cable corridor links the OAA with this landfall search area.

- 2.3.6 The onshore Scoping Boundary includes the areas considered for connection of the various landfall options to the potential grid connection options currently being considered by National Grid Electricity System Operator (NGESO) and the Transmission Operator (TO), Scottish & Southern Electricity Networks (SSEN) in liaison with the Applicant, this includes substations near both Peterhead and New Deer.
- 2.3.7 Both the offshore and onshore elements of the Scoping Boundary have been designed to provide adequate flexibility in the connection of the OAA to the grid connection point(s), and to provide sufficient space for export cable route optioneering to avoid and/or circumnavigate key areas of identified environmental sensitivity or construction risk along the route. The onshore and offshore elements of the Scoping Boundary will be further refined as ongoing engineering and environmental information is gathered and incorporated into the design of the Project.
- 2.3.8 The Holistic Network Design (HND) report (National Grid, 2022) published in July 2022 confirmed that 1.5 gigawatts (GW) would be connected in the vicinity of Peterhead with the remaining capacity to be confirmed as part of the HND Follow Up Exercise (HND FUE), anticipated to be available at the end of Q1 2023. The Applicant has been in discussions with NGESO and the grid connection offer is being prepared at present, accepting Peterhead as the point of connection for 1.5GW at this time. The Applicant will also continue to liaise and engage with NGESO and SSEN on the remaining capacity and the findings of HND FUE.
- 2.3.9 It is anticipated that the full 3GW will be connected in the vicinity of Peterhead. However, whilst the Project's contracted grid connection remains unfinalised, the Scoping Report is based on the following two distinct options:
- A full 3GW connection in the vicinity of Peterhead; or
 - A 1.5GW connection in the vicinity of Peterhead with the residual assumption of a 1.5GW connection to New Deer.
- 2.3.10 Whilst this Scoping Report currently presents the technical scope, which is applicable to both connection scenarios, it clearly differentiates where necessary in response to any specific environmental and social features. Following the HND FUE review and confirmation and acceptance of the remaining 1.5GW capacity and its associated grid connection point, the Project will be refined accordingly and discussions with the relevant stakeholders will be undertaken to confirm the refined scope within the technical assessments.
- 2.3.11 Grid connection dates are still to be confirmed but are anticipated to be provided between 2030 and 2035, subject to confirmation from both NGESO and the onshore TO.
- 2.3.12 The proposed indicative design envelope for key characteristics of the Scoping Boundary for the Project is summarised in **Table 2.3.1**.

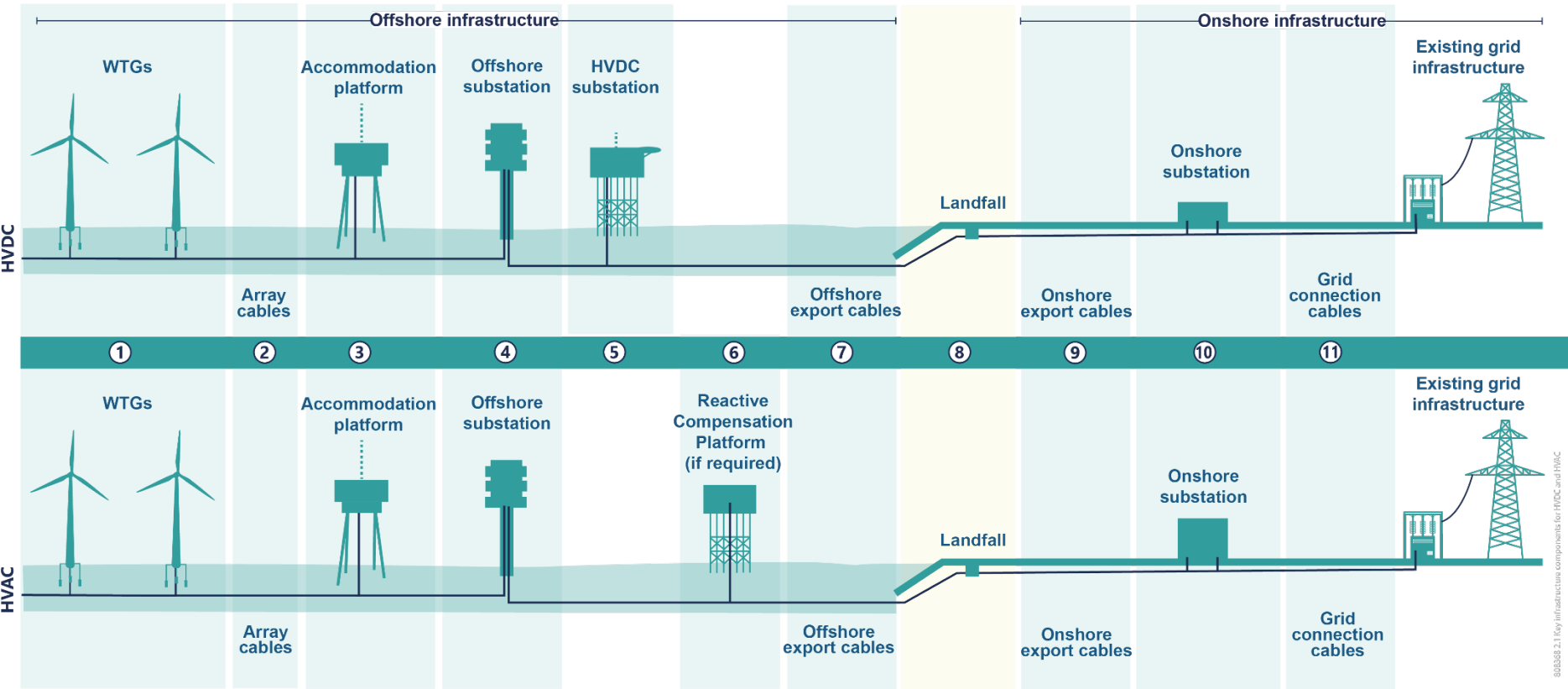
Table 2.3.1 Scoping Boundary characteristics

Parameters	Values
OAA	684km ²
Water depth range in wind farm OAA	87 – 117.5m
Closest distance to shore of wind farm OAA	75.6km
Offshore Scoping Boundary area (excluding OAA)	3,847km ²
Onshore Scoping Boundary area	634km ²
Onshore substation search areas (centred on an assumed grid connection point)	In the vicinity of the existing Peterhead SSEN substation (5km search radius): 35.4km ² and then existing New Deer SSEN substation (3km search radius): 28.3km ² .

Overview of Project infrastructure

- 2.3.13 For the purpose of this Scoping Report, the key components of the Project are separated into offshore, landfall(s) and onshore elements, with an overview of each provided below. These subsequent sections provide detail and parameters where possible at this stage of design development and are described in accordance with the indicative design envelope principle. As the Project progresses through the EIA process, further clarity and refinements to Project design, cable routing and the location of facilities will be expected. This Project design evolution will be described in the EIA Report.
- 2.3.14 Options for transmission of electricity from the offshore wind farm to the onshore grid are currently under review and include both High Voltage Alternating Current (HVAC) and High Voltage Direct Current (HVDC) approaches. A decision will be taken based on the impact assessment of the options in addition to determining the most efficient and economic approach.
- 2.3.15 The key components of the Project are shown in **Plate 2.3.1**, noting the components that are common to both HVDC and HVAC technology. A description of the function of each component is provided in **Table 2.3.2**.
- 2.3.16 The infrastructure required for both types of transmission is broadly similar, as illustrated in **Plate 2.3.1**. The key differences are as follows and are included within the Project indicative design envelope:
- HVDC transmission would require additional converter technology offshore (within the OAA);
 - HVAC transmission would likely require, given the length of the offshore export cable corridor, reactive compensation technology at a location midway between the OAA and the landfall(s);
 - the offshore and onshore export cables would be different in number, design, installation and spacing between HVDC and HVAC; and
 - the onshore substation would be different in design and size for HVDC and HVAC.

Plate 2.3.1 Key infrastructure components for HVDC and HVAC



000308.2.1 Key infrastructure components for HVDC and HVAC

Table 2.3.2 Key components and functionality

Plate 2.3.1 ID	Component	Purpose/function
Offshore Infrastructure		
1	Floating wind turbine generators (WTGs)	WTGs convert wind energy to electricity. Each floating WTG will comprise a tower (potentially assembled in sections), a rotor with multiple blades (typically three) attached to a nacelle. The nacelle typically houses a gearbox (except for direct drive technologies), generator, converter, transformer, and control equipment.
	WTG floating unit	The water depth range at the Project site exceeds the maximum depth at which fixed structure foundations are generally deployed. The floating unit comprises the WTG described above as well as a floating platform, or “floater”. These are positively buoyant and are moored in position on the seabed and used to support the WTGs. A number of floater concepts are currently under consideration.
	WTG station keeping system	Each WTG floating unit will be secured in place using a station keeping or mooring system, involving anchors and mooring lines. Typically, multiple mooring lines will spread out radially from the floating structure, each ending in an anchor point on the seabed.
2	Array cables	<p>Array cables will be used to connect the WTGs to one another in strings (or loops) and to the offshore substation(s). The cables will have a requirement to withstand both dynamic conditions at the floaters as well as static lay and burial in or on the seabed.</p> <p>The cables may be buried below the seabed or otherwise protected from damage using secondary protection such as rock berms or concrete mattresses.</p>
3	Accommodation platform	An accommodation platform may be required to provide permanent welfare and accommodation facilities for personnel working on site to operate and maintain the wind farm. It may have a helideck for personnel access. Such a platform, if required, may have a floating or a fixed foundation (as described for items 1 and 4 respectively).
4	Offshore substation(s)	<p>Offshore substation platforms are installed to collect the energy generated by the WTGs and house the transmission equipment. The latter is required to convert the wind farm electricity to higher voltages necessary for long distance transmission through subsea cables to the onshore grid. Several platforms may be required for the Project.</p> <p>The offshore substation(s) will be installed on either ‘fixed’ foundations (i.e. solid structures standing on and secured to the seabed) or floating platforms. Several different designs may be considered with either steel or concrete construction.</p> <p>Scour protection, typically in the form of rock or mattresses, may be installed on the seabed around the fixed foundations to prevent sediments from being eroded by localised currents around the structure. It may have a helideck for personnel access.</p>

Plate 2.3.1 ID	Component	Purpose/function
5	HVDC substation (HVDC only)	Additional equipment is required for HVDC transmission to convert the AC power from the WTGs to DC. This may be installed on a separate platform or combined with the offshore AC substation.
6	Reactive Compensation Platform (RCP)	<p>For HVAC transmission, there is an upper limit of offshore export cable route length, beyond which the electrical losses incurred during transmission become prohibitive. This limit can be increased using reactive power compensation equipment connected through a separate substation(s) along the export cable route, typically at the mid-point between the offshore substation and landfall(s).</p> <p>The additional offshore platform(s) are typically similar in design and construction to the main offshore substations in the offshore wind farm area but may potentially be lighter in design due to the limited electrical equipment needed and usually shallower water depth.</p>
7	Offshore export cables	<p>Subsea export cables connect the offshore substation(s) to the landfall site(s) where a transition joint bay links the offshore subsea cables to the onshore underground cables. This cable system is necessary to export power from the offshore wind farm through the onshore substation to the existing grid network.</p> <p>The number and type of cables will depend on the transmission technology used and site installation conditions, particularly at the landfall(s).</p> <p>As with the array cables, export cables will require protection from external threats including third party damage (e.g. by anchors or fishing gear) and hydrodynamic loading (i.e. stresses caused by cross currents).</p> <p>Protection will generally be achieved by burial where possible, and via secondary protection methods such as concrete mattresses or rock berms where burial is not possible.</p>
Landfall(s)		
8	Landfall(s)	<p>The landfall is the area where the offshore export cables cross from the marine environment, through the intertidal zone and onto shore to the transition joint bay.</p> <p>Depending on the characteristics of the site, different construction techniques may be used, the two most common of which are open cut/cut-and-fill construction (digging a trench in which the export cable is laid) and Horizontal Directional Drilling (HDD) (tunnelling a hole through which the export cable is pulled). Depending on the site characteristics and the final landfall selection/design taken forward, a cofferdam construction may also be considered.</p>
	Transition joint bay	<p>This is a component of the landfall and is where the offshore export cables connect with the onshore export cables (which are of different construction).</p> <p>One or more transition joint bays may be required. This is typically in a pit dug below ground level. Once both sets of cables are installed, the transition joint bays are re-buried with access remaining for maintenance and repair via relatively small link boxes.</p>
Onshore infrastructure		

Plate 2.3.1 ID	Component	Purpose/function
9	Onshore export cables	<p>These are underground cables that connect from the landfall transition joint bay to the onshore substation. As with the offshore export cables, the type and number of cables will depend on the transmission technology used and installation conditions along the route (e.g. crossings, ground conditions etc.). Installation conditions will be assessed on confirmation of the onshore cable routing. Cables are typically installed in ducts in a standard buried trench arrangement where possible. HDD or other tunnelling methods may be necessary to cross sensitive features such as watercourses, roads and railways. Routing in roads may be necessary in some cases where concrete ducts may be utilised to protect the cables.</p> <p>Cables will be installed in sections and jointed together at regular intervals. Each set of joints between cable sections will be housed within a joint bay; similar to a transition joint bay (as above) but with the exception that the sections jointed will be of the same or similar design.</p>
10	Onshore converter station ('onshore substation')	<p>A new onshore substation will be required to convert the transmitted power to be compatible for feed-in to the NETS. As with the offshore converters, additional equipment will be required for HVDC transmission.</p> <p>The onshore substation will include all electrical conversion/transformation equipment needed to meet the SSEN requirements for connection to the network. This may include energy balancing infrastructure, such as battery banks to provide a buffer against periods of fluctuating demand.</p>
11	Grid connection cables	<p>Further onshore export cables will be required to connect the new onshore substation to the nominated NETS connection point(s). The cables are likely to be to underground and this forms the basis for the scoping report. However the installation status will continue to be reviewed to take account of additional constraint information and consultation feedback, with the potential for overhead lines to form part of the connection. The transmission type and voltage of these cables will be compatible with grid requirements at the grid connection point.</p>
	Grid connection	<p>The nominated SSEN substation into which the Project will connect, noting that the SSEN substation does not form part of the planning application.</p>

Offshore elements of the Project

Overview

- 2.3.17 The offshore elements of the Project refer to works seaward of Mean High Water Springs (MHWS) at the coast and will include the following key components:
- WTGs, including floating units (platforms and station keeping system);
 - array cables;
 - accommodation platform(s) (if required);
 - offshore substation(s);
 - reactive Compensation Platform(s) (if required); and

- offshore export cables to connect the wind farm area to the landfall(s).

2.3.18 The location of the offshore part of the Scoping Boundary is presented in **Figure 1.1** in **Appendix 1A** and the key components of the offshore infrastructure of the Project are described below.

Wind turbine generators

2.3.19 The Project will have a total grid connection capacity of up to 3GW. The generating capacity of the offshore wind array depends upon a range of WTG specifications, which are not yet agreed. For the basis of assessment, each WTG will have an individual generation capacity of up to 25 megawatt (MW).

2.3.20 Depending on the final WTG size selected, the Project is expected to have in the region of 126 to 225 WTGs (assuming a typical overplanting of around 5%). As WTG technology is continually evolving, it is difficult to definitively predict the generating capacity of WTGs that will be commercially available at the point of construction at least five years into the future from the point of writing. The final number, size, capacity and layout of WTGs will be determined based upon further assessment of the optimum wind resource, prevailing site conditions, the capacity of each individual WTG and findings of environmental and engineering surveys.

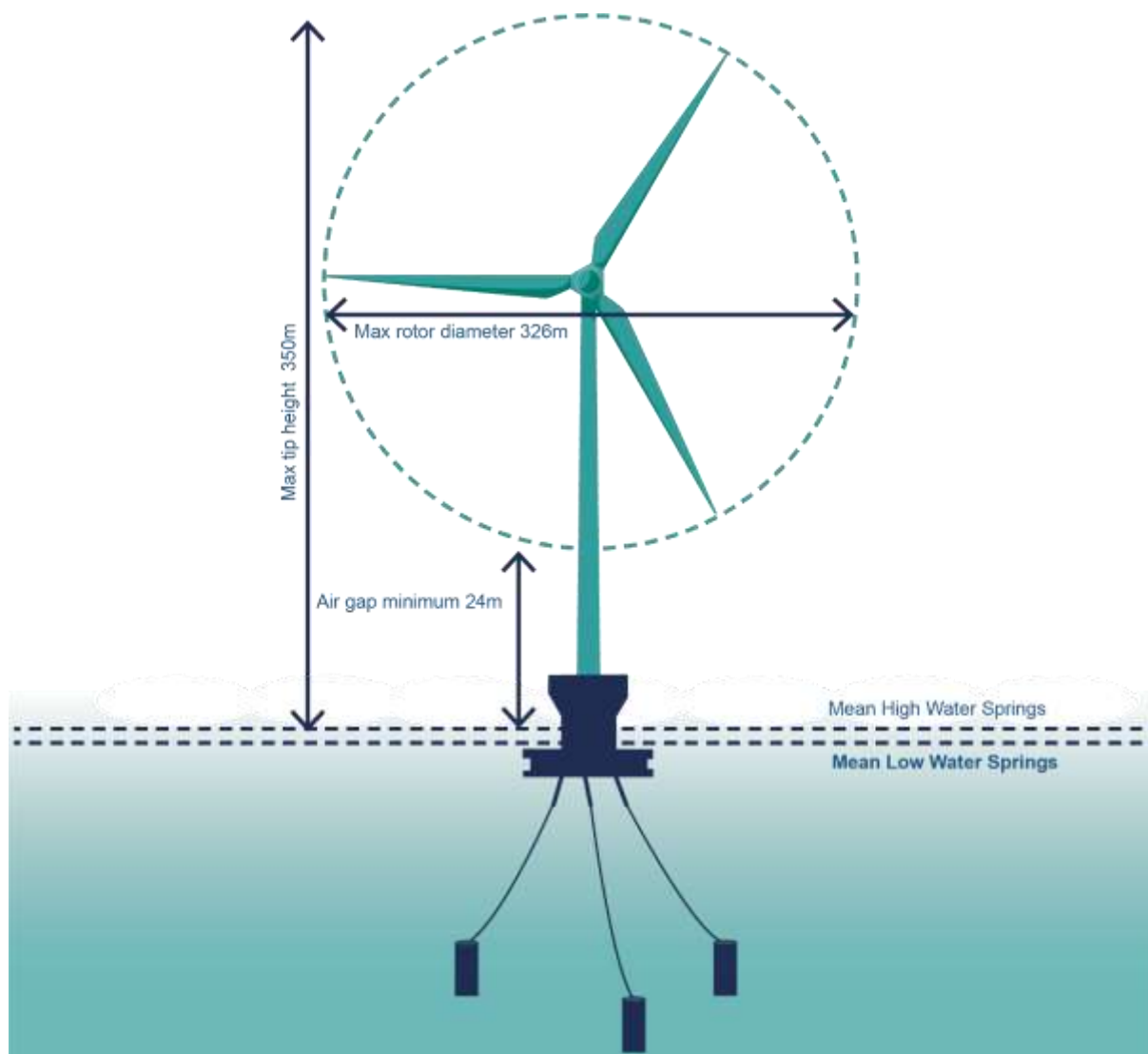
2.3.21 The methods and locations for the fabrication and assembly of the WTGs are not yet known as these are reliant on the supply chain availability. The required modes of transportation for the WTGs to site offshore, whether as components or assembled is also not yet known as this will depend upon the type of floater selected, as well as the fabrication and assembly locations. The basis for assessment will evolve subject to supply chain and design evolution and through engagement with stakeholders.

2.3.22 The proposed indicative design envelope for the WTGs is as follows in **Table 2.3.3** and illustrated in **Plate 2.3.2**. These indicative maximum parameters are subject to further design review following surveys and stakeholder engagement acknowledging the minimum blade clearance.

Table 2.3.3 Indicative WTG parameters

Parameter	Indicative design envelope
Range of WTG capacity (MW)	Up to 25MW per WTG.
Number of WTGs	In the region of 126 to 225 turbines.
Maximum rotor diameter (m)	Up to 326m.
Maximum blade tip height (m) above Mean High Water Springs (MHWS)	Up to 350m.
Minimum blade clearance above Mean High Water Springs (MHWS)	A minimum of 24m.

Plate 2.3.2 Illustration of WTG key dimensions



See **Plate 2.3.3** “illustration of floating unit types” for further mooring concepts.

Floating unit

- 2.3.23 The WTGs will each be mounted on a floating unit, which will consist of a floating platform or “floater” that will be stabilised to the seabed by a dedicated “station keeping system”. The station keeping system consists primarily of mooring lines and seabed anchors. Several design options are being considered for the floating unit at this stage of the Project. The final design concept will be identified following further market engagement, site survey and design development. The EIA will consider a design envelope associated with a potential range of floating unit types. Typical floating unit type variations, with indicative numbers of mooring lines are illustrated in **Plate 2.3.3** and **Plate 2.3.4**. The number of mooring lines associated with the chosen floating unit is yet to be determined and will be described in the EIA Report.
- 2.3.24 A key component of floater design also involves establishing moorings to anchor points on the seabed. The purpose of moorings is to maintain the position of the floating structure against destabilising forces over the lifetime of the development.
- 2.3.25 The overall seabed footprint of the WTG floating unit, whichever design concept is selected, will depend on the mooring concept applied (see **Plate 2.3.5**), which could be:

- catenary mooring (in which each mooring line hangs in a slack curve dictated by its own weight);
- taut line mooring (in which each mooring line is tensioned until it is taut); and
- semi-taut mooring (in which slack and taut elements are used in combination in the mooring system).

2.3.26

The geophysical and geotechnical surveys being undertaken for the Project will assist in establishing the appropriate length of mooring lines, which are often dependant on ground conditions of the seabed.

Plate 2.3.3 Illustration of floating unit types

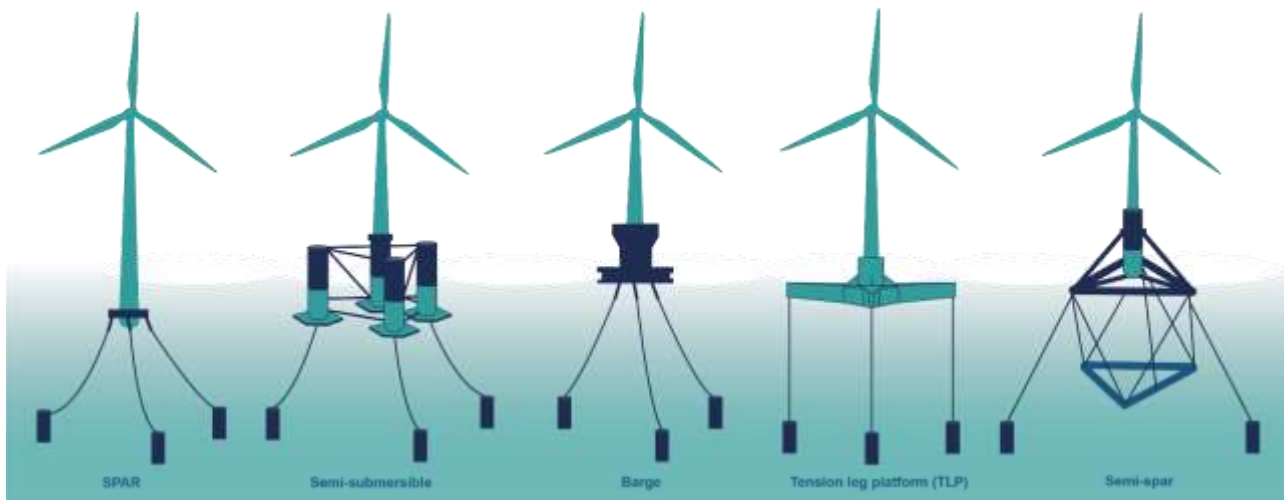


Plate 2.3.4 Floating platform key spatial parameters

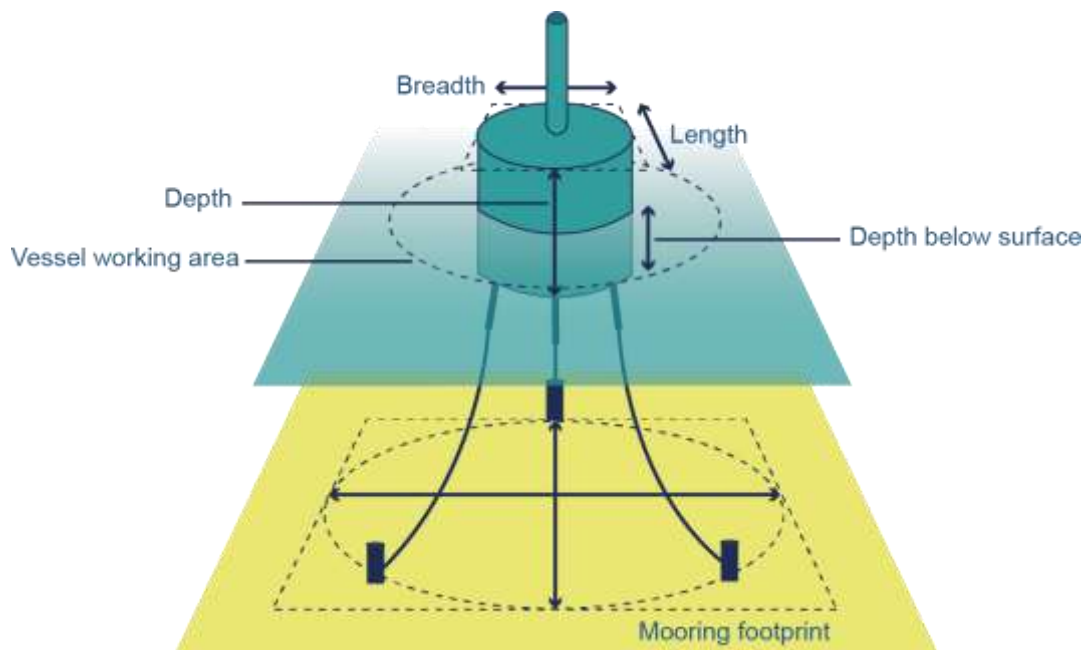


Plate 2.3.5 Mooring concepts

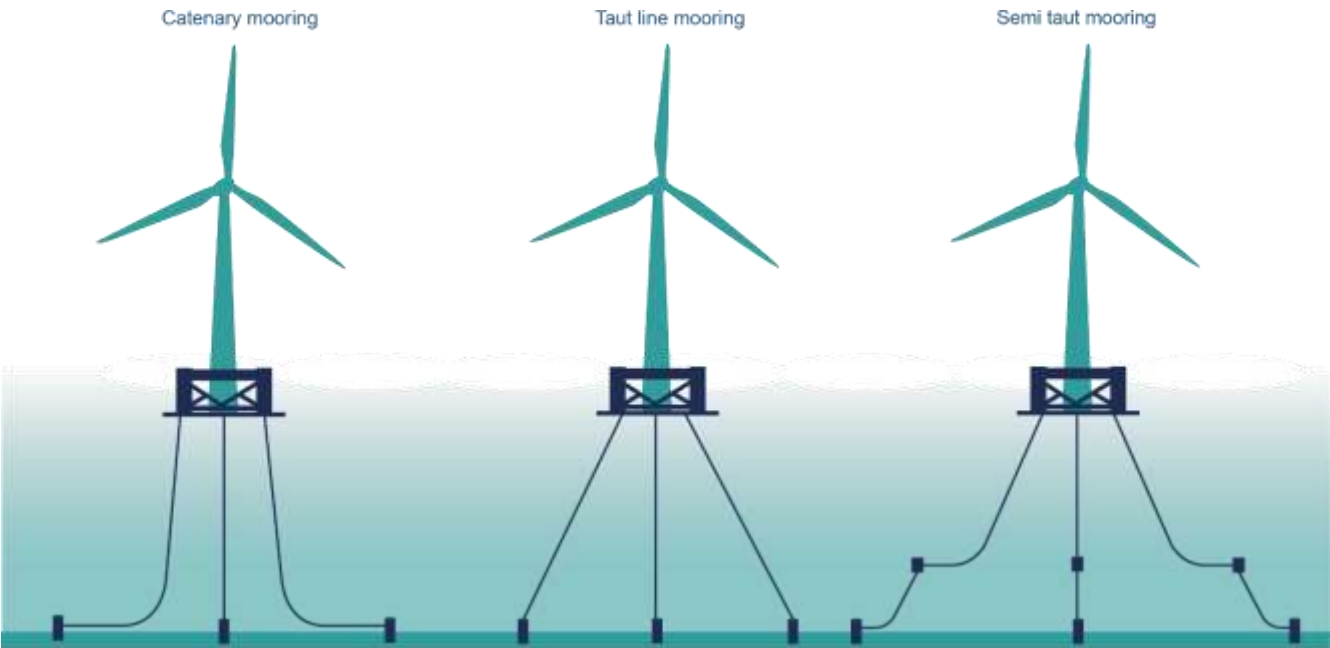


Table 2.3.4 Floating platform parameters

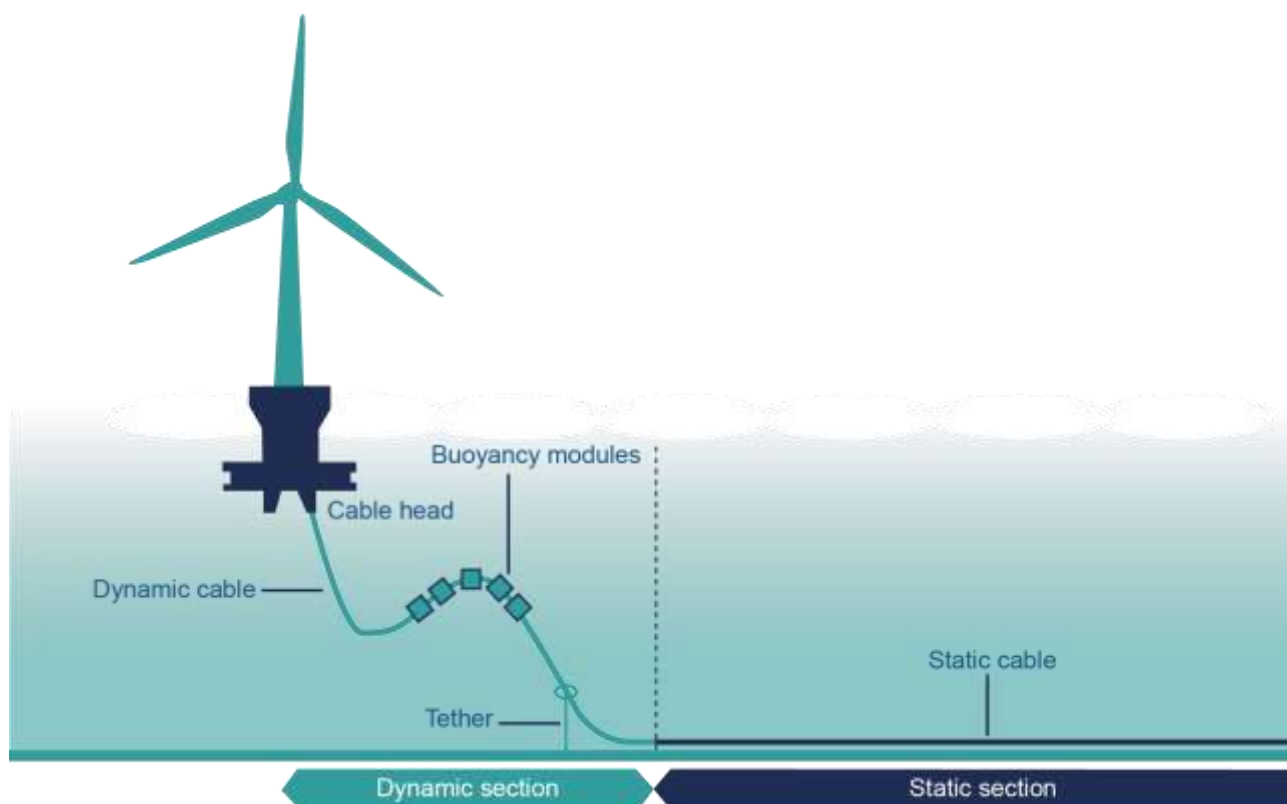
Parameter	Indicative design envelope
Foundation type	Floating (concept to be confirmed).
Navigational lighting	Included as required, subject to further assessment.

2.3.27 Anchoring is an integral part of the overall mooring system and there is a wide spectrum of anchoring and mooring solutions that could be fitted to the floater concepts identified above. These include drag embedment anchors, driven piles, suction anchors, drilled and grouted piles, vertically loaded anchors, torpedo anchors and gravity-based anchors.

Array cables

2.3.28 Each array cable will be a single 3-core AC cable, constructed using a ‘dynamic’ cable design with additional mechanical protection. The cable can be broken down into two sections: a dynamic section required to move with the floater and a static section which will most likely be buried for protection. A tethered reverse pliant (‘lazy wave’) configuration is shown in **Plate 2.3.6** by way of an example design but the actual approach will be determined in consideration of structure type and anticipated and extreme loading conditions.

Plate 2.3.6 Illustration of ‘lazy wave’ dynamic cable



2.3.29 The prevailing voltage in use for offshore array cables at the present time is 66kV, but higher voltages (up to 145kV) may also be used depending on the WTG rated power, technology readiness level of the cables, and associated switchgear and installation conditions onsite. The length of cable sections will be dependent on the distance between WTGs themselves, and the distance between the WTGs and offshore substation.

2.3.30 The proposed indicative design envelope for key characteristics of the array cables for the Project are summarised in **Table 2.3.5**.

Table 2.3.5 Array cable parameters

Parameter	Indicative design envelope
Array cable voltage	Between 66-145kV.
Target cable burial depth (m)	Typically 1-2m, subject to Cable Burial Risk Assessment (CBRA) and seabed mobility.
Secondary protection	Typically concrete mattresses/rock berm.

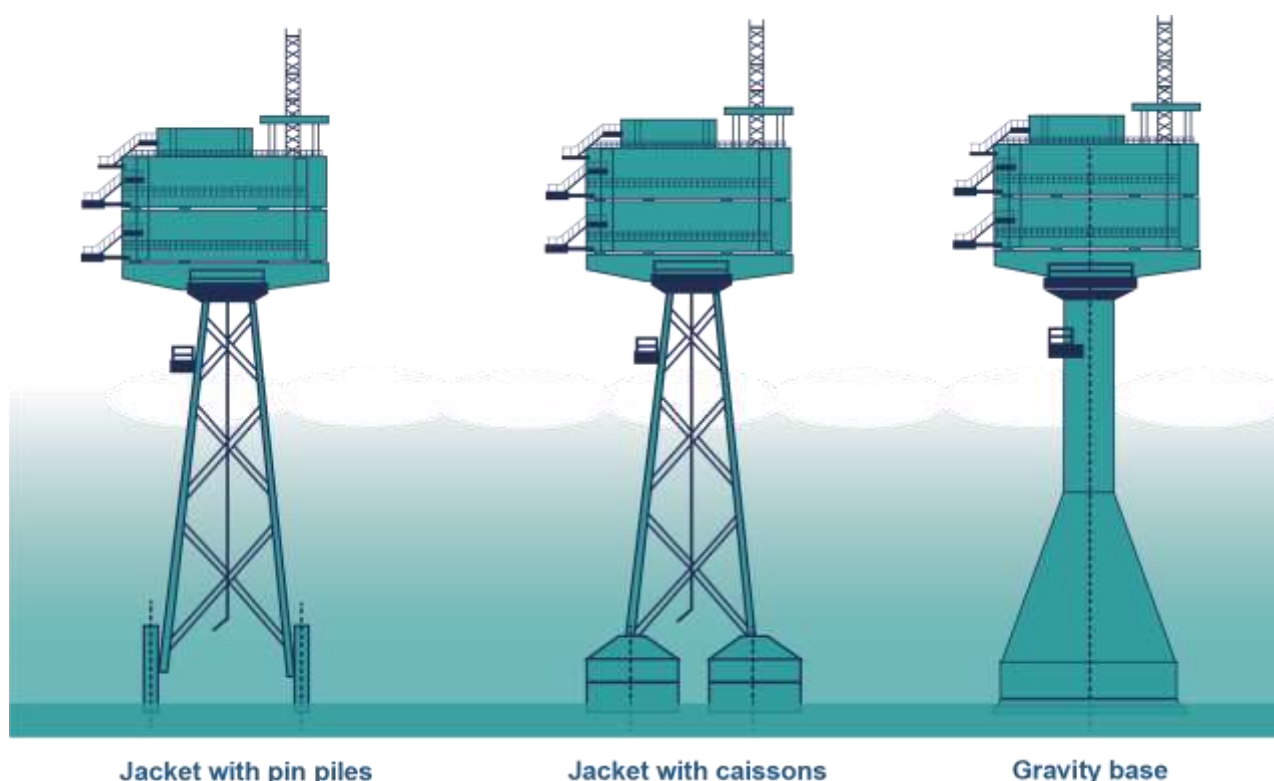
2.3.31 Depending on at-sea risks and hydrodynamic conditions, it is likely that the static sections of the array cables will be protected by burial, typically by ploughing, jetting or trenching, depending on the seabed conditions along the array cable routes. Cables for which optimal burial depths are not achievable may be subject to secondary protection measures such as rock placement or installation of concrete mattresses.

Offshore platforms

Substation platforms

- 2.3.32 The WTGs will be arranged in a suitable configuration for the site (e.g. strings, stars or loops). The WTGs will connect (via the array cables) to a substation platform located within the OAA. The number of substations required will depend on the chosen technology and the site layout. The substations may be interconnected by link cables to funnel the combined output to a common export location, and for redundancy.
- 2.3.33 The substations will house the main electrical equipment, auxiliary, controls and operational systems necessary. The offshore substations may also include a helideck.
- 2.3.34 It is expected that the substation platform foundations that will support the topside equipment will be fixed platforms. This is due to the current technology maturation associated with the electrical export system and risk to security of supply. The fixed design concept types being considered are shown in **Plate 2.3.7**. However, technology development to suit floating substations is underway and as such a floating structure cannot be ruled out at this time. See **Plate 2.3.3** and **Plate 2.3.5** for mooring concepts, which will apply for a floating substation.

Plate 2.3.7 Illustration of fixed foundation types



- 2.3.35 Prior to installation, it may be necessary to prepare and level the seabed by activities such as dredging/pre-sweeping of sandwaves, ground reinforcement or the application of a filter layer of rock. Debris and boulder removal may also be required, and the vicinity will have to be cleared of any potential unexploded ordnance (UXO) targets.
- 2.3.36 Foundations will be fabricated offsite at a portside facility and transported to site for installation. This is likely to require the use of specialist heavy lift vessels, and pin piling may be required to secure (for example) jacket structures to the seabed.

- 2.3.37 Once the foundations are installed, additional scour protection may be required, typically in the form of a circular rock berm laid around the foundations.
- 2.3.38 Topside units or modules may be lifted into place once the foundations are secured, also using heavy lift vessels or barges.

Accommodation platforms

- 2.3.39 The O&M strategy for the wind farm may include the use of a permanent accommodation platform within the OAA, to allow access to the WTGs and substations for prolonged periods.
- 2.3.40 If an additional structure or structures are required, it is expected that the size and footprint of the structure will be smaller than, or equivalent in size to, the offshore substation platforms. Since the water depth will be similar, the height, and consequently breadth, of the substructure will also be similar.
- 2.3.41 Topside equipment and modules will be different to other functional platforms, in that the focus will be around accommodation, welfare, and housekeeping, as well as safety equipment and facilities. The accommodation platform may include a helideck and suitable craft for travelling between the accommodation platform and the other structures will also need to be berthed/housed.

Reactive compensation platforms (HVAC only)

- 2.3.42 If HVAC transmission technology is used, the length of the offshore cable route may require the installation of reactive compensation equipment approximately midway between the OAA and grid connection.
- 2.3.43 Such equipment would need to be mounted on one or more offshore substation platform structure(s) (albeit reduced in size from the offshore substation(s)) located well outside the OAA. The offshore export cables would connect into the platform, and further cables would continue from the platform to the landfall site(s).
- 2.3.44 If reactive compensation is required, it is expected that the size and footprint of the platform structure(s) will be smaller than, or equivalent in size to, the offshore substation platforms. Being located closer to shore will mean that the water is shallower than at the OAA, and the height, and consequently breadth, of the substructure could also be reduced.
- 2.3.45 Installation activities will be comparable to those described for the offshore substation platforms.

Offshore export cables

- 2.3.46 Electricity from the offshore substation(s) will be transmitted via offshore export cables to the transition joint bays located onshore at the landfall(s). The voltage, number and size of cables required will depend on the design selection of transmission technology and the installation conditions determined along the export route. The worst-case envelope is considered here, which is the HVAC option as it involves the greatest number of cables (3-core) to be installed.
- 2.3.47 The proposed indicative design envelope for key characteristics of the offshore export cables is summarised in **Table 2.3.6**.

Table 2.3.6 Indicative offshore export cable parameters

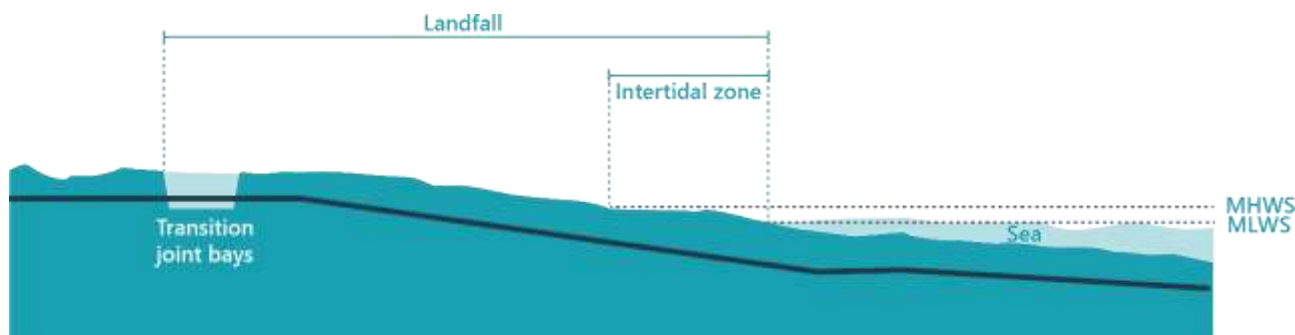
Parameter	Indicative design envelope
Number of export cables.	Up to 8 (dependent on technology used).
Length of export route.	Up to 120km.
Target cable burial depth (m).	Typically 1-2m, subject to CBRA and seabed mobility.
Secondary protection.	Concrete mattresses/rock berm.

- 2.3.48 Additional cables for communications, controls and (potentially) condition monitoring will be either strapped to or embedded within the export cable.
- 2.3.49 The cables will be installed in several lengths using a large capacity cable lay vessel. The sections will then be jointed together and deployed to the seabed.
- 2.3.50 The cable corridor width required is driven by factors including maintenance access requirements, which are in turn related to water depth. As such, the basis for assessment for the offshore cable installation corridor working width will be confirmed based on a refined design envelope once a decision is reached on the use of HVDC or HVAC cabling in the marine environment.
- 2.3.51 Prior to installation, seabed preparation measures will be applied over the export cable corridor, including (as applicable) pre-sweeping of sandwaves, debris and boulder clearance, UXO clearance, pre-lay grapnel runs and Out of Service (OOS) cable clearance.
- 2.3.52 The offshore export cables will be protected by burial, typically by ploughing, jetting or trenching. Several different approaches to burial are possible: a pre-lay trench can be excavated into which the cable is installed; simultaneous lay and burial is achievable using a suitable plough; or various types of post-lay burial equipment can be used.
- 2.3.53 Sections of the export cables for which optimal burial depths are not achievable may be subject to secondary protection measures such as rock placement or installation of concrete mattresses.
- 2.3.54 Linear seabed assets (cables and pipelines) that are crossed by the offshore export cable route will generally be protected at the crossing point by a separation layer or appurtenance and then stabilised post-installation of the crossing cable by rock berm or concrete mattresses. The crossing design applied must be agreed in advance with the existing asset owners, with whom a crossing agreement will be agreed.

Landfall

- 2.3.55 The landfall is the point at which the offshore export cables crosses from the marine environment through the intertidal zone to shore. If required, HDD activities can commence below Mean Low Water Springs (MLWS). The landward end of the landfall is the transition joint bay(s), which is located above MHWS (see **Plate 2.3.8**).

Plate 2.3.8 Landfall profile



- 2.3.56 The final landfall location(s) has/have not yet been determined, but a number of indicative options have been identified along the Aberdeenshire coastline via the optioneering process described in **Section 2.4**.
- 2.3.57 The construction method for the landfall(s) has yet to be determined, and will be specific to the site chosen, its geology, topography and other constraints. Typically either open cut/cut-and-fill construction or trenchless construction (e.g. HDD) will be used. It is possible that a cofferdam and / or sheet piling may be required, depending on site characteristics and landfall design.
- 2.3.58 Generally, for HDD, each export cable will require a separate duct and therefore a separate bore. The process involves drilling a pilot hole between the entry (onshore) and exit (offshore) points, which is then enlarged by a larger reaming tool passing through the hole. A duct is then pulled through the created channel, through which the cable will subsequently be installed.
- 2.3.59 The drill entry point is typically located within an onshore construction compound, exiting at a targeted location on the shore or on the seabed. The length of the HDD will depend on factors such as water depth, seabed topography, shallow geology/soil conditions and environmental constraints.
- 2.3.60 The HDD offshore exit pits (one per bore) will be spaced some distance apart, typically 20-50m depending on local environmental and technical constraints. A shallow water post-lay burial solution may be required to bury the cables in the area between the exit pit and deeper waters where normal offshore cable burial tools can be deployed.
- 2.3.61 Open-cut/cut-and-fill construction by contrast, requires the excavation of a trench through the shoreline into which either the cable is pulled directly, or a duct is installed for later cable pull-in.
- 2.3.62 Transition joint bays will be constructed above MHWS at the landfall(s) to house the joints connecting the offshore export cables and the onshore export cables. Each transition joint bay is a large, concrete-lined, excavated pit in which the component cable cores are split out for jointing.
- 2.3.63 Both Aberdeenshire Council and MS-LOT will need to consider the cable infrastructure in the intertidal zone as their respective jurisdictions overlap (see **Chapter 1: Introduction** for further details).
- 2.3.64 The proposed indicative design envelope for key characteristics of the Project landfall(s) are summarised in **Table 2.3.7**.

Table 2.3.7 Landfall parameters

Parameter	Indicative design envelope
Maximum width of HDD/open-cut trenching corridor.	Up to 350m (to meet jointing requirements and subject to site conditions).
Number of cable trenches/ducts.	8
Number of transition joint bays.	Up to 8.
Transition joint bays dimensions (typical).	5m x 10m (approximately).
Landfall construction compound dimensions.	175m x 100m (approximately).

- 2.3.65 The onshore construction compound, located above MHWS, at the landfall(s) will be temporary in nature and the site will be reinstated after completion of the Project construction phase. An inspection chamber or equivalent permanent access arrangement may be left in place at the transition joint bays.
- 2.3.66 Establishing access to the landfall construction site(s) may require construction of temporary access routes and/or permanent reinforcement of existing roadways.

Onshore elements of the Project

Overview

- 2.3.67 The onshore elements of the Project relate to the onshore electricity grid connection infrastructure. The key components are:
- landfall – the infrastructure associated with landfall(s) located above MLWS is explained in the section above;
 - onshore export cables running from the landfall(s) to the onshore substation(s);
 - onshore substation(s);
 - grid connection cables (connecting the onshore substation to the grid connection point). The cables are likely to be to underground and this forms the basis for the Scoping Report; and
 - grid connection point (an SSEN substation, which does not form part of the planning application).
- 2.3.68 The location of the onshore part of the Scoping Boundary is presented in **Figure 1.1** in **Appendix 1A** and the key components of the onshore infrastructure of the Project are described below.

Onshore export cables

- 2.3.69 Underground cables will be used to connect from the landfall transition joint bays to the Project onshore substation. The onshore export cable route corridor will be refined during the detailed design and the EIA process in order to identify a route which is optimal from an environmental, economic and engineering perspective.
- 2.3.70 The overall length of the route has yet to be determined as both the location of the landfall site(s) and onshore substation site(s) remain to be finalised. As part of the ongoing iterative

design and pre-application consultation processes the length of the onshore export cable route will be confirmed, with the identified route taking account of environmental, economic and engineering considerations.

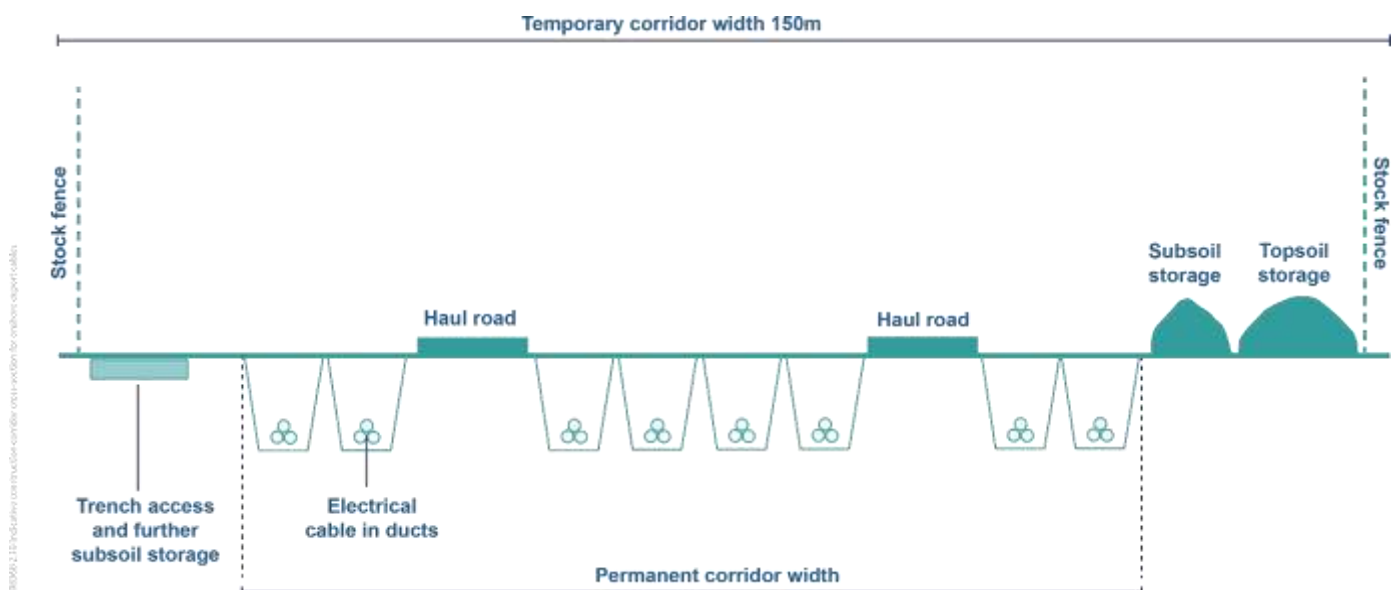
- 2.3.71 The proposed indicative design envelope for key characteristics of the onshore export cables is summarised in **Table 2.3.8**.

Table 2.3.8 Indicative onshore export cable parameters

Parameter	Indicative design envelope
Number of onshore export cables.	Up to 24 (assuming HVAC).
Installation method.	Cut-and-fill; trenchless methods such as HDD, where necessary, to cross sensitive features such as watercourses, roads and railways.
Maximum number of trenches	Up to 8.
Number of cables per trench (including fibre optics for communication and monitoring purposes).	Up to 3 (plus 1 fibre optic).
Temporary onshore export cable construction corridor width.	Approximately 150m (to meet jointing requirements and subject to site conditions).
Typical cable burial depth (to top of cable).	Typically 1-2m, dependent on ground conditions.

- 2.3.72 **Plate 2.3.9** shows the indicative onshore cable configuration and construction corridor cross-section.

Plate 2.3.9 Typical construction corridor cross-section for onshore export cables



- 2.3.73 The onshore export cables will be installed in sections, the maximum length of which will be limited by the volume and weight that can be transported by road. Jointing bays will therefore be required at intervals along the route to enable the cable installation and connection process. The jointing bays are subsurface structures with an associated link box located at or above ground level. These link boxes enable electrical checks and testing to be carried out on the cable system during operation.
- 2.3.74 The standard trench cable sections will typically be installed by standard cut-and-fill techniques, where a trench section of requisite length is excavated before the corresponding cable ducts are lowered into the trench. Once all ducts are in the trench, it is backfilled using the spoil from the prior excavation (and/or special backfill material if required) and reinstated accordingly. Further safety measures such as warning tape and protective tiles are buried above the cable ducts to flag the presence of the cable to anyone digging in the area. The cables are then pulled through and into the ducts by a winch temporarily installed at the far end.
- 2.3.75 Where it is necessary to cross sensitive features, such as watercourses, roads and railways crossings, trenchless construction methods such as HDD will be used to install ducts under the crossed feature. The cables are then pulled through via entry and exit pits (see **paragraph 2.3.58** for further information about HDD). Additional protective measures may also be required, such as concrete slabs or casing around the cables/ducts.
- 2.3.76 During construction, a temporary construction corridor will be defined, which will incorporate temporary working areas to provide suitable access and allow for safe construction. In particular, the temporary construction corridor will provide access to construction traffic, and space for cable assembly, cable trench excavation, and storage space for excavated topsoil and subsoil in separate stockpiles. It is expected that the width of the cable construction corridor for surface trenching will be approximately 150m and will be confirmed as part of the envelope presented within the EIA Report. At any sensitive features identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects. The temporary onshore export cable construction corridor may also require widening beyond the standard width in predetermined locations to allow sufficient space for access at crossings, avoidance of obstacles, directional drilling, and the application of trenchless techniques.
- 2.3.77 Onshore cable installation practices are well-established and incorporate environmental management and mitigation measures as standard. These will be described in the EIA Report where appropriate as environmental measures.
- 2.3.78 A number of temporary construction laydown areas and construction compounds will be required along the temporary construction corridor to accommodate construction equipment, materials, and site offices / welfare.
- 2.3.79 On completion of construction, the export cable construction corridor land will be reinstated with the haul road, any soil storage and stock fences removed. Where underground cables are installed, a permanent easement will be agreed to enable access for inspections and maintenance during operation of the Project.
- 2.3.80 In the unlikely event that it is not possible to install all onshore cables in a single operation, ducts may be installed in the trenches in the initial construction phase to allow the cables to be drawn through the ducts as later phases of the Project are brought forward. This approach would be intended to remove the need to undertake repeat excavations along the route. On completion of cable installation, the haul road, and any construction compounds will be removed, and the cable corridor will be reinstated.

Onshore substation

- 2.3.81 The onshore substation(s) will house the electrical components required to ensure the offshore wind farm export power is compliant with UK Grid Code (NGESO, 2023) to then be connected to the SSEN substation.
- 2.3.82 The equipment may be installed in a warehouse style building or several smaller buildings. Alternatively, some of the components may be sited in an open compound.
- 2.3.83 The overall permanent site footprint for an onshore substation for a up to 3GW connection in the vicinity of Peterhead is anticipated to be up to 8 hectares (ha). For a 1.5GW connection in the vicinity of Peterhead with the residual assumption of a 1.5GW connection to New Deer, the footprint for the onshore substation at each site is anticipated to be up to 4ha. The exact location of the substation(s) will be confirmed as the detailed design, the EIA process and landowner discussions progress. The final size of the onshore substation site(s) is expected to be optimised and will be subject to further ongoing design refinements.
- 2.3.84 Outside the anticipated permanent footprint of the onshore substation(s) boundary, a wider construction area will be required for construction equipment, welfare facilities, laydown and storage. An additional 4ha construction area is identified for construction of a up to 3GW onshore substation in the vicinity of Peterhead, in addition to the permanent footprint, making a total construction area of 12ha. For a 1.5GW connection in the vicinity of Peterhead with the residual assumption of a 1.5GW connection to New Deer, an additional 2ha construction area is identified for each site making a total construction area at each site of 6ha.
- 2.3.85 Construction works for the onshore substation will include creation of site access, site preparation works, installation of underground services and foundations, construction the building(s), installation and commissioning of electrical equipment, installation of perimeter fencing, and landscaping. This temporary construction compound area will be reinstated after construction is complete.
- 2.3.86 The proposed indicative design envelope for key characteristics of the onshore substation(s) are summarised in **Table 2.3.9**.

Table 2.3.9 Indicative onshore substation parameters

Parameter	Indicative design envelope
Number of onshore substations	Up to 2.
Estimated permanent footprint for a up to 3GW substation	Up to 200m x 400m.
Estimated permanent footprint for a single 1.5 GW substation	Up to 200m x 200m.
Estimated substation height for HVDC substation (inc. converter)	Up to 32m.
Estimated substation height for HVAC substation	Up to 32m.
Distance from grid connection location	Up to 5km from the existing SSEN substation near Peterhead; up to 3km from the existing SSEN substation near at New Deer. See Figure 1.1 in Appendix 1A .
Estimated overall substation footprint (construction) for a up to 3GW substation	Up to 12ha (total).
Estimated overall substation footprint (construction) for a single 1.5GW substation	Up to 6ha (total).

- 2.3.87 The search areas are subject to ongoing discussions with SSEN and will be refined and updated accordingly. The Applicant will update the relevant stakeholders as the process progresses.
- 2.3.88 Additional grid stability and balancing services equipment may be installed at onshore substation(s). Various grid stability and balancing services technologies are currently under development and Project-specific provisions may be considered as the engineering design progresses.
- 2.3.89 If these services are considered at the onshore substation, the necessary equipment may feature additional buildings or containers, or further open yard equipment which could be up to an additional 2ha to the proposed onshore substation footprint.

Grid connection cables

- 2.3.90 An additional section of the onshore export cable route will run from the onshore substation site(s) to the grid connection point, the installation status of which will be assessed on confirmation of a route.
- 2.3.91 The cables are likely to be underground and this forms the basis for the Scoping Report. However, the installation status will continue to be reviewed to take account of additional constraint information and consultation feedback, with the potential for overhead lines to form part of the connection. The transmission type and voltage of these cables will be compatible with grid requirements at the grid connection point.
- 2.3.92 The length of the connection will depend on the location of the preferred onshore substation site(s), but the maximum length will be approximately 5km in line with the onshore substation search area (the rationale for the size of the substation search area is provided in **paragraph 2.4.35**).

- 2.3.93 Installation methods will be the same as those used for the onshore export cables. It is expected that the width of the cable construction corridor for surface trenching will be approximately 150m and will be confirmed as part of the envelope presented within the EIA Report.

Project construction programme

- 2.3.94 The overall duration of construction of the offshore infrastructure is anticipated to be up to eight years. This will be subject to final grid connection date, supply chain discussions and further site surveys (pre-consent).
- 2.3.95 A shorter period within the eight years is expected for construction of the onshore infrastructure; in the range of two to three years (falling within the overall duration as above).

Project operation and maintenance

- 2.3.96 The O&M strategy will be finalised once the technical specifications of the Project are confirmed, including the WTG model, floater, electrical transmission infrastructure and final Project layout.
- 2.3.97 Both preventative and corrective maintenance activities will be undertaken. Offshore O&M services would typically be undertaken via supply and crew vessels but may also be undertaken via helicopters / specialised vessels. Offshore accommodation may be provided via an accommodation platform.
- 2.3.98 During the operation of the onshore cable, periodic testing of the cable is likely to be required (typically every two to five years). This will require access to the link boxes along the onshore export cable route, which will involve attendance by light vehicles such as vans. The vehicles will gain access using existing field accesses as agreed with landowners to reach the relevant sections of the cable.
- 2.3.99 The onshore substation(s) are likely to be designed to be unmanned during operation, however some maintenance visits may be required. This would typically involve a very small number of vehicles, typically light vans. Infrequently, equipment may be required to be replaced, then the use of an occasional heavy goods vehicles (HGV) may be utilised, depending on the nature of the repair.
- 2.3.100 The lease agreement allows the Project to remain until 2080, which would be the maximum operational lifetime under the terms of the lease.

Project decommissioning

- 2.3.101 The requirements for decommissioning are detailed in sections 105 to 114 of the Energy Act 2004 (as amended) and associated offshore renewable energy decommissioning guidance (Scottish Government, 2022). Under the terms of the Act, developers of offshore renewable energy projects are required to develop a costed decommissioning programme for submission to, and approval by, Scottish Ministers.
- 2.3.102 A decommissioning plan and programme will be developed prior to construction and updated during the operational phase of the Project to account for any changes to industry best practice, relevant legislation and policy, or developments in technology.
- 2.3.103 Decommissioning of the Project is anticipated to involve the removal of all offshore infrastructure above the seabed, including floating platform substructures and associated mooring lines. Electrical cables could be removed or left in-situ offshore and onshore to

minimise environmental effects and associated navigational safety risks (offshore only) associated with removal.

- 2.3.104 The EIA will be developed in line with current decommissioning policies in place. The necessary approach at the time of decommissioning will depend on the relevant regulations and guidance in place at that future time. The Project will engage with MS-LOT at an appropriate time to ensure that any future policy developments are accounted for in decommissioning strategy decisions.
- 2.3.105 The onshore substation(s) will be removed and the site(s) reinstated.
- 2.3.106 The decommissioning works are likely to be carried out in reverse to the sequence of construction works and will involve similar levels of equipment. Further detail will be provided in the decommissioning plan.

2.4 Consideration of alternatives

- 2.4.1 The EIA Report will set out the options considered for the Project and the main reasons for selecting particular options, taking into consideration environmental sensitivities, technical feasibility and the overall objectives of the Project. In addition, the EIA Report will also consider a ‘no development option’, which will outline the scenario without the implementation of the Project.
- 2.4.2 This consideration of alternatives section will present a summary of the process for route planning and site selection that is being followed for the Project. The process is holistic for offshore and onshore, with the aim being to identify the best end-to-end solution from the OAA to the NETS connection point. At this stage, the optioneering work in the offshore environment is more progressed than in the onshore environment due to the uncertainties presented by NGESO and SSEN regarding grid connections in this region.
- 2.4.3 The EIA Report will provide further detail on the iterative design process, including how the design, routes and locations have evolved over time and any refinements that take place. The optioneering methodology and findings will be consulted on during the pre-application process. Refinements made as a result of the EIA process, taking into account environmental sensitivities and the application of the EIA mitigation hierarchy; and in response to stakeholder feedback as part of the pre-application consultation or outcomes due to grid developments, will be described. Alternative Project infrastructure that has been considered and discounted will also be described in the EIA Report.

Grid connection and offshore wind farm area

Overview

- 2.4.4 The location of the Project infrastructure is determined by the location of the OAA and the NETS connection point, which dictate where the connecting electrical network will start and end. These two elements are described below.

Offshore wind farm area

- 2.4.5 The Applicant has been awarded an exclusivity agreement for lease, or Option Agreement to develop offshore wind energy generating infrastructure within the NE7 Plan Option. The Option Agreement Area (OAA) and proposed wind farm array area are, at this stage of development and in advance of finalisation of an agreed site layout, spatially identical to the NE7 Plan Option.

- 2.4.6 NE7 Plan Option is one of 15 Plan Options within four distinct regions that were identified in the Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020a). Further information is provided in **Section 3.1** in **Chapter 3: Legislative and Policy Context**.
- 2.4.7 The NE7 Plan Option was developed and selected through an iterative constraints analysis exercise undertaken by the Marine Scotland Directorate on behalf of Scottish Ministers. It identified key constraints and was supplemented by extensive consultation, which was used to support the Scottish Ministers in identifying and refining the Plan Options.
- 2.4.8 This process saw 24 areas of search evolve into 17 Draft Plan Options, which was later reduced to a short-list of 15 Plan Options that were subject to further refinement. Through this process the final NE7 Plan Option was subject to amendments to its boundary and the area was reduced by 34%. This was undertaken to avoid the areas of the highest levels of fishing activity, identified via consultation and analysis (Scottish Government, 2020b).
- 2.4.9 The final NE7 Plan Option was identified by the Scottish Government as a seabed area that met key policy objectives for the identification of opportunities for commercial-scale offshore wind development, whilst recognising that some potential adverse environmental effects could remain.
- 2.4.10 The Sectoral Marine Plan (Scottish Government, 2020a) highlights the “*key factors to development within the North East region are:*”
- *risks to bird species, including collision risk and displacement, as well as potential impacts to birds on migratory pathways;*
 - *potential impacts on commercial fishing;*
 - *potential impacts on marine mammal receptors;*
 - *potential impacts on migratory fish species;*
 - *potential impacts on benthic habitat and species; and*
 - *potential cost impacts and associated navigation risk from diverting key commercial shipping routes.”*
- 2.4.11 The evidence-base to support the decision-making on NE7 was supported by a full Sustainability Appraisal (SA) undertaken by Marine Scotland Directorate (in consultation with stakeholders). This SA incorporated a plan-specific Strategic Environmental Assessment, which identified the likely significant impacts of the Sectoral Marine Plan and proposed reasonable alternatives to them (Scottish Government, 2019).
- 2.4.12 The SA also involved a Plan-level Habitats Regulations Appraisal (HRA) to assess the implications of the plan for European sites in view of the sites’ conservation objectives. The HRA Report concluded that NE7 was not amongst those Plan Options for which adverse effects on European site integrity could not be ruled out. While NE7 consequently represents an alternative site for development with a reduced likelihood of impacts to European site integrity, the HRA Report identified mitigation measures that should be applied across all Plan Options.
- 2.4.13 On balance, the findings of the SA indicated that the NE7 Plan Option is a favourable site for offshore wind development when considered alongside the alternative Plan Options identified by the constraints analysis exercise.
- 2.4.14 **Figure 1.1** in **Appendix 1A** shows the Project’s OAA for the wind farm array, which corresponds to the NE7 Plan Option boundary.

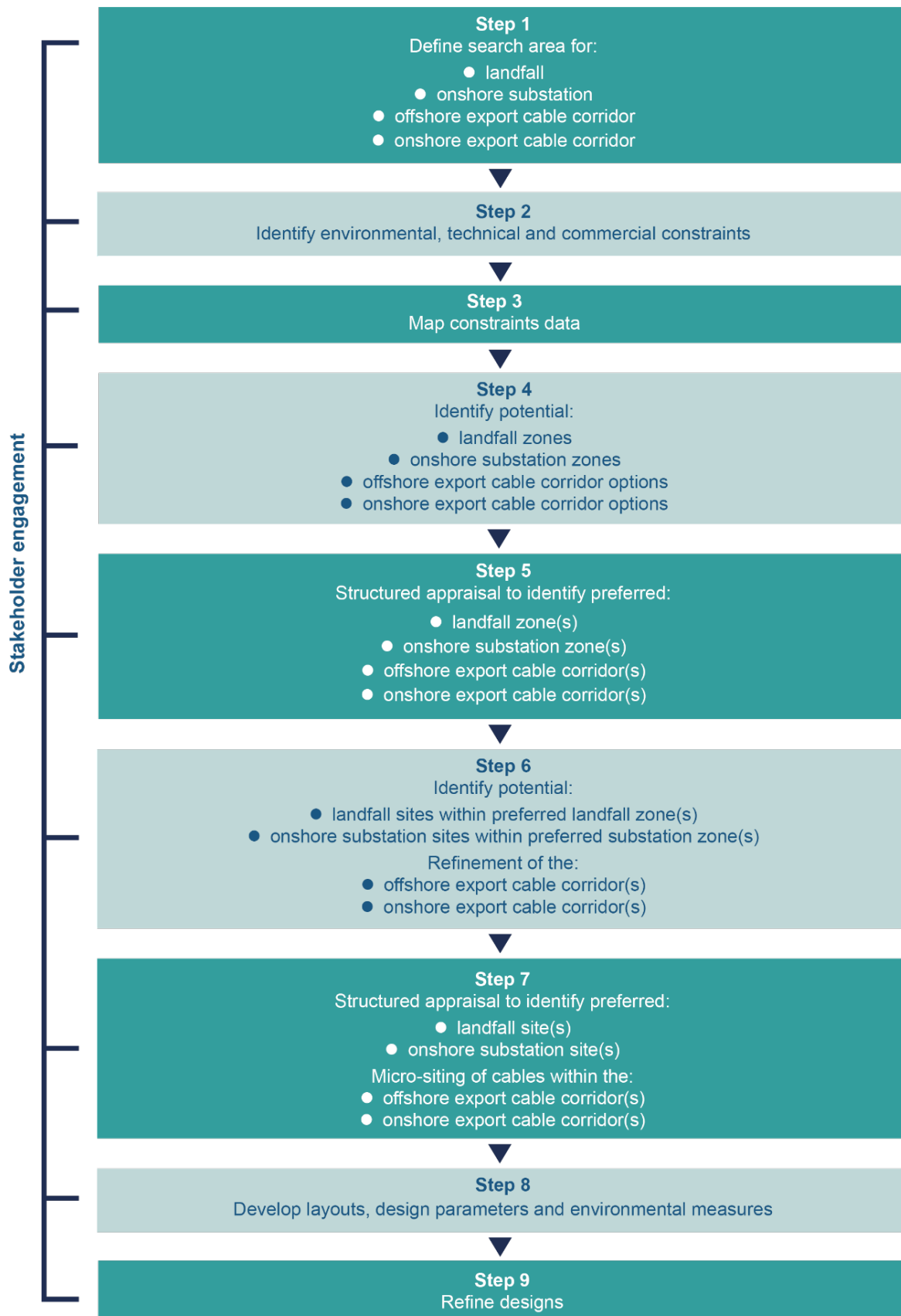
Identification of National Grid Electricity Transmission connection point

- 2.4.15 NGESO's HND (National Grid, 2022) is expected to provide recommended offshore and onshore transmission network designs to ensure suitable grid connections for UK offshore wind projects. This is a new NGESO process that has been created to provide a coordinated and integrated approach for connecting the large number of UK offshore wind projects currently in the scoping phase and to ensure the most appropriate approach is taken forward with regards to consumers, local communities, and the environment. As such, the Project will need to respond to the HND as it progresses.
- 2.4.16 As described in **Section 2.3**, the HND confirmed that 1.5GW of the Project's grid connection capacity will connect into the transmission system in the vicinity of Peterhead. The Applicant has been in discussions with NGESO and the grid connection offer is being prepared at present, accepting Peterhead as the point of connection for 1.5GW. The Applicant will also continue to liaise and engage with NGESO and SSEN on the remaining capacity and the findings of HND FUE. It is anticipated that the full 3GW will be connected in the vicinity of Peterhead. Whilst the Project's contracted connection to Peterhead remains unfinalised, the Scoping Report is based on the following two distinct options:
- A full 3GW connection in the vicinity of Peterhead; or
 - A 1.5GW connection in the vicinity of Peterhead with the residual assumption of a 1.5GW connection to New Deer.
- 2.4.17 A Project-specific onshore substation will be located near the new Peterhead area SSEN substation (the location of which is to be confirmed). It should be noted that any new SSEN substation required to facilitate the connection of the Project would be the responsibility of SSEN in relation to obtaining planning consent and would therefore be separate to the Project and considered as part of the cumulative assessment insofar as appropriate. With the uncertainty surrounding the specific location of the Project grid connection point, and for the purposes of advancing the optioneering work, an initial search area boundary with a 5km radius has been assumed around the existing Peterhead 400 kV substation to consider reasonable options for a Project-specific substation.
- 2.4.18 If a grid connection to SSEN New Deer substation is subsequently required for connection of the remaining 1.5GW in HND FUE, it has been assumed that the connection would be to the existing SSEN New Deer substation as per the existing connection contract secured. In this instance the Project has assumed it would connect via a Project-specific substation established in the vicinity of the existing SSEN New Deer substation.
- 2.4.19 Detailed connection options and results of the HND will be described in more detail and included in the EIA Report.

Optioneering and site selection methodology

- 2.4.20 A comprehensive route planning and site selection exercise is being conducted to identify environmentally, technically, and economically acceptable landfall(s), as well as offshore and onshore export cable corridor and substation site options. This process is summarised in **Plate 2.4.1**.

Plate 2.4.1 Site selection methodology flowchart



- 2.4.21 To inform the identification of potential landfall zones, onshore substation zones and offshore and onshore export cable corridors, a detailed constraints mapping exercise is being undertaken. Key environmental, technical and commercial constraints are being established for each component and constraints data is being gathered across the landfall, onshore substation and offshore and onshore export cable corridor search areas.
- 2.4.22 Once the constraints data is mapped, potential options for the location of the infrastructure will be identified. A structured appraisal of the landfall zones, substation zones in proximity to the grid connection points, and offshore and onshore export cable corridor options identified through this process will then be undertaken.
- 2.4.23 This will enable the potential environmental impact of the option, the ease of construction with reference to the technical criteria, and the commercial considerations to be identified. The appraisal will allow the number of options to be reduced and preferred options and sites to be identified and refined for assessment in the EIA Report.
- 2.4.24 The views of consultees and the public will be important for informing the site selection exercise. As such, stakeholders will be engaged during the process, through formal consultation exercises and informal public consultation events, landowner liaison and other stakeholder engagement on the emerging and final Project design.

Offshore export cable corridor optioneering and site selection

- 2.4.25 The offshore export cable corridor will be routed between the NE7 OAA and the landfall location(s) at the Aberdeenshire coast (allowing for the contingency scenario of a New Deer connection). The landfall optioneering process is described further in the following onshore site selection section.
- 2.4.26 A comprehensive offshore route planning and site selection exercise is being conducted to identify geologically, environmentally, and commercially acceptable offshore export cable corridor options.
- 2.4.27 **Table 2.4.1** presents the constraints that were considered and grouped into six categories for the offshore export cable corridor.

Table 2.4.1 Constraints considered for the offshore export cable corridor

Constraint category	Constraint
Bathymetry and morphology.	Seabed elevation Slope gradient Seabed mobility
Geology and geotechnics.	Shallow geology Rocky substrate
Seabed obstructions.	Oil and gas wells Oil and gas pipelines Oil and gas platforms Oil and gas other seabed infrastructure Chartered wrecks and obstructions Wind farms Cable Disposal sites
UXO	Risk of UXO
Environmental	Marine ecology – fish nursery and spawning Marine ecology – habitats and designated sites. Seabird
Commercial	Inshore fishing Static fishing Commercial fisheries Harbour limits Anchorages

- 2.4.28 For the offshore export cable corridor constraints analysis, a quantitative approach was adopted that combined constraint heat mapping, professional judgement, and algorithmic Geographical Information System (GIS) analysis. The analysis generates route corridors that follow the least constrained route between a single point on the OAA boundary and a range of early landfall options. The analysis included testing of the results to determine whether the least constrained routes would change when subject to input data variability. The resultant route options are then analysed further by environmental subject matter experts and marine cable installation engineers to interrogate their feasibility and determine a preferred corridor. The latter stages of this analysis and the decision-making it supports remain ongoing.
- 2.4.29 The final part of the offshore export cable corridor constraints analysis is to define an optimal route and a 2km wide corridor about that route, which will define the planned export cable corridor. This corridor will then be subject to a geophysical, geotechnical and benthic survey in spring 2023.
- 2.4.30 A number of offshore export cable corridor routes and associated landfall options are currently being considered and will be refined as part of the EIA process. The optioneering methodology and findings will be reported upon during the pre-application stage and will be the subject of stakeholder engagement in 2023.

Onshore optioneering and site selection

- 2.4.31 An initial list of environmental and technical constraints that will be considered in the optioneering and site selection for the landfall(s), onshore substation(s) and onshore export

cable corridor(s) are summarised in **Table 2.4.2**. These will be further developed and refined, reflecting the element of the onshore infrastructure being sited and designed, the stage of the optioneering and site selection process, and taking into consideration stakeholder feedback.

Table 2.4.2 Initial constraints considered for onshore infrastructure optioneering

Constraint category	Constraint
Technical challenges and construction risk.	Elevation change. Geohazards. Space for temporary and permanent infrastructure. Access. Utilities and overhead cables. Roads, rivers, railway lines. Highway access.
Water environment.	Flood risk. Potable use. Surface water bodies.
Nature conservation.	Designated sites, habitats and species.
Ground conditions.	Land contamination. Geodiversity. Soil conditions (peat).
Planning and land use.	Planning policy. Planning applications. Minerals sites. Land use and ownership. Agricultural Land Classification.
Historic environment.	Designated sites. Heritage assets.
Community and amenity.	Residential properties. Community and recreation features. Landscape designations. Visual receptors. Public access.
Coastal (to inform landfall selection).	UXO. Dumping grounds. Offshore utilities. Coastal protection. Coastal erosion. Nearshore seabed burial characteristics. Metocean. Distance to 10m depth contour. Heritage assets. Marine ecology. Static fishing and commercial fisheries. Shellfish Protected Areas. Aquaculture sites. Shipping interests.

Landfall

- 2.4.32 The initial search area for the landfall(s) extended from Troup Head in the north to Black Dog Beach, north of Aberdeen, in the south. This search area encompasses a total of 70km of coastline centred around the grid connection point at Peterhead. These spatial extents were chosen to provide a range of options for locating suitable landfall options, whilst minimising the distance of both an offshore and onshore export cable corridor between the OAA and the grid connection point to reduce potential environmental impacts and technical constraints.
- 2.4.33 Constraints data were mapped and an initial appraisal was undertaken in order to refine the extents of the search area to avoid some of the key drivers to site selection (such as residential areas or internationally designated biodiversity sites). This narrowed the search area down to the stretch of coast between Sandhaven on the north coast (west of Fraserburgh) to Sandford Bay (south of Peterhead), as shown in the onshore Scoping Boundary (**Figure 1.1 in Appendix 1A**).
- 2.4.34 Further identification and appraisal of constraints will be undertaken to allow the remaining areas of coast to be divided into zones. A structured appraisal of these zones will be undertaken, informed by an engineering feasibility review, site visits, environmental desk studies and surveys, stakeholder engagement and the results of the onshore substation and onshore and offshore export cable corridor optioneering. This will enable the options to be narrowed down and a preferred landfall zone(s), and subsequently landfall site(s) within the zone(s), to be identified.

Onshore substation(s)

- 2.4.35 A search area consisting of a 5km radius centred on a grid connection point at Peterhead has been identified. For the purposes of Scoping, the grid connection point is assumed to be in the vicinity of the existing SSEN substation. This radius has been applied due to the proximity of the coastline and residential land nearby, and that the search radius also includes the sea beyond the shoreline.
- 2.4.36 The search areas are subject to ongoing discussions with SSEN and will be refined and updated accordingly. The Applicant will update the relevant stakeholders as the process progresses.
- 2.4.37 A 3km radius has been applied to a grid connection at the SSEN substation at New Deer (if required). This is considered to provide a sufficient area in which to identify potential onshore substation site options whilst limiting the search to an area as close as reasonably practicable to the existing grid connection points.
- 2.4.38 Constraints will be identified and mapped to determine potential onshore substation zones for further consideration. A structured appraisal of these zones will be undertaken, informed by an engineering feasibility review, site visits, environmental desk studies and surveys, stakeholder engagement and the results of the onshore export cable corridor optioneering. This will enable the options to be narrowed down and a preferred onshore substation zone, and subsequently site within the zone, to be identified at Peterhead and if required, New Deer.

Onshore export cable corridor

- 2.4.39 The onshore export cable corridor optioneering will commence with identifying and mapping constraints data. A GIS-based heat mapping exercise will be undertaken to define initial paths of least resistance through the constraint layers between the landfall zones and the onshore substation search area/zones. Potential onshore export cable corridor options will be identified for further consideration. A structured appraisal of these options will be

undertaken, informed by an engineering feasibility review, site visits, environmental desk studies and surveys, stakeholder engagement and the results of the landfall, onshore substation and offshore cable corridor optioneering. This will enable the options to be narrowed down and preferred onshore export cable corridors to be identified.

- 2.4.40 Within the preferred onshore export cable corridor, the route will subsequently be further refined, informed by environmental and engineering surveys and land ownership studies.

Next steps

- 2.4.41 A preferred holistic solution will be identified that comprises an offshore wind farm array, offshore export cable corridor, landfall site(s), onshore export cable corridor, and onshore substation site(s).
- 2.4.42 Layouts will then be developed, and engineering envelopes established, along with final design parameters, environmental mitigation measures, and methodologies for construction, operation and maintenance, and decommissioning.
- 2.4.43 The EIA Report will outline further how the Project design, routes and locations have evolved as the Project progresses through the EIA process.

2.5 References

Energy Act 2004. (c. 20). [online] Available at:

<https://www.legislation.gov.uk/ukpga/2004/20/contents> [Accessed 03 August 2022].

National Grid, (2022). *Pathway to 2030 Holistic Network Design July 2022* [online] Available at:

<https://www.nationalgrideso.com/document/262681/download> [Accessed: 20 July 2022].

National Grid Electricity System Operator Limited (NGESO), (2023). *Grid Code*. [online] Available at: <https://www.nationalgrideso.com/electricity-transmission/industry-information/codes/grid-code> [Accessed 23 January 2023].

Scottish Government, (2019). *Offshore Wind Energy – draft sectoral marine plan: strategic environmental assessment*. [online] Available at: <https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-strategic-environmental-assessment/pages/2/> [Accessed: 30 August 2022].

Scottish Government, (2020a). *Sectoral Marine Plan for Offshore Wind Energy*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2020/10/sectoral-marine-plan-offshore-wind-energy/documents/sectoral-marine-plan-offshore-wind-energy/sectoral-marine-plan-offshore-wind-energy/govscot%3Adocument/sectoral-marine-plan-offshore-wind-energy.pdf> [Accessed 19 July 2022].

Scottish Government, (2020b). *Sectoral Marine Plan for Offshore Wind Energy: Post Adoption Statement*. [online] Available at: <https://www.gov.scot/publications/sectoral-marine-plan-post-adoption-statement/> [Accessed: 22 July 2022].

Scottish Government, (2022). *Decommissioning of Offshore Renewable Energy Installations in Scottish waters or in the Scottish part of the Renewable Energy Zone under The Energy Act 2004: Guidance notes for industry (in Scotland)*. [online] Available at: [Supporting documents - Offshore renewable energy: decommissioning guidance for Scottish waters - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/supporting-documents-offshore-renewable-energy-decommissioning-guidance-for-scottish-waters/govscot%3Adocument/supporting-documents-offshore-renewable-energy-decommissioning-guidance-for-scottish-waters.pdf) [Accessed 8 September 2022].

3. Legislative and Policy Context

3.1 Introduction

- 3.1.1 This Chapter provides an overview of the relevant legislative and policy context for the Project and the Environmental Impact Assessment (EIA). This Chapter supports a policy-led approach to EIA by providing an overview of the applicable consenting legislative framework, identifying the strategic policy context for the Project and outlining the applicable policy framework to guide proportionate technical assessments. **Appendix 3A: Planning Policy Framework** provides a detailed summary of individual national, marine and local planning policies of relevance to the EIA, and which have informed the proposed scope of assessment.
- 3.1.2 The purpose of this Chapter is to help inform the scope of the EIA and demonstrate compliance with applicable legislative and policy requirements. The EIA will be progressed taking account of all applicable legislation, policy, guidance and best practice. At this stage, relevant legislative and policy frameworks will guide the scope of the EIA and help to inform the types of receptors, likely significant effects and environmental issues that should be assessed. Where specific legislation, policy or guidance requirements inform the proposed scope of assessment for technical areas within the EIA, this is set out in the relevant sections of **Chapter 5: Environmental Aspects Offshore**, **Chapter 6: Environmental Aspects Onshore** and **Chapter 7: Environmental Aspects Whole Project** of this Scoping Report. The implications of relevant statutory and policy requirements, as identified below, will subsequently be considered in further detail within the EIA Report and associated consenting applications for the Project.
- 3.1.3 In addition to considering applicable legislation and policies, this EIA Scoping Report has been informed by Marine Scotland's Consenting and Licensing Manual (Scottish Government, 2018) which provides guidance on applying for licences and consents for marine renewable energy projects within Scottish territorial waters (0-12nm) and Scottish offshore waters (12-200nm). At the time of writing, Marine Scotland is preparing a new licensing and consenting manual. Once finalised, this will similarly inform the EIA.

ScotWind leasing context

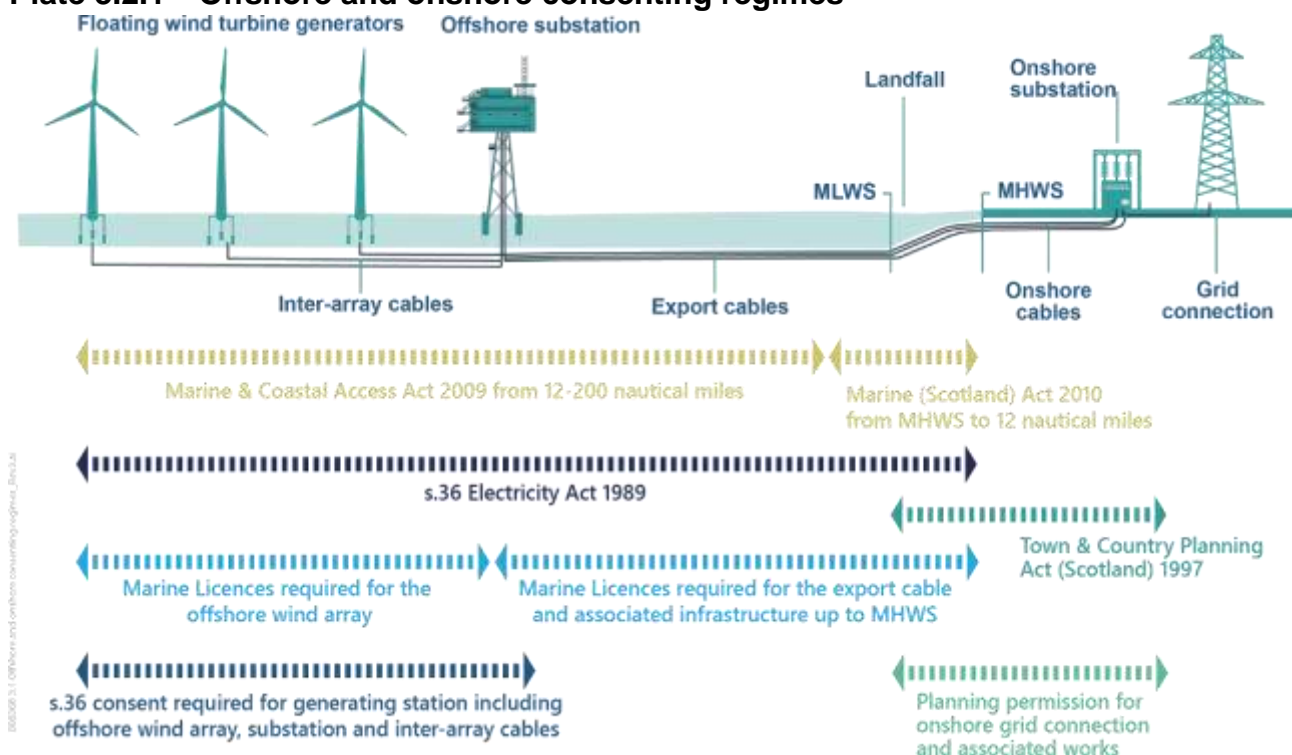
- 3.1.4 ScotWind is the first round of offshore wind leasing in Scottish waters for a decade. It is the process of making seabed available for commercial-scale offshore wind projects to benefit Scottish business and communities for decades to come (CES, 2021). The ScotWind process was designed to make sure that the best projects and strongest applicants progressed, rather than being focussed solely on ability to bid for the highest option fee (CES, 2021).
- 3.1.5 There were 17 ScotWind projects with seabed option agreements confirmed and signed by April 2022. In August 2022, the ScotWind clearing process led to a further three projects offered OAs. In total, there are now 20 ScotWind projects with a total capacity of up to 27.6GW.
- 3.1.6 CES will offer a full seabed lease once developers have secured the necessary consents, licences and finance. The ScotWind process is 'plan-led', therefore all projects are sited in Plan Options defined within the Sectoral Marine Plan for Offshore Wind (Scottish Government, 2020a), which was subject to plan-level Strategic Environmental Assessment (SEA), Habitats Regulations Appraisal (HRA) and socio-economic assessment throughout its preparation. The Project is located within Plan Option NE7.

- 3.1.7 The Sectoral Marine Plan provides a spatial and environmental framework which underpins ScotWind leasing, including the identification of 15 Plan Options. This is discussed in further detail within **Section 3.4**.
- 3.1.8 The Sectoral Marine Plan seeks to “*contribute to the achievement of Scottish and UK energy and climate change policy objectives and targets, through the provision of a spatial strategy to inform the seabed leasing process for commercial offshore wind energy in Scottish waters, which:*
- *minimises the potential adverse effects on other marine users, economic sectors and the environment resulting from further commercial-scale offshore wind development; and*
 - *maximises opportunities for economic development, investment and employment in Scotland, by identifying new opportunities for commercial-scale offshore wind development, including deeper water wind technologies*” (Scottish Government, 2020a).
- 3.1.9 In April 2022, Marine Scotland commenced a formal Iterative Plan Review (IPR) of the Sectoral Marine Plan, with draft outputs from the review expected to be consulted on in early 2023 and final outputs anticipated in summer 2023. The Applicant is engaging in the IPR process, which is seeking to respond to the results of the ScotWind leasing round.

3.2 Consenting legislation

- 3.2.1 The following section covers the key consents required for the construction and operation of the Project. **Plate 3.2.1** illustrates the applicable consenting regimes and jurisdictions across the marine-terrestrial interface of relevance to the Project.

Plate 3.2.1 Offshore and onshore consenting regimes



Section 36 Consent under the Electricity Act 1989

- 3.2.2 Scottish Ministers are responsible for determining applications under s.36 of the Electricity Act 1989 for offshore generating stations with an installed capacity exceeding 1MW in Scottish territorial waters, and over 50MW in the Scottish Renewable Energy Zone (REZ). Such applications are processed on behalf of Scottish Ministers by the MS-LOT. The Electricity Act 1989 imposes specific obligations on electricity companies in respect of the preservation of amenity and fisheries through Section 38 and Schedule 9.
- 3.2.3 S.36 consent is required for the generating station and ancillary infrastructure, including the offshore wind array and inter-array cables. Section 36A covers the public rights of navigation with Section 36B sets out duties in relation to navigation.

Marine and Coastal Access Act 2009 (between 12 and 200 nm) and the Marine (Scotland) Act 2010 (between 0 and 12 nm)

- 3.2.4 The Marine and Coastal Access Act 2009 (the 2009 Act) provides a statutory framework for sustainable management of the UK seas, including around Scotland, beyond 12 nm. The requirement for a marine licence to undertake certain licensable activities was introduced under the 2009 Act.
- 3.2.5 The Marine (Scotland) Act 2010 (the 2010 Act) introduces a duty to protect and enhance the marine environment within Scottish Territorial Waters (from Mean High Water Springs (MHWS) out to 12 nm), including measures to help boost economic investment and growth in areas such as marine renewables. Key measures included within the Act include marine planning, marine licensing, marine conservation, and enforcement.
- 3.2.6 A marine licence will be required to undertake prescribed marine licensable activities for the Project, including deposition of cables or other objects on or within the seabed, installation of any necessary cable protection, installation of mooring lines and anchors, and the installation of any wider infrastructure or substructures required.
- 3.2.7 To facilitate the expected future transfer of offshore electricity transmission infrastructure to a third-party operator (OFTO) the Project will require two separate but related marine licence applications: one marine licence for the offshore generating station (comprising windfarm array and ancillary infrastructure) in association with the required s.36 consent; and a separate marine licence for the export cable and associated infrastructure up to Mean Low Water Springs (MLWS). The Scottish Ministers are the decision maker for marine licences under both the 2009 and 2010 Acts.
- 3.2.8 The consultation requirements of relevance to these legislative requirements are discussed in **Chapter 4: Approach to Scoping and EIA**.

Town and Country Planning (Scotland) Act 1997

- 3.2.9 Full planning permission for the onshore infrastructure above MLWS will be sought from Aberdeenshire Council in accordance with the Town and Country Planning (Scotland) Act 1997 (TCPA). Planning obligations to restrict or regulate the use of land (by way of financial or other obligations) may be entered into in accordance with Section 75 of the TCPA. Other legal agreements may also be required or otherwise proposed under separate legislation.
- 3.2.10 This Scoping Report includes a request for a TCPA EIA Scoping Opinion to be adopted by Aberdeenshire Council in respect of proposed onshore works above MLWS.

3.3 EIA Regulations

- 3.3.1 Four sets of EIA Regulations are applicable to the Project, as outlined below. Where relevant, these are collectively referred to as the 'EIA Regulations' in this Scoping Report. In addition to the EIA Regulations, a range of environmental legislation at international and national level will apply to the EIA for the Project. This environmental legislation will be described in the EIA Report and some key guidance is described in **Section 3.7** below.

Requirements of the EIA Regulations

- 3.3.2 The EIA Regulations set out procedures for assessing, consulting upon and informing decision-making for projects that are likely to have significant environmental effects. The EIA Regulations require the provision of an EIA Report alongside the applications for the s.36 consent, marine licences and planning permission under the TCPA (see **Section 4.1** in **Chapter 4: Approach to Scoping and EIA** for further details).

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017

- 3.3.3 The requirement for an EIA for electricity generation projects requiring consent under s.36 of the Electricity Act 1989 is provided for in Scotland by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (hereafter referred to as 'Electricity Works EIA Regulations 2017'). These regulations set out the statutory process and minimum requirements for EIA.
- 3.3.4 The Electricity Works EIA Regulations 2017 identify that certain developments will be, or may be, subject to EIA. An offshore wind farm fall under Schedule 2 of the Electricity Works EIA Regulation 2017 regulations as "*a generating station*". Where a Schedule 2 project is likely to have significant effects on the environment by virtue of factors such as its nature, size or location, an EIA is required. Due to the location and scale of the Project, the Applicant accepts that it could have significant effects on the environment and therefore an EIA will be prepared under the Electricity Works EIA Regulations 2017.
- 3.3.5 The Electricity Works EIA Regulations 2017 also make provision for a written request to be submitted to the Scottish Ministers (in this case through MS-LOT) for an opinion as to the scope of the information to be provided within the EIA Report (a Scoping Opinion).

The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) Regulations 2007

- 3.3.6 The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (hereafter referred to as the 'Marine Works EIA Regulations 2017') are relevant to the marine licences to be applied for in respect of the offshore works, including the cable connection, on or under the seabed within the 12 nm limit of Scottish territorial waters.
- 3.3.7 The Marine Works (Environmental Impact Assessment) Regulations 2007 (hereafter referred to as the 'Marine Works EIA Regulations 2007') are relevant for the marine licences to be applied for the offshore works on or under the seabed in Scottish offshore waters beyond 12 nm.
- 3.3.8 The Marine Works EIA Regulations 2017 identify that an EIA is be required for certain developments likely to have significant effects on the environment by virtue of factors such as its nature, size or location. The proposed offshore wind farm, which forms the main

offshore element of the Project falls under Schedule 2. The Project will need two marine licences as discussed in **Section 3.2** for other Project elements. Due to the location and scale of the Project, the Applicant accepts that it could have significant effects on the environment and therefore an EIA will be prepared under the Marine Works EIA Regulations 2017.

- 3.3.9 Similar to the Electricity Works EIA Regulations 2017, the Marine Works EIA Regulations 2017 and the Marine Works EIA Regulations 2007 make provision for a written request to be submitted to the Scottish Ministers (through MS-LOT) for an opinion as to the scope of the information to be provided within the EIA Report (a Scoping Opinion).

Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017

- 3.3.10 For onshore transmission infrastructure and associated works, the relevant EIA Regulations are the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (hereafter referred to as the 'TCP EIA Regulations 2017').
- 3.3.11 The TCP EIA Regulations 2017 do not specifically include underground cables as Schedule 2 development which may require an EIA. However, the Applicant proposes to take a 'whole project' approach to the EIA and has therefore volunteered an EIA for the onshore elements.
- 3.3.12 The TCP EIA Regulations 2017 make provision for a written request to be submitted to the Planning Authority (Aberdeenshire Council) for an opinion as to the scope of the information to be provided within the EIA Report (a Scoping Opinion).

3.4 Strategic policy context for the Project

- 3.4.1 The need for a secure energy supply in the face of climate change has led to the development of legislation and policies to both tackle climate change and support renewable energy deployment at place and scale. This is of relevance to the consenting process for the Project and therefore to this EIA.
- 3.4.2 The strategic policy context demonstrates the need for the Project through considering the relevance and implications of legislation and policies relating to tackling climate change and supporting renewable energy generation at international, European and national levels. An appraisal of the needs case and planning merits of the Project will be provided in separate documentation to support the consenting applications for the Project in due course. **Table 3.4.1** provides a summary of legislation and policies relevant to climate change and **Table 3.4.2** provides a summary of relevant UK and Scottish energy policies.

Table 3.4.1 Climate legislation and policy summary

Policies and directives	Summary
United Nations Framework Convention on Climate Change (UNFCCC), 1992	At the international level, action to tackle climate change is informed by the Intergovernmental Panel on Climate Change and underpinned by the UNFCCC. The UNFCCC aims to stabilise atmospheric greenhouse gas (GHG) concentrations at a level sufficiently low “to prevent dangerous anthropogenic interference with the climate system” (Article 2).
The Kyoto Protocol, 1997	The Kyoto Protocol was adopted on 11 December 1997 and came into force in 2005. There are 192 parties to the Kyoto Protocol at present. The Kyoto Protocol commits industrialised countries and economies in transition to limit and reduce GHG emissions in accordance with agreed individual targets. The Doha Amendment was adopted on 8 December 2012, lasting until 2020. The Amendment includes new commitments for Annex I Parties to the Kyoto Protocol, a revised list of GHG to be reported on by Parties and amendments to several articles of the Kyoto Protocol. The UK is a signatory to the Kyoto Protocol and its commitments were transposed into UK law by the Climate Change Act 2008.
The Paris Agreement - 21st United Nations Climate Change Conference of the Parties (COP21), 2015	<p>The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 countries at the Paris Climate Conference (COP21) on 12 December 2015 and entered into force on 04 November 2016. The Agreement sets out a target to limit global warming to well below 2° Celsius above pre-industrial global average temperature levels, with the preferable aim of limiting global warming to 1.5° Celsius.</p> <p>In accordance with the Paris Agreement, on 12 December 2020, the UK communicated its Nationally Determined Contribution. The current Nationally Determined Contribution commits the UK to reducing economy-wide greenhouse gas emissions by at least 68% by 2030, compared to 1990 levels.</p>
26th United Nations Climate Change Conference of the Parties (COP26), 2021	The COP26 summit brought parties together to accelerate action towards the goals of the Paris Agreement and the UNFCCC. COP26 marked a step forward in global effort to address climate change, and an increase in ambitions to reduce emissions across the world. 197 countries agreed to a new climate deal ‘The Glasgow Climate Pact’, and the Paris Rulebook was finalised. The 2018 Paris Rulebook governs how the world’s communities must pledge emissions reduction targets in the Paris Agreement.
The Climate Change Act 2008, amended by the 2050 Target Amendment Order 2019	<p>The Climate Change Act 2008 is the basis for the UK’s approach to tackling and responding to climate change. It establishes the framework to deliver on these requirements.</p> <p>The Act was amended in 2019 so that the minimum percentage by which the net UK carbon account for the year 2050 must be lower than the 1990 baseline is increased from 80% to 100%.</p>
The Climate Change (Scotland) Act 2009, amended by the Climate Change (Emissions	The Climate Change (Scotland) Act 2009 is an act of the Scottish Parliament creating the statutory framework for greenhouse gas emissions reductions in Scotland.

Policies and directives	Summary
Reduction Targets) (Scotland) Act 2019	<p>The Climate Change (Scotland) Act 2009 was amended by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, and shortly after the Scottish Government declared a Climate Emergency in April 2019. The amended Act placed climate change at the heart of all policy decisions and actions and increased the ambition of Scotland's statutory renewable energy targets to net zero by 2045 and revised interim and annual emissions reduction targets as follows:</p> <ul style="list-style-type: none"> • a reduction in greenhouse gas emissions of at least 56% from baseline values by 2020; • an emissions reduction of 75% by 2030; and • an emissions reduction of 90% by 2040. <p>The objective of this Act is to contribute appropriately to the world's efforts to deliver on the Paris Agreement reached at the 21st COP of the UNFCCC.</p>
The Climate Change Plan, Third Report on Proposals and Policies (2018-2032), Updated 2020	<p>This Climate Change Plan is the Scottish Government's third report on proposals and policies for meeting its climate change targets (Scottish Government, 2020b). It sets out how Scotland can deliver its target of 66% emissions reductions, relative to the baseline for the period 2018–2032.</p> <p>Part 1 of the plan shows the emissions reductions pathway to 2032, and states that <i>“by 2032, Scotland's energy system will be largely decarbonised and be increasingly important as a power source for heat and transport.”</i></p>
UK Climate Change Strategy 2021- 2024	<p>The Climate Change Strategy 2021-2024, through implementation of the five strategic pillars, aim to reduce GHG emissions to net zero by 2050. The five strategic pillars include:</p> <ul style="list-style-type: none"> • <i>“Increasing support to clean growth and climate adaptation;</i> • <i>Reducing the portfolio for GHG emissions;</i> • <i>Understanding and mitigating climate-related financial risks;</i> • <i>Transparency and disclosure; and</i> • <i>Providing international leadership on climate change”</i> (UK Export Finance, 2021).

Table 3.4.2 Energy policy summary

Title	Summary
The Scottish Energy Strategy 2017	<p>The Scottish Energy Strategy: The Future of Energy in Scotland (Scottish Government, 2017a) sets out the Scottish Government's vision for the future energy system, focusing on a vision for Scotland by the year 2050.</p> <p>The Strategy states that <i>“a diverse, well balanced energy supply portfolio or ‘energy mix’ will remain essential as Scotland decarbonises, providing</i></p>

Title	Summary
	<p><i>the basis for secure and affordable heat, mobility, and power in future decades”.</i></p> <p>The Strategy sets two new targets for the Scottish energy system by 2030:</p> <ul style="list-style-type: none"> • The equivalent of 50% of the energy for Scotland’s heat, transport and electricity consumption to be supplied from renewable sources. • An increase by 30% in the productivity of energy use across the Scottish economy.
<p>The Energy Strategy: Position Statement 2021</p>	<p>The Energy Strategy: Position Statement, published in March 2021 was intended to provide a clear view of the Scottish Government’s policies in advance of COP26 in November 2021. It reinforces a commitment to remain guided by the key principles set out in Scotland’s Energy Strategy and sets out a number of key priorities for the short to medium-term.</p> <p>The Position Statement summarises how the recent policy publications such as the Hydrogen Policy Statement, Local Energy Policy Statement and Offshore Wind Policy Statement collectively support the delivery of the Climate Change Plan update.</p> <p>While it sets out the comprehensive programme of work across the energy sector, the current Energy Strategy (Scottish Government, 2021) remains in place until any further Energy Strategy refresh is adopted by Ministers. At the time of writing, a draft refreshed Energy Strategy and Just Transition Plan is expected to be published for consultation shortly.</p>
<p>Energy white paper: Powering our net zero future 2020</p>	<p>The energy white paper sets out how the UK will clean up its energy system and reach net zero emissions by 2050. It addresses the transformation of the UK’s energy system through the green industrial revolution, by promoting high-skilled jobs and clean, resilient economic growth to deliver net-zero emissions by 2050.</p>
<p>British Energy Security Strategy 2022</p>	<p>Published in April 2022, the British Energy Security Strategy (BESS), aims to improve the UK’s energy security and resilience.</p> <p>In relation to offshore wind, the BESS focuses on accelerating deployment and delivery of 50GW of capacity by 2030. The BESS therefore sets a higher level of ambition than the previous 30 and 40GW 2030 targets for offshore wind deployment set and updated through the UK Sector Deal. The BESS has also set a new target of at least 5GW floating offshore wind deployment by 2030, which is the first deployment target dedicated to this technology.</p> <p>The Strategy summarises how the timescale for the development of offshore wind will be cut by:</p> <ul style="list-style-type: none"> • <i>“Making environmental considerations at a more strategic level allowing us to speed up the process while improving the marine environment; and</i> • <i>Introducing strategic compensation environmental measures including for projects already in the system to offset environmental effects and reduce delays to projects” (BEIS, 2022).</i>

Title	Summary
Offshore Wind Policy Statement 2020	<p>The Statement sets out ambitions for the future of offshore wind in Scotland and is the context for Marine Scotland's Sectoral Marine Plan for Offshore Wind. The Statement, which was prepared in line with the 2017 Energy Strategy and pre-dates the announcement of ScotWind leasing results (where 24.7GW of capacity was awarded), confirms the Scottish Government's support for offshore wind deployment and set an ambition for 11GW deployment by 2030.</p> <p>The Statement (Scottish Government, 2020c) sets out further ambitions to capitalise on offshore wind development and the role this technology could play in meeting the commitment of net zero by 2045.</p>
Offshore Wind Sector Deal, Updated 2020	<p>The Offshore Wind Sector Deal builds on the UK's global leadership position in offshore wind and seeks to maximise the advantages for UK industry from the global shift to clean growth, consistent with the Clean Growth Grand Challenge.</p> <p>The Deal (BEIS, 2020a) sets out how the Crown Estate and CES will undertake new seabed leasing to ensure a sustainable pipeline of new projects for the late 2020s and early 2030s.</p> <p>The ambition is to increase the industry's productivity, competitiveness, and innovation, while helping to grow coastal economies. Eight regional offshore wind clusters are being developed across the UK, one of which is Deep Wind (North Scotland).</p>
UK Net Zero Strategy: Build Back Greener 2021	<p>This strategy set out policies and proposals for decarbonising all sectors of the UK economy to meet its net zero target by 2050. Key policies from the strategy include:</p> <ul style="list-style-type: none"> • <i>"40GW of offshore wind by 2030... - with a new approach to onshore and offshore electricity networks to incorporate new low carbon generation and demand in the most efficient manner that takes account of the needs of local communities; and</i> • <i>moving to 1GW of floating offshore by 2030 to put us at the forefront of this new technology that can utilise our North and Celtic Seas"</i> (HM Government, 2021). <p>Note, the outcome of the judicial review proceedings was announced in July 2022 and the UK government now has eight months to produce a new strategy addressing the inadequacies identified in the judicial review.</p>
Offshore Transmission Network Review (OTNR) 2020	<p>The OTNR was launched in July 2020 to ensure that transmission connections for offshore wind generation can be delivered to support the UK Government's ambitions to increase offshore wind power to 40GW by 2030 and to deliver on its Net Zero ambitions by 2050.</p> <p>In 2020 the Committee on Climate Change called for government to <i>"develop a strategy to coordinate interconnectors and offshore networks for wind farms and their connections to the onshore network and bring forward any legislation necessary to enable coordination"</i> (BEIS, 2020b).</p> <p>The OTNR HND (HM Government, 2020) sets out the blueprint for the strategic network infrastructure necessary to deliver the Government's new ambition for 50GW of offshore wind by 2030. The HND will be</p>

Title	Summary
The Electricity Generation Policy Statement 2013	<p>followed by the Detailed Network Design stage and consenting process that will develop the HND recommendations further to determine technology choices, transmission routes and where substations and converter stations will be located.</p> <p>The Scottish Government's Electricity Generation Policy Statement was published in June 2013, based on research studies looking at future energy supply, storage, and demand. It sets out the Scottish Government's future plans for renewable energy and fossil fuel thermal generation in Scotland's energy mix (Scottish Government, 2013a).</p> <p>It is required under the Climate Change (Scotland) Act 2009 to set out proposals and policies for meeting annual emissions reductions targets from 2010 to 2022.</p> <p>An updated Electricity Generation Policy Statement is expected to be reviewed and published towards the end of 2022, ahead of the next Climate Change Plan (Scottish Government, 2020b).</p>
European Union (EU) Renewable Energy Directive (2018/2001/EU), 2018	<p>The Renewable Energy Directive is the legal framework for the development of renewable energy sectors across the EU economy. The Directive was originally established in 2009 (2009/28/EC) and set a target of achieving 20% of EU energy consumption from renewable sources by 2020.</p> <p>The Renewable Energy Directive was amended in 2018 (2018/2001/EU), setting a revised and binding renewable energy target of achieving a minimum of 32% energy consumption from renewable energy sources within the EU by the year 2030.</p> <p>It is of note that the UK formally withdrew from the European Union (EU) on 31 January 2020 under terms set out in the European Union (Withdrawal Agreement) Act 2018 ('the Withdrawal Act').</p>
National Policy Statements (NPSs) 2011	<p>The Scottish Ministers hold executively devolved powers under s.36 of the Electricity Act 1989 and therefore primarily apply relevant Scottish level policies in the determination of consenting applications. However, energy generally remains a UK reserved matter and therefore the UK Government's policy for the delivery of energy infrastructure, as set out within a suite of Energy National Policy Statements (NPSs), are also relevant considerations. The UK NPSs form part of both the energy and planning policy frameworks applicable to the consenting of the Project. As detailed in Appendix 3A: Planning Policy Framework, policy coverage within the NPSs regarding UK reserved matters is of particular importance. This means the NPSs have limited relevance in relation to specific aspects of this EIA.</p> <p>There are six energy NPSs, three of which are relevant to offshore wind farm development. These comprise, The Overarching NPS for Energy (NPS-EN 1); The NPS for Renewable Energy Infrastructure (NPS EN-3); and The NPS for Electricity Networks Infrastructure (NPS EN-5) (DECC, 2011a; DECC, 2011b; DECC, 2011c). Following a review of the NPSs in response to the Energy White Paper, updated draft energy NPSs were published for consultation in 2021. At present the consultation is closed and updated NPSs are expected to be published in due course, but no date has been set for when the revised statements will be published.</p>

3.5 Legislative and policy framework for this EIA

3.5.1 In order to provide a robust assessment evidence base, **Section 3.5** provides an overview of the legislative and policy framework of relevance to the Project. This has been used to directly inform the scope of the EIA by taking account of specific requirements to assess and address likely impacts on a range of sensitive receptors and to consider relevant environmental issues. In doing so, the EIA will respond to the EIA Regulations and provide objective assessment evidence which should also help to address relevant policy requirements. Drawing upon this evidence, the need for the Project and its accordance with relevant policies will then be considered separately in other documentation prepared in support of consenting applications for the Project. **Table 3.5.1** provides a summary of national planning policies and guidance of relevance, **Table 3.5.2** provides marine planning policies and guidance of relevance, and **Section 3.5** provides local planning policies and guidance of relevance. **Appendix 3A** provides a detailed review of planning policies and guidance of relevance, whilst identifying the policy tests of relevance to technical chapters of the EIA.

National planning policies and guidance

3.5.2 **Table 3.5.1** below outlines the national planning policy framework presently applicable to the determination of consenting applications for the Project (S.36, marine licence and planning) and therefore to this EIA. It should be noted that in relation to the determination of S.36 applications, the statutory Development Plan is not afforded primacy as section 25 of TCPA is not engaged, but it is a material consideration. **Appendix 3A** provides a detailed summary of individual policies of relevance which have informed the proposed approach to this EIA and the scope of assessment.

Table 3.5.1 National planning policies and guidance summary

Title	Summary
National Planning Framework 4 (NPF4) 2023	<p>On 8th November 2022, the Scottish Government laid the Revised Draft NPF4 (Scottish Government, 2022a) and supporting documents in the Scottish Parliament for approval within an expected 6-week period. This follows an earlier consultation on the Draft NPF4 (Scottish Government, 2021b) and associated parliamentary scrutiny from November 2021 to March 2022. The Revised Draft NPF4 is accompanied by an Explanatory Report that outlines the changes from Draft NPF4 (Scottish Government, 2021b) to the Revised Draft NPF4 (Scottish Government, 2022a).</p> <p>The Revised Draft NPF4 underwent parliamentary consideration and on 11th January 2023 it was approved without modification by the Scottish Parliament.</p> <p>Upon formal adoption (anticipated to occur in February 2023) and the commencement of associated regulations, the NPF4 will set out a new national policy position for spatial planning and form part of the statutory Development Plan for the determination of planning applications. There is a statutory requirement for it to be taken into account by planning authorities when preparing Local Development Plans. It will replace NPF3 (Scottish Government, 2014a) and SPP (Scottish Government, 2014b).</p>

Title	Summary
National Planning Framework 3 (NPF3) 2014	<p>The Approved NPF4 provides the spatial strategy for Scotland to 2045 and takes account of the target of net zero emissions by 2045 set by the Scottish Government.</p> <p>The Approved NPF4 includes a specific policy on the climate and nature crisis to ensure that they are appropriately recognised as priorities in all plans and decisions. The Approved NPF4 provides a strong framework for the deployment of renewable energy developments and identifies the need for strategic scale renewable energy developments, including offshore wind farms. The Approved NPF4 also sets out a range of new policy tests, requirements and expectations for all developments.</p> <p>At the time of writing the NPF3 remains in place but is shortly expected to be replaced by National Planning Framework 4 (NPF4) following formal adoption by the Scottish Ministers (expected February 2023). Noting that NPF3 is now of very limited relevance to the EIA going forward, Appendix 3A: Planning Policy Framework provides a list of the relevant NPF3 provisions.</p>
Scottish Planning Policy (SPP) 2014	<p>At the time of writing SPP remains in place but is shortly expected to be replaced by National Planning Framework 4 (NPF4) subject to adoption by the Scottish Ministers and publication. SPP is therefore of limited relevance to this EIA. NPF4 will bring the NPF and SPP together as a formal part of the Development Plan and an integral part of the planning decision-making process.</p> <p>SPP (Scottish Government, 2014b) currently sets out national planning policies that reflect the priorities of the Scottish Ministers for the operation of the planning system and the development and use of land through sustainable economic growth. SPP is non-statutory, but as a statement of Ministers' priorities, its content is a material consideration that carries significant weight. However, it is for the decision-maker to determine the appropriate weight in each case.</p> <p>SPP recognises that renewable energy generation will contribute to more secure and diverse energy supplies and support sustainable economic growth. The commitment to increase the amount of electricity generated from renewable sources is a vital part of the response to climate change.</p> <p>Appendix 3A outlines relevant SPP policies. It is of note that once the NPF4 has been adopted, SPP will be superseded. At present however, SPP provides relevant policy tests which this EIA responds to.</p>
A Stronger and More Resilient Scotland: Programme for Government 2022 – 2023	<p>The Scottish Government's Programme for Government confirmed plans to develop a replacement National Marine Plan 2. This is expected to play a key role in the consenting of ScotWind offshore wind projects over the coming years.</p> <p>This Programme for Government defines the response to the challenges ahead, and the better tomorrow the Scottish Government want to secure. It details that Scotland's journey to net zero requires an investment in a strong economy, and in building a fairer society. The development of renewable energy is noted to help to reduce energy price fluctuations and costs.</p>

Title	Summary
Nature Conservation (Scotland) Act 2004	<p>Public bodies in Scotland have a duty to further the conservation of biodiversity under the Nature Conservation (Scotland) Act 2004. Fulfilling the Biodiversity duty will allow wider outcomes to be addressed, such as:</p> <ul style="list-style-type: none"> • “ensuring compliance with the legislation and helping Scotland to meet its nation and international biodiversity targets; • helping Scotland address biodiversity loss and the climate emergency, and contributing to a Green recovery and a Net Zero future; • improving image and demonstrating working in a socially responsible and ethical way by, safeguarding biodiversity and environmental assets for future generations; and • contributing to sustainable development and the quality of life in Scotland” (Nature Conservation (Scotland) Act 2004).
The Environment Strategy for Scotland 2020, and Progress Report 2022	<p>This Strategy has a 2045 vision, whereby, restoring nature and ending Scotland's contribution to climate change, Scotland will be transformed for the better, therefore helping to secure the wellbeing of Scottish people and the planet.</p> <p>The contribution of the Environment Strategy vision and outcomes will contribute to National Outcomes and the UN Sustainable Development Goals.</p> <p>The outcomes that are relevant to the Project, include:</p> <ul style="list-style-type: none"> • “we play our full role in tackling the global climate emergency and limiting temperature rise to 1.5°C; • Scotland’s nature is protected and restored with flourishing biodiversity and clean and healthy air, water seas and soils; and • our thriving sustainable economy conserves and grows our natural assets” (Scottish Government, 2020d). <p>In March 2022, the first annual progress report to Parliament on the development of the environmental policy strategy, which Scottish Ministers are required to publish under section 47 of the Continuity Act, was provided.</p>
Scottish Biodiversity Strategy Post-2020: A Statement of Intent	<p>The original strategy ‘Scotland’s Biodiversity: It’s in Your Hands’ was published in 2004. In 2013, it was supplemented by the ‘2020 Challenge for Scotland’s Biodiversity’. The two documents constitute the Scottish Biodiversity Strategy. In December 2020 the ‘Scottish Biodiversity Strategy Post-2020: A Statement of Intent’ was published. This paved the way for a new, ambitious 25-year strategy which will be published at the end of 2022 (Scottish Government, 2020e). This new strategy will supersede the 2020 Challenge strategy.</p> <p>The new Scottish strategy will need to align with the new global biodiversity framework being developed through the UN Biodiversity Conference (COP 15 – December 2022) to contribute to the objectives of the Convention on Biological Diversity. This draft framework focuses on setting targets and associated actions for signatory parties to reduce threats to biodiversity by 2030.</p>

Marine planning policies and guidance

- 3.5.3 A marine licence will be required to undertake prescribed marine licensable activities for the Project, in which two separate but related marine licence applications are sought. The Scottish Ministers are the decision maker for marine licence applications, which must be determined primarily in accordance with appropriate statutory requirements, marine planning policies and guidance. These are also relevant considerations in the determination of applications made under S.36 of the Electricity Act 1989. **Table 3.5.2** below provides a summary of the UK and Scottish marine policies of relevance to the Project and the EIA, supported by a detailed review in **Appendix 3A** to inform the proposed scope of assessment.

Table 3.5.2 National marine policy summary

Title	Summary
UK Marine Policy Statement 2011	<p>The Marine Policy Statement, (MPS) adopted 2011 is 'the framework for preparing Marine Plans and taking decisions affecting the marine environment' (Defra, 2011). It will contribute to the achievement of sustainable development in the United Kingdom marine area'.</p> <p>The document was adopted for the purposes of section 44 of the Marine and Coastal Access Act 2009 and will support the formulation of Marine Plans. Appendix 3A: Planning Policy Framework provides a summary of the relevance of the UK MPS.</p>
Scottish National Marine Plan (NMP) 2015	<p>Adopted in March 2015 (Scottish Government, 2015), this Plan sets out strategic policies for the sustainable development of Scotland's marine resources out to 200 nm. It provides a framework for managing all development in or affecting Scotland's marine areas, both territorial (up to 12 nm) and offshore waters (12-200nm). It is required to be compatible with the UK MPS and existing marine plans across the UK.</p> <p>This Plan adopts the approach of stipulating a set of General Policies (Chapter 4), which apply across all development and use of the marine environment. These General Policies are intended to represent the parameters against which the sustainability of development and other use is considered. They also intend to ensure this is undertaken in a manner that is sensitive to the protection and enhancement of the environment, the needs of other users and the long-term health of the resource. Appendix 3A provides a summary of the policies relevant to this Project.</p> <p>The Scottish Government's Programme for Government 2022-23 (2022) confirmed plans to develop a replacement National Marine Plan 2. This is expected to play a key role in the consenting of ScotWind offshore wind projects, but the preparation timescale and process have not yet been confirmed.</p>
Regional Marine Plans (RMPs) 2015	<p>The Marine (Scotland) Act 2010 introduced a new era for the management of Scotland's seas and the resulting National Marine Plan (NMP) (2015) sets the wider context for marine planning within Scotland, including what should be considered when creating local, regional marine plans</p>

Title	Summary
	<p>Eleven Scottish Marine Regions have been created, which cover sea areas extending out to 12 nautical miles. Regional marine plans will be developed by Marine Planning Partnerships, allowing more local ownership and decision making about specific issues within their area.</p> <p>The Scoping Boundary extends into the North East Regional Marine Plan (RMP) and Moray Firth RMP. Only the extent of the Project's elements and EIA Scoping boundary falling within 12nm would be subject to the RMPs when they are developed. At the time of writing neither RMPs has been developed.</p>
<p>Offshore Wind Policy Statement 2020</p>	<p>The Statement sets out ambitions for the future of offshore wind in Scotland and is the context for Marine Scotland's Sectoral Marine Plan for Offshore Wind. The Statement, which was prepared in line with the 2017 Energy Strategy and pre-dates the announcement of ScotWind leasing results (where 24.7GW of capacity was awarded), confirms the Scottish Government's support for offshore wind deployment and set an ambition for 11GW deployment by 2030.</p> <p>The Statement (Scottish Government, 2020c) sets out further ambitions to capitalise on offshore wind development and the role this technology could play in meeting the commitment of net zero by 2045.</p>
<p>Sectoral Marine Plan for Offshore Wind Energy 2020</p>	<p>Published in October 2020, the Sectoral Marine Plan – Offshore Wind Energy identifies sustainable options for the future development of commercial scale offshore wind energy in Scotland, including deep water wind technologies and covers Scottish inshore and offshore waters (Scottish Government, 2020a). The plan identified a suite of Plan Options (POs) to underpin Crown Estate Scotland's ScotWind leasing round.</p> <p>The spatial strategy aims to “<i>minimise the potential adverse effects on other marine users, economic sectors and the environment resulting from further commercial-scale offshore wind development</i>” and “<i>maximise opportunities for economic development, investment and employment in Scotland, by identifying new opportunities for commercial scale offshore wind development, including deeper water wind technologies.</i>”</p> <p>The MarramWind Offshore Wind Farm Project is located in Plan Option NE7, as identified in the SMP for Offshore Wind. Plan Options including NE7 were subject to testing, refinement and area reduction through SEA, HRA and plan development processes. The SEA identified relevant characteristics of Plan Option NE7 and identified the risks to be addressed, such as potential for significant socio-economic cost impacts from development within Plan Option NE7 associated with the loss of fishing grounds and the potential for impacts to bird species (Scottish Government, 2020a).</p> <p>In April 2022, Marine Scotland commenced a formal IPR of the Sectoral Marine Plan, with draft outputs from the review expected to be consulted on in early 2023 and final outputs anticipated in Summer 2023. SPR is engaging in the IPR process, which is seeking to respond to the results of the ScotWind leasing round.</p>

Title	Summary
	In December 2022 the Scottish Government published the Sectoral Marine Plan: Roadmap of Actions (2022) which details the actions required to improve the understanding of the potential implications of ScotWind sites on seabirds as identified by the Sectoral Marine Plan (2020).

Local planning policies and guidance

- 3.5.4 Planning permission for the onshore infrastructure above MLWS will be sought from Aberdeenshire Council in accordance with the 1997 Act. Under section 25 of TCPA, the application will be determined in accordance with the Development Plan unless material considerations indicate otherwise, which is discussed below.
- 3.5.5 **Appendix 3A: Planning Policy Framework** provides a detailed summary of individual policies of relevance that have informed the proposed scope of assessment, including policies within the Aberdeenshire Local Development Plan (LDP) 2023 and Aberdeenshire Council's Natural Heritage Strategy 2019-2022 (Aberdeenshire Council, 2019).

Aberdeen City and Shire Strategic Development Plan 2020

- 3.5.6 The Aberdeen City and Shire Strategic Development Plan was prepared by the Aberdeen City and Shire Strategic Development Planning Authority and approved by Scottish Ministers on 12 August 2020. It covers the period up to 2040 (Aberdeenshire Council, 2020b) and the local authority areas of Aberdeenshire and Aberdeen City, excluding the Cairngorms National Park.
- 3.5.7 The Plan identifies, at paragraph 3.28, a Strategic Growth Area between Aberdeen and Peterhead requiring the LDP to make provision for a number of national developments, including Peterhead as a National Renewable Infrastructure Site and Energy Hub, as well as the '*expected landfall for offshore High Voltage Energy Transmission Networks to Norway and England*'. It also notes at paragraph 3.30 that Peterhead Port offers '*deep-water, decommissioning and offshore renewable opportunities*'.
- 3.5.8 The objective set out at Chapter 6 is "*To be a City Region which 'takes the lead in reducing the amount of emission and pollutants released into the environment; mitigates and adapts to the effects of climate change and changing weather patterns; limits the amount of non-renewable resources it uses; and supports and protects our biodiversity*'" (Aberdeenshire Council, 2020b).
- 3.5.9 The Plan highlights at paragraph 6.15 the need to tackle the supply of energy during the Plan period by increasing the supply of heat and power from renewable sources, noting the considerable potential in offshore renewables yet to be realised.

Aberdeenshire LDP 2023

- 3.5.10 Until very recently, the statutory development plan applicable to the onshore elements of the Project comprised the Aberdeen City and Shire Strategic Development Plan 2020 and the Aberdeenshire LDP 2017, including associated LDP Supplementary Guidance.
- 3.5.11 A Modified Proposed Aberdeenshire LDP 2020 has undergone a period of consultation and consideration by Scottish Ministers and was formally adopted by Aberdeenshire Council on 13th January 2023. As such, the Adopted Aberdeenshire LDP 2023 is now applicable. The

Aberdeenshire LDP (2017) and Supplementary Guidance has been revoked and has therefore not been considered further.

3.5.12 As stated above, once formally adopted the NPF4 will also form part of the statutory Development Plan.

3.6 Guidance on EIA for offshore wind projects

3.6.1 The EIA will be undertaken in line with relevant legislation and policy and specifically in accordance with the requirements of the EIA Regulations. In addition, the EIA will take into consideration a range of up-to-date key guidance documents. The list below of key guidance documents provides a general overview of important documents that will help to inform the EIA process which include (but are not limited to):

- Environmental Impact Assessment Guide to: Shaping Quality Development (IEMA, 2015);
- Delivering Proportionate EIA. A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice (IEMA, 2017);
- Environmental Impact Assessment Handbook. Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland (Scottish Natural Heritage and Historic Environment Scotland, 2018);
- Guidance for Applicants on Using the Design Envelope for Applications under Section 36 of the Electricity Act 1989 (Scottish Government, 2022c);
- Planning Advice Note (PAN) 1/2013 Environmental Impact Assessment (Scottish Government, 2013b);
- Planning Circular 1/2017: Environmental Impact Assessment regulations (Scottish Government, 2017b);
- Offshore Wind Farms: Guidance Note for Environmental Impact Assessment in Respect of Food and Environment Protection Act 1985 and Coast Protection Act 1949 Requirements (Version 2) (Centre for Environment, Fisheries and Aquaculture Science (CEFAS), 2004);
- Decommissioning of Offshore Renewable Energy Installations in Scottish Waters or in the Scottish Part of the Renewable Energy Zone under the Energy Act 2004: Guidance Notes for industry in Scotland (Scottish Government, 2022d); and
- Offshore Wind, Wave and Tidal Energy Applications: Consenting and Licensing Manual (Scottish Government, 2018).

3.6.2 The list will be continually reviewed and updated throughout the EIA process, up to submission of the EIA Report. Each individual environmental topic also refers to relevant topic-specific guidance in **Chapters 5, 6 and 7** of this Scoping Report, where appropriate.

3.6.3 A full list of relevant legislation and guidance considered as part of the EIA process will be provided in the EIA Report.

3.7 Other legislative consenting requirements

Habitats Regulations Appraisal (HRA)

- 3.7.1 The Habitats Directive (Directive 92/43/ECC) and the Wild Birds Directive (Directive 2009/147/EC) were transposed into Scottish Law by the Conservation (Natural Habitats &c) Regulations 1994 ('Habitats Regulations') (up to 12 nm); by the Conservation of Offshore Marine Habitats and Species Regulations 2017 ('Offshore Marine Regulations') (beyond 12 nm); the Conservation of Habitats and Species Regulations 2017 (of relevance to consents under Section 36 of the Electricity Act 1989); the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001; and the Wildlife and Countryside Act 1981. The Habitats Regulations set out the stages of the Habitats Regulations Appraisal (HRA) process required to assess the potential impacts of a proposed project on European Sites (Special Areas of Conservation, Special Protection Areas, candidate SACs and SPAs and Ramsar Sites). If the project is not directly connected with or necessary to site management for nature conservation of the European Site and, either alone or in-combination with other projects or plans, is likely to have a significant effect on the qualifying interests of a European Site, the relevant decision-making authority (or competent authority) must carry out an Appropriate Assessment (AA).
- 3.7.2 In accordance with HRA Regulations, an HRA is being undertaken for the Project. The HRA documentation will be co-ordinated with the EIA but reported separately to ensure compliance with all relevant statutory requirements guidance and best practice. Marine Scotland and Aberdeenshire Council, as competent authorities, must determine whether the Project will adversely affect the integrity of any relevant marine or terrestrial European Site.

Marine Protected Areas (MPAs)

- 3.7.3 There are currently over 200 Marine Protected Areas (MPAs) for nature conservation purposes in Scottish waters, covering approximately 108,000 km². Whilst many of these MPAs are aligned with existing Special Areas of Conservation (SACs), Special Protected Areas (SPAs), Ramsar sites or Sites of Special Scientific Interest (SSSIs), a number have been designated directly under MPA legislation, through the Marine (Scotland) Act 2010, and the UK Marine and Coastal Access Act 2009, for inshore and offshore waters, respectively.
- 3.7.4 The EIA will assess the potential for impacts on MPAs, informed by engagement with Marine Scotland, as the competent authority and any other relevant information deemed appropriate.

Flood Risk Assessment (FRA)

- 3.7.5 The Flood Risk Management (Scotland) Act 2009 makes provision for assessment and sustainable management of flood risk. This requires a Flood Risk Assessment (FRA) for most developments that fall within a flood zone. The assessment should assess the flood risk and surface water runoff, and the assessment must state how the developer will manage the flood risk.
- 3.7.6 The EIA Report will include an FRA for Project elements that may be located within a flood zone. The onshore optioneering for the Project is ongoing so the extent of any necessary FRA cannot yet be determined. Further detail is provided in **Section 4.2 in Chapter 4: Approach to Scoping and EIA** and **Section 6.3: Water resources and flood risk**.

Water Framework Directive (WFD)

- 3.7.7 The Water Framework Directive (Directive 2000/60/EC) (WFD) aims to 'prevent deterioration and enhance the status of aquatic ecosystems, including groundwater, promote sustainable water use, reduce pollution and contribute to the mitigation of floods and droughts.' These aims are to make sure that the water environment will be improved and protected on a catchment scale. The WFD was transposed into Scottish legislation by the Water Environment and Water Services (Scotland) Act 2003 and the Water Environment (Controlled Activities) (Scotland) Regulations 2011, with Scottish Environment Protection Agency (SEPA) being the competent authority, having the responsibility to consider whether proposals for developments have the potential to:
- cause a deterioration of a WFD water body from its current status or potential; and/or,
 - prevent future attainment of good status or potential where not already achieved.
- 3.7.8 The WFD also requires River Basin Management Plans (RBMPs) to be created. Statutory objectives are set for Scottish waters through River Basin Management Planning. These objectives are based on ecological assessments and economic judgments.
- 3.7.9 The WFD seeks to ensure Good Environmental Status (GES) within designated water bodies, covering freshwater, transitional and coastal waters up to 1nm. Within the EIA Report, the Project will be screened under WFD to identify WFD designated water bodies that have potential to be at risk from the installation, operation or decommissioning of the Project in relation to their GES status and RBMP objectives. The WFD screening will be used by the competent authorities in determining whether a full WFD assessment is required. Further detail is provided in **Section 4.2 in Chapter 4: Approach to Scoping and EIA** and **Section 6.3: Water resources and flood risk**.

Marine Strategy Framework Directive (MSFD)

- 3.7.10 The Marine Strategy Framework Directive 2008/56/EC (MSFD) of the European Parliament and of the Council 17 June 2008, establishing a framework for community action in the field of marine environmental policy (the MSFD), was adopted in 2008, with the overall aim of protecting the marine environment across Europe. The MSFD is transposed for the whole of the UK by the Marine Strategy Regulations 2010. The UK has made amendment to the Marine Strategy Regulations 2010, under the Marine Environment (Amendment) (EU Exit) Regulations 2018, which transpose the requirement into domestic law, so that MSFD can continue to be effective now the UK is no longer part of the EU.
- 3.7.11 Marine Scotland, as the competent authority, will carry out the assessment to determine whether the Project has the potential to influence Good Environmental Status (GES) of the UK's marine water and therefore the UK Government's ability to uphold its responsibilities under the MSFD. The MSFD Screening assessment will be provided with the EIA Report.

Decommissioning

- 3.7.12 Sections 105 to 114 of the Energy Act 2004 contain statutory requirements in relation to the decommissioning of offshore renewable energy installations (OREI) and their related electricity lines. Under the terms of the Energy Act, Scottish Ministers may require a person who is responsible for these installations or lines in Scottish Waters or in a Scottish part of an REZ to prepare (and carry out) a costed decommissioning programme for submission to and approval by Scottish Ministers (Scottish Government, 2022c).
- 3.7.13 Responsibilities and powers associated with decommissioning for OREI within Scottish Waters transferred from the Secretary of State to Scottish Ministers in 2017. Before this the

Department for Business, Energy & Industrial Strategy (BEIS) was responsible for requiring decommissioning programmes (BEIS, 2019). Marine Scotland are seeking to establish robust policies and procedures covering decommissioning, the Guidance Note for Decommissioning of Offshore Renewable Energy Installation in Scottish Waters or in the Scottish Part of the Renewable Energy Zone under the Energy Act 2004 (Scottish Government, 2022c) was finalised in August 2022.

- 3.7.14 Scottish Ministers have the power to determine specific approaches to decommissioning, including stipulating the form, timing and size of financial securities are required. The expected content of a decommissioning programme includes decommissioning standards, financial security, residual liability and industrial cooperation and collaboration.
- 3.7.15 Section 5 of the draft Guidance Note states that “*an indication of the decommissioning proposals should be included as part of the statutory consenting or licensing process so that the feasibility of removing the infrastructure can be assessed as part of the application process*” (Scottish Government, 2022c).
- 3.7.16 The decommissioning requirements in Scotland relate to the area between the MLWS mark and the seaward limits of the territorial waters, including coastal water and the Scottish part of the REZ. The Energy Act 2004 does not cover the intertidal waters.

3.8 Other consents and licences

- 3.8.1 **Table 3.8.1** highlights the other consents and licences that may be required for the Project.

Table 3.8.1 Other consents and licences that may be required

Licence/permit/consent	Regulatory body	Consent requirements
Marine licence or Exemptions	MS-LOT	For carrying out site investigations, buoy deployment and surveys.
European Protected Species (EPS) licence applications (under the Conservation (Natural Habitats, &c.) Regulations 1994, Conservation of Habitats and Species Regulations 2017 and the Offshore Marine Regulations 2017)	NatureScot / MS-LOT	For carrying out activities that could result in the disturbance of EPS, such as site investigation, buoy deployment and surveys, or disturbance identified as part of the EIA.
Protected Species licences (under the Wildlife and Countryside Act 1981 (as amended) (for example for basking shark, grey seal) and Wildlife and Natural Environment (Scotland) Act 2011)	NatureScot / MS-LOT	For carrying out site investigations, buoy deployment and surveys, or disturbance identified as part of the EIA.
Safety Zone applications (under the Energy Act 2004)	MS-LOT	To be established for any phase of an offshore renewable energy project but are normally applied for the construction or aspects of operations and maintenance phases.
Decommissioning Programmes (Sections 105 to 114 under the Energy Act 2004)	MS-LOT	Decommissioning Programme will be required prior to construction.

Licence/permit/consent	Regulatory body	Consent requirements
Controlled activities licence (under the Water Environment (Controlled Activities) (Scotland) Regulations 2011	SEPA	Licences for coastal and onshore water environments for pollution prevention and / or waste.
Marine works licence	CES	For carrying out survey works in the offshore export cable corridor.

3.9 References

- Aberdeenshire Council, (2019). *Aberdeenshire Council Natural Heritage Strategy 2019 – 2022*. [online] Available at: <http://publications.aberdeenshire.gov.uk/dataset/b71bf9e9-6a19-4d3e-a89e-0a0af7523b15/resource/5596fc91-f5d1-4eb6-971e-695c992b9389/download/natural-heritage-strategy-2019-2022.pdf> [Accessed 8 July 2022].
- Aberdeenshire Council, (2020). *Aberdeen City and Shire Strategic Development Plan 2020*. [online] Available at: <http://publications.aberdeenshire.gov.uk/dataset/b5991364-41ff-4827-b5d4-06aa48c0616a/resource/27bcc9ff-8b5f-4dc3-b322-519f9800ac2c/download/abdnandshirestrategicdevplanfinal2020.pdf> [Accessed: 8 July 2022].
- Aberdeenshire Council, (2022). *Modified Proposed Aberdeenshire Local Development Plan 2020*. [online] Available at: <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/pldp-2020/> [Accessed 15 December 2022].
- Aberdeenshire Council, (2023). *Aberdeenshire Local Development Plan 2023* [online] Available at: <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/ldp-2023/> [Accessed 24 January 2023].
- Centre for Environment Fisheries and Aquaculture Science (CEFAS), (2004). *Offshore Wind Farms: Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements (Version 2)*. [online] Available at: <https://www.cefasc.co.uk/publications/files/windfarm-guidance.pdf> [Accessed 8 July 2022].
- Climate Change (Emissions Reduction Targets) (Scotland) Act 2019*. (asp. 15). [online] Available at: <https://www.legislation.gov.uk/asp/2019/15/enacted> [Access 1 July 2022].
- Climate Change (Scotland) Act 2009*. (asp. 12) [online] Available at: <https://www.legislation.gov.uk/asp/2009/12> [Accessed: 1 July 2022].
- Climate Change Act 2008*. (c. 27). [online] Available at: <https://www.legislation.gov.uk/ukpga/2008/27/data.pdf> [Accessed: 1 July 2022].
- Crown Estate Scotland (CES), (2021). *ScotWind Leasing Seabed Leasing for new offshore wind farms*. [online] Available at: <https://www.crownestatescotland.com/resources/documents/scotwind-leasing-guidance-notes-april-2021> [Accessed: 15 July 2022].
- Department for Business, Energy & Industrial Strategy (BEIS), (2019). *Decommissioning of Offshore Renewable Energy Installations Under the Energy Act 2004. Guidance notes for industry*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/916912/decommissioning-offshore-renewable-energy-installations-energy-act-2004-guidance-industry_1.pdf [Accessed: 14 July 2022].
- Department for Business, Energy & Industrial Strategy (BEIS), (2020a). *Offshore wind Sector Deal*. [online] Available at: <https://www.gov.uk/government/publications/offshore-wind-sector-deal/offshore-wind-sector-deal#executive-summary> [Accessed 11 August 2022].

Department for Business, Energy & Industrial Strategy (BEIS), (2020b). *Offshore Transmission Network Review*. [online] Available at: <https://www.gov.uk/government/groups/offshore-transmission-network-review#background> [Accessed: 11 August 2022].

Department for Business, Energy & Industrial Strategy (BEIS), (2022). *British Energy Security Strategy*. [online] Available at: <https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy#renewables> [Accessed 11 August 2022].

Department for Environment, Food & Rural Affairs (Defra), (2011). *UK Marine Policy Statement*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf [Accessed: 8 July 2022].

Department of Energy & Climate Change (DECC), (2011a). *Overarching National Policy Statement for Energy (EN-1)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Accessed 11 August 2022].

Department of Energy & Climate Change (DECC), (2011b). *Overarching National Policy Statement for Renewable Energy Infrastructure (EN-3)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf [Accessed 11 August 2022].

Department of Energy & Climate Change (DECC), (2011c). *Overarching National Policy Statement for Electricity Networks Infrastructure (EN-5)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47858/1942-national-policy-statement-electricity-networks.pdf [Accessed 11 August 2022].

Electricity Act 1989. (c. 29). [online] Available at: <https://www.legislation.gov.uk/ukpga/1989/29/contents> [Accessed 23 June 2022].

Energy Act 2004. (c. 20). [online] Available at: <https://www.legislation.gov.uk/ukpga/2004/20/contents> [Accessed 8 July 2022].

European Union (Withdrawal) Act 2018. (c. 15). [online] Available at: <https://www.legislation.gov.uk/ukpga/2018/16/enacted> [Accessed: 1 July 2022].

Flood Risk Management (Scotland) Act 2009. (asp. 6) [online] Available at: <https://www.legislation.gov.uk/asp/2009/6/data.pdf> [Accessed 8 July 2022].

Her Majesty's (HM) Government, (2020). *Offshore Transmission Network Review: Update from project partners following publication of the Holistic Network Design*. [online] Available at: <https://www.gov.uk/government/groups/offshore-transmission-network-review> [Accessed 9th December 2022].

Her Majesty's (HM) Government, (2021). *Net Zero Strategy: Build Back Greener*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf [Accessed 11 August 2022].

Institute of Environmental Management and Assessment (IEMA), (2017). *Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice*. [online] Available at: <https://www.iema.net/resources/reading-room/2017/07/18/delivering-proportionate-eia> [Accessed 23 June 2022].

Marine (Scotland) Act 2010. (asp. 5). [online] Available at: <https://www.legislation.gov.uk/asp/2010/5/contents> [Accessed: 23 June 2022].

Marine and Coastal Access Act 2009. (c. 23). [online] Available at: <https://www.legislation.gov.uk/ukpga/2009/23/contents> [Accessed: 23 June 2022].

Nature Conservation (Scotland) Act 2004. (asp 6). [online] Available at: <https://www.legislation.gov.uk/asp/2004/6/contents> [Accessed 16 August 2022].

NatureScot, (2022). *Biodiversity Duty*. [online] Available at: <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy-and-cop15/biodiversity-duty> [Accessed 16 August 2022].

Scotland Act 2016. (c. 11) [online] Available at: <https://www.legislation.gov.uk/ukpga/2016/11/contents> [Accessed 8 July 2022].

Scottish Government, (2013a). *Electricity Generation Policy Statement – 2013*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/speech-statement/2013/06/electricity-generation-policy-statement-2013/documents/00427293-pdf/00427293-pdf/govscot%3Adocument/00427293.pdf> [Accessed: 24 June 2022].

Scottish Government, (2013b). *Planning Advice Note 1/2013: Environmental Impact Assessment*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2013/08/planning-advice-note-1-2013-environmental-impact-assessment/documents/00521028-pdf/00521028-pdf/govscot%3Adocument/00521028.pdf> [Accessed 24 June 2022].

Scottish Government, (2014a). *National Planning Framework 3*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2014/06/national-planning-framework-3/documents/00453683-pdf/00453683-pdf/govscot%3Adocument/00453683.pdf> [Accessed: 24 June 2022].

Scottish Government, (2014b) *Scottish Planning Policy*. [online] Available at: <https://www.gov.scot/publications/scottish-planning-policy/documents/> [Accessed 26 August 2022].

Scottish Government, (2015). *Scotland's National Marine Plan A single Framework for Managing Our Seas*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2015/03/scotlands-national-marine-plan/documents/00475466-pdf/00475466-pdf/govscot%3Adocument/00475466.pdf> [Accessed: 8 July 2022].

Scottish Government, (2017a). *Scottish Energy Strategy: The future of energy in Scotland*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2017/12/scottish-energy-strategy-future-energy-scotland-9781788515276/documents/00529523-pdf/00529523-pdf/govscot%3Adocument/00529523.pdf> [Accessed: 24 June 2022].

Scottish Government, (2017b). *Planning Circular 1/2017: Environmental Impacts Assessment Regulations*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2017/05/planning-circular-1-2017-environmental-impact-assessment-regulations-2017/documents/00518122-pdf/00518122-pdf/govscot%3Adocument/00518122.pdf> [Accessed 24 June 23 June 2022].

Scottish Government, (2018). *Offshore Wind, Wave and Tidal Energy Applications: Consenting and Licensing Manual*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/consultation-paper/2018/10/marine-scotland-consenting-licensing-manual-offshore-wind-wave-tidal-energy-applications/documents/00542001-pdf/00542001-pdf/govscot%3Adocument/00542001.pdf> [Accessed 1 July 2022].

Scottish Government, (2020a). *Sectoral Marine Plan for Offshore Wind Energy*. [online] Available at: <https://www.gov.scot/publications/sectoral-marine-plan-offshore-wind-energy/documents/> [Accessed 8 July 2022].

Scottish Government, (2020b). *Update to the Climate Change Plan 2018 – 2032: Securing a Green Recovering on a Path to Net Zero*. [online] Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> [Accessed: 24 June 2022].

Scottish Government, (2020c). *Offshore Wind Policy Statement*. [online] Available at: <https://www.gov.scot/publications/offshore-wind-policy-statement/documents/> [Accessed: 1 July 2022].

Scottish Government, (2020d). *The Environment Strategy For Scotland: Vision and Outcomes*. [online] Available at: <https://www.gov.scot/publications/environment-strategy-scotland-vision-outcomes/documents/> [Accessed: 16 August 2022].

Scottish Government, (2020e). *Scottish Biodiversity Strategy Post-2020: A Statement of Intent*. [online] Available at: <https://www.gov.scot/publications/scottish-biodiversity-strategy-post-2020-statement-intent/documents/> [Accessed 16 August 2022].

Scottish Government, (2021a). *Energy Strategy: Position Statement*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2021/03/scotlands-energy-strategy-position-statement/documents/scotlands-energy-strategy-position-statement/scotlands-energy-strategy-position-statement/govscot%3Adocument/scotlands-energy-strategy-position-statement.pdf> [Accessed: 24 June 2022].

Scottish Government, (2022a). *National Planning Framework 4: Revised Draft*. [online] Available at: <https://www.gov.scot/publications/national-planning-framework-4-revised-draft/documents/> [Accessed 15 November 2022].

Scottish Government, (2022b). *Sectoral Marine Plan – Roadmap of actions*. [online] Available at: <https://www.gov.scot/publications/sectoral-marine-plan-roadmap-actions/documents/> [Accessed: 5 January 2023].

Scottish Government, (2022c). *Guidance for Applicants on Using the Design Envelope for Applications under Section 36 of the Electricity Act 1989*. [online] Available at: <https://www.gov.scot/publications/guidance-applicants-using-design-envelope-applications-under-section-36-electricity-act-1989/documents/> [Accessed 11 July 2022].

Scottish Government, (2022d). *Decommissioning of Offshore Renewable Energy Installations in Scottish waters or in the Scottish part of the Renewable Energy Zone under The Energy Act 2004: Guidance notes for industry (in Scotland)*. [online] Available at: <https://www.gov.scot/publications/offshore-renewable-energy-decommissioning-guidance-scottish-waters/documents/> [Accessed 8 September 2022].

Scottish Natural Heritage and Historic Environment, (2018). *Environmental Impact Assessment Handbook. Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland*. [online] Available at: <https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf> [Accessed 23 June 2022].

The Conservation of Offshore Marine Habitats and Species Regulations 2017. (SI 2017 1013). [online] Available at: <https://www.legislation.gov.uk/ukxi/2017/1013/made/data.pdf> [Accessed: 12 July 2022].

The Conservation (Natural Habitats, &c.) Regulations 1994. (SI 1994 2716). [online] Available at: <https://www.legislation.gov.uk/ukxi/1994/2716/made/data.pdf> [Accessed 8 July 2022].

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. (SI 2017 101). [online] Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents/made> [Accessed 23 June 2022].

The European Commission, (1992). *Directive 92/43/EEC of the European Parliament and of the Council on the conservation of natural habitats and of wild fauna and flora*. [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043> [Accessed 8 July 2022].

The European Commission, (2000). *Directive 2000/60/EC of the European Parliament and the Council establishing a framework for Community action in the field of water policy*. [online] Available at: <https://www.legislation.gov.uk/eudr/2000/60/data.pdf> [Accessed 8 July 2022].

The European Commission, (2008). *Directive 2008/56/EC of the European Parliament and the Council establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)*. [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0056&from=EN> [Accessed 8 July 2022].

The European Commission, (2009). *Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directive 2001/77/EC and 2003/30/EC*. [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=en> [Accessed: 8 July 2022].

The European Commission, (2009). *Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds*. [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0147&from=EN> [Accessed 8 July 2022].

The European Commission, (2018). *Directive 2018/2001/EU of the European Parliament and of the Council on the promotion of the use of energy from renewable sources*. [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001> [Accessed: 1 July 2022].

The Marine Environment (Amendment) (EU Exit) Regulations 2018. (SI 2018 1399). [online] Available at: <https://www.legislation.gov.uk/ukxi/2018/1399/contents/made> [Accessed 8 July 2022].

The Marine Strategy Regulations 2010. (SI 2010 1627). [online] Available at: <https://www.legislation.gov.uk/ukxi/2010/1627/made/data.pdf> [Accessed 8 July 2022].

The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (SI 2017 115). [online] Available at: <https://www.legislation.gov.uk/ssi/2017/115/made> [Accessed: 23 June 2022].

The Marine Works (Environmental Impact Assessment) Regulations 2007. (SI 2017 1518). [online] Available at: <https://www.legislation.gov.uk/ukxi/2007/1518/data.xht?view=snippet&wrap=true> [Accessed 23 June 2022].

The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007. (SI 2007 1842). [online] Available at: <https://www.legislation.gov.uk/ukxi/2007/1842/made/data.pdf> [Accessed 8 July 2022].

The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. (SI 2017 102). [online] Available at: <https://www.legislation.gov.uk/ssi/2017/102/contents/made> [Accessed: 23 June 2022].

The Water Environment (Controlled Activities) (Scotland) Regulations 2011. (SI 2011 209). [online] Available at: <https://www.legislation.gov.uk/ssi/2011/209/contents/made> [Accessed 15 November 2022].

Town and Country Planning (Scotland) Act 1997. (c. 8). [online] Available at: <https://www.legislation.gov.uk/ukpga/1997/8/contents> [Accessed 8 July 2022].

Water Environment and Water Services (Scotland) Act 2003. (asp. 3) [online] Available at: <https://www.legislation.gov.uk/asp/2003/3/contents> [Accessed 8 July 2022].

Wildlife and Natural Environment (Scotland) Act 2011. (asp. 6). [online] Available at: <https://www.legislation.gov.uk/asp/2011/6/contents/enacted> [Accessed 8 July 2022].

UK Export Finance, (2021). *Climate Change Strategy 2021-2024*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1019141/UKEF_Climate_Change_Strategy_2021.pdf [Accessed 11 August 2022].

United Nations, (1992). *United Nations Framework Convention on Climate Change*. [online] Available at: <https://unfccc.int/resource/docs/convkp/conveng.pdf> [Accessed 15 August 2022].

United Nations, (1997). *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. [online] Available at: <https://unfccc.int/resource/docs/convkp/kpeng.pdf> [Accessed 15 August 2022].

United Nations, (2015). *Report on the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015*. [online] Available at: <https://unfccc.int/resource/docs/2015/cop21/eng/10.pdf> [Accessed 15 August 2022].

United Nations, (2021). *Report on the Conference of the Parties on its twenty-sixth session, held in Glasgow from 31 October to 13 November 2021*. [online] Available at: <https://unfccc.int/documents/460953> [Accessed 15 August 2022].

4. Approach to Scoping and EIA

4.1 Introduction

- 4.1.1 This Chapter describes the principles of EIA and the approach being taken to identify and evaluate likely significant effects of the Project on the environment. The approach to Scoping is outlined, along with the broad principles relating to the establishment of baseline conditions, embedded environmental measures, and the methodology for the assessment of effects that will be adopted for the EIA. This Chapter also sets out the proposed stakeholder consultation and engagement that will be undertaken as part of the EIA process. The proposed temporal, spatial and technical scope of the environmental assessments are also described, along with an overview of the proposed methodologies for cumulative effects assessment (CEA).

EIA Scoping

- 4.1.2 Effective Scoping enables agreement to be reached on the aspects and methodologies to be taken forward and reported in much greater detail in the EIA Report. The Scoping Report refines the scope of the assessment and focus on the key issues. It also provides an opportunity for early interaction with stakeholders, strengthening the assessment evidence base and allowing active participation of interested parties in project development and decision-making. This can in turn improve project design, environmental performance and social acceptability.
- 4.1.3 For the purposes of the EIA and this Scoping Report, the term 'impacts' is used to describe the changes that arise as a result of the Project (for example, changes in drainage pattern) and the term 'effects' are the consequences of those changes (for example, habitat is changed by an alteration in the drainage pattern).
- 4.1.4 Schedule 4 of the EIA Regulations 2017 and Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007 states that the description of the likely significant effects should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development.
- 4.1.5 The EIA will consider all of these types of effects in the environmental aspects outlined in **Chapter 5: Environmental Aspects Offshore**, **Chapter 6: Environmental Aspects Onshore** and **Chapter 7: Environmental Aspects Whole Project**.
- 4.1.6 Whilst some terms are self-explanatory, a definition of effects has been provided to confirm how these terms will be applied throughout the EIA process:
- **Direct effects:** Those effects that result directly from the Project, i.e. effects that are made directly to a receptor. An example would be effects of construction activities on species and habitats.
 - **Indirect and secondary effects:** Those effects that are not caused immediately by the Project but arise as a consequence of it. An example would be where indirect employment is created as suppliers increase their activities and hire new workers to provide the additional goods and services required by the Project.
 - **Transboundary effects:** Those effects that would affect the environment in an adjacent state.

- **Inter-related effects:** Effects resulting from two or more project impacts acting together, to result in a new or changed effect on a single receptor.
- **Cumulative effects:** Effects resulting from the combined impacts of the Project with other projects / plans on the same single receptor.
- **In-combination effects:** Effects resulting from the combined impacts of the Project with other projects / plans on European Sites within the national site network. These will be presented separately within HRA documentation via a separate and later submission.

4.1.7 Under the EIA Regulations, once a request for a Scoping Opinion has been issued to the Scottish Ministers and Planning Authority for consideration, they are required to consult with the consultation bodies (as defined under Regulation 12(4) of the Electricity Works EIA Regulations 2017; Regulation 14(4) of the Marine Works EIA Regulations; Regulation 17(4) of the TCPA EIA Regulations; and Schedule 4 of the Marine Works EIA Regulations 2007).

4.1.8 The Scoping Opinion of the Scottish Ministers and Planning Authority is being sought on the following:

- the environmental aspects that should be assessed within the EIA Report;
- the likely significant effects of the construction; operation and maintenance; and decommissioning of the Project;
- those effects that are not likely to be significant and can be scoped out of the EIA;
- the approach to defining the study areas for each environmental aspect;
- the data that has been gathered and will be gathered to support the assessments;
- the assessment methods that will be used to determine likely significant effects;
- the approach to determining the environmental measures that could be incorporated into the Project to avoid, reduce or compensate for significant effects; and
- the approach to the assessment of cumulative, inter-related and transboundary effects.

4.1.9 Ongoing dialogue will be held between the Applicant and MS-LOT (on behalf of the Scottish Ministers), Aberdeenshire Council and stakeholders with regards to the scope of the assessment, and with a view to reaching agreement over the scope. Future changes in the design of the Project or new environmental information will also be subject to discussion over any consequent changes to the scope of the assessment.

Consultation process

Introduction

4.1.10 This Scoping Report has been prepared to support a request for Scoping Opinions in relation to the Project from MS-LOT and Aberdeenshire Council. In advance of formal submission of the EIA Report, both statutory and non-statutory consultation and engagement will be carried out to give any stakeholders and members of the public with an interest in the Project the opportunity to feedback on all aspects of the Project and to inform the scope of studies, surveys and assessments being undertaken. This will be delivered in accordance with relevant legislation, guidance and best practice and will build on the feedback to be provided by consultees in the Scoping Opinions and further define the scope of studies, surveys and assessments, as required.

Previous stakeholder engagement

- 4.1.11 The Applicant has strong existing relationships with a wide variety of stakeholders. Prior to CES awarding the Applicant an exclusivity agreement to develop the Project within the NE7 Plan Option, a stakeholder mapping exercise was undertaken to support early stakeholder engagement. Stakeholders were identified who could contribute to the site selection process, inform supply chain planning and help shape project concept development. Where appropriate, key stakeholders were engaged to ensure robust definition and development of a project concept. Feedback from this early engagement has fed into site selection, development of the understanding of potential constraints and identification of challenges, as well as opportunities.
- 4.1.12 Since award of the exclusivity agreement, key stakeholders have been engaged to provide an introduction to the Project, establish contacts and channels of engagement, and to begin sharing data and information that will help in the undertaking of assessments for the delivery of the Scoping Reports and the design of the Project.

Pre-application consultation (PAC)

- 4.1.13 The pre-application consultation (PAC) process is the statutory requirement to undertake public consultation prior to the submission of planning and marine licence applications for certain proposals. The aim of the PAC process is to *“improve the quality of planning and licence applications, and to provide, where possible an early opportunity for community views to be reflected in proposals”* (Scottish Government, 2013). It must be undertaken in advance of relevant planning and marine licence applications being submitted.
- 4.1.14 The Applicant is adopting an approach to consultation that will meet the requirements for all of the regimes (for both onshore and offshore) for PAC and the relevant notices that are required. Statutory and non-statutory consultation and engagement will help to inform the preparation of key materials as part of the EIA. This includes this Scoping Report and the EIA Report.
- 4.1.15 In addition to statutory consultation with prescribed consultees, applicants are also encouraged, as best practice, to engage in non-statutory engagement with all potentially affected parties from the earliest stages of design. This also allows stakeholders and local communities to gain a better understanding of the Project and any potential effects identified, whilst also providing the opportunity to influence the design and help identify appropriate mitigation.
- 4.1.16 The various statutory consultation requirements and associated guidance that are relevant under the applicable consenting regimes for the Project are detailed below in **Table 4.1.1**.

Table 4.1.1 Legislative / regulations requirements for consultation

Legislation / regulations	Statutory requirement for consultation / expectation for consultation
Electricity Act 1989, s.36 consent	<p>No statutory requirements for consultation.</p> <p>Expectation to undertake pre-application consultation with the public, hosting at least two consultation events held at least 14 days apart. The publication of a notice at least seven days before holding a public event. The Project will be undertaking pre-application consultation activities as required by the Marine licences under Marine (Scotland) Act 2010 (Part 4) and the Town and Country Planning (Pre-application Consultation) (Scotland) Amendment Regulations 2021 under the Town and Country Planning (Scotland) Act 1997 (both detailed below).</p>
Marine and Coastal Access Act 2009	<p>No statutory requirements for consultation.</p> <p>However, the Project will be undertaking pre-application consultation activities as expected or as required by the Electricity Act 1989, s.36 consent (detailed above), and the Marine licences under Marine (Scotland) Act 2010 (Part 4) and the Town and Country Planning (Pre-application Consultation) (Scotland) Amendment Regulations 2021 under the Town and Country Planning (Scotland) Act 1997 (both detailed below).</p>
Marine licences under Marine (Scotland) Act 2010 (Part 4)	<p>Statutory requirement for pre-application consultation.</p> <p>At least one pre-application consultation event, which will provide statutory stakeholders and members of the public the opportunity to view and comment on the proposals. A notice must be published in a local newspaper at least six weeks prior to the event taking place.</p>
Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013 and Town and Country Planning (Pre-application Consultation) (Scotland) Amendment Regulations 2021 under the Town and Country Planning (Scotland) Act 1997	<p>Statutory requirement for pre-application consultation.</p> <p>Under the updated regulations, at least two public events must be held where members of the public can submit comments. The final event, which must take place at least 14 days after the first event, must provide feedback to members of the public on how comments received have been considered in the development of the Project. A PAC report must be prepared under the regulations.</p>
The EIA Regulations	<p>Scottish Ministers and the Planning Authority (Aberdeenshire Council) must consult the consultation bodies and other public bodies prior to adopting Scoping Opinions and on publication of the EIA Report.</p>

4.1.17 The Applicant will track all stakeholder feedback from Project set up, throughout development and into execution. Throughout the consenting process and into the post-consent period it is important to ensure that issues specified in the Scoping Opinion, and comments raised subsequently by consultees, are adequately addressed and logged so that there is an audit trail of how each stakeholder issue has been considered in the development of the Project. MS-LOT advises that this is achieved through Gap Analysis

(Scottish Government, 2018), which is a process that logs stakeholder responses and issues raised and explains how these have been addressed in the EIA Report.

- 4.1.18 The Gap Analysis methods (or alternative agreed method or review) will be applied at three points:
- Scoping Opinion;
 - EIA and submission; and
 - Post-consent.

Pre-Application Consultation (PAC) Report

- 4.1.19 Statutory PAC reporting for both planning and marine licence applications will be provided in a single report. In line with the approach being adopted to undertake this EIA, consideration will be given to the 'whole Project' when writing this report, providing a holistic overview of the Project, its consultation, and the feedback received.
- 4.1.20 A PAC Report needs to detail what has been done to comply with the requirements of the Planning Act and associated Regulations, as detailed above in **Table 4.1.1**. A PAC Report must:
- specify who has been consulted;
 - set out what steps have been taken to comply with the statutory requirements and additional requirements of the consenting authorities;
 - contain copies of all illustrative drawings, and any other materials, exhibited to communities at the PAC events; and
 - set out how the applicant has responded to the comments made by the general public and consultees, including whether the proposals have changed as a result of PAC.
- 4.1.21 A PAC Report will be submitted with the TCPA planning application, s.36 consent and marine licencing applications along with the other documents required under these consents.

4.2 Approach to the EIA process

Overview

- 4.2.1 An EIA is a process for identifying the likely significant environmental effects of a Project (positive and negative) to inform the decision-making process for development consent. The EIA process will culminate in the provision of an EIA Report, written in accordance with the planning legislation set out in **Section 3.4** in **Chapter 3: Legislative and Policy Context**. The EIA Report will describe the likely significant effects associated with the Project during its construction, operation and maintenance, and decommissioning phases.
- 4.2.2 The current Scoping phase involves a process to identify anticipated content of the EIA Report and the various methodologies that will be used for the assessment. These will be discussed with key stakeholders prior to Scoping submission and based on recognised good practice and guidelines specific to each environmental topic or discipline as set out in **Chapters 5, 6 and 7**.
- 4.2.3 The assessment phase of the EIA process comes next, which involves the assessment of effects, statutory stakeholder consultation, and the production of the EIA Report.

- 4.2.4 In practice, the approaches to EIA (i.e. the way in which the assessment is conducted) and the assessment criteria applied across different environmental and socio-economic aspects vary. The term 'aspects' refers to the individual environmental topics or disciplines that are assessed in the EIA. **Chapters 5, 6 and 7** outline the proposed approaches to the environmental aspects that will be addressed in the EIA.

Design evolution process

- 4.2.5 The EIA process aims to be systematic, analytical, impartial, consultative and iterative allowing opportunities for environmental concerns to be addressed in the design and evolution of the Project. Typically, throughout the evolution of the design, a number of design iterations take place in response to environmental constraints identified during the EIA process prior to the final design being submitted for approval. This iterative design process is a fundamental element of the EIA and for the Project and will develop following feedback via the Scoping Opinion and other engagement with key stakeholders.
- 4.2.6 The iterative design process will continue to develop for the EIA Report. Statutory and non-statutory engagement is ongoing and is integral to the provision of opportunities for stakeholders to provide feedback and to understand and influence the design as it progresses.
- 4.2.7 The iterative design process also integrates the advice and experience of the environmental subject matter experts that undertake the Scoping and assessments for the EIA in regular liaison with the Project's engineering team. This ensures that design evolution is informed by a Project-wide understanding of environmental sensitivities such that the mitigation hierarchy is adhered to throughout the Project's development.
- 4.2.8 From the outset the environment has been central to the design of the Project, and this is demonstrated through the development of embedded environmental measures presented in this Scoping Report. With this approach to design, the Applicant is seeking to achieve a sustainable and environmentally appropriate design for the Project, being one that will meet operational requirements at the same time as limiting and mitigating the environmental effects of the Project as far as practical.
- 4.2.9 The design evolution process and activities undertaken to date are described in **Chapter 2: Project Description**. This process has included a combination of engagement, EIA surveys and other technical studies to define the Scoping Boundary. The characteristics of the Scoping Boundary are described in **Chapter 2**.

Proportionate EIA

- 4.2.10 Scoping is intended to inform a proportional and robust approach to assessment through initial evaluation and reporting of identified likely significant effects in a Scoping Report.
- 4.2.11 In accordance with guidance and legislation, this Scoping Report seeks to ensure that the EIA and resultant EIA Report are robust and focused to help inform the decision-making process. This means that where appropriate, this Scoping Report seeks to scope out environmental aspects and specific matters under an aspect from further assessment with suitable justification and evidence provided. This will focus the assessment on key likely significant effects and ensure the EIA for the Project is proportionate in accordance with PAN 1/2013 (Scottish Government, 2013) and IEMA's Delivering Proportionate EIA guidance document (IEMA, 2017).
- 4.2.12 A proactive, early stage Scoping process is a way of ensuring that the EIA process and EIA Report are robust whilst suitably focused on aspects of the environment likely to be subject to significant effects. Where more certainty in relation to information exists, this Scoping

Report aims to focus the scope of the proposed assessments on material issues to ensure the EIA is appropriate and proportionate.

4.2.13 The following key tools/approaches have been adopted at the Scoping stage for the Project, to assist in the delivery of proportionate EIA:

- use of existing evidence base; and
- inclusion of embedded environmental measures (informed by the site selection exercise, and good and standard practices).

Evidence base

4.2.14 Where available, the existing evidence base has been collated, supplemented and drawn upon for the purposes of this Scoping Report to help inform the scope of the forthcoming environmental assessments. Further details are provided in **Chapters 5, 6 and 7** for each of the relevant individual environmental aspects. These data and information have been utilised to:

- inform the understanding of current and future baseline environment;
- scope out matters from further consideration in the EIA where appropriate and justifiable; and
- scope in matters for further assessment as part of the EIA.

4.2.15 The existing evidence base will continue to be expanded as the EIA progresses and as further data collection and environmental survey and modelling work is carried out. The evidence base will be regularly discussed with relevant stakeholders to ensure that it is appropriate.

Environmental measures

4.2.16 As part of the ongoing Scoping process, to enable refinement of the likely significant effects of the Project to be taken forward and assessed as part of the EIA, early stage environmental measures will be implemented as part of the Project and will be embedded into the design.

4.2.17 These include a range of environmental measures covering proposed avoidance measures that have been informed by the ongoing site selection exercise (see **Section 2.4 in Chapter 2: Project Description**), and good practice measures identified with reference to legislative requirements. Also included are best practice design commitments that are considered to be sectoral practices and procedures for major infrastructure projects, and in particular offshore wind farm development.

4.2.18 These measures have been used to inform the scope of the individual assessments and are set out in each environmental aspect section in **Chapters 5, 6 and 7**.

Design envelope

4.2.19 The EIA for the Project will adopt a parameter-based design envelope approach. The provision of a design envelope is intended to identify key parameters to enable the EIA to be carried out whilst retaining sufficient flexibility to accommodate further refinement during detailed design. The design envelope approach is widely used and accepted for major infrastructure projects in the UK, including for recent applications for offshore wind farms. The approach is recognised by Marine Scotland and the Energy Consents Unit in their guidance on how the design envelope assessment approach may be applied in the context

of applications received for generating stations under s.36 of the Electricity Act 1989 (Scottish Government, 2022). This states:

“in some instances, the nature of the proposed development and evolving technology mean that some aspects of the final project are yet to be settled in precise detail at the time that the application is submitted (such as the precise location of certain types of infrastructure, the foundation type, the size of certain structures or the turbine model). Where that is the case and some details are still to be finalised, the design envelope approach can be employed for such applications to enable a degree of flexibility and address these uncertainties. Through the design envelope approach, the application can set out parameters for the proposal including the maximum extents of the proposal and can assess on that basis what the likely worst case effects of the proposal may be. The detailed design of the project can then vary within this ‘envelope’ to ensure that the project as-constructed has been properly assessed”.

- 4.2.20 There is also UK guidance for the design envelope approach, including within the UK National Policy Statement for Renewable Energy Infrastructure (Department of Energy and Climate Change, 2011) and in the Planning Inspectorate’s Advice Note Nine: Rochdale Envelope (Planning Inspectorate, 2018a). Both of these guides closely align with the Marine Scotland and the Energy Consents Unit guidance.
- 4.2.21 The assessment will consider a maximum design scenario whilst allowing the flexibility to make improvements in the future in ways that cannot be predicted at the time of submission of the consent and licence applications. This will enable a meaningful and comprehensive assessment of the Project on a reasonable worst-case scenario basis, whilst maintaining flexibility for refinements to the design as it continues to evolve. The reasonable worst-case scenario defined for any given parameter may vary by technical aspect, depending on how the parameter can be expected to interact with the receptor being considered. The use of this approach has been adopted for this Scoping Report and will also enable the subsequent EIA to be based on a description of the location, design and size of the Project that is suitable to allow a comprehensive assessment of its likely significant environmental effects.
- 4.2.22 The description of the Project will be refined as the Project continues to evolve through the key subsequent stages of the design and EIA process including in the EIA Report that will accompany the consents and licences.

Technical, spatial, and temporal scope

Technical scope

- 4.2.23 The technical scope of assessment for each environmental aspect is detailed in **Chapters 5, 6 and 7**. Justification is provided for the individual approach and scoping of matters to be considered in the assessment for each environmental aspect. The technical scope also details the approach to baseline data collection and assessment methodologies. **Chapter 8: Summary and Next Steps** provides a summary table of impacts and effects to be scoped out of the EIA.
- 4.2.24 Other EIA matters that have been given due consideration for the technical scope of the EIA are as follows:
- **Major accidents and disasters** – Schedule 4 of the EIA Regulations 2017 requires the environmental assessment to identify, describe and assess the vulnerability of the Project to major accidents and/or disasters. A ‘major accident’ is an event (such as a major marine vessel accident e.g. ‘MV Braer’ tanker running aground off the Shetland Isles in 1993) that threatens immediate or delayed serious environmental effects to human health, welfare and / or the environment. A ‘disaster’ is a man-made / external

hazard (e.g. an act of terrorism) or a natural hazard (e.g. earthquake) with the potential to cause an event or situation that meets the definition of a major accident (IEMA, 2020).

The Project will comply with the Health and Safety at Work etc. Act 1974 and all regulations made thereunder. The Health and Safety at Work etc. Act 1974 and supporting regulations require that a suitable risk assessment is undertaken for all workplace activities, and that any residual risks must be reduced to 'As Low As Reasonably Practicable' (i.e. the ALARP principle). The provisions of the Health and Safety at Work etc. Act (as amended) are applied to work activities beyond the 12nm territorial sea limit and include energy structures and related structures, such as wind farms. The construction of the Project will be undertaken in compliance with the Construction (Design and Management) Regulations 2015, which make specific requirements for the client, designers and construction contractors to reduce the risk of accidents to ALARP. The Project will also comply to the Health & Safety Executive's regulatory expectation for emergency response arrangements for the offshore renewable energy industry (Health & Safety Executive, 2019) and RenewableUK's guidance Offshore Wind and Marine Energy Health and Safety (RenewableUK, 2014).

A standalone EIA Report chapter on major accidents and/or disasters is therefore not proposed. Where appropriate, relevant environmental aspects, as part of the EIA, will assess the likely risks either to/or arising from the Project in relation to potential areas of vulnerability and the associated control measures which will be employed to address these. For example, any flood risk concerns are considered with **Section 6.3: Water resources and flood risk** and will be addressed as part of the FRA.

- **Human health** – Schedule 4 of the EIA Regulations 2017 also outlines that 'human health' needs to be taken into consideration in the EIA. It is anticipated that the main interactions of the Project with human health will likely be through ground conditions, water resources and flood risk, noise and vibration, air quality, visual, marine water quality, socio-economic and transport effects during construction, operation and maintenance, and decommissioning. Therefore, human health will be addressed through these relevant environmental aspect chapters in the EIA Report, for example **Section 5.2: Marine water and sediment quality** considers bathing water quality and **Section 7.3: Socio-economics** considers population demographics and access to health facilities. Inter-related effects on health will be addressed in the inter-related effects EIA Report chapter. In addition, as outlined above for major accidents and disasters, the Project will comply with the Health and Safety at Work etc. Act 1974 and all regulations made thereunder, as well as the Construction (Design and Management) Regulations 2015. Consequently, a stand-alone human health EIA Report chapter is not proposed.
- **Waste** – Schedule 4 of the EIA Regulations 2017 and Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007 requires the EIA to describe effects from the disposal and recovery of waste. The Project will adopt best practice construction and management techniques to ensure waste is minimised as far as possible and that the storage, transport and eventual disposal of waste has no significant environmental effects. The management and collection of waste arisings will be carried out under the requirements of the Scottish waste regulatory regime. It is therefore proposed that waste will not be the subject of a separate environmental aspect chapter in the EIA. Any waste related development will be described in the project description of the EIA Report and any effects relating to such development will be addressed as part of the relevant environmental aspects and associated strategies. An example of this will be that where appropriate, the transport effects from the management of waste arisings will be considered in **Section 6.8: Traffic and transport**.

- **Climate change** – The influence of climate change on the future baseline and likely significant effects of the Project will be considered, where necessary, within the aspect specific assessments, for example **Section 5.1: Marine geology, oceanography and physical processes** considers changes to coastal morphology and **Section 6.3: Water resources and flood risk** considers flood risk. The proposed scope of an assessment of the Project's potential climatic impact as a result of greenhouse gas emissions, and consideration of the Project's resilience to climate change, are considered in **Section 7.1: Climate resilience** and **Section 7.2: Greenhouse gases**.
- **Electromagnetic fields (EMF)** – The generation of EMF by the Project and the potential effects of EMF caused by onshore Project infrastructure is considered in **Section 5.4: Electromagnetic fields (EMF)**. The potential effects of EMF caused by offshore Project infrastructure is considered in **Section 5.4: Electromagnetic fields (EMF)**, **Section 5.5: Benthic, epibenthic and intertidal ecology**, **Section 5.6: Marine mammals**, **Section 5.7: Offshore and intertidal ornithology** and **Section 5.8: Fish and shellfish ecology**.

4.2.25 The Revised Draft Planning Framework 4 (NPF4) underwent parliamentary consideration and on 11th January 2023 it was approved without modification by Scottish Parliament. Upon formal adoption and publication, the NPF4 will set out a new national policy position for spatial planning and form part of the statutory Development Plan for the determination of planning applications.

4.2.26 The Approved NPF4 2023 introduces new requirements which will be taken account of in the EIA and associated consenting documents.

Spatial scope

4.2.27 The geographical context within which the Project is located is shown in **Figure 1.1: Scoping Boundary** in **Appendix 1A**. The spatial scope for each aspect assessment will depend on the nature of the potential effects and the location of features that could be affected. The study area relevant to each environmental aspect is described in the aspect sections within **Chapters 5, 6 and 7** where appropriate. The spatial scope of the technical assessments will therefore take account of:

- the physical or developable area of the Project;
- the nature of the baseline environment; and
- the manner and extent to which environmental effects may occur within the developable area or beyond its boundaries.

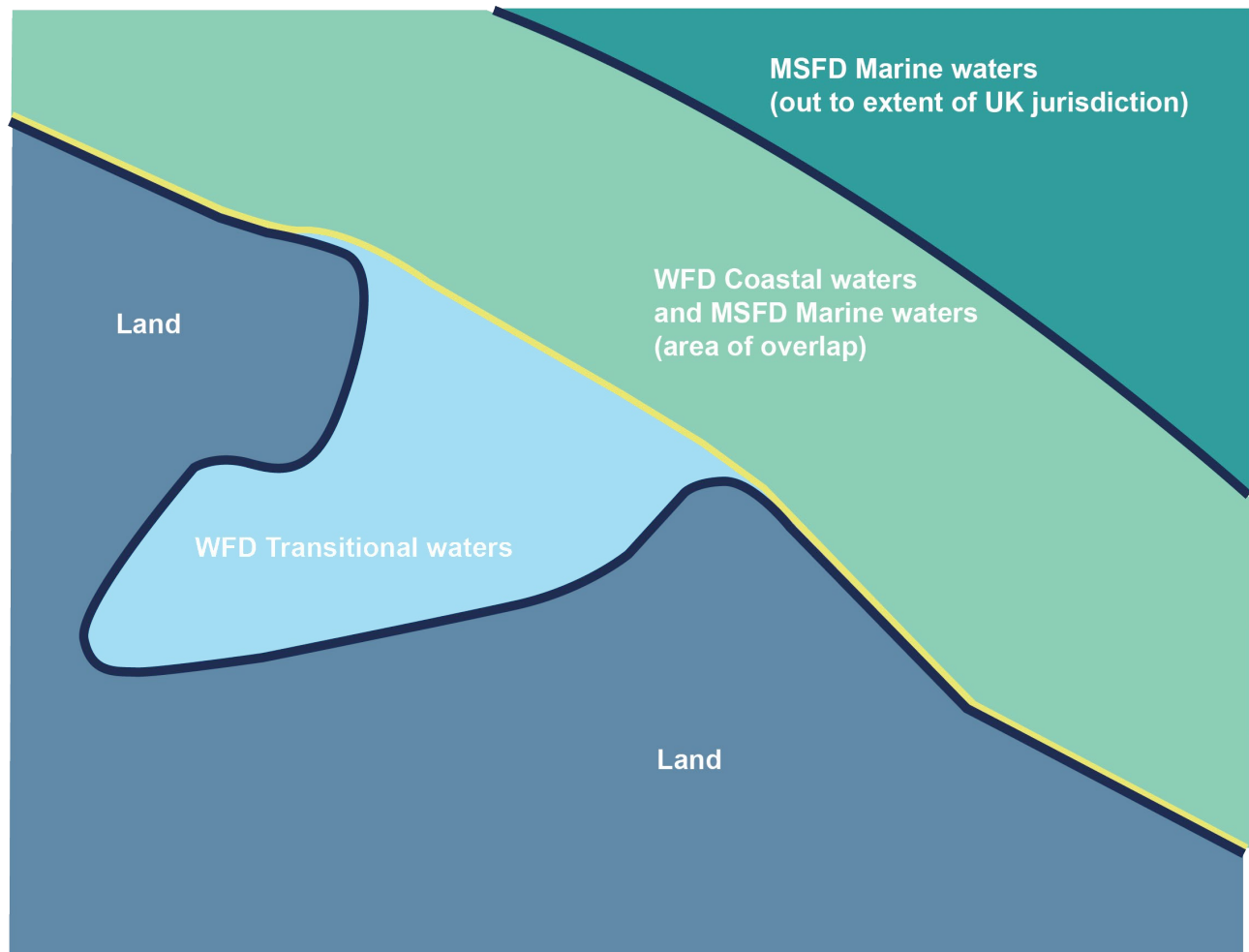
4.2.28 The methodology for setting the aspect-specific study area will then be applied to the final location of the components and supporting infrastructure. The study area for any given aspect may need to be refined in consultation with relevant consultees to ensure they still adequately reflect the area of potential influence for likely significant environmental effects.

Approach to the land-water interface

4.2.29 All onshore infrastructure located above MLWS is consented under the Town and Country Planning (Scotland) Act 1997. The Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010 have a landward jurisdictional limit of MHWS. Since marine licencing covers the marine area up to MHWS and terrestrial planning control extends down to MLWS, there is an overlap of consenting regimes in the intertidal zone (see **Plate 3.2.1** in **Chapter 3: Legislative and Policy Context**). The intertidal zone is defined as the area between MLWS and MHWS.

- 4.2.30 The term 'offshore' refers to environmental features located on the seaward side of MHWS and 'onshore' refers to environmental features on the landward side of MLWS. It is acknowledged that this approach creates an area of overlap, i.e. the 'intertidal' area between MLWS and MHWS. This is considered appropriate given the overlap between the respective consenting regimes. The approach to the assessment of the intertidal zone is indicated within each aspect section in the study area description (within **Chapters 5, 6 and 7**).
- 4.2.31 In this Scoping Report :
- the offshore assessment (**Chapter 5**) covers impacts from the offshore Project elements on features and resources that are seaward of MHWS;
 - the onshore assessment (**Chapter 6**) covers impacts from the onshore Project elements on features and resources that are landward of MLWS; and
 - the climate resilience; greenhouse gas; socio-economics; and military and civil aviation and telecommunication assessments for the Project are covered in a single chapter as these aspects are Project-wide concerns that include the potential for onshore, intertidal and offshore impacts (**Chapter 7**).
- 4.2.32 The relationship across the land-water interface is also of importance with regards to assessments of potential effects under the WFD and MSFD (see **Section 3.7 in Chapter 3: Legislative and Policy Context** for legislative context). Due to their consideration of potential effects on the aquatic environment, there is an element of overlap between the two Directives' jurisdictions and objectives. The MSFD includes coastal waters, but not transitional waters as defined by the WFD, such as estuaries, sea lochs or coastal lagoons. The line between the two Directives is taken as the 'bay closing line', or the seaward limit of transitional waters, as defined under the WFD. This is presented in **Plate 4.2.1**.
- 4.2.33 The HRA will be considered holistically with no differentiation of approach at the land-water interface.

Plate 4.2.1 Schematic to illustrate WFD and MSFD interface



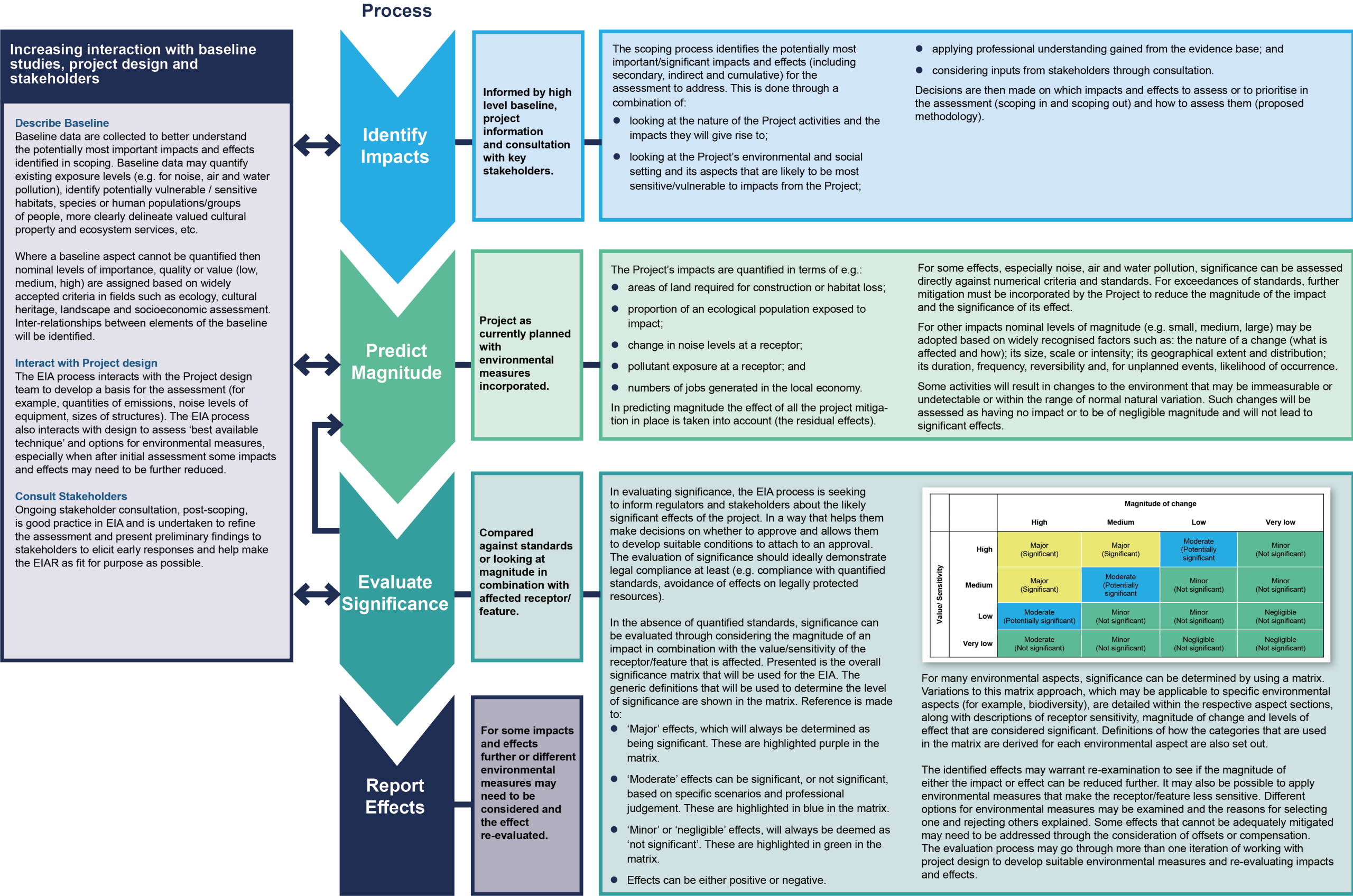
Temporal scope

- 1.1.1 The temporal scope refers to the time periods over which impacts and effects may be experienced by sensitive receptors and this will be defined further for each aspect in discussion with relevant consultees. The EIA will assess effects during the construction, operation and where appropriate, decommissioning phases of the Project.
- 1.1.2 Environmental effects will be compared to the situation prevailing before the Project commences development (the current baseline) and will also take into consideration the projected future baseline (i.e. the theoretical situation that would exist in the absence of the Project) where possible. For example, predictable changes such as climate change, or changes that can be expected based on reasonable assumptions and modelling calculations, will be taken into account. Each environmental aspect chapter of the EIA Report will define the baseline (current and future where possible) against which the environmental effects of the Project will be assessed. The baseline conditions to be assessed for each environmental aspect are outlined in **Chapters 5, 6 and 7** of this Scoping Report.

Assessment of effects and determining significance

- 4.2.36 The general methodological framework that will be applied in order to assess effects on environmental receptors and features, and used to determine the significance of their effects in the EIA Report is outlined in **Plate 4.2.2**. The assessments will broadly consider the magnitude of impacts and the value or sensitivity of receptors and features that could be affected in order to classify the significance of effects.
- 4.2.37 In practice, the approaches and criteria applied across different environmental aspects could vary. Therefore, professional judgment in the application of standards mandated by professional bodies (for example the Chartered Institute of Ecology and Environmental Management (CIEEM) or the Landscape Institute) is applied. Where this is the case, further detail and justification will be provided. The environmental aspect sections in **Chapters 5, 6 and 7** provide greater detail on the approaches to the assessment that will be addressed in the EIA.

Plate 4.2.2 Approach to EIA



Receptor (or feature) sensitivity or value

- 4.2.38 The sensitivity or value of a receptor (or 'feature' when referring to ecological receptors) is largely a product of its societal importance, as informed by legislation and policy, and as qualified by professional judgement. For example, higher value receptors for landscape, biodiversity or the historic environment may be defined as being of international or national importance; lower value receptors may be designated as being sensitive or important at a council area or district level.
- 4.2.39 The use of a receptor also plays a part in its classification. For example, when considering visual amenity, a receptor that is residential in nature may be valued more than a place of work as the environmental quality of the residential receptor is more likely to be an important part of that receptor's use.
- 4.2.40 **Table 4.2.1** sets out the generic guidelines for the assessment of sensitivity and value of a receptor or feature. Guidelines specific to each aspect are provided in each aspect section within **Chapters 5, 6 and 7**.

Table 4.2.1 Generic guidelines for the assessment of sensitivity or value

Value or sensitivity	Guidelines
High	Value: Feature or receptor possesses key characteristics that contribute significantly to the distinctiveness, rarity and character of the site or receptor (for example designated features of international or national importance). Sensitivity: Feature or receptor has a very low capacity to accommodate the proposed change.
Medium	Value: Feature or receptor possesses key characteristics that contribute significantly to the distinctiveness and character of the site or feature (for example designated features of regional importance). Sensitivity: Feature or receptor has a low capacity to accommodate the proposed change.
Low	Value: Feature or receptor possesses characteristics which are locally significant. Feature or receptor which is either not designated or is designated at a local or district level. Sensitivity: Feature or receptor has some tolerance to accommodate the proposed change.
Very low	Value: Feature or receptor characteristics do not make a significant contribution to local distinctiveness and not designated. Sensitivity: Feature or receptor is generally tolerant and can accommodate the proposed change.

Magnitude of change

- 4.2.41 The magnitude of change affecting a receptor that would result from the Project will be identified on a scale from minor alterations or change, up to major changes or the total or substantial loss of the receptor. For certain aspects, the magnitude of change would be related to guidance on levels of acceptability (for example, for air quality or noise), and is therefore based on numerical parameters. For others it will be a matter of professional judgement to determine the magnitude of change, using descriptive terminology.
- 4.2.42 **Table 4.2.2** sets out the generic criteria of the assessment of the magnitude of change.

Table 4.2.2 Generic criteria for the assessment of magnitude

Magnitude	Guidelines
High	Large scale changes over the whole development area and potentially beyond to key characteristics or features of the particular environmental aspect's character or distinctiveness.
Medium	Medium scale changes over the majority of the development area and potentially beyond to key characteristics or features of the particular environmental aspect's character or distinctiveness.
Low	Noticeable but small-scale changes over part of the development area and potentially beyond to key characteristics or features of the particular environmental aspect's character or distinctiveness.
Very low	Noticeable but very small-scale change or barely discernible changes over a small part of the development area and potentially beyond, to key characteristics or features of the particular environmental aspect's character or distinctiveness.

Environmental measures and residual effects

4.2.43 For each environmental aspect, the EIA process will systematically identify impacts and effects and take into consideration environmental measures that the Project will adopt. These environmental measures include both avoidance, best practice and design commitments. The IEMA Guide to Shaping Quality Development (IEMA, 2015) provides guidance on three categories of environmental measures: primary, secondary or tertiary measures:

- **Primary** – “these are modifications to the location or design of the development made during the pre-application phase that are an inherent part of the Project and do not require additional action to be taken”. These are referred to as ‘design measures’;
- **Secondary** – “actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent or through inclusion in the EIA Report”. These are referred to as ‘additional measures’; and
- **Tertiary** – “actions that would occur with or without input from the EIA process. These include actions that will be taken to meet legislative requirements, or those considered to be standard practice and used to manage commonly occurring environmental effects”. These are referred to as ‘good practice measures’.

4.2.44 Opportunities for design measures will be identified throughout the evolution of the design and implementation strategy for the Project and the EIA process. This allows potential significant adverse environmental effects to be fed back into the design process, to verify whether they can be avoided or otherwise mitigated in accordance with the hierarchy. In addition, relevant and proportionate opportunities for environmental enhancement and good practice measures will be identified where appropriate, in accordance with applicable statutory, policy and guidance requirements (see **Chapter 3: Legislative and Policy Context**). These design measures and good practice measures will be included within the Project plans and drawings and thus are integrated into the overall design strategy as embedded environmental measures.

4.2.45 Environmental measures will be subject to ongoing review to ensure that the Project can be adaptive to changes or unexpected outcomes. The EIA Report will report on the anticipated effects of the Project following the implementation of environmental measures, known as ‘residual effects’. A clear statement will be made as to whether the likely residual effects are

significant or not significant in EIA terms. Residual effects may be beneficial as well as adverse.

- 4.2.46 During the construction phase, adherence to a Construction Environmental Management Plan (CEMP) or equivalent is proposed and the CEMP will contain a range of environmental and health and safety considerations. An outline CEMP will be appended to the EIA Report.
- 4.2.47 Environmental measures will be recorded in a Commitments Register to enable them to be secured (where required) and implemented. Opportunities will be provided for stakeholders to provide feedback on the commitments as part of the planned stakeholder engagement exercises. The Commitments Register will be provided alongside the EIA Report.
- 4.2.48 The environmental measures will be secured through adherence to the design envelope, s.36 conditions, Town and Country Planning Act planning consent conditions and/or marine licence conditions, as appropriate.

Cumulative effects assessment

- 4.2.49 A cumulative effects assessment (CEA) will be carried out for the whole Project which will examine the result from the combined impacts of the Project with other projects / plans on the same single receptor. These will be assessed in the EIA Report, which is currently planned to follow the same approach as the Scoping Report, as a single Project-wide document covering all infrastructure proposed both onshore and offshore.
- 4.2.50 Should it become necessary to separate the onshore and offshore consent application submissions into separate EIA Reports, the approach to CEA would remain focused on the whole Project insofar as practicable.
- 4.2.51 In-combination effects are similar but relate specifically to European Sites for the purposes of HRA. These are effects resulting from the combined impacts of the Project with other projects / plans on European Sites, and will be presented separately within the HRA documentation.
- 4.2.52 Schedule 4 of the EIA Regulations 2017 and Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007 requires that cumulative effects of the development should be described in the EIA Report. Planning Circular 1/2017 (Scottish Government, 2017) and PAN 1/2013 (Scottish Government, 2013) also set out this requirement. There is currently no specific Scottish guidance on the methodological framework for assessing cumulative effects in general. PAN 1/2013 acknowledges that “assessment methods for cumulative impacts and interactions vary” and that it is a “matter of professional judgement to ensure the relevant projects and activities – and their environmental effects – are identified, taking into account the circumstances of the individual proposal and its location”. As such, the approach to the CEA will be informed by several guidance documents including: the Planning Inspectorate’s Advice Note Seventeen (Planning Inspectorate, 2019); and for the offshore elements especially, the RenewableUK and the Natural Environment Research Council (NERC) published guidelines (RenewableUK, 2013) on the undertaking of CEA and the Marine Scotland guidance on offshore wind, wave and tidal energy applications, which provides guidance on the types of projects to include in a CEA (Scottish Government, 2018).
- 4.2.53 At the time of writing, it is noted that MS-LOT and NatureScot are currently producing a cumulative effects framework (CEF) that focuses on CEA in Scotland (UK Centre for Ecology and Hydrology, 2022), and this CEF will be drawn upon if available at the time of writing the EIA Report (currently expected spring 2023).
- 4.2.54 In accordance with the above guidance documents, other developments that are deemed likely to go ahead or are going ahead, and for which sufficient information is available,

should be taken forward for consideration. For the purposes of the CEA, the types of other developments that are proposed for consideration include:

- projects that are under construction;
- projects that have planning permission, energy consent or marine licences;
- projects for which planning, energy consent or marine licence applications have been submitted to the relevant authority; and
- projects that are reasonably foreseeable (e.g. projects identified in development plans, projects in other plans and programmes as may be relevant, offshore renewable energy projects that have a Crown Estate Agreement for lease, offshore renewable energy projects that have been scoped).

4.2.55 An offshore EIA Scoping workshop for the Project was held on 29th and 30th September 2022. It was hosted by the Applicant and attended by representatives from MS-LOT, Marine Scotland Science (MSS), NatureScot, and the Royal Society for the Protection of Birds (RSPB). The proposed approach to CEA was discussed during the workshop, and the Applicant sought the advice of MS-LOT on the temporal scope of the CEA. MS-LOT subsequently advised the following (via email on 03 November 2022).

4.2.56 *“Regarding the question on the cumulative effects assessment and from what point in time this should start, MS-LOT advises that this should consider operational windfarms and those under construction (including those in English waters, or other non-UK parts of the North Sea if you consider there is relevance, connectivity, or the potential of a cumulative effect), those consented but not yet under construction, and those not yet consented but undergoing to consenting process. In relation to future protects, you should consider projects that have submitted scoping report up to three months prior to application submission. This should also include non-wind projects”.*

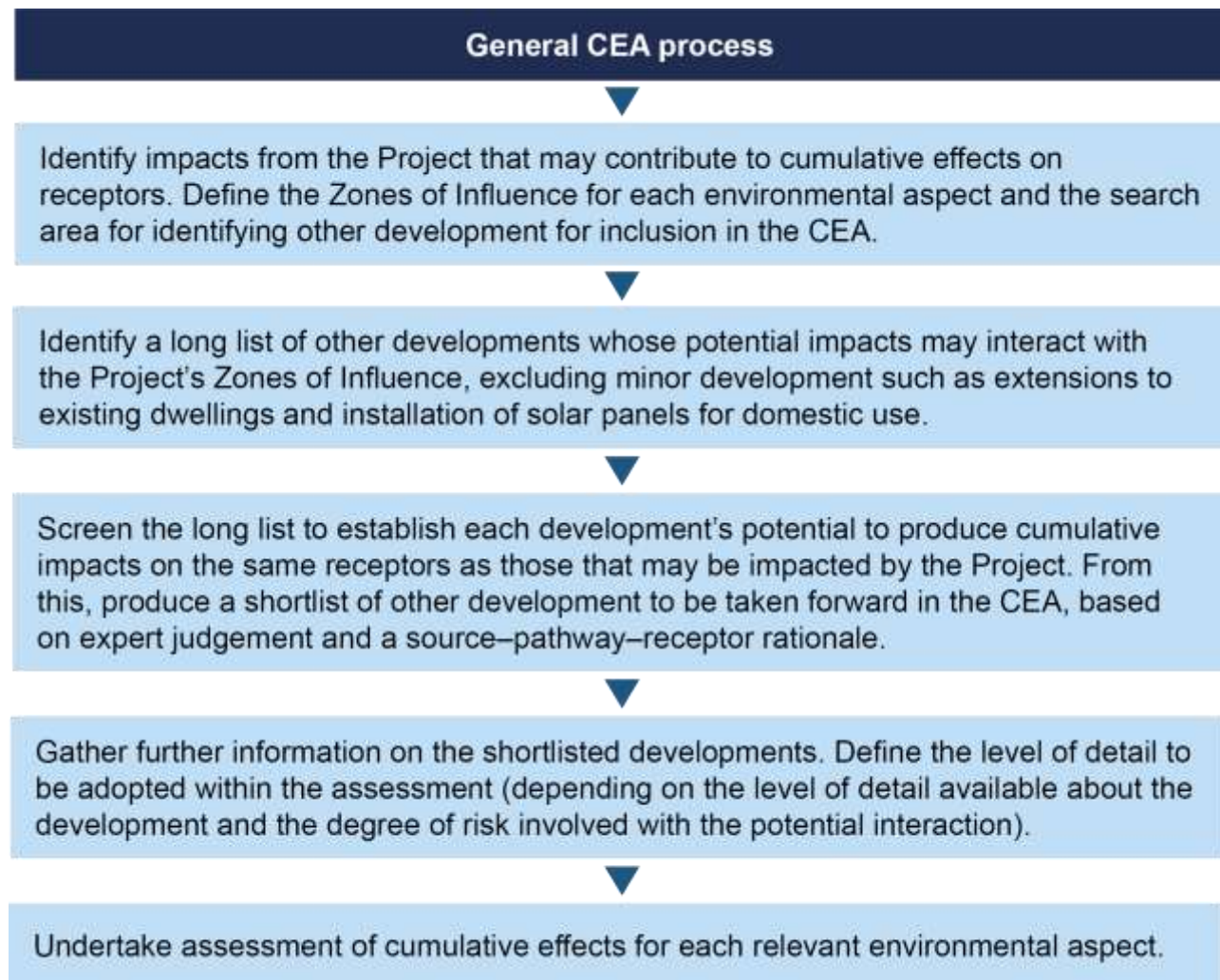
4.2.57 The CEA approach including its temporal and spatial scope will require discussion and agreement with Aberdeenshire Council to ensure a consistent project-wide approach.

4.2.58 The CEA will focus on other developments in proximity to the Project that may have effects on the same receptors. Generally, only other developments where an EIA is required are considered appropriate for inclusion in the CEA. This is because these developments are most likely to result in effects of a magnitude sufficient to lead to likely significant effects either on their own or in combination with the Project, and they are also most likely to have sufficient information in order to undertake a meaningful assessment. The CEA will include other developments that may begin construction or operation or be decommissioned within the same period as the Project construction, operation (and maintenance) or decommissioning.

4.2.59 The CEA methodology will be generally divided into a screening stage and an assessment stage. The offshore and onshore CEAs will have slightly different approaches. The offshore screening approach will follow the RenewableUK (2013) accepted guidance, which is specific to the marine elements of an offshore wind farm, addressing the need to consider mobile wide-ranging species (foraging species, migratory routes etc). The onshore screening approach will be guided by the principles of the Planning Inspectorate’s Advice Note Seventeen (Planning Inspectorate, 2019), but adapted for the nature, scale and location of the Project.

4.2.60 Detailed methodologies, including the Zones of Influence for each environmental aspect, will be developed in consultation with Aberdeenshire Council and MS-LOT. These will draw upon the anticipated new guidance from MS-LOT and NatureScot, when available. However, the general staged process that will be followed for the onshore and offshore CEA is set out in **Plate 4.2.3**.

Plate 4.2.3 General CEA process



- 4.2.61 A variety of sources will be used to identify developments for potential inclusion in the CEA, and Aberdeenshire Council and MS-LOT will be engaged to ensure all relevant developments and plans are captured.
- 4.2.62 A list of other developments for CEA will be developed and shared with Aberdeenshire Council and MS-LOT for agreement in order to inform the EIA Report, taking into account the anticipated new guidance from MS-LOT and NatureScot.
- 4.2.63 Where potential cumulative environmental effects have been identified, these will be considered further in the relevant environmental aspect assessments in the EIA Report.
- 4.2.64 In this Scoping Report, for each aspect, potential impacts of the Project that may contribute to cumulative effects on receptors are set out in **Chapters 5, 6 and 7**.

Inter-related effects

- 4.2.65 Regulation 4(2) of the Electricity Works (EIA) (Scotland) Regulations 2017, Regulation 5(2) of the Marine Works (EIA) (Scotland) Regulations 2017, Regulation 4(2) of the Town and Country Planning (EIA) (Scotland) Regulations 2017 and Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007 require that the EIA consider the interaction of environmental effects associated with the Project. The likely significant effects of multiple impacts from the Project on one receptor will be identified and assessed in the

EIA. For example, noise and air quality impacts together could have a greater effect on a residential receptor than each impact considered separately.

4.2.66 In the majority of cases, inter-related effects will be inherently considered within each aspect chapter of the EIA Report. For example, the combined impact of foraging habitat loss and underwater noise disturbance on marine mammals would be considered in the marine mammals chapter.

4.2.67 Where the Project may result in combined 'amenity' effects on any one human receptor that may collectively cause a greater effect (such as the combined effects of noise and air quality impacts during construction on local residents), this will be presented and assessed within a standalone chapter in the EIA Report.

4.2.68 Environmental aspects that have common receptors will be identified, and consideration will be given to whether the aspect effects on any common receptors are likely to combine. The aspect assessments will:

- identify the common receptor(s) from the individual aspect assessments;
- identify impacts that each common receptor(s) may experience;
- screen receptors, discounting those where there is no potential for inter-related effects, no spatial or temporal overlap of aspect impacts or where aspect impacts are identified as 'negligible' in core topic assessments; and
- assess inter-related effects for the construction, operation and maintenance and decommissioning phases, where appropriate.

Transboundary effects

4.2.69 Transboundary effects may occur when impacts from a development within one European Economic Area (EEA) State affects the environment of another EEA State(s).

4.2.70 The United Nations Economic Commission for Europe Convention on EIA in a Transboundary Context (adopted in 1991 as the 'Espoo Convention') was negotiated to enhance the cooperation between European Economic Area (EEA) States in assessing environmental effects. The Espoo Convention has been transposed into Scottish EIA law by way of Regulation 29 of the Electricity Works (EIA) (Scotland) Regulations 2017, Regulation 30 of the Marine Works (EIA) (Scotland) Regulations 2017, and Regulation 41 of the Town and Country Planning (EIA) (Scotland) Regulations 2017. These Regulations set out the processes for consultation and notification. In the event that a project is considered to cause significant transboundary effects, the EIA Regulations 2017 require Scottish Ministers to engage with the affected EEA State and invite them to participate in consultation.

4.2.71 Following the exit of the UK from the European Union (EU) in December 2020, the UK is no longer an EU Member State. However, for the purposes of assessing potential transboundary effects, the approach outlined above has been followed for the Project.

4.2.72 The assessment of potential transboundary effects and, determination of their significance draws on the use of zones of influence (ZOI) for key categories of effect. In the absence of specific Scottish guidance, the proposed approach to transboundary assessment has drawn on guidance provided in Planning Inspectorate's Advice Note Twelve: Transboundary Impacts and Process (Planning Inspectorate, 2020). This includes consideration of the transboundary screening process, which outlines key aspects of the Project to consider from an international perspective, including:

- characteristics of the Project;

- location of the Project, including proximity to relevant EEA States;
- environmental context / importance, for example any EEA protected areas which may be affected by the Project;
- potential pathways of effect;
- the extent of potential effects;
- the scale of the potential effect, to consider magnitude, probability, duration, frequency and recoverability; and
- cumulative impacts.

4.2.73 Where applicable, consideration of transboundary effects will follow the standard approach to EIA, as outlined within **Plate 4.2.2**, with regards to magnitude, significance etc. The assessment will be presented within each aspect chapter of the EIA Report where relevant. A Transboundary Screening Matrix that summarises the potential for transboundary effects to occur in relation to each of the onshore and offshore aspects is provided in **Appendix 4A: Transboundary Screening Matrix**.

Related environmental assessments

Overview

4.2.74 The EIA process is not a standalone assessment with regards to the consenting of the Project. In addition, assessments are required under additional legislation, which will be captured within the consent application for the Project. These are described within **Section 3.6** in **Chapter 3: Legislative and Policy Context**. For consistency of approach, these assessments will draw on the established evidence base, i.e. the results of site-specific surveys studies, and any third-party data and/or information collected to support the Project.

Habitats Regulations Appraisal

4.2.75 HRA, as described within **Section 3.6** in **Chapter 3: Legislative and Policy Context**, considers the potential for likely significant effects (LSE) to arise as a result of a plan or project, which may affect the integrity of the national site network and their associated qualifying features, and can involve up to four stages:

- Stage 1: Screening: This stage identifies the likely impacts upon a national site network of a project or plan, either alone or 'in combination' with other projects or plans and considers whether these impacts are likely to be significant.
- Stage 2: Appropriate Assessment: Where there are likely significant impacts, this stage considers the impacts of the plan or project on the integrity of the relevant national site network sites, either alone or 'in combination' with other projects or plans, with respect to the sites' structure and function and their conservation objectives. Where there are adverse impacts, it also includes an assessment of the potential mitigation for those impacts.
- Stage 3: Assessment of Alternative Solutions: Where adverse impacts (on the integrity of the site) are predicted, this stage examines (whether or not there are) alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the national site network.
- Stage 4: Assessment Where No Alternative Solutions Exist and Where Adverse Impacts Remain: This stage assesses compensatory measures where it is deemed that the

project or plan should proceed for imperative reasons of overriding public interest (IROPI).

- 4.2.76 An HRA is required for the Project, therefore, the Project will provide the Scottish Government with HRA reports, providing the necessary information to undertake all required stages of the HRA. The HRA will be undertaken holistically for the whole Project.
- 4.2.77 As Stage 2 of the HRA requires the findings of the EIA process to enable full assessment, the full HRA reporting will be submitted alongside the EIA Report for the Project. A Screening report, addressing Stage 1, will be submitted subsequently to the Scoping Report.

Flood Risk Assessment

- 4.2.78 The FRA will be carried out in accordance with applicable national planning policies and guidance to ensure the Project is not significantly prone to impacts from flooding, and that it does not increase the probability of flooding elsewhere from a range of sources (including coastal, fluvial, surface water, groundwater and artificial). A high-level overview of the relevant baseline flood risk sources is presented within this Scoping Report see **Section 6.3: Water resources and flood risk**. This baseline assessment will be taken forward and updated at the subsequent EIA Report stage, with the FRA included with the EIA Report as an appendix.
- 4.2.79 Policy 22 of the Approved NPF4 (Scottish Government, 2022b) sets out that development proposals will not increase the risk of surface water flooding to others, or themselves be at risk. Policy 22 of the Approved NPF4 recognises a need to strengthen resilience to flood risk by promoting avoidance of development in areas of flood risk as a first principal and by reducing the vulnerability of existing and future development to flooding. The Planning system should encourage the use of natural flood risk management to provide wider benefits for people and nature (Scottish Government, 2021). It is anticipated that any mitigation required for the protection of any flood risk receptors will be identified and incorporated into the design of the Project during ongoing design evolution and that those measures will be presented in the EIA Report and FRA.

Water Framework Directive

- 4.2.80 The purpose of the WFD assessment is to provide SEPA as the competent authority, with sufficient information to evaluate whether the Project could cause or contribute to the deterioration of the WFD status of any water body, as described within **Section 3.6 in Chapter 3: Legislative and Policy Context**. It also provides for an evaluation of whether the Project could jeopardise the water body achieving good status, and/or whether the Project activities comply with the RBMP. The competent authority must also consider the objectives of any WFD Protected Areas (including SACs, SPAs, bathing waters, and shellfish waters), where relevant. Reporting will follow a standard approach:
- Stage 1: WFD Screening: Identification of the activities associated with the Project that are to be assessed, and determination of which WFD water bodies could potentially be affected through identification of a zone of influence (ZOI).
 - Stage 2: WFD Scoping: For each water body identified in Stage 1, an assessment is carried out to identify the effects and potential risks to quality elements from all activities.
 - Stage 3: WFD Impact Assessment: A detailed assessment of the water bodies and activities carried forward from the WFD screening and scoping stages.

- 4.2.81 The WFD assessment methodology and baseline of waterbodies that could potentially be impacted by the Project are described in **Section 5.2: Marine water and sediment quality** and **Section 6.3: Water resources and flood risk**.
- 4.2.82 With the WFD assessment requiring outputs of the EIA to be completed, the assessment will be submitted alongside the EIA Report for the Project.

Marine Strategy Framework Directive

- 4.2.83 Unlike the WFD, there is no formal guidance or approach to completing an MSFD assessment for a project. As outlined within **Section 3.6** in **Chapter 3: Legislative and Policy Context**, the goal of the MSFD is for an EU Member State's marine waters to reach and/or maintain GES, through adaption of a series of measures, monitored through key indicators, under 11 high level descriptors.
- 4.2.84 The approach to MSFD assessment to be applied to the Project is therefore qualitative and narrative-based, drawing on the findings of the EIA, as applicable to the descriptors, with the objective of the assessment being to determine whether the Project has the potential to influence the UK's ability to achieve or maintain GES within its waters. Each of the 11 descriptors is broadly associated with an aspect addressed within the EIA. For example, consideration of potential effects on biodiversity relates to Descriptors 1 (Biodiversity), 2 (Non-indigenous species), 4 (Food web structures), and 11 (Energy and noise).
- 4.2.85 The MSFD assessment will outline the following:
- MSFD Descriptor;
 - MSFD Descriptor definitions of GES for the relevant MSFD water body;
 - potential effects of the Project, as identified within the EIA, that could relate to MSFD Descriptors;
 - signposting to the relevant chapters of the EIA Report; and
 - a narrative-based assessment of whether these potential effects have the capacity to influence the water body's ability to achieve / maintain GES, taking into account the current status of the water body in relation to the Descriptor.
- 4.2.86 With the MSFD assessment requiring the outputs of the EIA to be completed, the assessment will be submitted alongside the EIA Report for the Project.

Marine Protected Areas assessment

- 4.2.87 The MPA assessment process comprises three steps:
- Step 1: Initial Screening: Is the activity capable of affecting the protected features of a Nature Conservation MPA?
 - Step 2: Initial Screening: Is the activity capable of affecting, other than insignificantly, the protected features of a Nature Conservation MPA?
 - Step 3: Main Assessment: Is there a significant risk of hindering the achievement of the conservation objectives of a Nature Conservation MPA?
- 4.2.88 With the MPA assessment requiring the outputs of the EIA to be completed, the assessment will be submitted alongside the EIA Report for the Project. The MPA Step 1 screening is provided in **Appendix 4B: Nature Conservation Marine Protected Area Assessment**.

European Protected Species risk assessments

- 4.2.89 Under the Conservation (Natural Habitats & Conservation) Regulations 1994 and the Offshore Marine Regulations 2017, it is an offence to:
- deliberately capture, injure or kill an EPS (including all cetaceans);
 - deliberately disturb an EPS; or
 - damage or destroy a breeding site or resting place of an EPS.
- 4.2.90 Disturbance is defined as an activity that impairs the ability of the EPS to survive, breed, rear/nurture their young, to migrate, or an activity that significantly affects the local distribution or abundance of the species.
- 4.2.91 As described in **Chapter 3: Legislative and Policy Context**, EPS licence applications may be needed for the Project where activities are proposed that could result in the disturbance of EPS, such as site investigation, or buoy deployment and surveys.
- 4.2.92 If the risk of injury or significant disturbance cannot be reduced to negligible levels with mitigation, then an EPS licence is required. An EPS licence can only be granted subject to the following three tests being met (NatureScot, 2022):
- Test 1: There must be a licensable purpose for which licences can be granted. The reason for the licence must relate to one of several purposes specified in Regulation 44(2) of the Conservation (Natural Habitats &c.) Regulations 1994 (as amended).
 - Test 2: There must be no satisfactory alternative.
 - Test 3: The proposed action must not be detrimental to maintaining the species at 'favourable conservation status'. In considering this test, NatureScot and MS-LOT will take into account any possible impacts of development proposals on the favourable conservation status of the relevant species in its native range.
- 4.2.93 The Project is responsible for providing risk assessments and supporting information to NatureScot and MS-LOT in order to facilitate their decision-making in relation to an EPS licence application.
- 4.2.94 The Project has already provided risk assessments and supporting information to MS-LOT in relation to EPS licence applications for early survey works in the marine environment. The Project will continue to engage with NatureScot and MS-LOT in the event that any further EPS licence applications are required.

4.3 Structure of the Environmental Impact Assessment Report (EIA Report)

- 4.3.1 At this stage it is anticipated that the EIA Report will comprise the following structure set out in **Table 4.3.1**.
- 4.3.2 This is based on a single EIA Report for the whole Project. The overall structure will include the offshore aspects, onshore aspects and aspects that cover the whole project, including military and civil aviation and telecommunication, socio-economics, greenhouse gases and climate resilience.

Table 4.3.1 Draft structure of the EIA Report

Volume/chapter	Content
Volume 1	Non -Technical Summary
Volume 2	Environmental Impact Assessment Report
Chapter 1	Introduction
Chapter 2	Legislative and Policy Context
Chapter 3	The Project
Chapter 4	Site Selection and Alternatives
Chapter 5	Approach to EIA
Chapter 6 – 18	Environmental aspects offshore, including: <ul style="list-style-type: none"> • Marine Geology, Oceanography, and Physical Processes; • Marine Water and Sediment Quality; • Underwater Noise and Vibration; • EMF; • Benthic, Epibenthic, and Intertidal Ecology; • Marine Mammals; • Offshore and Intertidal Ornithology; • Fish and Shellfish Ecology; • Commercial Fisheries; • Shipping and Navigation; • Marine Archaeology and Cultural Heritage; • Seascape, Landscape and Visual; and • Infrastructure And Other Marine Users.
Chapter 19 – 27	Environmental aspects onshore, including: <ul style="list-style-type: none"> • Ground Conditions and Contamination; • Air Quality; • Water Resources and Flood Risk; • Land Use; • Terrestrial Ecology and Ornithology; • Onshore Archaeology and Cultural Heritage; • Onshore Noise and Vibration; • Traffic and Transport; and • Landscape and Visual.
Chapter 28 – 31	Whole project environmental aspects, including: <ul style="list-style-type: none"> • Climate Resilience; • Greenhouse Gases; • Socio-economics; • Military and Civil Aviation and Telecommunication; and • Inter-related Effects.
Chapter 32	Summary and Conclusions
Volume 3	EIA Report Figures
Volume 4	EIA Report Appendices
Volume 5	Confidential EIA Report Appendices

4.4 References

Construction (Design and Management) Regulations 2015. (SI 2015 51). [online] Available at: <https://www.legislation.gov.uk/ukxi/2015/51/contents/made> [Accessed: 1 July 2022].

Department of Energy and Climate Change, (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. July 2011. London: The Stationery Office.

Department of Energy & Climate Change (DECC), (2012). *Power Lines: Demonstrating compliance with EMF public exposure guidelines – a voluntary code of practice*. [online] Available at: <https://www.gov.uk/government/publications/demonstrating-compliance-with-emf-public-exposure-guidelines-voluntary-code-of-practice> [Accessed: 24 June 2022].

Electricity Act 1989. (c.29). [online] Available at: <https://www.legislation.gov.uk/ukpga/1989/29/contents> [Accessed 23 June 2022].

Health and Safety at Work etc. Act 1974. (c. 37). [online] Available at: <https://www.legislation.gov.uk/ukpga/1974/37/contents> [Accessed: 1 July 2022].

Health and Safety Executive, (2019). *Regulatory expectations for emergency response arrangements for the offshore renewable energy industry*. [online] Available at: <https://www.hse.gov.uk/offshore/infosheets/is2-2019.pdf> [Accessed 05 August 2022].

Institute of Environmental Management and Assessment (IEMA), (2015). *Environmental Impact Assessment Guide to Shaping Quality Development*. [online] Available at: <https://www.iaia.org/pdf/wab/IEMA%20Guidance%20Documents%20EIA%20Guide%20to%20Shaping%20Quality%20Development%20V6.pdf> [Accessed 23 June 2022].

Institute of Environmental Management and Assessment (IEMA), (2017). *Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice*. [online] Available at: <https://www.iema.net/resources/reading-room/2017/07/18/delivering-proportionate-eia> [Accessed: 24 June 2022].

Institute of Environmental Management and Assessment (IEMA), (2020). *Major accidents and Disasters in EIA: A Primer*. [online] Available at: <https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer> [Accessed: 11 July 2022].

International Commission on Non-Ionizing Radiation Protection (ICNIRP), (2020). *ICNIRP Guidelines for Limiting Exposure to Electromagnetic Field (100 kHz to 300 GHz)*. Health Phys, 118(00):000-000.

Marine and Coastal Access Act 2009. (c. 23). [online] Available at: <https://www.legislation.gov.uk/ukpga/2009/23/contents> [Accessed: 23 June 2022].

Marine (Scotland) Act 2010. (asp. 5). [online] Available at: <https://www.legislation.gov.uk/asp/2010/5/contents> [Accessed 24 June 2022].

NatureScot, (2022). *European protected species licensing*. [online] Available at: <https://www.nature.scot/professional-advice/protected-areas-and-species/licensing/european-protected-species-licensing> [Accessed 15 July 2022].

Planning Inspectorate, (2018a). *Advice Note Nine: Rochdale Envelope (Version 3)*. [online] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/> [Accessed: 18 July 2022].

Planning Inspectorate, (2019). *Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Version 2)*. [online] Available at:

<https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/> [Accessed: 11 July 2022].

Planning Inspectorate, (2020). *Advice Note Twelve: Transboundary Impacts and Process* (Version 6). [Online] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-twelve-transboundary-impacts-and-process/> [Accessed: 11 July 2022].

RenewableUK, (2013). *Cumulative Impact Assessment Guidelines – Guiding Principles for Cumulative Impact Assessment in Offshore Wind Farms*. [online] Available at: <https://tethys.pnnl.gov/sites/default/files/publications/Cumulative-Impact-Assessment-Guidelines.pdf> [Accessed: 24 June 2022].

RenewableUK, (2014). *Offshore Wind and Marine Energy Health and Safety Guidelines*. [online] Available at: https://cdn.ymaws.com/www.renewableuk.com/resource/collection/AE19ECA8-5B2B-4AB5-96C7-ECF3F0462F75/Offshore_Marine_HealthSafety_Guidelines.pdf [Accessed: 05 August 2022].

Scottish Government, (2013). *Planning Advice Note 1/2013: Environmental Impact Assessment*. [online] Available at: <https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/> [Accessed: 24 June 2022].

Scottish Government, (2017). *Planning Circular 1/2017: Environmental Impact Assessment Regulations*. [online] Available at: <https://www.gov.scot/publications/planning-circular-1-2017-environmental-impact-assessment-regulations-2017/pages/3/> [Accessed: 24 June 2022].

Scottish Government, (2018). *Offshore wind, wave and tidal energy applications: consenting and licensing manual*. [online] Available at: <https://www.gov.scot/publications/marine-scotland-consenting-licensing-manual-offshore-wind-wave-tidal-energy-applications/pages/2/> [Accessed: 24 June 2022].

Scottish Government, (2022a). *Guidance for Applicants on Using the Design Envelope for Applications under Section 36 of the Electricity Act 1989*. [online] Available at: <https://www.gov.scot/publications/guidance-applicants-using-design-envelope-applications-under-section-36-electricity-act-1989/documents/> [Accessed 11 July 2022].

Scottish Government, (2022b). *National Planning Framework 4: Revised Draft*. [online] Available at: <https://www.gov.scot/publications/national-planning-framework-4-revised-draft/documents/> [Accessed 15 November 2022].

The Conservation of Offshore Marine Habitats and Species Regulations 2017. (SI 2017 1013). [online] Available at: <https://www.legislation.gov.uk/uksi/2017/1013/made/data.pdf> [Accessed: 12 July 2022].

The Conservation (Natural Habitats, &c.) Regulations 1994. (SI 1994 2716). [online] Available at: <https://www.legislation.gov.uk/uksi/1994/2716/made/data.pdf> [Accessed 8 July 2022].

The Control of Electronic Fields at Work Regulations 2016. (SI 2016 588). [online] Available at: <https://www.legislation.gov.uk/uksi/2016/588/made/data.pdf> [Accessed: 1 July 2022].

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. (SI 2017 101). [online] Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents/made> [Accessed 23 June 2022].

The Marine Licensing (Pre-application Consultation) (Scotland) Regulations 2013. (SI 2013 286). [online] Available at: <https://www.legislation.gov.uk/ssi/2013/286/made> [Accessed 8 July 2022].

The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017. (SI 2017 115). [online] Available at: <https://www.legislation.gov.uk/ssi/2017/115/contents/made> [Accessed: 1 July 2022].

The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. (SI 2017 102). [online] Available at: <https://www.legislation.gov.uk/ssi/2017/102/contents/made> [Accessed: 1 July 2022].

The Town and Country Planning (Pre-application Consultation) (Scotland) Amendment Regulations 2021. [online] Available at: <https://www.legislation.gov.uk/ssi/2021/99/made/data.pdf> [Accessed 1 July 2022].

Town and Country Planning (Scotland) Act 1997. (c. 8). [online] Available at: <https://www.legislation.gov.uk/ukpga/1997/8/contents> [Accessed: 24 June 2022].

The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013. [online] Available at: <https://www.legislation.gov.uk/ssi/2013/155/made> [Accessed: 8 July 2022].

UK Centre for Ecology and Hydrology, (2022). *Cumulative Effects Framework for Key Ecological Receptors: Project Overview.* [online] Available at: <https://www.ceh.ac.uk/our-science/projects/cumulative-effects-framework-key-ecological-receptors> [Accessed: 10 August 2022].

5. Environmental Aspects Offshore

5.1 Marine geology, oceanography and physical processes

Introduction

- 5.1.1 The marine geology, oceanography, and physical processes assessment will consider the potential likely significant effects on marine physical process receptors that may arise from the construction, operation and decommissioning of the offshore Project that are seaward of Mean High Water Springs (MHWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the likely significant effects to be considered, and how these likely significant effects will be assessed for the purpose of the EIA.
- 5.1.2 Marine geology, oceanography, and physical processes is a collective term for the following:
- water levels;
 - currents;
 - waves (and winds);
 - sediments and geology (including seabed sediment distribution and sediment transport);
 - seabed geomorphology; and
 - coastal geomorphology.
- 5.1.3 Marine geology, oceanography, and physical processes interfaces with other aspects. For instance, the mobilisation of sediment during project construction activities may result in the creation of suspended sediment plumes. The subsequent settling of material to the bed from such plumes may result in smothering of sensitive benthic habitats which are considered in **Section 5.5: Benthic, epibenthic and intertidal ecology**. This marine geology, oceanography and physical processes section should therefore be considered alongside these other sections, namely:
- **Section 5.2: Marine water and sediment quality:** As a principal potential source of changes in water quality will be sediment mobilisation and as the magnitude and extent of effects of such mobilisation and of any water discharges on marine water quality will depend on physical processes, the information from this Section will inform the marine water quality assessment.
 - **Section 5.5: Benthic, epibenthic and intertidal ecology:** Changes to marine geology, oceanography and physical processes have the potential to affect potentially sensitive benthic, epibenthic, and intertidal ecology receptor species and habitats. The information from this Section will inform the benthic, epibenthic and intertidal ecology assessment.
 - **Section 5.6: Marine mammals:** Marine mammal receptor species are potentially sensitive to changes in physical processes, therefore information from this Section will inform the marine mammal assessment.
 - **Section 5.7: Offshore and intertidal ornithology:** There are potential pathways of effect from marine processes physical parameters on potentially sensitive marine ornithological receptor species, therefore information from this Section will inform the offshore and intertidal ornithology assessment.

- **Section 5.8: Fish and shellfish ecology:** Changes to marine geology, oceanography and physical processes have the potential to directly or indirectly impact fish and shellfish features due to the reliance on physical processes during certain stages of their lifecycle. Therefore, the information from this assessment will be used to inform the fish and shellfish ecology section.
- **Section 5.9: Commercial fisheries:** Changes to marine geology, oceanography and physical processes may affect potentially sensitive commercial fisheries receptor species, therefore information from this Section will inform the commercial fisheries assessment.
- **Section 5.10: Shipping and navigation:** This Section describes pathways of effect from marine processes physical parameters on potentially sensitive shipping and navigation receptors.
- **Section 5.11: Marine archaeology and cultural heritage:** This Section describes pathways of effect from marine processes physical parameters on potentially sensitive marine archaeology and cultural heritage receptors. Due to the potential for altered marine processes to affect marine archaeological remains, this section will be used to inform the marine archaeology and cultural heritage assessment.
- **Section 5.13: Infrastructure and other marine users:** This Section describes pathways of effect from marine processes physical parameters on infrastructure and other marine users.
- **Section 6.3: Water resources and flood risk:** Changes to marine processes physical parameters may result in potential changes to flood risk. Therefore, information from this assessment will inform the water resources and flood risk assessment.
- **Section 7.1: Climate resilience:** The interference with climate resilience with marine geology, oceanography and physical processes is captured in the In-Combination Climate Impacts (ICCI) assessment.

5.1.4 The interlinkages between these aspects and marine geology, oceanography and physical processes are considered within the respective aspect sections.

Legislation, and policy context

5.1.5 This Section identifies the relevant legislative and policy context which has informed the scope of the marine geology, oceanography, and physical processes assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual international, national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.

5.1.6 In order to provide a robust evidence base, **Table 5.1.1** below presents a summary of legislation and policies relevant for the marine geology, oceanography and physical processes assessment for which this Section seeks to demonstrate compliance. This Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. **Table 5.1.1** does not quote the policies in full but rather states the relevance to this Section.

Table 5.1.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
The Conservation (Natural Habitats, &c.) Regulations (1994) (and amendments)	<ul style="list-style-type: none"> Defines the species, habitats and types of sites that receive legal protection and described the protection that is afforded.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crisis.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development, many of which will need to be taken into consideration with the cumulative effects assessment. Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector.
Scottish Planning Policy (2014) - Paragraph 169	<ul style="list-style-type: none"> Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> net economic impacts; scale of contribution to renewable energy generation; effect on greenhouse gas emissions; cumulative impacts; impacts on communities and individual dwellings; landscape and visual; natural heritage; carbon rich soils impacts; impacts on historic environment; impacts on road traffic; and effects on hydrology.
National Policy Statements (NPS) (2011)	<ul style="list-style-type: none"> The National Policy Statement for renewable energy infrastructure (EN-3) and the National Policy Statement for electricity networks infrastructure (EN-5) both make reference to the need for assessment of marine geology, oceanography and physical processes.

Relevant legislation and policy	Relevance to the assessment
Marine Policy	
Sectoral Marine Plan - Offshore Wind Energy (2020)	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. • Section 4.1 lists a range of potential negative impacts identified through plan-level SEA, HRA and SEIA which require further consideration through project level assessments, including the following of relevance to the marine geology, oceanography and physical processes scoping assessment and EIA: <ul style="list-style-type: none"> ▶ <i>“loss of/damage to marine and coastal habitats;</i> ▶ <i>effects on subsea geology, sediments and coastal processes arising from changes in hydrodynamics and existing wave regimes; and</i> ▶ <i>effects on landscape and coastal characters and visual receptors”.</i> <p>These potential negative impacts will be avoided or greatly minimised through optioneering and/or the incorporation of environmental mitigation measures.</p>
Scottish National Marine Plan (2015) <ul style="list-style-type: none"> - GEN 8 Coastal process and flooding - GEN 9 - Natural Heritage - GEN 21 - Cumulative Impacts - CABLES 2 	<ul style="list-style-type: none"> • GEN 8 requires that developments and activities in the marine environment should be resilient to coastal change and flooding, and not have unacceptable adverse impact on coastal processes or contribute to coastal flooding • GEN 9 requires development to comply with legal requirements for protected areas; not to result in significant impact on the national status of Priority Marine Features (PMFs) (which includes geodiversity features); and to protect, and, where appropriate, enhance the health of the marine area. • GEN 21 requires for cumulative impacts affecting the ecosystem to be addressed. • CABLES 2 requires the following to be taken into account when reaching decisions regarding cable development: cables should be suitably routed to provide sufficient requirements for installation and cable protection; <ul style="list-style-type: none"> ▶ new cables should implement methods to minimise impacts on the environment, seabed and other users; ▶ where burial is demonstrated not to be feasible, cables may be suitably protected; and ▶ the need to reinstate the seabed, undertake post-lay surveys and

Relevant legislation and policy	Relevance to the assessment
	monitoring and carry out remedial action where required.
UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. Requires that the use of the marine environment benefits society as a whole, contributing to resilient and cohesive communities that can adapt to coastal erosion and flood risk, as well as contributing to physical and mental wellbeing; Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. States that offshore wind farm fixed bottom foundation designs are likely to influence hydrodynamics and consequent sediment movement.

Local Policy

Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy R1 Special rural areas Policy E2 Landscape Policy E1 Natural Heritage <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>
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Technical guidance

5.1.7 Technical guidance that has been used to define the assessment is set out in **Table 5.1.2**.

Table 5.1.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Environmental impact assessment for offshore renewable energy projects (BSI, 2015)	Provides a summary of marine physical process impact pathways, potential assessment methods and tools. Also provides guidance on the development of impact assessment matrices. The potential impact assessment pathways identified in this guidance are all considered later in this document, within the likely significant effects section.
Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects (CEFAS, 2012)	These guidelines assist in the design, review and implementation of environmental data collection and analytical activities associated with all stages of offshore renewable energy developments. There is a specific section covering 'physical and sedimentary process studies', setting out guidance on data acquisition and adequacy, survey design and impact assessment techniques (including modelling).

Guidance reference	Relevance to the assessment
	The scope of the Project specific geophysical and oceanographic surveys are consistent with this guidance. They will allow for the collection of suitable data to underpin robust analysis of sediment transport processes within the study area.
Coastal Process Modelling for Offshore Wind farm Environmental Impact Assessment: Best Practice Guide (ABPmer & HR Wallingford 2009)	This report provides an update to existing best practice guidance on the application and use of numerical models to predict the potential impact from offshore wind farms on coastal processes. As such, it provides guidance on the scoping and design stages of the coastal processes part of an EIA, as well as on the requirements for numerical modelling, and how to assess the extent and quality of an numerical modelling work proposed and undertaken. This guidance will be used to inform set-up, calibration and validation of the numerical wave model which will be developed to assess the potential blockage of waves associated with floating platforms.
Guidelines in the use of metocean data through the lifecycle of a marine renewables development (CIRIA, 2008)	<p>This guide has been developed to identify and recommend on the uses of metocean data through the life cycle of a marine renewable energy development. It includes a review of metocean data types, data sources and identifies the importance of good data management.</p> <p>This guidance will be used to help assess the adequacy of metocean data used to inform the assessment.</p>
Offshore Windfarms: Guidance note for Environmental Impact Assessment in Respect of FEPA and CPA requirements (CEFAS, 2004)	<p>This guidance provides scientific guidance to those involved with the gathering, interpretation and presentation of data within an EIA. The marine physical process parameters which require assessment are set out and divided into direct and indirect impacts, with guidance also given regarding the key parameters which need documenting in the marine processes baseline. Recommendations for mitigation and monitoring are also set out.</p> <p>The baseline description which will be produced as part of the EIA will comply with the above guidance, whilst the assessment will also take into consideration the full range of marine physical processes parameters set out in CEFAS (2004).</p>

Study area

- 5.1.8 The study area for the marine geology, oceanography, and physical processes assessment is defined in **Figure 5.1.1: Marine geology, oceanography and physical processes study area** in **Appendix 1A**. It includes the Option Agreement Area (OAA), the entire marine area within the Scoping Boundary, and the wider marine area surrounding the Project. The study area has been informed by expert judgement, based on understanding of region-scale marine geology, oceanography, and physical processes, in particular that of the prevailing wave direction, tidal excursion distances and sediment transport pathways. **Figure 5.1.1** in **Appendix 1A** also includes a spring tidal excursion ellipse buffer around the Scoping Boundary. This represents the approximate distance over which water is advected during one spring flood or ebb tide and represents the likely maximum extent of potential sediment plume impacts.
- 5.1.9 The study area overlaps with a number of nationally and internationally designated nature conservation sites, some of which are designated on the basis of the geological and geomorphological features contained within them. These include the Southern Trench Marine Protected Area and Roseheartly to Fraserburgh Coast Site of Special Scientific Interest, both designated in part for the geodiversity features they contain.

- 5.1.10 The study area will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

Consultation

- 5.1.11 This Section has been informed by engagement and discussion with various stakeholders. **Table 5.1.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 5.1.3 Consultation

Consultee	Comments and considerations	How this is accounted for
Marine Scotland	Consideration should be given to the potential for the Project to influence water column stratification and any associated frontal systems	The Buchan front has been included as a receptor. Its location is shown in Figure 5.1.1 in Appendix 1A .
Marine Scotland Licensing Operations Team (MS-LOT) and Marine Scotland Science (MSS), NatureScot and RSPB	<p>An offshore EIA Scoping workshop was held on 29th and 30th September 2022. During a technical break-out session and after the workshop, the Project team submitted the following written questions to MS-LOT and MSS in relation to marine geology, oceanography, physical processes:</p> <ul style="list-style-type: none"> Do the regulators agree that the proposed study area is suitable for use? Do the regulators agree with the data sources, impact pathways and approach to physical processes modelling presented in the workshop (ie as reported upon in this Section)? Are there any relevant data sources that would be specifically expected to be used within the physical processes assessment? Are there any data sources that should be considered that are not noted in the slides (ie as reported upon in this Section)? Do the regulators agree with the proposed approach to the assessment of future climate change (if necessary), seeking input specifically on future epoch(s) and methodology (i.e. use of UKCP18 / RCP scenario / percentile / increased storminess etc) and is there anything further that should be considered in relation to future climate baseline? 	MS-LOT and MSS confirmed to the Project team that they will respond to these questions in the advisory response to be provided during the Scoping Report consultation process. This is understood to mean via the Scoping Opinion. The responses will therefore be addressed in the EIA Report.

Assessment methodology

Introduction

- 5.1.12 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this marine geology, oceanography, and physical processes section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to

address the specific needs of the marine geology, oceanography, and physical processes assessment.

5.1.13 In most cases, marine geology, oceanography, and physical processes are not themselves receptors. They are instead, pathways that have the potential to indirectly impact other environmental receptor groups. Accordingly, whilst potential changes assessed and reported in the marine geology, oceanography, and physical processes section may not themselves be significant, they may have potential to cause significant impacts to the receptors identified by other EIA aspects, notably those identified within the water quality and benthic ecology sections.

5.1.14 Whilst physical processes can largely be considered as pathways, a small number of features have been identified as potentially sensitive physical processes receptors. These are:

- the coast; and
- seabed areas contained within designated baseline conditions.

Baseline conditions

Data sources

Table 5.1.4 Key sources of marine geology, oceanography, and physical processes data

Source	Date of data	Summary	Coverage of study area
Project-specific geophysical survey	2022 – 2023	Geophysical survey of the MarramWind OAA (completed 2022) and offshore export cable corridor (planned spring/summer 2023). Both datasets will be available to inform the EIA.	Full coverage of the study area.
Marine Scotland Data Portal (Marine Scotland, 2022b)	Accessed 2022	Data layers of bathymetry, ocean climate, waves, sea level, seabed geology, surface and subtidal sediments. (Available at: https://marine.gov.scot).	Partial coverage of the study area.
National Tide and Sea Level Facility (2022)	Accessed 2022	Tidal water levels from point locations within the study area. (Available at: https://www.ntsif.org).	Partial coverage of the study area.
British Oceanographic Data Centre (2022)	Accessed 2022	Hydrodynamic data (inc. current speed & direction) from point locations within the study area. (Available at: https://www.bodc.ac.uk/).	Partial coverage of the study area.
CEFAS WaveNet data (2022)	Accessed 2022	Wave records from point locations within the study area. (Available at: https://www.cefasc.co.uk/cefasc-data-hub/wavenet/).	Partial coverage of the study area.

Source	Date of data	Summary	Coverage of study area
ABPmer SEASTATES (2022)	1979 to 2022	Modelled hindcast wave and hydrodynamic data from across the study area. (Available at: https://www.seastates.net/).	Full coverage of the study area.
Hydrodynamic and wave data from the Marine Renewables Atlas	2008	Modelled hindcast wave and hydrodynamic data from across the study area (Available at: ABPmer <i>et al.</i> (2008)).	Full coverage of the study area.
UKCP18 climate change projections	2018	Sea level rise predictions for coastal locations within the study area. (Available at: Met Office (2018)).	Partial coverage of the study area.
British Geological Survey (BGS) offshore geindex (2022a)	Accessed 2022	Seabed sediment maps (based on Folk classification) and borehole records from point locations within the study area. (Available at: https://www.bgs.ac.uk/GeoIndex/offshore.htm).	Full coverage of the study area.
Strategic Environmental Assessment Data Portal (BGS, 2022b)	Accessed 2022	Seabed mapping data collected on behalf of the Department of Trade and Industry (DTI) to support Strategic Environmental Assessment in Project Area 5. (Available at: https://webapps.bgs.ac.uk/data/sea/app/search).	Partial coverage of the study area.
United Kingdom Hydrographic Office (UKHO, 2021)	Accessed 2022	Bathymetric data for the study area in the form of multibeam and single beam data, as well as Admiralty Charts. (Available at: https://www.gov.uk/guidance/the-ukho-archive).	Full coverage of the study area.
Suspended Sediment Climatology around the UK	2016	Monthly and seasonal Suspended Particulate Matter maps for the study area. (Available at: CEFAS (2016)).	Full coverage of the study area.
Scottish Coastal Observatory (2022)	Accessed 2022	Monitoring data collected as part of the Scottish Coastal Observatory, covering a range of marine environmental variables including temperature and salinity. (Available at: https://marine.gov.scot/data/scottish-coastal-observatory-data).	Partial coverage of the study area.
Scottish Environment Protection Agency (2022)	Accessed 2022	A range of datasets related to the environment including flood risk management. (Available at: https://www.sepa.org.uk/).	Partial coverage of the study area.

Source	Date of data	Summary	Coverage of study area
Dynamic Coast: The National Overview (2022)	2021	The Dynamic Coast project aims to provide the strategic evidence base on the extent of coastal erosion in Scotland. (Available at: https://www.dynamiccoast.com/).	Partial coverage of the study area.
Scottish Remote Sensing Portal (2022)	Accessed 2022	LiDAR datasets to inform past coastal change. (Available at: https://remotesensingdata.gov.scot/).	Partial coverage of the study area.
Key publications	[various]	Public and grey literature considering coastal morphology and behaviour at sensitive coastal locations within the study area e.g. Hansom <i>et al.</i> (2017); Hansom <i>et al.</i> (2004) and Baxter <i>et al.</i> (2011).	Full coverage of the study area.

Current Baseline

Bathymetry

- 5.1.15 Bathymetry within the study area is highly variable, with large-scale morphological seabed features interrupting the general increase in depth with distance offshore (**Figure 5.1.2: Seabed bathymetry within the marine geology, oceanography, and physical processes study area** in **Appendix 1A**). Water depths within the OAA are typically in the range of 87 to 117.5m below Lowest Astronomical Tide (LAT), with the shallowest water depths located in central areas and deepest areas along the eastern margin. Across much of the marine geology, oceanography, and physical processes study area, water depths are more typically in the range 50 to 100m LAT, although increase to over 200m LAT at the eastern end of the Southern Trench in the Outer Moray Firth.

Hydrodynamic regime

- 5.1.16 The OAA is in a region characterised by semi-diurnal tides, with a mean spring range of approximately 1.7 and 1.9m and a mean neap range of approximately 0.8 to 1.0m. Tidal range increases to the southwest, with a mean spring range of approximately 3.1 to 3.2m at the coast within the Scoping Boundary (ABPmer *et al.*, 2008).
- 5.1.17 Tidal currents are strong near the coast within the study area, reaching speeds of approximately 1.5m/s during peak spring flows. Speeds decrease with distance offshore and are more typically around 0.3 to 0.4m/s in the OAA (ABPmer *et al.*, 2008).
- 5.1.18 Tidal flow is relatively rectilinear within the OAA, with tidal current direction to the north during the ebb and to the south during the flood. Closer inshore, flows become more aligned to the coast, with spring tidal excursion distances also increasing (to over 10km) in response to the faster current speeds (ABPmer *et al.*, 2008).
- 5.1.19 The speeds and directions of currents near the bed (which are important for bedload sediment transport) are influenced by the interactions of tidal currents and currents generated from swell- and wind-driven currents with the seabed topography. Waves generate wave-orbital currents: these currents are non-directional but in stormy conditions may be an order of magnitude higher than the directional peak tidal currents (Holmes *et al.*,

2004). This is likely to be important within the study area because the orbital currents from waves will mobilise the seabed sediments in relatively deep water where tidal currents otherwise could not do so.

Wind and wave regime

- 5.1.20 The wave climate within the study area is controlled by a combination of the wind regime and its relative position within the Outer Moray Firth and wider North Sea basin.
- 5.1.21 Winds in the region most frequently come from the south (just under 20% of the time) but also regularly come from south-westerly around to north-westerly directions (accounting for approximately 50% of the record) (**Plate 5.1.1**). Stronger winds (>16m/s) tend to also come from these directional sectors (ABPmer *et al.*, 2022). The local wind climate along the coast depends to a large extent on the degree of shelter from winds from the north and east (Barne *et al.*, 1996).
- 5.1.22 Waves within the study area are a combination of locally generated wind waves and waves generated elsewhere in the North Sea. Waves predominantly come from northerly and southerly directions (approximately 25% of time each), and relatively frequently from north westerly directions (approximately 15% of time each) (**Plate 5.1.1**) (ABPmer *et al.*, 2022).
- 5.1.23 Wave heights across the study area will tend to reduce with distance towards the coast due primarily to decreasing water depth. Close to shore, the local predominant wave direction also varies in response to sheltering and refraction.

Stratification and frontal systems

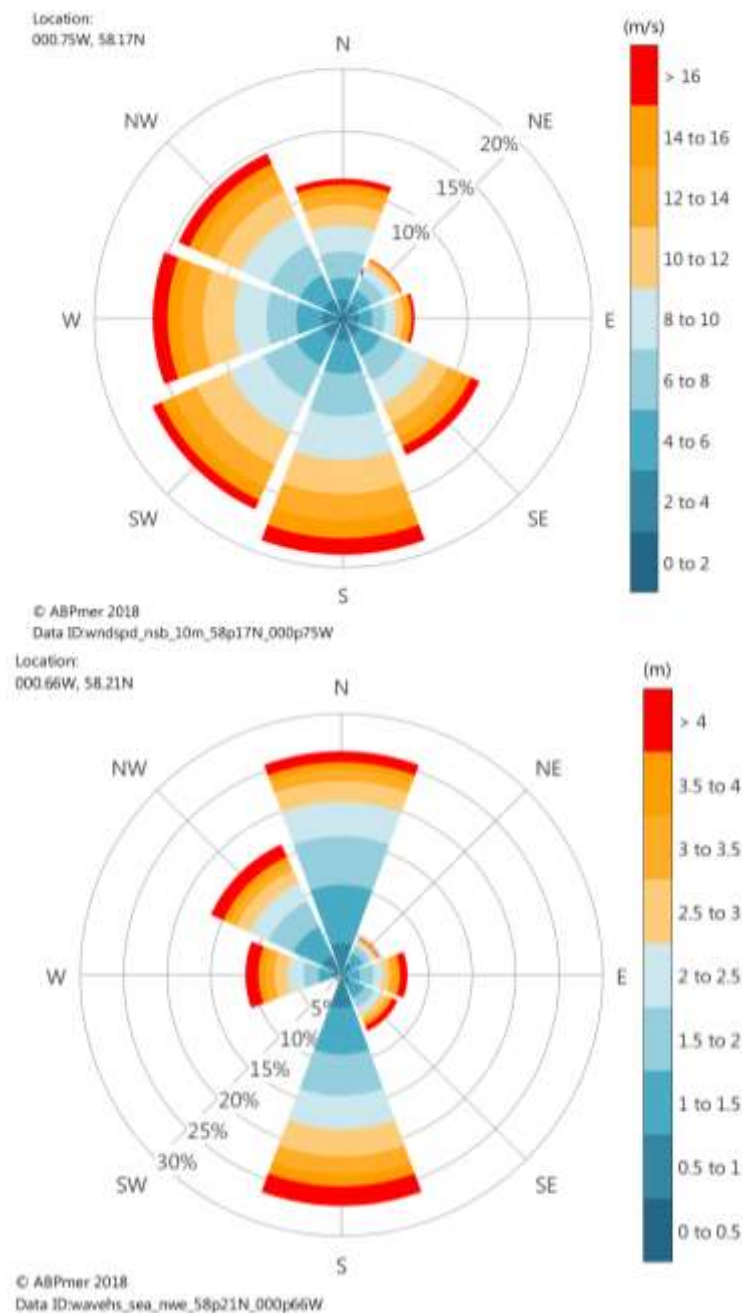
- 5.1.24 Stratification is a term used to describe when two distinct layers occupy the vertical water column in the sea; the near-surface layer being less dense than the near-bed one. This can be due to differences in temperature (warm layer overlying a cooler layer), salinity (fresh water overlying saltier water), or both (Marine Scotland, 2022a). A 'front' is an area separating two distinct water masses with different densities. A pronounced tidal front (the Buchan front) is found in a transitional zone off Buchan and the Aberdeenshire coast, where shallow coastal water meets deeper, seasonally stratified North Sea water (Edwards & John, 1996).

Geology and sediments

- 5.1.25 The geological structure of the underlying bedrock in this region is characterised by a complex pattern of down-faulted basins separated by platforms (relatively uplifted areas). The uplifted platforms formed approximately 420 million years ago and underlie the modern coastline and nearshore parts of the study area. The Mesozoic basins found further offshore formed more recently during faulting, approximately 142 to 250 million years ago (Holmes *et al.*, 2004). The modern-day seabed configuration reflects the combination of this large-scale geological structure and burial by younger sediments, in particular those deposited during the Quaternary period in response to the growth and decay of Pleistocene ice sheets and associated changes in relative sea level.
- 5.1.26 Seabed sediments across the study area are highly variable, with coarse (sand and gravels) and fine (muddy) grained sediments present. The distribution broadly reflects spatial variation in current speeds, with coarser material encountered closer to the coast (where current speeds are high) and finer material found further offshore, including within the OAA (where current speeds are much lower). Close to the shore, the very high current speeds have scoured the seabed, leaving exposed areas of bedrock in places (Gafeira *et al.*, 2010).

- 5.1.27 A lack of major river sediment input and the resistance of most of the shorelines to erosion, has resulted in only minor amounts of clastic sediment (rock) input from the coastal areas to offshore areas over the last 10,000 years. This, coupled with strong tidal and non-tidal currents, has provided favourable environments for the proliferation of calcareous seabed biota meaning in places the biogenic carbonate content of the sand fraction in seabed sediments may comprise up to 50% (Holmes *et al.*, 2004).

Plate 5.1.1 Rose plots of wind (top) and significant wave height and direction (bottom) for the period 1979 to 2009, for a nominal location within the Option Agreement Area (Source: ABPmer, 2018).



Geomorphology and sediment transport

- 5.1.28 A range of active and relict (i.e. historic/ no longer active) bedforms and geomorphological features are present within the study area, reflecting contemporary seabed processes and past glacial and geological activity. Sand wave fields are present in the south of the study area (BGS, 1984). Given the tidal current characteristics in this region, it is understood that these features have the potential to be mobile although this will be investigated further, through consideration of the Project-specific geophysical survey data. Pockmarks - shallow seabed hollows originating from the release of shallow gas or fluids at the sediment/water interface – are also known to be present in the study area, including within the offshore export cable corridor and in waters immediately adjacent to the OAA (Judd, 2001).
- 5.1.29 The most distinctive seabed feature within the study area is the Southern Trench, located in the Outer Moray Firth, running parallel to the Aberdeenshire Coast. The main trench and its sub-trenches are of glacial origin, formed from at least two erosion events in different directions (Holmes et al. 2004; Brooks et al. 2011).
- 5.1.30 Bedload sediment transport is largely to the south in central/ northern areas of the study area and to the north in southern parts of the study area. These region-scale patterns are driven by tidal asymmetry and result in the development of a bed load convergence zone off the coast of Peterhead, characterised by net long term sediment accretion. Wave driven transport dominates offshore, where tidal currents are weaker.
- 5.1.31 Sediment transport at the coast is described within the context of coastal cells and sub-cells in Ramsay and Brampton (2000a,b). The study area is within sub-cell 2d (Cairnbulg Point to Girdle Ness) and sub-cell 3a (Portknockie to Cairnbulg Point), with a major cell divide at Cairnbulg Point. Within sub-cell 2d, net littoral drift is low, as northward wave-induced drift is generally cancelled-out by southward tidal currents. Within sub-cell 3a, there are many small pocket beaches that tend to be isolated from each other little accretion and little evidence of significant longshore drift (Barne et al., 1996). Longshore sediment transport is dominated by wave action but tidal currents, particularly at high tide, may also transport sediment.

Coastal characteristics

- 5.1.32 The coastline in the study area extends from Troup Head (in the northwest) to the River Ythan (in the southeast). Rocky / cliffed coastlines which are resilient to marine erosion dominate much of the study area. However, extensive sandy beaches with accompanying dune systems are present between Cairnbulg Point and Peterhead and are located within the Loch of Strathbeg SSSI.
- 5.1.33 Flood Risk Management Plans for the North East Local Plan District are set out in SEPA (2021a). SEPA has included consideration of coastal erosion in the flood risk management plans by identifying areas that are likely to be susceptible to erosion and where erosion can exacerbate flood risk. Most of the coastline within the study area is undefended, reflecting (at least in part) its resilience to erosion. However, localised artificial defences are in place, especially around the larger coastal settlements of Peterhead and Fraserburgh. Present Scottish Planning Policy guidance is that new development requiring new defences against coastal erosion or coastal flooding will not be supported except where there is a clear justification for a departure.

Designated sites

- 5.1.34 The study area contains several nationally and internationally designated sites (**Figure 5.1.1 in Appendix 1A**). There are sites for which geological and geomorphological characteristics are a key reason for their designation such as the Rosehearty to Fraserburgh

Coast SSSI. The Southern Trench Marine Protected Area (MPA) is similarly designated for both its biodiversity and geodiversity interests.

- 5.1.35 Other coastal and offshore sites (such as Turbot Bank MPA) are designated for the habitats they contain rather than for the presence of geological and geomorphological features. However, changes to the physical characteristics of these sites have the potential to impact the habitats they support and therefore consideration will be given in the marine geology, oceanography, and physical processes assessment.

Future baseline

- 5.1.36 The baseline is expected to evolve in response to natural variation (for example, the lunar nodal cycle, North Atlantic Oscillation etc), wider changes in climate expected over the lifetime (but in the absence) of the Project, and anthropogenic management of the coast. These are discussed below.
- Mean sea level in the marine geology, oceanography, and physical processes study area is likely to rise slightly over the lifetime of the Project. This change is generally accepted to include contributions from global eustatic changes in mean sea level and because of regionally varying vertical (isostatic) adjustments of the land.
 - Information on the rate and magnitude of anticipated relative sea level change during the 21st Century is available from UKCP18 (Palmer *et al.*, 2018). It is predicted that by 2060, relative sea level could have risen by approximately 0.3m above present day (2022) levels (Representative Concentration Pathway (RCP) 8.5; 95th percentile) at the landfall(s) with rates of change increasing over time.
 - A rise in sea level would potentially allow larger waves, and therefore more wave energy, to reach the coast in certain conditions and consequently result in an increase in local rates or patterns of erosion and the equilibrium position of coastal features. Sea level rise may also result in a loss of intertidal habitat through the process of 'coastal squeeze' caused by the presence of coastal defences preventing natural roll back of the coast.
 - UKCP18 also includes projections of changes to storm surge magnitude in the future as a result of climate change. However, it is found that UKCP18 projections of change in extreme coastal water levels are dominated by the increases in mean sea level with only a minor (less than ten percent) additional contribution due to atmospheric storminess changes over the 21st Century (Palmer *et al.*, 2018).
 - Modification of the wave regime may also occur in response to changing patterns of atmospheric circulation, although this is associated with much uncertainty (Palmer *et al.*, 2018).

Basis for scoping assessment

- 5.1.37 The marine geology, oceanography, and physical processes Scoping assessment is based on key project design details set out in **Chapter 2: Project Description**:
- the potential wind turbine generator (WTG) station keeping system and cable burial technique(s) to be used (since these will determine the rate/volume of material that may enter into suspension, forming sediment plumes);
 - the location, number, type, size and spacing of the floating WTGs and WTG floating units (since this will determine the extent to which waves and currents are interrupted as they pass through the array); and
 - the location, footprint, height and extent of any cable protection measures (since this will determine the extent to which waves and currents are interrupted as they pass over the structures).
- 5.1.38 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.1.6**.
- 5.1.39 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 5.1.40 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on marine geology, oceanography, and physical processes (see **Table 5.1.5**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 5.1.41 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the Scoping assessment.

Table 5.1.5 Relevant marine geology, oceanography, and physical processes embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-028	Scour Protection Management Plan will be developed. It will include details of the need, type, quantity, location(s) and installation methods for scour protection.	s.36 conditions and marine licence conditions.
M-054	A detailed Cable Burial Risk Assessment (CBRA) will be undertaken to enable informed judgements about burial depth. This should maximise the chance of cables remaining buried whilst limiting the amount of sediment disturbance to that which is necessary. The array cables will typically be buried at a target burial depth between 1-2m below the seabed surface. The final depth of the cable will be dependent on the seabed mobility and CBRA.	s.36 conditions and marine licence conditions.
M-063	A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. The CEMP will be the securing mechanism for many measures.	s.36 conditions, marine licence conditions and CEMP.
M-106	The development of and adherence to a decommissioning programme.	Required under sections 105 and 114 (Energy Act 2004) and marine licence conditions.

Likely significant effects

- 5.1.42 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 5.1.43 The likely significant effects on marine geology, oceanography, and physical processes are summarised in **Table 5.1.6**. The Scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for marine geology, oceanography, and physical processes effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.1.44 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.1.6 Likely significant marine geology, oceanography, and physical processes effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction					
Potential changes to suspended sediment concentrations, bed levels and sediment type	N/A	No likely significant effect to marine geology, oceanography, and physical process receptors but potential pathway of effect for other aspects.	Scoped in. Quantitative assessment.	Marine ecological receptors; effects assessed in other sections.	Seabed sediment and shallow geophysical data.
Potential impacts to seabed morphology	N/A	Significant effects to marine geology, oceanography, and physical process receptors not expected but assessed in accordance with best practice approach to assessment of marine physical processes (see Table 5.1.2).	Scoped in. Assessed as a semi-quantitative desktop exercise.	Designated areas of seabed.	Multibeam bathymetry data.
Potential impacts to landfall morphology	N/A	Significant effects to marine geology, oceanography, and physical process receptors not expected but assessed in accordance with best practice approach to assessment of marine physical processes (see Table 5.1.2).	Scoped in. Assessed as a desktop analysis, considering available relevant coastal processes data.	The coast.	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Operation					
Potential changes to the tidal regime	N/A	No likely significant effect to marine geology, oceanography, and physical process receptors but potential pathway of effect for other aspects.	Scoped in. Assessed using semi-quantitative desk-based analysis.	N/A	N/A
Potential changes to the wave regime	N/A	No likely significant effect to marine geology, oceanography, and physical process receptors but potential pathway of effect for other aspects.	Scoped in. Assessed using numerical modelling.	N/A	N/A
Potential changes to the sediment transport regime	N/A	No likely significant effect to marine geology, oceanography, and physical process receptors but potential pathway of effect for other aspects.	Scoped in. Assessed using semi-quantitative desk-based analysis.	N/A	N/A
Potential impacts to seabed morphology	N/A	Significant effects to marine geology, oceanography, and physical process receptors not expected but assessed in accordance with best practice approach to assessment of marine physical processes (see Table 5.1.2)	Scoped in. Desk based analysis, drawing on baseline understanding and results of assessment looking at change to the tide, wave and sediment transport regimes.	Designated areas of seabed.	N/A
Potential impacts to coastal morphology	N/A	Significant effects to marine geology, oceanography, and physical process receptors not expected but assessed in	Scoped in. Desk based analysis, drawing on baseline	The coast.	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		accordance with best practice approach to assessment of marine physical processes (see Table 5.1.2).	understanding and results of assessment looking at change to the tide, wave and sediment transport regimes.		
Scour	M-028	No likely significant effect to marine geology, oceanography, and physical process receptors but potential pathway of effect for other aspects.	Scoped in. Assessed quantitatively using empirical equations.	Marine ecological receptors; effects assessed in other sections.	Seabed sediment and shallow geophysical data
Decommissioning					
Potential changes to suspended sediment concentrations, bed levels and sediment type	N/A	No likely significant effect to marine geology, oceanography, and physical process receptors but potential pathway of effect for other aspects.	Scoped in. It is expected that decommissioning activities will result in a lesser rate of sediment disturbance than that already considered in relation to the construction phase.	Marine ecological receptors; effects assessed in other sections.	Seabed sediment and shallow geophysical data
Potential impacts to seabed morphology	N/A	Significant effects to marine geology, oceanography, and physical process receptors not expected but assessed in accordance with best practice approach to assessment of marine physical processes (see Table 5.1.2).	Scoped in. (Assessed as a semi-quantitative desktop exercise).	Designated areas of seabed.	Multibeam bathymetry data

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Potential impacts to landfall morphology	N/A	Significant effects to marine geology, oceanography, and physical process receptors not expected but assessed in accordance with best practice approach to assessment of marine physical processes (see Table 5.1.2).	Scoped in. Assessed as a desktop analysis.	The coast.	N/A

Impacts scoped out of assessment

- 5.1.45 Based on the baseline environment information currently available and the project description (outlined in **Chapter 2: Project Description**), no impacts (to physical processes receptors) or pathways have been scoped out at this stage. This is principally due to the potential for pathway changes to impact on other aspect receptors and the requirement for informing those assessments.

Cumulative effects

- 5.1.46 Cumulative effects on marine geology, oceanography, and physical processes resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the Cumulative Effects Assessment screening exercise.
- 5.1.47 The following impacts from the Project have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:
- During operation, potential interaction with other proposed offshore wind farms in the Outer Moray Firth, resulting in cumulative changes to waves. These could potentially result in morphological impacts to identified receptor groups including the coast and designated areas of seabed.

Transboundary effects

- 5.1.48 The potential effects from construction, operation (including maintenance) and decommissioning on marine geology, oceanography and physical processes receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. Due to the localised and small-scale nature of the impacts on marine geology, oceanography and physical processes, no significant transboundary impacts have been identified in relation to marine geology, oceanography, and physical processes. Predicted impacts effects upon receptors are considered likely to be limited to the Project footprint for direct effects and one tidal excursion for indirect effects such as sediment transport and deposition. It is, therefore, proposed that transboundary marine geology, oceanography and physical processes impacts are scoped out from further consideration within the EIA Report.

Proposed approach to the EIA Report

- 5.1.49 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process, which is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.1.50 Likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

5.2 Marine water and sediment quality

Introduction

- 5.2.1 The marine water and sediment quality assessment will consider the potential likely significant effects on marine water and sediment quality that may arise from the construction, operation and maintenance and decommissioning of the offshore Project elements that are seaward of Mean High Water Springs (MHWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potential likely significant effects to be considered on water quality targets, and changes in water quality as a pathway to effects on other receptors to be considered within the EIA, and how these will be assessed for the purpose of the EIA.
- 5.2.2 Marine water and sediment quality interfaces with other aspects. For instance, changes in marine water quality will be influenced by the physical characteristics of the marine area and by sediment quality, and are a principally a pathway by which effects on other receptors may be exerted. This marine water and sediment quality section should therefore be considered alongside these other sections, namely:
- **Section 5.1: Marine geology, oceanography and physical processes:** As a principal potential source of changes in water quality will be sediment mobilisation and as the magnitude and extent of effects of such mobilisation and of any water discharges on marine water quality will depend on physical processes, the information from this assessment will be used to inform the marine water quality assessment.
 - **Section 5.5: Benthic, epibenthic and intertidal ecology:** Changes in marine water and sediment quality have the potential to result in adverse effects on benthic and epibenthic biota through toxicity and other mechanisms. While assessment against established water quality and sediment quality standards, designed to be protective of biota, is included in this water and sediment quality section, further specific assessment of effects of changes in water quality, particularly where no environmental quality standard (EQS) is available, may also be included in the benthic, epibenthic and intertidal ecology section.
 - **Section 5.6: Marine mammals:** Marine mammal receptor species are sensitive to accidental pollution, increased concentration of suspended solids and the leaching of toxins. The marine water and sediment quality section will inform the marine mammal section.
 - **Section 5.8: Fish and shellfish ecology:** As described in relation to **Section 5.5**, while assessment against EQS is included in the marine water and sediment quality section, further assessment of effects of specific water quality changes may need to be addressed in the fish and shellfish ecology section.
 - **Section 6.5: Terrestrial ecology and ornithology:** The terrestrial ecology and ornithology section includes consideration of effects on freshwater fish. Depending on the selected landfall(s), there is potential for this receptor to be affected by changes in marine water and sediment quality if these obstruct fish migration into and through estuaries.
 - **Section 7.1: Climate resilience:** The interference between climate resilience with marine water and sediment quality is captured in the In-Combination Climate Impacts (ICCI) assessment.

- 5.2.3 Changes in marine water quality also have the potential to affect fish migration to and from freshwaters, so this marine water and sediment quality section should therefore be considered in conjunction with the following onshore section:
- **Section 6.5: Terrestrial ecology and ornithology:** This Section includes consideration of effects on freshwater fish. Depending on the selected landfall(s), there is potential for this receptor to be affected by changes in marine water and sediment quality if these obstruct fish migration into and through estuaries.
- 5.2.4 Links with the following appendices should also be borne in mind:
- **Appendix 4B: Nature Conservation Marine Protected Areas (MPA) assessment:** The MPA assessment will need to take account of any water quality changes that may affect relevant designated, MPAs and will therefore need to take account of the conclusions of this section.

Legislative and policy context

- 5.2.5 This Section identifies the relevant legislation and policy context which has informed the scope of the this assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual international, national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 5.2.6 In order to provide a robust evidence base, **Table 5.2.1** below presents a summary of legislation and policies relevant for the marine water and sediment quality assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.2.1 Legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
International: Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR, 1992)	<p>The OSPAR Convention will be implemented through OSPAR's North-East Atlantic Environment Strategy 2030. Contained within the OSPAR Convention are a series of annexes relevant to the marine water and sediment quality assessment:</p> <ul style="list-style-type: none"> ● Annex I: Prevention and elimination of pollution from land-based sources; ● Annex II: Prevention and elimination of pollution from dumping or incineration; ● Annex III: Prevention and elimination of pollution from offshore sources; ● Annex IV: Assessment of the quality of the marine environment.

Relevant legislation and policy	Relevance to the assessment
<p>International: EC Directive (2000/60/EC) establishing a framework for Community action in the field of water policy (Water Framework Directive - WFD)</p> <p>International: EC Directive 2008/105/EC on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC (EQS Directive)</p> <p>EU Directive 2013/39/EU amending Directives 2000/60/EC and 2008/105/EC (EQS amendment Directive)</p>	<ul style="list-style-type: none"> Sets out a legislative framework for the protection of surface waters, including rivers, lakes, transitional waters and coastal waters, extending to 3 nautical miles (nm) from the shore in Scotland (12nm for chemical status). Requires classification of water bodies, definition of objectives and implementation of programmes of measures to prevent deterioration and achieve good status. Implemented through preparation of a River Basin Management Plan (RBMP) for the Scotland River Basin District (RBD). Summary WFD baseline information is provided in paragraphs 5.2.29 and 5.2.30.
<p>National: Water Environment and Water Services (Scotland) Act 2003</p> <p>The Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019</p>	<ul style="list-style-type: none"> Sets out arrangements for the protection of the water environment in Scotland. Establishes river basin management plans (RBMPs) for each respective river basin district (RBD).
<p>International: EC Directive (2006/7/EC) concerning the management of bathing water quality and repealing Directive 76/160/EEC</p> <p>National: Bathing waters (Scotland) Regulations 2008</p>	<ul style="list-style-type: none"> Sets water quality standards for designated bathing waters and requires Members States to monitor and assess the bathing water for at least two bacterial parameters. In addition, they must inform the public about bathing water quality and beach management, through bathing water profiles, which provide information to bathers on the risks to bathers' health.
<p>International: EC Directive (2008/56/EC) establishing a framework for Community action in the field of marine environmental policy (Marine Strategy Framework Directive)</p> <p>National: Marine Strategy Regulations 2010</p> <p>National: Marine Environment (Amendment) (EU Exit) Regulations 2018</p>	<ul style="list-style-type: none"> Sets out the objective of reaching Good Environmental Status (GES) in the marine environment. Defines 11 descriptors for use in determining GES. Descriptors relevant to this technical assessment include: <ul style="list-style-type: none"> ▶ Descriptor 5 – Human-induced eutrophication; ▶ Descriptor 8 – Concentrations of contaminants; and ▶ Descriptor 9 – Contaminants in fish and other seafood.

Relevant legislation and policy	Relevance to the assessment
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Relevance of Town & Country Planning policies to marine water and sediment quality are limited, as the regime only extends to low water mark. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crisis.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Sets out the need to factor changing water quality into planning decisions over the longer term.
Scottish Planning Policy (SPP) (2014) <ul style="list-style-type: none"> Paragraph 169: Development Management 	<ul style="list-style-type: none"> Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations listed that are relevant to marine water quality include: <ul style="list-style-type: none"> effects on hydrology, the water environment and flood risk.
Scotland River Basin Management Plan (SEPA, 2021)	<ul style="list-style-type: none"> Sets out programmes of measures for water bodies within the RBD to reach good status or good potential by 2027.
Marine Policy	
UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> Sets out a requirement to ensure that development will not cause deterioration in any waters to which the WFD applies, subject to Article 4.7, or prevent compliance with WFD obligations. Requires impacts on the quality of bathing waters to be taken into account. Requires assessment of impacts on targets, indicators or measures aimed at achieving GES under the MSFD.
Scotland's National Marine Plan (2015) <ul style="list-style-type: none"> GEN 12 Water Quality and Resources 	<ul style="list-style-type: none"> Sets out the plan for Scottish inshore waters (out to 12nm) and offshore waters (12 to 200nm). It applies to the exercise of both reserved and devolved functions. Applicable policies regarding water quality include: <ul style="list-style-type: none"> GEN 12 – Water Quality and Resources: Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives apply.

Relevant legislation and policy	Relevance to the assessment
Sectoral Marine Plan – Offshore Wind Energy (2020)	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. • Section 4.1 of the Sectoral Marine Plan (2020) lists a range of potential negative impacts identified through plan-level SEA, HRA and SEIA which require further consideration through project level assessments, including: <ul style="list-style-type: none"> ▶ effects from pollution releases on species and habitats; and ▶ effects on water quality.
Local policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • C2 – Renewable Energy <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>

Technical guidance

- 5.2.7 Technical guidance that has been used to define the assessment is set out in **Table 5.2.2** below.

Table 5.2.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Canadian Sediment Quality Guidelines for the Protection of Aquatic Life: <ul style="list-style-type: none"> • Introduction – updated 2001; • Protocol 1995; • Summary Tables updated 2002 	<p>There are no established EQS for marine sediment quality in the UK, and the Canadian Guidelines are widely used as a substitute, being one of the few sets of such guidelines available that covers the marine environment. They define interim sediment quality guideline (ISQG) values and a probable effects level (PEL) for a wide range of chemical parameters in marine sediments.</p>
RenewableUK and NERC guidelines on Cumulative Impact Assessment Guidelines – Guiding Principles for Cumulative Impact Assessment in Offshore Wind Farms (RenewableUK, 2013)	<p>RenewableUK and NERC provides guidance on how to conduct a cumulative effects assessment (CEA) and recommend that the spatial scales for individual receptors and the spatial extent of environmental changes can be identified in line with the source-pathway-receptor model.</p> <p>The guidance will be followed in undertaking the CEA for marine water and sediment quality.</p>
Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy project (Judd, 2012)	<p>This report provides guidelines for data acquisition to support marine environmental assessments for offshore renewable energy projects.</p> <p>This guidance has been incorporated into the marine water and sediment quality scoping assessment on acquiring data for the study area.</p>

Study area

- 5.2.8 The study area for the marine water and sediment quality assessment is defined as the offshore Scoping Boundary together with a buffer zone extending one spring tidal excursion outside this boundary, as shown in **Figure 5.2.1: Marine water and sediment quality study area** in **Appendix 1A**. The buffer zone has been informed by the tidal excursion extent to encompass the area over which suspended sediments may travel following disturbance as a result of the Project's activities, extending 15km around the array Scoping Boundary, and a distance of 15km surrounding the offshore cable corridor. Within 3nm (5.56km) of the shore, the study area has also been extended to include the whole of each coastal water body intercepted by the buffer zone boundary, to ensure that all baseline water quality data relating to each of these water bodies is included in the study.
- 5.2.9 The study area will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response to feedback from consultation.

Consultation

- 5.2.10 This Section has been informed by engagement and discussion with various stakeholders, including an online workshop with MS-LOT and NatureScot on 29th September 2022. **Table 5.2.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 5.2.3 Consultation

Consultee	Comments and considerations	How this is accounted for
Maritime and Coastguard Agency	Sediment and water quality surveys: MCA confirms that marine sediment and water quality surveys will have a low risk to shipping and navigation on the understanding that outlined mitigation re issuing Notice to Mariners is followed.	Prior to sediment and geotechnical surveys commencing, Notices to Mariners were submitted.
Northern Lighthouse Board	Sediment and water quality surveys: NLB confirms that marine sediment and water quality surveys will have a low risk to shipping and navigation on the understanding that outlined mitigation re issuing Notice to Mariners is followed.	Prior to sediment and geotechnical surveys commencing, Notices to Mariners were submitted.
MS-LOT and NatureScot	<p>Sediment Sampling Strategy: The sediment sampling strategy (with samples collected alongside benthic biota sampling) for the array site investigation was shared with MS-LOT and NatureScot in June 2022 in advance of its mobilisation for sediment sampling in July 2022.</p> <p>NatureScot were concerned to see that dependencies and links between different parts of the assessment were fully identified to provide a whole ecosystem approach to the assessment.</p> <p>Concise presentation of policy and guidance was also requested without repetition.</p>	<p>Survey data are being stored in line with standard data protocols. Comments and advice received were incorporated into the sampling strategy prior to finalisation with the survey contractor.</p> <p>This is of particular importance in relation to marine water and sediment quality and is fully recognised in this Section.</p> <p>In writing this Section, care has been taken not to repeat information contained in Appendix 3A: Planning Policy Framework.</p>
Marine Scotland Licensing Operations Team (MS-LOT) and Marine Scotland Science (MSS), NatureScot and RSPB	<p>An offshore EIA Scoping workshop was held on 29th and 30th September 2022. During a technical break-out session and after the workshop, the Project team submitted the following written questions to MS-LOT and MSS in relation to marine water and sediment quality.</p> <ul style="list-style-type: none"> Do the regulators agree that the proposed study area is suitable for use? Are the regulators aware of any water quality data sets for the study area? Are there any data sources that should be considered that are not noted in the workshop (i.e. as reported upon in this Section)? 	MS-LOT and MSS confirmed to the Project team that they (and NatureScot and RSPB) will respond to these questions in the advisory response to be provided during the Scoping Report consultation process. This is understood to mean via the Scoping Opinion. The responses will therefore be addressed in the EIA Report.

Assessment methodology

Introduction

- 5.2.11 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, while this has informed the approach that has been used in this Marine water and sediment quality section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the Marine water and sediment quality assessment.

Desk-based review

- 5.2.12 A desk-based review of existing marine water and sediment quality data will be undertaken, focusing on sourcing data that have been collected within or in close proximity to the study area. These data will be supplemented with information on water and sediment quality in the wider Scottish Marine Regions and Offshore Marine Regions where available (see **Figure 5.2.2: Scottish marine regions in Appendix 1A**).
- 5.2.13 A range of data from a variety of sources will be reviewed to inform the environmental assessment. A list of the data sources to support this Scoping Report and to be used in the final assessment has been highlighted in **Table 5.2.6**. It should be noted that there is very limited coverage in or near to the Option Agreement Area (OAA) for marine water quality, but this will be supplemented by site-specific survey data.

Site-specific surveys

- 5.2.14 To supplement and complement the existing data sources, further information will be available from within the Scoping Boundary through site-specific marine water and sediment quality surveys, within the windfarm OAA and along the offshore export cable route corridor. Seabed sediment samples, using a dual Van Veen grab sampler, have already been collected within the OAA but, due to the timing of the surveys, the site-specific data have not been available to inform this Scoping Report. Further sampling will cover the offshore export cable corridor. All of these survey data will, however, be available to inform the EIA Report. Sediments will be analysed for granulometric characteristics (particle size analysis) and for contaminants that may be of concern if mobilised into the water column by Project activities.
- 5.2.15 Water sampling will involve collection of samples throughout the water column. Samples will be analysed to provide a baseline against which to assess the effects of construction, operation and decommissioning of the Project on concentrations of suspended solids, nutrients and contaminants that may be introduced into the water column.

Approach

- 5.2.16 To enable the potential impact of the Project to be assessed, the baseline water and sediment quality will be described.
- 5.2.17 Potential impacts on marine water and sediment quality that may occur as a result of the planned construction, operation and decommissioning of the Project will then be identified, paying particular attention to parameters affecting compliance with WFD chemical status within 12nm of the shore and water quality elements supporting WFD ecological status within 3nm (5.56km) of the shore. Further offshore, assessment will pay particular attention to parameters relevant to compliance with MSFD descriptors (5), (8) and (9) (see **Table 5.2.1**).

- 5.2.18 If offshore accommodation platforms and substation(s) are to be provided and involve discharges of treated sewage, then bacteriological water quality at designated bathing waters within the potential export cable corridor may need to be taken into account and the effects of the sewage discharges on compliance with bathing water standards considered.
- 5.2.19 In the event that the Project is predicted to have a direct impact on compliance with water or sediment environmental quality standards these will be assessed in the marine water and sediment quality section of the EIA Report. Where there is potential for changes in water or sediment quality to affect other receptors, links will be made with other sections, as described in **paragraphs 5.2.1 to 5.2.4**. Where appropriate, measures will be proposed to mitigate the impacts.
- 5.2.20 Cumulative impacts will be assessed by taking into consideration any other relevant developments, proposed or existing, that are in the vicinity of the Project and which have the potential to affect the same features.

Impact assessment methodology

- 5.2.21 Scales for the sensitivity/ value of existing water and sediment quality characteristics and for the magnitude of impact specific to marine water and sediment quality are provided in the following sections.

Sensitivity/Value

- 5.2.22 The sensitivity of a feature is dependent upon its adaptability (the degree to which a feature can avoid or adapt to an effect), tolerance (the ability of a feature to absorb stress or disturbance without changing character) and recoverability (the temporal scale and extent to which a feature will recover following an effect).
- 5.2.23 In addition, for some assessments the 'value' of a feature may also require consideration in the assessment where relevant, for instance if a feature is designated or has an economic value.
- 5.2.24 The sensitivity and value are combined, using expert judgement as required, to provide a score for use in the significance assessment matrix in **Plate 4.2.2** in **Chapter 4: Approach to Scoping and EIA**. The definitions of sensitivity/value levels for marine water and sediment quality, using a four-point scale, and example definitions of the sensitivity/value levels are provided in **Table 5.2.4**.

Table 5.2.4 Definitions of sensitivity/value levels for marine water and sediment quality

Value	Definition
High	<p>WFD surface water body (or part thereof) with overall 'High' or 'Good' status/potential.</p> <p>Water or sediment quality conditions supporting a nature conservation site that is part of the national site network (SPA and SAC) or Ramsar sites, where water and/or sediment quality is an important factor in maintaining the site's conservation objectives.</p> <p>Water or sediment quality conditions supporting designated use, such as a designated bathing water or shellfish water.</p>
Medium	<p>WFD surface water body (or part thereof) with overall 'Moderate' or lower status/potential.</p> <p>Water or sediment quality conditions supporting a site of special scientific interest (SSSI), where water and/or sediment quality is an important factor in maintaining the site's conservation objectives.</p> <p>Water or sediment quality conditions supporting designated use, such as cooling water abstraction or general amenity use.</p>
Low	<p>Non-reportable WFD surface water or groundwater body (or part thereof), or non-WFD water body.</p> <p>Water or sediment quality conditions supporting a site with a local conservation designation (for example, Local Nature Reserve (LNR), where water and/or sediment quality is an important factor in maintaining the site's conservation objectives.</p>
Very low	<p>Non-reportable WFD surface water or groundwater body (or part thereof), or non-WFD water body.</p> <p>Water or sediment quality conditions supporting undesignated ecosystems or those with low sensitivity to water quality.</p>

5.2.25 It should be noted that high value and high sensitivity are not necessarily linked within a particular impact. Where these differ, professional judgement is used to define the sensitivity/value score.

Magnitude

5.2.26 Example definitions of the magnitude levels for marine water and sediment quality are given in **Table 5.2.5**.

Table 5.2.5 Definitions of magnitude of effect for marine water and sediment quality

Value	Definition
High	<p>Wide spatial extent with large magnitude compared to the natural variability and with a continuous signal extending into the long-term.</p> <p>Long-term or permanent and irreversible breaches of EQS values for water quality, which leads to a downgrading of WFD/MSFD status/potential.</p> <p>Large, long-term and permanent change to parameters defining chemical status and/or change to physico-chemical elements supporting the biological elements, which leads to a downgrading of WFD/MSFD status/potential.</p>
Medium	<p>Regional spatial extent with moderate magnitude compared to the natural variability, frequently occurring in the short- or medium-term.</p> <p>Local spatial extent with moderate magnitude compared to natural variability, occurring frequently over a long-term timescale.</p> <p>Measurable long-term change in water quality that uses much of the available headroom to the EQS, but without breaching EQS values; or medium-term and reversible breaches of EQS values, which do not actually lead to a downgrading of WFD/MSFD status/potential.</p> <p>Measurable long-term change to parameters defining chemical status and/or change to physico-chemical elements supporting the biological elements, which does not actually lead to a downgrading of WFD/MSFD status/potential.</p>
Low	<p>Local or regional spatial extent with low magnitude, frequently occurring over a short or medium timescale.</p> <p>Measurable change in water quality, but with significant headroom to the EQS limit still available; or short-term and reversible breaches of EQS values, and no change to WFD/MSFD status.</p> <p>Measurable change to parameters defining chemical status and/or change to physico-chemical elements supporting the biological elements, which does not actually lead to a downgrading of WFD/MSFD status.</p>
Very low	<p>Local spatial extent, with magnitude comparable to natural variability, occurring infrequently over a short or medium timescale.</p> <p>No measurable change in water quality, and no breach of relevant EQS values, and no change to WFD/MSFD status.</p> <p>No measurable change to parameters defining chemical status and/or change to physico-chemical elements supporting the biological elements, and no change to WFD/MSFD status.</p>

Effect significance

5.2.27 Following the identification of sensitivity/value and the magnitude of the impact, it is possible to determine the significance of the effect. The matrix provided in **Plate 4.2.2** in **Chapter 4: Approach to Scoping and EIA** is used as a framework to aid in determination of significance in the impact assessment. Significance of indirect effects of changes in water or sediment quality on other receptors will be assessed under the sections dealing with those other receptors.

Baseline conditions

Data sources

5.2.28 A desk-based review of literature to support this Scoping Report highlighted data sources that provide coverage across large parts of the Project's marine water and sediment quality study area, and the wider region. The list of desk-based sources is provided in **Table 5.2.6**.

Table 5.2.6 Key sources of marine water and sediment quality data

Source	Date	Summary	Coverage of study area
Scotland's Marine Atlas (Scottish Government, 2011b)	Accessed 2022	Contains data collected to support development of Scotland's National Marine Plan. The " <i>Clean and safe</i> " assessment chapter includes data on contaminants in water, sediment and biota for the Moray Firth and North East SMRs and the Fladen and Moray Firth Offshore Marine Region (OMR). https://www.gov.scot/publications/scotlands-marine-atlas-information-national-marine-plan/	Complete coverage of study area.
Marine Scotland NMPi (2022h)	Accessed 2022	Publicly available mapping showing monitoring points, administrative areas etc. https://marinescotland.atkinsgeospatial.com/nmpi/	Complete coverage of study area.
SEPA (2022b)	Accessed 2022	WFD monitoring of coastal water bodies extending out 3nm from the coastal baseline. https://www2.sepa.org.uk/WaterBodyDataSheets/	Includes the seven WFD coastal water bodies and three WFD transitional water bodies within the study area.
SEPA (2022c)	Accessed 2022	Monitoring of coastal bathing waters during the bathing season. https://www2.sepa.org.uk/bathingwaters/	Includes the seven coastal bathing waters in the study area.
NorthConnect (2018a,b)	Survey undertaken in 2016 and 2017.	Grab sampling (biota, Particle Size Analysis (PSA) and chemical analysis), seabed photography and video systems were used across the selected sample locations as part of the baseline characterisation.	NorthConnect consenting corridor overlaps study area.
Hywind (2015)	Surveys undertaken in 2013.	Grab sampling gear were deployed to collect sediment for analysis of particle size across the survey area and along the export cable corridor to determine levels of metals and hydrocarbons.	Hywind Offshore Wind Farm Pre-construction Geophysical and environmental baseline survey are covered overlaps study area.

Source	Date	Summary	Coverage of study area
Green Volt (2021)	Survey undertaken in 2021. Accessed 2022	Grab sampling was deployed to collect sediment for physio-chemical substances analysis and macrofaunal identification. The survey covered Green Volt's wind farm area (which is east of the Project's offshore Scoping Boundary for the offshore export cable) and two export cable routes, one to Buzzard and the other to land towards Peterhead area (which overlaps the offshore Scoping Boundary for the Project offshore export cable from the east to the south-west).	Green Volt area and two export cable routes. Area surveyed overlaps study area.

Current baseline

Marine water quality

- 5.2.29 Currently the overall status of each of the WFD coastal water bodies within the marine water and sediment quality study area, based on latest available (2021) data, is as follows (heavily modified water bodies are denoted HMWB):
- 200499 – Macduff to Rosehearty (good status);
 - 200500 – Rosehearty to Cairnbulg Point (good status);
 - 200142 – Cairnbulg Point to the Ugie Estuary (high status);
 - 200131 – Ugie Estuary to Buchan Ness (Peterhead) (good potential) (HMWB);
 - 200125 – Buchan Ness to Cruden Bay (high status);
 - 200118 – Cruden Bay (high status); and
 - 200117 – Cruden Bay to the Don Estuary (high status).
- 5.2.30 Currently (as at 2021) the status of each of the following WFD transitional water bodies within the Marine water and sediment quality study area is as follows:
- 200137 - Strathbeg Estuary (high status);
 - 200129 - Ugie Estuary (high status); and
 - 200113 - Ythan Estuary (moderate status).
- 5.2.31 The bacteriological quality of the seven designated coastal bathing waters within the study area in 2022 was 'excellent' at all locations except Fraserburgh (Tiger Hill) and Collieston, where it was 'good' and Cruden Bay, where no sampling took place.
- 5.2.32 The water bodies and bathing waters are shown in **Figure 5.2.3: WFD water bodies in Appendix 1A**.
- 5.2.33 In the nearshore zone, water quality is potentially affected by several treated sewage outfalls, and an outfall at Peterhead discharging power station cooling water. There are also several combined sewer overflow (CSO) outfalls within the study area. The effects of these discharges on baseline water quality will need to be established during the planned water quality monitoring programme and further desk study.

Seabed sediment quality

- 5.2.34 Limited data in Scotland's Marine Atlas for the Fladen and Moray Firth OMR (further offshore from the OAA show concentrations of zinc, cadmium and mercury in seabed sediments are all below the Canadian ISQG level, while concentrations of copper and lead are expressed as less than a concentration slightly above the ISQG in each case.
- 5.2.35 Surveys undertaken for Hywind and Green Volt projects provide additional sediment analysis information which will be collated and used to augment data from site-specific surveys (sediment already collected but not yet analysed).
- 5.2.36 Pockmarks have been recorded during physical surveys undertaken for the Project in the OAA. Sediments in the vicinity may exhibit elevated levels of some hydrocarbons derived from the leaking gas. This will be checked during the analysis of sediment samples already collected.

Future baseline

- 5.2.37 Determining the future baseline draws upon information about the likely future use and management of the Project sites in the absence of development, climate change (see **Section 7.1: Climate resilience** in **Chapter 7: Environmental Aspects Whole Project**) and any other proposed developments (consented or proposed) that may act cumulatively with the Project to affect marine water and sediment quality.
- 5.2.38 On the basis of available evidence, in the absence of the Project, any future baseline for marine water and sediment quality over the lifetime of the Project is unlikely to be markedly different from the current baseline in terms of compliance with water quality standards. Therefore, it is considered appropriate to use the current baseline for the purpose of this assessment.

Basis for scoping assessment

- 5.2.39 The marine water and sediment quality scoping assessment is based on the following key design details, which are also set out in **Chapter 2: Project Description**. In particular the assessment will need to take account of:
- the proposed wind turbine generator (WTG) station keeping system and the method of installation, cable burial and protection techniques and installation and scour protection techniques for any fixed platforms (as these will affect the potential for mobilisation of sediments during construction and decommissioning, potential for loss of drilling muds and potential for leaching of substances during operation);
 - the nature of the materials to be placed in the sea, including the characteristics of any coatings (as these may affect the potential for leaching of toxic substances into the water during operation);
 - materials carried aboard vessels or used in the floating WTGs (which could cause pollution as a result of accidental spillage);
 - sewage discharges from any accommodation platforms (during their period of use);
 - impacts of all phases of the Project (construction, operation and decommissioning).
- 5.2.40 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.2.8**.
- 5.2.41 The Approved NPF4 2023 introduces new requirements, which will be taken into account in the EIA and associated consenting documents.

Embedded environmental measures

- 5.2.42 As part of the Project design process, a number of embedded environmental measures are proposed to reduce the potential for adverse impacts on marine water and sediment quality (see **Table 5.2.7**). These will evolve over the development process as the EIA progresses and in response to consultation responses. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 5.2.43 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in this Scoping assessment.

Table 5.2.7 Relevant marine water and sediment quality embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-033	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to the Project. The MPCP will also include relevant key emergency contact details.	s.36 conditions and marine licence conditions.
M-049	Development of and adherence to a Project Environmental Monitoring Programme (PEMP), which will set out commitments to environmental monitoring in pre-, during and post-construction phases of the Project.	s.36 conditions and marine licence conditions.
M-059	Apply micro-siting to proposed offshore Project infrastructure such as cables (trenched or ploughed in), or WTG anchor structures, to minimise mobilisation of contaminants from any areas of significantly contaminated sediment detected during pre-construction surveys.	S.36 conditions and marine licence conditions.
M-060	Minimise turbidity in the water column caused by sediment mobilisation during construction by selection of best practice construction methods.	S.36 conditions, marine licence conditions and CEMP
M-061	Minimise potential for creation of a temporary barrier to fish migration in any river adjacent to cable landfall(s) due to a plume of mobilised sediment obstructing the river entrance by appropriate timing of operations close to the shore regarding tidal flows and fish migration seasons.	S.36 conditions, marine licence conditions and CEMP
M-062	Minimise adverse effects on water and sediment quality from loss of drilling muds when using Horizontal Directional Drilling (HDD) across the littoral zone by employment of a site-specific best practice protocol and use of the least toxic additives.	S.36 conditions, marine licences conditions and CEMP
M-063	A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the	S.36 conditions and marine licences conditions. CEMP

ID	Environmental measure proposed	How the environmental measures will be secured
	<p>project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. Other measures that feed into the CEMP include:</p> <ul style="list-style-type: none"> • M-033: MPCP; • M-059: Offshore micro-siting; • M-060: Minimise turbidity; • M-061: Minimise temporary barrier to fish migration; and • M-062: Sediment quality. <p>The CEMP will be the securing mechanism for many measures.</p>	
M-064	Ensure that any material to be deposited in the sea (metal components, rock for armour, concrete mattresses) does not contain toxic materials that could leach into the sea water and result in toxic effects.	S.36 conditions and marine licence conditions.
M-065	Ensure sewage discharges from any accommodation platform provided will comply with the provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and, additionally, will be appropriately treated, and disinfected if required, to ensure no adverse effect on compliance with bacteriological quality standards at any nearby designated coastal bathing waters.	S.36 conditions and marine licence conditions.
M-106	The development of and adherence to a decommissioning programme.	Required under sections 105 and 114 (Energy Act 2004) and marine licence conditions.

Likely significant effects

- 5.2.44 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-feature pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-feature pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 5.2.45 The likely significant effects on marine water and sediment quality, as well as anticipated changes in marine water and sediment quality that may provide a pathway to likely significant effects on other receptors are summarised in **Table 5.2.8**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for effects on marine water and sediment quality, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.2.46 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considering them is presented after **Table 5.2.8** supported by an evidence base.

Table 5.2.8 Likely significant marine water and sediment quality effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Feature	Further data baseline requirements
Accidental pollution events (Construction, Operation/Maintenance and Decommissioning)	M-033, M-063, M-106	<p>Pollution of water and sediment through accidental release of pollutants or chemicals from vessels or WTGs, which could affect local water and sediment quality.</p> <p>No likely significant effect if MPCB is in place and mitigation measures implemented quickly.</p>	Scoped out: See rationale in section below paragraph 5.2.47 to 5.2.49.	N/A	N/A
Mobilisation of contaminants contained in seabed sediment during construction operations to install anchorages and cables, resulting in changes in water quality (Construction)	M-059, M-063	<p>Potential adverse effects on water quality compliance with WFD and MSFD.</p> <p>Potential changes in water quality that may affect marine biota.</p> <p>Potential changes in sediment quality by resettlement of contaminated mobilised sediment that may affect marine biota.</p>	<p>Scoped in: Assessment will be based on sediment transport modelling that will be undertaken as part of the assessment in Section 5.1: Marine geology, oceanography and physical processes and on results of analysis of seabed sediment samples for contaminants.</p> <p>If no contaminated sediments are identified, this impact and potential effects can be scoped out at a later stage.</p>	<p>Water quality.</p> <p>Sediment quality.</p> <p>Marine ecology (fish and benthos) (indirect effects).</p>	<p>Sediment survey - particle size analysis.</p> <p>Sediment survey - contaminants baseline analysis.</p> <p>Water quality baseline survey and analysis.</p>

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Feature	Further data baseline requirements
Disturbance of seabed sediment by installation of anchor systems or burying cables, leading to turbidity (resulting from increased concentrations of total suspended solids (TSS)) in the water column (Construction).	M-060, M-063	<p>Potential adverse effects on water quality compliance with MSFD.</p> <p>Potential changes in water quality that may affect pelagic marine biota.</p> <p>Potential smothering of benthic biota on resettlement.</p>	Scoped in: Assessment will be based on sediment transport modelling that will be undertaken as part of the assessment in Section 5.1: Marine geology, oceanography and physical processes.	<p>Water quality.</p> <p>Marine ecology (fish and benthos) (indirect effects).</p> <p>Amenity users of the sea.</p>	<p>Sediment survey - particle size analysis.</p> <p>Water quality baseline survey and analysis (TSS).</p>
Disturbance of seabed sediment by installation of anchor systems or burying cables, leading to turbid plume across may any river adjacent to the cable landfall(s) (Construction).	M-061, M-063	Turbid plume causing temporary barrier to fish migration in river adjacent to cable landfall(s).	<p>Scoped in: Assessment will be based on sediment transport modelling that will be undertaken as part of the assessment in Section 5.1: Marine geology, oceanography and physical processes. However, any effects are likely to be able to be mitigated fully by appropriate timing of operations close to the shore regarding tidal flows and fish migration seasons.</p> <p>If there is no river adjacent to the landfall site(s) when site(s) is/are identified, this potential effect can be scoped out at a later stage.</p>	<p>Water quality.</p> <p>Migratory fish ecology (indirect)</p>	Sediment survey - particle size analysis.
HDD across littoral zone leading to loss of drilling muds into the sea (Construction).	M-062, M-063	Potential adverse effects on water quality compliance with WFD and MSFD.	Scoped in: Assessment will be based on composition of drilling mud to be used and published toxicity data.	<p>Water quality.</p> <p>Sediment quality.</p>	Details of drilling muds to be used if HDD is to be employed.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Feature	Further data baseline requirements
		<p>Potential changes in water quality that may affect marine biota.</p> <p>Potential changes in sediment quality by resettlement of contaminated drilling mud and cuttings that may affect marine biota.</p>	If no use of HDD is proposed, this can be scoped out at a later stage.	Marine ecology (fish and benthos) (indirect effects).	
Deposit of material into the sea resulting in leaching of toxicants into the sea water and/or sediment (Construction, Operation/Maintenance).	M-064	<p>Potential adverse effects on water quality compliance with WFD and MSFD.</p> <p>Potential local adverse effects on sediment quality.</p> <p>Potential changes in water and sediment quality that may affect marine biota.</p>	Scoped in: Included in assessment until precise characteristics of materials to be placed in the sea and any coatings are known. Provided that the selected materials do not contain leachable toxicants, this potential impact can rapidly be determined to be not significant.	<p>Water quality.</p> <p>Sediment quality.</p> <p>Marine ecology (fish and benthos) (indirect effects).</p>	
Any accommodation platform will have a requirement to dispose of sewage, most likely to sea via a treatment plant (Construction, Operation/Maintenance and Decommissioning).	M-065, M-106	Treated sewage discharges could affect potentially affect bathing water compliance with bacteriological standards.	Scoped out: See rationale in section below paragraph 5.2.47 to 5.2.49.	N/A	N/A

Impacts scoped out of assessment

- 5.2.47 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgment on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.
- 5.2.48 **Accidental pollution events** are not considered to result in a significant effect on compliance with WFD and MSFD water quality EQS and sediment guideline standards. The magnitude of an accidental spill will be limited by the size of chemical or oil inventory on construction vessels. In addition, release of hydrocarbons would be subject to rapid dilution, weathering and dispersion and would be unlikely to persist in the marine environment. The likelihood of an incident will be reduced by implementation of Project Environmental Monitoring Programme (PEMP) (embedded measure M-049) and Marine Pollution Contingency Plan (embedded environmental measure M-033), which will be approved by the relevant stakeholders and secured through s.36 conditions, marine licence conditions and included in the CEMP (embedded environmental measure M-063).
- 5.2.49 An accommodation platform is included in the project description as an option and such a platform may generate a **discharge of treated sewage** (an alternative is to tanker it ashore). However, to have any useful purpose the platform would need to be located close to or in the OAA, probably over 70km from the nearest coastal bathing water. With the small population involved and the very great distance, taking into account typical die-off rates of bacteria in the sea and the fact that the main tidal flow around the OAA runs in a north-south direction parallel to the shore rather than towards the shore, significant effects on bacteriological compliance at the bathing waters are extremely unlikely if not totally unrealistic. Therefore, these can be scoped out.

Cumulative effects

- 5.2.50 Cumulative effects on marine water and sediment quality resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the Cumulative Effects Assessment (CEA) screening exercise.
- 5.2.51 The principal potential for cumulative effects is in relation to sediment mobilisation from concurrent construction activities relating to different projects. It is likely that it would be possible to avoid such adverse cumulative effects by cooperation on timing of specific construction activities.
- 5.2.52 Long-term effects on water and sediment quality, such as the effect of treated sewage discharges from any accommodation platform, are likely to be very localised and it is not anticipated that they will lead to significant cumulative effects.

Transboundary effects

- 5.2.53 The potential effects from construction, operation (including maintenance) and decommissioning on marine water and sediment quality are considered in **Appendix 4A: Transboundary Screening Matrix**. Due to the localised and small-scale nature of the expected impacts on marine water and sediment quality, significant transboundary impacts are considered to be unlikely. It is, therefore, proposed that transboundary impacts on water and sediment quality are scoped out from further consideration within the EIA Report.

Proposed approach to the EIA Report

- 5.2.54 The impact assessment methodology will be based on that described in the above Section 'Assessment methodology' and **Chapter 4: Approach to Scoping and EIA**, aligned with relevant guidance documents, evidence from other offshore wind farms, and expert opinion. The following Section provides further context, including consultation and engagement that will be undertaken further to inform the assessment.
- 5.2.55 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the PAC process, which is set out in **Chapter 4: Approach to Scoping and EIA**. Key consultees of relevance to marine water and sediment quality include MS-LOT, Marine Scotland Science (MSS) and SEPA. Consultee responses will be addressed, and the scope of the assessment will be modified accordingly in the EIA Report.
- 5.2.56 The marine water and sediment quality study area (**Figure 5.2.1** in **Appendix 1A**) was informed by tidal excursion (see **Section 5.1: Marine geology, oceanography and physical processes**), to reflect the furthest distance disturbed sediments are likely to travel. This study area will be reviewed and amended in response to such matters as refinement of the offshore components, identification of additional impact pathway, and in response to feedback from consultation where appropriate. Additionally, information from site-specific modelling, and information from **Section 5.1: Marine geology, oceanography and physical processes** will also inform the final study area.
- 5.2.57 The baseline will be established through the compilation of both desk-based studies and site-specific field surveys. The key data sources to be utilised to inform the baseline and assessment are listed in **Table 5.2.6**. Site-specific surveys will help fill data gaps that currently exist across the Project's marine water and sediment quality study area.
- 5.2.58 The likely significant effects on marine water and sediment quality from the precautionary approach scenarios will be described and assessed. The assessment of potential changes in marine water and sediment quality will take into account the magnitude and duration of the change, its reversibility and the timing and frequency of the activity. The quantification of changes will feed into the assessment of effects on other receptors as described earlier. Where it is possible directly to assess the significance of effects on marine water and sediment quality against EQS established by the WFD, the MSFD or other bodies, this assessment will take account of the magnitude of the effect and the sensitivity/value of the water and sediment body.

5.3 Underwater noise and vibration

Introduction

- 5.3.1 The underwater noise and vibration assessment will consider the potential likely significant effects on relevant sensitive receptors that may arise from the construction, operation and maintenance and decommissioning of the offshore Project elements that are seaward of Mean High Water Springs (MHWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA. The significance of these effects will be determined in the receptor-specific assessments.
- 5.3.2 Underwater noise interfaces with other aspects and as such, should be considered alongside these; namely:
- **Section 5.6: Marine mammals:** This Section describes pathways of effect from noise sources on pertinent sensitive marine mammal receptor species, therefore information from the underwater noise assessment will inform the marine mammals' assessment.
 - **Section 5.8: Fish and shellfish ecology:** Changes to underwater noise and vibration have the potential to directly and indirectly impact fish and shellfish features principally through displacement, barrier effects or potentially could be lethal to fish and shellfish species. Therefore, information from this assessment will be used to inform the fish and shellfish ecology assessment.
 - **Section 5.9: Commercial fisheries:** This underwater noise and vibration section describes pathways of effect from noise sources on pertinent sensitive commercial fisheries receptor species, therefore information from this Section will be used in the commercial fisheries' assessment.
 - **Section 5.13: Infrastructure and other marine users:** The underwater noise section describes pathways of effect from noise sources on other transient marine users.
- 5.3.3 This Section considers the potential offshore noise and vibration effects on receptors seaward of MHWS. Onshore noise and vibration effects on receptors above Mean Low Water Springs (MLWS) are addressed in **Section 6.7: Onshore noise and vibration**. Any cumulative impact of offshore noise on receptors above MLWS or vice versa will also be considered.

Legislative and policy context

- 5.3.4 This Section identifies the relevant legislative and policy context which has informed the scope of the underwater noise and vibration assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual international, national, marine, and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 5.3.5 In order to provide a robust evidence base, **Table 5.3.1** below, presents a summary of legislation and policies of relevance for the underwater noise and vibration assessment for which this Section takes account of specific requirements to assess and address likely

impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.3.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
European Union (EU) Marine Strategy Framework Directive (MSFD) (Directive 2008/56/EC)	<ul style="list-style-type: none">• Paragraph 3.7.10 in Chapter 3: Legislative and Policy Context sets out the legislative framework for MSFD. MSFD sets out measures for Good Environmental Status (GES) in the marine environment. Descriptors relevant to this technical assessment include:<ul style="list-style-type: none">▶ Descriptor 11: Energy including underwater noise.
Marine Strategy Regulations 2010	
Marine Environment (Amendment) (EU Exit) Regulations 2018	
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none">• Policy 1: Tackling climate and nature crisis.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none">• Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development.• Notes the need for major infrastructure investment to unlock the growth of Scotland’s marine renewable energy sector.• Identified terrestrial and marine planning to play a key role in meeting targets.
Scottish Planning Policy (2014) <ul style="list-style-type: none">- Paragraph 169	<ul style="list-style-type: none">• Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include:<ul style="list-style-type: none">▶ net economic impacts;▶ scale of contribution to renewable energy generation;▶ effect on greenhouse gas emissions;▶ cumulative impacts;▶ impacts on communities and individual dwellings;▶ landscape and visual;▶ natural heritage;▶ carbon rich soils impacts;▶ impacts on historic environment;▶ impacts on road traffic; and▶ effects on hydrology.
National Policy Statement (NPS) EN-3 2011 <ul style="list-style-type: none">- Paragraph 2.4.2: Criteria for “good design” for energy infrastructure	<ul style="list-style-type: none">• Sets out proposals for renewable energy infrastructure and should demonstrate good design in respect of landscape and visual amenity, and in the design of the

Relevant legislation and policy	Relevance to the assessment
	project to mitigate impacts such as noise and effects on ecology.
Marine Policy	
UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all.
Scottish National Marine Plan 2015 - GEN 13: Noise	<ul style="list-style-type: none"> GEN 13 requires that development and subsequent operation in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.
Sectoral Marine Plan – Offshore Wind (2020)	<ul style="list-style-type: none"> Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment.
Local Policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> E1 – Natural Heritage C2 – Renewable Energy

Technical guidance

- 5.3.6 Technical guidance that has been used to define the assessment is set out in **Table 5.3.2** below.

Table 5.3.2 Relevant technical guidance

Guidance reference	Implications to the assessment
Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects (Southall <i>et al.</i> 2019)	Southall <i>et al.</i> 2019 provides sound exposure criteria to predict the onset of auditory effects in marine mammals. Estimate audiograms, weighting functions ('M-weighting') and underwater noise exposure criteria for temporary and permanent auditory effects of noise are presented for six species groupings, including all marine mammal species, and will be considered within the underwater noise modelling.
Sound Exposure Guidelines for Fishes and Sea Turtles (Popper <i>et al.</i> 2014)	Popper <i>et al.</i> 2014 provides sound exposure guidelines for fish. The guidelines were developed for a broad group of animals, defined by the way they detect different sound sources and their corresponding characteristics. The resultant sound exposure guidelines will be considered within the underwater noise modelling.
How loud is underwater noise from operating offshore wind turbines? (Tougaard <i>et al.</i> 2020)	The underwater noise emissions from operational turbines will be predicted using the methodology proposed by Tougaard <i>et al.</i> 2020. It is noted that Tougaard <i>et al.</i> 2020 is based on fixed foundation designs, and this is expected to be considered a worst-case prediction of noise for floating WTGs at MarramWind as the floating design omits the foundation pile, which is expected to be the primary radiator of sound into the water. This methodology concerns noise from the operational stage of the development only.

Study area

- 5.3.7 The study area for the underwater noise assessment is defined by the sensitive receptors identified within each of the aspect sections as noted in **paragraph 5.3.2**.
- 5.3.8 The study area will be reviewed and amended in response to such matters following refinement of the offshore components, the identification of additional impact pathways and, in response to feedback from consultation where appropriate.

Consultation

- 5.3.9 This Section has been informed by engagement and discussion with various stakeholders. **Table 5.3.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 5.3.3 Consultation

Consultee	Comments and considerations	How this is accounted for
Marine Scotland Licensing Operations Team (MS-LOT) and Marine Scotland Science (MSS), NatureScot and RSPB	<p>An offshore EIA Scoping workshop was held on 29th and 30th September 2022. During a technical break-out session and after the workshop, the Project team submitted the following written questions to MS-LOT and MSS in relation to underwater noise:</p> <ul style="list-style-type: none"> Do the regulators agree with the proposed study area, data sources, receptor groups and impact pathways, and overall approach to the assessment including the approach to underwater noise modelling? Are there any data sources that should be considered that were not noted in the workshop (i.e. as reported upon in this Chapter)? Can MS-LOT advise on what point in time the Cumulative Effect Assessment (CEA) should start? e.g. Forward from MarramWind, or from the first offshore wind project in Scotland, or some other time? 	<p>MS-LOT and MSS confirmed to the Project team that they (and NatureScot and RSPB) will respond to these questions in the advisory response to be provided during the Scoping Report consultation process. This is understood to mean via the Scoping Opinion. The responses will therefore be addressed in the EIA Report.</p> <p>Advice from MS-LOT regarding the CEA is reported upon in Chapter 4: Approach to Scoping and EIA.</p>

Assessment methodology

Introduction

- 5.3.10 Underwater noise and vibration are effect pathways to receptors associated with the chapters as listed in **paragraph 5.3.2**. The outputs of the underwater noise and vibration modelling will then inform their respective assessments and will subsequently inform their respective assessments. On this basis, the underwater noise and vibration assessment will be included as a technical report appended to the EIA Report rather than as a specific aspect chapter. The technical report will include an assessment of the level of underwater noise and vibration generated from the Project.
- 5.3.11 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this Section, it is necessary to set out how this methodology will be applied to address the specific needs of the underwater noise assessment.

Desk-based review

- 5.3.12 A desk-based review of existing publicly available literature and studies of the impact of impulsive underwater noise on marine mammal and fish species, including an assessment of the sensitivity of fish and marine mammals to underwater sound, and derivation of criteria for estimating the impact to be agreed with the Statutory Nature Conservation Bodies (SNCBs) will be undertaken. Experience from existing and consented offshore wind farm developments in Scotland will be drawn on to inform the underwater noise assessment and modelling strategy for the Project.

Approach

- 5.3.13 Offshore construction activity, particularly piling activities from the installation of the anchor points on the sea floor, as well as noise associated with the operational functionality of offshore wind turbines including 'snapping' noise from the cabling, will generate noise and vibration that may have a potential impact on sensitive receptors. Drawing on experience gained through a large number of other offshore wind projects in UK waters, an underwater noise assessment, including noise propagation modelling, will be required.
- 5.3.14 It is anticipated that this assessment will include the following:
- estimation of source level noise for impact piling operations of the Project based on engineering input in respect of pile diameters, seabed composition and attendant hammer energy requirements;
 - estimation of source noise levels of turbine operational noise, including both the low frequency noise associated with the moving mechanical parts in the nacelle, and the transient noise characteristics associated with the anchor cables;
 - noise propagation modelling to estimate potential impact ranges for injury to marine mammals and fish as a result of piling during construction, operational turbine noise, and operational noise associated with noise emission characteristics of the anchor cables;
 - noise propagation modelling to estimate potential impact ranges for behavioural effects to marine mammals and fish as a result of piling during construction, and the operational noise emissions;
 - operational noise predictions of the turbine array as a whole, in addition to considering each turbine individually; and
 - consideration of underwater noise effects associated with the decommissioning phase of the Project.
- 5.3.15 The impacts of underwater noise associated with the Project will be identified within the relevant aspect chapters of the EIA Report, following consultation with SNCBs. Discussion and agreement of the worst case spatial and temporal project parameters will be included. The impact criteria will be based on relevant published injury and behavioural thresholds for marine mammals and fish, which will be agreed in advance with the SNCBs. These thresholds will be derived from the most recent publication of relevance, which is Southall *et al.* (2019) for marine mammal receptors and from Popper *et al.* (2014) for fish (unless further evidence is published in the interim).

Baseline conditions

- 5.3.16 The baseline conditions, including future baseline conditions, and basis for the assessment of underwater noise and vibration will be detailed within the relevant aspects sections that consider impacts on receptors potentially sensitive to underwater noise emissions. In particular, this will relate to the following:
- **Section 5.6: Marine mammals;**
 - **Section 5.8: Fish and shellfish ecology;**
 - **Section 5.9: Commercial fisheries; and**
 - **Section 5.13: Infrastructure and other marine users.**

Embedded environmental measures

5.3.17 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on underwater noise (see **Table 5.3.4**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

Table 5.3.4 Relevant underwater noise embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-032	Development of and adherence to an agreed Marine Mammal Mitigation Protocol (MMMP). This will subsequently mitigate potential impacts from underwater noise on marine mammals and fish through good or standard practice actions in order to meet legislative requirements. These will evolve over the development process as the EIA processes and in response to consultation.	Design evolution, s.36 conditions and marine licences conditions.
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. Other measures that that feed into the CEMP include:</p> <ul style="list-style-type: none"> • M-090: Construction noise and vibration; • M-097: Risk Assessment Method Statement; • M-098: Reduce greenhouse gases emissions; • M-099: CEMP to include measures to minimise emissions; and • M:109: Protection of visual receptors.. <p>The CEMP will be the securing mechanism for many measures.</p>	Planning conditions, s.36 conditions, marine licences conditions and CEMP.
M-106	The development of and adherence to a decommissioning programme.	Required under sections 105 and 114 (Energy Act 2004) and marine licences conditions.

5.3.18 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered at Scoping.

Likely significant effects

- 5.3.19 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017, the pathway is scoped out from assessment.
- 5.3.20 The likely significant effects of underwater noise to each relevant receptor are summarised in the aspect tables as listed below:
- Marine mammals **Table 5.6.11**;
 - Fish and shellfish ecology **Table 5.8.16**;
 - Commercial fisheries **Table 5.9.9**; and
 - Infrastructure and other marine users **Table 5.13.6**.
- 5.3.21 Whilst the above tables provide the relevant receptors and subsequent interface with the relevant section topics, the EIA Report will include a standalone underwater noise chapter assessment.

Cumulative effects

- 5.3.22 Cumulative effects on pertinent receptors due to underwater noise resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the Cumulative Effects Assessment (CEA) screening exercise.
- 5.3.23 Further details on each aspect cumulative effect assessment, including impacts relevant to underwater noise and vibration can be found in the following sections:
- **Section 5.6: Marine mammals**;
 - **Section 5.8: Fish and shellfish ecology**;
 - **Section 5.9: Commercial fisheries**; and
 - **Section 5.13: Infrastructure and other marine users**.

Transboundary effects

- 5.3.24 The potential effects from construction, operation (including maintenance) and decommissioning on noise sensitive receptors (such as marine mammals and fish) in **Appendix 4A: Transboundary Screening Matrix**.

5.4 Electromagnetic fields (EMF)

Introduction

- 5.4.1 The electromagnetic fields (EMF) assessment will consider the potential likely significant effects from EMF that may arise from the construction, operation and maintenance and decommissioning of the onshore and offshore Project. This Section of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, the likely significant effects to be considered, and how these likely significant effects will be assessed for the purpose of an EIA.
- 5.4.2 Electrical cables can be a source of EMF emissions, and exposure to EMF can result in behavioural and/or ecological changes to various biological receptors. EMF emissions are a result of electricity flowing through a cable which produces an electrical field and a magnetic field. EMF can endure at a distance from the source, but the strength of this emission is dependent on the surrounding material (Tethys, 2019). The earth has its own levels of EMF from its geomagnetic field, which are considered the background levels (25-65 micro Tesla) for the purposes of assessment. Any EMF values above these values around the cables are likely to result in an effect (Hutchison *et al.*, 2020).
- 5.4.3 Cable armour, the grounded screen and the high voltage conductor of a cable prevents the electrical field escaping beyond the cable; however, it does not prevent the magnetic fields radiating into the adjacent environment. Induced electrical fields can occur through movement around a cable within the magnetic field. Both magnetic fields and induced electrical fields are reduced with distance from the source cable. EMF emissions are likely to result in an impact zone around cables associated with the Project infrastructure, but this is likely to be localised around the cables (Normandeau, 2011).
- 5.4.4 EMF interfaces with other aspects and as such, should be considered alongside these, namely:
- **Section 5.5: Benthic, epibenthic and intertidal ecology:** There is potential for EMF emissions to affect benthic, epibenthic and intertidal ecology due to the presence of marine cable infrastructure within the seabed. These cables have the potential to emit EMF to and effect benthic, epibenthic and intertidal ecology. Therefore, the EMF section will be used to inform the benthic, epibenthic and intertidal ecology section.
 - **Section 5.6: Marine mammals:** There is potential for EMF emissions to affect marine mammals as they use the marine environment as part of their lifecycle, therefore this Section will be used to inform the marine mammal assessment.
 - **Section 5.7: Offshore and intertidal ornithology:** Seabirds use the offshore environment to hunt for prey, therefore there is potential for EMF emissions to affect offshore ornithology. The EMF section will be used to inform the offshore and intertidal ornithology assessment.
 - **Section 5.8: Fish and shellfish ecology:** EMF emissions from the Project have the potential to affect fish and shellfish receptors. EMF is emitted from cables and could potentially cause behavioural changes or create a barrier effect to fish and shellfish species. Therefore, information from this assessment will be used to inform the fish and shellfish ecology assessment.
 - **Section 5.9: Commercial fisheries:** There is potential for EMF emissions to affect commercial fisheries as behavioural changes to fish may occur as a result of EMF. Therefore information from this Section will inform the commercial fisheries assessment.

- **Section 7.3: Socio-economics:** There is potential for EMF emissions to affect human health as a result of EMF emissions. Therefore, information from this Section will inform the socio economic assessment.

Legislative and policy context

- 5.4.5 This Section identifies the relevant legislation and policy context which has informed the scope of the EMF assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual international, national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 5.4.6 In order to provide a robust evidence base, **Table 5.4.1** below presents a summary of legislation and policies of relevance to the EMF assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.4.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
No policy is of specific legislation relevant to this area of technical assessment.	
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • Policy 1: Tackling the climate and nature crises • National Developments: 3. Strategic Renewable Electricity Generation and Transmission Infrastructure
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector.
Scottish Planning Policy (SPP) (2014) <ul style="list-style-type: none"> - Paragraph 169 - Paragraph 195 - Paragraph 199 - Paragraph 214 	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts;

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology. <ul style="list-style-type: none"> • Looks at how planning authorities, have a duty under the Nature Conservation (Scotland) Act 2004 to make sure they further the conservation of biodiversity. • Talks about how plans should make sure they address the potential effects of development on the natural environment. • Identifies that the presence of legally protected species is important in the consideration of planning decisions. If there is evidence to suggest that a protected species is present on site, protection should be factored into the planning and design of the development.
Marine Policy	
UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> • Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. • Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all.
Scottish National Marine Plan (2015) <ul style="list-style-type: none"> - CABLES 1 - CABLES 2 	<ul style="list-style-type: none"> • CABLES 1 requirement for cable and network owners provide evidence that the development and activity minimise impacts, where possible, on the environment and appropriate and proportionate environmental consideration and risk assessments should be provided which may include cable protection measures and mitigation plans. • CABLES 2 requires the following to be taken into account when reaching decision regarding cable development: <ul style="list-style-type: none"> ▶ cables should be suitably routed to provide sufficient requirements for installation and cable protection; ▶ new cables should implement methods to minimise impacts on the environment, seabed and other users; ▶ cables should be buried to maximise protection where there are safety or seabed stability risks and to reduce conflict with other marine users and to protect the assets and infrastructure; ▶ where burial is demonstrated not to be feasible, cables may be suitably protected; and ▶ consideration of the need to reinstate the seabed, undertake post-lay surveys and monitoring and carry out remedial action where required.

Relevant legislation and policy	Relevance to the assessment
Sectoral Marine Plan for Offshore Wind (2020)	<ul style="list-style-type: none"> This plan seeks to contribute to the achievement of Scottish and UK energy and climate change policy objectives and targets, through provision of a spatial strategy to inform the seabed leasing process for commercial offshore wind energy in Scottish waters, which: Minimises the potential adverse effect on other marine users, economic sectors and the environment resulting from further commercial-scale offshore wind development; and Maximises opportunities for economic development, investment and employment in Scotland, by identifying new opportunities for commercial scale offshore wind development, including deeper water wind technologies.

Local Policy

No policy is of specific relevance to this area of technical assessment.

Technical guidance

- 5.4.7 Technical guidance that has been used to define the assessment is set out in **Table 5.4.2** below. Additional guidance may be applicable during the EIA, and this will be referred to as appropriate in the EIA Report.

Table 5.4.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines (2020)	There is the potential for EMF exposure from onshore cables, which may result in adverse effects to humans. This document provides guidelines on limiting the exposure of EMF for the protection of humans.
Department of Energy & Climate Change (DECC) Demonstrating Compliance with EMF Public Exposure Guidelines (DECC, 2012)	There is the potential for EMF exposure from onshore cables, which may result in adverse effects to humans. This document provides guidelines on limiting the exposure of EMF for the protection of humans.

Study area

- 5.4.8 The study area for this assessment is defined by the sensitive receptor within each of the aspect sections identified in **paragraph 5.4.4.**; individual sections should be referred to for receptor-specific detail.
- 5.4.9 The study area will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

Consultation

5.4.10 This Section has been informed by engagement and discussion with various stakeholders. **Table 5.4.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 5.4.3 Consultation

Consultee	Comments and considerations	How this is accounted for
Marine Scotland Licensing Operations Team (MS-LOT) and Marine Scotland Science (MSS), NatureScot and RSPB	<p>An offshore EIA Scoping workshop was held on 29th and 30th September 2022. During a technical break-out session and after the workshop, the Project team submitted the following written questions to MS-LOT and MSS in relation to EMF:</p> <ul style="list-style-type: none"> • What is MS-LOT's view on the potential for impacts from EMF • Do the regulators agree with the proposed study area, data sources, receptor groups and impact pathways, and overall approach to the assessment presented in the workshop (i.e. as presented in this Section)? • Are the regulators aware of any data sources or studies concerning fish ecology and EMF available for the study area? • Are there any data sources that should be considered that were not noted in the workshop (i.e. as presented in this Section)? • Can NatureScot advise on how they intend to collect EMF data on a strategic level through ScotMER and how they wish developers to engage with this? 	<p>MS-LOT and MSS confirmed to the Project team that they (and NatureScot and RSPB) will respond to these questions in the advisory response to be provided during the Scoping Report consultation process. This is understood to mean via the Scoping Opinion. The responses will therefore be addressed in the EIA Report.</p>
Scottish Fishermen's Federation, Scottish White Fish Producers Association, and Inshore Fisheries Alliance (CIFA)	<p>An update meeting was held on 16th November 2022. A discussion point was on the consideration of EMF in relation to fish distribution.</p>	<p>The EIA Report will assess the interaction between EMF and fish distribution.</p>

Assessment methodology

Introduction

- 5.4.11 The EMF assessment will be included as an appended technical report to the EIA Report rather than a specific aspect chapter. The technical report will include an assessment of the EMF emissions generated by the Project, which will then be considered by other receptor-specific assessments as required.
- 5.4.12 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this EMF section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of this assessment.

Desk-based review

- 5.4.13 A desk-based review of existing information and current literature on EMF will be undertaken, notably including any information on the type of cables and associated EMF emissions, drawing on existing project applications and data from construction monitoring. These data will be reviewed and used, where applicable, to inform the EMF assessment.

Approach

- 5.4.14 The EMF assessment will detail the approach to calculating the EMF emissions from the Project. As part of this approach the EMF emissions will be placed into broad emission categories based on the EMF field that is likely to be associated with the various cable configuration seen across the Project, which will include:
- any buried cables / cables that have rock protection as emissions are likely to be reduced the further away from the source of emissions;
 - cables that are surface-laid (on the seabed);
 - cables within the water column;
 - cable crossings, as locations where cables cross over each other can amplify EMF emissions; and
 - onshore cables, as they are likely to be buried and have mitigation, which prevents EMF emissions reaching receptors.

Baseline conditions

Data sources

- 5.4.15 A desk-based review of literature to support this Scoping Report highlighted the following data sources, which provide coverage across large parts of the Project's EMF study area, and wider region. The list of desk-based sources is provided in **Table 5.4.4**.

Table 5.4.4 Key sources of EMF reports / data

Source	Date	Summary	Coverage of study area
Harsanyi <i>et al.</i>, 2022	Accessed 2022	Study looking at the effects of EMF to lobster and crab. The Effects of Anthropogenic EMF on the Early Development of Two Commercially Important Crustaceans, European lobster, <i>Homarus gammarus</i> (L.) and edible crab, <i>Cancer pagurus</i> (L.).	Receptor specific response to EMF.
Erebus ES Volume 3. Technical Appendix: 7.2 EMF Assessment, 2021 (MarineSpace Ltd., 2021)	Accessed 2022	Erebus floating offshore windfarm will have similar impacts to this Project and will be a valuable source of information for assessing the impacts from EMF (available online: https://www.bluegemwind.com/wp-content/uploads/2020/07/Erebus-ES-Vol-3-Appendix-7.2-EMF-Assessment_.pdf).	N/A
Gill and Taylor, 2001	Accessed 2022	The potential effects of EMFs generated by cabling between offshore wind turbine generators (WTGs) upon elasmobranch fishes.	Potential effects of EMF to elasmobranchs.
Fisher and Slater, 2010	Accessed 2022	Effects of EMPs on Marine Species: A Literature Review	Effects of EMF on a range of receptors.
Gill <i>et al.</i>, 2009	Accessed 2022	COWRIE 2.0 EMF Phase 2: EMF-Sensitive Fish Response to EM Emissions from Subsea Electricity Cables of the type Used by the Offshore Renewable Energy Industry. Commissioned by COWRIE Ltd.	Effects of EMF on a range of receptors.
Gill <i>et al.</i>, 2020	Accessed 2022	Setting the Context for Offshore Wind Development Effects on Fish and Fisheries.	EMF emissions from an offshore wind farm and effects on fish
Meißner, Schabelon, Bellebaum, and Sordyl, 2006	Accessed 2022	Impacts of submarine cables on the marine environment: a literature review.	Designated site-specific data.

Source	Date	Summary	Coverage of study area
Moray Offshore Renewables Ltd, 2019	Accessed 2022	Wind Farms and Associated Transmission Infrastructure Environmental Statement. Technical Appendix 4.3 D-electromagnetic Field Modelling. (Available at: http://marine.gov.scot/datafiles/lot/morl/Environmental_statement/Volumes%208%20to%2011%20-%20Technical%20Appendices/Volume%2010%20Part%201%20-%20Biological%20Environment%20Technical%20Appendices/Appendix%204.3%20D%20-%20Electromagnetic%20Fields%20Modelling.pdf).	Information on EMF emissions from cables.
National Grid and Energinet, 2017	Accessed 2022	Cable Heating Effects – Marine Ecological Report, Viking Link.	Effects of heat emissions from cables.
Normandeau Exponent Inc. et al., A., 2011	Accessed 2022	Effects of EMFs from Undersea Power Cables on Elasmobranchs and Other Marine Species.	Information on EMF emissions from cables.
Bureau of Ocean Energy Management (BOEM), 2020	Accessed 2022	EMF from Offshore Wind Facilities.	Information on EMF emissions from cables.

5.4.16 The baseline conditions of EMF will be detailed within the relevant aspects sections that consider impacts on receptors potentially sensitive to EMF emissions. In particular, this will relate to the receptors notes in **paragraph 5.4.4**.

Embedded environmental measures

5.4.17 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts from EMF (see **Table 5.4.5**). These will evolve over the development process as the EIA progresses and in response to consultation, being fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.4.18 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 5.4.5 Relevant EMF embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-001	Underground cables will be used to connect from the landfall transition joint bay(s) to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the new onshore substation nominated by NETS grid connection point(s). The installation status of which will be assessed on confirmation of a route of the onshore cable routing. Cables are typically installed in ducts in a standard buried trench arrangement.	CEMP management plans and planning conditions.
M-028	A Scour Protection Management Plan will be developed. It will include details of the need, type, quantity, location(s) and installation methods for scour protection.	Planning conditions, s.36 conditions and marine licences conditions.
M-054	A detailed Cable Burial Risk Assessment (CBRA) will be undertaken to enable informed judgements about burial depth. This should maximise the chance of cables remaining buried whilst limiting the amount of sediment disturbance to that which is necessary. The array cables will typically be buried at a target burial depth between 1-2m below the seabed surface. The final depth of the cable will be dependent on the seabed mobility and CBRA.	Planning conditions, s.36 conditions and marine licences conditions.
M-057	Burial of the cable where possible and / or use of external cable protection such as concrete mattresses or rock berms.	Description of Project
M-058	Safe distances between electrical components and publicly accessible points.	Occupational Exposure Guidelines for EMF.
M-063	A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. The CEMP will be the securing mechanism for many measures.	Planning conditions, s.36 conditions, marine licences conditions and CEMP.
M-106	The development of and adherence to a decommissioning programme.	Required under Sections 105 and 114 (Energy Act 2004) and marine licences conditions.

Likely significant effects

5.4.19 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

- 5.4.20 The likely significant effects from EMF are summarised in **Table 5.4.6**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for EMF effects to various receptors, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.4.21 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.4.6 Likely significant effects from EMF emissions

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Onshore EMF exposure in the terrestrial environment from cables and onshore substation (Operation/Maintenance)	M-001	Potential for likely significant effect through EMF emissions from cables and may subsequently impact human health within the area.	Scoped out: See rationale in section below paragraph 5.4.23 .	Socio-economics.	N/A
Offshore EMF exposure from cables within the marine environment (Operation/Maintenance)	M-028, M-054, M-057, M-058	Potential for likely significant effect through EMF emissions from cables and may subsequently impact biodiversity and commercial fisheries within the area.	Scoped in: The effect of EMF to receptors may result in behavioural or ecological changes, however the magnitude of these effects will be dependent on the receptor and exposure time. The presence and extent of effects will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of receptors to potential EMF impacts will be determined through available literature and expert knowledge based on the receptors resilience and resistance to impacts.	Benthic species; Fish and shellfish ecology; Marine mammals; and Commercial fisheries.	N/A

Impacts scoped out of assessment

- 5.4.22 Potential effects from **onshore EMF emissions** have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. The scoped out effect is considered below.
- 5.4.23 The Project will generate EMFs from onshore cable circuits and equipment housed within the onshore substation. The underground cables and onshore substation will be designed and operated in accordance with all relevant health and safety legislation and the occupational exposure guidelines for EMF (such as The Control of Electronic Fields at Work Regulations (2016); International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines (2020); and the Department of Energy & Climate Change (DECC) Demonstrating Compliance with EMF Public Exposure Guidelines (DECC, 2012). This will ensure safe distances between electrical components and publicly accessible points. Furthermore, due to the manufacturing design of underground cables, limited emissions of EMFs, if any, will occur. The maximum EMF level that the public will be exposed to will be significantly below the guideline for public exposure limits which are set to protect health (ICNIRP, 2020). Therefore, EMFs related to onshore infrastructure will not be considered further and are scoped out of the EIA.

Cumulative effects

- 5.4.24 There is potential for cumulative effects (intra-relationships and inter-relationships) to arise which require assessing, due to the spatial scope of the Project and associated assessment. An initial list of developments requiring consideration for assessment will be provided as an appendix to **Chapter 4: Approach to Scoping and EIA**; due to the broad Scoping Boundary being considered, this is likely to be focussed on key offshore projects that are known about, with a full list to be provided in the final EIA Report.
- 5.4.25 Cumulative effects on EMF resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA**, and considering the other developments that have been screened in as part of the CEA screening exercise.
- 5.4.26 The following impacts from Project have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:
- cable crossings- any project that has cables that cross over the Project cables may result in cumulative EMF emissions due to amplification of the EMF waves. This can result in a larger potential field of impact.

Transboundary effects

- 5.4.27 The potential effects from EMF during construction, operation (including maintenance) and decommissioning on receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. No significant transboundary impacts in electromagnetic fields are predicted due to the localised and small-scale nature of the impact.

5.5 Benthic, epibenthic and intertidal ecology

Introduction

- 5.5.1 The benthic, epibenthic and intertidal ecology assessment will consider the potential likely significant effects on benthic, epibenthic and intertidal ecological features that may arise from the construction, operation and maintenance and decommissioning of the offshore Project elements seaward of Mean High Water Springs (MHWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potentially likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 5.5.2 Benthic, epibenthic and intertidal ecology interfaces with other aspects and as such, should be considered alongside these sections; namely:
- **Section 5.1: Marine geology, oceanography and physical processes:** Changes to marine geology, oceanography and physical processes have the potential to affect sensitive benthic, epibenthic and intertidal ecology receptor features and habitats. The information from this assessment will be used to inform the benthic, epibenthic and intertidal ecology assessment.
 - **Section 5.2: Marine water and sediment quality:** Changes in marine water and sediment quality have the potential to result in adverse effects on benthic and epibenthic biota through toxicity and other mechanisms. The assessment against established water and sediment quality standards, design to be protective of biota is included in the marine and sediment quality section, further specific assessment of effects of changes in water quality, particularly where no environmental quality standard (EQS) is available will be included in this technical assessment.
 - **Section 5.4: Electromagnetic fields (EMF):** There is potential for EMF emissions to affect benthic, epibenthic and intertidal ecology due to the presence of marine cable infrastructure within the seabed. These cables have the potential to emit EMF to and effect benthic, epibenthic and intertidal ecology receptors. Therefore, the EMF section will be used to inform this technical assessment.
 - **Section 5.6: Marine mammals:** The marine mammal receptor species are sensitive to possible changes on prey resource and habitats. Therefore, the benthic, epibenthic and intertidal ecology section will inform the marine mammal assessment.
 - **Section 5.7: Offshore and intertidal ornithology:** The seabird receptor species are sensitive to possible changes on prey resource and habitats. Therefore, the benthic, epibenthic and intertidal ecology section will inform the offshore and intertidal ornithology assessment.
 - **Section 5.8: Fish and shellfish ecology:** The benthic, epibenthic and intertidal ecology aspect includes species that live within the epibenthos and use the benthic environment as part of their life cycle and therefore there is a degree of overlap between these aspects. Some species may also rely on benthic species as part of their diet. Therefore, the information from this Section will be used to inform the fish and shellfish ecology section.
 - **Section 6.5: Terrestrial ecology and ornithology:** The terrestrial ecology and ornithology assessment will interlink with this Section due to the intersections of habitats up to MHWS.

- **Section 7.1: Climate resilience:** The interference with climate resilience with benthic, epibenthic and intertidal ecology is captured in the In-Combination Climate Impacts (ICCI) assessment.
- **Appendix 4B: Nature Conservation Marine Protected Areas (MPA) assessment:** The Nature Conservation MPA assessment will include MPAs that relate to protected benthic, epibenthic and intertidal ecology features and therefore must be considered together.

Legislative and policy context

- 5.5.3 This Section identifies the relevant legislative and policy context that has informed the scope of the benthic, epibenthic and intertidal ecology assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework**, which provides a detailed summary of individual, national, marine and local planning policies of relevance to the EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 5.5.4 In order to provide a robust evidence base, **Table 5.2.1** below presents a summary of legislation and policies relevant for the benthic, epibenthic and intertidal ecology assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.5.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
International: EC Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora National: Conservation (Natural Habitats, &c) Regulations 1994 National: Conservation of Offshore Marine Habitats and Species Regulations 2017	<ul style="list-style-type: none"> • Sets out the conservation objectives for listed Annex I habitats. • The four-stage process of determining the absence of adverse effects on European sites under the Habitats Directives/Regulations is known as a Habitat Regulations Assessment (HRA). Stage 1 of this process is known as HRA Screening. This will be provided separately to the Scoping Report.
International: Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 (the Ramsar Convention)	<ul style="list-style-type: none"> • Sets out protective provisions for wetland sites of international importance (known as Ramsar sites). The assessment has been informed by the presence of Ramsar sites (as designated by the Convention) through the review of existing data. The Convention has been applied in Ramsar site selection and when reviewing existing data for the assessment.
International: EC Directive (2000/60/EC) establishing a framework for Community action in the field of water policy (Water Framework Directive)	<ul style="list-style-type: none"> • Sets out the requirement to classify water bodies and objectives for the prevention of deterioration and improvement of status.

Relevant legislation and policy	Relevance to the assessment
<p>National: Water Environment and Water Services (Scotland) Act 2003</p> <p>The Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019</p>	<ul style="list-style-type: none"> Sets out arrangements for the protection of the water environment in Scotland.
<p>International: Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR) 1992</p>	<p>The OSPAR Convention will be implemented through OSPAR's North-East Atlantic Environment Strategy 2030. Contained within the OSPAR Convention are a series of annexes relevant to the benthic, epibenthic and intertidal ecology assessment:</p> <ul style="list-style-type: none"> Annex I: Prevention and elimination of pollution from land-based sources; Annex II: Prevention and elimination of pollution from dumping or incineration; Annex III: Prevention and elimination of pollution from offshore sources; Annex IV: Assessment of the quality of the marine environment; and Annex V: On the protection and conservation of the ecosystems and biological diversity of the maritime area. <p>The OSPAR Strategy for the Protection and Conservation for Ecosystems and Biological Diversity foresees that the OSPAR Commission will identify species and habitats in need of protection. The OSPAR list of threatened and/or declining species and habitats has been developed to meet this commitment.</p>
<p>National: Wildlife and Natural Environment (Scotland) Act 2011</p>	<p>The Act enabled Scotland to adopt a Code of Practice on INNS, which includes:</p> <ul style="list-style-type: none"> adopting a precautionary approach and not carrying out operations which might lead to the spread of INNS until there is a clear understanding of the situation; carrying out risk assessments to understand the risk of spreading an INNS; seeking advice and following good practice; and reporting the presence of INNS.
<p>International: Marine Strategy Framework Directive (MSFD) (2008/56/EC)</p> <p>National: Marine Strategy Regulations 2010</p> <p>National: Marine Environment (Amendment) (EU Exit) Regulations 2018</p>	<p>Paragraph 3.7.10 in Chapter 3: Legislative and Policy Context sets out the legislative framework for MSFD. MSFD sets out measures for Good Environmental Status (GES) in the marine environment. Descriptors relevant to this technical assessment include:</p> <ul style="list-style-type: none"> Descriptor 1 – Biological diversity; Descriptor 2 – Non-indigenous species; Descriptor 4 – Elements of marine food web; Descriptor 6 – Sea floor integrity; Descriptor 7 – Alteration of hydrographical conditions; Descriptor 8 – Contaminants; and Descriptor 10 – Marine litter.

Relevant legislation and policy	Relevance to the assessment
National: Marine (Scotland) Act 2010	<ul style="list-style-type: none"> Relevant marine plan(s) and MPA(s) will be considered in the benthic, epibenthic and intertidal ecology assessment. In conjunction with the EIA and MPA assessment would be completed. (see Appendix 4B: Nature Conservation Marine Protected Area Assessment)
National: Marine and Coastal Access Act 2009	<ul style="list-style-type: none"> Relevant marine plan(s) and MPA(s) will be considered in the benthic, epibenthic and intertidal ecology assessment. In conjunction with the EIA and MPA assessment would be completed (see Appendix 4B: Nature Conservation Marine Protected Area Assessment).
International: Convention on Biological Diversity 1992	<ul style="list-style-type: none"> Identifies a compiled list of Biodiversity Action Plan (BAP) species and habitats, in which subsequent action plans sought to ensure that priority species or habitats are conserved or enhanced.

National Policy

Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crisis Policy 3: Biodiversity Policy 20: Blue and Green Infrastructure.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. Identified terrestrial and marine planning to play a key role in meeting targets.
Scottish Planning Policy (SPP) (2014) <ul style="list-style-type: none"> Paragraph 169: Development Management Paragraph 195: Delivery Paragraph 199: Development Plans Paragraph 214: Protected Species 	<ul style="list-style-type: none"> Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> net economic impacts; scale of contribution to renewable energy generation; effect on greenhouse gas emissions; cumulative impacts; impacts on communities and individual dwellings; landscape and visual; natural heritage; carbon rich soils impacts; impacts on historic environment; impacts on road traffic; and effects on hydrology.

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> Looks at how planning authorities, have a duty under the Nature Conservation (Scotland) Act 2004 to make sure they further the conservation of biodiversity. Talks about how plans should make sure they address the potential effects of development on the natural environment. Identifies that the presence of legally protected species is important in the consideration of planning decisions. If there is evidence to suggest that a protected species is present on site, protection should be factored into the planning and design of the development.

Marine Policy

UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> Sets out requirements for biodiversity to be protected, conserved and where appropriate recovered and loss halted. Requirements for healthy marine and coastal habitats can occur across their natural range and are able to support strong biodiverse biological communities and the functioning of healthy, resilient and adaptable marine ecosystems. Requirements for the oceans to have viable populations of representative, rare, vulnerable and valued species.
Scottish National Marine Plan (2015) <ul style="list-style-type: none"> - GEN 9 – Natural Heritage - GEN 10 – Invasive Non-Native Species - GEN 21 – Cumulative Impacts - CABLES 2 	<ul style="list-style-type: none"> GEN 9 requires development to comply with legal requirements for protected areas and protected species; not to result in significant impact on the national status of Priority Marine Features (PMFs); and protect, and, where appropriate, enhance the health of the marine area. GEN 10 supports opportunities to reduce the introduction on INNS to a minimum or proactively improve the practice of existing activity should be taken when decisions are being made. Codes of practice for INNS should be complied with. GEN 21 requires for cumulative impacts affect the ecosystem to be addressed. CABLES 2 requires the following to be taken into account when reaching decision regarding cable development: <ul style="list-style-type: none"> ▶ cables should be suitably routed to provide sufficient requirements for installation and cable protection; ▶ new cables should implement methods to minimise impacts on the environment, seabed and other users; ▶ where burial is demonstrated not to be feasible, cables may be suitably protected; and ▶ consideration of the need to reinstate the seabed, undertake post-lay surveys and monitoring and carry out remedial action where required.

Relevant legislation and policy	Relevance to the assessment
Sectoral Marine Plan – Offshore Wind (2020)	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. • Section 4.1 lists a range of potential negative impacts identified through plan-level SEA, HRA and SEIA which require further consideration through project level assessments, including: <ul style="list-style-type: none"> ▶ <i>“loss of / damage to marine and coastal habitats;</i> ▶ <i>effects from pollution releases on species and habitats;</i> ▶ <i>effects from the introduction and spread of Invasive Non Native Species; and</i> ▶ <i>effects on ecological status”.</i>
Local policy	
Modified Proposed Aberdeenshire Local Development Plan 2020	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • E1 – Natural Heritage • C2 – Renewable Energy
Aberdeenshire Council Natural Heritage Strategy 2019-2022 <ul style="list-style-type: none"> - Aim 1 – Protection of Natural Heritage - Aim 3 – Promotion of Natural Heritage 	<p>Details a number of natural heritage objectives of relevance to this technical assessment including:</p> <ul style="list-style-type: none"> • Objective 1.6 – Protect locally significant sites for nature conservation; • Objective 3.1 Aberdeenshire Council engages in and promotes key natural heritage issues – Biodiversity of the following species: <ul style="list-style-type: none"> ▶ Freshwater pearl mussel; and ▶ Invasive non-native species. • Objective 3.2 – Promote, protect and enhance natural heritage through cross-organisation partnership working; and • Objective 3.4 Promote prevention and management of invasive non-native species spread in Aberdeenshire.

Technical guidance

5.5.5 Technical guidance that has been used to define the assessment is set out in **Table 5.5.2** below.

Table 5.5.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Sectoral Marine Plan (SMP): Regional Local Guidance (Scottish Government, 2020b)	<p>Sets out regional spatial baseline data for the SMP for offshore wind energy and describes the information used in the planning and assessment process.</p> <p>The regional local guidance has been considered in the benthic, epibenthic and intertidal scoping assessment by giving a regional context of the area around Plan Option NE7, where the Option Agreement Area (OAA) array site is located.</p>
Joint Nature Conservation Committee (JNCC) Monitoring Guidance for Marine Benthic Habitats (Noble-James <i>et al.</i>, 2018)	<p>Guidance combines established ecological theory and protocols with JNCC advice and recommendations on benthic monitoring, by means of a step-wise framework that details key stages in the development of a monitoring plan.</p> <p>This guidance has been incorporated into the benthic sampling strategy for the Project's array site and offshore export cable corridor.</p>
Scottish Natural Heritage (SNH) Identification of Priority Marine Features (PMF) (Howson <i>et al.</i>, 2012)	<p>SNH report describes the process that was developed and used to identify a list of priority marine habitats and species of marine nature conservation importance for which it would be appropriate to use.</p> <p>The guidance sets out a PMF checklist to identify the PMFs may be impacted; how the PMF may be impacted; the magnitude of change and the significance. This guidance will be incorporated into the benthic, epibenthic and intertidal ecology scoping assessment and EIA.</p>
SNH Guidance on Survey and Monitoring in Relation to Marine Renewables Deployments in Scotland (Saunders <i>et al.</i>, 2011)	<p>Volume 5 of this guidance discusses benthic species and habitats of potential concern when considering potential impacts of wave and tidal devices. The guidance is relevant to the benthic, epibenthic and intertidal ecology assessment as it describes potential impacts that may be similar to offshore wind farm impacts.</p>
A Review of Assessment Methodologies for Offshore Wind Farms (Collaborative Offshore Wind Research into The Environment (COWRIE)) METH-08-08 (Maclean <i>et al.</i>, 2009)	<p>This report discusses the potential of high-definition cameras; reviews boat-based and aerial survey methodologies; reviews methodologies for analysing data; and recommends methodologies for analysing data.</p> <p>This guidance has been incorporated into the benthic survey strategy for the Project's array site and offshore export cable corridor.</p>
Marine Scotland, Consenting and Licencing Guidance: For Offshore Wind, Wave and Tidal Energy	<p>Marine Scotland's consenting and licencing manual provides guidance on applying for s.36 consents and marine licences for offshore renewables.</p>

Guidance reference	Relevance to the assessment
Applications (Scottish Government, 2018)	<p>The Guidance states an EIA must take account of the OSPAR List of threatened and/or declining species and habitats. Designated sites should be fully considered including, SACs; SPAs; SCIs; cSACs; pSPAs and pSACs.</p> <p>The guidance states under section 83 of the Marine (Scotland) Act 2010 / section 126 of the Marine and Coastal Access Act 2009, Public Authorities are required to consider whether a project is capable of affecting (other than insignificantly) protected features in an MPA.</p> <p>This guidance is considered at the forefront of the technical scoping assessment and EIA.</p>
Chartered Institute for Ecology and Environmental Management (CIEEM), Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018)	<p>Marine ecology methods apply an Ecological Impact Assessment (EclA) based approach to assess the potential effects of the Project on ecological features for consideration in the EIA methodology to be used for the benthic, epibenthic and intertidal ecology assessment.</p>
Marine Evidence based Sensitivity Assessment (MarESA) (Tyler-Walters <i>et al.</i>, 2018)	<p>Sensitivity assessments determine the resistance (or tolerance) of a feature to a pressure and the ability to recover following the cessation of the pressure, termed resilience. Resistance and resilience descriptors are informed by the MarESA approach for benthic features and highly mobile species.</p> <p>This guidance will be incorporated into the EIA, assessing the sensitivities of biotopes within the study area.</p>
Marine Scotland's Feature Activity Sensitivity Tool (FeAST) (Marine Scotland, 2022c)	<p>FeAST is a web-based application that allows users to investigate the sensitivity of marine features in Scotland's seas, to pressures arising from human activities.</p> <p>This guidance will be incorporated into the EIA, assessing the sensitivities of biotopes within the study area.</p>
RenewableUK and NERC guidelines on Cumulative Impact Assessment Guidelines – Guiding Principles for Cumulative Impact Assessment in Offshore Wind Farms (RenewableUK, 2013)	<p>RenewableUK and NERC provides guidance on how to conduct a CEA and recommend that the spatial scales for individual receptors and the spatial extent of environmental changes can be identified in line with the source-pathway-receptor model. At the time of writing, it is noted that MS-LOT and NatureScot are currently producing a cumulative effects framework (CEF) that focuses on CEA in Scotland (see paragraph 4.2.53 in Chapter 4: Approach to Scoping and EIA), until the CEF is adopted the CEA for offshore receptors will follow the RenewableUK and NERC guidance.</p>
NatureScot advice on Marine non-native species (NatureScot, 2022a)	<p>Provides guidance on identification of non-native species; and preventing introduction, including Marine Biosecurity Planning guidance.</p> <p>This guidance will be incorporated into the technical assessment and embedded environmental measures.</p>

Guidance reference	Relevance to the assessment
Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy project (Judd, 2012)	<p>This report provides guidelines for data acquisition to support marine environmental assessments for offshore renewable energy projects.</p> <p>This guidance has been incorporated into the scoping assessment on acquiring data for the study area.</p>
OSPAR, Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR Commission, 2008)	The purpose of the OSPAR guidance note is to assist developers in the identification and consideration of some of the issues associated with determining the environmental effects of offshore wind farm developments for consideration in the benthic, epibenthic and intertidal ecology scoping assessment and EIA.
Natural Resources Wales (NRW), Guidance for undertaking benthic marine habitat survey and monitoring (NRW, 2019)	NRW's report sets out guidance on methods and approaches for survey and monitoring of benthic marine habitats where such work is required to support environmental and ecological impact assessments for developments. The Welsh guidance is referred to in the absence of specific Scottish guidance.

Study area

- 5.5.6 The study area for the benthic, epibenthic and intertidal ecology assessment is defined as the offshore Scoping Boundary together with the secondary impact Zone of Influence (ZOI), as shown in **Figure 5.5.1: Benthic, epibenthic and intertidal ecology study area in Appendix 1A**. The secondary ZOI has been informed by the tidal excursion extent and coastal processes. The ZOI buffer, therefore, encompasses the area over which suspended sediments may travel following disturbance as a result of the Project's activities, extending 15km around the array Scoping Boundary, and a distance of 15km surrounding the offshore cable corridor. A precautionary approach of 15km has been used for tidal excursions, as the Atlas of UK Marine Renewable Energy Resources found a mean tidal excursion in the vicinity of the Project of approximately 7km (ABPmer, 2008).
- 5.5.7 The intertidal ecology study area is defined by the intertidal zone extending up to MHWS mark within the offshore cable corridor Scoping Boundary. All land above MHWS will comprise the onshore terrestrial ecology and ornithology study area as detailed in **Section 6.5: Terrestrial ecology and ornithology**.
- 5.5.8 The study area will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

Consultation

- 5.5.9 This Section has been informed by engagement and discussion with various stakeholders. **Table 5.5.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 5.5.3 Consultation

Consultee	Comments and considerations	How this is accounted for
Maritime and Coastguard Agency (MCA)	Benthic and Geotechnical Surveys. 9 March 2022, MCA confirmed that Benthic and Geotechnical surveys will have a low risk to shipping and navigation on the understanding that outlined mitigation re issuing Notice to Mariners is followed.	Prior to benthic and geotechnical surveys commencing, Notices to Mariners were submitted.
Northern Lighthouse Board (NLB)	Benthic and Geotechnical Surveys. 9 March 2022, NLB confirmed Benthic and Geotechnical surveys will have a low risk to shipping and navigation on the understanding that outlined mitigation regarding issuing Notice to Mariners is followed.	Prior to benthic and geotechnical surveys commencing, Notices to Mariners were submitted.
MS-LOT and NatureScot	<p>Benthic Sampling Strategy. The benthic sampling strategy for the array site investigation was shared with MS-LOT and NatureScot in April 2022 in advance of its mobilisation for benthic sampling in July 2022.</p> <p>17 May 2022 NatureScot recommended that survey data is collected and stored in line with standard data protocols (e.g., MEDIN, where appropriate) so that they can be archived in a suitable data store. NatureScot advises that the proposed activities will not have any significant effects on any designated sites.</p> <p>18 May 2022 MS-LOT recommended that rather than co-locating Drop-Down Video (DDV) and grab samples, the final survey design should consider offsetting some of the DDV and grab locations to reduce the gap size. Offsetting some of the DDV sites away from grab sites will achieve a more comprehensive characterisation of the habitats across the survey area.</p>	<p>Survey data are being stored in line with standard data protocols. Comments and advice received were incorporated into the sampling strategy prior to finalisation with the survey contractor.</p> <p>The MarramWind Benthic Sampling Strategy (MAR-DWF-ENV-STG-SCW-000001) for the survey was revised to have 50% of the DDV transects co-located and 50% independent to increase data coverage.</p>
Marine Scotland Licensing Operations Team (MS-LOT) and Marine Scotland Science (MSS), NatureScot and RSPB	<p>An offshore EIA Scoping workshop was held on 29th and 30th September 2022. During a technical break-out session and after the workshop, the Project team submitted the following written questions to MS-LOT and MSS in relation to fish and shellfish ecology:</p> <ul style="list-style-type: none"> • Do the regulators agree with the proposed study area, data sources, receptor groups and impact pathways, and overall approach to the assessment presented in the workshop (i.e., as presented in Section)? • Can Marine Scotland / NatureScot provide the shapefiles for areas of <i>Arctica islandica</i> within the region to be included in the Scoping Report? • Are there any additional data / studies for benthic receptors that we have not been aware of? • Can Marine Scotland advise approach for the MPA screening assessment for the benthic ecology features is appropriate? I.e., the conservative buffer of 15km for benthic features? 	MS-LOT and MSS confirmed to the Project team that they (and NatureScot and RSPB) will respond to these questions in the advisory response to be provided during the Scoping Report consultation process. This is understood to mean via the Scoping Opinion. The responses will therefore be addressed in the EIA Report.

Assessment methodology

Introduction

- 5.5.10 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this Section on benthic, epibenthic and intertidal ecology, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the benthic, epibenthic and intertidal ecology assessment.

Desk-based review

- 5.5.11 A desk-based review of existing benthic, epibenthic and intertidal ecology data will be undertaken, focusing on sourcing data that have been collected within or in close proximity to the study area for the benthic, epibenthic and intertidal ecology assessment. This data will be supplemented with information on benthic, epibenthic and intertidal ecology of the wider region where available.
- 5.5.12 A range of data from a variety of source will be reviewed to inform the environmental assessment. A list of the data sources to support this Scoping Report and to be used in the final assessment have been highlighted in **Table 5.5.7**. It should be noted that there is data coverage across the Project study area for benthic subtidal ecology, but this will be supplemented by site-specific survey data.

Site-specific surveys

- 5.5.13 To supplement and complement the existing data sources, further information will be available for the study area through site-specific benthic ecology surveys, which were undertaken within the OAA Scoping Boundary during summer 2022 and surveys for the offshore export cable route, which will be undertaken in spring / summer 2023. Reports from the summer 2022 survey campaign were unavailable at the time of writing this Section and therefore this site-specific data has not informed this Scoping Report. It will however be included in the EIA Report at submission.
- 5.5.14 Epibenthic habitats will be sampled via a combination of targeted benthic infauna grab sampling and DDV surveys, with particular focus on any habitats of conservation interest. Sediment samples will also be collected for contaminants and particle size analysis (PSA).
- 5.5.15 Intertidal benthic habitats will be characterised via an intertidal survey in spring / summer 2023, which will cover all areas of the intertidal foreshore from MHWS to Mean Low Water Springs (MLWS) that may be directly affected by proposed cable installation works. The survey will be conducted according to standard Phase 1 intertidal methodology (Davies *et al.*, 2001). During the survey, a qualitative assessment of the abundance of dominant benthic species will be recorded.

Approach

- 5.5.16 To enable the potential impact of the Project to be assessed, a description of the existing benthic communities, focusing particularly on any areas or features of conservation interest, will be produced. Potential impacts that may occur on the benthic, epibenthic and intertidal physical, chemical and biological environment as a result of the planned construction, operation/maintenance and decommissioning of the Project will then be identified. The sensitivities of the communities present to the types of impact expected from wind farm construction, operation/maintenance and decommissioning will be assessed. Where necessary, measures will be proposed to mitigate the impacts.

- 5.5.17 In the event that the Project has a direct impact on any sites that are designated for conservation at the national site network level (SAC or SPA) or international level (Ramsar), as a result of qualifying habitats or species that they support, then the requisite information will be provided alongside the EIA Report to assist the Competent Authority to carry out an Appropriate Assessment (AA).
- 5.5.18 Cumulative impacts will be assessed by taking into consideration any other relevant developments, proposed or existing, that are in the vicinity of the Project, and which have the potential to affect the same features.

Impact assessment methodology

- 5.5.19 The sensitivity and value of the features and the magnitude of impact specific to benthic, epibenthic and intertidal ecology are provided in the following sections. This assessment is also conducted with reference to Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018).

Sensitivity

- 5.5.20 Four-point scales (high, medium, low or negligible) for the sensitivities of benthic, epibenthic and intertidal species and habitats have been developed. These scales have been developed with reference to the Marine Life Information Network (MarLIN) MarESA (Tyler-Walters, 2018). The scales for resistance and resilience are provided in **Table 5.5.4** and **Table 5.5.5** and the matrix of sensitivity scores is provided in **Table 4.2.1** in **Chapter 4: Approach to Scoping and EIA**. Marine Scotland's FeAST has also been used in assessment of sensitivity of MPA protected features (Marine Scotland, 2022c). FeAST has developed a sensitivity matrix of marine habitats and species to pressures taking place in the marine environment.
- 5.5.21 The sensitivity of a feature is dependent upon its adaptability (the degree to which a feature can avoid or adapt to an effect), tolerance (the ability of a feature to absorb stress or disturbance without changing character) and recoverability (the temporal scale and extent to which a feature will recover following an effect). In locations where several sensitivity levels are given for features against a potential impact, professional judgement will be used and justified for the assessment.

Table 5.5.4 Assessment scale for resistance (tolerance) to a defined intensity of pressure

Resistance	Definition
High	No significant effects on the physiochemical character of habitat and no effect on population viability of key / characterising species but may affect feeding, respiration and reproduction rates.
Medium	Some mortality of species (can be significant where these are not keystone structural / functional and characterising species) without change to habitats relates to the loss <25% of the species or habitat component.
Low	Significant mortality of key and characterising species with some effects on the physiochemical character of habitat. A significant decline / reduction relates to the loss of 25-75% of the extent, density or abundance of the selected species or habitat component, e.g., loss of 25-75% of the substratum.
None	Key functional, structural, characterising species severely decline and / or physiochemical parameters are also affected e.g., removal of habitats, causing a change in habitat types. A severe decline / reduction relates to the loss of 75% of the extent, density or abundance of the selected species or habitat component, e.g., loss of 75% substratum (where this can be sensibly applied).

Table 5.5.5 Assessment scale for resilience (recovery)

Resilience	Definition
High	Full recovery within two years.
Medium	Full recovery within 2-10 years.
Low	Full recovery within 10-25 years.
Very low	Negligible or prolonged recovery possible, at least 25 years to recover structure and function.

Value

5.5.22 In addition, for some assessments the 'value' of a feature may also require consideration in the assessment where relevant – for instance if a feature is designated or has an economic value. The definitions of value levels have been developed using a four-point scale and example definitions of the value levels are provided in **Table 5.5.6**.

Table 5.5.6 Definitions of value levels for benthic, epibenthic and intertidal ecology

Value	Definition
High	<u>Nationally important</u> / rare with limited potential for offsetting / compensation. Habitats and species protected under international law (e.g., qualifying features of a Ramsar listed site) and habitats and species that are qualifying features of sites comprising the national sites network.
Medium	<u>Regionally important</u> / rare with limited potential for offsetting / compensation. Habitats or species protected under national law but not within an national site network site. UK Biodiversity Action Plan (BAP) priority habitats and species). Species / habitats that may be rare or threatened in the UK.
Low	<u>Locally important</u> / rare; regional UK BAP priority habitats. Habitats or species that provide prey items for other species of conservation value.
Negligible	Habitats and species that are not protected under conservation legislation and are not considered to be particularly important or rare.

5.5.23 It should be noted that high value and high sensitivity are not necessarily linked within a particular impact. A feature could be of high value (e.g., an Annex I habitat within an NSN site) but have a low or negligible physical / ecological sensitivity to an effect – it is important not to inflate impact significance just because a feature is ‘valued’. This is where the narrative behind the assessment is important; the value can be used where relevant as a modifier for the sensitivity assigned to the feature.

Magnitude

5.5.24 Example definitions of the magnitude levels for a generic feature are given in **Table 4.2.2** in **Chapter 4: Approach to Scoping and EIA**.

5.5.25 In sections where several magnitude values are given for features against a potential impact, professional judgement will be used and justified for the assessment.

Effect significance

5.5.26 Following the identification of feature value and sensitivity, and the magnitude of the impact, it is possible to determine the significance of the effect. The matrix provided in **Plate 4.2.2** in **Chapter 4: Approach to Scoping and EIA** (and the definitions of sensitivity, value described above and magnitude in **Table 4.2.2** in **Chapter 4: Approach to Scoping and EIA** is used as a framework to aid in determination of the impact assessment.

5.5.27 Where possible, assessment of the magnitude of the impact on benthic, epibenthic and intertidal ecology is based upon quantitative criteria, together with the use of value judgement and expert interpretation to establish the extent to which an impact is significant.

Baseline conditions

Data sources

5.5.28 A desk-based review of literature to support this Scoping Report highlighted data sources that provide coverage across large parts of the Project’s benthic, epibenthic and intertidal

ecology study area, and the wider region. The list of desk-based sources is provided in Table 5.5.7.

Table 5.5.7 Key sources of benthic, epibenthic and intertidal ecology data

Source	Date	Summary	Coverage of study area
North Sea habitats by European Marine Observation and Data Network (EMODnet, 2019)	2019	EMODnet broad-scale seabed habitat map for Europe of physical habitats (available online: https://www.emodnet-seabedhabitats.eu/access-data/launch-map-viewer/) is a predictive habitat map that covers the seabed of a large area of European waters including the North Sea. Habitats are described in the European Nature Information System (EUNIS) and MSFD predominant habitat classifications and predicted based on a number of physical parameters. Associated confidence maps are also available which give a break down confidence in predicted habitats into high, medium, and low.	Full coverage of study area.
EUSeaMap, 2021	2021	EUNIS level 4 model, detailing biological zone and substrate (available online: http://gis.ices.dk/geonetwork/srv/eng/catalog.search#/metadata/10d3d35c-8f8e-40ff-898f-32e0b037356c)	Full coverage of study area.
Biologically informed habitat map (Cooper <i>et al.</i>, 2019)	Samples have been collected over a period of 48 years from 1969 to 2016, although the vast majority (96%) were acquired since 2000.	A biologically informed habitat map (available online: https://besjournals.onlinelibrary.wiley.com/doi/10.1111/1365-2664.13381) produced using all Regional Seabed Monitoring Plan (RSMP) data.	Full coverage of study area.
SAC designation documents by JNCC	Accessed 2022	SAC designation documents and site management plans (available online: https://jncc.gov.uk/our-work/special-areas-of-conservation-overview/).	Designated site-specific data.
Natura 2000 standard data form by JNCC (JNCC, 2022)	Accessed 2022	Natura 2000 standard data forms published by the JNCC.	Designated site-specific data.
Benthic ecology data maintained by Marine Data Exchange (2022)	Survey Undertaken 2013	Benthic ecology survey data and reports previously done (available online: https://www.marinedataexchange.co.uk/).	Hywind Offshore Wind Farm Pre-Construction Geophysical

Source	Date	Summary	Coverage of study area
	Accessed 2022		survey Regional context.
North Sea benthic data held by MarLIN	Accessed 2022	North Sea benthic data (available online: https://www.marlin.ac.uk/).	Regional context of the North Sea.
Offshore Energies UK (OEUK)	Accessed 2022	OEUK database of offshore environmental surveys for UK benthos (available online: https://oeuk.org.uk/product/ukbenthos-database-5-17/).	Partial coverage of the study area.
North Sea benthic data by National Biodiversity Network (NBN) Gateway	Accessed 2022	The NBN Gateway is a database that holds species records (available online: https://nbnatlas.org/).	Partial coverage of the study area.
North Sea benthic and intertidal habitats held by Multi-Agency Geographic Information for the Countryside (MAGiC)	Accessed 2022	Online geographical information system that provides data from the natural environment from across government (available online: https://magic.defra.gov.uk/magicmap.aspx).	Full coverage of the study area.
Marine Protected Areas by NatureScot (NatureScot, 2022b)	Accessed 2022	Marine Protected Area Reports from NatureScot (available online: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/marine-protected-areas-mpas).	Partial coverage of the study area.
Priority Marine Habitats by NatureScot and JNCC (NatureScot, 2022c)	Accessed 2022	Priority marine habitats information from NatureScot and JNCC (available online: https://www.nature.scot/doc/priority-marine-features-scotlands-seas-habitats).	Partial coverage of the study area.
North Sea habitats (Marine Scotland, 2022d)	Accessed 2022	NatureScot Habitat Map of Scotland (HabMoS) will publish all available habitat data and manage a programme to survey those areas for new information (available online: https://marinescotland.atkinsgeospatial.com/nmpi/default.aspx?layers=958).	Full coverage of the study area.
Kelp bed habitat information by Marine Scotland (Marine Scotland, 2022e)	Accessed 2022	Kelp bed information from Marine Scotland including five layers available to cover the subtidal rock habitat (available online: https://marine.gov.scot/node/14689).	Full coverage of the study area.
Burrowed mud habitats information by Marine Scotland (Marine Scotland, 2022f)	Accessed 2022	Burrowed mud habitats information from Marine Scotland including six layers, representing a number of important burrowed mud communities and species (available online: https://marine.gov.scot/node/14626).	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
Ocean quahog habitat information by Marine Scotland (Marine Scotland, 2022g)	Accessed 2022	Ocean quahog <i>A.islandica</i> habitat information (available online: https://marine.gov.scot/maps/953).	Full coverage of the study area.
NorthConnect (2018)	Survey undertaken in 2016 and 2017	Grab sampling (biota, PSA and chemical analysis), seabed photography and video systems were used across the selected sample locations as part of the baseline characterisation.	NorthConnect consenting corridor. Partial coverage of the study area.
Hywind (2015)	Surveys undertaken in 2013	DDV and photography were used over the whole survey area to provide information about seabed type, features and epibenthic biotopes. Grab sampling gear were deployed to collect sediment for analysis of benthic invertebrates and particle size across the survey area and along the export cable corridor to determine levels of metals and hydrocarbons.	Hywind Offshore Wind Farm Pre-construction Geophysical and environmental baseline survey. Partial coverage of the study area.
Green Volt (2022)	Survey undertaken in 2021 Accessed 2022	Grab sampling and video transect surveys and stations using a remotely operated vehicle (ROV) were deployed to collect sediment for physio-chemical substances analysis and macrofaunal identification. The survey covered Green Volt's wind farm area (which is east for the Project's offshore Scoping Boundary for the offshore export cable) and two export cable routes, one to Buzzard and the other to land towards Peterhead area (which overlaps the offshore Scoping Boundary for the offshore export cable from the east to the southwest).	Green Volt area and two export cable routes. Partial coverage of the study area.
Species distribution modelling for marine benthos: a North Sea case study (Reiss et al., 2011)	2011	Species distribution models applied to predict the distribution of 20 marine benthic species in the North Sea.	Partial coverage of the study area.
Status of <i>Sabellaria spinulosa</i> reef off the Moray Firth and Aberdeenshire Coasts and Guidance (Pearce and Kimber, 2018)	2018	Video footage, still images and ROV clips collected from five sites were analysed to determine the status of <i>S.spinulosa</i> habitats by applying reefiness criteria in Moray Forth and Aberdeenshire Coasts. Guidance for the conservation of the species off the coast off the Scottish east coast.	Partial coverage of the study area.

Current baseline

Subtidal sediments

Windfarm OAA

- 5.5.29 Broadscale regional habitat mapping to EUNIS Level 4, detailing biological zone and substrate (EUSaMap, 2021), indicates that the habitats across the Project windfarm OAA are predominantly characterised by deep circalittoral muddy sand, deep circalittoral sand (see **Figure 5.5.2: Seabed substrate** in **Appendix 1A**). Similar substrates are found across the wider benthic, epibenthic ecology study area.

Offshore export cable corridor area

- 5.5.30 EUSaMap predictions for the mid- to offshore Scoping Boundary of the export cable included the same habitats as the windfarm OAA as well as deep circalittoral coarse sediment. This is further recorded by previous surveys for offshore windfarm EIAs in the area, such as for the Hywind project. Hywind surveys found sediments were composed of medium to fine sand (Hywind, 2015). The inshore portion of the proposed offshore cable corridor Scoping Boundary includes: circalittoral coarse sediment; circalittoral fine sand and muddy sand; deep moderate energy circalittoral rock; Atlantic and Mediterranean moderate energy circalittoral rock; Atlantic and Mediterranean moderate energy infralittoral rock; Atlantic and Mediterranean high energy infralittoral rock; high energy circalittoral seabed; and infralittoral rock. This is further recorded by survey results from NorthConnect detailing the presence of bedrock, sand, mud and mixed sediments (NorthConnect, 2018) and Hywind recording sediments composed of medium to fine sand, with coarse sand and very fine pebbles (Hywind, 2015).

Subtidal benthic ecology

- 5.5.31 As described above, the inshore benthic, epibenthic subtidal study area have been demonstrated to comprise a mixture of sands, muds, and rocks, which is typical of the wider region, representing a mosaic of different habitat types. Further offshore, the area is dominated by sand and muddy sand. A description of each biotope identified is presented in **Table 5.5.8** and presented in **Figure 5.5.2** in **Appendix 1A**.

Table 5.5.8 EUNIS habitat types and description within the benthic, epibenthic and intertidal ecology study area

EUNIS habitat type	EUNIS code	Description	Study area location
Infralittoral rock and other hard substrata	A3	This biotope is characterised by habitats of bedrock, boulders and cobbles, which occur in the shallow subtidal zone and typically support seaweed communities. The upper limit is marked by the top of the kelp zone whilst the lower limit is marked by the lower limit of kelp growth or the lower limit of dense seaweed growth. Infralittoral rock typically has an upper zone of dense kelp (forest) and a lower zone of sparse kelp (park), both with an understorey of erect seaweeds. In exposed conditions the kelp is <i>Laminaria hyperborea</i> whilst in more sheltered habitats it is usually <i>Laminaria saccharina</i> ; other kelp species may dominate under certain conditions. On the extreme lower shore and in the very shallow subtidal (sublittoral fringe) there is usually a narrow band of dabberlocks (<i>Alaria esculenta</i>) (exposed coasts) or the kelps <i>Laminaria digitata</i> (moderately exposed) or <i>L. saccharina</i> (very sheltered). Areas of mixed ground, lacking stable rock, may lack kelps but support seaweed communities (European Environment Agency (EEA), 2022a).	Offshore export cable corridor search area.
Atlantic and Mediterranean high energy infralittoral rock	A3.1	This biotope is rocky habitats in the infralittoral zone subject to exposed to extremely exposed wave action or strong tidal streams. Typically, the rock supports a community of kelp <i>L. hyperborea</i> with foliose seaweeds and animals, the latter tending to become more prominent in areas of strongest water movement. The sublittoral fringe is characterised by dabberlocks <i>A. esculenta</i> (EEA, 2022b).	Offshore export cable corridor search area.
Atlantic and Mediterranean moderate energy infralittoral rock	A3.2	Predominantly moderately wave-exposed bedrock and boulders, subject to moderately strong to weak tidal streams. On the bedrock and stable boulders there is typically a narrow band of kelp <i>L. digitata</i> in the sublittoral fringe which lies above a <i>L. hyperborea</i> forest and park. Associated with the kelp are communities of seaweeds, predominantly reds and including a greater variety of more delicate filamentous types than found on more exposed coasts (EEA, 2022c).	Offshore export cable corridor search area.

EUNIS habitat type	EUNIS code	Description	Study area location
Atlantic and Mediterranean low energy infralittoral rock	A3.3	Infralittoral rock in wave and tide-sheltered conditions, support silty communities with <i>L. hyperborean</i> and / or <i>L. saccharina</i> (A3.31). Associated seaweeds are typically silt-tolerant and include a high proportion of delicate filamentous types. In turbid-water estuarine areas, the kelp and seaweeds (A3.32) may be replaced by animal-dominated communities (A3.36) whilst stable hard substrata in lagoons support distinctive communities (A3.34) (EEA, 2022d).	<1km west of the offshore export cable corridor search area.
Circalittoral rock and other hard substrata	A4	Circalittoral rock is characterised by animal dominated communities (a departure from the algae dominated communities in the infralittoral zone). The circalittoral zone can itself be split into two sub-zones; upper circalittoral (foliose red algae present but not dominant) and lower circalittoral (foliose red algae absent)). The depth at which the circalittoral zone begins is directly dependent on the intensity of light reaching the seabed; in highly turbid conditions, the circalittoral zone may begin just below water level at MLWS. The biotopes identified in the field can be broadly assigned to one of three energy level categories: high, moderate and low energy circalittoral rock (used to define the habitat complex level). The character of the fauna varies enormously and is affected mainly by wave action, tidal stream strength, salinity, turbidity, the degree of scouring and rock topography. It is typical for the community not to be dominated by single species, as is common in shore and infralittoral habitats, but rather comprise a mosaic of species. This, coupled with the range of influencing factors, makes circalittoral rock a difficult area to satisfactorily classify; particular care should therefore be taken in matching species and habitat data to the classification (EEA, 2022e).	Surrounding area south of the offshore export cable corridor search area.
Atlantic and Mediterranean high energy circalittoral rock	A4.1	This biotope occurs on extremely wave-exposed to exposed circalittoral bedrock and boulders subject to tidal streams ranging from strong to very strong. Typically found in tidal straits and narrows. The high energy levels found within this habitat complex are reflected in the fauna recorded. Sponges such as <i>Pachymatisma johnstonia</i> , <i>Halichondria panicea</i> , <i>Esperiopsis fucorum</i> and <i>Myxilla incrustans</i> may all be recorded. Characteristic of this habitat complex is the dense 'carpet' of the hydroid <i>Tubularia indivisa</i> . The barnacle <i>Balanus crenatus</i> is recorded in high abundance on the rocky substrata. On rocky outcrops, <i>Alcyonium digitatum</i> is often present (EEA, 2022f)	Offshore export cable corridor search area.

EUNIS habitat type	EUNIS code	Description	Study area location
Atlantic and Mediterranean moderate energy circalittoral rock	A4.2	Mainly occurs on exposed to moderately wave-exposed circalittoral bedrock and boulders, subject to moderately strong and weak tidal streams. This habitat type contains a broad range of biological subtypes, from echinoderms and crustose communities (A4.21) to <i>Sabellaria</i> reefs (A4.22) and circalittoral mussel beds (A4.24) (EEA, 2022g)	Offshore export cable corridor search area.
Faunal communities on deep moderate energy circalittoral rock	A4.27	These communities populate hard substrata with low hydrodynamics and strong sedimentation (EEA, 2022h). Specific species are not mentioned in the EUNIS habitat description.	Offshore export cable corridor search area.
Atlantic and Mediterranean low energy circalittoral rock	A4.3	Occurs on wave-sheltered circalittoral bedrock and boulders subject to mainly weak/very weak tidal streams. The biotope identified within this habitat type are often dominated by encrusting red algae, brachiopods (<i>Neocrania anomala</i>) and ascidians (<i>Ciona intestinalis</i> and <i>Ascidia mentula</i>) (EEA, 2022i).	Surrounding area south of the offshore export cable corridor.
Sublittoral sediment	A5	Sediment habitats in the sublittoral near shore zone (i.e. covering the infralittoral and circalittoral zones), typically extending from the extreme lower shore down to the edge of the bathyal zone (200m). Sediment ranges from boulders and cobbles, through pebbles and shingle, coarse sands, sands, fine sands, muds and mixed sediments. Those communities found in or on sediment are described within this broad habitat type (EEA, 2022j).	Offshore export cable corridor search area.
Infralittoral coarse sediment	A5.13	Moderately exposed habitats with coarse sand, gravelly sand, shingle and gravel in the infralittoral, are subject to disturbance by tidal streams and wave action. Such habitats found on the open coast or in tide-swept marine inlets are characterised by a robust fauna of infauna polychaetes such as <i>Chaetozone setosa</i> and <i>Lanice conchilega</i> , cumacean crustacea such as <i>Lphinoe trispinosa</i> and <i>Diastylis bradyi</i> , and venerid bivalves. Habitats with the lancelet <i>Branchiostoma lanceolatum</i> may also occur (EEA, 2022k).	Offshore export cable corridor search area.
Circalittoral coarse sediment	A5.14	Tide-swept circalittoral coarse sands, gravel and shingle generally in depths of over 15-20m. This habitat may be found in tidal channels of marine inlets, along exposed coasts and offshore. This habitat, as with shallower coarse sediments, may be characterised by robust infauna polychaetes, mobile crustacea and	Offshore export cable corridor search area.

EUNIS habitat type	EUNIS code	Description	Study area location
		bivalves. Certain species of sea cucumber (e.g. <i>Neopentadactyla</i>) may also be prevalent in these areas along with the lancelet <i>B. lanceolatum</i> (EEA, 2022l).	
Deep circalittoral coarse sediment	A5.15	Offshore (deep) circalittoral habitats with coarse sands and gravel or shell. This habitat may cover large areas of the offshore continental shelf. Such habitats are quite diverse compared to shallower versions of this habitat and generally characterised by robust infauna polychaete and bivalve species. Animal communities in this habitat are closely related to offshore mixed sediments and in some areas, the settlement of <i>Modiolus</i> larvae may occur and consequently these habitats may occasionally have large numbers of juvenile <i>M. modiolus</i> (EEA, 2022m).	Offshore export cable corridor search area.
Infralittoral fine sand	A5.23	Clean sands that occur in shallow water, either on the open coast or in tide-swept channels of marine inlets. The habitat typically lacks a significant seaweed component and is characterised by robust fauna, particularly amphipods (<i>Bathyporeia</i>) and robust polychaetes including <i>Nephtys cirrosa</i> and <i>L. conchilega</i> (EEA, 2022n).	Offshore export cable corridor search area.
Infralittoral muddy sand	A5.24	Infralittoral muddy sand: Non-cohesive muddy sand (with 5% to 20% silt/clay) in the infralittoral zone, extending from the extreme lower shore down to more stable circalittoral zone at about 15-20 m. The habitat supports a variety of animal-dominated communities, particularly polychaetes (<i>Magelona mirabilis</i> , <i>Spiophanes bombyx</i> and <i>C. setosa</i>), bivalves (<i>Fabulina fabula</i> and <i>Chamelea gallina</i>) and the urchin <i>Echinocardium cordatum</i> (EEA, 2022o).	Offshore export cable corridor search area.
Circalittoral fine sand	A5.25	Clean fine sands with less than 5% silt/clay in deeper water, either on the open coast or in tide-swept channels of marine inlets in depths of over 15-20 m. The habitat may also extend offshore and is characterised by a wide range of echinoderms (in some areas including the sea urchin <i>Echinocyamus pusillus</i>), polychaetes and bivalves (EEA, 2022p).	Offshore export cable corridor search area.
Circalittoral muddy sand	A5.26	Circalittoral non-cohesive muddy sands with the silt content of the substratum typically ranging from 5% to 20%. This habitat is generally found in water depths of over 15-20 m and supports animal-dominated communities characterised by a wide variety of polychaetes, bivalves such as <i>Abra alba</i> and <i>Nucula nitidosa</i> , and	Offshore export cable corridor search area.

EUNIS habitat type	EUNIS code	Description	Study area location
		echinoderms such as <i>Amphiura</i> spp. and <i>Ophiura</i> spp., and <i>Astropecten irregularis</i> (EEA, 2022q).	
Deep circalittoral sand	A5.27	Offshore (deep) circalittoral habitats with fine sands or non-cohesive muddy sands. Very little data is available on these habitats. However, they are likely to be more stable than their shallower counterparts and characterised by a diverse range of polychaetes, amphipods, bivalves and echinoderms (EEA, 2022r).	OAA
Deep circalittoral mud	A5.37	In mud and cohesive sandy mud in the offshore circalittoral zone, typically below 50-70 m, a variety of faunal communities may develop, depending upon the level of silt/clay and organic matter in the sediment. Communities are typically dominated by polychaetes but often with high numbers of bivalves such as <i>Thyasira</i> spp., echinoderms and foraminifera (EEA 2022s).	OAA
Deep circalittoral mixed sediments	A5.45	Offshore (deep) circalittoral habitats with slightly muddy mixed gravelly sand and stones or shells. This habitat may cover large areas of the offshore continental shelf although there is relatively little data available. Such habitats are often highly diverse with a high number of infauna polychaete and bivalve species. Animal communities in this habitat are closely related to offshore gravels and coarse sands and in some areas populations of the horse mussel <i>M. modiolus</i> may develop in these habitats (EEA, 2022t)	Surrounding area west of offshore export cable corridor search area.
Deep circalittoral seabed	N/A	N/A	Offshore export cable corridor search area.
Infralittoral seabed	N/A	N/A	Offshore export cable corridor search area.
Shallow circalittoral seabed	N/A	N/A	Offshore export cable corridor search area.

5.5.32 **Figure 5.5.3: Benthic biotopes** in **Appendix 1A** presents the biologically informed habitat map from Cooper *et al.*, 2019. This biological-based seabed map utilises a comprehensive dataset of macrofaunal data and used these data to produce a baseline assessment for UK shelf waters. This large dataset was created by integrating empirical data acquired from both government and non-governmental sector (e.g., marine aggregates, offshore wind, oil and gas) monitoring efforts and is a useful resource. This demonstrates that the macrofaunal assemblages across the Project's benthic, epibenthic and intertidal study area were characterised by the following groups, see **Table 5.5.9** below.

Table 5.5.9 Biological characteristics of the macrofaunal assemblages relevant to the Project (Cooper *et al.*, 2019)

Cluster	Characteristic taxa
C1a	Characterised by the polychaetes Spionidae, Terebellidae, Serpulidar, Syllidae, Capitellidae, Cirratulidae, Lumbrineridae, Sableriidae, Glyceridae and the Lophotrochozoa phylum Nemertea. This group is likely to be located on a variety of sandy substrates.
D2a	Represented by a faunal assemblage that was characterised by the polychaetes Spionidae, Glyceridae, Terebellidae, Capitellidae, Phyllodocidae and the Lophotrochozoa phylum Nemertea. This group is likely to be located on a variety of sandy substrates.
D2b	Represented by a faunal assemblage that was characterised by the polychaetes Spionidae, Glyceridae, Terebellidae, Capitellidae, Phyllodocidae and the Lophotrochozoa phylum Nemertea. This group is likely to be located within deep water, muddy sands.
D2c	Represented by a faunal assemblage that was characterised by polychaetes including Nephtyidae, Spionidae and Opheliidae. All of which are typically found in sand and muddy sands.

Intertidal ecology

5.5.33 The landfall location(s) has/have not yet been determined. The initial landfall search area runs from Sandhaven on the north coast (west of Fraserburgh) to Sandford Bay (south of Peterhead) (see **Section 2.3** in **Chapter 2: Project Description**).

5.5.34 The coastline to the south of Peterhead in the southern section of the of the Scoping Boundary overlaps the Buchan Ness to Collieston SAC. Further details on the SAC can be found in **Table 5.5.10**). The NorthConnect (2018) benthic surveys were not able to survey close to the cliffs or the intertidal zone because of access issues; however, observations from the survey vessel and top of cliff face, indicated an exposed, barren habitat, with populations likely limited to barnacles, limpets, chitons and other encrusting species present. There may be some areas of fucoid algae particularly in sheltered crevices. MarramWind intertidal surveys and the offshore export cable corridor survey to be conducted in spring / summer 2023 will provide more information and will be reported on in the EIA Report.

5.5.35 The coastline to the north of Peterhead comprises mainly sandy beaches backed by an extensive sand dune habitat comprising fixed dunes, shifting dunes and unvegetated sand beaches above the drift line (Green Volt, 2021). North of Rattray, the Loch of Strathbeg SPA, SSSI and Ramsar site is within the Scoping Boundary, further details on the designated sites can be found in **Table 5.5.10**. See **Section 6.5: Terrestrial ecology and ornithology** in **Chapter 6: Environmental Aspects Onshore** for further details on communities landward of MHWS.

- 5.5.36 The beach at Fraserburgh, the most northern part of the coastline within the Scoping Boundary, has been described as a high energy intertidal environment exhibiting a relatively steep profile (Elertheriou & Robertson, 1988). Biotope classification for Moray East Offshore Windfarm found three classifications for the intertidal region:
- EUNIS Code A2.22 (Barren or amphipod dominated mobile sand shores);
 - EUNIS Code A1.113 (*Semibalanous balanoides* and *Littorina* spp. on exposed to moderately exposed eulittoral boulders and cobbles); and
 - EUNIS Code B3.111 (yellow and grey lichens on supralittoral rock).
- 5.5.37 No species of nature conservation importance or biotopes that are rare or restricted in distribution were recorded (Moray Offshore Renewables Ltd., 2012).
- 5.5.38 A complete benthic characterisation for the landfall(s) and offshore export cable corridor will be provided in the EIA Report, once the preferred options for each have been identified.

Species and habitats of conservation importance

Windfarm OAA

- 5.5.39 The habitats of conservation importance with the potential to be encountered in the windfarm OAA are as follows: 'Offshore deep sea muds'; 'Offshore subtidal sands and gravels', 'Offshore deep sea muds' and 'Burrowed mud' PMFs (NatureScot, 2020c); and the similar OSPAR (2008b) habitat of 'Seapens and burrowing megafauna' (see Southern Trench MPA in **Table 5.5.10** and **Figure 5.5.4: Habitats of conservation importance in Appendix 1A**).
- 5.5.40 The site-specific 2022 summer survey results will inform the benthic, epibenthic and intertidal ecology chapter of the EIA Report.

Offshore export cable corridor

- 5.5.41 The following habitats of conservation importance are potentially present in the offshore export cable corridor Scoping Boundary (**Figure 5.5.4 in Appendix 1A**) are:
- 'Inshore deep mud with burrowing heart urchins' (EUNIS Code: A5.36) PMF;
 - 'Seapens and burrowing megafauna in circalittoral fine mud' (EUNIS Code: A5.361) PMF (see Southern Trench MPA in **Table 5.5.10**);
 - 'Offshore subtidal sands and gravels' (EUNIS Code: A5.26) PMF;
 - 'Offshore deep sea muds' (EUNIS Code A5.37) PMF;
 - '*L.hyperborea* on tide-swept, infralittoral rock' (EUNIS Code A3.212) PMF;
 - '*L.hyperborea* with dense foliose red seaweeds on exposed infralittoral rock' (EUNIS Code: A3.115) PMF;
 - 'Ocean quahog *A.islandica*' PMF and
 - *S.spinulosa* reef (EUNIS Code: A2.221) Annex I habitat.
- 5.5.42 The following habitats were recorded by the NorthConnect (2018) surveys within its proposed offshore export cable corridor Scoping Boundary:
- *S.spinulosa* with a bryozoan turf and barnacles on silty turbid circalittoral rock PMF; and
 - A5.251 – *E.pusilus*, *Ophelia borealis* and *Abra prismatica* in circalittoral fine sand PMF.

- 5.5.43 The benthic survey results for the Green Volt offshore windfarm observed ‘sea pen and burrowing megafauna communities’ habitats in a number of locations within the Blackbird area of the wind farm site (UKCS Block 20/02) (Green Volt, 2022), adjacent to the Project’s Scoping Boundary. NorthConnect surveys also recorded ‘sea pen and burrowing megafauna communities’ habitats along the last 95km of the survey corridor up to the edge of the UK EEZ (NorthConnect, 2018) which overlaps the Project’s offshore Scoping Boundary.
- 5.5.44 The site-specific spring / summer 2023 survey results will inform the benthic, epibenthic and intertidal ecology chapter of the EIA Report.

Intertidal

- 5.5.45 The Annex I habitat ‘Mudflats and sandflats not covered by seawater at low tide’ (EUNIS Code: A2.221) is potentially present in the intertidal zone of the Scoping Boundary, to the west of Fraserburgh and approximately 19km southeast of Fraserburgh.

Designated sites

- 5.5.46 For this Scoping Report, a desk-based review has been undertaken to identify designated sites with relevance to benthic, epibenthic and intertidal ecology surrounding the Scoping Boundary.
- 5.5.47 The nature conservation designations that have been screened in for consideration in the benthic, epibenthic and intertidal ecology assessment comprise the national site network (i.e. SACs, SPAs, SCIs and Ramsar sites) and national designations (i.e. MPAs, SSSIs and National Nature Reserves (NNRs)), which are listed in **Table 5.5.10** and presented in **Figure 5.5.5: Designated sites surrounding the Project, with relevance to benthic, epibenthic and intertidal ecology** in **Appendix 1A**.

Table 5.5.10 Marine nature conservation designations with relevance to benthic subtidal and intertidal ecology

Site	Location relative to Scoping Boundary	Features or description
Loch of Strathbeg SPA	Within the central section of the offshore part of the Scoping Boundary at the land-water interface.	<p>The site is composed of a shallow freshwater loch with surrounding wetland, dune and grassland communities. The site supports a number of important bird species, including sandwich tern <i>Sterna sandvicensis</i>, whooper swan <i>Cygnus</i>, Svalbard barnacle goose <i>Branta leucopsis</i>, pink-footed goose <i>Anser brachyrhynchus</i>, greylag goose <i>Anser anser</i> and seabird assemblages.</p> <p>For purposes of this Section, it is the habitats with potential for functional linkage to ornithological designated interest features of the SPAs being assessed, rather than the ornithological features themselves. Ornithological features are considered in Section 5.7: Offshore and intertidal ornithology.</p>
Buchan Ness to Collieston Coast SPA	Overlaps with the southern edge of the offshore part of the Scoping Boundary at the land-water interface.	<p>This site is a stretch of south-east facing cliff in Aberdeenshire, Scotland. The 15km stretch of cliffs has varied coastal vegetation on the ledges and the cliff tops includes maritime heath, grassland and brackish flushes. The site supports internationally important bird species, including fulmar <i>Fulmarus glacialis</i>, guillemot <i>Uria aalge</i>, herring gull <i>Larus argentatus</i>, black-legged kittiwake <i>Rissa tridactyla</i>, shag <i>Phalacrocorax aristotellus</i> and seabird assemblage.</p> <p>For purposes of this Section, it is the habitats with potential for functional linkage to ornithological designated interest features of the SPAs being assessed, rather than the ornithological features themselves. Ornithological features are considered in Section 5.7: Offshore and intertidal ornithology.</p>
Ythan Estuary, Sands of Forvie and Meikle Loch SPA	Approximately 6km south of the Scoping Boundary.	<p>Ythan Estuary, Sands of Forvie and Meikle Loch SPA covers a complex area that contains the long, narrow estuary of the River Ythan, the Sands of Forvie on the east bank of the estuary; the eutrophic Meikle Loch and a marine component covering the area of between Aberdeen and Cruden Bay to the north. The site supports the breeding bird species sandwich tern <i>S. sandvicensis</i>, common tern <i>Sterna hirundo</i>, and little tern <i>Sterna albifrons</i>; wintering bird species pink-footed goose <i>A. brachyrhynchus</i>, redshank <i>Tringa totanus</i>, lapwing <i>Vanellus vanellus</i> and eider <i>Somateria mollissima</i>; and waterfowl species.</p>

Site	Location relative to Scoping Boundary	Features or description
		For purposes of this Section, it is the habitats with potential for functional linkage to ornithological designated interest features of the SPAs being assessed, rather than the ornithological features themselves. Ornithological features are considered in Section 5.7: Offshore and intertidal ornithology .
Troup, Pennan and Lion's Heads SPA	Approximately 4km north-west of the Scoping Boundary.	<p>The site is a 9 km stretch of sea cliffs along the Aberdeenshire coast, which supports large colonies of breeding seabirds including black-legged kittiwake <i>R. tridactyla</i>, common guillemot <i>U. aalge</i>, Northern fulmar <i>F. glacialis</i>, herring gull <i>L. argentatus</i> and razorbill <i>Alca torda</i>.</p> <p>For purposes of this Section, it is the habitats with potential for functional linkage to ornithological designated interest features of the SPAs being assessed, rather than the ornithological features themselves. Ornithological features are considered in Section 5.7: Offshore and intertidal ornithology.</p>
Buchan Ness to Collieston SAC	Overlaps with the southern edge of the offshore part of the Scoping Boundary at the land-water interface.	<p>Designated for the Annex I habitat that are the primary reason for selection of this site:</p> <ul style="list-style-type: none"> • vegetated sea cliffs of the Atlantic and Baltic coasts. <p>The vegetated cliff slopes support a wide range of coastal vegetation types with an abundance of local species, such as Scots lovage <i>Ligusticum scoticum</i> and roseroot <i>Sedum rosea</i> and semi-natural plant communities such as maritime heath, acid peatland and brackish flushes. All these are now rare on the coast of the north-east Scotland and this section of the coastline contains some of the best remaining examples. These communities contain several plants which are associated with dry, calcareous grassland including carline thistle <i>Carlina vulgaris</i> and cowslip <i>Primula veris</i>. Sea wormwood <i>Seriphidium maritimum</i> also occurs. The cliffs support a scattered colony of cliff-nesting seabirds.</p>
Loch of Strathbeg Ramsar site	Overlaps with the middle section of the offshore part of the Scoping Boundary at the land-water interface.	<p>The Loch Strathbeg Ramsar site is composed of a dune slack pool with surrounding wetland habitats (open water transition fen, fen-meadow and alder willow carr), dune and grassland communities. It provides wintering and breeding habitat for a number of important wetland bird species, particularly wildfowl.</p> <ul style="list-style-type: none"> • Ramsar criterion 1: The loch constitutes the largest dune slack pool in Britain and the largest water body in the north-east Scottish lowlands and is one of very few naturally eutrophic lochs of the size in the region. • Ramsar criterion 2: Supporting sandwich tern <i>S. sandvicensis</i>.

Site	Location relative to Scoping Boundary	Features or description
		<ul style="list-style-type: none"> ● Ramsar criterion 4: Supporting the waterbird species at a critical stage in their life cycles, including teal <i>Anas crecca</i> and goldeneye <i>Bucephala clangula</i>. ● Ramsar criterion 5: Supporting assemblages of international importance waterfowl species. ● Ramsar criterion 6: Supporting 1% or more of the individuals in a population of waterbirds, including pink-footed goose <i>A. brachyrhynchus</i>, Whooper swan <i>C. cygnus</i>, graylag goose <i>A. anser</i> and Svalbard barnacle goose <i>B. leucopsis</i>. <p>For purposes of this Section, it is the habitats with potential for functional linkage to ornithological designated interest features of the Ramsar site being assessed, rather than the ornithological features themselves. Ornithological features are considered in Section 5.7: Offshore and intertidal ornithology.</p>
Southern Trench MPA	Overlaps from southeast to northwest following the coastline of the offshore part of the Scoping Boundary for the proposed export cable route.	<p>The Southern Trench MPA is located of the coast of the Aberdeenshire coast and is designated to protect marine mammals (minke whales), burrowed mud, fronts and shelf deeps. The offshore cable route Scoping Boundary intersects the MPA (see Figure 5.5.5 in Appendix 1A).</p> <p>The Southern Trench MPA is a 250m deep trench that runs parallel to the coastline. The dynamic mixing zone of warm and cold waters attracts shoals of herring, mackerel and cod to the area, with the soft sands providing abundant habitat for sandeels (NatureScot, 2020b).</p> <p>The burrowed mud habitat (EUNIS code: A5.361) PMF present in the Southern Trench MPA is characterised by the presence of Norway lobster, crabs, seapens and anemones. The burrowed mud habitat is in favourable condition but is a listed by OSPAR as a threatened and declining habitat. Burrowed mud habitats are highly sensitive to physical disturbance; disturbances to water flow, wave, exposure; and siltation.</p> <p>The conservation objectives of the site for burrowed mud include: "Conserve the diversity, abundance and distribution of typical species associated within the burrowed mud (including <i>Nephrops norvegicus</i>, <i>Pennatula phosphorea</i>, <i>Virgularia mirabilis</i>, <i>Goneplax rhomboides</i>, <i>Munida</i> spp., <i>Calacaris macandreae</i>, and <i>Callianassa subterranean</i>)" (NatureScot, 2020b).</p>

Site	Location relative to Scoping Boundary	Features or description
Turbot Bank MPA	Approximately 62km south of the windfarm OAA and 14km south of the offshore part of the Scoping Boundary for the proposed export cable route.	<p>Turbot Bank is designated for the protection of sandeels, which play an important role in the wider North Sea ecosystem, providing a vital source of food for larger fish, seabirds and marine mammals. Turbot Bank has the potential to act as a source of young sandeels for maintain and restocking surrounding areas.</p> <p>The Conservation Objectives for the Turbot Bank MPA are:</p> <ul style="list-style-type: none"> • “so far as already in favourable condition, remain in such condition; and • so far as not already in favourable condition, be brought into such condition, and remain in such condition. <p><i>With respect to sandeels, this means that the quality and quantity of its habitat and the composition of its population are such that they ensure that the population is maintained in numbers which enable it to thrive.</i></p> <p><i>Any temporary reduction of numbers is to be disregarded if the population of Sandeels is thriving and sufficiently resilient to enable its recovery from such reduction. Any alteration to that feature brought about entirely by natural processes is to be disregarded” (JNCC, 2018).</i></p>

Future baseline

- 5.5.48 Determining the future baseline draws upon information about the likely future use and management of the Project sites in the absence of development, known populations trends (for species), climate change (see **Section 7.1: Climate resilience** in **Chapter 7: Environmental Aspects Whole Project**) and any other proposed developments (consented or otherwise) that may act cumulatively with the Project to affect benthic, epibenthic and intertidal ecology features.
- 5.5.49 It is not possible to conclude that in the absence of the Project, any future baseline is likely to be markedly different from the current baseline. Therefore, it is considered appropriate to use the current baseline for the purpose of this assessment.

Basis for scoping assessment

- 5.5.50 The benthic, epibenthic and intertidal scoping assessment is based on the following key assumptions, which are also set out in **Chapter 2: Project Description**:
- impacts from all phases of the Project for a floating wind farm, grid connection capacity of up to 3GW, from changes to physical processes, such as increased suspended sediments;
 - impacts from changes / loss of habitat from all phases of the Project;
 - impacts from the presence of array and export cables causing anthropogenic EMF; and
 - impacts from the requirement for decommissioning.
- 5.5.51 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.5.12**.
- 5.5.52 The Approved NPF4 2023 introduces new requirements and responds to the global climate and nature crisis (Policy 1). These, amongst other requirements set out, will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 5.5.53 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for adverse impacts on benthic, epibenthic and intertidal ecology (see **Table 5.5.11**). These will evolve over the development process as the EIA progresses and in response to consultation responses. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 5.5.54 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the Scoping assessment.

Table 5.5.11 Relevant benthic, epibenthic and intertidal ecology embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-028	Scour Protection Management Plan will be developed. It will include details of the need, type, quantity, location(s) and installation methods for scour protection.	s.36 conditions and marine licence conditions.
M-033	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to the Project. The MPCP will also include relevant key emergency contact details.	S.36 conditions and marine licence conditions.
M-049	Development of and adherence to a Project Environmental Monitoring Programme (PEMP), which will set out commitments to environmental monitoring in pre-, during and post-construction phases of the Project.	s.36 conditions and marine licence conditions.
M-054	A detailed Cable Burial Risk Assessment (CBRA) will be undertaken to enable informed judgements about burial depth. This should maximise the chance of cables remaining buried whilst limiting the amount of sediment disturbance to that which is necessary. The array cables will typically be buried at a target burial depth between 1-2m below the seabed surface. The final depth of the cable will be dependent on the seabed mobility and CBRA.	s.36 conditions and marine licence conditions.
M-055	Avoidance of key sensitive habitats, where known, through pre-construction surveys and micro-siting of proposed offshore Project infrastructure.	s.36 conditions and marine licence conditions.
M-056	The offshore export cable will be installed at the landfall(s) using most likely either open-cut / cut-and-fill construction or trenchless construction (e.g., HDD). Depending on the site characteristics and the final landfall(s) selection / design taken forward, a cofferdam construction may also be considered.	s.36 conditions and marine licence conditions.
M-063	A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. The CEMP will be the securing mechanism for many measures.	s.36 conditions, marine licence conditions and CEMP.
M-102	The mitigation and control of invasive species measures will be incorporated into a PEMP.	s.36 conditions and marine licences conditions.
M-106	The development of and adherence to a decommissioning programme.	Required under sections 105 and 114 (Energy Act 2004) and marine licence conditions.

Likely significant effects

- 5.5.55 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-feature pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-feature pathway will not lead to a significant impact with regards to the EIA Regulations 2017, the pathway is scoped out from assessment.
- 5.5.56 The likely significant effects on benthic, epibenthic and intertidal ecology are summarised in **Table 5.5.12**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for benthic, epibenthic and intertidal ecological effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.5.57 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considering them is presented after **Table 5.5.12**, supported by an evidence base.

Table 5.5.12 Likely significant benthic, epibenthic and intertidal effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Feature	Further data baseline requirements
Temporary habitat disturbance of seabed habitat (Construction, Operation/Maintenance and Decommissioning)	M-056, M-106	Potential for likely significant effect to benthic and intertidal resources through temporary, direct habitat loss and disturbance.	Scoped in: The presence and extent of benthic and intertidal habitats and features will be informed through the use of new site-specific survey data. The area of habitat disturbance will be defined using a precautionary approach. The sensitivity of habitat types to the impact will be determined through available literature and expert knowledge, based on the habitats' resilience and resistance to impacts.	Benthic, epibenthic and intertidal ecology.	New site-specific survey data for benthic, epibenthic and intertidal ecology features.
Temporary increase in suspended sediment deposition (Construction, Operation/Maintenance and Decommissioning)	M-056, M-106	Potential for likely significant effect through smothering of sensitive benthic habitats and species.	Scoped in: The effects on benthic, epibenthic and intertidal ecology from increased suspended sediment deposition will be informed by the findings and assessment of the marine geology, oceanography and physical processes. The sensitivity of habitat types to the impact will be determined through available literature and expert knowledge, based on the habitats' resilience and resistance to impacts.	Benthic, epibenthic and intertidal ecology.	New site-specific survey data for benthic, epibenthic and intertidal ecology features.
Direct and indirect seabed disturbances	M-106	Potential for likely significant effect through	Scoped in: The effects on benthic, epibenthic and intertidal ecology	Benthic, epibenthic	The assessment will be informed by the findings of

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Feature	Further data baseline requirements
leading to the release of sediment contaminants (Construction, Operation/Maintenance and Decommissioning)		release of sediment bound contaminants into the water column.	from changes to water quality will be informed by the findings and assessment of the water and sediment quality assessment. The sensitivity of habitat types to the impact will be determined through available literature and expert knowledge, based on the habitats' resilience and resistance to impacts.	and intertidal ecology.	site-specific sediment contaminant analyses.
Long-term habitat loss (Operation/Maintenance)	M-054, M-055, M-056	Following the construction of the Project, there is potential for long-term habitat loss or alteration directly associated with the presence of, for example, scour and cable protection. Potential for likely significant effects through colonisation on floating structures.	Scoped in: The presence and extent of benthic, epibenthic and intertidal habitats and features will be informed through the use of existing and new site-specific survey data. The area of habitat loss will be defined using a precautionary approach to determine the maximum loss of seabed.	Benthic, epibenthic and intertidal ecology.	New site-specific survey data for benthic, epibenthic and intertidal ecology features.
Increased risk of introduction of spread of marine INNS (Construction and Decommissioning)	M-033, M-049, M-102, M-106	Potential for likely significant effect through increased vessel movements during construction (e.g., ballast water) and may subsequently impact biodiversity and benthic ecology of the area.	Scoped in: The potential introduction or spread of marine INNS and subsequently impact to local benthic ecology features will be assessed based on current industry understanding, available literature and expert knowledge.	Benthic, epibenthic and intertidal ecology.	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Feature	Further data baseline requirements
Colonisation of hard substrates (Operation/Maintenance)	M-028	Potential for likely significant effect through an increase in local biodiversity and alterations to benthic ecology from introduction of new habitat in the form of project infrastructure, including external cable protection.	Scoped in: The potential impacts on benthic, epibenthic and intertidal ecology features will be considered in terms of effects on biodiversity and productivity. The area of introduction of hard substrate will be defined using a precautionary approach to determine the maximum area of impact. The sensitivity of habitat types to the impacts will be determined through available literature and expert knowledge, based on the habitats' resilience and resistance to impacts.	Benthic, epibenthic and intertidal ecology.	N/A
Accidental pollution events (Construction, Operation/Maintenance and Decommissioning)	M-33, M-049, M-102, M-106	No likely significant effect. Pollution of water and sediment through accidental release of pollutants or chemicals from vessels, which could affect benthic, epibenthic and intertidal ecology throughout the Project area accessed by vessels.	Scoped out: See rationale in section below paragraph 5.2.48 .	N/A	N/A
EMF generated by array and export cables (Operation/Maintenance)	M-054, M-056	Potential for likely significant effect through EMF sources by export cables and suspended array cables could increase scope for anthropogenic EMFs in	Scoped in: The potential impacts on benthic, epibenthic and intertidal ecology features will be considered in terms of the effects on navigation and behaviours of organisms. The sensitivity of habitat types and organisms to the	Benthic, epibenthic and intertidal ecology.	New site-specific survey data for benthic, epibenthic and intertidal ecology features.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Feature	Further data baseline requirements
		the water column and react with benthic, epibenthic and intertidal ecology.	impacts will be determined through available literature and expert knowledge, based on the habitats and organisms' resilience and resistance to impacts.		
Potential impacts on the Southern Trench MPA, including long-term habitat loss, temporary habitat disturbance, and long-term habitat changes (Construction and Decommissioning)	M-028, M-033, M-049, M-054, M-055, M-056, M-063, M-102	Likely significant effect to the Southern Trench MPA and features through the proposed export cable corridor.	Scoped in: The potential impacts on burrowed mud habitat will be considered in terms of the proposed export cable corridor. While the preferred export cable corridor has not yet been identified, the cable corridor offshore Scoping Boundary runs through the Southern Trench MPA. Therefore, it is not possible to scope out any impacts from the installation of the export cable to the burrowed mud habitat of the Southern Trench MPA.	Burrowed mud habitat.	New site-specific survey data for benthic, epibenthic and intertidal ecology features.
Potential impacts on designated sites, including permanent habitat loss temporary habitat disturbance, long-term habitat changes, and increases in suspended sediment (Construction and Decommissioning)	M-028, M-033, M-049, M-054, M-055, M-056, M-063, M-102	Likely significant effect to other designated sites listed in Table 5.5.10 .	Scoped in: The potential impacts on designated sites listed in Table 5.5.10 and their features cannot be scoped out as there are a number of possible offshore export cable corridor options at time of Scoping.	Benthic, epibenthic and intertidal ecology.	New site-specific for benthic, epibenthic and intertidal ecology features.

Impacts scoped out of assessment

- 5.5.58 One potential effect has been scoped out from further assessment, resulting from a conclusion of no likely significant effect. This conclusion has been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgement on the potential for impact from such projects more widely. The conclusion follows (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.
- 5.5.59 There is **a risk of pollution being accidentally released during the construction, operation (and maintenance) and decommissioning phases** from sources including vessels and equipment. However, accidental pollution events are not considered to result in a significant effect on benthic, epibenthic and intertidal ecology features. The magnitude of an accidental spill will be limited by the size of chemical or oil inventory on construction vessels. In addition, release of hydrocarbons would be subject to rapid dilution, weathering and dispersion and would be unlikely to persist in the marine environment. The likelihood of an incident will be reduced by as all vessels on the Project will be required to comply with strict environmental controls with the implementation of Project Environmental Monitoring Programme (PEMP) (embedded measure M-102) and Marine Pollution Contingency Plan (embedded measure M-033), which will be approved by the relevant stakeholders and secured through s.36 conditions, marine licence conditions and CEMP (embedded measure M-063). These plans include planning for accidental spills, address all potential contaminant release and include key emergency contact details. It will also set out industry good practice and OSPAR and International Convention for the Prevention of Pollution from Ships (MARPOL) guidelines for preventing pollution at sea. Due to the implementation of control measures and small quantities of hydrocarbons and chemicals it is proposed to scope this impact out of further consideration within the EIA.

Cumulative effects

- 5.5.60 Cumulative effects on benthic, epibenthic and intertidal ecology resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the CEA screening exercise.
- 5.5.61 The following impacts from the Project have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects.
- 5.5.62 With regards to cumulative effects from offshore wind projects it should be noted that although there would be an aggregated direct and permanent loss of habitat during the operational phase of the wind farm it is anticipated that, given the locality of the predicted impacts, cumulative impacts during construction, operation (and maintenance) and decommissioning phases would not be considered significant. If the situation were to arise where several export cables were to be under construction concurrently, there may be potential for cumulative impacts to arise, however, these are not expected to be significant.
- 5.5.63 At this stage, impacts likely to be scoped into the cumulative effects assessment include:
- temporary increase in suspended sediment concentrations and sediment deposition, during the construction phase;
 - long-term habitat loss / change from the presence of turbine infrastructure, scour protection and cable protection;

- changes to seabed habitats arising from effects on coastal processes, including scour effects and changes in the sediment transport and wave regimes resulting in potential effects on benthic communities;
- impacts on the Southern Trench MPA site and receptors during the construction; operation/maintenance; and decommissioning phases, including permanent habitat loss, temporary habitat disturbance, and long-term habitat changes; and
- impacts to other designated sites and receptors during the construction; operation/maintenance; and decommissioning phases, including permanent habitat loss temporary habitat disturbance, long-term habitat changes, and increases in suspended sediment.

Transboundary effects

- 5.5.64 The potential effects from construction, operation (including maintenance) and decommissioning on benthic, epibenthic and intertidal receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. Due to the localised and small-scale nature of the impacts on benthic, epibenthic and intertidal ecology, significant transboundary impacts are considered to be unlikely. It is, therefore, proposed that transboundary benthic impacts are scoped out from further consideration within the EIA Report.

Proposed approach to the EIA Report

- 5.5.65 The impact assessment methodology will be based on that described in the above section 'Assessment methodology' and **Chapter 4: Approach to Scoping and EIA**, aligned with the key guidance documents produced on impact assessment of ecological receptors (CIEEM, 2018), evidence from other offshore wind farms, and expert opinion. The following section provides further context, including consultation and engagement that will be undertaken to further inform the assessment.
- 5.5.66 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-Application Consultation (PAC) process, which is set out in **Chapter 4: Approach to Scoping and EIA**. Key consultees of relevance to the benthic, epibenthic and intertidal ecology chapter include NatureScot, MS-LOT, Marine Scotland Science (MSS) and SEPA. Consultee responses will be addressed, and the scope of the assessment will be modified accordingly in the EIA Report where possible.
- 5.5.67 The benthic, epibenthic and intertidal ecology study area (**Figure 5.5.1 in Appendix 1A**) was informed by tidal excursion (see **Section 5.1: Marine geology, oceanography and physical processes**), to reflect the furthest distance disturbed sediments are likely to travel. This study area will be reviewed and amended in response to such matters as refinement of the offshore components, identification of additional impact pathway, and in response to feedback from consultation where appropriate. Additionally, information from site-specific modelling, and information from the Coastal Processes Technical Report will also inform the final study area.
- 5.5.68 The baseline will be established through the compilation of both desk-based studies and site-specific field surveys. The key data sources to be utilised to inform the baseline and assessment are listed in **Table 5.5.7**. Site-specific surveys will help fill data gaps that currently exist across the Project's benthic, epibenthic and intertidal ecology study area. Surveys will identify the extent and distribution of key habitat types and receptors, with a focus on any species or habitats of conservation importance, that might exist across the area of interest. The methodology for the survey will be consulted on with key stakeholders in due course.

5.5.69

The likely significant effects on benthic, epibenthic and intertidal features from the precautionary approach scenarios will be described and assessed. The assessment of potential impacts on benthic, epibenthic and intertidal features will take into account the magnitude and duration of the impact, the reversibility of the impact and the timing and frequency of the activity. The sensitivity of features will also be considered as part of the impact assessment. The sensitivity assessment of the species will take into account the current status of the species, and its importance (locally, regionally, nationally or internationally). The assessment will also include the consideration of potential significance of cumulative effects as appropriate, as set out in **Section 4.2** in **Chapter 4: Approach to Scoping and EIA**.

5.6 Marine mammals

Introduction

5.6.1 The marine mammal assessment will consider the potential likely significant effects on marine mammals that may arise from the construction, operation and maintenance, and decommissioning of the Project. This Section of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA) for marine mammals, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA. Marine mammals that have been considered are cetaceans (whales, dolphins, and porpoises) and pinnipeds (hereafter ‘seals’ when discussing the two species of interest for the Project).

5.6.2 This marine mammal section interfaces with other aspects and, as such, should be considered alongside these, namely:

- **Section 5.1: Marine geology, oceanography and physical processes:** Marine mammal receptor species are potentially sensitive to changes in physical processes, therefore information from that section will inform the marine mammal assessment.
- **Section 5.2: Marine water and sediment quality:** Marine mammal receptor species and their prey are sensitive to accidental pollution, increased concentration of suspended solids and the leaching of toxins. The marine water and sediment quality section will therefore inform the marine mammal assessment.
- **Section 5.3: Underwater noise and vibration:** The underwater noise and vibration section describes pathways of effect from noise sources on pertinent marine mammal receptor species groups; therefore, information from the underwater noise assessment will inform the marine mammal assessment.
- **Section 5.4: Electromagnetic fields (EMF):** There is potential for EMF emissions to affect marine mammals as they use the marine environment as part of their lifecycle, therefore the EMF section will be used to inform the marine mammal assessment.
- **Section 5.5: Benthic, epibenthic and intertidal ecology:** The marine mammal receptor species are sensitive to possible effects on prey resource and habitat. Therefore, the benthic, epibenthic and intertidal ecology section will inform the marine mammal assessment.
- **Section 5.8: Fish and shellfish ecology:** Marine mammals considered within the EIA will include species that rely on fish and shellfish species as part of their diet and therefore impacts to fish and shellfish could potentially indirectly affect marine mammals. The information from the fish and shellfish ecology section will be used to inform the marine mammal assessment.
- **Section 5.9: Commercial fisheries:** Some marine mammals rely on species targeted for commercial fishing, such as whiting, cod, sandeel and salmon, and therefore impacts to commercially targeted fish species could potentially indirectly affect marine mammals. The information from the commercial fisheries section will be used to inform the marine mammal assessment.
- **Section 7.1: Climate resilience:** The interference of climate resilience with marine mammals is captured in the In-Combination Climate Impacts (ICCI) assessment.

Legislative and policy context

- 5.6.3 This Section identifies the relevant legislative and policy context which has informed the scope of the marine mammal assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context**, which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework**, which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 5.6.4 In order to provide a robust evidence base, **Table 5.6.1** below presents a summary of legislation and policies relevant for the marine mammal assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance of these to this Section.

Table 5.6.1 UK legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
<p>International: European Commission Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora 1992</p> <p>National: The Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (referred to as the ‘Habitats Regulations’)</p>	<ul style="list-style-type: none"> All cetaceans and pinnipeds in Northern European waters are listed under Annex IV of the EU Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) as European protected species (EPS) of community interest and in need of strict protection. The harbour porpoise (<i>Phocoena phocoena</i>), bottlenose dolphin (<i>Tursiops truncatus</i>), harbour seal (<i>Phoca vitulina</i>), and grey seal (<i>Halichoerus grypus</i>) also have protection under Annex II as species of community interest, whose conservation requires the designation of special areas of conservation (SACs). The Habitats Regulations make it an offence to kill, injure or disturb any EPS. Disturbance occurs where an act is likely to have an ecologically significant adverse effect on a significant number of animals, affecting the local distribution or abundance of the species. The four-stage process of determining the absence of adverse effects on European sites under the Habitats Directives/Regulations is known as a Habitat Regulations Appraisal (HRA). Stage 1 of this process is known as HRA Screening. This will be provided separately to the Scoping Report.
<p>International: EU Directive 2008/56/EC – Marine Strategy Framework Directive</p> <p>National: Marine Strategy Regulations 2010</p>	<p>Paragraph 3.7.10 in Chapter 3: Legislative and Policy Context sets out the legislative framework for the MSFD. The MSFD sets out measures for Good Environmental Status (GES) in the marine environment. Descriptors relevant to this technical assessment include:</p> <ul style="list-style-type: none"> Descriptor 11 – Underwater noise

Relevant legislation and policy	Relevance to the assessment
National: Marine Environment (Amendment) (EU Exit) Regulations 2018	
The Convention on the Conservation of Migratory Species of Wild Animals (the ‘Bonn Convention’)	<ul style="list-style-type: none"> Requirements to conserve migratory species and their habitats by providing strict protection for endangered migratory species (Appendix I of the Convention) and lists migratory species which would benefit from multilateral agreements for conservation and management (Appendix II of the Convention). There are 44 cetacean species and six pinniped species listed under Appendix I of the Bonn Convention.
The Convention on the Conservation of European Wildlife and Natural Habitats (the ‘Bern Convention’)	<ul style="list-style-type: none"> Aims to ensure conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention). There are 30 species of cetacean listed under Annex II of the Bern Convention (strictly protected fauna), including harbour porpoise, bottlenose dolphin, common dolphin (<i>Delphinus delphis</i>), Risso’s dolphin (<i>Grampus griseus</i>), white-beaked dolphin (<i>Lagenorhynchus albirostris</i>) and minke whale (<i>Balaenoptera acutorostrata</i>). All other cetacean species, as well as both grey and harbour seals, are listed under Annex III of the Bern Convention (protected fauna).
Wildlife and Countryside Act 1981	<ul style="list-style-type: none"> The Act makes it an offence to intentionally (or recklessly) kill, injure or take any wild animal listed on Schedule 5 of the Act, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places. All cetacean species are protected within the 12 nm territorial waters under Schedule 5 of the Wildlife and Countryside Act.
Nature Conservation (Scotland) Act 2004	<ul style="list-style-type: none"> The Nature Conservation (Scotland) Act builds upon the Wildlife and Countryside Act 1981 by further improving protection of cetaceans from intentional disturbance. This further protection incorporates risk from reckless disturbance.
Marine (Scotland) Act 2010	<ul style="list-style-type: none"> Provides a framework to balance competing demands on Scotland’s marine environment. While protecting Scotland’s seas, it also promotes economic investment and growth in sectors such as marine renewable energy. The Act also provides improved protection for seals from intentional or reckless harassment, where certain haul-out sites have been designated as Special Areas of Conservation (SACs).

Relevant legislation and policy	Relevance to the assessment
The European Biodiversity Strategy to 2030	<ul style="list-style-type: none"> Contains specific actions and commitments, such as transforming at least 30% of Europe's land and sea into effectively managed protected areas. The actions include restoring marine ecosystems and international ocean governance along with strict protection of existing Natura 2000 areas. The protection conferred to marine mammals and Natura 2000 areas through this strategy is accounted for within this scoping report.
The Aichi Biodiversity Targets	<p>The United Nations' (UN) Convention on Biological Diversity, including the 'Aichi' biodiversity targets, has five strategic goals:</p> <ul style="list-style-type: none"> Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society; Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use; Strategic Goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity; Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services; and, Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.
The OSPAR Convention (1992)	<p>The Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention) will be implemented through OSPAR's North-East Atlantic Environment Strategy 2030. Contained within the OSPAR Convention are a series of Annexes which deal with the following specific areas:</p> <ul style="list-style-type: none"> Annex I: Prevention and elimination of pollution from land-based sources; Annex II: Prevention and elimination of pollution by dumping or incineration; Annex III: Prevention and elimination of pollution from offshore sources; Annex IV: Assessment of the quality of the marine environment; and Annex V: On the protection and conservation of the ecosystems and biological diversity of the maritime area. <p>The most relevant species listed in the OSPAR Convention is the harbour porpoise</p>
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crisis.

Relevant legislation and policy	Relevance to the assessment
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. Identified terrestrial and marine planning to play a key role in meeting targets.
Scottish Planning Policy (2014) <ul style="list-style-type: none"> - Paragraph 169 - Paragraph 195 - Paragraph 199 - Paragraph 214 	<ul style="list-style-type: none"> Paragraph 169 Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology. Paragraph 195 Looks at how planning authorities, have a duty under the Nature Conservation (Scotland) Act 2004 to make sure they further the conservation of biodiversity. This must be reflected in development plans. Paragraph 199 Talks about how plans should make sure they address the potential effects of development on the natural environment. They must consider the natural and cultural components together and promote opportunities for enhancement. Paragraph 214 identifies that the presence of legally protected species is important in the consideration of planning decisions. If there is evidence to suggest that a protected species is present on site. Protection should be factored into the planning and design of the development
The Scottish Biodiversity Strategy (Biodiversity Scotland, 2016)	<ul style="list-style-type: none"> This policy outlines Scottish Government's plans for conserving current and future biodiversity. As of the most recent report, 57% of marine mammal species commonly occurring in Scottish waters are deemed in favourable condition.
The UK Post-2010 Biodiversity Framework and the Scottish Biodiversity Strategy: Revised	<ul style="list-style-type: none"> The UK BAP identifies priority species that are the most threatened and require conservation. UK BAP priority species include the cetacean and seal species present in UK waters. This list of priority

Relevant legislation and policy	Relevance to the assessment
Implementation Plan (2018-2020) (JNCC, 2018)	species is still used to inform statutory lists of priority species in the UK.
Marine Policy	
UK Marine Policy Statement 2011	<ul style="list-style-type: none"> Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. Biodiversity to be protected, conserved, and where appropriate recovered and loss halted. Healthy marine and coastal habitats can occur across their natural range and able to support strong, biodiverse biological communities and the functioning of healthy, resilient and adaptable marine ecosystems. The oceans to have viable populations of representative, rare, vulnerable, and valued species.
Scotland's National Marine Plan (2015) <ul style="list-style-type: none"> - GEN 9 Natural Heritage - GEN 13 Noise - GEN 21 Cumulative Impacts - CABLES 1 - CABLES 2 	<ul style="list-style-type: none"> GEN 9 requirement for development to comply with legal requirements for protected areas and protected species; not to result in significant impact on the national status of Priority Marine Features; and protect and, where appropriate, enhance the health of the marine area. GEN 13 requirement for development to avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects. GEN 21 Proposals should enable coexistence with other development sectors and activities and requirement for cumulative impacts affecting the ecosystem to be addressed. CABLES 1 requirement for cable and network owners to provide evidence that the development and activity minimise impacts, where possible, on the environment and appropriate and proportionate environmental consideration and risk assessments should be provided which may include cable protection measures and mitigation plans. CABLES 2 requires the following to be taken into account when reaching decision regarding cable development: <ul style="list-style-type: none"> ▶ cables should be suitably routed to provide sufficient requirements for installation and cable protection; ▶ new cables should implement methods to minimise impacts on the environment, seabed and other users; ▶ cables should be buried to maximise protection where there are safety or seabed stability risks and to reduce conflict with

Relevant legislation and policy	Relevance to the assessment
	<p>other marine users and to protect the assets and infrastructure;</p> <ul style="list-style-type: none"> ▶ where burial is demonstrated not to be feasible, cables may be suitably protected; and ▶ consideration of the need to reinstate the seabed, undertake post-lay surveys and monitoring and carry out remedial action where required.
Sectoral Marine Plan – Offshore Wind (2020)	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. • Section 4.1 lists a range of potential negative impacts identified through plan-level SEA, HRA and SEIA which require further consideration through project level assessments, including: <ul style="list-style-type: none"> ▶ “loss of / damage to marine and coastal habitats; ▶ effects from pollution releases on species and habitats; ▶ issues relating to navigational safety, aviation and collision risk; ▶ effects arising from noise, vibration, light, dust and shadow flicker; ▶ effects on water quality; and ▶ effects on ecological status.”
Scottish Priority Marine Features (SNH, 2014)	<p>The term Priority Marine Features relates to habitats and species in Scotland deemed to be conservation priorities. All marine mammal species recorded in and surrounding the Project are listed in this policy.</p>
Local Policy	
Aberdeenshire Council Natural Heritage Strategy 2019-2022 <ul style="list-style-type: none"> - Aim 3 – Promotion of Natural Heritage 	<ul style="list-style-type: none"> • Objective 3.1 Aberdeenshire Council engages in and promotes key natural heritage issues – Biodiversity of Common bottlenose dolphin; • Objective 3.2 – Promote, protect and enhance natural heritage through cross-organisation partnership working; and, • Objective 3.4 – Promote prevention and management of invasive non-native species spread in Aberdeenshire.

Technical guidance

5.6.5 Technical guidance that has been used to define the assessment is set out in **Table 5.6.2** below.

Table 5.6.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
The protection of Marine European Protected Species from injury and disturbance: Guidance for Inshore Waters (July 2020 Version) (Marine Scotland, 2020)	This advice and guidance relates to regulations prohibiting the deliberate and reckless capture, injury, killing, and disturbance of marine European protected species (EPS), which include all cetacean species. Although seals are not EPS, the mitigation measures outlined can also be applied to reduce the risk of impacts to seals (and other marine species).
JNCC guidelines for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010a)	This set of mitigation measures offers guidance on reducing risk of injury to marine mammals during pile driving. If followed, risk of injury is likely to be negligible. The guidelines are split by survey planning, mitigation, and reporting, to increase ease of use.
JNCC guidelines for minimising the risk of disturbance and injury to marine mammals whilst using explosives (JNCC, 2010b)	This is a set of mitigation measures to reduce risk of injury to marine mammals during detonation of unexploded ordnance and the use of other explosives. If followed, risk of injury is likely to be negligible. The guidelines are split by survey planning, mitigation, and reporting, to increase ease of use.
Guidance on the Offence of Harassment at Seal Haul-out Sites (Marine Scotland, 2014)	Section 117 of Marine Scotland Act 2010 makes it an offence to intentionally harass seals at haul-out sites. The document provides guidance as to what this may entail and advises on what appropriate actions should be taken if harassment is reported. This guidance assists with the licensing process in relation to harassment and provides advice on how to behave responsibly around haul-out sites.
Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects (Southall <i>et al.</i>, 2019)	This peer-reviewed publication is commonly used in assessments to provide information on function hearing groups of marine mammals. The authors present values at which underwater noise levels can cause a temporary threshold shift (TTS) in hearing, meaning hearing is temporarily affected, or a permanent threshold shift (PTS) in hearing, meaning hearing is affected permanently. These values are typically used in conjunction with underwater noise modelling to assess the effect on species at the individual and population level.
Scottish Marine Wildlife Watching Code (SNH, 2017d)	These guidelines provide advice for leisure and commercial activities associated with wildlife watching. They include information detailing activities likely to disturb wildlife, how to safely approach them and how to view with minimum disturbance. This code provides guidance for marine users to reduce the disturbance on marine life, including marine mammals.

Study area

- 5.6.6 The study area for the marine mammal assessment encompasses the Project's Scoping Boundary, defined as the option agreement area and the offshore export cable corridor plus a 60km buffer. **Figure 5.6.1: Study area for marine mammal assessment surrounding and including the MarramWind Scoping Boundary** in **Appendix 1A** identifies the marine mammal study area.
- 5.6.7 The marine mammal study area has been determined based on the zone of influence (Zol) of the Project's activities. The main impact pathways of concern to marine mammals

generally relate to underwater noise. The ZoI, therefore, considers the propagation of underwater noise and the sensitivity of marine mammals to this impact.

- 5.6.8 The approach taken for cetaceans in this Scoping Report is to use marine mammal management units (MUs), whereby these are ‘functionally linked’ to protected areas. Given that the size of some MUs is greater than the UK territorial waters, the effective deterrent ranges (EDRs) for activities relevant to the Project (geophysical surveys (including seismic), piling and UXO clearance), as outlined in the JNCC (2010b) guidance document, were also considered in determining the study area. This guidance focuses on harbour porpoise (*Phocoena phocoena*) but, as these are the most acoustically sensitive species of marine mammal in UK waters, the EDRs can be applied to other marine mammal species and, in these cases, should be considered as precautionary.
- 5.6.9 For harbour (*Phoca vitulina*) and grey (*Halichoerus grypus*) seals, consideration is given to the seal management areas (SMAs), as opposed to OSPAR Regions, as the SMAs are based on expert knowledge and opinion of seal ecology, using the most pragmatic approach to management of seals, without inferring discrete populations (SCOS, 2021).
- 5.6.10 Consequently, the decision was made that the study area for marine mammals should comprise the scoping boundary plus a 60km buffer zone. This was largely based on taking a proportionate approach in relation to the potential impact of the activities (minimum EDR of 12km for geophysical surveys and maximum EDR of 26km for UXO clearances, with mitigated piling at 15km), current guidance on assessing the significance of noise (e.g. JNCC, 2010a) and current knowledge of the relevant species of marine mammals.
- 5.6.11 The study area will be reviewed and may be amended in response to design changes or feedback from consultation.

Consultation

- 5.6.12 This Section has been informed by engagement and discussion with various stakeholders. **Table 5.6.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 5.6.3 Consultation

Consultee	Comments and considerations	How this is accounted for
NatureScot and Marine Scotland Licensing Operations Team (MS-LOT)	An online stakeholder consultation workshop took place on 01/09/2022 to discuss digital aerial survey (DAS) for the Project. NatureScot commented that DAS (and a 4km buffer) may not be sufficient to fully characterise marine mammal abundance and density and may need to be supplemented by passive acoustic monitoring (PAM). This is to be discussed further and a decision made between NatureScot and Marine Scotland.	MS-LOT and MSS confirmed to the Project team that they will respond to these questions in the advisory response to be provided during the Scoping Report consultation process. This is understood to mean via the Scoping Opinion. The responses will therefore be addressed in the EIA Report
NatureScot, MS-LOT and Marine Scotland Science (MSS)	An offshore EIA Scoping workshop was held on 29th and 30th September 2022. During a technical break-out session and after the workshop, the Project team submitted the	MS-LOT and MSS confirmed to the Project team that they will respond to these questions in the advisory response to be provided during the Scoping Report

Consultee	Comments and considerations	How this is accounted for
	<p>following written questions to MS-LOT and MSS in relation to marine mammals:</p> <ul style="list-style-type: none"> • Can the regulators advise on the potential need for PAM for the MarramWind project? • Can the regulators advise on an approach to assessing collision risk with floating foundation mooring lines? • Are there any data sources that should be considered that were not noted in the workshop (i.e. as presented in this Section)? • How has NatureScot calculated the EDR for the four marine mammals in their comments on the ECC EPS risk assessment? • Can MS-LOT advise on what point in time the cumulative effect assessment should start, e.g. forward from MarramWind, or from the first offshore wind project in Scotland, or some other time? 	<p>consultation process. This is understood to mean via the Scoping Opinion. The responses will therefore be addressed in the EIA Report.</p> <p>Advice from MS-LOT regarding the CEA is reported upon in Chapter 4: Approach to Scoping and EIA.</p>

Assessment methodology

Introduction

5.6.13 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**; however, whilst this has informed the approach that has been used in this marine mammal section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the marine mammal assessment.

5.6.14 In some instances, the Project will retain flexibility in terms of the options for methods and approaches to be applied during the construction phase. Where this is the case, for each combination of effect and receptor, the assessment will be based on a precautionary worst-case scenario and where this approach is taken it will be clearly indicated in the EIA Report together with a definition of the worst-case scenario for the specific assessment.

Baseline characterisation

5.6.15 Baseline data are collected to better understand the potential impacts and effects identified in scoping.

5.6.16 Available literature and data are assessed to identify marine mammal species distributions, abundances, and designated sites that may be affected by the Project.

5.6.17 Species identified from the literature likely to occur in the area, whether resident, semi-resident, vagrant or migratory, will be highlighted. The most frequently occurring species will be carried forward to assessment, whereas species rarely recorded have been noted but not carried forward. For regularly occurring species, the distribution and abundance are considered: for example, how they use the area spatially and temporally and if the area is

ecologically important (e.g. if there is any evidence of it being a feeding, breeding or calving site).

Assessment methodology

- 5.6.18 This Scoping Report sets out the potential environmental effects associated with the Project and identifies those proposed to be scoped into or out of the EIA process. The EIA scoping assessment considers value, sensitivity and likelihood of significance of the impacts to marine mammals. It includes embedded mitigation, such as those measures built into the Project design and implementation of best practices.
- 5.6.19 All offshore infrastructure, including foundations, cables, offshore substation platforms and onshore landfall cable infrastructure will form part of the assessment. The EIA Report will assess the potential impacts of construction, operation and maintenance, and decommissioning activities based on experience and best practice; however, further consents or licences will be applied for, if required.
- 5.6.20 Impacts resulting from the Project may have an adverse, positive or no effect on marine mammals. The process of identifying and assessing effects will involve consideration of all types of effect (see **Table 5.6.11**).

Sensitivity

- 5.6.21 The sensitivity of marine mammals to potential impacts will be determined based on evidence of responses to stimuli and professional judgement. The assessment will be based on species' ecology and behaviour, using the criteria set out in **Table 5.6.4**. Professional judgement will be applied to take account of information available on the responses of marine mammals to various stimuli (e.g. underwater noise, where such data exist) and whether their ecology makes them vulnerable to potential impacts. A description is provided in **Table 5.6.4** of how the sensitivity of the receptor species will be assessed.

Table 5.6.4 Definition of level of sensitivity for marine mammal receptors.

Value	Description
High	The species has very limited tolerance to sources of disturbance such as noise, prey disturbance and vessel movements
Medium	The species has limited tolerance to sources of disturbance such as noise, prey disturbance and vessel movements
Low	The species has some tolerance to sources of disturbance such as noise, prey disturbance and vessel movements
Negligible	The species is generally tolerant to sources of disturbance such as noise, prey disturbance and vessel movements

Magnitude

- 5.6.22 Impacts on marine mammals will be assessed in terms of their magnitude. Magnitude refers to the scale or duration of an impact and will be determined on a quantitative basis, where possible. This may relate to the area of habitat lost to the development footprint in the case

of a habitat feature or predicted loss of individuals in the case of a marine mammal population. Magnitude is assessed within four levels, as detailed in **Table 5.6.5**.

5.6.23 For certain species of marine mammal, magnitude of change will be based on guidelines such as the ‘Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise’ (JNCC, 2010a). There is also a matter of professional judgement, using peer-review publications, research, and descriptive terminology to determine the magnitude of change.

Table 5.6.5 Definition of level of magnitude for marine mammal receptors

Magnitude	Definition
High	A change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site that is predicted to irreversibly alter the population in the short-to-long term and to alter the long-term viability of the population and/or the integrity of the protected site. Recovery to baseline levels from that change predicted to be achieved in the long term (i.e. more than five years) following cessation of the Project activity.
Medium	A change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site that occurs in the short and long term, but which is not predicted to alter the long-term viability of the population and/or the integrity of the protected site. Recovery to baseline levels from that change predicted to be achieved in the medium term (i.e. no more than five years) following cessation of the Project activity.
Low	A change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site that is sufficiently small-scale or of short duration to cause no long-term harm to the feature/population. Recovery to baseline levels from that change predicted to be achieved in the short term (i.e. no more than one year) following cessation of the Project activity.
Negligible	Very slight change from the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site. Recovery to baseline levels from that change predicted to be rapid (i.e. no more than circa six months) following cessation of the Project activity.

Effect significance

5.6.24 For the purposes of assessment, and in line with common practice, only those effects that are of moderate or major significance will be assessed as significant or potentially significant in EIA terms. The significance of an effect is determined by considering the overall importance (defined here as the overall sensitivity) of the receptor and the magnitude of the impact using a matrix-based approach, provided in **Plate 4.2.2** in **Chapter 4: Approach to Scoping and EIA**. The overall significance of an effect will be determined using the matrix below and professional judgment (**Table 5.6.6**).

Table 5.6.6 Matrix to guide determination of effect significance

		Magnitude of change			
		High	Medium	Low	Very Low
Value/Sensitivity	High	Major	Major	Moderate (potentially significant)	Minor
	Medium	Major	Moderate (not significant)	Minor	Minor
	Low	Moderate (potentially significant)	Minor	Minor	Negligible
	Very Low	Moderate (not significant)	Minor	Negligible	Negligible

Environmental measures and residual effects

- 5.6.25 For each environmental aspect, the EIA process will systematically identify impacts and effects and take into consideration environmental measures that the Project will adopt. These embedded measures include avoidance, best practice and design commitments. For any effects considered to be of moderate or major significance, additional mitigation/enhancement measures (beyond embedded measures) are proposed to further reduce the significance of effect.
- 5.6.26 Residual effects on marine ecological receptors (i.e. effects following implementation of specific mitigation measures) are then identified and their significance determined.

Baseline conditions

Data sources

- 5.6.27 An initial desk-based literature review has identified key data sources (**Table 5.6.7**) that have been used to inform the Scoping Report; these include Project-specific survey data. It must be noted that this is not an exhaustive list to which the assessment will be restricted; where new, relevant data are published, these would be incorporated into the EIA assessment. Information on the abundance and distribution of marine mammals in the study area is available from the Small Cetaceans in European Atlantic waters and the North Sea (SCANS) surveys with the study area falling inside blocks R and T, and close to block S (Hammond *et al.*, 2021; Lacey *et al.*, 2022). Hague *et al.*, (2020) have compiled regional baseline data for marine mammals in Scottish waters, collating datasets from 1965 to 2022. For seals, at sea distribution has been modelled based on telemetry, aerial survey, and colony count data throughout the British Isles (SCOS, 2021; Carter *et al.*, 2022).

Table 5.6.7 Key sources to inform baseline for marine mammals

Source	Date	Summary	Coverage of study area
Atlas of cetacean distribution in north-west European waters (Reid <i>et al.</i>, 2003)	Accessed 2022	This Atlas provides an account of the distribution of all 28 cetacean species that are known to have occurred in the waters off north-west Europe, at the time of publication.	Full coverage of study area.
Modelled density surfaces of cetaceans in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys (Lacey <i>et al.</i>, 2022)	Accessed 2022	The report describes the density surface modelling for those cetacean species for which sufficient data were obtained during SCANS-III surveys across the North-East Atlantic. Species included the harbour porpoise (<i>Phocoena phocoena</i>), bottlenose dolphin (<i>Tursiops truncatus</i>), white-beaked dolphin (<i>Lagenorhynchus albirostris</i>), common dolphin (<i>Delphinus delphis</i>), striped dolphin (<i>Stenella coeruleoalba</i>), long-finned pilot whale (<i>Globicephala melas</i>), all beaked whale species combined (<i>Ziphiidae</i>), minke whale (<i>Balaenoptera acutorostrata</i>) and fin whale (<i>Balaenoptera physalus</i>).	Full coverage of study area.
Revised Phase III data analysis of joint cetacean protocol data resources (Paxton <i>et al.</i>, 2016)	Accessed 2022	This report collates and provides information on the abundance and distribution of cetacean species in the UK.	Full coverage of study area.
Strandings data from Scottish Marine Animal Stranding Scheme (SMASS) (Brownlow <i>et al.</i>, 2020)	Accessed 2022	Stranding records and post-mortem information for marine fauna across Scotland.	Partial coverage of study area.
Marine Mammal Management Units (MUs) in UK waters (IAMMWG, 2022)	Accessed 2022	This report details abundance estimates for species and their MUs for the seven most common cetacean species in UK waters.	Full coverage of study area.
Scientific Advice on Matters Related to the Management	Accessed 2022	The Special Committee on Seals (SCOS) provide scientific advice to government on matters relating to the management of UK seal populations.	Full coverage of study area.

Source	Date	Summary	Coverage of study area
of Seal Populations (SCOS 2020; 2021)		There have been numerous reports collated by the that identify any conservation and management issues, including ecology, behaviour, population trends and estimates, important areas and the status of both grey and harbour seals in the UK.	
Habitat-based predictions of at sea distribution for grey and harbour seals in the British Isles (Carter et al., 2022)	Accessed 2022	This report provides estimates of at-sea distribution for both grey and harbour seals from haul-outs in the British Isles. The predictions are based on regional models of habitat preference.	Full coverage of study area.
Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters (Hague et al., 2020)	Accessed 2022	This report collates and provides information on the abundance and distribution of marine mammal species in the Scottish Northern North Sea region and Scottish Atlantic waters, with a focus on what were the draft plan option (DPO) sites identified in the Draft Sectoral Marine Plan for Offshore Wind Energy for Scotland.	Full coverage of study area.
Estimated at-sea distribution of grey and harbour seals (Russell et al., 2017)	Accessed 2022	Telemetry tagging studies to identify the distribution of grey and harbour seals in the UK and provide UK-wide usage maps.	Partial coverage of study area.
Surveys of harbour (common) and grey seals in Orkney, the north coast of Scotland, the Moray Firth and the Firth of Tay in August (Sharples et al., 2012)	Accessed 2022	This report describes the findings of harbour seal aerial surveys conducted in/on Orkney, the north coast of Scotland, the Moray Firth and the Firth of Tay carried out in August 2012.	Partial coverage of study area.
Photo-identification surveys of east coast of Scotland bottlenose dolphin population (Civil et al., 2019)	Accessed 2022	SMRU and University of Aberdeen's survey data used to estimate abundance and movement of bottlenose dolphin across the east coast of Scotland.	Partial coverage of study area.

Source	Date	Summary	Coverage of study area
East Coast Marine Mammal Acoustic Study (ECOMMAS)	Accessed 2022	The ECOMMAS project, a Scottish Government funded project, used click detectors(C-PODs), at 30 locations off the east coast of Scotland, to detect echolocation clicks. At 10 of these locations, a broadband acoustic recorder was also deployed, to record ambient noise levels, as well as other animal vocalisations. Data have been used in numerous outputs, including peer-reviewed publications and Environmental Impact Assessments for major infrastructure projects on the east coast of Scotland (available online: https://marine.gov.scot/information/east-coast-marine-mammal-acoustic-study-ecommas).	Partial coverage of study area.
Moray Firth Regional Advisory Group (MFRAG) meeting notes and marine mammal monitoring	Accessed 2022	These reports and notes highlight key information on marine mammal species in the region, in relation to ongoing research, surveys, and works. Attendees include: MS-LOT, MSS, NatureScot, JNCC, Whale and Dolphin Conservation (WDC), University of Aberdeen, and relevant developers (available online: https://marine.gov.scot/ml/moray-firth-regional-advisory-group-mfrag).	Partial coverage of study area.
Forth and Tay Regional Advisory Group (FTRAG) meeting notes and marine mammal monitoring	Accessed 2022	These reports and notes highlight key information on marine mammal species in the region, in relation to ongoing research, surveys, and works. Attendees include: MS-LOT, MSS, NatureScot, JNCC, WDC, and relevant developers (available online: https://marine.gov.scot/ml/forth-tay-regional-advisory-group-ftfrag).	Partial coverage of study area.
Protected site citations	Accessed 2022	Information on designated sites in the region (available online: https://mapper.mpa.jncc.gov.uk/).	Full coverage of study area.
Project-specific digital aerial surveys of seabirds and marine mammals	Accessed 2022	APEM has been commissioned to carry out digital aerial survey for birds and marine mammals in the survey area, between April 2021 and March 2023, as part of the site characterisation process.	Full coverage of study area.

Current baseline

5.6.28 The following Section presents the baseline review of the current environment and population trends of marine mammals known to occur within the study area. Key features requiring consideration within the EIA are:

- marine mammal species which occur regularly within the study area; and
- protected sites where marine mammals are a designated feature(s) (e.g. SACs and MPAs) and, where relevant, connectivity between the study area and the designated site; and haul-out dependence (seals) during breeding and moulting periods.

Cetaceans

5.6.29 All cetaceans (dolphins, porpoises, and whales) are protected under UK law and are European protected species (EPS; see **Table 5.6.1** for further legislation details) which makes it an offence to carry out any activity causing disturbance, harassment, injury, or mortality. Seventeen of the 23 species of cetacean recorded in Scottish waters occur within the northern North Sea (Reid *et al.*, 2003; Hague *et al.*, 2020; Hammond *et al.*, 2021; Paxton *et al.*, 2016). Using recent sources, species noted in the study area have been included in this Section (Hague *et al.*, 2020; Hammond *et al.*, 2021; Lacey *et al.*, 2022). The study area overlaps with SCANS-III survey blocks R, S and T (Hammond *et al.*, 2021). Since commencing the EIA process, density map data have been released (Lacey *et al.*, 2022); these would be used to calculate site specific density estimates. Where possible, digital aerial survey (DAS) data will be integrated from the site characterisation surveys to provide a more detailed baseline.

5.6.30 An assessment of harbour porpoise in UK waters concluded that the overall trend in conservation status was unknown (JNCC, 2019a). The report highlighted that there were insufficient data to establish a trend for the population size or potential future prospects for the population. Harbour porpoise are the most abundant cetacean species in UK waters (Weir *et al.*, 2001; Hammond *et al.*, 2002). This is reflected in the estimates for the relevant SCANS block **Table 5.6.8 (Figure 5.6.3: Harbour porpoise abundance data including SCANS blocks (Lacey *et al.*, 2022) in Appendix 1A)**. There are no protected sites within or with connectivity to the study area, for which harbour porpoise are a designated feature.

5.6.31 An assessment of bottlenose dolphin (*Tursiops truncatus*) in UK waters concluded that the overall trend in conservation status was unknown (JNCC, 2019b). The report suggested that the population was stable; however, there were insufficient data to conclude this confidently. Bottlenose dolphin are present along the east coast of Scotland, with a notable population being present year-round within the Moray Firth. The Moray Firth Special Area of Conservation (SAC) is designated for the population and has an estimated number of 224 individuals (IAMMWG 2022; **Figure 5.6.2: Protected sites with marine mammal features including the MarramWind Scoping Boundary in Appendix 1A)**. The SAC extends from Helmsdale in the north to Lossiemouth in the south, within 5km to the west of the study area. More than 50% of the east-coast population of bottlenose dolphin utilise the area within the SAC, with some individuals travelling further out into the Moray Firth and south, as far as the Firth of Forth; however, the population mostly maintains a coastal distribution (Cheney *et al.*, 2013; Civil *et al.*, 2019). Bottlenose dolphins were recorded in Blocks R and S of the SCANS III surveys and the density surface map shows their site usage (**Figure 5.6.4: Bottlenose dolphin abundance data including SCANS blocks (Lacey *et al.*, 2022 in Appendix 1A) (Table 5.6.8)**).

- 5.6.32 An assessment of white-beaked dolphin (*Lagenorhynchus albirostris*) in UK waters concluded that the overall trend in conservation status was unknown (JNCC, 2019c). The report stated that there were insufficient data to establish a trend for the population size or potential future prospects for the population. White-beaked dolphin are one of the most abundant cetacean species in Scottish shelf waters. They are present year-round with seasonal sightings peaking in June and October (Reid *et al.*, 2003; Weir *et al.*, 2007). White-beaked dolphin were recorded in blocks R, S, and T (**Table 5.6.8**) and the density surface map shows their site usage (**Figure 5.6.5: White-beaked dolphin abundance data including SCANS blocks (Lacey et al., 2022) in Appendix 1A**). There are no protected sites for which white-beaked dolphin are a designated feature in the study area.
- 5.6.33 An assessment of minke whale (*Balaenoptera acutorostrata*) in UK waters concluded that the overall trend in conservation status was unknown (JNCC, 2019d). The report stated that there were insufficient data to establish a trend for the population size or potential future prospects for the population. Minke whales are the most common baleen whale in UK waters and have a year-round distribution with peaks between April and October (Robinson *et al.*, 2007). Minke whales are included as a protected feature in the Southern Trench Marine Protected Area (MPA), highlighting their seasonal use of areas in the outer Moray Firth, which partially overlaps with the study area (**Figure 5.6.2 in Appendix 1A**). Minke whales were recorded in blocks R, S, and T (**Table 5.6.8**) and the density surface map shows their site usage (**Figure 5.6.6: Minke whale abundance data including SCANS blocks (Lacey et al., 2022) in Appendix 1A**).
- 5.6.34 The lowest estimated abundance of a recorded species was Atlantic white-sided dolphin (*Lagenorhynchus acutus*), which are typically found in offshore continental shelf and slope waters. Atlantic white-sided dolphins were recorded in block R and T (**Table 5.6.8**).
- 5.6.35 Reid *et al.*, (2003) highlighted that Risso's dolphin (*Grampus griseus*) and short-beaked common dolphin (*Delphinus delphis*) may have been recorded in this region; however, neither species was recorded in blocks R, S, or T of the SCANS-III surveys (Hammond *et al.*, 2021; Lacey *et al.*, 2022). Both species prefer continental shelf habitat (Hague *et al.*, 2020), which is not within the study area.
- 5.6.36 Other species occasionally or rarely recorded in the region include killer whale (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), sei whale (*Balaenoptera borealis*), striped dolphin (*Stenella coeruleoalba*), long-finned pilot whale (*Globicephala melas*), and beaked whale species (*Mesoplodon* spp.; Hague *et al.*, 2020; Reid *et al.*, 2003).

Table 5.6.8 Cetacean abundance estimates in study area (MU = Management Unit) including the confidence interval (CI) and coefficient of variance (CV). Sources: IAMMWG, 2022; Hammond *et al.*, 2021. where a '-' is shown, this indicates there are no records of the species in the block

Common Name	Latin Name	Hammond <i>et al.</i> 2021			IAMMWG 2022
		Block R	Block S	Block T	
Harbour porpoise	<i>Phocoena phocoena</i>	38,646 (95% CI=20,584-66,524)	6,147 (95% CI=3,401-10,065)	26,309 (95% CI=14,219-45,280)	North Sea Management Unit (MU): 159,632 (95% CI= 127,442 -199,954)
Bottlenose dolphin	<i>Tursiops truncatus</i>	1,924 (95% CI=0-5,048)	151 (95% CI=0-527)	-	Coastal East Scotland MU: 224 (95% CI=214-234) Greater North Sea MU: 1,885 (95% CI=476-7,461)
Short-beaked common dolphin	<i>Delphinus delphis</i>	-	-	-	Celtic and Greater North Seas MU: 57,417 (95% CI=30,850 – 106,863)
White beaked dolphin	<i>Lagenorhynchus albirostris</i>	15,694 (95% CI=3,022-33,340)	868 (95% CI=0-2,258)	2,417 (95% CI=593-5,091)	Celtic and Greater North Seas MU: 34,025 (95% CI=20,026 – 57,807)
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	644 (95% CI=0-2,069)	-	1,366 (95% CI=0-5,031)	Celtic and Greater North Seas MU: 12,293 (95% CI=3,891 – 38,841)
Risso's dolphin	<i>Grampus griseus</i>	-	-	-	Celtic and Greater North Seas MU: 8,687 (95% CI=2,810 – 26,852)
Minke whale	<i>Balaenoptera acutorostrata</i>	2,498 (95% CI=604-6,791)	383 (95% CI=0-1,364)	2,068 (95% CI=290-6,960)	Celtic and Greater North Seas MU: 10,288 (CV=0.26, 95% CI=6,210 – 17,042)

Seals

- 5.6.37 The two seal species found in UK waters are harbour seal and grey seal. They are protected under the Marine (Scotland) Act 2010 and the Conservation (Natural Habitats, &c.) Regulations 1994 and are also listed under Annex II of the EU Habitats Directive, which requires the designation of Special Areas of Conservation (SACs) and haul-out sites (Marine Scotland, 2017; SCOS, 2022). There are several SACs on the east coast of Scotland that have seals as designated interest features. These have been designated, in part, due to being important and/or established haul-out and breeding sites. Given the distances seals travel, it is possible that there is connectivity between SACs and the study area (Carter *et al.*, 2022).
- 5.6.38 Haul-out sites are also designated via Protection of Seals Orders, under section 117 of Marine (Scotland) Act 2010. They are designed to protect seals from intentional or reckless harassment within the designated haul-out site, such as at the Ythan River Mouth haul-out within the East Scotland SMA (further details of which are given below).
- 5.6.39 Both species are regularly recorded within the study area and along the east coast of Scotland. The study area contains parts of the Moray Firth, East Scotland, and North Coast and Orkney SMAs.
- 5.6.40 Harbour seals have been assessed by the JNCC as having an ‘unfavourable – inadequate’ conservation status in the UK given that the short-term trend is unknown and the current population is below the favourable reference range (JNCC, 2019e). The total Scottish populations are estimated at 37,200 harbour seals to the nearest hundred (SCOS, 2021), with local population numbers across some regions fluctuating over time. For example, harbour seal numbers are showing a decline on the east coast of Scotland (SCOS, 2021). The North Coast and Orkney SMA contains around 5%, the Moray Firth SMA contains 4%, and the East Scotland SMA contains 1% of the total harbour seals recorded in Scotland (Morris *et al.*, 2021; Carter *et al.*, 2020; **Figure 5.6.7: Harbour seal telemetry data (Carter *et al.*, 2020, 2022) in Appendix 1A**). The majority (60%) of harbour seals within the Moray Firth are distributed within haul-outs between Culbin and Findhorn (SCOS, 2021). There are no designated seal haul-out sites for harbour seals within the study area, but twenty-three designated sites fall within the North Coast and Orkney SMA, seven fall within the Moray Firth SMA, and two fall within the East Scotland SMA. SACs for harbour seals include Firth of Tay and Eden Estuary (East Scotland SMA), Dornoch Firth and Morrich More (Moray Firth SMA), and Sanday SAC (North Coast and Orkney SMA). Harbour seals are particularly vulnerable to disturbance during the breeding season, between June and July, and the moulting season, during August.
- 5.6.41 In the UK, grey seals have been assessed as having a ‘favourable’ conservation status and the overall trend was assessed as ‘improving’ (JNCC, 2019f). Total Scottish populations for 2020 were estimated at 120,800 grey seals to the nearest hundred (SCOS, 2021). The Moray Firth SMA contains 7% of total grey seals and the East Scotland SMA contains 14% of total grey seals recorded in Scotland (**Table 5.6.9**; Morris *et al.*, 2021; Cater *et al.*, 2022; **Figure 5.6.8: Grey seal telemetry data (Carter *et al.*, 2020, 2022) in Appendix 1A**). Pup production is increasing in both SMAs, with an average estimated increase of 28% between 2014 and 2019 in the East Coast Scotland SMA (SCOS, 2021). SACs for grey seals include Faray and Holm of Faray (North Coast and Orkney SMA), Isle of May (East Scotland SMA), and Berwickshire and North Northumberland Coast (East Scotland SMA). There are no SACs for grey seals within Moray Firth SMA, but there are seven designated haul-out sites. Thirty-three designated haul-out sites fall within the North Coast and Orkney SMA, and six fall within the East Scotland SMA. Only one site is found within the study area; the Ythan River Mouth designated haul-out site, located within the East Scotland SMA, is situated

approximately 20km south of the Scoping Boundary. This site is the most recently designated site for grey seals and was afforded protection in 2017. Grey seals have been shown to travel to forage in areas near to and within the study area (Russell *et al.*, 2017).

Table 5.6.9 Count data within relevant Seal Management Areas (SMAs) and Special Areas of Conservation (SACs). Sources: Morris *et al.*, 2021; SCOS, 2021

Common Name (Latin name)	Seal Management Area (SMA) counts	Special Area of Conservation (SAC) counts
Harbour (common) seal (<i>Phoca vitulina</i>)	North Coast and Orkney: 1,405	Sanday SAC: 77 (2019)
	Moray Firth: 1,077	Dornoch Firth and Morrich More SAC: 62 (2019)
	East Scotland: 476	Firth of Tay and Eden Estuary SAC: 41 (2019)
Grey seal (<i>Halichoerus grypus</i>)	North Coast and Orkney: 8,599	Faray and Holm of Faray SAC: 228 (2019)
	Moray Firth: 1,657	-
	East Scotland: 3,683	Isle of May SAC: 40 (2016) Firth of Tay and Eden Estuary SAC*: 686 (2019) Berwickshire and North Northumberland Coast SAC (within Scotland): 71 (2018)

*A count is presented but it should be noted that grey seal is not a protected feature of this SAC

Future baseline

- 5.6.42 Construction of the Project is estimated to begin mid-2025 at the earliest, with an operational lifetime assumed to be a minimum of 35 years, although the lease agreement allows the Project to remain until 2080. Risks associated with the construction and operation of this project are included in **Table 5.6.11**. As the Project has several phases over many years, the future baseline of marine mammals will be considered. The future baseline represents changes likely to occur at the Site in the absence of the Project or in the period before development commences.
- 5.6.43 Currently, there are no other known proposed developments, which could influence the marine mammal baseline. It is assumed that marine mammal populations will follow regional and national trends in the absence of significant local impacts from such developments. Natural population fluctuations occurring between now and the commencement of the Project are unlikely to be quantifiable. Change can result from climatic factors, such as sea temperature change and subsequent impacts on species' ranges, but these tend to show a long-term trend. Other natural phenomena, such as morbillivirus infection (Barrett *et al.* 1993; Duignan *et al.* 2014), may have a more immediate effect but are less predictable. Anthropogenic activity, such as increasing vessel traffic, could be an additional stressor; therefore, baseline conditions are likely to exhibit some degree of change over time, irrespective of the Project's activities.

Basis for scoping assessment

- 5.6.44 The marine mammal scoping assessment is based on the following key assumptions, which are also set out in **Chapter 2: Project Description**:
- impacts from all phases of the Project for a floating wind farm with a grid connection capacity of up to 3GW;
 - impacts from changes / loss of prey resource / habitat from all phases of the Project;
 - impacts from underwater noise associated with site investigation works;
 - impacts from clearance of unexploded ordnance (UXO);
 - impacts from construction-related underwater noise e.g. pile-driving;
 - impacts from underwater noise of operational floating wind turbine generator (WTG) units;
 - impacts from the presence of array and export cables causing anthropogenic EMF;
 - impacts from the presence of array and export cables and mooring lines potentially posing a risk of entanglement;
 - the maintenance of the above infrastructure during operation; and
 - the requirement for decommissioning.
- 5.6.45 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.6.11**.
- 5.6.46 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 5.6.47 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on marine mammals (see **Table 5.6.10**). These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 5.6.48 As there is a commitment to implementing these environmental measures, and to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in this scoping assessment.
- 5.6.49 The requirement for other embedded environmental measures and additional mitigation methods will be considered as the EIA progresses. This approach will take into consideration outputs from work undertaken for this Project (e.g. underwater noise propagation modelling) and through the outputs and findings from the development of other floating offshore wind farms, for example. An important aspect of this process will be engagement with, and incorporation of, the responses from statutory consultees and other relevant stakeholders.

Table 5.6.10 Relevant embedded environmental measures to reduce potential impacts on marine mammals

ID	Environmental measure proposed	How the environmental measures will be secured
M-032	Development of and adherence to an agreed Marine Mammal Mitigation Protocol (MMMP). This will subsequently mitigate potential impacts from underwater noise on marine mammals and fish through good or standard practice actions in order to meet legislative requirements. The MMMP will evolve during the development phase and as the EIA progresses and in response to consultation.	s.36 conditions and marine licence conditions.
M-033	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to the Project. The MPCP will also include relevant key emergency contact details.	s.36 conditions and marine licence conditions.
M-041	Development of and adherence to a Vessel Management Plan, which will confirm the types and numbers of vessels that will be engaged on the Project, and consider vessel coordination including indicative transit route planning.	s.36 conditions and marine licence condition. TBC by project if NSVMP or NSP and VMP.
M-057	Burial of the cable where possible and/or use of external cable protection such as concrete mattresses or rock berms.	Project design.
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase.</p> <p>The CEMP will be the securing mechanism for many measures.</p>	s.36 conditions, marine licence conditions and CEMP.
M-105	Development and adherence to a piling strategy for fixed accommodation platform(s) and other offshore substation(s) or platform(s). It will detail the method of pile installation and associated underwater noise (UWN) levels. It will describe any mitigation measures to be implemented (e.g. soft start and ramp up measures, use of acoustic deterrent devices) prior to and during pile installation to manage the effect of UWN.	Piling Strategy is required under s.36 conditions and marine licence conditions.
M-106	The development of and adherence to, a decommissioning programme.	Required under sections 105 and 114 (Energy Act 2004) and marine licence conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-114	Use of 'low order' techniques such as deflagration for UXO disposal, where possible and required.	Required under the Habitat Regulations and marine licence conditions.
M-115	UXO Management Plan to mitigate any potential for UXO within the offshore construction area and also disposal once encountered.	s.36 conditions and marine licence conditions.

Likely significant effects

- 5.6.50 In line with the EIA Regulations 2017, the EIA for the Project will assess those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant effect. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 5.6.51 The potentially significant effects on marine mammals are summarised in **Table 5.6.11**. The scoping assessment has been based on a combination of the Project definition of MarramWind Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for marine operational effects on marine mammals, and professional judgement. The approach to this assessment is set out in **Chapter 4 Approach to Scoping and EIA**.
- 5.6.52 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore to no longer consider them in the EIA, is presented after the table.

Table 5.6.11 Potentially significant effects on marine mammals

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Increased underwater noise during installation, operation and maintenance, and decommissioning e.g. anchor piles (pre-construction, construction and decommissioning)	M-063, M-105	Habitat displacement or physical injury. TTS/PTS resulting in displacement from breeding and foraging sites. Reduced ability to communicate, forage, and navigate (Southall <i>et al.</i> , 2019). Potential for physical injury or death (Thompson <i>et al.</i> , 2020).	Scoped in.	Cetaceans and seals	Further data to be collected to support assessment: <ul style="list-style-type: none"> Predicted underwater noise levels for construction period; Habitat models, density and abundance estimates, and available desk-based review of species distribution and use.
Increased above-water noise during installation and decommissioning (pre-construction, construction and decommissioning)	M-063, M-105	Habitat displacement. Local disturbance from activities on seal haul out sites along the coast.	Scoped out: see rationale in section below paragraphs 5.6.54 and 5.6.55).	Seals	Further data to be collected to support assessment: <ul style="list-style-type: none"> Desk-based review of available literature on presence of seal haul out sites along Scottish east coast; Results of Digital Aerial Surveys.
Indirect effects of underwater noise on marine mammal prey species (construction and decommissioning)	M-063, M-105	Potential change to prey availability and distribution due to increased noise could negatively affect foraging efficiency of marine mammals.	Scoped in.	Cetaceans and seals	Further data to be collected to support assessment: <ul style="list-style-type: none"> Habitat models, density and abundance estimates, and available desk-based review of species distribution and use.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		Fish species sensitive to noise and typical prey for marine mammals include cod, herring, sprat, and whiting.			
Increased vessel presence and traffic (construction, operation and decommissioning)	M-041, M-106	<p>Local disturbance from vessel presence and increased noise can influence surface behaviour, avoidance behaviour, and disrupt foraging (Pirota <i>et al.</i>, 2015).</p> <p>Vessel collision can result in injury or death (Maxwell <i>et al.</i>, 2022).</p>	Scoped in.	Cetaceans and seals	<p>Further data to be collected to support assessment:</p> <ul style="list-style-type: none"> • Desk-based review of available literature on effects of increased vessel traffic on marine mammals.
Habitat change due to offshore wind farm structures, e.g. foraging opportunities (operation and maintenance)	M-028, M-063, M-114, M-115	<p>Possibility for changes in prey availability due to the addition of fixed structures which can create an artificial reef which could affect foraging opportunities for marine mammals (Ounanian <i>et al.</i>, 2020; Todd <i>et al.</i>, 2016).</p> <p>The Project's scope of work primarily features floating offshore wind farm structures, which could create a barrier effect reducing prey opportunities; however, the fixed structures of platforms</p>	Scoped in.	Cetaceans and seals	<p>Further data to be collected to support assessment:</p> <ul style="list-style-type: none"> • Refer to Sections 5.5: Benthic, epibenthic and intertidal ecology and 5.8: Fish and shellfish ecology for wider environmental use currently and future outlook; • Desk-based review of available literature to inform baseline information (e.g. Fernandez Betelu <i>et al.</i>, 2022); • Habitat models of species distribution and use; and • Implement monitoring measures to quantify how the Project affects the marine environment.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		could have the opposite effect providing a surface for fauna to colonize. Colonisation and area use would need to be monitored to determine how this project would impact species distribution.			
Entanglement in lines and cables e.g. mooring lines, inter-array cables, and export cables (operation and maintenance)	M-032, M-041	<p>Although entanglement in mooring lines pose an unlikely major threat to marine mammals, this threat will be considered in the EIA as the Project is the largest proposed offshore wind farm thus far and effects are currently unknown.</p> <p>Direct: Animals themselves become entangled in lines or cables leading to drowning, impaired foraging ability, starvation and infection.</p> <p>Indirect: Marine debris, such as ghost fishing nets, become entangled in lines or cables which the animal entangles in (Maxwell <i>et al.</i>, 2022)</p>	Scoped in.	Cetaceans and seals, particularly large whales	<p>Further data to be collected to support assessment:</p> <ul style="list-style-type: none"> • Desk-based review of available literature on effects of floating offshore wind farm on marine mammals; • Monitor for updates from Hywind and Fortune Supergen projects; • Implement monitoring measures to assess risk of entanglement.
Disturbance of habitat from sea	M-028, M-063	Sea floor attachments can cause scouring and resuspension of sediment,	Scoped out: see rationale in section	Cetaceans and seals	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
floor attachments, e.g. anchors		<p>causing secondary impacts such an increased turbidity, which disturbs benthic habitats and species, including prey species (Maxwell <i>et al.</i>, 2022).</p> <p>Increased turbidity related with installation and decommissioning activities are unlikely to remain over time with settlement out of the water column expected to occur within four or five tidal cycles (Hitchcock and Bell, 2004). Marine mammals regularly utilise areas of high turbidity with limited evidence of negative impacts (Au <i>et al.</i>, 2000); therefore, this impact will not be included in the EIA.</p>	below paragraphs 5.6.56 and 5.6.57 .		
Chemical pollution	M-033, M-063	Re-suspension of contaminants from sediment, release of anti-fouling substances, and vessel/WTG related pollution including increased traffic, oil and fluid spill, and accidental collision (Bailey <i>et al.</i> , 2014; Maxwell <i>et al.</i> , 2022) may occur intermittently throughout the lifetime of the Project. Small	Scoped out: see rationale in section below paragraphs 5.6.58 and 5.6.59 .	Cetaceans and seals	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		spills in a tidal environment mean the area surrounding the Project will likely show a high dispersal rate and therefore will have a limited interaction with marine mammals.			
Electromagnetic fields (EMF) from cables	M-054, M-057	<p>Cables emit EMF; the highest forces will be associated with high-voltage export cables.</p> <p>There is no evidence that seals can detect or respond to EMF; however, some cetacean species have been shown to respond to the Earth's magnetic field (see Normandeau <i>et al.</i>, 2011 for a review).</p> <p>While EMF from cables may be less intense than the geomagnetic field, little is known about the potential impacts of EMF from cables on cetaceans (Gill, 2016; Gill and Desender, 2020).</p> <p>Potential secondary impacts from disturbance to prey species such as migratory</p>	Scoped in.	Cetaceans and seals	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		diadromous fishes (Maxwell <i>et al.</i> , 2022).			
Unexploded ordnance (UXO) (construction)	M-114, M-115	<p>Detonation of UXO could result in direct trauma, auditory damage causing TTS/PTS or disturbance resulting in behavioural change (Benda-Beckmann <i>et al.</i>, 2015).</p> <p>Appropriate mitigation guidelines to limit injury are advised by JNCC (2010) in the case of UXO clearance.</p>	Scoped in.	Cetaceans and seals	N/A

Impacts scoped out of assessment

- 5.6.53 This scoping assessment concluded no likely significant effects from several Project activities. These have therefore been scoped out from further assessment in the EIA. These conclusions have been made based on knowledge of the baseline environment, the nature of planned works and evidence from research and/or monitoring projects. The conclusions follow (in a site-based context) existing best practice. Each potential effect that has been scoped out is outlined in **Table 5.6.11**, with further evidence and justification provided below.

Increased above-water noise

- 5.6.54 During the construction and installation phase of the Project, whilst the majority of the potentially significant effects of noise will be transmitted through the underwater environment, some noise will also be transmitted above water. This noise has the potential, in some circumstances, to cause disturbance to seals hauled out on land.
- 5.6.55 During this scoping exercise, a single designated haul-out site was identified within the marine mammal study area. However, at a distance of 20km from the Scoping Boundary and further still from landfall site(s), the works are unlikely to cause a harassment event to seals hauled out at this site. Therefore, this potential impact can be scoped out at this stage.

Disturbance of habitat from sea floor attachments, e.g. anchors

- 5.6.56 Anchoring is an integral part of the overall mooring system and there is a wide spectrum of anchoring and mooring solutions that could be used. These include drag embedment anchors, driven piles, suction anchors, drilled and grouted piles, and gravity-based anchors. The proportion of the anchor itself that interacts with the seabed is smaller than the size of the anchor, and any disturbance is short-lived, during installation.
- 5.6.57 In a recent literature review, it was noted that more research needs to be undertaken in scouring and liquefaction of habitats from these types of anchor points (Sumer *et al.*, 2021). However, whilst increased sedimentation, scouring, and liquefaction may indirectly impact marine mammals by affecting their prey, the activity of installation is short-lived and localised. Consequently, this potential effect has been scoped out at this stage.

Chemical pollution

- 5.6.58 Re-suspension of contaminants from sediment, release of anti-fouling substances, and vessel/WTG related pollution including increased traffic, oil and fluid spill, and accidental collision (Bailey *et al.*, 2014; Maxwell *et al.*, 2022) may occur intermittently throughout the lifetime of the Project. All vessels will be compliant to the International Convention for the Prevention of Pollution from Ships (MARPOL). Throughout this Project, there will be development and adherence to an Environmental Management Plan, which is to include a Marine Pollution Contingency Plan and development and adherence to a vessel management plan (VMP). To reduce the risk at decommissioning, a decommissioning programme will be developed and adhered to.
- 5.6.59 The addition of chemical pollution may directly impact marine mammals and indirectly by affecting their prey. The introduction of chemical pollution is likely to be short-lived and localised and with the correct control measures adopted throughout the life cycle of the Project, the risk is further mitigated. Consequently, this potential effect has been scoped out at this stage.

Cumulative effects

- 5.6.60 Cumulative effects on marine mammals resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the CEA screening exercise. As the EIA progresses, it will take into account any new information, such as the new guidance for cumulative effects assessment, which is currently expected to be available from Marine Scotland in spring 2023. The cumulative effects baseline will be considered in relation to other relevant projects in the region and will be taken from when baseline data were collected (e.g. two years prior to construction), unless otherwise outlined by the new guidance and/or in consultation with statutory stakeholders.
- 5.6.61 The cumulative effects of the Project and other offshore wind farms, operational and consented, located off the north-east coast of Scotland will be considered. With respect to underwater noise, this will primarily occur during the construction period when pile driving may be necessary for the anchoring and fixed structure points. There was also concern from consultees regarding operational noise of floating WTG units, given the scale of the Project as this could elevate the background noise levels, causing masking and/or displacement. The timing of construction will need to be considered in relation to other relevant developments (e.g. offshore wind farm construction, major harbour developments) and activities (e.g. seismic surveys) occurring within the region, and in relation to protected areas for marine mammals (e.g. SACs) and related to the species' relevant management units (cetaceans) and management areas (seals), where practical

Transboundary effects

- 5.6.62 The potential effects from construction, operation (including maintenance) and decommissioning on marine mammals are considered in **Appendix 4A: Transboundary Screening Matrix**. There is potential for transboundary effects upon marine mammals during the construction, operation and maintenance, and decommissioning of the Project. Although the Project is situated within Scottish waters, marine mammals are typically highly mobile, with large foraging ranges and / or may migrate over large distances for key life-history events (e.g. breeding and calving). In the UK, cetacean populations are managed using management units (MU; IAMMWG, 2021), which for some species are large geographic areas that cross into other territorial waters. An example of this is the North Sea MU, which is applicable to harbour porpoise and spans territorial waters of the UK, Norway, Denmark, Germany, the Netherlands, Belgium, and France. Therefore, depending on the significance of the effects identified in the Project assessment (e.g. underwater noise modelling) and the Cumulative Effect Assessment (CEA), transboundary effects may require assessment.
- 5.6.63 Following the exit of the UK from the European Union in December 2020, the UK is no longer an EU Member State; however, for the purposes of assessing potential transboundary effects, the approach outlined in **Chapter 4: Approach to Scoping and EIA** will be followed for the Project.
- 5.6.64 The assessment of potential transboundary effects and determination of their significance will draw on the use of zones of influence (Zoi) for key categories of effect.

Proposed approach to the EIA Report

- 5.6.65 Assessment of impacts on marine mammals will utilise both Project-specific and publicly available data (see **Table 5.6.7**), which will be consulted upon during the EIA reporting phase. Consultation will be held with relevant statutory and non-statutory organisations and

as part of the pre-application consultation process, which is set out in **Chapter 4: Approach to Scoping and EIA**.

- 5.6.66 Key consultees for the marine mammal impact assessment include Marine Scotland Science, Marine Scotland Licensing Operations Team (MS-LOT), and NatureScot. The project has already welcomed consultation with each of these consultees, with regards to marine-mammal-related issues.
- 5.6.67 The Project has been conducting monthly site-specific digital aerial surveys (DAS) since April 2021 to inform the baseline at-sea distribution and abundance of marine mammals and birds. These surveys will continue until March 2023. Further to discussion at the consultation workshops (see **Table 5.6.3**), it may be recommended that DAS data be complemented with PAM data, to collect additional baseline information on marine mammals, particularly in terms of understanding diurnal variation and the occurrence of more elusive, deep-diving species. In addition, PAM has scope to monitor changes in cetacean activity across other phases of the project. A position on PAM's efficacy for the Project is still under discussion by NatureScot and Marine Scotland.
- 5.6.68 Where possible and / or required, population consequences of disturbance (PCoD) modelling will be undertaken to consider potential impacts of disturbance on five key marine mammal species: bottlenose dolphin; harbour porpoise; minke whale; and harbour and grey seals. Due to the absence of demographic data required for other species that are common to the region (e.g. white-beaked dolphins, white-sided dolphins, and Risso's dolphins), it is not possible to quantitatively assess PCoD. Therefore, for these species, assessment would be carried out qualitatively.
- 5.6.69 Likely significant effects identified above that have not been scoped out (**Table 5.6.11**) will be assessed, and will include consideration of potential cumulative effects, where appropriate (following the methodology outlined in **Chapter 4: Approach to Scoping and EIA**).
- 5.6.70 Direct and indirect impacts are to be assessed, where direct impacts include those caused specifically by interactions between marine mammals and Project activity, such as underwater noise (e.g. pile driving and UXO clearance) or entanglement with mooring lines. Indirect impacts are those created through an impact pathway, such as habitat loss and disturbance, which could affect foraging or breeding opportunities. Assessments will be based on a precautionary worst-case scenario.
- 5.6.71 Impacts from underwater noise are an important consideration for marine mammals. Underwater noise propagation models will be developed to predict the extent and magnitude of noise levels at the Project site for UXO clearance, installation works, , operational noise, and during decommissioning. The latest literature on noise exposure criteria for marine mammals (Southall *et al.* 2019) will be used to determine where thresholds for auditory injury (PTS) are surpassed. The risk of injury will be based on both the cumulative sound exposure level (SEL_{cum}) and peak sound pressure level (peak SPL). The SEL_{cum} criterion predicts frequency-weighted received sound levels across a 24-hour period and the peak SPL criterion uses unweighted sound levels, typically used to assess impulsive noise sources such as impact pile driving and UXO clearance. Noise propagation model outputs can be compared with marine mammal density estimates to predict the number of marine mammals likely to be disturbed, and the number in which PTS onset occurs (both instantaneously and cumulatively).
- 5.6.72 A Habitats Regulations Appraisal (HRA) process will run in parallel with the EIA. During this process, the proximity of European sites that have marine mammal species as designated interest features will be considered in relation to the study area. Where possible and / or relevant, connectivity between relevant designated European sites and the study area (and any potential impacts predicted to extend out with) will be considered. For example,

bottlenose dolphins are a designated feature of the Moray Firth SAC, and individuals from this protected population are known to use areas out with the boundary of the SAC and are regularly recorded further south in the Forth and Tay SAC (Arso Civil, *et al.* 2021). Consequently, developments in the Forth and Tay have assessed potential impacts on the Moray Firth SAC. Where European sites are identified, the HRA will assess if there are potential likely significant effects and assess the impact on the integrity of the given site and the relevant designated feature.

5.7 Offshore and intertidal ornithology

Introduction

- 5.7.1 The offshore and intertidal ornithology assessment will consider the potentially significant effects¹ on bird species that may arise from the construction, operation and maintenance and decommissioning of the offshore Project elements that are seaward of Mean High Water Springs (MHWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potentially significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 5.7.2 Offshore and intertidal ornithology interfaces with other aspects as birds rely on and interact with other habitats and species, therefore this Section should be considered alongside other sections; namely:
- **Section 5.1: Marine geology, oceanography and physical processes:** There are potential pathways of effect from marine processes physical parameters on potentially sensitive marine ornithological receptor species, therefore information from the marine geology, oceanography and physical processes section will inform the offshore and intertidal ornithology assessment.
 - **Section 5.4: Electromagnetic fields (EMF):** Seabirds use the offshore environment to hunt for prey, therefore there is potential for EMF emissions to affect offshore ornithology. The EMF section will be used to inform the offshore and intertidal ornithology assessment.
 - **Section 5.5: Benthic, epibenthic and intertidal ecology:** The seabird receptor species are sensitive to possible changes on prey resource and habitats. Therefore, the benthic, epibenthic and intertidal ecology section will inform the offshore and intertidal ornithology assessment.
 - **Section 5.8: Fish and shellfish ecology:** Offshore and intertidal ornithology will include some species that rely on fish and shellfish species as part of their diet and therefore impacts to fish and shellfish could potentially impact offshore ornithology. The information from the fish and shellfish ecology section will be used to inform the offshore ornithology assessment.
 - **Section 6.5: Terrestrial ecology and ornithology:** The terrestrial ecology and ornithology assessment will interlink with offshore and intertidal ornithology due to the presence of bird species that use both intertidal and offshore habitats.
 - **Section 7.1: Climate resilience:** The interference with climate resilience with benthic, epibenthic and intertidal ecology is captured in the In-Combination Climate Impacts (ICCI) assessment.

¹ Other technical chapters use 'likely significant effects' and 'potential likely significant effects' to accord with the EIA Regulations 2017. Within the offshore and intertidal ornithology ecology chapter the term 'potentially significant effects' is used as it accords with CIEEM guidance to describe effects that have the potential to be significant prior to their assessment (i.e. until the end of the 'scope of the assessment'), and the term 'likely significant effects', only once assessment has determined that they would indeed be significant. This is not to be confused with Likely Significant Effects (LSEs) when used in the context of the Habitats Regulations Assessment. For further information on the Project's approach to HRA, see **Chapter 4: Approach to Scoping and EIA**.

Legislative and policy context

- 5.7.3 This Section identifies the relevant legislation and policy context which has informed the scope of the offshore and intertidal ornithology assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** and **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual international, national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 5.7.4 In order to provide a robust evidence base, **Table 5.7.1** below presents a summary of legislation and policies relevant for the offshore and intertidal ornithology assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.7.1 Relevant legislation and policy

Relevant Legislation and Policy	Relevance to the assessment
	Legislation
<p>International: European Commission Directive 2009/147/EC (codified version of 79/409/EC) on the Conservation of Wild Birds (the 'Birds Directive') (2009)</p> <p>International: EC Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (known as the 'Habitats Directive') (1992)</p> <p>National: The Conservation (Natural Habitats, &C.) (EU Exit) (Scotland) (Amendment) Regulations (the 'Habitat Regulations') (2019)</p> <p>National: The Conservation of Offshore Marine Habitats and Species Regulations (2017)</p>	<ul style="list-style-type: none"> The Birds Directive aims to protect all of the 500 wild bird species naturally occurring in the European Union and stipulates that Member States must designate Special Protection Areas (SPAs) for the survival of species listed under Annex 1 of the Directive and all migratory bird species. The Directive is implemented in Scotland by the Nature Conservation (Scotland) Act (2004) and the Offshore Regulations (2017). The potential for effects on birds protected under the Birds Directive will be considered throughout the assessments in the Environmental Impact Assessment Report (EIA Report). The Habitats Directive ensures the conservation of a wide range of rare, threatened, or endemic animal and plant species within Europe. Among other things, the Directive stipulates the procedures for the protection of SPAs and sets out the steps which must be taken in order to assess the impact of any proposed development. The Directive is implemented in Scotland by The Habitats Regulations (2019) and the Offshore Regulations (2017). The potential for effects on bird habitats protected under the Habitats Directive will be considered throughout the assessments in the EIA Report. The Habitat Regulations cover the requirements for protecting sites that are internationally important for threatened habitats and species. The Regulations also provide a legal framework for species requiring strict protection. The potential for effects on bird habitats protected under the Habitat Regulations will be considered throughout the assessments in the EIA Report. The Regulations implement the species protection requirements of the Habitats and Birds Directives offshore (more than 12 nautical miles from the coast). The potential for effects on offshore bird habitats

Relevant Legislation and Policy	Relevance to the assessment
International: Ramsar Convention on Wetlands of International Importance (1971)	<p>protected under the Offshore Regulations will be considered throughout the assessments in the EIA Report.</p> <ul style="list-style-type: none"> The four-stage process of determining the absence of adverse effects on European sites under the Habitats Directives/Regulations is known as a Habitat Regulations Assessment (HRA). Stage 1 of this process is known as HRA Screening. This will be provided separately to the Scoping Report.
International: The Convention on the Conservation of Migratory Species of Wild Animals (the 'Bonn Convention') (1979)	<ul style="list-style-type: none"> The Convention stipulates that Contracting Parties collaborate to conserve migratory species and their habitats by providing strict protection for endangered migratory species (listed in Appendix I of the Convention), concluding multilateral Agreements for the conservation and management of migratory species which require or would benefit from international co-operation (listed in Appendix II), and by undertaking co-operative research activities. The potential for effects on migratory bird species protected under the Bonn Convention will be considered throughout the assessments in the EIA Report.
International: The Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') (1979)	<ul style="list-style-type: none"> The principal aims of the Convention are to ensure conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase co-operation between contracting parties, and to regulate the exploitation of migratory species listed in Appendix III. The potential for effects on birds and their habitats protected under the Bern Convention will be considered throughout the assessments in the EIA Report.
National: The Wildlife and Countryside Act (as amended) (1981)	<ul style="list-style-type: none"> The Wildlife and Countryside Act 1981 was enacted to implement the Birds Directive and Bern Convention in Britain, supplemented by the Nature Conservation (Scotland) Act (2004). Among other things, the Wildlife and Countryside Act 1981 provides protection to all birds, with increased protection afforded to those listed under Schedule 1 of the Act. All Birds Directive Annex 1 species are listed under Schedule 1 of the Act. The potential for effects on birds protected under the Act will be considered throughout the assessments in the EIA Report.

Relevant Legislation and Policy	Relevance to the assessment
National: Nature Conservation (Scotland) Act (2004)	<ul style="list-style-type: none"> The Act introduces a requirement that public bodies in Scotland have a duty to further the conservation of biodiversity and sets out a series of measures that are designed to conserve biodiversity and to protect and enhance the biological and geological natural heritage of Scotland. The potential for effects on birds and their habitats protected under the Act will be considered throughout the assessments in the EIA Report, with the scope influenced by elements of the Act contained within Parts 1-3. Part 1 stipulates that the presence of biodiversity is understood and assessed appropriately, which is provided via the EIA baseline. Part 2 stipulates the designation and conservation of Sites of Special Scientific Interest (SSSIs) within Scotland. Part 3 addresses the protection of wildlife and the assessment required under the Habitat Regulations (2019). These are considered within the scope of the assessments.
National: Marine (Scotland) Act (2010)	<ul style="list-style-type: none"> Creates a new legislative and management framework for the marine environment in Scotland. Amongst other things, the Act introduces a duty to protect and enhance the marine environment and includes measures to improve marine nature and historic conservation with new powers to protect and manage areas of importance for marine wildlife and habitats. The potential for effects on birds and their habitats protected under the Act will be considered throughout the assessments in the EIA Report.
National: UK Post-2010 Biodiversity Framework (2012)	<ul style="list-style-type: none"> The Framework demonstrates how the work of the four countries (England, Northern Ireland, Scotland and Wales) and the UK contributes to achieving the Aichi Targets, and identifies the activities required to complement the country biodiversity strategies in achieving the Targets.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crisis
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector.
Scottish Planning Policy (SPP) 2014 <ul style="list-style-type: none"> Paragraph 169 (Development Management) Paragraph 195: Delivery 	<ul style="list-style-type: none"> Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> net economic impacts;

Relevant Legislation and Policy	Relevance to the assessment
<ul style="list-style-type: none"> - Paragraph 199: Development Plans - Paragraph 202-203: Development Management - Paragraph 214: Protected Species 	<ul style="list-style-type: none"> ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology. • Highlights that planning authorities, have a duty under the Nature Conservation (Scotland) Act 2004 to make sure they further the conservation of biodiversity. This must be reflected in development plans. • Discusses about how plans should make sure they address the potential effects of development on the natural environment. They must consider the natural and cultural components together and promote opportunities for enhancement. • Considers how the siting and design of a proposed development should take account of the local landscape character. It also mentions that planning permission will be refused if the nature or scale of the project has an unacceptable impact on the natural environment. • Identifies that the presence of legally protected species is important in the consideration of planning decisions. If there is evidence to suggest that a protected species is present on site. Protection should be factored into the planning and design of the development.

Marine Policy

UK Marine Policy Statement (2011):	<ul style="list-style-type: none"> • Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. • Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. • Requirements for biodiversity to be protected, conserved and where appropriate recovered and loss halted; • Requirements for healthy marine and coastal habitats can occur across their natural range and are able to support strong, biodiverse biological communities and the functioning of healthy, resilient and adaptable marine ecosystems; and the oceans to have viable populations of representative, rare, vulnerable and valued species.
Scottish National Marine Plan 2015 <ul style="list-style-type: none"> - GEN 1 General planning principle - GEN 4 Co-existence - GEN 9 Natural heritage - CABLES 1 	<ul style="list-style-type: none"> • GEN 1 supports sustainable developments which provide economic benefit to Scottish communities and social benefits will be favoured • GEN 4 emphasises the need for co-existence between development sectors and activities and requires cumulative impacts to be addressed. • GEN 9 sets a requirement for development to comply with the legal requirements for protected areas and

Relevant Legislation and Policy	Relevance to the assessment
<ul style="list-style-type: none"> - REC & TOURISM 5 - CABLES 2 - CABLES 4 	<p>protected species; not to result in significant impact on the national status of Priority Marine Features; and protect and, where appropriate, enhance the health of the marine area.</p> <ul style="list-style-type: none"> • REC & TOURISM 5 sets a requirement to support enhancement to the aesthetic qualities, coastal character and wildlife experience. • CABLES 1 sets a requirement for cable and network owners provide evidence that the development and activity minimise impacts, where possible, on the environment and appropriate and proportionate environmental consideration and risk assessments should be provided which may include cable protection measures and mitigation plans. • CABLES 2 sets a requirement for the following to be taken into account when reaching decision regarding cable development: <ul style="list-style-type: none"> ▶ cables should be suitably routed to provide sufficient requirements for installation and cable protection; ▶ new cables should implement methods to minimise impacts on the environment, seabed and other users; ▶ cables should be buried to maximise protection where there are safety or seabed stability risks and to reduce conflict with other marine users and to protect the assets and infrastructure; ▶ where burial is demonstrated not to be feasible, cables may be suitably protected; ▶ consideration of the need to reinstate the seabed, undertake post-lay surveys and monitoring and carry out remedial action where required. • CABLES 4 details that when selecting locations for landfall of power and telecommunications equipment and cabling, developers and decision makers should consider the policies pertaining to flooding and coastal protection.
<p>Sectoral Marine Plan - Offshore Wind Energy (2020)</p> <p>Sectoral Marine Plan – Roadmap of Actions (2022)</p>	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. • Section 4.1 lists a range of potential negative impacts identified through plan-level SEA, HRA and SEIA which require further consideration through project level assessments, including: <ul style="list-style-type: none"> ▶ “loss of/damage to marine and coastal habitats; ▶ effects from pollution releases on species and habitats; ▶ effects on water quality; and ▶ effects on ecological status”. • In December 2022 the Scottish Government published the Sectoral Marine Plan: Roadmap of Actions (2022) which details the actions required to improve the

Relevant Legislation and Policy	Relevance to the assessment
	understanding of the potential implications of ScotWind sites on seabirds as identified by the Sectoral Marine Plan (2020).
Local Planning Policy	
Aberdeenshire Local Development Plan (LDP) 2023	As detailed in Appendix 3A: Planning Policy Framework , modified policies of relevance to this area of technical assessment are: <ul style="list-style-type: none"> • Policy C2 Renewable Energy • Policy PR2 Preserving and Protecting Important Development
Aberdeenshire Council Natural Heritage Strategy (2019) <ul style="list-style-type: none"> - Aim 1 – Protection of Natural Heritage 	As detailed in Appendix 3A – Planning Policy Framework , aims and objectives of relevance to this area of technical assessment are: <ul style="list-style-type: none"> • Objective 1.6 – Protect locally significant sites for nature conservation.

Technical guidance

5.7.5 Technical guidance that has been used to define the assessment is set out in **Table 5.7.2** below.

Table 5.7.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Band (2012)	Guidance on using a collision risk model to estimate bird collisions for offshore wind farm developments. This guidance will be considered when undertaking collision risk modelling.
McGregor <i>et al.</i> (2018)	User guide for the Stochastic Collision Risk Model (sCRM). This guidance will be considered when undertaking collision risk modelling.
CIEEM (2019)	Guidelines on the approach to EIA recommending that the conservation values of receptors are considered. This guidance will be considered when assessing potential impacts at the EIA scale.
Furness <i>et al.</i> (2013)	Analysis of seabird sensitivity to offshore wind farm developments. This guidance will be considered to inform species sensitivities to potential impacts from offshore wind farms.
Furness (2015)	Provides Biologically Defined Minimum Population Scales (BDMPS) used to define nonbreeding season populations. This guidance will be considered to inform species demographics and non-breeding season population assessments.
NatureScot (2018)	Interim guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs. This guidance will be considered when apportioning potential impacts to individuals SPAs for HRA.

Guidance reference	Relevance to the assessment
NatureScot (2020c)	Guidance on the effect of aviation obstruction lighting on ornithological receptors at wind turbine generators (WTGs), communication towers, and other structures. This guidance will be considered in relation to lighting effects on ornithology receptors.
NatureScot (2020d)	Guidance on seasonal periods for ornithological receptors in the Scottish marine environment used to define breeding seasons for the key species in assessment. This guidance will be considered to inform generic species season component months for Scottish seabirds.
Searle et al. (2014; 2018)	Guidance on use of SeaBORD for seabird displacement modelling. This guidance will be considered if SeaBORD is considered appropriate / possible for to model for this Project.
Natural England (2019)	Guidance from Natural England on seabird population modelling. This guidance will be considered if PVA is required for the Project. This will be established through stakeholder engagement.
SNCBs (2014)	Advice note from the joint Statutory Nature Conservation Bodies (SNCBs) on seabird avoidance rates to use in collision risk models. This guidance will be considered when identifying suitable avoidance rates for inclusion within CRM.
SNBCs (2022)	Advice note from the joint SNCBs on undertaking displacement assessment. Used to consider the risk that seabirds will be displaced from an operational offshore wind farm development and to estimate the mortality rates that may arise as a result. This guidance will be considered when undertaking displacement analysis.
Woodward et al. (2019)	Defines the mean maximum +1SD seabird foraging ranges used for screening statutory designated sites into apportioning calculations. This guidance will be considered to define species / colonies with connectivity to the Project during the breeding season.

Study area

- 5.7.6 The study area for the offshore and intertidal ornithology assessment is defined as the wind farm Option Agreement Area (OAA) covering a surface area of 684km² and associated offshore export cable corridor search area. The OAA is the spatial boundary of the NE7 Plan Option, as defined in the Scottish Government's Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020a) and is located 75-110km offshore of the north-east Aberdeenshire coastline, Scotland. **Figure 5.7.1: Offshore and intertidal ornithology study area** in **Appendix 1A** identifies the offshore and the intertidal ornithology study areas.
- 5.7.7 Two study areas inform the Scoping Report (and subsequently the EIA Report). These are listed below, with further detail provided in the following sections:
- offshore ornithology study area; and
 - intertidal ornithology study area.

Offshore ornithology study area

- 5.7.8 The offshore ornithology study area comprises the offshore Scoping boundary plus a 4km buffer surrounding the OAA. It also includes the nearshore environment seaward of MHWS within the Scoping boundary (**Figure 5.7.1** in **Appendix 1A**). For the purposes of the

assessment of potential adverse impacts on ornithology receptors data were collected from the site-specific aerial digital surveys within the OAA and surrounding 4km survey buffer. A 4km buffer was used in line with SNCB guidance (Updated, 2022) for offshore ornithology baseline characterisation, as the project is significantly further than 10km away from a SPA designated for red-throated divers.

- 5.7.9 This offshore ornithology study area will provide an appropriate ornithological context for the Project. The aerial digital survey collection methods were agreed with NatureScot as fit for the purpose of defining the baseline for offshore ornithology within the OAA and 4km buffer. These data will also provide an appropriate scale of data for a robust pre-and post-construction comparison of seabird abundance and distribution along a gradient outward from the Project and to allow this to be monitored.
- 5.7.10 The proposed offshore export cable corridor beyond the 4km survey buffer area is not included in the aerial digital survey area. Based on the predicted temporary and low-level potential impacts arising from cable laying on seabirds, the use of existing data sources is considered sufficient to characterise baseline characteristics of the proposed offshore export cable corridor for the purposes of the EIA Report.

Intertidal ornithology study area

- 5.7.11 The intertidal ornithology study area for the assessment of effects on waterbirds in the intertidal zone covers the coastal area between MHWS and Mean Low Water Springs (MLWS) at the proposed landfall location(s) within which intertidal bird surveys are to be carried out in the non-breeding season. This study area covers the initial search area for the landfall(s) along the coast, with areas extending between 326.52m and 3,095.19m in length along the coastline with 500m survey buffers (inclusive of habitat seaward from MHWS), encompassing the whole intertidal area (**Figure 5.7.1** in **Appendix 1A**). Inclusion of a 500m survey buffer is a cautionary approach based on recommendations presented within the Waterbird Disturbance Mitigation Toolkit (Cutts, *et al.*, 2013).
- 5.7.12 The intertidal ornithology study area will be reviewed and amended in response to such matters as refinement of the offshore components (inclusive of finalisation of offshore export cable corridor route/s), the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

Consultation

- 5.7.13 This Section has been informed by engagement and discussion with various stakeholders. **Table 5.7.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.
- 5.7.14 An offshore EIA Scoping workshop took place virtually on 29th September 2022 with NatureScot, MSS, MS-LOT and RSPB present. Ahead of the consultation meeting a paper providing an overview of proposed methods for determining baseline and EIA methods prior to the Scoping Report being drafted to NatureScot, MSS, MS-LOT and RSPB. A series of questions were also provided to the same consultees ahead of the consultation meeting in order to feed into a workshop to agree on the methods proposed or provide guidance on any alternate approaches. The detail with regard to the approach for Scoping and the future EIA Report are provided throughout this Scoping Report whilst the questions posed to SNCBs are included in **Table 5.7.3**.
- 5.7.15 Following the offshore EIA Scoping workshop, NatureScot, MSS and MS-LOT confirmed that they would not provide their responses to these questions ahead of viewing the full Scoping Report and intend to reply via the Scoping Opinion. The RSPB provided draft responses, though these are not included as they may be subject to change subject to

receipt of the full Scoping Report. Questions presented here are also provided throughout the Scoping Report at relevant stages to prompt consultees to provide clarification with regard to such matters.

Table 5.7.3 Consultation

Consultee	Comments and considerations	How this is accounted for
MS-LOT and NatureScot	A meeting on 1 st September 2022 to present the digital aerial survey methodology, programme, and highlights from the Year 1 data collected.	Meeting minutes and the digital aerial survey Year 1 data report have been shared with MS-LOT and NatureScot.
RSPB	An introductory meeting on 27 th September 2022 to present progress on the Project to date, describe the approach to identifying a Scoping boundary, and consideration of data sources including the proposed approach to digital aerial surveys, intertidal bird surveys, and wintering bird surveys.	Meeting minutes have been agreed with RSPB.
Marine Scotland Licensing Operations Team (MS-LOT) and Marine Scotland Science (MSS), NatureScot and RSPB	<p>An offshore EIA Scoping workshop was held on 29th and 30th September 2022. During a technical break-out session and after the workshop, the Project team submitted the following written questions to MS-LOT and MSS in relation to offshore and intertidal ornithology:</p> <ul style="list-style-type: none"> • Do SNCBs agree that assessments should be based on the breeding and non-breeding seasons as presented in the workshop? If not, please provide your preferred approach to species-specific seasonal definitions. • Does NatureScot and other consultees agree that based on review of the first year of data for the project, there is potential that refinements to the seasonal definitions based on NatureScot (2022) guidance note is appropriate for Project Marram? • For the key species presented in the workshop, please can you confirm whether the Seabird Monitoring Programme database provides the most up to date colony counts for Scottish colonies? If not, is NatureScot able to provide Project MarramWind with information on how to obtain the most recent and up to date data on Scottish seabird colony counts. • Does NatureScot and other consultees agree with the proposed method for defining the regional breeding season populations? If not, please provide an alternate method for deriving a regional breeding season population. 	The RSPB provided draft responses to these questions, though these are not included here as they may be subject to change subject to receipt of the full Scoping Report.

Consultee	Comments and considerations	How this is accounted for
	<ul style="list-style-type: none"> Does NatureScot and other consultees agree with the proposed method for defining the non-breeding season BDMPS? If not, please provide an alternate method for deriving a non-breeding BDMPS populations. As discussed during the Scoping Workshop, to accompany the realistic worst-case scenario, the Project would welcome SNCBs opinion on what they consider to be the worst-case scenario displacement and mortality rates for assessment for species considered sensitive to disturbance and displacement. Can NatureScot and other consultees provide their position on whether they consider there is a requirement to undertake disturbance and displacement assessment for kittiwake? If you consider the species should require assessment, it would be useful to understand your justification and any preferred worst-case scenario displacement and mortality rates to be applied and the method to determine / estimate the risk (e.g., matrix approach). Does NatureScot and other consultees agree with the use of the sCRM run deterministically for modelling potential collision risk for Project Marram? If not, could you please provide your preferred method for assessing collision risk? Does NatureScot and other consultees agree with the proposed collision risk input parameters for use in the sCRM presented during the workshop? If not, please provide your preferred collision risk input parameters and reference source. Does NatureScot and other consultees agree that there is not a requirement for a stand-alone assessment of barrier effect due to being included within disturbance and displacement assessments as per joint UK SNCBs (Updated, 2022) guidance? Does NatureScot and other consultees agree that there is not a requirement for disturbance and displacement assessments during the construction / installation phase of Project Marram? If not, please provide your preferred approach for assessment of disturbance and displacement during the construction / installation phase. 	

Consultee	Comments and considerations	How this is accounted for
	<ul style="list-style-type: none"> Does NatureScot and other consultees agree with the proposed approach for inclusion of other plans and projects for cumulative assessments? If not, please provide your alternate method for scoping sites in for cumulative effect assessment. 	

Assessment methodology

Introduction

5.7.16 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this offshore and intertidal ornithology section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the offshore and intertidal ornithology assessment.

5.7.17 A 'source-pathway-receptor' model is proposed to identify any likely impacts on offshore and intertidal ornithology receptors resulting from the proposed construction, operation and maintenance and decommissioning of the offshore infrastructure. The parameters of this model are defined as follows:

- Source – the origin of a potential impact (noting that one source may have several pathways and receptors) e.g. an activity such as cable installation and a resultant effect such as re-suspension of sediments.
- Pathway – the means by which the effect of the activity could impact the receptor e.g. for the example above, re-suspended sediment could settle and smother immobile benthic species, causing a reduction in prey availability.
- Receptor – the element of the receiving environment that is impacted e.g. for the above example, seabirds which are unable to forage effectively due to a reduction in benthic prey availability.

Evaluating potential receptors

5.7.18 The proposed assessment process will involve identifying Valued Ornithological Receptors (VORs). These receptors and their conservation value will be determined by the criteria defined in **Table 5.7.4**. These criteria are intended as a guide and are not definitive.

Table 5.7.4 Definition of conservation value levels for ornithological receptors.

Value	Definition
High	A species for which individuals at risk can be clearly connected to a particular SPA or is found in numbers of international importance within the OAA during a particular season.
Medium	A species for which individuals at risk are probably drawn from particular SPA populations or found in numbers of national importance within the OAA during a particular season, although other colonies (both SPA and non-SPA) may also contribute to individuals observed in the offshore and intertidal ornithology study area.
Low	A species for which it is not possible to attribute to particular SPAs and may be found in regionally or locally important numbers during specific seasons within the offshore and intertidal ornithology study area.
Negligible	All other species that are widespread and common and which are not present in locally important (or greater) numbers and which are of low conservation concern (e.g. UK BoCC5 Green List species; Stanbury <i>et al.</i> , 2021).

5.7.19 The assessment of potential receptors will consider the importance of the Project study area for the bird species under consideration. In accordance with CIEEM (2019) guidelines the focus of assessments will be on “*significant effects rather than all ecological effects*”. To illustrate the rationale of this approach, whilst a VOR could be considered of high conservation importance using the criteria in **Table 5.7.4**, the importance of the Project study area to this species may be considered limited if only a low number of sightings are recorded within the study area in the baseline surveys. As such, while the conservation value of the species is considered, the number of individuals of that species using the Project study area, and the nature and level of this use, is also considered. An assessment is then made of the importance of the Project study area to the species in question.

Characterising potential impacts

5.7.20 The sensitivity of the offshore and intertidal ornithology receptors to potential impacts will be determined subjectively based on species’ ecology and behaviour, using the criteria set out in **Table 5.7.5**. Judgement will take account of information available on the responses of VORs to various stimuli (e.g. predators, noise and visual disturbance, existing offshore wind farms where such data exist) and whether a VOR’s ecology makes it vulnerable to potential impacts (e.g. species that typically fly at heights that overlap with the rotor-swept area are considered to be more sensitive to collision risk with the moving blades of WTGs than species that fly much higher or lower than the rotor-swept area that avoid collision risk). A description is provided in **Table 5.7.5** of how sensitivity is intended to be assessed for the impact of disturbance by human activities, but the general approach can be applied to any impact.

Table 5.7.5 Definition of level of sensitivity for ornithological receptors.

Value	Definition
High	VOR has very limited tolerance to sources of disturbance such as noise, light, vessel movements and the sight of people.
Medium	VOR has limited tolerance to sources of disturbance such as noise, light, vessel movements and the sight of people.
Low	VOR has some tolerance to sources of disturbance such as noise, light, vessel movements and the sight of people.
Negligible	VOR is generally tolerant to sources of disturbance such as noise, light, vessel movements and the sight of people.

- 5.7.21 Sensitivity can differ between similar species, between different populations of the same species, between different individuals within a population and also differ in the same individual during different times. Thus, the behavioural responses of offshore and intertidal VORs are likely to vary with both the nature and context of the stimulus and the experience of the individual bird. Sensitivity also depends on the activity of the bird.
- 5.7.22 In addition, individual birds of the same species will differ in their tolerance depending on the level of human disturbance that they regularly experience in a particular area and have become habituated to (e.g. individuals that forage within close proximity to an area with high human activity levels are likely to have a greater tolerance than those that occupy remote locations with little or no human presence).
- 5.7.23 Consideration of the level of sensitivity with regards to individual VORs will be one of the core components of the assessment of potential impacts and their effects.
- 5.7.24 In addition, each receptor's conservation value will also be considered using reasoned judgement when determining their overall sensitivity to any potential impact or effect. For example, herring gull could be listed as a qualifying feature of an SPA and is a red listed species of conservation concern across the UK in BoCC5 (Stanbury *et al.*, 2021), but not judged to be sensitive to anthropogenic disturbance given its propensity to forage successfully on active landfill sites, utilise development structures including WTGs to perch on and to breed within urban environments on industrial and residential buildings roof tops. Such reasoned judgement is an important part of the overall narrative used to determine potential impact significance and will be used, where relevant, as a mechanism for modifying the sensitivity of an effect assigned to a specific VOR.
- 5.7.25 The use of expert judgement (CIEEM, 2019), alongside the conservation value (**Table 5.7.4**) and sensitivity (**Table 5.7.5**) of a VOR will be used to determine their overall sensitivity in the assessment.

Magnitude

- 5.7.26 Impacts on VORs will be judged in terms of their magnitude. Magnitude refers to the scale of an impact and will be determined on a quantitative basis where possible. This may relate to the area of habitat lost to the development footprint in the case of a habitat feature or predicted loss of individuals in the case of a population of a species of bird. Magnitude is assessed within four levels, as detailed in **Table 5.7.6**.

Table 5.7.6 Definition of level of potential magnitude of change for ornithological receptors.

Magnitude	Definition
High	A change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site that is predicted to irreversibly alter the population in the short to long-term and to alter the long-term viability of the population and/ or the integrity of the protected site. Recovery to baseline levels from that change predicted to be achieved in the long-term (i.e. more than five years) following cessation of the development activity.
Medium	A change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site that occurs in the short and long-term, but which is not predicted to alter the long-term viability of the population and/ or the integrity of the protected site. Recovery to baseline levels from that change predicted to be achieved in the medium-term (i.e. no more than five years) following cessation of the development activity.
Low	A change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site that is sufficiently small-scale or of short duration to cause no long-term harm to the feature/ population. Recovery to baseline levels from that change predicted to be achieved in the short-term (i.e. no more than one year) following cessation of the development activity.
Negligible	Very slight change from the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site. Recovery to baseline levels from that change predicted to be rapid (i.e. no more than circa six months) following cessation of the development activity.

5.7.27 Knowledge of how rapidly the population or performance of a species is likely to recover following loss or disturbance (e.g. by individuals being recruited from other populations elsewhere) will also be used to assess impact magnitude, where such information is available.

Impact significance

5.7.28 The CIEEM guidelines (2019) use only two categories to classify effects: “*significant*” or “*not significant*”. The significance of an effect is determined by considering the overall importance (defined here as the overall sensitivity) of the receptor and the magnitude of the impact using a matrix-based approach provided in **Plate 4.2.2** in **Chapter 4: Approach to Scoping and EIA**. Where possible, assessment of the magnitude of the impact on offshore and intertidal ornithology is based upon quantitative criteria, together with applying professional judgement as to whether the integrity of the feature will be affected.

5.7.29 Effects are more likely to be considered significant where they affect ornithological features of higher overall sensitivity or where the magnitude of the impact is high. Effects not considered to be significant would be those where the integrity of the feature is not threatened, effects on features of lower overall sensitivity, or where the magnitude of the impact is low.

Baseline conditions

Data sources

- 5.7.30 As is standard for offshore wind farms, a two-year programme of monthly digital aerial surveys of the OAA and a 4km buffer began in April 2021 and is due to complete in March 2023. Surveys of offshore birds are being carried out monthly using industry standard methods to provide baseline data for the offshore ornithology assessment.
- 5.7.31 Baseline ornithology surveys of the offshore export cable corridor are not being carried out, again in line with standard practice for offshore wind farms due to impacts on offshore birds in the export cable corridor being temporary and small scale in nature. However, should a location for the export cable be chosen that overlaps with the SPA, then baseline surveys of the area of overlap will be required.
- 5.7.32 Intertidal surveys are being undertaken at initial search area for the landfall(s) using the 'Through the Tidal Cycle Count' method, which is based upon 'look-see' methods (Gilbert *et al.* 1998). Surveys are being undertaken monthly during the non-breeding season (September-March) with alternate visits capturing the rising and falling tides, as there are differences in food availability and energy budgets on the rising and ebbing tides. This also allows for the capture of both high tide and low tide roosts and foraging activities and results in a more robust assessment of the potential impacts of the Project upon ornithological receptors within the intertidal and nearshore areas. The surveys serve to census and map the waterbirds and other species of interest present within the intertidal zone between the mean low-water and mean high-water marks and any significant roosts above the high-water mark, as well as those present in the nearshore waters within 500m of the shoreline at the proposed export cable corridor landfall site(s).

Table 5.7.7 Key sources of offshore and intertidal ornithology data and guidance

Sources and dates	Summary	Coverage of study area
Wade <i>et al.</i> 2016; Furness <i>et al.</i> , 2013; Furness and Wade 2012; Langston 2010; Stienen <i>et al.</i> , 2007; Drewitt and Langston 2006; Garthe and Hüppop 2004.	Guidance and research – sensitivity of birds to offshore wind farms.	Full coverage of study area.
SNCBs 2022; Dierschke <i>et al.</i> 2016; Masden <i>et al.</i> 2012, 2010; Speakman <i>et al.</i> , 2009.	Guidance, research and methodology – offshore wind farm displacement / barrier effects on birds.	Full coverage of study area.
Bowgen and Cook 2018; MacGregor <i>et al.</i> , 2018; Skov <i>et al.</i> 2018; Cook <i>et al.</i> 2014; Johnston <i>et al.</i> , 2014a and b; SNCBs 2014; Band 2012; Wright <i>et al.</i> , 2012; Cook <i>et al.</i> 2012. It is noted that a recent review and recommendations for revised avoidance rates (Cook 2021), commissioned by Natural England, has been withdrawn.	Guidance, research and methodology – collision risk modelling, flight heights and avoidance rates for birds and offshore wind farms, including the Band deterministic model, the stochastic model and the migratory species model.	Full coverage of study area.
Natural England 2019	Population viability analysis modelling tool for seabirds.	Full coverage of study area.

Sources and dates	Summary	Coverage of study area
Cleasby <i>et al.</i>, 2020, 2018; Waggit <i>et al.</i>, 2019; Woodward <i>et al.</i> 2019; Wakefield <i>et al.</i>, 2017, 2013; Kober <i>et al.</i>, 2010; Stone <i>et al.</i> 1995, specific tracking studies for north east Scotland seabird breeding colonies e.g. MacArthur Green (2018, 2019), Waggit <i>et al.</i> 2020	Seabird foraging ranges and distribution at sea.	Full coverage of study area.
Furness 2015; Mitchell <i>et al.</i> 2004; JNCC seabird monitoring programme database; designated site citations / departmental briefs / conservation advice from the websites of SNCBs.	Bird population estimates.	Full coverage of study area.
Relevant documents from marine licence applications for other offshore wind farms in UK offshore waters (in particular Scottish and English East Coast Waters), and Transboundary offshore wind farms.	Information and data for cumulative (and in combination (HRA)) assessment.	Full coverage of study area.
Relevant ecological studies for species included in EIA (peer reviewed scientific papers and 'grey' literature), including postconstruction monitoring studies (e.g. Moray Firth Regional Advisory Group https://marine.gov.scot/ml/moray-firthregional-advisory-group-mfrag), Kincardine offshore wind farm bird collision study (KOWL, 2019), Offshore Renewables Joint Industry Programme (ORJIP) collision avoidance study (SKOV <i>et al.</i> 2018), East Coast of Scotland regional digital aerial surveys (APEM 2019 and subsequent upcoming modelling report (Marine Scotland Science, date TBC)	Empirical evidence and studies relevant to assessment.	Full coverage of study area.
Published documents relating to Scottish Government plans for offshore wind energy (ABPmer 2019, Scottish Government 2020)	Relevant strategy and policy documents.	N/A
Bird records from the North East Scotland Biodiversity Record Centre (NESBReC) and the North East Scotland Scottish Ornithologists' Club (SOC) Bird Recorder, BTO Wetland Bird Survey (WeBS) Data, as well as any other relevant bodies identified.	Intertidal and nearshore bird records to inform on abundance and distribution of species within the intertidal zone of influence.	Full coverage of study area.
The BTO Bird Atlas (Balmer <i>et al.</i>, 2013), Birds of Scotland (Forrester <i>et al.</i>, 2007), the Aberdeenshire County Bird Report (Scottish Ornithologists Club, multiple years), The Breeding Birds of North-East Scotland (Francis <i>et al.</i>, 2011), and any other relevant publications identified.	Intertidal and nearshore bird records and ecology to inform on abundance and distribution of species within the intertidal zone of influence.	Full coverage of study area.

Current baseline

- 5.7.33 This Section presents an overview of the existing environment and key bird species likely to be present within the Scoping Boundary to MHWS. This is based on species recorded to date during baseline surveys (detailed below), EIAs for offshore wind farms in close proximity to the Project, the location, and reasons for designation of nearby SPAs in the North Sea and other sources, as cited.
- 5.7.34 The Project Area is situated in the North Sea, approximately 75km (at its closest point to land) to 110km (at its farthest point) off north-east Aberdeenshire. The North Sea is important for seabirds throughout the year, providing foraging grounds for seabirds breeding in adjoining coastal areas during the breeding season, from colonies further afield in the nonbreeding season, and for sub-adult birds (pre-breeding age) throughout the year. Overall, at least 19 seabird species breed on coastal areas around the North Sea, including large populations of northern gannet, kittiwake, common guillemot and razorbill (ICES 2021).
- 5.7.35 At the time of writing, results from site-specific baseline surveys are available for 10 surveys for the period April 2021 to March 2022. Note that two surveys were missed during Year 1 (in November 2021 and February 2022) due to adverse weather conditions. Consequently, two extra surveys are planned to be undertaken in the 2022 / 2023 winter season to maintain collection of the required seasonal data. An approach to undertake two surveys in either October or November or December 2022 and to undertake two surveys in either January or February or March 2023 in place of those missing months from Year 1 was presented to MS-LOT, NatureScot, and the RSPB, who acknowledged the difficulty in surveying during the autumn and winter and agreed with this strategy with no concerns raised. These surveys were statistically analysed to provide abundance estimates (**Table 5.7.8**) for the OAA to provide an initial insight into the species present based on the first year's survey effort.

Table 5.7.8 Abundance estimates (all behaviours) of seabirds recorded within the OAA from the first year of aerial digital surveys

Species	Apr 21	May 21	June 21	Jul 21	Aug 21	Sep 21	Oct 21	Dec 21	Jan 22	Mar 22
Kittiwake	1,144	278	23	15	190	7	55	16	63	86
Common gull	0	0	0	15	0	0	0	0	0	0
Great black-backed gull	31	0	0	0	0	7	16	32	227	47
Herring gull	8	8	0	0	0	0	0	16	71	0
Lesser black-backed gull*	0	0	0	0	0	0	0	0	0	0
Arctic tern	0	0	0	30	8	0	0	0	0	0
'Commic' tern	0	23	0	8	0	0	0	0	0	0
Great skua	0	0	0	23	111	0	0	0	0	0
Guillemot	11,930	239	273	2,950	3,408	324	2,010	118	125	1,549
Razorbill	147	0	0	38	0	83	40	0	16	47
Guillemot/razorbill	510	0	31	181	79	1,716	546	1,080	1,183	343
Puffin	139	85	16	45	0	15	0	0	0	0
Storm petrel spp.	0	0	39	249	16	0	0	0	0	0
Fulmar	626	324	187	1,147	3,265	1,656	562	804	635	202
Gannet	572	209	273	75	2,490	429	356	16	16	39

Table Note: *Lesser black-backed gull recorded in the 4km buffer only. Counts in bold represent the peak abundance recorded for each species.

5.7.36 Based on the first year of survey results (**Table 5.7.8**) and taking into consideration the criteria for identification of VORs in **paragraph 5.7.18**, the key species identified as likely requiring assessment are as follows:

- Kittiwake *Rissa tridactyla*;
- Great black-backed gull *Larus marinus*;
- Herring gull *Larus argentatus*.
- Common guillemot *Uria aalge*;
- Razorbill *Alca torda*;
- Atlantic puffin *Fratercula arctica*; and
- Northern gannet *Morus bassanus*.

5.7.37 It should be noted that the species listed above may be subject to change following the completion of the remaining site-specific surveys, further evidence emerges on the potential effects of offshore wind farm developments or taking into account stakeholder consideration.

Future baseline

5.7.38 The current baseline description above reflects the Project's understanding of the current state of the existing environment. There are currently no known other proposed developments likely to influence the offshore study area. In the absence of significant local impacts, it is likely that the populations of bird species present will evolve in accordance with regional and national trends. The overall duration of construction is anticipated to be up to eight years with an assumed minimum operational life of 35 years, with an agreement for lease up to 2080. Therefore, there exists the potential for the baseline to evolve between the time of assessment and point of impact. Outside of short-term or seasonal fluctuations, changes to the baseline in relation to offshore ornithology usually occur over an extended period. Based on current information regarding reasonably foreseeable events over the next two years, the baseline is not anticipated to have fundamentally changed from its current state at the point in time when impacts occur.

5.7.39 Should the Project be developed or not, changes in populations are likely to result from climatic factors (such as temperature change and subsequent impacts on species' ranges) and other natural phenomena (such as the recent avian influenza epidemic), or anthropogenic activities such as changes in fishing activities indirectly affecting marine bird communities. Baseline conditions are therefore not static and are likely to exhibit some degree of change over time, with or without the Project in place

Basis for scoping assessment

5.7.40 The offshore and intertidal ornithology scoping assessment is based on the following key assumptions, which are also set out in **Chapter 2: Project Description**:

- impacts from all phases of the Project for a floating wind farm, with a grid connection capacity of up to 3GW, from changes to physical processes;
- impacts from changes / loss of habitat that can affect key prey resources from all phases of the Project;
- impacts from the potential presence of array and export cables causing anthropogenic EMF;

- impacts from the maintenance of the above infrastructure during operation.
- impacts from the floating units and floating WTG, such as collision risk, disturbance, displacement, or barrier;
- impacts from the presence of array cables and mooring lines, such as collision;
- the potential for clearance of unexploded ordnance (UXO); and.
- impacts from the requirement for decommissioning.

5.7.41 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.7.10**.

5.7.42 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

5.7.43 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on offshore and intertidal ornithology (see **Table 5.7.9**). The environmental measures proposed are relevant to ornithological features as well as prey resources. These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.7.44 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 5.7.9 Relevant offshore and intertidal ornithology embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-032	Development of and adherence to an agreed Marine Mammal Mitigation Protocol (MMMP). This will subsequently mitigate potential impacts from underwater noise on marine mammals and fish through good or standard practice actions in order to meet legislative requirements. The MMMP will evolve during the development phase and as the EIA progresses and in response to consultation.	s.36 conditions and marine licence conditions.
M-033	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution even arising from offshore operations relating to the Project. The MPCP will also include relevant key emergency contact details.	s.36 conditions and marine licence conditions.
M-038	Development of and adherence to a Lighting and Marking Plan (LMP). The LMP will confirm compliance	s.36 conditions and marine licence conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	with legal requirements with regards to shipping, navigation and aviation marking and lighting.	
M-041	Development of and adherence to a Vessel Management Plan (VMP), which will confirm the types and numbers of vessels that will be engaged on the Project, and consider vessel coordination including indicative transit route planning.	s.36 conditions and marine licence conditions.
M-046	There will be a minimum blade tip clearance of at least 24m above mean sea level.	s.36 conditions and marine licence conditions.
M-049	Development of and adherence to a Project Environmental Monitoring Programme (PEMP), which will set out commitments to environmental monitoring in pre-, during and post-construction phases of the Project.	s.36 conditions and marine licence conditions.
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase.</p> <p>The CEMP will be the securing mechanism for many measures.</p>	s.36 conditions, marine licence conditions and CEMP.
M-106	The development of and adherence to a decommissioning programme.	Required under sections 105 and 114 (Energy Act 2004) and marine licence consent conditions.

Potential impacts

- 5.7.45 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a potentially significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 5.7.46 The potential impacts on offshore and intertidal ornithology are summarised in **Table 5.7.10**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for offshore and intertidal ornithology effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.7.47 The early identification of potentially significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.7.10 Potential offshore and intertidal ornithology impacts

Activity and impact	Embedded measures	Potential impact	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Direct temporary habitat loss / disturbance due to construction and decommissioning (Construction and Decommissioning)	M-049, M-063, M-106	Construction activities such as increased vessel activity and underwater noise may result in temporary direct disturbance or displacement of birds from important feeding and roosting areas, including due to direct habitat loss.	Scoped in.	Offshore ornithological receptors.	Ongoing aerial digital surveys and data analysis will further inform the assessment of this impact, supported by Section 5.5: Benthic, epibenthic and intertidal ecology ; and Section 5.8: Fish and shellfish ecology .
Direct temporary intertidal habitat loss / disturbance / displacement due to export cable corridor landfall(s) construction and decommissioning (Construction and Decommissioning)	M-049, M-063, M-106	Construction activities such as increased vehicle activities, footfall, excavation and cable laying may result in temporary direct disturbance / displacement of birds from important feeding and roosting areas, including due to direct temporary habitat loss.	Scoped in.	Intertidal and nearshore ornithological receptors.	Ongoing intertidal ornithology surveys will further inform the assessment of this impact, supported by data acquired during desk-based study.
Indirect impacts due to effects on prey species and habitats (Construction and Operation and Maintenance)	N/A	Impacts may result from underwater noise or the generation of suspended sediments that may alter the distribution, physiology or behaviour of bird prey species and thereby have an indirect effect. These mechanisms could potentially result in less prey	Scoped in.	Offshore ornithological receptors.	Review of the data and impact assessments for benthic and intertidal ecology and fish and shellfish will be conducted within the context of the potential impacts on

Activity and impact	Embedded measures	Potential impact	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		being available in the area adjacent to active construction works to foraging seabirds. There is also evidence that fish and mobile invertebrates may be attracted to the operational area (Kerckhof <i>et al</i> , 2010; EMU Ltd., 2008; Krone <i>et al</i> , 2013; Linley <i>et al</i> , 2008 and Wilhelmsson <i>et al</i> . 2006) and so beneficial impacts may occur.			offshore and intertidal ornithology.
Operational disturbance and displacement (proposed WTG array area and applicable buffer; Operation and Maintenance)	M-046	The presence of WTGs has the potential to disturb and displace birds from within and around the Project study area. This will have the potential to reduce the area available to birds for feeding or loafing. Vessel activity and the lighting of WTGs and associated ancillary structures could also attract (or repel) certain species of birds and affect migrating birds.	Scoped in.	Offshore ornithological receptors.	Ongoing aerial digital surveys will further inform the assessment of this impact.
Collision risk (proposed WTG array area; Operation and Maintenance)	M-046	There is a risk of birds in flight colliding with rotating WTG blades. The susceptibility of species to collision risk depends upon physiological and behavioral characteristics of the species.	Scoped in.	Offshore ornithological receptors.	Ongoing aerial digital surveys will further inform the assessment of this impact.
Entanglement with mooring lines	N/A	Derelict/lost fishing gear could entangle in mooring lines with the	Scoped in.	Offshore ornithological receptors.	Ongoing aerial digital surveys will further inform

Activity and impact	Embedded measures	Potential impact	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
(Operation and Maintenance)		potential for diving seabirds to become entangled.			the assessment of this impact.
Accidental pollution during construction (including indirect effects) (Construction)	M-033	Negligible potential direct and indirect impacts.	Scoped out See paragraph 5.7.49.	Offshore and intertidal ornithological receptors.	N/A
Operational disturbance and displacement (offshore export cable) (Operation and Maintenance)	M-041, M-046	Negligible potential direct impact.	Scoped out See rational in section below paragraph 5.7.51.	Offshore ornithological receptors.	N/A
Barrier effects (Operation and Maintenance)	N/A	Negligible potential direct impact.	Scoped out See rational in section below paragraph 5.7.52.	Offshore ornithological receptors.	N/A

Impacts scoped out of assessment

- 5.7.48 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of negligible chance of a potentially significant adverse effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the evidence available on the potential for impact from projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.

Accidental pollution during construction (including indirect effects)

- 5.7.49 The impact of pollution including accidental spills and contaminant releases associated with the construction of infrastructure and use of supply / service vessels may lead to direct mortality of birds or indirectly via causing a deterioration in habitat quality or a reduction in prey availability either of which may affect species' survival rates. It has been predicted for other offshore wind farms that any impact would be of local spatial extent, short term duration, and not significant in EIA terms. This is considered to be equally applicable to the Project, for which construction will be comparable in scale and operation and within the same environment, whilst implementing an appropriate approach to construction practices. Therefore, subject to consultation with the stakeholders and feedback received on this EIA Report Scoping Report, it is intended to scope this impact out of further consideration within the EIA Report.
- 5.7.50 Following appropriate construction best practice, it has been agreed with stakeholders on consent applications for other offshore wind farms in the UK and elsewhere that complete mortality within the equivalent extent of the Project Array Area plus 4km buffer area is considered very unlikely to occur, and a major incident that may impact any species at a population level is considered very unlikely. This has been the case at, for example, Awel Y Mor and Rampion 2 EIA Scoping Opinion in Wales and England respectively, as well as Green Volt in Scotland.

Operational disturbance and displacement (offshore export cable)

- 5.7.51 Given that potential impacts along the potential offshore export cable corridor would be highly localised and episodic (i.e., limited to any maintenance or repair of the export cables) it is proposed that this impact should be scoped out from further consideration within the EIA Report in relation to the potential offshore export cable corridor, with the focus of operation disturbance-displacement on the OAA only.

Barrier effects during operation

- 5.7.52 For the purposes of assessment of displacement for breeding birds, it is usually not possible to distinguish between displacement and barrier effects. For example, to define where individual birds may have intended to travel to, or beyond an offshore wind farm, even when tracking data are available. The proposed approach to displacement assessment is highly precautionary and is assumed to account for barrier effects in addition to displacement impacts per se, and this is recognised by the updated SNCB (2022) interim guidance on displacement and the inclusion of flying as well as sitting birds. Therefore, within the EIA Report, potential barrier effects on resident VORs will not be assessed in their own right but will be assumed to be captured within the assessment of displacement effects.
- 5.7.53 The small risk of impact to migrating birds resulting from flying around rather than through the WTG array of an offshore wind farm is considered a potential barrier effect but has been scoped out of the assessment. Masden *et al.* (2010, 2012) and Speakman *et al.* (2009) calculated that the costs of one-off avoidances during migration were small, accounting for

less than 2% of available fat reserves. Therefore, the impacts of any barrier effect on birds that only migrate through the site (including seabirds, waders and waterbirds on passage) are considered negligible and these would be scoped out of detailed assessment in the EIA Report.

Cumulative effects

- 5.7.54 Cumulative effects on offshore and intertidal ornithology resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the CEA screening exercise.

Offshore ornithology

- 5.7.55 Based on experience of other offshore wind farm projects, for offshore ornithology it is expected that the cumulative assessment will focus on operational and maintenance phase cumulative displacement and collision risk due to the presence of offshore infrastructure when considered alongside other offshore wind farm projects. Cumulative impacts during the construction and decommissioning phases are anticipated to be screened out, the contribution from the Project is likely to be small and is dependent on a temporal and spatial co-incidence of displacement from other plans or projects (significant additive effects associated with simultaneous construction phases are considered unlikely based on currently available project information for other developments).
- 5.7.56 The assessment of cumulative effects will be undertaken on a seasonal basis. For the breeding season where a significant proportion of the population will be restricted to movements within foraging range of their associated colony, projects will be scoped in for cumulative effects assessment based on species specific mean max plus 1SD foraging range from the Project (Woodward *et al.* 2019). In the non-breeding season where species may migrate and disperse significant distances away from their natal colony and wider mixing of different colonies occurs, other projects will be scoped in for cumulative assessment based on location within the regional BDMPS areas described in Furness (2015).
- 5.7.57 Wherever possible the cumulative assessment will be quantitative (i.e. where data in an appropriate format have been obtained). However, the level of data available and the ease with which impacts can be combined across offshore wind farms is quite variable, reflecting the availability of relevant data for older projects and the approach to assessment taken. Where this has not been possible (e.g. for older projects) a qualitative assessment will be considered instead.

Intertidal ornithology

- 5.7.58 For intertidal ornithology the cumulative impacts are assumed to be negligible due to the temporary and low-level nature of potential intertidal impacts resulting from the proposed cable-laying infrastructure installation.

Transboundary effects

- 5.7.59 The potential effects from construction, operation (including maintenance) and decommissioning on offshore and intertidal ornithology receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. The Project alone and cumulative impact assessments may affect offshore bird populations located outside UK territorial water, giving the potential for transboundary impacts. The area of search for Transboundary offshore wind farms is likely to be the North Sea. Transboundary offshore wind farms will

be screened for the potential to impact on the same bird populations as are present at the Project proposed development site. If transboundary sites are screened in, impacts will be assessed as per the other cumulative impacts.

Proposed approach to the EIA Report

- 5.7.60 The offshore and intertidal ornithology EIA Chapter will be supported by the following technical annexes:
- Offshore and Intertidal Ornithology Baseline Technical Report;
 - Displacement Analysis Technical Annex;
 - Collision Risk Modelling Technical Annex; and
 - Population Viability Analysis Technical Annex (should this be required).
- 5.7.61 Consultation will be held with relevant statutory and non-statutory organisations prior to drafting the Chapter and associated annexes in order to agree upon the approach to assessment and as part of the Pre-application Consultation process as set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.7.62 Following on from the EIA Scoping workshop held on 29th and 30th September 2022, several areas of uncertainty remained regarding approach to assessment of intertidal and offshore ornithology features. The Applicant has therefore included additional questions to those set out in **Table 5.7.3**, to aid in addressing the remaining areas of uncertainty via Scoping Opinion responses from stakeholders.

Baseline characterisation

- 5.7.63 The ornithology baseline technical report will present the following information:
- the methods and results of the site-specific aerial digital and intertidal surveys used to characterise the baseline for offshore ornithology;
 - the results of any other data used to support or characterise the baseline for offshore and intertidal ornithology including site-specific survey data;
 - the method for calculating the design-based density and abundance estimates for all species recorded within the offshore site-specific surveys;
 - the method for apportioning unidentified species groups within the offshore surveys datasets;
 - presentation of the monthly design-based density and abundance estimates for the array area, array area plus 2km buffer, and array area plus 4km buffer both pre- and post-apportionment of unidentified species group and correction for availability bias to allow for appropriate assessment of disturbance and displacement effects following SNCB guidance (Updated, 2022);
 - presentation of sex and age ratios recorded from the site-specific aerial digital surveys; and
 - species accounts for the most abundant / key species which will include graphical presentation of the distribution within both the offshore and intertidal survey areas by season and consideration of likely connectivity and site usage using available data such as flight direction.
- 5.7.64 For deriving density and abundance estimates for the OAA plus 4km buffer using the offshore site-specific survey data, the Project intends to use design-based methods rather

than MRSea. This is because of the location of the Project means that the environmental covariates commonly used for MRSea, bathymetry and distance to shore, have little to add to explain any variation in the distribution of seabirds over the OAA. This is due to the relatively deep and uniform depth of water (87 – 117.5m) over the OAA and the distance to land of over 75km at which distance effects become minimal. Environmental data that may have additional explanatory benefit to the modelling, such as prey distribution, are currently not available at the spatial and temporal scales required and also does not cover the study area / Scoping Boundary. It is also apparent from the Year 1 dataset that the majority of raw count data are so low as to mean it would be difficult or not possible to run MRSea in a meaningful manner. Any resulting abundance estimates from the use of MRSea when relying on limited raw count data, no additional environmental parameters and only x and y coordinates are unlikely to differ significantly from design-based abundance estimates.

5.7.65 In relation to the above proposed approach the Project would welcome responses to the following questions:

- Do you agree that the above information being made available would be sufficient to appropriately characterise the baseline environment for offshore and intertidal ornithology? If the answer is no, please provide details of any additional information that would be required.
- Do you agree that population modelling using MRSea to determine seabird abundance and density estimates is not required for the Project?

Biological seasons

5.7.66 Bird behaviour and abundance is recognised to differ across a calendar year dependent upon the biological seasons (referred to by NatureScot more simply as seasons (NatureScot, 2020d) that may be applicable to different offshore ornithology receptors, therefore assessments will be undertaken on a seasonal basis. The proposed species-specific seasons are presented in **Table 5.7.11** below, which have been collated based on the seasonal definitions and BDMPs from the NatureScot (2020d) guidance note. The seasons are defined as:

5.7.67 Based on NatureScot (2020d) guidance note:

- breeding: when birds are strongly associated with the nest site; and
- non-breeding: non-breeding (or winter) period.

5.7.68 The suggested seasons and population sizes for identified VORs are presented in **Table 5.7.11**. The intention for kittiwake is to present the assessment using two and three season options; using two seasons defined by NatureScot guidance and three seasons by incorporating the migratory periods pre- and post-breeding defined in Furness (2015). This is suggested to maximise interpretation of peak abundance estimates and behaviour over the study area of this species. For gannet, three seasons are proposed to account for extensive population movements occurring during migratory periods.

5.7.69 As noted within the NatureScot (2020d) guidance note, the indicated seabird seasons may change slightly depending on project location throughout Scotland. Due to the location of the Project, there may be instances where the general seasonal guidance may not accurately reflect the species behaviour recorded within the site-specific data.

5.7.70 Following review of the first year of site-specific survey data, for some species the site-specific patterns, occurrence and abundances suggest that amendments to the generalised seasonal definitions in **Table 5.7.11** may be appropriate. For example, the data illustrates the change in monthly abundance estimates of guillemots from the site-specific survey data within the OAA for the generalised seasons according to the NatureScot (2020d) guidance

note in **Table 5.7.11**. In April 2021 the abundance estimate is substantially higher than the other core breeding season months (May and June), suggesting an anomaly which is likely explained as a spring pulse of guillemots migrating through the site on route to breeding colonies north of the site. Therefore, this would suggest that in this case data from the month of April would be best considered within the non-breeding season for determining the baseline for assessment purposes.

5.7.71 For the same species, guillemot, increases in abundances were also estimated in the months of July and August, comparatively to the core breeding months of May. Such increases are not uncommon during the post-breeding dispersal period for this species, as birds are likely to be beginning to undertake migration to wintering grounds. This is reinforced by the fact that during July 2021 a total of 139 juvenile guillemots were recorded within the OAA plus 4km buffer and in August a total of 14 juveniles were recorded. This post-breeding migration movement of guillemots in July also correlates with the post breeding dispersal movements of guillemots presented within Buckingham *et al.* (2022). Subject to review of the second year of survey data, it is recommended that the most appropriate seasonal definitions for guillemot would be mid-April to mid-June for the breeding season and July to mid-April for the non-breeding season.

5.7.72 Where seabird distribution patterns, behaviours and abundances do not correlate between the site-specific survey data and the NatureScot (2020d) guidance note, it is recommended to adjust the seasonal definitions to determine the most appropriate seasons to define the baseline for assessment purposes. Any adjustments to the seasonal definitions would be presented to NatureScot and other consultees for discussion and agreement, prior to any assessments taking place.

5.7.73 In relation to the above proposed approach the Project would welcome responses to the following questions:

- Do you agree the proposed seasons presented in **Table 5.7.11** match the SNCB generic seasonal guidance based on NatureScot (2020d) for assessment?
- Do you agree that based on review of the first year of data for the project, there is potential that refinements to the seasonal definitions based on NatureScot (2020d) guidance note is appropriate for the Project?

Table 5.7.11 Proposed seasons and biogeographic sizes.

Species	Breeding (NatureScot, 2020)	Non-breeding (NatureScot, 2020)	Biogeographic population (Furness, 2015)
Kittiwake	Mid-April to August	September to Mid-April	5,100,000
Great black-backed gull	April to August	September to March	235,000
Herring gull	April to August	September to March	1,098,000
Guillemot	April to mid-August	Mid-August to March	4,125,000
Razorbill	April to mid-August	Mid-August to March	1,707,000
Puffin	April to mid-August	Mid-August to March	11,840,000
European storm petrel	Mid-May to October	N/A	N/A

Reference populations

- 5.7.74 The regional breeding season population sizes will be derived from the latest colony counts from the Seabird Monitoring Programme database (JNCC, 2022) based on inclusion of all colonies within the mean max plus one standard deviation (SD) defined in Woodward *et al.* (2019). However, based on outliers in the data as noted within Woodward *et al.* (2019) the following exceptions will be accounted for when deriving the breeding season population:
- for guillemot and razorbill, the mean max plus one SD foraging range will exclude Fair Isle data for sites south of the Pentland Firth; and
 - sites which are outwith the mean maximum plus one SD but are known to have tracking data overlapping with the proposed OAA and 4km buffer will be included.
- 5.7.75 The latest full colony count on the Seabird Monitoring Programme database will be used for informing the breeding season population size. Where colony counts are expressed as apparently occupied nests (AON), apparently occupied burrows (AOB), apparently occupied territories (AOT), or apparently occupied sites (AOS), the assumption will be taken that the one count will equate to two breeding individuals.
- 5.7.76 In addition to the breeding adult bird counts derived from the Seabird Monitoring Programme database, there will be immature birds, juvenile birds and “*sabbatical*” birds (mature birds not breeding in a given year) present within the region, including the study area. The non-breeding proportion of the breeding season population will be derived from the estimated number of immatures presented in Appendix A of Furness (2015) in the return migration season.
- 5.7.77 For the non-breeding season, where significant mixing of birds from different UK and overseas populations occurs, the regional population will be derived from the largest non-breeding population size for the North Sea (and English Channel, where appropriate) defined in Furness (2015).
- 5.7.78 In addition, for intertidal birds, colony counts for intertidal SPAs will be used should they not be captured within the offshore populations.
- 5.7.79 In relation to the above proposed approach the Project would welcome responses to the following questions:
- Do you agree with the approach taken for deriving species regional breeding season population described above, include the exceptions described above?
 - Do you agree on the use of the Seabird Monitoring Programme database for deriving the latest colony counts for all Scottish sites? If the answer is no, please provide alternative data source where the latest colony count can be derived from.
 - Do you agree with the non-breeding populations being derived from Furness (2015)?

Species demographics

- 5.7.80 The method to assess the potential impact from additional mortality to the population due to the Project will be assessed in terms of any change in relation to the baseline mortality rate for any given species within each of the recognised bio-seasons. A complete review of all seabird parameters feeding into the calculations for estimating species-specific productivity and mortality rates was undertaken for the Project.
- 5.7.81 The average mortality across all age classes for identified VORs are presented in **Table 5.7.12** below. The method presented assumes all age classes are at risk to the possible impacts of the proposed development equally, and as such the baseline mortality rate is a

weighted average based on all age classes. Demographic rates for each species were those provided in Horswill and Robinson (2015), which were used to calculate the expected stable proportions in each age class for each species. Each age class survival rate was multiplied by its stable age proportion and the total for all ages summed to give the weighted average survival rate converted to an average mortality rate. The exception to this was great black-backed gull, as data on this species from Horswill and Robinson (2015) is stated as not deemed sufficiently robust enough for use, so the mortality rate was calculated using herring gull juvenile survival rate (0.798) for juveniles and the calculated average survival rate taken from herring gull juvenile and adult for sub-adults. Great black-backed gull productivity was taken from the Seabird Monitoring Programme report (JNCC 2020), which provided an average UK productivity between 1991 to 2018 of 0.890.

5.7.82

In relation to the above proposed approach the Project would welcome responses to the following question:

- Do you agree with the average mortality rates presented in **Table 5.7.12**? If the answer is no, please provide further detail on your preferred method for derivation of population level mortality rates.

Table 5.7.12 Proposed species demographic rates and calculated population level average mortality

Species	Parameter	Survival (age class)							Productivity (chicks per pair)	Average mortality
		0-1	1-2	2-3	3-4	4-5	5-6	Adult		
Kittiwake	Demographic rate	0.790	0.854	0.854	0.854	0.854	0.854	0.854	0.690	0.156
	Population age ratio	0.153	0.121	0.103	0.088	-	-	0.535		
Great black-backed gull	Demographic rate	0.798	0.816	0.816	0.816	0.816	-	0.885	0.890	0.160
	Population age ratio	0.177	0.141	0.115	0.094	0.076	-	0.397		
Herring gull	Demographic rate	0.798	0.834	0.834	0.834	0.834	-	0.834	0.920	0.172
	Population age ratio	0.177	0.141	0.118	0.098	0.082	-	0.384		
Guillemot	Demographic rate	0.560	0.792	0.917	0.0917	0.939	0.939	0.939	0.672	0.138
	Population age ratio	0.160	0.090	0.071	0.065	0.061	0.57	0.496		
Razorbill	Demographic rate	0.630	0.630	0.630	0.895	0.895	-	0.895	0.570	0.193
	Population age ratio	0.163	0.103	0.065	0.041	0.037	-	0.591		

Species	Parameter	Survival (age class)							Productivity (chicks per pair)	Average mortality
		0-1	1-2	2-3	3-4	4-5	5-6	Adult		
Puffin	Demographic rate	0.709	0.709	0.709	0.760	0.805	-	0.906	0.617	0.175
	Population age ratio	0.158	0.112	0.079	0.056	0.043	-	0.552		
Gannet	Demographic rate	0.424	0.829	0.891	0.895	0.895	-	0.919	0.700	0.187
	Population age ratio	0.191	0.081	0.067	0.060	0.054	-	0.547		

Displacement analysis

- 5.7.83 Disturbance and displacement will be assessed using the matrix approach as recommended in the SNCB (Updated, 2022) for the species applicable bio-seasons presented in **Table 5.7.13**. Each seasonal assessment will be made against a mean-peak abundance estimate of the array area and a 2km buffer for both flying and sitting birds (all behaviours) derived from the site-specific aerial digital surveys. The inclusion of flying birds within displacement assessments will allow for any potential barrier effects from the Project to be accounted for.
- 5.7.84 Consideration has been provided to a wide range of evidence to identify the most likely displacement and mortality rates for each species based on post-consent monitoring studies and academic research, which are summarised in **Table 5.7.13**. These rates are proposed to form the main basis of assessments within the EIA Report. A review of SNCBs preferred approach in terms of displacement and mortality rates as advised for other recent projects is presented in **Table 5.7.14**, the Applicant intends to also present assessments using these values alongside the Applicant's preferred approach.

Table 5.7.13 Applicant's proposed displacement and mortality rates for assessment

Species	Displacement rate	Mortality Rate	Reference
Guillemot	Up to 50%	Up to 1%	APEM, 2022a
Razorbill	Up to 50%	Up to 1%	APEM, 2022a
Puffin	Up to 50%	Up to 1%	APEM, 2022a
Gannet	40-60% during the breeding season and 60-80% during the non-breeding seasons	Up to 1%	APEM, 2022b

Table 5.7.14 SNCB proposed displacement and mortality rates for assessment

Species	Displacement rate	Mortality Rate (Breeding season)	Mortality Rate (Non-Breeding season)
Guillemot	60%	3 – 5%	1 – 3%
Razorbill	60%	3 – 5%	1 – 3%
Puffin	60%	3 – 5%	1 – 3%
Gannet	70%	1 – 3%	1 – 3%

- 5.7.85 The Project does not consider disturbance and displacement assessment is required for kittiwake. This is based on the species being classified as very low vulnerability in Bradbury *et al.* (2014) and as presented in Dierschke *et al.* (2016), kittiwake was primarily found to show limited response to the presence of offshore wind farms.
- 5.7.86 The Project does not intend to use SeabORD for assessment of disturbance and displacement, due to the Project being outwith of the mean max foraging range for the

majority of common guillemot and razorbill colonies along the North East Coast of Scotland, the species for which the model was developed to assess. This means the prediction power of SeabORD is limited to determine displacement and barrier effects.

5.7.87 In relation to the above proposed approach the Project would welcome responses to the following questions:

- Do you agree on the use of the matrix approach only described above for assessment of disturbance and displacement?
- Do you agree with the list of VORs and corresponding displacement and mortality rates for assessment? If the answer is no, please provide your preferred displacement and mortality rates.
- Do you agree with kittiwake displacement analysis not being required based on the above information, if the answer is no, it would be useful to understand your justification and any preferred worst-case scenario displacement and mortality rates to be applied and the method to determine / estimate the risk.
- Do you agree with the proposed displacement rates in **Table 5.7.13**, if the answer is no, please provide the SNCB preferred displacement rates so these can be incorporated when undertaking displacement analysis, alongside the Applicant's preferred approach.
- Do you agree that in the case of this proposed Array Area it is too distant from seabird colonies to enable a meaningful assessment of displacement through the use of SeabORD and as such would SNCBs recommend the use of the 'matrix approach' in its place (SNCBs, updated 2022).

Collision risk modelling

5.7.88 It is proposed that the potential risk of collision with WTGs will be undertaken using the stochastic collision risk model (sCRM) developed by McGregor *et al.* (2018). The model will be ran either deterministically or stochastically depending on agreement with SNCBs on suitable avoidance rates for running the model stochastically. If the model is run deterministically, three separate scenarios will be modelled; central, minimum and maximum estimate in order to quantify confidence levels associated with the central estimate.

5.7.89 For all species results for Band Option 2 will be modelled and presented using the generic maximum likelihood flight height distributions from Johnston *et al.* (2014). Where applicable, Band Option 3 will also be run for species with available avoidance rates (e.g. for large gull species).

5.7.90 Flying seabird densities for collision risk modelling will be derived from the site-specific aerial digital survey data. An SD value will be calculated around the central seabird flying density estimate and incorporated into the modelling to quantify confidence levels associated with the central estimate.

5.7.91 Flight height data derived from the aerial surveys will be provided. However, owing to the technical difficulties in estimating flight height from aerial imagery, it is anticipated that insufficient flight height data will be available to derive robust flight height estimates to make Band Option 1 or 4 feasible for assessment.

5.7.92 The proposed collision risk input parameters for identified VORs are presented in **Table 5.7.15**.

5.7.93 The avoidance rates in **Table 5.7.15** are the current joint SNCB (2014) recommended avoidance rates. The Project is aware that a new avoidance rate paper is currently pending

publication and, therefore, the avoidance rates may be subject to change following review of the paper once published and any subsequent advice and guidance from NatureScot.

5.7.94 Bird length and wingspan values are derived from Robinson (2005). Whilst SD values are built-in to the sCRM Shiny App for the two parameters, it is suggested that these values are not utilised due to uncertainties surrounding the source of these data.

5.7.95 For all species, flight speed values are derived from the ORJIP collision avoidance study (Skov *et al.* 2018). Rangefinders fitted to operational WTGs were used to calculate average flight speeds from the study and are considered to present the most realistic flight speeds of birds flying through an offshore wind farm and are calculated based on a larger dataset than other flight speed reference sources such as Pennycuick (1997) or Alerstam *et al.* (2007). Furthermore, the values in Pennycuick (1997) or Alerstam *et al.* (2007) are primarily based on commuting or migratory flights, not foraging flight behaviour as would be expected within the Project area, therefore these values are likely to lead to overestimated impacts increasing uncertainty in the predicted collision risk estimates.

5.7.96 For all species, nocturnal activity values are derived from the tracking loggers deployed for East Anglia Three (MacArthur Green, APEM & Royal HaskoningDHV, 2015). The level of nocturnal activity in either the breeding and non-breeding season were found to be significantly lower than previously suggested by Garthe and Hüppop (2004), which recommended nocturnal activity rates were based on converting from a generalised scoring index. The results of the East Anglia Three being considered more reflective nocturnal activity rates is backed up by the results of the ORJIP collision avoidance study (Skov *et al.* 2018), which although species specific nocturnal activity rates could not be calculated a general seabird nocturnal activity was found to be less than 3% from nocturnal video recordings.

5.7.97 As gannet has been scoped in for assessment of both displacement and collision risk, it is likely that there will be significant over estimation of predicted impacts on the species when the two impacts are combined, as a bird which is displaced would not be at risk of collision and vice versa. In order to resolve this issue, the Project suggests that additional modelling with reduced densities based on the suggested displacement rates in **Table 5.7.15** be undertaken.

5.7.98 In relation to the above proposed approach the Project would welcome responses to the following questions:

- Do you agree with the sCRM being run stochastically for informing collision risk estimates?
- Based on the first year of survey data do you agree with the proposed VORs (see **Table 5.7.15** requiring collision risk modelling? If the answer is no, please provide further details of other species you feel should be included.
- Do you agree with the proposed input parameters for modelling in **Table 5.7.15** below? If the answer is no, please provide reference and justification for your preferred rates.
- Do you agree will the proposed additional modelling for gannet in order to resolve the issue of overestimating combined displacement and collision risk predicted impacts?

Table 5.7.15 Proposed collision risk input parameters.

Species	Avoidance rate		Bird length (m)	Wingspan (m)	Flight speed (m/s ⁻¹)	Nocturnal activity (%)	Flight height data	Flight type
	BO2	BO3						
Kittiwake	0.989 ± 0.002	N/A	0.39	1.08	8.71 ± 3.16	12%	Johnston <i>et al.</i> (2014) maximum likelihood	Flapping
Herring gull	0.995 ± 0.001	0.990 ± 0.002	0.60	1.44	9.68 ± 3.47	25%	Johnston <i>et al.</i> (2014) maximum likelihood	Flapping
Great black-backed gull	0.995 ± 0.001	0.989 ± 0.002	0.71	1.58	9.78 ± 3.65	25%	Johnston <i>et al.</i> (2014) maximum likelihood	Flapping
Gannet	0.989 ± 0.002	N/A	0.94	1.72	13.33 ± 4.24	2%	Johnston <i>et al.</i> (2014) maximum likelihood	Flapping

Population viability analysis

- 5.7.99 Population Viability Analysis (PVA) will be undertaken, only when the level of predicted impacts exceeds agreed impact thresholds, to further predict population consequences of such predicted impacts for the Project alone and / or cumulatively with other plans and projects; it is proposed that the Seabird PVA tool (Searle *et al.* 2019) will be used, where required. The detailed methodology and scope of the impact assessment, and reference population sizes for each species, will be based on the best available information at the time of undertaking the assessment and will be subject to consultation with key stakeholders.
- 5.7.100 In relation to the above proposed approach the Project would welcome responses to the following questions:
- Do you agree with the use of the Seabird PVA tool (Searle *et al.* 2019) for informing population level effects?
 - Do you agree with the proposed general threshold for further investigation of impacts through the use of PVA?

5.8 Fish and shellfish ecology

Introduction

- 5.8.1 The fish and shellfish ecology assessment will consider the potential likely significant effects on fish and shellfish ecological features that may arise from the construction, operation and maintenance and decommissioning of the offshore Project elements that are seaward of Mean High Water Springs (MHWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 5.8.2 Fish and shellfish interfaces with other aspects which are being assessed and as such, should be considered alongside these sections, namely:
- **Section 5.1: Marine geology, oceanography and physical processes:** Changes to marine geology, oceanography and physical processes have the potential to directly or indirectly impact fish and shellfish features due to the reliance on physical processes during certain stages of their lifecycle. Therefore, the information from this assessment will be used to inform the fish and shellfish ecology assessment.
 - **Section 5.2: Marine water and sediment quality:** As described in relation to **Section 5.5: Benthic, epibenthic and intertidal ecology**, while assessment against environmental quality standard (EQS) is included in the marine water and sediment quality section, further assessment of effects of specific water quality changes may need to be addressed in the fish and shellfish ecology section.
 - **Section 5.3: Underwater noise and vibration:** Changes to underwater noise and vibration have the potential to directly and indirectly impact fish and shellfish features principally through displacement, barrier effects or potentially being lethal to fish and shellfish species. Therefore, information from this assessment will be used to inform the fish and shellfish ecology assessment.
 - **Section 5.4: Electromagnetic fields (EMF):** EMF emissions from the Project have the potential to affect fish and shellfish receptors. EMF is emitted from cables and could potentially cause behavioural changes or create a barrier effect to fish and shellfish species. Therefore, information from this assessment will be used to inform the fish and shellfish ecology assessment.
 - **Section 5.5: Benthic, epibenthic and intertidal ecology:** The benthic, epibenthic and intertidal ecology aspect includes species that live within the epibenthos and use the benthic environment as part of their life cycle and therefore there is a degree of overlap between these aspects. Some species may also rely on benthic species as part of their diet. Therefore, information from this Section will be used to inform the fish and shellfish ecology assessment.
 - **Section 5.6: Marine mammals:** Marine mammals considered within the EIA will include some species that rely on fish and shellfish species as part of their diet and therefore impacts to fish and shellfish could potentially indirectly impact marine mammals. The information from the fish and shellfish ecology section will be used to inform the marine mammals assessment.
 - **Section 5.7: Offshore and intertidal ornithology:** Offshore and intertidal ornithology will include some species that rely on fish and shellfish species as part of their diet and therefore impacts to fish and shellfish could potentially impact offshore ornithology. The

information from the fish and shellfish ecology section will be used to inform the offshore ornithology assessment.

- **Section 5.9: Commercial fisheries:** The commercial fisheries section includes commercially important species and fisheries data and there is an overlap between these sections. Information and data from this assessment will be used to inform the fish and shellfish ecology assessment as commercial fisheries has the potential to directly and indirectly impact fish and shellfish ecology.
- **Section 6.5: Terrestrial ecology and ornithology:** The terrestrial ecology and ornithology section includes fish and shellfish species that spend some of their life cycle within both the aquatic and marine environment. Therefore, there is potential for species to overlap between the onshore and offshore environment. Information from the terrestrial ecology and ornithology section will be used to inform the fish and shellfish ecology section.
- **Section 7.1: Climate resilience:** The interference with climate resilience with fish and shellfish ecology is captured in the In-Combination Climate Impacts (ICCI) assessment.
- **Appendix 4A: Nature Conservation Marine Protected Areas (MPA) assessment:** The MPA assessment will include MPAs that relate to protected fish and shellfish ecology features and therefore must be considered together.

Legislative and policy context

5.8.3 This Section identifies the relevant legislation and policy context which has informed the scope of the fish and shellfish ecology assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual international, national, marine, and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.

5.8.4 In order to provide a robust evidence base, **Table 5.8.1** below presents a summary of legislation and policies of relevance for the fish and shellfish ecology assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.8.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
International: EC Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora National: Conservation (Natural Habitats, &c) Regulations 1994 National: Conservation of Offshore Marine Habitats and Species Regulations 2017	<ul style="list-style-type: none"> Sets out the conservation objectives for listed Annex II species.
International: Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 (the Ramsar Convention)	<ul style="list-style-type: none"> Sets out protective provisions for wetland sites of international importance (known as Ramsar sites). The assessment has been informed by the presence of Ramsar sites (as designated by the Convention) through the review of existing data. The Convention has been applied in Ramsar site selection and when reviewing existing data for the assessment.
Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003	<ul style="list-style-type: none"> Sets out the key governing legislation for Scotland's district salmon fishery boards, offers a good practice for fishing the species and gives protection to juvenile and spawning salmon.
Electricity Act 1989 (Schedule 9)	<ul style="list-style-type: none"> Sets out the requirements for the Preservation of amenity and fisheries in Scotland.
International: EC Directive (2000/60/EC) establishing a framework for Community action in the field of water policy (Water Framework Directive)	<ul style="list-style-type: none"> Sets out the requirement to classify water bodies and objectives for the prevention of deterioration and improvement of status.
National: Water Environment and Water Services (Scotland) Act 2003	<ul style="list-style-type: none"> Sets out arrangements for the protection of the water environment in Scotland.
The Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019	
International: Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR) 1992	<p>The OSPAR Convention will be implemented through OSPAR's North-East Atlantic Environment Strategy 2030. Contained within the OSPAR Convention are a series of annexes relevant to the fish and shellfish ecology assessment:</p> <ul style="list-style-type: none"> Annex I: Prevention and elimination of pollution from land-based sources; Annex II: Prevention and elimination of pollution from dumping or incineration; Annex III: Prevention and elimination of pollution from offshore sources; Annex IV: Assessment of the quality of the marine environment; and Annex V: On the protection and conservation of the ecosystems and biological diversity of the maritime area.

Relevant legislation and policy	Relevance to the assessment
Convention on Biological diversity post-2020 global biodiversity framework	<p>The OSPAR Strategy for the Protection and Conservation for Ecosystems and Biological Diversity foresees that the OSPAR Commission will identify species and habitats in need of protection. The OSPAR list of threatened and/or declining species and habitats has been developed to meet this commitment.</p> <ul style="list-style-type: none"> • Sets out the 2050 goals with 2030 milestones, which aim to reduce threats to biodiversity by 2030. Specific target relevant to fish and shellfish ecology are: <ul style="list-style-type: none"> ▶ Target 1: ensuring that all land and sea areas globally are under integrated biodiversity-inclusive spatial planning addressing land- and sea-use change; ▶ Target 2: ensuring that at least 20% of degraded freshwater, marine and terrestrial ecosystems are under restoration, focusing on priority ecosystems; ▶ Target 3: ensuring that at least 30% globally of land areas and of sea areas, especially areas of particular importance for biodiversity, are conserved through effectively and equitably manage, and integrated into wider landscapes and seascapes; ▶ Target 4: ensuring active management actions to enable the recovery and conservation of species; ▶ Target 6: managing the pathways for the introduction of invasive and non-native species (INNS), preventing or reducing their rate of introduction and establishment by at least 50%, and control or eradicate INNS to eliminate or reduce their impacts, focusing on priority species and priority sites; and ▶ Target 8: minimising the impact of climate change on biodiversity, contribute to mitigation and adaptation through ecosystem-based approach, contributing at least 10GtCO₂ per year to global mitigation effects, and ensure that all mitigation and adaptation efforts avoid negative impacts on biodiversity.
Nature Conservation (Scotland) Act 2004	<ul style="list-style-type: none"> • Sets out the duty of public bodies in Scotland to further the conservation of biodiversity, with a particular consideration towards designated features of Sites of Special Scientific Interest (SSSIs) and habitats with potential for functional linkage.
National: Wildlife and Natural Environment (Scotland) Act 2011	<p>The Act enabled Scotland to adopt a Code of Practice on invasive and non-native species (INNS), which includes:</p> <ul style="list-style-type: none"> • adopting a precautionary approach and not carrying out operations which might lead to the spread of

Relevant legislation and policy	Relevance to the assessment
	<p>INNS until there is a clear understanding of the situation;</p> <ul style="list-style-type: none"> • carrying out risk assessments to understand the risk of spreading a INNS; • seeking advice and following good practice; and • reporting the presence of INNS.
<p>International: Marine Strategy Framework Directive (MSFD) (2008/56/EC)</p> <p>National: Marine Strategy Regulations 2010</p> <p>National: Marine Environment (Amendment) (EU Exit) Regulations 2018</p>	<p>Paragraph 3.7.10 in Chapter 3: Legislative and Policy Context sets out the legislative framework for MSFD. MSFD sets out measures for Good Environmental Status (GES) in the marine environment. Descriptors relevant to this technical assessment include:</p> <ul style="list-style-type: none"> • Descriptor 1 – Biological diversity • Descriptor 2 – Non-indigenous species; • Descriptor 4 – Elements of marine food web • Descriptor 6 – Sea floor integrity • Descriptor 7 – Alteration of hydrographical conditions • Descriptor 8 – Contaminants • Descriptor 10 – Marine litter.
<p>National: Marine (Scotland) Act 2010</p> <p>National: Marine and Coastal Access Act 2009</p>	<p>Relevant marine plan(s) and MPA(s) will be considered in the fish and shellfish ecology assessment. In conjunction with the EIA, an MPA assessment would be completed. (see Appendix 4B: Nature Conservation Marine Protected Area Assessment)</p>
<p>International: Convention on Biological Diversity 1992</p>	<p>Identifies a compiled list of Biodiversity Action Plan (BAP) species and habitats, in which subsequent action plans sought to ensure that priority species or habitats are conserved or enhanced.</p>
National Policy	
<p>Approved National Planning Framework 4 (NPF4) 2023</p>	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • Policy 1: Tackling the climate and nature crisis
<p>National Planning Framework 3 (NPF3) (2014)</p>	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. • Identified terrestrial and marine planning to play a key role in meeting targets.
<p>Scottish Planning Policy (SPP) (2014)</p> <ul style="list-style-type: none"> - Paragraph 169 - Paragraph 195 - Paragraph 199 - Paragraph 202-203 - Paragraph 214 - Paragraph 214 	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▸ net economic impacts;

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology. <ul style="list-style-type: none"> • Looks at how planning authorities, have a duty under the Nature Conservation (Scotland) Act 2004 to make sure they further the conservation of biodiversity. • Talks about how plans should make sure they address the potential effects of development on the natural environment. • Identifies that the presence of legally protected species is important in the consideration of planning decisions. If there is evidence to suggest that a protected species is present on site, protection should be factored into the planning and design of the development.

Marine Policy

UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> • Sets out requirements for biodiversity to be protected, conserved and where appropriate recovered and loss halted. • Requirements for healthy marine and coastal habitats can occur across their natural range and are able to support strong biodiverse biological communities and the functioning of healthy, resilient and adaptable marine ecosystems. • Requirements for the oceans to have viable populations of representative, rare, vulnerable and valued species.
Scottish National Marine Plan (2015) <ul style="list-style-type: none"> - GEN 9 – Natural Heritage - GEN 10 – Invasive Non-Native Species - GEN 13 – Noise - GEN 21 – Cumulative Impacts - WILD FISH 1 - FISHERIES 1 - FISHERIES 2 - FISHERIES 3 - TRANSPORT 2 - CABLES 2 	<ul style="list-style-type: none"> • GEN 9 requires development: to comply with legal requirements for protected areas and protected species; not result in significant impact on the national status of Priority Marine Features (PMFs); and protect, and, where appropriate, enhance the health of the marine area. • GEN 10 supports opportunities to reduce the introduction of invasive non-native species to a minimum or proactively improve the practice of existing activity should be taken when decisions are being made. Codes of practice for INNS should be complied with. • GEN 13 states that development should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> • GEN 21 requires for cumulative impacts affect the ecosystem to be addressed. • WILD FISH 1 notes a requirement to assess the impact of development on diadromous fish species and where evidence of impacts on salmon and other diadromous species is inconclusive, it states that mitigation should be adopted where possible and information on the impact on diadromous species from monitoring should be used. • FISHERIES 1, FISHERIES 2 and FISHERIES 3 include a requirement to take account of the EU's Common Fisheries Policy, Habitats Directive, Birds Directive and MSFD. Developments and activities should take account of the potential impacts on: <ul style="list-style-type: none"> ▶ fish and shellfish stocks and resultant fishing opportunities; ▶ fishing grounds, commercially fished grounds; and ▶ displacement of fish stocks, the socio-economic costs to fishers and their communities and other marine users. • TRANSPORT 2 notes that marine development should not be permitted where it will restrict access to, or future expansion of, major commercial ports or existing or proposed ports and harbours, for example Peterhead. • CABLES 2 requires the following to be taken into account when reaching decision regarding cable development: <ul style="list-style-type: none"> ▶ cables should be suitably routed to provide sufficient requirements for installation and cable protection; ▶ new cables should implement methods to minimise impacts on the environment, seabed and other users; ▶ where burial is demonstrated not to be feasible, cables may be suitably protected; and consideration of the need to reinstate the seabed, undertake post-lay surveys and monitoring and carry out remedial action where required.
Sectoral Marine Plan – Offshore Wind (2020)	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. • Section 4.1 lists a range of potential negative impacts identified through plan-level SEA, HRA and SEIA which require further consideration through project level assessments, including: <ul style="list-style-type: none"> ▶ <i>“loss of / damage to marine and coastal habitats;</i> ▶ <i>effects from pollution releases on species and habitats;</i>

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> ▶ <i>effects from the introduction and spread of Invasive Non Native Species; and</i> ▶ <i>effects on ecological status”.</i>
Local Planning Policy	
Modified Proposed Aberdeenshire Local Development Plan 2020	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • E1 – Natural Heritage • PR1 – Protecting Important Resources • C2 – Renewable Energy • PR2 – Preserving and Protecting Important Development Sites • C3 – Carbon Sinks and Stores • HE2 – Protecting Historic, Cultural and Conservation Areas

Technical guidance

5.8.5 Technical guidance that has been used to define the assessment is set out in **Table 5.8.2** below. Additional guidance may be applicable during the EIA, and this will be referred to as appropriate in the EIA Report.

Table 5.8.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Joint Nature Conservation Committee (JNCC) Monitoring Guidance for Marine Benthic Habitats (Noble-James <i>et al.</i>, 2018)	<p>Guidance combines established ecological theory and protocols with JNCC advice and recommendations on benthic monitoring, by means of a step-wise framework which details key stages in the development of a monitoring plan.</p> <p>This guidance has been incorporated into the benthic sampling strategy for the array site and offshore export cable corridor (see Table 5.5.3 in Section 5.5: Benthic, epibenthic and intertidal ecology). This sampling data will be used to inform the EIA and the background information for fish and shellfish species.</p>
Scottish Natural Heritage (SNH) Identification of Priority Marine Features (Howson <i>et al.</i>, 2012)	<p>The SNH report describes the process used to identify a list of priority marine habitats and species of conservation importance. The guidance sets out a PMF checklist to identify: the PMFs which may be impacted; how the PMF may be impacted; the magnitude of change and the significance. This guidance will be incorporated into the fish and shellfish ecology EIA.</p>
A Review of Assessment Methodologies for Offshore Wind Farms (Collaborative Offshore Wind Research into The Environment (COWRIE)) METH-08-08 (Maclean <i>et al.</i>, 2009)	<p>This report discusses the potential of high-definition cameras; reviews boat-based and aerial survey methodologies; reviews methodologies for analysing data; and recommends methodologies for analysing data. Methodologies described within the review will be considered and, as appropriate, drawn upon within the fish and shellfish EIA.</p>

Guidance reference	Relevance to the assessment
British Standards Institute (BSI) Environmental Impact Assessment for Offshore Renewable Energy Projects (BSI, 2015)	<p>The BSI guide provides an overview on undertaking EIAs for offshore renewable projects.</p> <p>This guidance has been used to identify relevant effects to be considered and assessed for fish and shellfish within the EIA.</p>
Marine Scotland, Consenting and Licencing Guidance: For Offshore Wind, Wave and Tidal Energy Applications (Scottish Government, 2018)	<p>Marine Scotland's consenting and licencing manual provides guidance on applying for s.36 consents and marine licences for offshore renewables.</p> <p>The Guidance states an EIA must take account of the OSPAR List of threatened and/or declining species and habitats. Designated sites should be fully considered including, SACs; SPA; SCIs; cSACs; pSPAs and pSACs.</p> <p>The Guidance states a network of Nature Conservation MPAs have been designated in Scottish waters under the Marine (Scotland) Act 2010 or the Marine and Coastal Access Act 2009, protecting habitats and species. Under section 83 of the Marine (Scotland) Act 2010 / section 126 of the Marine and Coastal Access Act 2009 Public Authorities are required to consider whether a project is cable of affect (other than insignificantly) a protected feature in an MPA.</p> <p>Protected habitats, species and sites will be considered within the fish and shellfish ecology EIA, taking the guidance on effects and their assessment into account.</p>
Chartered Institute for Ecology and Environmental Management (CIEEM), Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018)	<p>Marine ecology methods should apply an Ecological Impact Assessment (EclA) based approach to assess the potential effects of the Project on ecological features for consideration in the EIA methodology to be used for the fish and shellfish ecology assessment. as outlined within the CIEEM Guidelines.</p>
Marine Evidence based Sensitivity Assessment (MarESA) (Tyler-Walters <i>et al.</i>, 2018)	<p>Sensitivity assessments determine the resistance (or tolerance) of a feature to a pressure and the ability to recover following the cessation of the pressure, termed resilience. Resistance and resilience descriptors are informed by the MarESA approach for benthic features and highly mobile species.</p> <p>This guidance will be incorporated into the fish and shellfish ecology EIA assessment, assessing the sensitivities of biotopes within the study area.</p>
Marine Scotland's Feature Activity Sensitivity Tool (FeAST) (Marine Scotland, 2022c)	<p>FeAST is a web-based application which allows users to investigate the sensitivity of marine features in Scotland's seas, to pressures arising from human activities.</p> <p>This guidance will be incorporated into the fish and shellfish ecology EIA assessment, assessing the sensitivities of biotopes within the study area.</p>
NatureScot advice on marine non-native species (NatureScot, 2022a)	<p>Provides guidance on identification of non-native species; and preventing introduction, including Marine Biosecurity Planning guidance.</p>

Guidance reference	Relevance to the assessment
	This guidance will be incorporated into the fish and shellfish ecology assessment and embedded environmental measures, in particular in relation to the potential spread of INNS.
Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy project (Judd, 2012)	<p>This report provides guidelines for data acquisition to support marine environmental assessments for offshore renewable energy projects.</p> <p>This guidance has been incorporated into the fish and shellfish scoping assessment on acquiring data for the study area.</p>
OSPAR, Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR Commission, 2008)	The purpose of the OSPAR guidance note is to assist developers in the identification and consideration of some of the issues associated with determining the environmental effects of offshore wind farm developments for consideration in the fish and shellfish ecology scoping assessment and EIA.
Natural Resources Wales (NRW), Guidance for undertaking benthic marine habitat survey and monitoring (NRW, 2019)	NRW's report sets out guidance on methods and approaches for survey and monitoring of benthic marine habitats where such work is required to support environmental and ecological impact assessments for developments.

Study area

- 5.8.6 The study area for the fish and shellfish assessment is defined as the offshore Scoping Boundary together with the secondary ZOI up to the MHWS mark. **Figure 5.8.1: Fish and shellfish ecology study area** in **Appendix 1A** identifies the study area as the red line boundary with a ZOI based on the tidal excursion, coastal processes and potential spread of underwater noise. The ZOI buffer encompasses the area over which suspended sediments may travel following disturbance as a result of the Project's activities, extending 15km around the array Scoping Boundary, and a distance of 15km surrounding the offshore cable corridor. A precautionary approach of 15 km has been used for the tidal excursions, as the Atlas of UK Marine Renewable Energy Resources found a mean tidal excursion in the vicinity of the Project of approximately 7km (ABPmer, 2008). For some species the study area may be greater than 15km, due to their mobile nature. Species that have large ranges will be assessed accordingly. Species that spend part of their lifecycle in both the aquatic and marine environments will be considered in both the fish and shellfish ecology assessment and the terrestrial ecology and ornithology assessment.
- 5.8.7 The study area will be reviewed and amended in response to such matters as refinement of the onshore/offshore components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

Consultation

- 5.8.8 This Section has been informed by engagement and discussion with various stakeholders. **Table 5.8.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 5.8.3 Consultation

Consultee	Comments and considerations	How this is accounted for
MS-LOT	<p>An offshore EIA Scoping workshop was held on 29th and 30th September 2022. During a technical break-out session and after the workshop, the Project team submitted the following written questions to MS-LOT and MSS in relation to fish and shellfish ecology:</p> <ul style="list-style-type: none"> • Do the regulators agree with the proposed study area, data sources, receptor groups and impact pathways, and overall approach to the assessment presented in the workshop (ie as presented in this Section)? • Are the regulators aware of any data sources or studies concerning fish ecology and EMF available for the study area? • Are there any data sources that should be considered that were not noted in the workshop (ie as presented in this Section)? 	<p>MS-LOT and MSS confirmed to the Project team that they will respond to these questions in the advisory response to be provided during the Scoping Report consultation process. This is understood to mean via the Scoping Opinion. The responses will therefore be addressed in the EIA Report.</p>

Assessment methodology

Introduction

- 5.8.9 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this fish and shellfish ecology section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the fish and shellfish ecology assessment.

Desk-based review

- 5.8.10 A desk-based review of existing fish and shellfish ecology data will be undertaken, focusing on sourcing data that have been collected within or in close proximity to the study area for the fish and shellfish ecology assessment. This data will be supplemented with information on fish and shellfish ecology of the wider region where available.
- 5.8.11 A range of data from a variety of sources will be reviewed to inform the environmental assessment. A list of the data sources to support this Scoping Report and to be used in the final assessment have been highlighted in **Table 5.8.8**.

Site-specific surveys

- 5.8.12 To supplement and complement the existing data sources, further information will be available for the fish and shellfish ecology study area through site-specific benthic ecology surveys, which were undertaken within the Scoping Boundary during summer 2022 and surveys for the offshore export cable, which will be undertaken in spring / summer 2023.

Reports from the summer 2022 survey campaign were unavailable at the time of writing this chapter and therefore this site-specific data has not informed this Scoping Report. It will however be included in the EIA Report at submission.

- 5.8.13 Epibenthic habitats are also being sampled via a combination of targeted benthic infauna grab sampling and drop-down video (DDV) surveys, with particular focus on any habitats of conservation interest. Sediment samples will also be collected for contaminants and particle size analysis (PSA).
- 5.8.14 Intertidal benthic habitats will be characterised via an intertidal survey which will cover all areas of the intertidal foreshore from MHWS to MLWS that may be directly affected by proposed cable installation works. The survey will be conducted according to standard Phase 1 intertidal methodology (Davies *et al.*, 2001). During the walkover survey, a qualitative assessment of the abundance of dominant benthic species will be recorded.

Approach

- 5.8.15 To enable the potential impact of the Project to be assessed, a description of the existing fish and shellfish communities, focusing particularly on any areas or features of conservation interest, will be produced. Potential impacts that may occur directly to fish and shellfish receptors and indirectly through impacts to physical, chemical and biological environment as a result of the planned construction, operation and maintenance and decommissioning will then be identified. The sensitivities of the communities present to the types of impact expected from offshore infrastructure during all phases of development will be assessed. Where necessary, measures will be proposed to mitigate the impacts.
- 5.8.16 In the event that the Project has a direct impact on any sites that are designated for conservation at the national site network level (SAC or SPA) or international level (Ramsar), as a result of qualifying habitats or species that they support, then the requisite information will be provided alongside the EIA to assist the Competent Authority to carry out an Appropriate Assessment (AA).
- 5.8.17 Cumulative impacts will be assessed by taking into consideration any other relevant developments, proposed or existing, that are in the vicinity of the development zone, and which have the potential to affect the same features.

Impact assessment methodology

- 5.8.18 The sensitivity and value of the features and the magnitude of impact specific to fish and shellfish ecology are provided in the following sections. This assessment is also conducted with reference to Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018).

Sensitivity

- 5.8.19 Scales for the sensitivities of fish and shellfish species and habitats have been developed using a four-point scale (high, medium, low or negligible). These scales have been developed with reference to the Marine Life Information Network (MarLIN) MarESA (Tyler-Walters, 2018). The scales for resistance and resilience are provided in **Table 5.8.4** and **Table 5.8.5** and the matrix of sensitivity scores is provided in

- 5.8.20 **Table 5.8.6.** Marine Scotland’s FeAST has also been used in assessment of sensitivity of MPA protected features. FeAST has developed a sensitivity matrix of marine habitats and species to pressures taking place in the marine environment.
- 5.8.21 The sensitivity of a feature is dependent upon its adaptability (the degree to which a feature can avoid or adapt to a change), tolerance (the ability of a feature to absorb stress or disturbance without changing character) and recoverability (the temporal scale and extent to which a feature will recover following an effect).

Table 5.8.4 Assessment scale for resistance (tolerance) to a defined intensity of pressure

Resistance	Definition
High	No significant effects on the physicochemical character of habitat and no effect on population viability of key / characterising species but may affect feeding, respiration and reproduction rates.
Medium	Some mortality of species (can be significant where these are not keystone structural / functional and characterising species) without change to habitats relates to the loss <25% of the species or habitat component.
Low	Significant mortality of key and characterising species with some effects on the physicochemical character of habitat. A significant decline / reduction relates to the loss of 25-75% of the extent, density or abundance of the selected species or habitat component, e.g. loss of 25-75% of the substratum.
None	Key functional, structural, characterising species severely decline and / or physicochemical parameters are also affected e.g. removal of habitats, causing a change in habitat types. A severe decline / reduction relates to the loss of 75% of the extent, density or abundance of the selected species or habitat component, e.g. loss of 75% substratum (where this can be sensibly applied).

Table 5.8.5 Assessment scale for resilience (recovery)

Resilience	Definition
High	Full recovery back to baseline levels within two years.
Medium	Full recovery back to baseline levels within 2-10 years.
Low	Full recovery back to baseline levels within 10-25 years.
Very low	Negligible or prolonged recovery possible, at least 25 years to recover structure and function.

Table 5.8.6 Definitions of sensitivity levels for fish and shellfish ecology

Resilience	Resistance			
	None	Low	Medium	High
Very low	High	High	Medium	Low
Low	High	High	Medium	Low
Medium	Medium	Medium	Medium	Low
High	Medium	Medium	Low	Negligible

5.8.22 In sections where several sensitivity levels are given for features against a potential impact, professional judgement will be used for the assessment.

Value

5.8.23 In addition, for some assessments the ‘value’ of a feature may also be an element to add to the assessment where relevant – for instance if a feature is designated or has an economic value. The definitions of value levels have been developed using a four-point scale and example definitions are provided in **Table 5.8.7**.

Table 5.8.7 Definitions of value levels for fish and shellfish ecology

Value	Definition
High	<u>Nationally important</u> / rare with limited potential for offsetting / compensation. Habitats and species protected under international law (e.g. Annex I habitats within a SAC boundary).
Medium	<u>Regional important</u> / rare with limited potential for offsetting / compensating. Habitats protected under national law (e.g. Annex I habitats not within an SAC boundary). UK Biodiversity Action Plan (BAP) priority habitats and species). Species / habitats that may be rare or threatened in the UK.
Low	<u>Locally important</u> / rare; regional UK BAP priority habitats. Habitats or species that provide prey items for other species of conservation value.
Negligible	Habitats and species which are not protected under conservation legislation and are not considered to be particularly important or rare.

5.8.24 It should be noted that high value and high sensitivity are not necessarily linked within a particular impact. A feature could be of high value (e.g. an Annex II species) but have a low or negligible physical / ecological sensitivity to an effect – it is important not to inflate impact / significance just because a feature is ‘valued’. This is where the narrative behind the assessment is important; the value can be used where relevant as a modifier for the sensitivity assigned to the feature.

Magnitude

- 5.8.25 Example definitions of the magnitude levels for a generic feature are given in **Table 4.2.2** in Chapter 4: Approach to Scoping and EIA.
- 5.8.26 In sections where several magnitude values are given for features against a potential impact, professional judgement will be used and justified for the assessment.

Impact significance

- 5.8.27 Following the identification of a features value, sensitivity and magnitude of the impact, it is possible to determine the significance of the impact. The matrix provided in **Plate 4.2.2** in **Chapter 4: Approach to Scoping and EIA** (and the definitions of sensitivity, value and magnitude) in **Table 4.3** in **Chapter 4: Approach to Scoping and EIA** is used as a framework to aid in determination of the impact assessment.
- 5.8.28 Where possible, the impact on fish and shellfish ecology is based upon quantitative accepted criteria, together with the use of value judgement and expert interpretation to establish to what an extent an impact is significant.

Baseline conditions

Data sources

- 5.8.29 A desk-based review of literature to support this Scoping Report highlighted the following data sources, which provide coverage across large parts of the Project's fish and shellfish ecology study area, and wider region. The list of desk-based sources is provided in **Table 5.8.8**.

Table 5.8.8 Key sources of fish and shellfish ecology data

Source	Date	Summary	Coverage of study area
Natura 2000 standard data forms by JNCC	Accessed 2022	Nature 2000 standard data forms published by the JNCC.	Designated site-specific data.
Marine Scotland Information for fisheries sensitivity maps, spawning and nursery grounds	Accessed 2022	Marine Scotland Information has a range of species-specific information as well as downloadable data in the form of Geographical Information System (GIS) layers. The information covers the UK and includes the Project area (available online: https://marine.gov.scot/information/fisheries-sensitivity-maps). Maps of spawning and nursesey grounds of fish key species in UK waters by Coull <i>et al.</i> (1998) and revised by Ellis <i>et al.</i> (2012).	Full coverage of the study area.
Marine Information Network (MarLIN)	Accessed 2022	North Sea fish data (available online: https://www.marlin.ac.uk/).	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
North Sea habitats by European Marine Observation and Data Network (EMODnet)	Accessed 2022	EMODnet broad-scale seabed habitat map for Europe of physical habitats (available online: https://www.emodnet-seabedhabitats.eu/access-data/launch-map-viewer/) is a predictive habitat map which covers the seabed of a large area of European waters including the North Sea. Habitats are described in the European Nature Information System (EUNIS) and MSFD predominant habitat classifications and predicted based on a number of physical parameters. Associated confidence maps are also available which give a break down confidence in predicted habitats into high, medium, and low.	Full coverage of the study area.
Ocean Biodiversity Information System	Accessed 2022	Has a range of different species from various sources. It includes the original data sets, which can be downloaded as layers for various species. It has a global coverage, but some areas do have less data points than others (available online https://mapper.obis.org/).	Partial coverage of the study area.
ICES data and reports	Accessed 2022	ICES has data from fish trawl surveys and catch data, which provide an understanding of the species found throughout the North Sea (available online: https://www.ices.dk/data/data-portals/Pages/default.aspx).	Full coverage of the study area.
SAC designation documents by JNCC	Accessed 2022	SAC designation documents and site management plans (available online: https://jncc.gov.uk/our-work/special-areas-of-conservation-overview/).	Designated site-specific data.
Natura 2000 standard data form by JNCC	Accessed 2022	Nature 2000 standard data forms published by the JNCC.	Designated site-specific data.
Data maintained by Marine Data Exchange	Survey undertaken 2013 Accessed 2022	Benthic ecology survey data and reports previously done (available online: https://www.marinedataexchange.co.uk/)	Hywind Offshore Wind Farm Pre-construction Geophysical survey regional context. Partial coverage to study area.
North Sea fish and shellfish data held by MarLIN	Accessed 2022	North sea benthic data (available online: https://www.marlin.ac.uk/).	Partial coverage of the study area.
North Sea benthic data by National Biodiversity	Accessed 2022	The NBN Gateway is a database which holds species records (available online: https://nbnatlas.org/).	Partial coverage of the study area.

Source	Date	Summary	Coverage of study area
Network (NBN) Gateway			
North Sea benthic and intertidal habitats held by Multi-Agency Geographic Information for the Countryside (MAGiC)	Accessed 2022	Online geographical information system which provides data from the natural environment from across government (available online: https://magic.defra.gov.uk/magicmap.aspx).	Full coverage of the study area.
Marine Protected Areas by NatureScot	Accessed 2022	Marine Protected Area Reports from NatureScot (available online: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/marine-protected-areas-mpas).	Partial coverage to study area.
North East Scotland Biological Records Centre (NESBReC)	Accessed 2022	Provides data on fish species and observations/ records of different species from the area (available online: https://nesbrec.org.uk/).	Partial coverage of the study area.
Priority Marine Habitats by NatureScot and JNCC	Accessed 2022	Priority marine habitats information from NatureScot and JNCC (available online: https://www.nature.scot/doc/priority-marine-features-scotlands-seas-habitats).	Partial coverage of the study area.
North Sea habitats held by NatureScot	Accessed 2022	NatureScot Habitat Map of Scotland (HabMoS) will publish all available habitat data and manage a programme to survey those areas for new information (available online: https://marinescotland.atkinsgeospatial.com/nmpi/default.aspx?layers=958).	Full coverage of the study area.
NorthConnect	Survey undertaken in 2016 and 2017	Grab sampling (biota, PSA and chemical analysis), seabed photography and video systems were used across the selected sample locations as part of the baseline characterisation.	NorthConnect consenting corridor Partial coverage of the study area.
Hywind	Surveys undertaken in 2013	DDV and photography were used over the whole survey area to provide information about seabed type, features and epibenthic biotopes. Grab sampling gear were deployed to collect sediment for analysis of benthic invertebrates and particle size across the survey area and along the export cable corridor to determine levels of metals and hydrocarbons.	Hywind Offshore Wind Farm Pre-construction Geophysical and environmental baseline survey

Source	Date	Summary	Coverage of study area
			Partial coverage of the study area.
Green Volt	Survey undertaken in 2021 Accessed 2022	Grab sampling and video transect surveys and stations using a remotely operated vehicle (ROV) were deployed to collect sediment for physicochemical substances analysis and macrofaunal identification.	Green Volt area and two export cable routes Partial coverage of the study area.

Current baseline

5.8.30 The study area is located in the North Sea, which is known to have variable seabed conditions. The main EUNIS habitats found offshore within the Project area consist of deep circalittoral coarse substrate and deep circalittoral sand and the wider study area has a mixture of sands, muds, and rocks (Hywind, 2015; North Connect, 2018; EUSeaMap, 2021). Although these are broad scale habitats it is likely that there are a range of species living off the coast of east Scotland. Closer to the shore there are more hard substrates, which could also support a range of fish or shellfish species. The Greater North Sea area is inhabited by approximately 230 fish species (OSPAR, 2013). For the purpose of this scoping assessment fish have been placed into the following broad receptor groups based on their ecology:

- pelagic;
- demersal;
- elasmobranchs;
- migratory fish; and
- shellfish.

Pelagic fish species

5.8.31 Pelagic fish are species that spend the majority of their life cycle within the water column and their distribution and abundance can be influenced by hydrographic conditions, which can be extremely variable. Hydrographic factors are important for pelagic species due to the egg and larval stages, which rely on ocean currents for distribution. Some pelagic species also rely on specific habitats for egg laying, which may mean that they are sensitive to habitat loss. Key species found within the region include commercially important species such as Atlantic herring *Clupea harengus* and Atlantic mackerel *Scomber scombrus* and ecologically important species including European sprat *Sprattus sprattus*, which are prey items for larger fish, marine mammals, and birds.

5.8.32 Some pelagic species are highly mobile and will move depending on food availability and migratory patterns. This can also cause annual variability in the spatial movements of pelagic species. To account for highly mobile species, different approaches will be used including regional approaches and the use of ICES rectangle data, where available. Other pelagic species that are likely to occur within the area and are listed as a Scottish Priority Marine Feature (PMF), in Annex II of the Bern Convention or as a UK Post-2010 Biodiversity Framework species are listed below (Coull *et al.*, 1998; Paramor *et al.*, 2009; Ellis *et al.*, 2012):

- Atlantic bluefin tuna *Thunnus thynnus*;
- Atlantic herring;
- Atlantic mackerel;
- black scabbardfish *Aphanopus carbo*;
- blue whiting *Micromesistius poutassou*;
- European sprat;
- horse mackerel *Trachurus trachurus*;
- orange roughy *Hoplostethus atlanticus*; and
- roundnose grenadier *Coryphaenoides rupestris*.

5.8.33 Roundnose grenadier is listed as 'Critically endangered' under the IUCN (International Union for Conservation of Nature) Red List.

Pelagic fish spawning and nursery grounds

5.8.34 Pelagic fish spawning data indicates that Atlantic herring spawn within the Project area, whereas Atlantic mackerel and European sprat do not. Nursery grounds for Atlantic mackerel, Atlantic herring and European sprat exist within the project area (Coull *et al.*, 1998; Ellis *et al.*, 2012). **Figure 5.8.2: Spawning and nursery ground in Appendix 1A** shows spawning and nursery grounds for Atlantic mackerel, Atlantic herring and European sprat **Table 5.8.9** shows a summary of the spawning and nursery and whether they overlap with the Project area (Coull *et al.*, 1998).

Atlantic Herring

5.8.35 Atlantic herring play an important role in the North Sea food web as they are food resource for many species. Atlantic herring have defined spawning areas and based on their spawning times they have been divided into sub-populations. The sub-population off the coast of northeast Scotland is known as the Buchan population and spawn around September/October. Atlantic herring is known to deposit adhesive eggs to a variety of substrates in high energy and/or structurally complex environments, between depths of 1-250m (Frost & Diele, 2022). Substrate ranges from man-made structures, shell fragments and coarse sands to rocks and boulders but their preferred substrate is gravel (Folk, 1954).

Table 5.8.9 Pelagic fish listed above and the level of protection under national and international legislation (Coull et al., 1998; Ellis et al., 2012; MarLIN, 2022)

Species	Overlap with the study area		UK BAP species	IUCN Red List	Scottish PMF	Scottish Biodiversity List	OSPAR
	Spawning Ground	Nursery Ground					
Atlantic Herring	Y	Y	Y	Least concern	Y	N	N
Atlantic Mackerel		Y	Y	N	Y	N	N
Horse mackerel		Y	Y	N	Y	N	N
Blue whiting	Y	Y	Y	N	N	N	N
European Sprat	Y	Y	N	N	N	N	N
Whiting	Y	Y	Y	N	Y	Y	N
Atlantic Bluefin Tuna			Y	Least concern	N	N	Y
Black scabbardfish			Y	N	Y	N	N
Orange roughy			Y	N	Y	N	Y
Roundnose grenadier			Y	Critically endangered	Y	N	N

Demersal fish species

5.8.36 Demersal fish are species which spend the majority of their time on or near the seabed and tend to be bottom feeders. Commercially important demersal fish include Atlantic cod *Gadus morhua*, haddock *Melanogrammus aeglefinus* and European plaice *Pleuronectes platessa*. Demersal fish distribution is principally determined by hydrography and sediment type (abiotic factors), but interspecific competition and predator-prey interactions are also important for this group (biotic factors). Demersal fish species that are likely to occur within the area and are listed as a Scottish PMF, in Annex II of the Bern Convention or as a UK Post-2010 Biodiversity Framework species are listed below (Coull et al., 1998; Paramor et al., 2009; Ellis et al., 2012):

- Anglerfish / sea monkfish *Lophius piscatorius*;
- Atlantic cod;
- Atlantic halibut *Hippoglossus hippoglossus*;
- blue ling *Molva dypterygia*;
- common goby *Pomatoschistus microps*;
- common sole *Solea solea*;
- European hake *Merluccius merluccius*;

- European plaice;
- Greenland halibut *Reinhardtius hippoglossoides*;
- haddock;
- lemon sole *Microstomus kitt*;
- ling *Molva molva*;
- Norway pout *Trisopterus esmarkii*;
- saithe *Pollachius virens*;
- sand goby *Pomatoschistus minutus*;
- sandeel *Ammodytes* spp.; and
- whiting *Merlangius merlangus*.

Demersal fish spawning and nursery grounds

5.8.37 High intensity spawning grounds for sandeel and low intensity spawning grounds for Atlantic cod, European plaice, saithe and whiting overlap with the study area. Nursery grounds for saithe and lemon sole overlap with the study area. Nursery grounds for anglerfish, Atlantic cod, European hake, ling, European plaice, sandeel, and whiting overlap with the study area (Coull *et al.*, 1998; Ellis *et al.*, 2012). **Figure 5.8.3: Predicted presence of buried lesser sandeels in Appendix 1A** shows spawning and nursery grounds for sandeel. **Table 5.8.10** shows a summary of demersal fish species and level of protection (Coull *et al.*, 1998; Ellis *et al.*, 2012; MarLIN, 2022).

Sandeel

5.8.38 Sandeel play a key role in the North Sea food web and many species rely on them as a source of food. Sandeel are particularly vulnerable as they require a specific substratum (mainly consisting of medium to coarse sand and low silt) for their habitat requirements (Holland *et al.*, 2005). Sandeel spend autumn and winter months lying dormant in the sediment, apart from a brief emergence to spawn. During the spring and summer months they are more active, moving between the seabed and water column diurnally. Sandeel that have settled are rarely found at depths greater than 30 m (Jensen *et al.*, 2011, Greenstreet *et al.*, 2010, Rowley, 2008).

5.8.39 Due to sandeels' ecological importance and habitat preferences they are vulnerable to disturbance through direct habitat loss or indirect changes to the seabed. They are also vulnerable to noise disturbance due to their internal swim bladder, which aids their buoyancy but can be affected by the sound pressure (Coull *et al.*, 1998).

Table 5.8.10 Demersal fish species listed above, and the level of protection under national and international legislation (Coull et al., 1998; Ellis et al., 2012; MarLIN, 2022)

Species	Overlap with the study area		UK BAP species	IUCN Red List	Scottish PMF	Scottish Biodiversity List	OSPAR	Bern Convention
	Spawning Ground	Nursery Ground						
European hake		Y	Y	N	N	Y	N	N
Anglerfish		Y	Y	N	Y	N	N	N
European Plaice	Y	Y	Y	N	N	Y	N	N
Ling		Y	Y	N	Y	Y	N	N
Lemon Sole	Y	Y	N	N	N	N	N	N
Atlantic Cod	Y	Y	Y	Vulnerable	Y	Y	Y	N
Sandeel	Y	Y	Y	N	Y	Y	N	N
Norway Pout	Y	Y	N	N	Y	Y	N	N
Haddock			N	Vulnerable	N	N	N	N
Saithe			N	N	Y	N	N	N
Atlantic halibut			Y	Endangered	Y	N	N	N
Blue ling			Y	N	Y	N	N	N
Common goby			N	Least Concern	N	N	N	Y
Common sole			Y	N	N	N	N	N
Greenland halibut			Y	N	Y	N	N	N
Sand goby			N	N	Y	N	N	Y

Elasmobranchs

5.8.40 The elasmobranch receptor group includes sharks, skates and rays, and they can be vulnerable to disturbance due to their low fecundity, late maturity, and low reproductivity.

This makes them particularly vulnerable to fishing as they have a low population recovery rate. Due to their vulnerability to disturbance, they are considered sensitive, and many species are protected under international and national legislation.

5.8.41 Some elasmobranch species can be highly migratory, whereas others can have high site fidelity. Elasmobranch species can vary significantly even in the way that they give birth as some lay eggs (oviparous) and some give birth to live young (viviparous). Elasmobranch species that are likely to occur within the area and are listed below (Coull et al., 1998; Paramor et al., 2009; Ellis et al., 2012):

- angel shark *Squatina squatina*;
- basking shark *Cetorhinus maximus*;
- blue shark *Prionace glauca*;
- flapper skate *Dipturus intermedius*;
- blue skate *Dipturus flossada*;
- gulper shark *Centrophorus granulosus*;
- kitefin shark *Dalatias licha*;
- leafscale gulper shark *Centrophorus squamosus*;
- porbeagle shark *Lamna nasus*;
- portuguese dogfish *Centroscymnus coelolepis*;
- sandy ray *Leucoraja circularis*;
- spurdog *Squalus acanthias*;
- tope shark *Galeorhinus galeus*;
- spotted ray *Raja montagui*; and
- thornback ray *Raja clavata*.

5.8.42 Basking sharks are usually found off the west coast of Scotland but there have been some observations off the east coast. Basking sharks are listed as endangered by the IUCN Red List and are a PMF in Scotland (Witt et al., 2012). The Hywind (2015) project did not observe any basking sharks during their Hywind European Seabirds at Sea (ESAS) surveys, and they report no recent records of basking sharks within the area (Hywind, 2015). Satellite tracking on basking sharks revealed that of 70 basking sharks tagged, none of them used the area of the east coast of Scotland (Doherty et al., 2017).

Elasmobranch spawning and nursery grounds

5.8.43 Low intensity nursery grounds overlap with the study area for spurdog, tope shark, thornback ray, common skate and spotted ray (Coull et al., 1998; Ellis et al., 2012). **Table 5.8.11** shows a summary of elasmobranch species and level of protection (Coull et al., 1998; Ellis et al., 2012; MarLIN, 2022).

Table 5.8.11 Elasmobranch species listed above, and the level of protection under national and international legislation (Coull et al., 1998; Ellis et al., 2012; MarLIN, 2022)

Common name	Overlap with the study area		UK BAP species	IUCN Red List	Scottish PMF	Scottish Biodiversity List	OSPAR	The Wildlife & Countryside Act 1981	Berne Convention	Convention on migratory species
	Spawning Ground	Nursery Ground								
Spurdog	N/A	Y	Y	Vulnerable	Y	N	Y	N	N	N
Tope shark	N/A	Y(partial)	Y	Critically endangered	N	N	N	N	N	N
Common skate	N/A	Y(partial)	Y	Critically endangered	Y	Y	Y	Y	N	N
Thornback ray	N/A	Y(partial)	N	Near threatened	N	Y	Y	N	N	N
Spotted ray	N/A	Y	N	Least concern	N	N	Y	N	N	N
Angel shark	N/A	N/A	Y	Critically endangered	N	N	Y	Y	N	N
Basking shark	N/A	N/A	Y	Vulnerable	Y	Y	Y	Y	Y	Y

Common name	Overlap with the study area		UK BAP species	IUCN Red List	Scottish PMF	Scottish Biodiversity List	OSPAR	The Wildlife & Countryside Act 1981	Berne Convention	Convention on migratory species
	Spawning Ground	Nursery Ground								
Blue shark	N/A	N/A	Y	Near threatened	N	N	N	N	N	N
Gulper shark	N/A	N/A	Y	Endangered	N	N	Y	N	N	N
Kitefin shark	N/A	N/A	Y	N	N	N	N	N	N	N
Leafscale gulper shark	N/A	N/A	Y	Endangered	Y	N	Y	N	N	N
Porbeagle shark	N/A	N/A	Y	Vulnerable	Y	N	Y	N	N	N
Portuguese dogfish	N/A	N/A	Y	Near threatened	Y	N	Y	N	N	N
Sandy Ray	N/A	N/A	Y	Endangered	Y	N	N	N	N	N

Migratory fish

5.8.44 Migratory (diadromous) fish are fish that spend part of their life history in both freshwater and sea water, migrating between the two. Some species are anadromous, which means they spend the majority of their adult lives at sea and then migrate back to freshwater to reproduce. Lamprey species, Atlantic salmon *Salmo salar* and sea trout *Salmo trutta* are anadromous. European eels *Anguilla Anguilla* are catadromous fish, as they migrate to the sea to spawn and their larvae predominantly migrate to freshwater. In the study area, the general movement of salmon when at sea is in a northerly direction, and salmon continue up the north Aberdeenshire coast (Malcolm *et al.*, 2010).

5.8.45 The Project area has an important network of rivers for Atlantic salmon. The Project landfall site(s) and cable route(s) have not yet been selected, but within the study area there are rivers, which potentially could support migratory fish. The River Ugie is just above Peterhead and is known to support Atlantic salmon. Other rivers within the study area are known to support Atlantic salmon such as the Water of Philorth and some areas are likely to have salmon present (Scottish Government, 2020c). River mouths may not be within the project area but it is understood that salmon from other rivers do use the study area (Malcolm *et al.*, 2010). Based on other projects within the area it is likely that the species present within the study are (Hywind, 2015; Green Volt, 2021; and North Connect, 2018):

- Atlantic salmon;
- Sea trout;
- European eel;
- River lamprey *Lampetra fluviatilis*; and
- Sea lamprey *Petromyzon marinus*.

Table 5.8.12 Migratory fish listed above, and the level of protection under national and international legislation (Coull et al., 1998; Ellis et al., 2012; MarLIN, 2022)

Species	UK BAP species	IUCN Red List	Scottish PMF	Scottish Biodiversity List	OSPAR	The Wildlife & Countryside Act 1981	Bern Convention	Convention on migratory species
Atlantic salmon	Y	Least concern	Y	Y	Y	Y (freshwater only)	N	N
Sea trout	Y	Least concern	Y	Y	N	N	N	N
European eel	Y	Critically endangered	Y	Y	Y	N	N	Y
River lamprey	Y	Least concern	Y	N	N	Y	N	N
Sea lamprey		Least concern	Y	N	N	N	N	N

Shellfish

5.8.46 Shellfish includes cephalopod, molluscs and crustacean species. The majority of the study area is characterised by soft sediments, which can often support burrowing megafauna including langoustine *Nephrops norvegicus*. Fladen Ground, within the study area, is a known spawning area for langoustine. The main landings from the north-east coast of Scotland are of scallops, crabs and langoustine (Scottish Government, 2020).

5.8.47 The most economically valuable shellfish species caught in Scotland is the langoustine which is found in areas of soft mud and sandy mud. The second most valuable species is scallops (Scottish Government, 2020). Based on other projects within the area it is likely that the species present within the study area are (Hywind, 2015; Green Volt, 2021; North Connect, 2018):

- langoustine;
- common lobster *Homarus gammarus*;
- shore crab *Carcinus maenas*;
- crayfish *Palunirus elegans*;
- king scallop *Pecten maximus*;
- ocean quahog *Artica Islandica*;
- razorfish *Ensis* species;
- veined squid *Loligo forbesii*;
- queen scallop *Aequipecten opercularis*;
- edible crab *Cancer pagurus*;
- velvet swimming crab *Necora puber*;
- squat lobster *Munida rugosa*; and
- European spiny lobster *Palinurus elephas*.

Table 5.8.13 Shellfish species listed above, and the level of protection under national and international legislation (Coull et al., 1998; Ellis et al., 2012; MarLIN, 2022)

Common name	UK BAP species	IUCN Red List	Scottish PMF	Scottish Biodiversity List	OSPAR	The Wildlife & Countryside Act 1981	Berne Convention	Convention on migratory species
Langoustine	Y	Least concern	N	N	N	N	N	N
Common lobster	Y	Least concern	N	N	N	N	Y	N
Shore crab	N	-	N	N	N	N	N	N
Crayfish	N	-	N	N	N	N	N	N
King scallop	Y	-	N	N		N	N	N
Ocean quahog	Y	-	Y	N	Y	N	N	N
Razorfish Ensis species	Y	-	N	N	N	N	N	N
Veined squid	Y	Least concern	N	N	N	N	N	N
Queen scallop	Y	-	N	N	N	N	N	N
Edible crabs	Y	-	N	N	N	N	N	N
Velvet swimming crab	Y	-	N	N	N	N	N	N
Squat lobster	Y	-	N	N	N	N	N	N
European spiny lobster	Y	Vulnerable	Y	Y	N	N	Y	N

Designated sites

5.8.48 For this Scoping Report a review has been undertaken to identify designated sites in the study area which are either designated for fish and shellfish interest or habitats/species which are dependent on or associated with fish and shellfish. Designated sites that are screened in comprise of the national site network for UK sites and European sites (SAC, SCIs and Ramsar sites) and national designations (i.e. MPAs, SSSIs and NNRs) which are listed in **Table 5.8.14** and presented in **Figure 5.8.4: Designated sites of relevance to fish and shellfish** in **Appendix 1A**.

Table 5.8.14 Marine nature conservation designations with relevance to fish and shellfish ecology

Site	Location relative to Scoping Boundary	Features or description
Troup, Pennan and Lion's Heads SPA	Approximately 4km north of the Scoping Boundary.	The site is a 9km stretch of sea cliffs along the Aberdeenshire coast, which supports large colonies of breeding seabirds including black-legged kittiwake <i>R.tridactyla</i> , common guillemot <i>U.aalge</i> , Northern fulmar <i>F.glacialis</i> , herring gull <i>L.argentatus</i> and razorbill <i>Alca torda</i> .
River Dee SAC	Approximately 39km south west of the Scoping Boundary.	Designated for Atlantic salmon and freshwater pearl mussel.
River South Esk	Approximately 90km south west of the Scoping Boundary.	Designated for Atlantic salmon and freshwater pearl mussel (<i>M.margaritifera</i>).
River Tay	Approximately 120km south west of the Scoping Boundary.	Designated for Atlantic salmon, sea lamprey, brook lamprey (<i>Lampetra planeri</i>) and river lamprey.
River Teith	Approximately 200km south west of the Scoping Boundary.	Designated for sea lamprey, brook lamprey, river lamprey and Atlantic salmon.
River Tweed	Approximately 200km south of the Scoping Boundary.	Designated for Atlantic salmon, sea lamprey (<i>P. marinus</i>), river lamprey and brook lamprey.
Southern Trench MPA	Overlaps with the middle section of the landfall-water interface part of the Scoping Boundary.	<p>The Southern Trench MPA is located off the coast of the Aberdeenshire coast and is designated to protect marine mammals (minke whales), burrowed mud, fronts and shelf deeps. The offshore cable route Scoping Boundary passes through the MPA (see Figure 5.8.4 in Appendix 1A).</p> <p>The Southern Trench MPA is a 250m deep trench that runs parallel to the coastline. The dynamic mixing zone of warm and cold waters attracts shoals of Atlantic herring, Atlantic mackerel and Atlantic cod to the area, with the soft sands providing abundant habitat for sandeels (NatureScot, 2020).</p>

Site	Location relative to Scoping Boundary	Features or description
		<p>The burrowed mud habitat (EUNIS code: A5.361) PMF present in the Southern Trench MPA is characterised by the presence of Norway lobster, crabs, seapens and anemones. The burrowed mud habitat is in favourable condition but is listed by OSPAR as a threatened and declining habitat. Burrowed mud habitats are highly sensitive to physical disturbance; disturbances to water flow, wave, exposure; and siltation.</p> <p>The conservation objectives of the site for burrowed mud include: <i>“Conserve the diversity, abundance and distribution of typical species associated within the burrowed mud (including Nephrops norvegicus, Pennatula phosphorea, Virgularia mirabilis.”</i></p>
Turbot Bank MPA	Approximately 14km east of the Scoping Boundary.	<p>Turbot bank is designated for the protection of sandeels, which play an important role in the wider North Sea ecosystem, providing a vital source of food for larger fish, seabirds and marine mammals. Turbot Bank has the potential to act as a source of young sandeels for maintain and restocking surrounding areas.</p> <p>The Conservation Objectives for the Turbot Bank MPA are:</p> <ul style="list-style-type: none"> • <i>“so far as already in favorable condition, remain in such condition; and</i> • <i>so far as not already in favorable condition, be brought into such condition, and remain in such condition.</i> <p><i>With respect to the sandeels, this means that the quality and quantity of its habitat and the composition of its population are such that they ensure that the population is maintained in numbers which enable it to thrive.</i></p> <p><i>Any temporary reduction of numbers is to be disregarded if the population of sandeels is thriving and sufficiently resilient to enable its recovery from such reduction. Any alteration to that feature brought about entirely by natural processes is to be disregarded” (JNCC, 2018).</i></p>

Future baseline

- 5.8.49 Determining future baseline draws upon information about the likely future use and management of the Project sites in the absence of development, known populations trends (for species), climate change (see **Section 7.1: Climate resilience**) and any other proposed developments (consented or otherwise) that may act cumulatively with the Project to affect fish and shellfish ecology features.
- 5.8.50 It is possible to conclude that in the absence of the Project, any future baseline is likely to be different from the current baseline. This is due to the current government priorities and projections related to the marine environment and the current projects within the area. Therefore, it is considered appropriate to use the current baseline for the purpose of this assessment.

Basis for scoping assessment

- 5.8.51 The fish and shellfish ecology scoping assessment is based on the key assumptions that are also set out in **Chapter 2: Project Description**:
- impacts from all phases of the Project for a floating wind farm, with a grid connection capacity of up to 3GW from changes to physical processes, such as increased suspended sediments;
 - impacts from changes / loss of habitat from all phases of the Project;
 - impacts from the presence of array and export cables causing anthropogenic EMF and heat effects;
 - impacts from all phases of the Project that emit underwater noise and vibration;
 - impacts from the presence of the Option Agreement Area (OAA), such as reduced fishing activity and entanglement; and
 - impacts from the requirements for decommissioning.
- 5.8.52 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.8.16**.
- 5.8.53 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 5.8.54 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on fish and shellfish ecology (see **Table 5.8.15**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 5.8.55 As there is a commitment to implementing these environmental measures, and to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 5.8.15 Relevant fish and shellfish ecology embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-028	Scour Protection Management Plan will be developed. It will include details of the need, type, quantity, location(s) and installation methods for scour protection.	s.36 conditions and marine licence conditions.
M-032	Development of and adherence to an agreed Marine Mammal Mitigation Protocol (MMMP). This will subsequently mitigate potential impacts from underwater noise on marine mammals and fish through good or standard practice actions in order to meet legislative requirements. These will evolve over the development process as the EIA processes and in response to consultation.	Design evolution, s.36 conditions and marine licence conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-033	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to the Project. The MPCP will also include relevant key emergency contact details.	s.36 conditions and marine licence conditions.
M-049	Development of and adherence to a Project Environmental Monitoring Programme (PEMP), which will set out commitments to environmental monitoring in pre-, during and post-construction phases of the Project.	s.36 conditions and marine licence conditions.
M-054	A detailed Cable Burial Risk Assessment (CBRA) will be undertaken to enable informed judgements about burial depth. This should maximise the chance of cables remaining buried whilst limiting the amount of sediment disturbance to that which is necessary. The array cables will typically be buried at a target burial depth between 1-2m below the seabed surface. The final depth of the cable will be dependent on the seabed mobility and CBRA.	s.36 conditions and marine licence conditions.
M-055	Avoidance of key sensitive habitats, where known, through pre-construction surveys and micro-siting of proposed Project infrastructure.	s.36 conditions and marine licence conditions.
M-056	The offshore export cable will be installed at the landfall(s) using most likely either open-cut / cut-and-fill construction or trenchless construction (e.g. HDD). Depending on the site characteristics and the final landfall(s) selection / design taken forward, a cofferdam construction may also be considered.	s.36 conditions and marine licence conditions.
M-062	Minimise adverse effects on water and sediment quality from loss of drilling muds when using HDD across the littoral zone by employment of a site-specific best practice protocol and use of the least toxic additives.	s.36 conditions, marine licence conditions and CEMP.
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase.</p> <p>The CEMP will be the securing mechanism for many measures.</p>	s.36 conditions, marine licence conditions and CEMP.
M-064	Ensure that any material to be deposited in the sea (metal components, rock for armour, concrete mattresses) does not contain toxic material that could leach into the sea water and result in toxic effects.	s.36 conditions, marine licence conditions and CEMP.

ID	Environmental measure proposed	How the environmental measures will be secured
M-102	The mitigation and control of invasive species measures will be incorporated not a PEMP.	s.36 conditions and marine licence conditions.
M-105	Development and adherence to a piling strategy for fixed accommodation platform(s) and other offshore substation(s) or platform(s). It will detail the method of pile installation and associated underwater noise (UWN) levels. It will describe any mitigation measures to be implemented (e.g. soft stat and ramp up measures, use of acoustic deterrent devices) prior to and during pile installation to manage the effect of UWN.	Piling strategy is required under s.36 conditions and marine licence conditions.
M-106	The development of and adherence to a decommissioning programme.	Required under sections 105 and 114 (Energy Act 2004) and marine licence conditions.
M-114	Use of 'low order' techniques such as deflagration for UXO disposal, where possible and required.	Required under the Habitats Regulations and marine licence conditions.

Likely significant effects

- 5.8.56 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 5.8.57 The likely significant effects on fish and shellfish ecology are summarised in **Table 5.8.16**. The scoping assessment is based on a combination of the Project definition at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for fish and shellfish ecological effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.8.58 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considering them is presented after the table, supported by evidence base.

Table 5.8.16 Likely significant fish and shellfish effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Habitat loss and/ or disturbance (Construction, Operation and Maintenance and Decommissioning)	M-056	Potential effect on feeding and spawning patterns through temporary / permanent, direct habitat loss and disturbance.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts will be determined through available literature and expert knowledge, based on the species resilience and resistance to impacts.	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish. 	Site-specific survey for benthic, epibenthic and intertidal ecology features.
Temporary localised increases in suspended sediment concentrations (SSC) and smothering (Construction, Operation and Maintenance and Decommissioning)	M-056	Potential for likely significant effect through smothering of species from the placement, maintenance and removal of infrastructure within the marine environment. Most of the SSC will be localised within the study area and will be based on tidal regimes.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts will be determined through available literature and	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish. 	No further baseline requirements.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			expert knowledge, based on the species resilience and resistance to impacts.		
Underwater noise and vibration including UXO clearance (Construction and Decommissioning)	M-032	Potential for likely significant effect through mortality, injury, behavioural changes and auditory masking in sensitive receptor.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts will be determined through available literature and expert knowledge, based on the species resilience and resistance to impacts.	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish 	No further baseline requirements.
Underwater noise and vibration (Operation and Maintenance)	M-032	Potential for likely significant effect through mortality, injury, behavioural changes and auditory masking in sensitive receptor.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish 	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			will be determined through available literature and expert knowledge, based on the species resilience and resistance to impacts.		
Increased hard substrate and structural complexity due to the presence of wind turbine generators (WTGs), including floating units (platforms and station keeping system) scour protection and cable protection (Operation and Maintenance)	M-028	Potential for likely significant effect through loss of suitable substrate or sensitive habitat.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts will be determined through available literature and expert knowledge, based on the species resilience and resistance to impacts.	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish. • Elasmobranchs; • Migratory fish; and • Shellfish 	Site-specific surveys for benthic, epibenthic and intertidal ecology features.
Potential for reduced fishing within the array area (Construction, Operation and Maintenance and Decommissioning)	n/a	There is potential for a change in abundance of fish species due to potentially reduced fishing effort within the OAA.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. Changes to the fish	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish 	Site-specific surveys for benthic, epibenthic and intertidal ecology features.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			community will be considered alongside the commercial fisheries chapter to make informed predictions on the effects to fish and shellfish ecology. The limited size of the array area may prevent the effects of reduced fishing pressure having a significant impact on populations across the wider study area.		
Electromagnetic field (EMF) impacts from cables (Operation and Maintenance)	M-054, M-056	Potential for likely significant effect through behavioural changes.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts will be determined through available literature and expert knowledge, based on the species resilience and resistance to impacts.	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish. 	No further baseline requirements.
Heat impacts from cables (Operation and Maintenance)	M-054, M-056	Potential for likely significant effect through behavioural changes.	Scoped in: The presence and extent of fish and shellfish species will be	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; 	No further baseline requirements.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts will be determined through available literature and expert knowledge, based on the species resilience and resistance to impacts.	<ul style="list-style-type: none"> • Migratory fish; and • Shellfish. 	
Accidental pollution impacts during the resulting in potential effects on fish and shellfish receptors (Construction, Operation and Maintenance and Decommissioning)	M-033	No likely significant effect.	Scoped out: See rationale in section below paragraphs 5.8.60 and 5.8.61.	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish 	N/A
Direct and indirect seabed disturbances leading to the release of sediment contaminants (Construction, Operation and Maintenance and Decommissioning)	N/A	Potential for likely significant effect through contamination resulting in ecological or behavioural changes in sensitive receptor.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish 	Site specific data from sediment samples collected from the study area. S

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			will be determined through available literature and expert knowledge, based on the species resilience and resistance to impacts.		
Collision or entanglement risk (Construction, Operation and Maintenance and Decommissioning)		Potential for species to collide with infrastructure or become entangled with cables or equipment attaching the anchor to the floating turbine. There is also an increased risk of collision due to an increase in vessels due to the Project.	Scoped out: See rationale in section below paragraph 5.8.62.	<ul style="list-style-type: none"> Elasmobranchs. 	No further baseline requirements.
Changes in water quality (Construction and Decommissioning)	M-062, M-064	Potential for likely significant effect resulting from construction (both on land and offshore) activity which could cause changes in water quality.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts will be determined through available literature and expert knowledge, based on	<ul style="list-style-type: none"> Pelagic fish; Demersal fish; Elasmobranchs; Migratory fish; and Shellfish 	Site specific data from sediment samples collected from the study area.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			the species resilience and resistance to impacts.		
Potential impact on the Southern Trench MPA (Construction, Operation and Maintenance and Decommissioning)	M-028	Potential for likely significant effect to the Southern Trench MPA and features through the proposed export cable corridor.	Scoped in: The potential impacts on burrowed mud habitat will be considered in terms of the proposed export cable corridor. As the cable corridor offshore Scoping Boundary runs through the Southern Trench MPA, it is not possible to scope out any impacts from the installation of the export cable to the burrowed mud habitat, which may be important habitats for fish species.	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish 	Site-specific surveys for benthic, epibenthic and intertidal ecology features.
Potential impacts on designated sites (Construction, Operation and Maintenance and Decommissioning)	N/A	Likely significant effects to other designated sites listed in Table 5.8.1 .	<p>Scoped in: The potential impacts on designated sites listed in Table 5.8.14 and their features cannot be scoped out as there are a number of possible provisional offshore export cable corridor at time of Scoping.</p> <p>See the HRA Screening Report (which will be submitted subsequently to the Scoping Report) for</p>	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish 	Site-specific surveys for benthic, epibenthic and intertidal ecology features.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			further information on designated sites.		
Colonisation of hard substrates by invasive non-native species (INNS) (Construction, Operation and Decommissioning)	M-033, M-049, M-102	Potential for likely significant effect resulting from increased hard structures allowing INNS to colonise the structures.	Scoped in: The presence and extent of fish and shellfish species will be informed through a desk-based review and site-specific survey data. The area of disturbance will be defined using a precautionary approach. The sensitivity of fish and shellfish to potential impacts will be determined through available literature and expert knowledge, based on the species resilience and resistance to impacts.	<ul style="list-style-type: none"> • Pelagic fish; • Demersal fish; • Elasmobranchs; • Migratory fish; and • Shellfish 	Site specific data from sediment samples collected from the study area.

Impacts scoped out of assessment

- 5.8.59 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.
- 5.8.60 **Accidental pollution** has been scoped out as a potential effect from further assessment, based on the conclusion of no likely significant effect. This conclusion has been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusion follows (in a site-based context) existing best practice. The scoped out effect is considered in turn below.
- 5.8.61 Accidental pollution events are not considered to result in a significant effect on fish and shellfish ecology features. The magnitude of an accidental spill will be limited by the size of chemical or oil inventory on construction vessels. In addition, release of hydrocarbons would be subject to rapid dilution, weathering, and dispersion and would be unlikely to persist in the marine environment. The likelihood of an incident will be reduced by implementation of Project Environmental Monitoring Programme (PEMP) and Marine Pollution Contingency Plan (embedded environmental measure 5.5d), which will be approved by the relevant stakeholders and secured through s.36 conditions, marine licence conditions and Construction Environmental Management Plan (CEMP).
- 5.8.62 **Collision risk and entanglement** has been scoped out as a potential effect from further assessment based on the conclusion of no likely significant effect. The sensitivity of fish to potential impacts has been determined through available literature and expert knowledge, based on the species resilience and resistance to impacts. There are unlikely to be large numbers of species that are likely to be impacted by the Project infrastructure. Collision risk is likely to be the highest for basking sharks due to their size and feeding behaviour. There have been some records of basking sharks being entangled in ropes from stationary gear (Benjamin *et al.*, 2014). However, any associated cables or chains with this project are likely to be taut within the water column with no loops that could potentially result in entanglement. There have been no records of basking shark entanglement or collision from cables or midwater chains. This is likely to be the type of equipment used in this Project and therefore the risk of this impact is considered low. Furthermore, the number of basking sharks is low within the Project area and the likelihood of collision or entanglement is low.

Cumulative effects

- 5.8.63 Cumulative effects on fish and shellfish ecology resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the CEA screening exercise.
- 5.8.64 With regards to cumulative effects from offshore wind projects it should be noted that although there would be an aggregated direct and permanent loss of habitat during the operational phase of the wind farm it is anticipated that, given the locality of the predicted impacts, cumulative impacts during construction, operation and maintenance and decommissioning phases would not be considered significant. If the situation were to arise where several export cables were to be under construction concurrently, there may be potential for cumulative impacts to arise, however, these are not expected to be significant.

- 5.8.65 At this stage, impacts likely to be scoped into the cumulative effects assessment include:
- temporary increase in SSC and sediment deposition, during the construction phase;
 - long-term habitat loss / change from the presence of WTG infrastructure, scour protection and cable protection;
 - colonisation of the WTGs and scour protection and cable protection may affect benthic ecology and biodiversity;
 - changes to seabed habitats arising from effects on coastal processes, including scour effects and changes in the sediment transport and wave regimes resulting in potential effects on benthic communities;
 - increase in EMF and heat emissions associated with cables;
 - impacts on the Southern Trench Marine Protected Area (MPA) site and features during the construction; operation/maintenance; and decommissioning phases; and
 - impacts to other designated sites and features during the construction; operation/maintenance; and decommissioning phases.

Transboundary effects

- 5.8.66 The potential effects from construction, operation (including maintenance) and decommissioning on fish and shellfish receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. The potential for transboundary effects upon fish during the construction, operation, maintenance, and decommissioning of the Project has been identified. Some fish can migrate over large geographic areas that cross into other territorial waters for key life stages. No transboundary impacts are predicted on shellfish due to the localised and temporary nature of the works. No significant transboundary impacts are predicted in relation to commercial fisheries as any potential displacement of fishing activity into the Norwegian EEZ is expected to be highly unlikely based on data reviewed within commercial fisheries section of this Scoping Report.

Proposed approach to the EIA Report

- 5.8.67 Likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.8.68 Consultations will be held with relevant statutory and non-statutory organisations as necessary. Key consultees of relevance to the fish and shellfish chapter include MS-LOT, MSS, NatureScot and the SEPA.
- 5.8.69 Consultee responses with regard to fish and shellfish ecology will be addressed and the scope of the assessment modified accordingly in the EIA Report chapter.

5.9 Commercial fisheries

Introduction

- 5.9.1 The commercial fisheries assessment will consider the potential likely significant effects on commercial fisheries that may arise from the construction, operation and maintenance and decommissioning of the offshore Project elements that are seaward of Mean High Water Springs (MHWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 5.9.2 Commercial fisheries interfaces with other aspects and, as such, should be considered alongside these, namely:
- **Section 5.1: Marine geology, oceanography and physical processes:** Changes to marine physical processes may potentially impact sensitive commercial fisheries receptor species; therefore information from that Section will inform the commercial fisheries assessment.
 - **Section 5.3: Underwater noise and vibration:** The underwater noise and vibration section describes potential impacts from noise and vibration sources on pertinent sensitive commercial fisheries receptor species, therefore, information from that Section will be used in the commercial fisheries assessment.
 - **Section 5.4: Electromagnetic fields (EMF):** There is potential for EMF emissions to have effects on commercial fisheries as behavioural changes on pertinent sensitive commercial fisheries receptor species may occur as a result of EMF. Therefore, information from that Section will inform the commercial fisheries assessment.
 - **Section 5.6: Marine mammals:** Some marine mammals rely on species targeted for commercial fishing, such as whiting, cod, sandeel and salmon, and therefore impacts to commercially targeted fish species could potentially indirectly affect marine mammals. The information from the commercial fisheries section will be used to inform the marine mammal assessment.
 - **Section 5.8: Fish and shellfish ecology:** The commercial fisheries section includes commercially important species and fisheries data. Information and data from the commercial fisheries Section will be used to inform the fish and shellfish ecology assessment, as commercial fisheries have the potential to directly and indirectly impact fish and shellfish ecology.
 - **Section 5.10: Shipping and navigation:** Potential shipping and navigation impacts may cause interference or risk to commercial fishing vessels transiting and actively fishing. Therefore, the shipping and navigation assessment will inform the commercial fisheries assessment.
 - **Section 7.3: Socio-economics:** Potential effects on the fishing sector and fishing communities will impact the socio-economics assessment. Therefore, the commercial fisheries assessment will inform the socio-economic assessment.
- 5.9.3 This Section considers commercial fisheries activity, which is understood as fishing activity legally undertaken where the wild catch is sold for taxable profit. Potential impacts of the Project on charter angling, defined as fishing for marine species where the purpose is recreation and not sale or trade, are assessed in **Section 5.13: Infrastructure and other marine users**.

Legislation and policy context

- 5.9.4 This Section identifies the relevant legislative and policy context which has informed the scope of the commercial fisheries assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 5.9.5 In order to provide a robust evidence base, **Table 5.9.1** below presents a summary of legislation and policies relevant for the commercial fisheries assessment, for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states their relevance to this Section.

Table 5.9.1 Relevant legislation and policy

Relevant Legislation and Policy	Relevance to the assessment
Legislation	
International: EC Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora	<ul style="list-style-type: none"> Defines the species and types of sites that receive legal protection Describes the protection that is afforded, specifically with respect to birds.
International: EC Directive (2009/147/EC) on the Conservation of Wild Birds	
National: Conservation of Offshore Marine Habitats and Species Regulations (2017)	<ul style="list-style-type: none"> Defines the species, habitats and types of sites that receive legal protection and describes the protection that is afforded.
Marine (Scotland) Act (2010)	<ul style="list-style-type: none"> A network of nature conservation Marine Protected Areas (MPAs) has been designated under the Act, protecting habitats and species.
Marine (Scotland) Act 2010 Marine and Coastal Access Act (2009)	<ul style="list-style-type: none"> States that Public Authorities are required to consider whether a project is capable of affecting a protected feature in an MPA.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A – Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the climate and nature crises.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector.

Relevant Legislation and Policy	Relevance to the assessment
Scottish Planning Policy (2014) <ul style="list-style-type: none"> - Paragraph 169 	<ul style="list-style-type: none"> • Identifies terrestrial and marine planning to play a key role in meeting targets. • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology.
Nature Positive 2030 (2021) <ul style="list-style-type: none"> - Policy 6.2.1 - Policy 6.2.3 	<ul style="list-style-type: none"> • Policy 6.2.1 seeks to maintain fish stocks at levels capable of producing maximum sustainable yield • Policy 6.2.3 seeks to ensure impacts from fisheries are effectively managed throughout UK waters including MPAs
Marine Policy	
UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> • Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. • Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. • Demonstrates support for the fishing sector, including with regard to displacement: “<i>seeking solutions such as co-location of activity wherever possible</i>”. • Stipulates that the process of marine planning should “<i>enable the co-existence of compatible activities wherever possible</i>” and supports the reduction of real and potential conflict as well as maximising compatibility and encouraging co-existence of activities.
Scotland’s National Marine Plan (2015) <ul style="list-style-type: none"> - FISHERIES 1 - FISHERIES 2 - FISHERIES 3 - CABLES 1 - CABLE 2 	<ul style="list-style-type: none"> • FISHERIES 1 emphasises safeguarding of fishing opportunities wherever possible, protecting fish stocks and supports conflict resolution. • FISHERIES 2 highlights consideration of the potential effect of displacement on: fish stocks; the wider environment; use of fuel; and socio-economic costs to fishers. • FISHERIES 3 stipulates a requirement for a Fisheries Management and Mitigation Strategy to

Relevant Legislation and Policy	Relevance to the assessment
	<p>be prepared involving full engagement with local fishing interests (and other interests as appropriate).</p> <ul style="list-style-type: none"> CABLES 1 emphasises achieving successful seabed user co-existence. CABLES 2 highlights the need to reduce risks to all seabed users.
Sectoral Marine Plan – Offshore Wind Energy (2020)	<ul style="list-style-type: none"> Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment.
Local Planning Policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A – Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> C2 – Renewable Energy PR2 – Preserving and Protecting Important Development Sites <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>

Technical guidance

5.9.6 Technical guidance that has been used to define the assessment is set out in **Table 5.9.2** below.

Table 5.9.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Guidance on preparing a Fisheries Management and Mitigation Strategy ('FMMS') (draft) (Marine Scotland, 2020)	Provides guidance on structure and content of an FMMS which is relevant for the development of embedded environmental measures for the Project.
Good Practice Guidance for assessing fisheries displacement by other licensed marine activities (Xodus, 2022)	Provides guidance on the methodology for assessing fisheries displacement caused due to other licensed marine activities, which is applicable to the assessment of likely significant effects for the Project. Likely significant effects.
Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (United Kingdom Fisheries Economic Network (UKFEN) and Seafish, 2012)	Provides guidance on methodology for assessing the importance of specific marine areas to the commercial fishing industry, including valuation of sites, which is applicable to the assessment of likely significant effects for the Project.
Fisheries Liaison with Offshore Wind and Wet Renewables group (FLOWW)	Provides guidance on engagement, consultation and liaison with the commercial fishing industry, which is

Guidance reference	Relevance to the assessment
Recommendations for Fisheries Liaison: Best Practice guidance for offshore renewable developers (FLOWW, 2014 and BERR, 2008)	applicable to consultation on and the development of embedded environmental measures for the Project.
FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015)	Provides guidance on when disruption payments and community funds are applicable and how they are calculated, which is applicable to the assessment of likely significant effects for the Project.
Damage to Gear Compensation Claim Forms (Marine Scotland, 2021a)	Provides a standard form for fishing vessel owners deploying static or mobile gear to complete in the instance of damage or loss of fishing gear, loss of fishing time, or damage to vessel by suspected offshore renewable activity, which is applicable to the development of embedded environmental measures and the assessment of likely significant effects for the Project.
Guidance on completing Damage to Gear Compensation Claim Forms (Marine Scotland, 2021b)	Provides guidance on making a claim for compensation for damage or loss of fishing gear, loss of fishing time, or damage to vessel by suspected offshore renewable activity, which is applicable to the development of embedded environmental measures and the assessment of likely significant effects for the Project.
Options and opportunities for marine fisheries mitigation associated with wind farms (Blyth-Skyrme, 2010a)	Provides potential mitigation approaches for commercial fisheries, which is applicable to the development of embedded environmental measures and the assessment of likely significant effects for the Project.
Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers (Blyth-Skyrme, 2010b)	Provides guidance on cumulative effects specific to commercial fisheries and will be taken into consideration in the assessment of cumulative effects for the Project.
Cumulative impact assessment guidelines, guiding principles for cumulative impacts assessments in offshore wind farms (RenewableUK, 2013)	Provides guidance on cumulative effects for offshore wind farms and will be taken into consideration in the assessment of cumulative effects for the Project.
Fishing and Submarine Cables - Working Together (International Cable Protection Committee, 2009)	Provides guidance to fishermen in avoiding catching submarine cables and provides information on what to do should gear become snagged and is applicable to the assessment of likely significant effects and development of embedded environmental measures for the Project.

Study area

- 5.9.7 The Option Agreement Area (OAA) is located within the International Council for the Exploration of the Sea (ICES) Division 4a (Northern North Sea) statistical area; within United Kingdom (UK) Exclusive Economic Zone (EEZ) waters; and outside of the 12nm limit boundary. For the purpose of recording fisheries landings, ICES Division 4a is divided into statistical rectangles which are consistent across all Member States operating in the North Sea.

- 5.9.8 The Project OAA is located within ICES rectangle 45E9, and the search area for the offshore export cable corridor is located across six ICES rectangles: 45E8, 45E9, 44E7, 44E8, 44E9 and 43E8. It should be noted that the Project occupies only a portion of these ICES rectangles, as follows:
- the Project OAA overlaps with 20.7% of 45E9; and
 - the search area for the offshore export cable corridor overlaps with 21% of the combined six ICES rectangles.
- 5.9.9 The study area for the commercial fisheries assessment is defined as the six ICES rectangles that overlap the Project, as identified in **Figure 5.9.1: Commercial fisheries study area** in **Appendix 1A**.
- 5.9.10 The study area will be reviewed and amended in response to such matters as refinement of the offshore components and the identification of additional impact pathways and, where appropriate, in response to feedback from consultation.

Consultation

- 5.9.11 This Section has been informed by engagement and discussion with various stakeholders. **Table 5.9.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 5.9.3 Consultation

Consultee	Comments and considerations	How this is accounted for
Marine Scotland Licensing Operations Team (MS-LOT) and Marine Scotland Science (MSS), NatureScot and RSPB	<p>An offshore EIA Scoping workshop was held on 29th and 30th September 2022. During a technical break-out session and after the workshop, the Project team submitted the following written questions to MS-LOT and MSS in relation to commercial fisheries:</p> <ul style="list-style-type: none"> • Do the regulators agree with the proposed study area, data sources, receptor groups and impact pathways, and overall approach to the assessment presented in the workshop (i.e. as presented in this Section)? • Are there any data sources that should be considered that are not noted in the workshop (i.e. as presented in this Section)? • Can Marine Scotland advise whether Vessel Monitoring System (VMS) data can be made available for UK registered vessels of length 12m to 14.99m? Noting that data for 15m and over vessels is available from the MMO. <p>This was agreed with MS-LOT to mean:</p> <ul style="list-style-type: none"> ▶ VMS data for all 12m and over vessels combined 	<p>MS-LOT and MSS confirmed to the Project team that they will respond to these questions in the advisory response to be provided during the Scoping Report consultation process. This is understood to mean via the Scoping Opinion. The responses will therefore be addressed in the EIA Report.</p> <p>In relation to the VMS and shellfish data requested, MS-LOT directed the request to the Central Enquiry Unit of the Scottish Government. VMS data has subsequently been delivered to the Project team for consideration in the EIA.</p>

Consultee	Comments and considerations	How this is accounted for
	<ul style="list-style-type: none"> ▶ VMS data analysed and provided as grided data by c-square method (as adopted by ICES), i.e. not point data ▶ Focus on value and weight of catch by gear type ▶ Gear types defined in broad categories e.g., demersal otter trawl, beam trawl, pots & traps, pelagic trawl etc, so that some categories are combined (such as twin rig and single rig demersal otter trawl) ▶ Data to include all UK vessels operating within Scottish EEZ (i.e. out to 200 nm or EEZ boundary) and further where data is available (i.e. in other EEZs) <ul style="list-style-type: none"> • Can Marine Scotland advise whether data from shellfish Form 1 entries indicating number of pots can be made available? This was agreed with MS-LOT to mean the number of pots hauled daily that corresponds to the quantity logged as being landed that day. 	
Scottish Fishermen's Federation, Scottish White Fish Producers Association, and Inshore Fisheries Alliance (CIFA)	<p>An update meeting was held on 16th November 2022. Key discussion points were:</p> <ul style="list-style-type: none"> • Permission to board and dropped object procedures. • Importance of maintaining regular communications activities that influence the navigational safety of fishermen. • Data sharing in relation to geophysical data and optioneering • Importance of considering the needs of inshore creel and line vessels. • Potential for electro-magnetic fields from HVAC cables to influence fish distribution. • Safety exclusion zones around the Golden Eye pipeline that intersects the array site and the occurrence of fishing activities along the pipeline. 	

Assessment methodology

Introduction

- 5.9.12 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this commercial fisheries section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the commercial fisheries assessment.

Methodology for establishing baseline conditions

Desk-based analysis

- 5.9.13 Landings statistics for UK registered vessels were obtained from the Marine Management Organisation (MMO) and analysed via excel.
- 5.9.14 Vessel Monitoring System (VMS) collated by MMO and ICES and Automatic Identification System (AIS) available from the European Maritime Safety Agency (EMSA) have been analysed for 2016 – 2019 using ArcMap and ArcGIS Pro.
- 5.9.15 The spatial and/or temporal limitations of any data sources or datasets relied upon for the assessment will be specified in the EIA.

Site-specific surveys

- 5.9.16 No site-specific surveys have been undertaken to inform this commercial fisheries assessment at the scoping stage.
- 5.9.17 Shipping and navigation AIS and radar surveys during the summer and winter periods will capture activity of fishing vessels and will inform the EIA see **Table 5.10.4** in **Section 5.10: Shipping and navigation**.

Impact assessment methodology

- 5.9.18 Definitions specific to commercial fisheries in relation to assessing the sensitivity of the receptor and magnitude of an impact are provided in **Table 5.9.4** and **Table 5.9.5** respectively. Receptors when used as a general term may apply to fishing fleets, fishing grounds, or the fishing industry in a wider sense.

Table 5.9.4 Definitions of sensitivity levels for commercial fisheries

Value	Definition
High	<p>Receptor is highly vulnerable to impacts that may arise from the Project and recoverability is long term or not possible.</p> <p>And/or: No alternative fishing grounds are available.</p>
Medium	<p>Receptor is somewhat vulnerable to impacts that may arise from the Project and has moderate levels of recoverability.</p> <p>And/or: Moderate levels of alternative fishing grounds are available and/or fishing fleet has moderate operational range.</p>
Low	<p>Receptor is not generally vulnerable to impacts that may arise from the Project and/or has high recoverability.</p> <p>And/or: High levels of alternative fishing grounds are available and/or fishing fleet has large to extensive operational range; fishing fleet is adaptive and resilient to change.</p>
Negligible	<p>Receptor is not vulnerable to impacts that may arise from the Project and/or has high recoverability.</p> <p>And/or: Extensive alternative fishing grounds available and/or fishing fleet is highly adaptive and resilient to change.</p>

Table 5.9.5 Definitions of magnitude levels for commercial fisheries

Value	Criteria (adverse)	Criteria (beneficial)
High	<p>Impact is of long-term duration (e.g., greater than 12 years duration) and/or is of extended physical extent;</p> <p>And: Impact is expected to result in one or more of the following:</p> <ul style="list-style-type: none"> • Substantial loss of target fish or shellfish biological resource (e.g., loss of substantial proportion of resource within project area); and • Substantial loss of ability to carry on fishing activities (e.g., substantial proportion of effort within project area). 	<p>Impact is expected to result in one or more of the following:</p> <ul style="list-style-type: none"> • Large scale or major improvement of resource quality, measurable against biomass reference points; or • Extensive restoration or enhancement of habitats supporting commercial fisheries resources.
Medium	<p>Impact is of medium-term duration (e.g., less than 12 years) and/or is of moderate physical extent;</p> <p>And: Impact is expected to result in one or more of the following:</p> <ul style="list-style-type: none"> • Partial loss of target fish or shellfish biological resource (e.g., moderate loss of resource within project area); and 	<p>Impact is expected to result in one or more of the following:</p> <ul style="list-style-type: none"> • Moderate improvement of resource quality; or • Moderate restoration or enhancement of habitats supporting commercial fisheries resources.

Value	Criteria (adverse)	Criteria (beneficial)
	<ul style="list-style-type: none"> Partial loss of ability to carry on fishing activities (e.g., moderate reduction of fishing effort within project area). 	
Low	<p>Impact is of short-term duration (e.g., less than 5 years) and/or is of limited physical extent; And: Impact is expected to result in one or more of the following:</p> <ul style="list-style-type: none"> Minor loss of target fish or shellfish biological resource (e.g., minor loss of resource within project area); and Minor loss of ability to carry on fishing activities (e.g., minor reduction of fishing effort within project area). 	<p>Impact is expected to result in one or more of the following:</p> <ul style="list-style-type: none"> Minor benefit to or minor improvement of resource quality; or Minor restoration or enhancement of habitats supporting commercial fisheries resources.
Negligible	Impact is expected to be undetectable compared to pre-Project baseline conditions.	

Effect significance

- 5.9.19 Following the identification of a receptor's value and sensitivity, and the magnitude of the impact, it is possible to determine the significance of the impact using professional judgement. The matrix provided in **Plate 4.2.2** in **Chapter 4: Approach to Scoping and EIA** (and the definitions of sensitivity and magnitude in **Table 5.9.4** and **Table 5.9.5**) is used as a framework to aid in determination of the impact assessment.
- 5.9.20 The definitions of impact significance to be used with the impact significance matrix are provided in **Table 5.9.6**.

Table 5.9.6 Impact significance definitions

Value	Definition
Major	Very large or large change in feature condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives or could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in feature condition, which are likely to be important considerations of a local level.
Minor	Small change in feature condition, which may be raised as local issues but are unlikely to be important in the decision-making process.
Negligible	No discernible change in feature condition.
No change	No impact, therefore, no change in feature condition.

Baseline conditions

Data sources

5.9.21 The data sources that have been used to inform this commercial fisheries section of the Scoping Report are presented within **Table 5.9.7**.

Table 5.9.7 Key sources of commercial fisheries data

Source	Date / period of data coverage	Summary	Coverage of study area
Marine Management Organisation (MMO)	2016 – 2020	UK annual fisheries landings statistics.	Full coverage of the study area.
MMO	2016 – 2019	UK Vessel Monitoring System (VMS) data.	Full coverage of the study area.
Scientific, Technical and Economic Committee for Fisheries (STECF)	2004 – 2016	EU annual fisheries landings statistics.	Full coverage of the study area.
ICES	2016 – 2020	EU VMS data.	Full coverage of the study area.
Marine Scotland NMPi	2013-2020	Fisheries datasets available from the Marine Scotland MAPS NMPi, including ScotMap data.	Full coverage of the study area.

Source	Date / period of data coverage	Summary	Coverage of study area
ICES and Marine Scotland	2016-2021	Key species stock assessments.	Full coverage of the study area.
Scottish Government Sectoral Marine Plan	2020	Description of regional commercial fisheries activity.	Full coverage of the study area.
European Maritime Safety Agency (EMSA)	2019-2021	Fishing vessel route density for vessels with AIS.	Full coverage of the study area.

- 5.9.22 It should be noted that the quantitative datasets identified in **Table 5.9.7** may not capture all commercial fisheries activity in the commercial fisheries study area. For instance, the VMS datasets only cover vessels ≥ 12 m (ICES data) or ≥ 15 m (MMO data) in length. Note that UK vessels ≥ 12 m in length have VMS on board, however, to date, the MMO provides amalgamated VMS datasets for ≥ 15 m vessels only.
- 5.9.23 However, in addition to VMS data, other published data does provide a useful insight into commercial fisheries activity undertaken in inshore areas e.g., ScotMap inshore fisheries mapping and EMSA fishing route density mapping. Consultation with fisheries stakeholders and industry is expected to further inform assessment in the EIA.
- 5.9.24 Consultation with representatives of fishermen's associations and organisations will be undertaken to seek to corroborate the findings of desk-based baseline data analysis and to provide insight into specific fishing grounds and activity of any vessels active in the area. Consultation will also be important to inform gear specifications for vessels active in the area, which will allow a full understanding of how different vessels and different gear configurations may be affected.
- 5.9.25 Variations and trends in commercial fisheries activity are an important aspect of the baseline assessment and are the principal reason for considering up to five years of key baseline data. Given the time periods considered in this scoping exercise (i.e., 2016 to 2021), existing baseline data may to some extent capture potential changes in commercial fisheries activity resulting from the COVID-19 pandemic, which is understood to have temporarily affected market demand and supply chains. However, changes in fishing patterns resulting from the withdrawal of the UK from the EU would be expected in future data sets, which include data for 2021 onwards. Long term environmental and climatic changes may be expected to be detectable within the five-year time series but may benefit from longer-term analysis dependant on the target species. Inclusion of such longer-term analysis will be informed by stakeholder consultation.

Current baseline

- 5.9.26 Landings by UK-registered vessels from the commercial fisheries study area (ICES rectangles 45E8-E9, 44E7-E9 and 43E8) had an annual average landings value of approximately £31.2 million across the years 2016 to 2020 (MMO, 2021), with landings values peaking at £40.4 million in 2019, but falling in 2020 to £24.2 million (likely due to a combination of COVID-19 restrictions and the UK's EU-exit). Over the same time period, the annual average weight of landings from the study area was approximately 17,400 tonnes, peaking at approximately 20,000 tonnes in 2019.
- 5.9.27 Landings from ICES rectangle 45E9, which overlaps the OAA, accounted for approximately 26% of the total value of landings from the commercial fisheries study area.

- 5.9.28 First sales value from the commercial fisheries study area was dominated by shellfish, accounting for 51% of the total landings value and 24% of the landed weight (based on data from MMO, 2021). Landed weight was dominated by the pelagic sector, accounting for 46% of the landed weight, and 24% of the value. An important demersal fishery is targeted in the study area, accounting for 25% of the value and 30% of the landed weight.
- 5.9.29 Scottish vessels were responsible for the majority (over 90%) of landings, with landings also being made by vessels registered in England and to a much lesser extent vessels registered in Northern Ireland. The main landing ports within the Scoping Boundary include (but are not limited to) Fraserburgh and Peterhead, which are two of the most important commercial fisheries landing ports in Scotland.
- 5.9.30 **Plate 5.9.1** and **Plate 5.9.2** show the top 15 species landed from the commercial fisheries study area by value and weight respectively, from 2016 to 2020 (MMO, 2021). **Plate 5.9.3** shows the landed value over the same period from the commercial fisheries study area by ICES rectangle and gear type. The key species landed are nephrops *Nephrops norvegicus*, (also known as Norway lobster), Atlantic mackerel *Scomber scombrus*, haddock *Melanogrammus aeglefinus*, veined squid *Loligo forbesi*, monkfish *Lophius* species, king scallops *Pecten maximus* and edible crab *Cancer pagurus*, as well as a range of mixed demersal whitefish species.

Plate 5.9.1 Top fifteen species by value Great British Pound (GBP) from 2016 to 2020 landed from the Commercial Fisheries study area (Source: MMO, 2021).

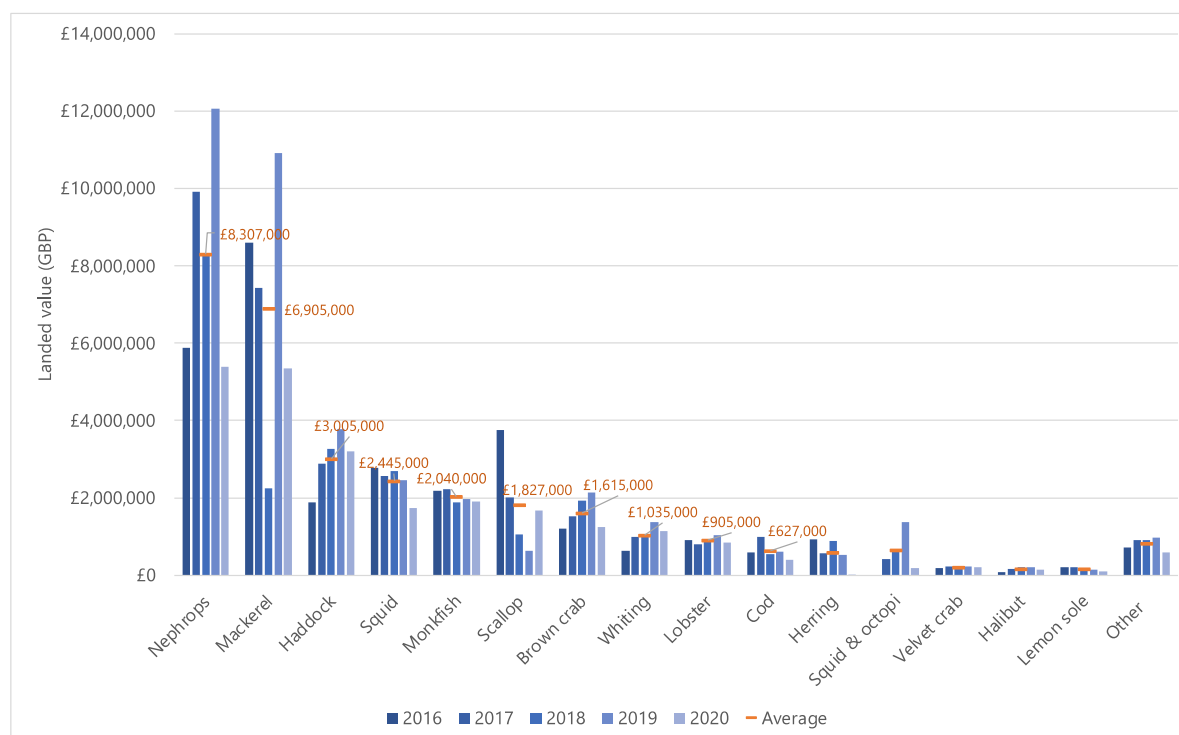


Plate 5.9.2 Top fifteen species by weight (tonnes) from 2016 to 2020 landed from the Commercial Fisheries study area (Source: MMO, 2021).

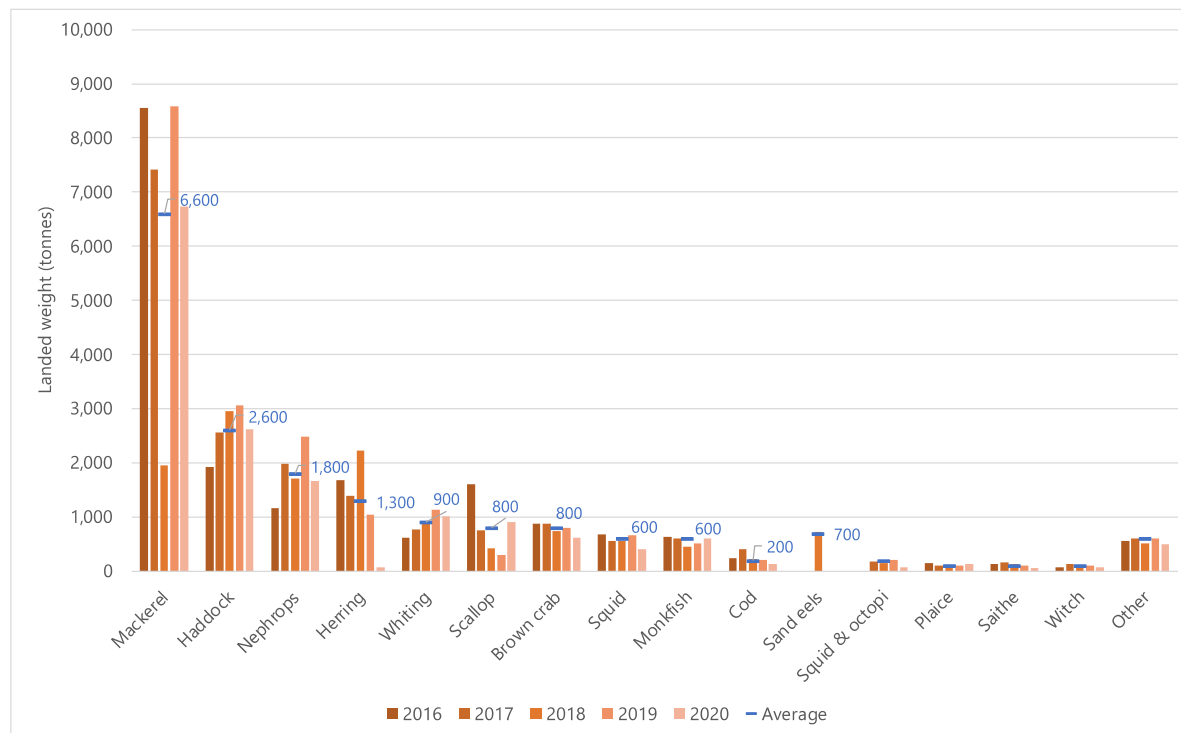
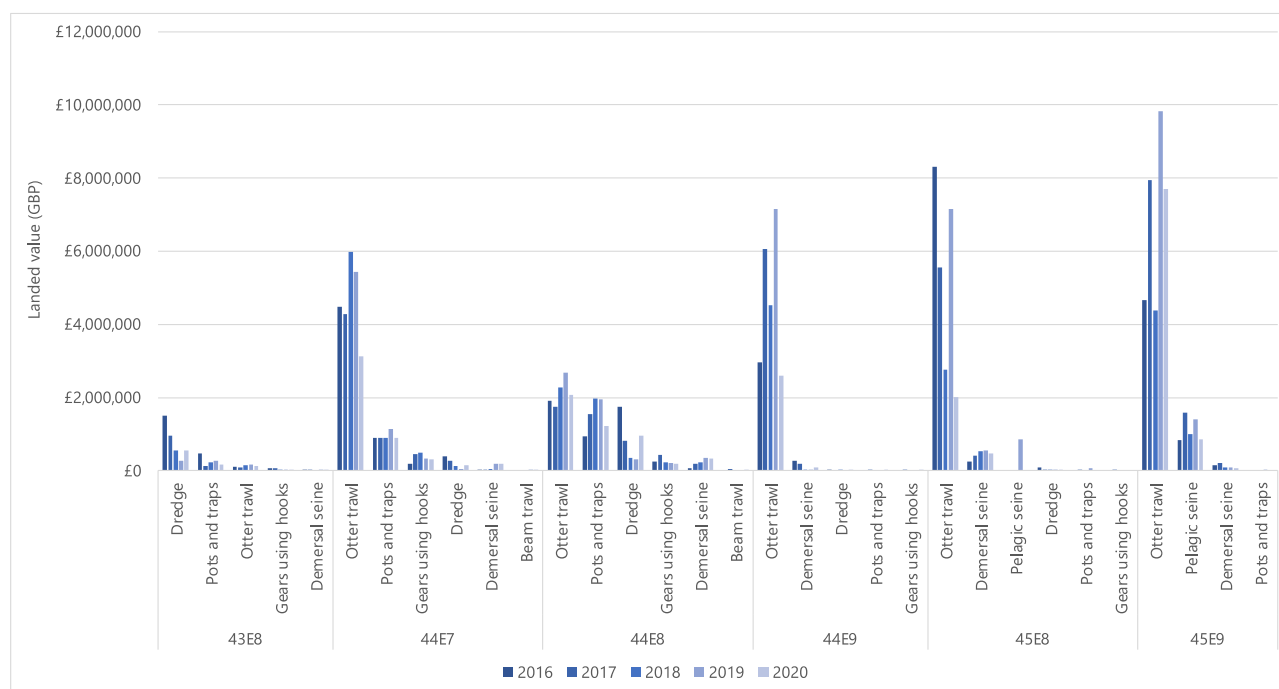


Plate 5.9.3 Landed value from 2016 to 2020 from the commercial fisheries study area by ICES rectangle and gear type (Source: MMO, 2021).



5.9.31 First sales value and weight of nephrops landings have fluctuated over the 2016 to 2020 period, with an annual average landed value of £8.3 million (based on 2016-2020 data), and a peak of £12 million in 2019. Landed values and weights of mackerel have also been variable across the time period, with five-year averages of £6.5 million and 6,600 tonnes

landed annually from the study area, with a noticeable drop in 2018; such patterns in landings by ICES rectangles are typical for pelagic species that swim in fast moving shoals and may not be specifically linked to areas or habitat when caught in the water column. Landings of haddock from the study area have generally increased over the time series, peaking in annual landed value in 2019 at £3.8 million. Landings of squid have remained fairly consistent with an average annual landed value of £2.4 million and 600 tonnes, although landings dropped in 2020.

- 5.9.32 Landing statistics indicate that landings by under 10 m vessels and over 10 m vessels are made across the commercial fisheries study area, with the majority of landings by value being made by vessels over 10 m length. Notably, the majority (91% by value) of the landings by potting vessels and all landings by vessels using gear with hooks are made by vessels ≤10 m in length, indicating the importance of the inshore fleet across the inshore portion of the commercial fisheries study area. Almost all of the landings by demersal trawl, dredge, demersal seine and pelagic seine are by vessels >10 m in length.
- 5.9.33 Landings of the species detailed above vary seasonally, with inshore vessels often equipped to move from species to species throughout the seasons. Landing trends per month will be analysed within the EIA for individual species at both an ICES rectangle level, and by port of landing to identify which fleet and fishery operate at specific times of the year.
- 5.9.34 EU landings data indicates the potential for occasional activity by German, Dutch and French fishing vessels. Activity by Norwegian pelagic trawlers targeting mackerel may also occur in the region.
- 5.9.35 In addition to landings data, VMS and spatial data to map fishing activity is available for UK and EU fleets. VMS data sourced from ICES displays the surface Swept Area Ratio (SAR) of catches by different gear types and covers EU (including UK) registered vessels 12 m and over in length. Surface SAR indicates the number of times in an annual period that a demersal fishing gear makes contact with (or sweeps) the seabed surface. Surface SAR provides a proxy for fishing intensity and has been analysed to determine an average annual SAR based on data from 2016-2020 for the following gear types:
- **Figure 5.9.2: Demersal otter trawl in Appendix 1A:** indicating high levels of activity within the search area for the Offshore Export Cable Corridor adjacent to the OAA area within ICES rectangle 45E9 and along its eastern edge within ICES rectangle 44E9. Activity is also noted to the east (and outside) the OAA.
 - **Figure 5.9.3: Dredge in Appendix 1A:** indicating high levels of activity within the search area for the Offshore Export Cable Corridor in ICES rectangle 44E8, particularly between the 6 to 12NM boundaries.
- 5.9.36 Other spatial data analysed to inform the Scoping Report includes:
- **Figure 5.9.4: ScotMap crab and lobster value data for potting activity in Appendix 1A** indicating moderate levels of potting in the inshore region of the search area for the Offshore Export Cable Corridor, particularly within 6nm in ICES rectangles 44E8, 43E8 and 44E7.
 - **Figure 5.9.5: Fishing vessel route density mapping in Appendix 1A** indicating very high levels of activity by fishing vessels (including both steaming and active fishing) in the inshore region of the search area for the Offshore Export Cable Corridor, particularly within 6NM and also between 6 to 12nm. The demersal otter trawl fishing grounds are also evidence within 45E9, to the west and east of the OAA boundary; notably, limited activity is recorded within the OAA itself.
- 5.9.37 Further time series will be analysed within the EIA Report for the above data sources, including presentation of data for all gear types and MMO VMS data.

5.9.38 In summary, based on the data gathered to inform this scoping exercise, the key fleets operating across the study area include (in no particular order):

- local creel fleet targeting edible crab and lobster (vessels typically 15m and under in length), predominately in the inshore areas (out to 6nm) of the Offshore Export Cable Corridor search area;
- demersal otter trawl fleet targeting nephrops, haddock, squid, monkfish, whiting and other mixed demersal species across the Scoping Boundary;
- pelagic otter and pelagic seine fleet targeting mackerel in offshore locations, potentially active within the OAA; and
- scallop dredging fleet targeting scallops, predominately between 6 to 12nm of the Offshore Export Cable Corridor search area.

Future baseline

5.9.39 Commercial fisheries patterns change and fluctuate based on a range of natural and management-controlled factors. These include the following:

- market demand: commercial fishing fleets respond to market demand, which is impacted by a range of factors, including the Coronavirus (COVID-19) pandemic;
- market prices: commercial fishing fleets respond to market prices by focusing effort on higher value target species when prices are high and markets in demand;
- stock abundance: fluctuation in the harvestable biomass in response to changes due to stock status, which is affected by recruitment, natural disturbances (e.g. due to storms, sea temperature etc.), changes in fishing pressure, amongst other factors, leading to changes in where, when and how much biomass is landed;
- fisheries management: including new management for specific species where overexploitation has been identified, or changes in Total Allowable Catches leading to the relocation of effort, and/or an overall increase/decrease of effort and catches from specific areas;
- environmental management: including the potential restriction of certain fisheries within protected areas;
- improved efficiency and gear technology: with fishing fleets constantly evolving to reduce operational costs e.g. by moving from beam trawl to demersal seine; this can lead to changes in gear configuration which may affect access ability, as well as reduced fishery footprint due to improved catching efficiency; and
- sustainability: with seafood buyers more frequently requesting certification of the sustainability of fish and shellfish products, such as the Marine Stewardship Council certification, the industry is adapting to improve fisheries management and wider environmental impacts.

5.9.40 The variations and trends in commercial fisheries activity are an important aspect of the baseline assessment and form the principal reason for considering up to five years of key baseline data. Given the time periods assessed, the future baseline scenario would typically be reflected within the current baseline assessment undertaken. However, in this case, existing baseline data do not capture all potential changes in commercial fisheries activity resulting from the withdrawal of the UK from the EU. This will be given further consideration within the EIA Report, when landings data for 2021 are expected to be available.

Basis for scoping assessment

- 5.9.41 The commercial fisheries scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: Project Description**:
- impacts from all of the phases for a floating wind farm, with a grid connection capacity of up to 3GW. The array will consist of wind turbine generators (WTGs), including floating units (platforms and station keeping system);
 - impacts from a maximum mooring footprint per structure is up to 4.5km² (for the catenary mooring concept, which has the greatest spread);
 - impacts from offshore substation(s), installed on jacket pin piles, jacket with caissons or gravity base with rock berm/rock bag scour protection;
 - impacts from array cables will be buried typically 1-2m, subject to Cable Burial Risk Assessment (CBRA);
 - impacts from a High Voltage Alternating Current (HVAC) reactive compensation platform or HVDC substation platform (if required), both with rock berm/rock bag scour protection;
 - impacts from up to eight export cables (dependent on technology used) that will be buried, where possible, with a target burial depth of around 1-2m;
 - impacts from maintenance activities that will be undertaken for both preventative and corrective maintenance requirements;
 - operational lifetime of the Project to be a minimum of 35 years; and
 - impacts from the requirements for decommissioning, where it is anticipated to involve the removal of all offshore infrastructure above the seabed, and electrical cables will be left in situ.
- 5.9.42 Given that the assumed mooring footprint of turbines will, for the purposes of an EIA reasonable worst-case scenario, take up the entirety of the OAA, the scoping assessment assumes that:
- It is assumed that commercial fishing activity will not resume within the OAA during the operational phase of the Project, including both mobile and static gears.
 - This assumption will be re-assessed at the point of EIA to account for any changes in the project description and/or position of stakeholders.
 - While the assumption is that fishing will not resume within the OAA, it remains unclear whether there is a legal means to exclude fishing, and furthermore, whether certain mooring designs will allow access. Therefore when assessing the snagging risk, it is assumed that fishing may occur within the OAA.
- 5.9.43 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.9.9**.
- 5.9.44 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 5.9.45 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on commercial fisheries (**Table 5.9.8**). These will evolve over the assessment process as the EIA progresses and in response to consultation. They

will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislative requirements.

5.9.46

As there is a commitment to implementing these measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 5.9.8 Relevant commercial fisheries embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-029	Development of and adherence to a Cable Plan (CaP). The CaP will confirm planned cable routing, burial and any additional protection and will set out methods for post-installation cable monitoring. Where practicable, cable burial will be the preferred means of cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the CaP.	s.36 conditions and marine licence conditions.
M-030	Advance warning and accurate location details of construction, operation and maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins.	s.36 conditions and marine licence conditions.
M-031	Application for and use of Safety Zones of up to 500m during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.	Application will be made under Section 95 and Schedule 16 of the Energy Act 2004 and The Electricity (Offshore Generating Stations) (Safety Zones) (Applications Procedures and Control of Access) Regulations 2007.
M-038	Development of and adherence to a Lighting and Marking Plan (LMP). The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting.	s.36 conditions and marine licence conditions.
M-039	Development of and adherence to a Navigational Safety Plan (NSP). The NSP will describe measures put in place by the Project related to navigational safety, including information on Safety Zones, charting, construction buoyage, temporary lighting and marking, and means of notification of Project activity to other sea users (e.g., via Notice to Mariners).	s.36 conditions and marine licence conditions.
M-048	Development of and adherence to a Fisheries Management and Mitigation Strategy (FMMS). The FMMS will set out the means of ongoing fisheries liaison through construction and operation and maintenance phases of the Project and detail any mitigation measures to be put in place to limit effects on commercial fisheries activity. This will include the following project policies: Fisheries Liaison Policy and Engagement Schedule, Conflict Avoidance Policy and Incident Response Policy.	s.36 conditions and marine licence conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-049	Development of and adherence to a Project Environmental Monitoring Programme (PEMP), which will set out commitments to environmental monitoring in pre-, during and post-construction phases of the Project.	s.36 conditions and marine licence conditions.
M-050	Any objects dropped on the seabed during works associated with the Project will be reported and objects will be recovered where they pose a hazard to other marine users and where recovery is possible.	s.36 conditions and marine licence conditions.
M-051	Participation in any fisheries working group to assist with liaison between the Project and the fishing community.	s.36 conditions and marine licence conditions.
M-052	Adherence to best practice guidance with regards to fisheries liaison and procedures in the event of interactions between the Project and fishing activities (e.g., FLOWW, 2014; 2015).	s.36 conditions and marine licence conditions.
M-053	Appointment of a Company Fisheries Liaison Officer (CFLO). The CFLO will support ongoing liaison and ensure clear communication between the Project and commercial fisheries.	s.36 conditions and marine licence conditions.
M-054	A detailed Cable Burial Risk Assessment (CBRA) will be undertaken to enable informed judgements about burial depth. This should maximise the chance of cables remaining buried whilst limiting the amount of sediment disturbance to that which is necessary. The array cables will typically be buried at a target burial depth between 1-2m below the seabed surface. The final depth of the cable will be dependent on the seabed mobility and CBRA.	s.36 conditions and marine licence conditions.
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase.</p> <p>The CEMP will be the securing mechanism for many measures.</p>	s.36 conditions, marine licence conditions and CEMP.
M-106	The development of and adherence to a decommissioning programme.	Required under Sections 105 and 114 (Energy Act 2004) and Marine Licence consent conditions.

Likely significant effects

5.9.47

In line with the EIA Regulations 2017, the EIA for the Project will assess those impacts where there is a likely significant effect only. This Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant effect. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant effect with regards to the EIA Regulations 2017, the pathway is scoped out from assessment.

- 5.9.48 The likely significant effects on commercial fisheries are summarised in **Table 5.9.9**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for commercial fisheries effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.9.49 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, which are therefore no longer considered, is presented after the table, supported by an evidence base.

Table 5.9.9 Likely significant commercial fisheries effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Reduction in access to, or exclusion from, established fishing grounds (Construction, Operation / Maintenance, and Decommissioning)	M-029, M-030, M-031, M-038, M-039, M-048, M-049, M-050, M-051, M-052, M-053	Project activities, together with the physical presence of infrastructure, have potential to create loss of fishing opportunities. This effect is expected to be localised, and long-term; furthermore, the operational range of relevant fleets will not typically be limited to the Project.	Scoped in. The level of commercial fisheries activity and intensity on a fleet-by-fleet basis will be informed through desk-based analysis, review of navigational site-specific survey data and consultation with the fishing industry. The sensitivity of commercial fishing fleets to potential impacts will be determined through desk-based analysis, consultation with the fishing industry and expert knowledge, and will be informed by the level of alternative fishing grounds and operational range of active fleets.	Demersal otter trawl fleets targeting: nephrops; whitefish; and squid; Dredge fleet targeting scallop; Potting fleet targeting crab species and lobster; Pelagic fleet targeting mackerel; and Gears using hooks targeting mackerel.	Data requests for further data to be submitted and analysed to support assessment. Data from navigational surveys will be considered.
Displacement of fishing activity leading to gear conflict and increased fishing pressure on adjacent grounds (Construction, Operation / Maintenance, and Decommissioning)	M-030, M-049, M-048, M-051, M-052, M-053	Any reduced access to fishing grounds creates the potential for displacement of fishing activity. This effect is expected to be long-term and localised, noting that the operational range of relevant fleets will not typically be limited to the Project.	Scoped in. The level of displacement will be assessed based on the analysis of activity and sensitivity described above and following recent guidance (Xodus, 2022).	As above.	Data requests for further data to be submitted and analysed to support assessment.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity (Construction, Operation / Maintenance, and Decommissioning)	M-049	Project activities may lead to disturbance of commercially important fish and shellfish resources and therefore displace or disrupt a range of fishing activity. It will be assumed that commercial fisheries will be affected as a result of any loss of resources.	Scoped in. The level of disturbance to resources will be informed by the fish and shellfish ecology, and EMF assessments. The sensitivity of commercial fishing fleets to potential impacts will be determined through desk-based analysis, consultation with the fishing industry and expert knowledge, and will be informed by the level of alternative fishing grounds and operational range of active fleets.	As above.	Information from the fish and shellfish ecology assessment will inform this assessment.
Increased vessel traffic associated with the Project within fishing grounds leading to interference with fishing activity (Construction, Operation / Maintenance, and Decommissioning)	M-030, M-039, M-048, M-052, M-053	Movement of vessels associated with the Project adding to the existing volume of marine traffic in the area, may lead to interference of fishing activity.	Scoped in. The impact of increased vessel traffic will be informed by the shipping and navigation assessment, together with analysis of commercial fisheries activity and sensitivity as described above.	As above.	Information from the shipping and navigation assessment will inform this assessment.
Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the Project (Construction,	M-030, M-039, M-048, M-052, M-053	A reduction in access to fishing grounds may require additional steaming to alternative grounds. Given the high volumes of commercial fishing traffic in the inshore area,	Scoped in. The impact of additional steaming will be informed by the shipping and navigation assessment and consultation with the fishing industry, together with analysis of	As above.	Information from the shipping and navigation assessment will inform this assessment.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Operation / Maintenance, and Decommissioning)		across two of the busiest fishing ports in Scotland, it is anticipated that deviations may lead to additional steaming time.	commercial fisheries activity and sensitivity as described above.		
Physical presence of infrastructure and potential exposure of that infrastructure leading to gear snagging (Construction, Operation / Maintenance, and Decommissioning)	M-048 M-029, M-030, M-031, M-038, M-039, M-048, M-050, M-052, M-053	<p>Standard industry practice and protocol (e.g., seabed infrastructure will be buried and/or marked on nautical charts) will minimise the risk of gear snagging, but it remains likely to be an area of industry concern.</p> <p>Safety aspects associated with this impact, including damage to property and vessel stability, will be considered within the Shipping and Navigation impact assessment.</p>	Scoped in. The impact of gear snagging will be informed by the analysis of commercial fisheries activity and sensitivity as described above.	As above.	No further data requirements.

Impacts scoped out of assessment

- 5.9.50 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed. No matters or aspects are being scoped out at this stage, but may be subject to project refinement and ongoing stakeholder engagement.

Cumulative effects

- 5.9.51 Cumulative effects on commercial fisheries resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the CEA screening exercise.
- 5.9.52 For commercial fisheries, the following impacts from Project have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:
- reduction in access to, or exclusion from established fishing grounds;
 - displacement leading to gear conflict and increased fishing pressure on adjacent grounds; and
 - disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity.

Transboundary effects

- 5.9.53 The potential transboundary effects from construction, operation (including maintenance) and decommissioning are considered in **Appendix 4A: Transboundary Screening Matrix**. Transboundary impacts will be considered based on any potential displacement of fishing activity into the Norwegian EEZ, which is expected to be highly unlikely based on data reviewed within this Scoping Report.

Proposed approach to the EIA Report

- 5.9.54 Detailed analysis of existing baseline datasets along with consideration of the future baseline will be undertaken within the offshore part of the EIA to characterise long-term (i.e., over several years) patterns in commercial fisheries activity across the study area and predict potential impacts upon future commercial fishing activities. Data sources include those set out within **Table 5.9.7**.
- 5.9.55 Consultation with the commercial fishing industry will be undertaken in order to ground-truth available baseline data and gain further understanding of commercial fisheries activity by smaller vessels across the inshore portion of the study area. Analysis of data and the results of consultation will provide an extended baseline characterisation of the study area, which will underpin and inform the impact assessment.
- 5.9.56 In addition, consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process which is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.9.57 No site-specific surveys are proposed to inform the commercial fisheries EIA chapter, although data and surveys collated for the fish and shellfish ecology and shipping and navigation assessments will also inform the commercial fisheries assessment.

- 5.9.58 Likely significant effects will be described, and the assessment will include consideration of potential likely significant cumulative effects, as set out in **Chapter 4: Approach to Scoping and EIA**.

5.10 Shipping and navigation

Introduction

- 5.10.1 The shipping and navigation assessment will consider the potential likely significant effects on vessel traffic that may arise from the construction, operation and maintenance and decommissioning of the offshore Project elements that are seaward of Mean High Spring Water (MHWs). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 5.10.2 Shipping and navigation interfaces with other aspects and as such, should be considered alongside these, namely:
- **Section 5.1: Marine geology, oceanography and physical processes:** This Section describes pathways of effect from marine processes physical parameters on potentially sensitive shipping and navigation receptors.
 - **Section 5.9: Commercial fisheries:** Potential shipping and navigation impacts may cause interference or risk to commercial fishing vessels transiting and actively fishing. Therefore, the shipping and navigation assessment will inform the commercial fisheries assessment.
 - **Section 5.13: Infrastructure and other marine users:** Potential shipping and navigation impacts may cause interference or risk to infrastructure and other marine users, for example, oil and gas infrastructure and existing or future vessel access. Therefore, the shipping and navigation assessment will inform the infrastructure and other marine users assessment.
 - **Section 7.3: Socio-economics:** Where impacts on recreational facilities are assessed.
- 5.10.3 It is noted that the shipping and navigation assessment will assess impacts associated with navigational safety only and not on vessels engaged in fishing (see **Section 5.9: Commercial fisheries**).

Legislation and policy context

- 5.10.4 This Section identifies the relevant legislative and policy context which has informed the scope of the shipping and navigation assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 5.10.5 In order to provide a robust evidence base, **Table 5.10.1** below presents a summary of legislation and policies of relevance for the shipping and navigation assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.10.1 Relevant legislation and policy

Relevant Legislation and Policy	Relevance to the assessment
Legislation	
United Nations Law of the Sea (UNCLOS 1982 Article 60 (7))	UNCLOS will be considered as part of the EIA Report Chapter. Regard is given to internationally recognised sea lanes (main commercial routes) which will be considered a key element of the shipping and navigation baseline.
International Regulations for the Prevention of Collisions at Sea (COLREGS) (International Maritime Organisation (IMO, 1972/77))	The COLREGs will be considered fully throughout the EIA Report Chapter.
International Regulations for the Safety of Life at Sea (SOLAS) (IMO, 1974)	SOLAS will be considered fully throughout the EIA Report Chapter.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • Policy 1: Tackling the climate and nature crises • National Spatial Strategy: North East
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. • States that whilst Scotland's maritime freight-handling capacity services both the Atlantic and North Sea routes, most movement comes from the North Sea. The right infrastructure must be in place to support these key international connections.
Scottish Planning Policy (2014) - Paragraph 169	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and

Relevant Legislation and Policy	Relevance to the assessment
	► effects on hydrology.
Marine Policy	
United Kingdom Marine Policy Statement (2011) <ul style="list-style-type: none"> - Paragraph 3.4.7 	<ul style="list-style-type: none"> • Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. • Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. • Requirements for infrastructure to be in place to support and promote safe, profitable and efficient marine businesses. • Requirements for marine businesses are to take long-term strategic decisions and manage risks effectively. • Requirements for marine businesses act in a way which respects environmental limits and is socially responsible.
Scotland's National Marine Plan (2015) <ul style="list-style-type: none"> - Transport 1 - Transport 2 - Transport 3 - Transport 6 	<ul style="list-style-type: none"> • Transport 1 requires for navigational safety in relevant areas used by shipping now and in the future will be protected, adhering to the rights of innocent passage and freedom of navigation contained in UN Convention on the Law of the Sea. • Transport 2 requires for marine development not to be permitted where it will restrict access to, or future expansion of, major commercial ports of existing or proposed ports and harbours, for example Peterhead. • Transport 4 requires maintenance, repair and sustainable development of port and harbour facilities in support of other sectors should be supported. • Transport 6 sets out displacement of shipping to be avoided and where possible mitigate to avoid increased journey lengths.
Local Planning Policy	
No policies are of specific relevance to this area of technical assessment.	

Technical guidance

5.10.6 Technical guidance that has been used to define the assessment is set out in **Table 5.10.2**

Table 5.10.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Maritime Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 (MCA, 2021) and its annexes	The primary guidance used to inform the shipping and navigation assessment and the Navigational Risk Assessment (NRA). Sets out what developers must include and assess within an NRA for an offshore wind farm. Compliance with MGN 654 will be demonstrated via completion of the MGN 654 checklist which will be included as an appendix to the NRA.
IMO guidelines for Formal Safety Assessment (FSA) (IMO, 2018)	Standard marine methodology for undertaking safety assessments for shipping and navigation users.
International Association of Lighthouse Authorities (IALA) Recommendation R139 and Guidance G1162 on the Marking of Man-Made Offshore Structures (IALA, 2021a)	Sets out international guidance on the lighting and marking of the man-made offshore structures. This guidance is then used by the relevant General Lighthouse Authority to establish lights and marks.
The Royal Yachting Association (RYA)'s Position on Offshore Energy Developments: Paper 1 - Wind Energy (RYA, 2019)	Sets out the RYA position on offshore wind farms including expected minimum standard and mitigations for consideration.
MCA and Health and Safety Executive (HSE) Regulatory Expectations on Moorings for Floating Wind and Marine Devices (MCA and HSE, 2017)	Provide essential considerations for the mooring systems and how they should be considered in proportion to the potential risks to develop a safe and sustainable development.

Study area

- 5.10.7 The study area for the shipping and navigation assessment is defined as a 10 nautical mile (nm) buffer of the Project array, as shown in **Figure 5.10.1: Shipping and navigation study area** in **Appendix 1A** (hereafter referred to as the shipping and navigation study area). This is an industry standard buffer used for shipping and navigation assessment as it captures relevant routeing in the area that may be affected while still remaining site specific to the wind turbine generators (WTGs), offshore substation platform and array cables located within the Project array.
- 5.10.8 A high-level assessment of the navigational features baseline within the offshore export cable corridor has also been undertaken for the purposes of the Scoping Report. Detailed assessment will be undertaken within an additional study area at Navigational Risk Assessment (NRA) stage to cover the offshore export cable corridor. This study area will depend on the location and size of the offshore export cable corridor; however, it is anticipated that an industry-standard 2nm buffer will be used for this purpose.
- 5.10.9 The shipping and navigation study area may be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

Consultation

5.10.10 This Section has been informed by engagement and discussion with various stakeholders. **Table 5.10.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 5.10.3 Consultation

Consultee	Comments and considerations	How this is accounted for
Marine Coastguard Agency (MCA)	<p>Introductory meeting 16 March 2022, key discussion points:</p> <ul style="list-style-type: none"> MCA highlighted that the Projects (once operational) could have cumulative vessel route impacts in the north to south direction and also out of the Moray Firth. It was recommended that coordination with other projects would be good to avoid vessel deviation as much as possible. MCA highlighted new and updated guidance documents. MCA noted the importance of retaining NRA terminology in the NRA and not replacing it with EIA terminology. 	<p>Potential cumulative effects are discussed in paragraph 7.4.25.</p> <p>Technical guidance used for this Section are listed in Table 5.10.2.</p> <p>The NRA terminology will remain in the NRA.</p>
National Lighthouse Board (NLB)	<p>Introductory meeting 24 March 2022, key discussion points:</p> <ul style="list-style-type: none"> NLB inquired how the Project will maintain the mooring system in the O&M phase. NLB are keen to understand due to the size of the site. NLB inquired the project construction timelines. Changes to navigational safety guidelines were noted. 	<p>A lighting and marking plan and naming convention will be produced. A description of the offshore elements of the Project are described in Section 2.3 in Chapter 2: Project Description.</p> <p>The Project construction programme is described in Chapter 2: Project Description, see paragraphs 2.3.94 and 2.3.95.</p> <p>Technical guidance used for this Section are listed in Table 5.10.2.</p>

Assessment methodology

Introduction

5.10.11 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the general approach that has been used in this Section the primary guidance on assessment of shipping and navigation risk is provided by the MCA.

- 5.10.12 As required under the MCA Methodology (Annex 1 to MGN 654) (MCA, 2021), and in line with international marine risk assessment standards, it is proposed that the IMO FSA (IMO, 2018) approach will be applied for impact assessment. The FSA methodology is centred on risk control and assesses each impact in terms of its frequency of occurrence and severity of consequence in order that its significance can be determined as “*broadly acceptable*”, “*tolerable*”, or “*unacceptable*” via a risk matrix as shown in **Table 5.10.4**. Any impact assessed as “*unacceptable*” will require additional mitigation measures implemented beyond those considered embedded to reduce the impact to within “*tolerable*” or “*broadly acceptable*” parameters.

Table 5.10.4 IMO FSA risk matrix

		Frequent	Tolerable	Tolerable	Unacceptable	Unacceptable	Unacceptable
Frequency	Reasonably Probable	Broadly Acceptable	Tolerable	Tolerable	Unacceptable	Unacceptable	Unacceptable
	Remote	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable	Unacceptable	Unacceptable
	Extremely Unlikely	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable	Tolerable
	Negligible	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable
		Negligible	Minor	Moderate	Serious	Major	Major
		Severity					

- 5.10.13 Severity and frequency will be determined via the NRA findings which will be based on various factors including:
- quantitative modelling (via Anatec’s CollRisk software);
 - output of the baseline assessment including vessel traffic surveys;
 - consideration of embedded environmental measures in place;
 - lessons learnt from other offshore wind farms;
 - levels of stakeholder concern; and
 - outputs of consultation.

Baseline conditions

- 5.10.14 This Section establishes the baseline environment in terms of navigational features, vessel traffic, and maritime incidents for the purpose of identifying impacts which should be scoped into the EIA Report.

Data sources

- 5.10.15 The data sources that have been used to inform this Section of the Scoping Report are presented in **Table 5.10.5**. It is noted that AIS data is not comprehensive of recreational vessels and fishing vessels less than 15 metres in length or vessels under 300 gross tonnes. Further assessment of these vessel types is therefore required as part of the NRA and as per MGN 654.

Table 5.10.5 Key sources of shipping and navigation data

Source	Date	Summary	Coverage of study area
Winter vessel traffic data	20 th January – 2 nd February 2022	Vessel traffic data (Automatic Identification System (AIS)) collected by Anatec Limited via terrestrial receivers for a variety of purposes (i.e. not Project-specific).	Full coverage of the study area.
MarramWind survey: Summer vessel traffic data	29 th July – 14 th August 2022	Vessel traffic survey data (AIS, Radar, visual observations) collected via an onsite survey vessel.	Full coverage of the study area.
United Kingdom Hydrographic Office (UKHO) Admiralty Charts	2022	Charts 115 – Moray Firth, 278 – North Sea Offshore Charts Sheet 5, 291 – North Sea Offshore Charts Sheet 4, 1409 – Buckie to Arbroath	Full coverage of the study area.
Admiralty Sailing Directions North Coast of Scotland Pilot, 10th Edition NP52 (UKHO, 2018)	2018	Pilot book detailing navigational features in the region.	Full coverage of the study area.
Marine Accident Investigation Branch (MAIB) Incident Data	2010 - 2019	Incident data provided by the MAIB.	Full coverage of the study area.
Royal National Lifeboat Institution (RNLI) Incident Data	2010 - 2019	Incident data provided by the RNLI.	Full coverage of the study area.

Current baseline

Navigational features

- 7.4.1 **Figure 5.10.3: Navigational features in the vicinity of the MarramWind offshore wind farm array** in **Appendix 1A** presents the navigational features charted within the vicinity of the Project array.
- 7.4.2 There are various oil and gas installations located around the Project array: this includes Ross and Blake field to the west; Golden Eagle, Buzzard and Ettrick to the south; Goldeneye and Buchan to the southeast; Scott and Tartan to the east; Claymore and Scapa to the northeast and Athena to the north. Consequently, there are many pipelines, manifolds and wells located in the vicinity. One of the pipelines intersects the Project array itself and many

run through the offshore export cable corridor and meet the coast at Rattray Bay, between Peterhead and Fraserburgh. A total of five manifolds and ten wells are located within the shipping and navigation study area.

- 7.4.3 A total of 17 charted wrecks and six obstructions are located within the shipping and navigation study area, with three of the charted wrecks being located within the Project array itself. Chaired wrecks are deemed to be the only wrecks that could impact navigational safety.
- 7.4.4 The Western European Tanker Reporting System is also located to the north of the Project array and intersects the shipping and navigation study area.
- 7.4.5 Major ports/harbours along where the coast meets the offshore export cable corridor include Fraserburgh Harbour and Peterhead Port Authority, which are mainly fishing ports. Fraserburgh Bay, east of the harbour entrance, also provides anchorage; during bad weather, vessels anchored in this location have been known to drag their anchors.

Marine traffic

- 7.4.6 This Section identifies the vessel traffic baseline based on preliminary assessment of 28 days of vessel traffic survey data as required by MGN 654 (see **Table 5.10.5**). This comprises 14 days of AIS data collected during 20 January – 2 February 2022 and 14 days of AIS, Radar and visual observations collected during 29 July – 14 August 2022.
- 7.4.7 **Figure 5.10.2: Vessels by type (28 days, AIS and radar) in the shipping and navigation study area** in **Appendix 1A** presents the 28 days of AIS and Radar data collected to date, colour-coded by type within the shipping and navigation study area. This will be updated with further data once the Project-specific winter vessel traffic survey has been completed in 2023.
- 7.4.8 The majority of the traffic within the shipping and navigation study area was recorded during the summer period; an average of 38 unique vessels were recorded per day during the summer period compared to an average of 22 unique vessels per day during the winter period. This was observed to be primarily associated with a decrease in fishing vessel activity during the winter period. An average of 11 unique vessels were recorded intersecting the Project array during the entire 28-day period.
- 7.4.9 The most common traffic types within the shipping and navigation study area were observed to be oil and gas, followed by fishing.
- 7.4.10 Oil and gas vessels are observed to commonly undertake northeast/southwest transit as well as attend the nearby Golden Eagle and Goldeneye installations. One of the most prominent of these routes intersects the northwest region of the Project array and another route intersects the southeast corner. Fishing vessels were also observed to be mainly in northeast/southwest transit with many of these vessels intersecting the Project array. Active fishing behaviour was also observed to the eastern extent of the shipping and navigation study area.

Maritime incidents

- 7.4.11 The marine incident data assessed indicates incident rates within the shipping and navigation study area are generally low. The RNLI data indicated four incidents within the shipping and navigation study area over the ten-year period (2010 – 2019) assessed, one

of which was located within the Project array itself. This incident occurred in 2013, involved a person in the water, and was responded to by the Wick RNLI station.

- 7.4.12 The MAIB data indicated seven incidents occurred within the shipping and navigation study area over the same ten-year period, with none within the Project array itself. There were 80 MAIB incidents and 171 RNLI incidents recorded within the offshore export cable corridor, noting most of these incidents were concentrated close to the coast.

Future baseline

- 7.4.13 Future changes in shipping depend on a variety of complex factors such as trading patterns and vessel design and as such are difficult to predict. The NRA will therefore consider a conservative increase which will be discussed with the relevant stakeholders. It should be considered that levels of oil and gas activity are likely to change, noting the ongoing decommissioning of various North Sea fields.

Basis for scoping assessment

- 7.4.14 The shipping and navigation scoping assessment is based on the following key assumptions, which are also set out in **Chapter 2: Project Description**:
- impacts from all phases of the Project for a floating wind farm with a grid connection capacity of up to 3GW, such as vessel displacement;
 - impacts from the WTG floating unit, such as allision risk;
 - impacts from the presence of the WTG station keeping unit, such as, increase in under keel and anchor and fishing gear interaction;
 - impacts from the presence of the floating unit in operation / maintenance, such as loss of station; and
 - impacts from the presence of fixed foundation infrastructure such as accommodation platforms and offshore substation platforms (including those housing reactive compensation equipment if required).
- 7.4.15 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.10.7**.
- 7.4.16 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 7.4.17 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on shipping and navigation (see **Table 5.10.6**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 7.4.18 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 5.10.6 Relevant shipping and navigation embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-029	Development of and adherence to a Cable Plan (CaP). The CaP will confirm planned cable routing, burial and any additional protection and will set out methods for post-installation cable monitoring. Where practicable, cable burial will be the preferred means of cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the CaP.	s.36 conditions and marine licence conditions.
M-030	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins.	s.36 conditions and marine licence conditions.
M-031	Application for and use of Safety Zones of up to 500m during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.	Application will be made under Section 95 and Schedule 16 of the Energy Act 2004 and The Electricity (Offshore Generating Stations) (Safety Zones) (Applications Procedures and Control of Access) Regulations 2007.
M-033	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to the Project. The MPCP will also include relevant key emergency contact details.	s.36 conditions and marine licence conditions.
M-038	Development of and adherence to a Lighting and Marking Plan (LMP). The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting.	s.36 conditions and marine licence conditions.
M-039	Development of and adherence to a Navigational Safety Plan (NSP). The NSP will describe measures put in place by the Project related to navigational safety, including information on Safety Zones, charting, construction buoyage, temporary lighting and marking, and means of notification of Project	Marine Operations Manual and Aids to Navigation Plan, s.36 conditions and marine licence conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	activity to other sea users (e.g., via Notice to Mariners).	
M-040	Marine coordination and communication to manage project vessel movements. Proactive Kingfisher notifications and other navigational warnings in a timely manner in addition to distribution to the UKHO.	Company Marine Operations Manual and AtN Plan, inclusion in Admiralty charts by KHO; condition on the s.36 consent and / or marine licence.
M-041	Development of and adherence to a Vessel Management Plan, which will confirm the types and numbers of vessels that will be engaged on the Project, and consider vessel coordination including indicative transit route planning.	s.36 conditions and marine licence conditions.
M-043	Development of and adherence to a Development Specification and Layout Plan, which will confirm the Project's layout and design parameters.	s.36 conditions and marine licences conditions.
M-044	Compliance with regulatory expectations on moorings for floating wind and marine devices (HSE and MCA, 2017).	s.36 conditions and marine licence conditions.
M-045	Compliance with MCA MGN 654 (MCA, 2021) and its annexes where applicable.	s.36 conditions and marine licence conditions.
M-046	Blade clearance of at least 24m above mean high water springs (MHWS).	s.36 conditions and marine licence conditions.
M-047	Appropriate marking of the Project on Admiralty and aeronautical charts. All offshore infrastructure structures (WTGs, platforms and other structures) of more than 91.4m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre (DGC). This is to update the UK's database of tall structures (Digital Vertical Obstruction File) and will be submitted at least ten weeks prior to construction. This will include provision of the positions and heights of structures to the UKHO, Civil Aviation Authority, Ministry of Defence and Defence Geographic Centre.	s.36 conditions and marine licence conditions.
M-048	Development of and adherence to a Fisheries Management and Mitigation Strategy (FMMS). The FMMS will set out the means of ongoing fisheries liaison through construction and operation and maintenance phases of the Project and detail any mitigation measures to be put in place to limit effects on commercial fisheries activity. This will include the following project policies: Fisheries Liaison Policy and Engagement Schedule, Conflict Avoidance Policy and Incident Response Policy.	s.36 conditions and marine licences conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-049	Development of and adherence to a Project Environmental Monitoring Programme (PEMP), which will set out commitments to environmental monitoring in pre-, during and post-construction phases of the Project.	s.36 conditions and marine licence conditions.
M-063	A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. The CEMP will be the securing mechanism for many measures.	s.36 conditions, marine licence conditions and CEMP.
M-106	The development of and adherence to a decommissioning programme.	Required under Sections 105 and 114 (Energy Act 2004) and Marine Licence consent conditions.
M-117	Marine navigation marking and lighting of the Project, as described in the LMP, will be defined in agreement with Northern Lighthouse Board and in line with IALA Recommendation G1162 (IALA, 2021).	s.36 conditions and marine licence conditions.
M-118	The construction area will be buoyed, as described in the NSP. Buoyage will be defined in consultation with the NLB.	s.36 conditions and marine licence conditions.

Likely significant effects

- 7.4.19 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 7.4.20 The likely significant effects on shipping and navigation are summarised in **Table 5.10.7**. The scoping assessment is based on a combination of the Project definition at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for shipping and navigation effects (see data sources in **Table 5.10.5** as determined on a preliminary basis via the baseline assessment), professional judgement and the requirements of MGN 654. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 7.4.21 It is noted that the NRA will be in line with MCA required terminology, however a clear explanation between the two glossaries will be included within the shipping and navigation chapter of the EIA Report.

Table 5.10.7 Likely significant shipping and navigation effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor (users)	Further data baseline requirements
Increased vessel to vessel collision risk resulting from displacement (third party to third party) around the construction, operation / maintenance and decommissioning area or array.	M-029, M-030, M-031, M-033, M-038, M-039, M-040, M-041, M-043, M-044, M-045, M-046, M-047, M-048, M-049, M-117, M-118	Potential significant effect. AIS and non-AIS traffic will need to be considered and quantitative modelling undertaken to assess the risk.	Scoped in.	Third party vessels.	Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654. Consultation required including hazard workshop.
Increased vessel to vessel collision risk (third party vessel and a project vessel) around the construction, operation / maintenance and decommissioning area or array.	M-029, M-030, M-031, M-033, M-038, M-039, M-040, M-041, M-043, M-044, M-045, M-046, M-047, M-048, M-049, M-117, M-118	Potential significant effect. AIS and non-AIS traffic will need to be considered and quantitative modelling undertaken to assess the risk.	Scoped in.	Third party vessels.	Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654. Consultation required including hazard workshop.
The presence of partially constructed operation / maintenance and decommissioning surface structures will create new collision risk to vessels under power	M-029, M-030, M-031, M-033, M-038, M-039, M-040, M-041, M-043, M-044, M-045, M-046, M-047, M-048,	Potential significant effect. AIS and non-AIS traffic will need to be considered and quantitative modelling undertaken to assess the risk.	Scoped in.	Third party vessels including commercial, recreational and fishing vessels in transit.	Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654. Consultation required including hazard workshop.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor (users)	Further data baseline requirements
	M-049, M-106, M-117, M-118				
The presence of partially constructed operation / maintenance and decommissioning surface structures will create new allision risk to vessels	M-029, M-030, M-031, M-033, M-038, M-039, M-040, M-041, M-043, M-044, M-045, M-046, M-047, M-048, M-049, M-117, M-118	Potential significant effect. AIS and non-AIS traffic will need to be considered and quantitative modelling undertaken to assess the risk.	Scoped in.	Third party vessels including commercial, recreational and fishing vessels in transit.	Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654. Consultation required including hazard workshop.
Construction, operation / maintenance and decommissioning and/or project vessel transits and activities may impact access to ports.	M-041, M-043, M-047	Potential significant effect.	Scoped in.	Third party vessels including commercial, recreational and fishing vessels in transit.	Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654. Consultation required including hazard workshop.
The presence of sub surface infrastructure e.g., cable protection or mooring may lead to an increase in under keel interaction risk during construction, operation / maintenance and decommissioning.	M-040, M-041, M-043, M-045, M-047, M-048, M-117	Potential significant effect. AIS and non-AIS traffic will need to be considered.	Scoped in.	Third party vessels including commercial, recreational and fishing vessels in transit.	Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654. Consultation required including hazard workshop.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor (users)	Further data baseline requirements
The presence of subsea infrastructure (e.g., subsea cables, mooring lines) may lead to an increase in anchor and fishing gear interaction risk during construction, operation / maintenance and decommissioning².	M-040, M-041, M-043, M-045, M-047, M-048, M-117	Potential significant AIS and non-AIS traffic will need to be considered.	Scoped in.	Third party vessels including commercial, recreational and fishing vessels in transit/fishing.	Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654. Consultation required including hazard workshop. Consultation with fisheries community through the Fisheries Liaison Officer.
Loss of station (floating platform) during operation / maintenance may lead to additional allision risk.	M-039, M-043	Potential significant effect.	Scoped in.	Third party vessels including commercial, recreational and fishing vessels in transit.	Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654. Consultation required including hazard workshop.
Interference with navigation, communications and position fixing equipment during the operation / maintenance phases (includes potential effects of	M-043	Potential significant effect.	Scoped in.	Third party vessels including commercial, recreational and fishing vessels in transit.	Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654. Consultation required including hazard workshop.

² Note this impact considered navigational safety only and commercial impacts are covered in **Section 5.9: Commercial fisheries.**

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor (users)	Further data baseline requirements
electromagnetic interference)					
Reduction of Search and Rescue capability during operation / maintenance due to surface infrastructure.	M-043	<p>Potential significant effect.</p> <p>There may be an increase in incident rates associated with the Project which may lead to a reduction in search and rescue resource capability. The layout of structures may also impact search and rescue resource access in the area.</p>	Scoped in.	Third party vessels including commercial, recreational and fishing vessels in transit.	<p>Additional data for NRA stage, including vessel traffic surveys compliant with MGN 654.</p> <p>Consultation required including hazard workshop.</p>

Impacts scoped out of assessment

- 7.4.22 All likely significant effects identified will be considered at further stages of the assessment along with more detail regarding the design as it becomes available, and greater levels of baseline data are collected and analysed. No matters or aspects are being scoped out at this stage in line with MGN 654 (MCA, 2021).

Cumulative effects

- 7.4.23 Cumulative effects on shipping and navigation resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the Cumulative Effects Assessment screening exercise.
- 7.4.24 All impacts identified on an in-isolation basis will be considered within the assessment for the potential for cumulative effects. In terms of cumulative projects to be included, other developments within a 50nm radius will be screened in or out of the cumulative assessment based on a number of factors, including:
- status of cumulative development;
 - data confidence level;
 - proximity to cumulative developments; and
 - location relative to routeing passing the site.
- 7.4.25 The following impacts from the Project have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects.
- increased vessel to vessel collision risk resulting from cumulative displacement (third party to third party);
 - cumulative vessel to structure collision risk (powered); and
 - cumulative reduced access to local ports, harbours and marinas.

Transboundary effects

- 7.4.26 The potential effects from construction, operation and maintenance and decommissioning on shipping and navigation receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. Transboundary effects associated with vessels transiting to/from outside of the United Kingdom including transboundary ports will be considered within the in-isolation assessment, and cumulatively with the presence of other offshore developments and activities within the cumulative assessment.

Proposed approach to the EIA Report

- 7.4.27 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process which as set out in **Chapter 4: Approach to Scoping and EIA**. Specifically for shipping and navigation, the NRA process will be informed via consultation with key relevant stakeholders. This is expected to include:

- dedicated key stakeholder meetings (e.g., MCA, NLB, RYA Scotland and the Chamber of Shipping);
- regular operator outreach (i.e., consultation with regular users of the area);
- a hazard workshop with local stakeholders;
- liaison via Fishing Liaison Officer where appropriate; and
- other consultation as directed by the NRA process.

7.4.28 As per MGN 654 (MCA, 2021), the NRA will include a minimum of 28 days of vessel traffic survey data that accounts for seasonal variation and non-AIS traffic. The summer survey data has already been collected and a further 14 days will be collected this winter from a dedicated survey vessel.

7.4.29 Likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**. It is noted that as per the assessment methodology section above, the NRA will apply the FSA as required under MGN 654.

5.11 Marine archaeology and cultural heritage

Introduction

- 5.11.1 The marine archaeology and cultural heritage assessment will consider the potential likely significant effects on offshore cultural heritage assets that may arise from the construction, operation and maintenance, and decommissioning of the offshore Project elements that are seaward of Mean High Water Springs (MHWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.
- 5.11.2 Marine archaeology and cultural heritage interfaces with other aspects and as such, should be consider alongside these; namely:
- **Section 5.1: Marine geology, oceanography and physical processes:** This Section describes pathways of effect from marine processes physical parameters on potentially sensitive marine archaeology and cultural heritage receptors. Due to the potential for altered marine processes to affect marine archaeological remains, the marine geology, oceanography and physical processes section will be used to inform the marine archaeology and cultural heritage assessment.
 - **Section 5.12: Seascape, landscape and visual:** This Section will inform the marine archaeology and cultural heritage section regarding visual effects on marine heritage features.
 - **Section 6.6: Onshore archaeology and cultural heritage:** As the marine and terrestrial historic environment are linked, with onshore features influencing factors such as shipping routes, deposits of geoarchaeological interest reflecting former terrestrial environments, and remains in the intertidal zone reflecting both marine and terrestrial historic environments. The onshore archaeology and cultural heritage section will be considered alongside the marine archaeology and cultural heritage assessment to aid interpretation of the distribution of archaeological material and inform understanding of the potential presence and value of receptors.

Legislation and policy context

- 5.11.3 This Section identifies the relevant legislative and policy context which has informed the scope of the marine archaeology and cultural heritage assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual, national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 5.11.4 In order to provide an objective evidence base **Table 5.11.1** below presents a summary of legislation and policies relevant for the marine archaeology and cultural heritage assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.11.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
Marine (Scotland) Act (2010)	<ul style="list-style-type: none"> Provides the designated of Historic Marine Protected Areas (HMPA) in respect of historically significant areas within the marine zone, including wrecks formerly protected under the Protection of Wrecks Act (1973).
Marine (Scotland) Act (2014)	<ul style="list-style-type: none"> The Act provides a framework to help balance competing demands on Scotland's seas. It introduces a duty to protect and enhance the marine environment and includes measures to help boost economic investment and growth in areas such as marine renewables.
Merchant Shipping Act (1995)	<ul style="list-style-type: none"> The Receiver of Wreck administers is responsible for processing incoming reports of wreck and cargo. The Project has the potential to impact items associated with wrecks, which fall within the definition of 'wreck'.
The Protection of Military Remains Act (1986)	<ul style="list-style-type: none"> Provides protection for the wreckage of military aircraft and certain military wrecks. Designations can be either as a Controlled Site or Protected Place where access may be permitted but any operations that may disturb the site are illegal unless licenced by the Ministry of Defence. All military aircraft are automatically protected under this legislation; however, vessels must be designated individually.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A – Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crisis Policy 7: Historic Assets and Places.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector Identify the historic environment as an integral part of our well-being and cultural identity.
Scottish Planning Policy (2014) - Paragraph 169	<ul style="list-style-type: none"> Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> net economic impacts; scale of contribution to renewable energy generation; effect on greenhouse gas emissions;

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology.
Historic Environment Policy for Scotland (HEPS) (2019)	<ul style="list-style-type: none"> • The document is designed to support and enable good decision-making about changes to the historic environment. HEPS sets out a series of principles and policies for the recognition, care and sustainable management of the historic environment which have informed development of the proposed scope and methodology of the assessment.
Marine Policy	
UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> • Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. • Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. • Requires use of marine environment recognises the protection and management needs of marine cultural heritage according to its significance.
Scotland National Marine Plan (2015) <ul style="list-style-type: none"> - GEN 6: Historic environment 	<ul style="list-style-type: none"> • GEN 6 Historic environment states the development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance.
Sectoral Marine Plan - Offshore Wind Energy (2020)	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. • It comments on the value of the historic environment to Scotland, noting existing protections and providing links to further information on designated and non-designated heritage assets.
Local Planning Policy	
No policy is of specific relevance to this offshore area of technical assessment.	

Technical guidance

5.11.5 Technical guidance that has been used to define the assessment is set out in **Table 5.11.2** below.

Table 5.11.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Historic Environment Guidance for the Offshore Renewable Energy Sector (COWRIE, 2007)	A generic guidance note on the survey, appraisal and monitoring of the historic environment during the development of offshore renewable energy projects in the UK. The guidance is applicable to the marine environment and the coastal environment adjacent to any development, encompassing the inter-tidal area, coastal margin and those areas further inland likely to be affected by offshore renewable energy developments.
Historic Environment Scotland (HES) (2019- updated May 2021) Scotland's Historic Marine Protected Areas	Explains what historic marine protected areas are and HES' role in advising the Scottish Government in designating these areas.

Study area

- 5.11.6 Initial data gathering to support development of the Scoping Report has been undertaken for the marine area with the Scoping Boundary, shown at **Figure 5.11.1 Marine heritage assets** in **Appendix 1A**.
- 5.11.7 Data for a study area, defined as a 5km buffer from the Option Agreement Area (OAA) and offshore export cable corridor as far as MHWS will be reviewed and amended for the EIA as set out in **paragraph 5.11.12** in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from stakeholder engagement and statutory consultation. In addition, data gathered for the onshore assessment will be reviewed to identify whether there is relevant contextual data that could inform the marine archaeology assessment

Consultation

- 5.11.8 This Section has been informed by engagement and discussion with various stakeholders. **Paragraphs 5.11.9** and **5.11.10** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.
- 5.11.9 Consultation regarding the marine archaeological assessment was undertaken with Aberdeenshire Council (16 June 2022) and Historic Environment Scotland (HES) (22 June 2022 and 13 October 2022). These discussions focused on providing consultees with an update on project progress and an initial discussion of the scope and methods of the EIA assessment. Aberdeenshire Council noted that they hold significant information on the marine zone as part of the Aberdeenshire Historic Environment Record, which should be consulted as part of the baseline development. Historic Environment Scotland noted a general agreement to the proposed scope of assessment, requesting the supply of more detailed information on the geophysical survey specification, setting out the types of sensor to be used, the resolution of the survey and the utility of the identified techniques for understanding the archaeological baseline. HES also requested that a rationale for scoping out the potential effects of visibility of offshore infrastructure be provided. This rationale has been set out at **Section 6.6: Onshore archaeology and cultural heritage**.
- 5.11.10 The Protocol for Archaeological Discoveries (PAD) for the marine geophysical survey and site investigation works was provided to HES on 15 June 2022.

Assessment methodology

Introduction

- 5.11.11 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this marine archaeology and cultural heritage section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the marine archaeology and cultural heritage assessment.
- 5.11.12 The methodology for establishing a detailed historic environment baseline is provided below, together with the methodology for assessing the significance of effects. To establish a detailed baseline, appropriate and proportionate assessments and surveys will be carried out following refinement of the onshore project components. These are expected to include:
- a desk-based review of data within the study area, using sources detailed in **Table 5.11.5**, as well as relevant readily available contextual studies, desk and field studies, geological and geotechnical data;
 - geophysical survey data from the site-specific site investigations undertaken in Summer 2022 (array) and to be undertaken in Spring/Summer 2023 (offshore export cable corridor); and
 - cross-referencing with other workstreams where appropriate to ensure an integrated approach to assessment.

Assessment of effects and determining significance

- 5.11.13 The sensitivity or value of a receptor is largely a product of its importance, as informed by legislation and policy, and as qualified by professional judgement. The rationale contained within **Table 5.11.3** is based on information provided within the Scottish Planning Policy (Scottish Government, 2014b) and Historic Environment Policy for Scotland (HES, 2019a). Note that the categorisation of the relative importance of those assets that are of less than national importance generally relies on the professional judgement of the marine archaeology and cultural heritage EIA team.
- 5.11.14 **Table 5.11.3** sets out the generic guidelines for the assessment of sensitivity and value of a receptor or feature.

Table 5.11.3 Generic guidelines for the assessment of sensitivity or value

Value or sensitivity	Guidelines
High	This category contains heritage assets that will be considered to be of national or international importance either for historic associations or their informative potential. This category includes heritage assets designated as scheduled monuments, protected military remains or HMPAs and those of equivalent value, or palaeoenvironment remains that are either very well-preserved or particularly important for understanding specific periods.
Medium	Heritage assets of regional importance for historic associations or their informative potential. This category includes well-preserved live wrecks that are not suitable for designation, or paleoenvironmental remains that are typical of a region.
Low	Non-designated heritage assets of local importance for historic associations or their informative potential may include marine debris or less well-preserved marine material, or generally representative archaeological material or feature types.
Very low	These include those features that are recorded but no longer extant, which are suggestive of further activity but not of intrinsic value (e.g. records of losses without identified wreck sites, some 'dead' wrecks, isolated finds of debris).

5.11.15 The magnitude of change affecting a receptor that will result from the Project will be identified on a scale from minor alterations of change, up to major changes or the total or substantial loss of the receptor. In this case the magnitude of change is a matter of professional judgement to determine the magnitude of change, using descriptive terminology.

5.11.16 **Table 5.11.4** sets out the generic criteria of the assessment of the magnitude of change.

Table 5.11.4 Generic criteria for the assessment of magnitude

Magnitude	Criteria (adverse)	Criteria (beneficial)
High	Total or substantial change to an asset. Loss or disturbance of defining features of the asset.	Large-scale increase in understanding and preservation of a heritage asset beyond the scale of any disturbance.
Medium	Partial alteration of an asset. Very limited disturbance to key features of the asset or loss of minor features	Benefits to understanding or preservation of a heritage asset not requiring disturbance.
Low	Minor alteration of an asset. Limited disturbance of minor features.	Minor benefits to understanding or preservation not requiring disturbance of a heritage asset.
Very low	Very limited alteration of minor features of an asset.	Minor alteration of elements of an asset, which are sensitive but do not contribute discernibly to sustainable use and/or management.

- 5.11.17 **Table 5.11.5** has been prepared to guide the assessment of whether effects on the historic environment for the purposes of EIA are to be considered significant or not. The classification of the effect is judged on the relationship of the magnitude of impact to the assessed heritage significance of the resource.

Table 5.11.5 Significance Assessment Matrix

Receptor Value	Magnitude of Change			
	High	Medium	Low	Very Low
High	Significant	Significant	Not Significant	Not Significant
Medium	Significant	Not Significant	Not Significant	Not Significant
Low	Not Significant	Not Significant	Not Significant	Not Significant
Very Low	Not Significant	Not Significant	Not Significant	Not Significant

- 5.11.18 All assessments will be presented as narrative discussions, setting out the significance of the relevant heritage asset(s), and where appropriate contribution of their settings to significance, providing a description of the anticipated change and setting out the magnitude of change in line with the definitions set out in **Table 5.11.5**.

Baseline conditions

Data sources

- 5.11.19 Data sources used to support development of this scoping report are set out at **Table 5.11.6**. Additional data sources, including the Aberdeenshire HER will be consulted during the development of the EIA baseline as set out at **paragraph 5.11.25** below.

Table 5.11.6 Key sources of marine archaeology and cultural heritage data

Source	Date	Summary	Coverage of scoping area
Historic Marine Protected Areas (HMPA) (2022i)	Accessed 2022	There is a record for each Historic Marine Protected Area (HMPA). Each HMPA record contains a map, detailed information about the marine historic asset(s), preservation objectives and summary operational advice.	Full coverage of study area.
United Kingdom Hydrographics Office (UKHO) Wrecks and Obstructions data	Accessed 2022	An extensive data set containing over 94,000 charted, uncharted, live and dead wrecks and obstructions from around the world.	Full coverage of study area.
Canmore/Canmore Maritime	Accessed 2022	Identifies recorded wrecks and losses in Scottish waters from a number of sources.	Full Coverage of study area.
Geophysical Survey	Accessed 2022	Initial results of geophysical survey of the OAA using bathymetry, magnetometry, Site Scan Sonar (SSS) and sub-bottom profiling.	Full coverage of the OAA.

Current baseline

- 5.11.20 Records from the initial data searches within the Scoping Boundary are plotted at **Figure 5.11.1** in **Appendix 1A**.
- 5.11.21 There are no HMPAs located within the offshore part of the Scoping Boundary. There are 155 recorded Wrecks and Obstacles recorded within the Scoping Boundary identified as part of the desk study, including five within the OAA, which are as follows:
- Ocean Challenge (Wreck Id 67749);
 - Welfare (Wreck Id 1669);
 - Emma Jane (Wreck Id 57916); and
 - Two further unspecified obstructions (Wreck Id 1715; 1668).
- 5.11.22 Initial examination of geophysical survey within the array area has identified the presence of six anomalies of likely anthropogenic origin. These include five apparent wrecks, mostly vessels that relate to recorded losses, although the positions of observed wrecks and recorded sites do not always correspond closely. One of these wrecks has been provisionally identified as the wreck of SS Tobol, a Sunderland-built turret-deck ship sunk by U-Boat in 1917 and is located approximately 18km from the reported location of its loss. Further analysis of geophysical survey data and historic sources will be carried out to allow these records to be identified and assessed more definitively in the EIA Report.
- 5.11.23 Most of the remaining wrecks and obstacles are recorded close to the coast, ten of which are sited within 1km of the Peterhead onshore substation search area.
- 5.11.24 Recent archaeological work in the North Sea area has highlighted the survival of relict terrestrial landscapes that were inundated at the end of the last glacial period, approximately 8,500 years before present. This survival has not been recorded as far north as the Scoping Boundary, and the specific geological conditions that apply further south where such remains are recorded are not present at the MarramWind OAA. Consequently, it is not considered likely that there will be extensive survival of any buried landscapes.

However, there is a potential that deposits of terrestrial origin that may hold material that allow study of palaeoenvironmental conditions in this area during the Mesolithic period survive in isolated features such as former river channels or hollows, particularly in the shallower waters closer to shore.

5.11.25 The potential for the presence of archaeological and palaeoenvironmental remains will be considered within a marine archaeology desk-based assessment and through the archaeological analysis of marine geophysical survey data for the OAA (undertaken in 2022) and the offshore export cable corridor (proposed to be undertaken in 2023). The following additional sources will be consulted for the desk-based assessment:

- Historic Environment Scotland Spatial Datasets;
- UKHO wrecks and obstructions data;
- Canmore/Canmore Maritime;
- Aberdeenshire HER;
- Wrecksite online resource;
- National Library of Scotland mapping resource; and
- other cartographic, archival and documentary sources.

Future baseline

5.11.26 No significant changes are expected to the current baseline in the absence of further marine development; marine processes causing sediment movements and deterioration of anthropogenic material may give rise to limited deterioration, disturbance or movement of archaeological remains over the life of the proposed development, but it is not anticipated that these would affect the distribution or preservation of archaeological remains sufficiently to affect the assessments made in the EIA Report.

Basis for scoping assessment

5.11.27 The marine archaeology and cultural heritage scoping assessment is based on the following key assumption, which is also set out in **Chapter 2: Project Description**:

- impacts from the installation of the floating wind turbine generators (WTGs) WTG floating units; WTG platforms and station keeping system; offshore substation(s), (if required) for reactive compensation platform(s), and (if required) HVDC substation(s), such as disturbance of marine archaeological remains or deposits of geoarchaeological interest;
- impacts from the installation of array and export cables, such as disturbance of marine archaeological remains or deposits of geoarchaeological interest;
- impacts from the presence of WTG station keeping system and hard cable protection, such as change to marine processes; and
- impacts from the requirement for decommissioning.

5.11.28 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.11.8**.

5.11.29 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 5.11.30 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on marine archaeology and cultural heritage (see **Table 5.11.7**) response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 5.11.31 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the Scoping assessment.

Table 5.11.7 Relevant marine archaeology and cultural heritage embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-034	Archaeological and paleoenvironmental mitigation will entail an agreed programme of archaeological recording and dissemination set out as a Written Scheme of Investigation (WSI), including a PAD, and providing for review of any additional geophysical and geotechnical survey, to mitigate any significant adverse effects during construction.	s.36 conditions and marine licence conditions.
M-035	Where practical, sensitive sites will be avoided by the temporary and permanent offshore footprint	Description of Project.
M-036	Loss or disturbance of possible submerged historic landscape elements arising from altered seabed conditions (e.g. scour) will be mitigated, as far as possible, through sensitive design.	Description of Project, CEMP.
M-037	Loss or disturbance of possible submerged historic landscape elements arising from works will be mitigated, as far as possible, through selection of appropriate working methods	Description of Project and CEMP.
M-063	A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. The CEMP will be the securing mechanism for many measures.	s.36 conditions, marine licence conditions and CEMP.
M-106	The development of and adherence to a decommissioning programme.	Required under sections 105 and 114 (Energy Act 2004) and marine licence conditions.

Likely significant effects

- 5.11.32 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017, the pathway is scoped out from assessment.
- 5.11.33 The likely significant effects on the marine historic environment are summarised in **Table 5.11.8** The Scoping assessment is based on a combination of the Project definition at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for marine archaeology, and cultural heritage effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.11.34 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered, is presented after the table, supported by the evidence base.

Table 5.11.8 Likely significant marine archaeology and cultural heritage effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction of offshore infrastructure	M-034, M-035, M-036, M-037, M-063	Likely significant effect. Potential disturbance of wrecks or recovery of cultural material during intrusive operations on the seabed.	Scoped in.	Designated and non-designated wrecks, crash sites or other cultural material.	Desk-based assessment, geophysical survey data.
	M-035, M-036, M-037, M-063	Likely significant effect. Potential permanent loss or disturbance of paleoenvironmental and archaeological remains during construction.	Scoped in.	Non-designated deposits of geoarchaeological / palaeoenvironmental interest.	Desk-based assessment, geophysical survey, vibrocore and borehole data where available.
	M-035, M-063	No change to setting of terrestrial heritage assets arising from visibility of offshore infrastructure during construction is anticipated as a result of the distance of visible infrastructure from the shore and the limited duration and visibility of construction works near shore.	Scoped out. Please refer to Section 6.6: Onshore archaeology and cultural heritage for rationale.	Designated heritage assets.	n/a
Operation / Maintenance of the Project	M-034, M-035	Likely significant effect. Potential harm from disturbance to wrecks in close proximity to the site arising from maintenance of the array or cables.	Scoped in.	Designated and non-designated wrecks, crash sites or other cultural material.	Desk-based assessment, geophysical survey data.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
	M-035, M-036	Likely significant effect. Potential harm from disturbance to wrecks in close proximity to the site arising from altered sea-bed conditions, e.g. scour or differential deposition of sediments.	Scoped in.	Designated and non-designated wrecks, crash sites or other cultural material.	Desk-based assessment, geophysical survey data.
	M-035	No change to setting of terrestrial heritage assets arising from visibility of offshore infrastructure during operation / maintenance is anticipated as a result of the distance of visible infrastructure from the shore.	Scoped out. Please refer to paragraph 5.11.36 for rationale.	Designated heritage assets.	n/a
Decommissioning of offshore infrastructure	M-034, M-106	Effect during decommissioning would be limited to areas already affected during construction or operation / maintenance with no potential for significant adverse effect arising through additional disturbance. Mitigation may be required for relatively minor effects.	Scoped out. Please refer to paragraph 5.11.37 for rationale.	Designated and non-designated wrecks, crash sites or other cultural material.	Desk-based assessment, geophysical survey data.

Impacts scoped out of assessment

- 5.11.35 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and professional judgement on the potential for impact from projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.
- 5.11.36 Potential effects arising from **visibility of offshore infrastructure during construction and operation / maintenance** of the Project have been scoped out of further assessment. A more detailed rationale for this decision is set out at **Section 6.6: Onshore archaeology and cultural heritage**.
- 5.11.37 Potential effects arising from the decommissioning of the Project have been scoped out from further assessment. In effect, any disturbance arising during this phase of the Project will present only minor effects on archaeological remains and/or geoarchaeological deposits that have previously been disturbed and mitigated during the construction or operational phases. It is possible that best practice mitigation measures, such as a PAD or WSI, will be required to ensure that very minor additional disturbance can be more fully mitigated.
- 5.11.38 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed.

Cumulative effects

- 5.11.39 Cumulative effects on marine archaeology and cultural heritage resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the Cumulative Effects Assessment (CEA) screening exercise.
- 5.11.40 These effects could arise from alteration to sediment transport arising from the action of the project in combination with other developments, and through maintenance operations causing physical disturbance to identified archaeological remains which have already been affected by other developments.
- 5.11.41 In that the potential receptors identified above represent isolated and discrete survivals, and the processes identified above are very localised, it is anticipated that adverse cumulative effects are very unlikely and would arise only where the Project interacts with other developments at or very close to an identified receptor.

Transboundary effects

- 5.11.42 No transboundary impacts have been identified due to the relatively localised nature of the potential effects; this is summarised at **Appendix 4A Transboundary Screening Matrix**.

Proposed approach to the EIA Report

- 5.11.43 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process which is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.11.44 Disturbance of archaeological remains is likely to occur during construction phase activity. Likely significant effects will be described, and the assessment will include consideration of

potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

- 5.11.45 The spatial scope for assessment during construction will be defined by the study area as described above and refined through consultation with key stakeholders.
- 5.11.46 Consultation will be held with the relevant statutory and non-statutory organisations as necessary and stakeholder feedback will inform the EIA. Consultees are expected to comprise
- HES; and
 - Aberdeenshire Council.
- 5.11.47 Consultation will be held with Aberdeenshire Council will in respect of:
- archaeological baseline data from the Aberdeenshire HER;
 - potential effects on archaeological remains within the intertidal zone; and
 - potential effects on geoarchaeological receptors which represent survivals of sequences also observed in the terrestrial zone.
- 5.11.48 Where wrecks or crash sites are identified that may constitute Protected Military Remains, consultation will be undertaken with the Ministry of Defence to ensure that all statutory requirements can be met.
- 5.11.49 Archaeological remains and deposits of geoarchaeological interest within the construction footprint and within any additional area anticipated to be affected by scour or other changed depositional processes will be assessed.
- 5.11.50 Likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

5.12 Seascape, landscape and visual

Introduction

- 5.12.1 The seascape, landscape and visual impact assessment (SLVIA) will consider the potential likely significant effects on the seascape / landscape resource and visual amenity that may arise from the construction, operation and maintenance, and decommissioning of the offshore Project elements that are seaward of Mean High Water Springs (MHWS)). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 5.12.2 The SLVIA interfaces with other aspects and should be considered alongside **Section 6.9: Landscape and visual**, noting the close association between the SLVIA and the landscape and visual impact assessment (LVIA), and the potential inter-project effects of the onshore and offshore elements of the Project. Other sections of relevance include:
- **Section 5.11: Marine archaeology and cultural heritage:** This Section will inform the marine archaeology and cultural heritage section regarding visual effects on marine heritage features.
 - **Section 7.1: Climate resilience:** The interference with climate resilience with SLVIA is captured in the In-Combination Climate Impacts (ICCI) assessment.
 - **Section 7.3: Socio-economics:** This Section will inform the socio-economic section regarding visual effects on marine related visual receptors, such as viewpoints relevant to recreation and the visitor economy.

Legislative and policy context

- 5.12.3 This section identifies the relevant legislation and policy context which has informed the scope of the SLVIA. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A**, should be read in conjunction with this Section.
- 5.12.4 In order to provide a robust evidence base, **Table 5.6.1** below presents a summary of legislation and policies relevant for the SLVIA for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.12.1 Relevant legislation and policy

Relevant Legislation and Policy	Relevance to the assessment
Legislation	
The Electricity Act (1989)	<ul style="list-style-type: none"> Sets out the desire of preserving natural beauty and providing reasonable mitigation. It is considered that natural beauty should be given a broad scope and would include seascape and coastal landscape in accordance with the European Landscape Convention (ELC).
The European Landscape Convention (ELC) (2006)	<ul style="list-style-type: none"> The ELC covers land and water (inland and seas), and natural, rural, urban and peri-urban landscapes. Significantly, it includes every-day or degraded landscapes as well as those that might be considered outstanding. The ELC sets out commitments to recognize landscapes in law, to establish policies aimed at landscape planning, alongside the protection, management and the integration of landscape into other policy areas.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A – Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crisis Spatial Planning Priorities: North – Productive Places Policy 10: Coastal Development Policy 14: Design, Quality and Place Policy 4: Natural Places Policy 6: Forestry, Woodland and Trees.
National Policy Statement (NPS) EN-3 (2011) <ul style="list-style-type: none"> Paragraph 2.4.2: Criteria for “good design” for energy infrastructure 	<ul style="list-style-type: none"> States proposals for renewable energy infrastructure and should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. Notes the need for major infrastructure investment to unlock the growth of Scotland’s marine renewable energy sector. States the 2020 Challenge for Scotland’s Biodiversity aims to promote and enhance Scotland’s nature, and to better connect people with the natural world. Spatial strategy identifies where development needs to be balance with a strategic approach to environmental enhancement. States proposals for renewable energy infrastructure should demonstrate good design in respect of landscape

Relevant Legislation and Policy	Relevance to the assessment
	and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.
Scottish Planning Policy (2014) <ul style="list-style-type: none"> Paragraph 169 	<ul style="list-style-type: none"> Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> net economic impacts; scale of contribution to renewable energy generation; effect on greenhouse gas emissions; cumulative impacts; impacts on communities and individual dwellings; landscape and visual; natural heritage; carbon rich soils impacts; impacts on historic environment; impacts on road traffic; and effects on hydrology.
Marine Policy	
UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. Requires that activities and development in marine and coastal areas may give rise to seascape effects and recommends that marine planning authorities should consider potential effects at a strategic level, liaising with relevant planning authorities where necessary, and utilising seascape and landscape character assessment. It also recommends that the authorities should have particular regard to development within, or close to any nationally designated areas. Requirements for the use of the marine environment is spatially planned where appropriate and based on ecosystems approach which takes account of climate change and recognises the protection and management needs of marine cultural heritage according to its significance.
Scottish National Marine Plan (2015) <ul style="list-style-type: none"> GEN 1 – General Planning Principle GEN 4 – Co-existence GEN 7 Landscape / Seascape REC & TOURISM 5 	<ul style="list-style-type: none"> GEN 1 supports sustainable developments which provide economic benefit to Scottish communities and social benefits. GEN 4 emphasises the need for co-existence between development sectors and activities and requires cumulative impacts to be addressed. GEN 7 emphasises Development should take account of seascape, landscape and visual impacts.

Relevant Legislation and Policy	Relevance to the assessment
	<ul style="list-style-type: none"> REC & TOURISM 5 sets out requirement to support enhancements to the aesthetic qualities, coastal character and wildlife experience.
Sectoral Marine Plan for Offshore Wind (2020)	<ul style="list-style-type: none"> Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. Seascape, landscape and visual effects were not identified as a risk to be addressed with the Plan.
Local Planning Policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A – Planning Policy Framework, policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> C2 Renewable Energy PR1 Protecting Important Resources PR2 Preserving and Protecting Important Development Sites E2 Landscape <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>
Aberdeenshire Council Nature Heritage Strategy (2019-2022) <ul style="list-style-type: none"> Aim 1: protection of Natural Heritage Aim 2: Enhancement of Nature Heritage 	<ul style="list-style-type: none"> Objective 1.5: Protect trees of visual and cultural importance Objective 1.6: Protect locally significant sites for nature conservation Objective 2.1: Use council managed land to enhance natural heritage and engage communities Objective 2.4: Creation and management of woodlands in Aberdeenshire

Technical guidance

- 5.12.5 The assessment will be undertaken in accordance with the Landscape Institute and IEMA (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3), and other technical guidance set out in **Table 5.12.2** below.

Table 5.12.2 Relevant technical guidance

Guidance reference	Relevance for the assessment
IEMA (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3),	This is the main technical guidance on LVIA including seascape assessment.
Landscape Institute (2019b) Visual Representation of Development Proposals, Technical Guidance Note 06/19	Technical guidance governing the visual representation of development proposals – how visualisations (photography, wirelines and photomontages) should be presented.
MMO (2019). An Approach to Seascape Sensitivity Assessment	Provides advice and guidance on seascape sensitivity assessment, at a more detailed level than GLVIA3.
NatureScot (2020e) Landscape Sensitivity Assessment Guidance	Provides advice and guidance on seascape and landscape sensitivity assessment, at a more detailed level than GLVIA3 and is specific to Scotland.
NatureScot (2021) Assessing the cumulative landscape and visual impact of onshore wind energy developments	Provides advice and guidance on the cumulative assessment of onshore wind farms, although the methodology and principles may also be applied to offshore wind farm development.
NNatureScot (formerly Scottish Natural Heritage) (2018) Guidance note: Coastal Character Assessment	Provides advice and guidance on coastal character assessment, at a more detailed level than GLVIA and is specific to Scotland.
NatureScot (2020f) Landscape Character Assessment Guidance	Provides advice and guidance on landscape character assessment, at a more detailed level than GLVIA and is specific to Scotland.
NatureScot (formerly Scottish Natural Heritage), (2012b) Offshore Renewables – Guidance on Assessing the Impact on Coastal Landscape and Seascape	Provides advice and guidance on scoping and assessment of offshore renewables development.
NatureScot (formerly Scottish Natural Heritage), (2017c) Visual Representation of Wind Farms, Version 2.2	Technical guidance governing the study area for assessment and visual representation of wind farm development proposals – how visualisations (photography, wirelines and photomontages) should be presented.

Study area

Study area methodology

- 5.12.6 Institute of Environmental Management and Assessment (IEMA) Guidance (IEMA, 2015 and 2017) recommends a proportionate EIA Report focused on the likely significant effects of a development, and a proportionate EIA Report aspect chapter. The SLVIA study area must therefore be large enough to capture all likely significant effects. However, an overly large SLVIA study area may be considered disproportionate if it makes understanding the key impacts of the Project more difficult by including extraneous baseline information, and hence receptors that are unlikely to be significantly affected by the Project.
- 5.12.7 This is supported by the Landscape Institute (GLVIA3) (Landscape Institute, 2013) (paragraph 3.16), which recommends that *“The level of detail provided should be that which*

is reasonably required to assess the likely significant effects". Paragraph 5.2 also states that *"The study area should include the site itself and the full extent of the wider landscape around it which the Project may influence in a significant manner"*.

- 5.12.8 The study area therefore is based on professional judgement and aims to include those areas that are potentially and likely to be significantly affected by the Project. This judgement is based on the Project's early understanding of the local landscape character and the scale of the construction and development proposed within the Scoping Boundary as well as a review of study areas used for similar projects including Moray West, Moray East and Beatrice offshore wind farms.
- 5.12.9 The study area will be reviewed and amended in response to the Project evolution and refinement of the onshore components, the identification of additional effects pathways, and in response to consultation.

SLVIA study areas

- 5.12.10 The Scottish Natural Heritage (2017c) Visual Representation of Wind Farms, Version 2.2 advises that the study area or zone of theoretical visibility (ZTV) for wind turbines exceeding 150m to blade tip height, is 45km from the outer-most wind turbine positions. The document advises on page 12 that *"greater distances may need to be considered for the larger turbines used offshore."* It may also be noted that the SLVIA study areas for the Moray West and Moray East offshore wind farms were 50km from the outer-most wind turbine positions and 40km in respect of the Beatrice offshore wind farm.

SLVIA 50km study area: Offshore elements located within the OAA

- 5.12.11 The SLVIA study area for those offshore elements of the Project located within the Option Agreement Area (OAA) is indicated on **Figure 5.12.1: SLVIA study area** in **Appendix 1A** as a 50km study area from the outer-most wind turbine positions, shown in the figures as the maximum possible area or 50km distanced from the OAA boundary.

SLVIA 25km study area: Offshore elements located outwith the OAA

- 5.12.12 Offshore elements of the Project located outwith the OAA may include the Reactive Compensation ("booster") platform (High Voltage Alternating Current (HVAC) only); transport of turbines and other offshore elements from port (yet to be identified) to the OAA, and offshore export cables. The SLVIA study areas for these components is anticipated to be based on a maximum of 25km distance.
- 5.12.13 A 25km study area is deemed appropriate for offshore elements outwith the OAA based on professional experience of similar infrastructure. As the locations of these are not defined, the study area extends 25km from the coast towards the OAA.
- 5.12.14 Both of the SLVIA study areas will evolve as the Project design matures. If the Project design evolution concludes the need for offshore substations to be located beyond the 25km and 50km boundaries then additional interpretation will be required during the EIA phase to determine the potential for seascape and/or landscape effects.

Consultation

- 5.12.15 This Section has been informed by engagement and discussion with stakeholders. To date, one meeting has been held with NatureScot to provide an overview of the Project, as detailed in **Table 5.12.3**.

Table 5.12.3 Consultation

Consultee	Comments and considerations	How this is accounted for
On-line Teams Meeting: 9th August 2022		
NatureScot	<p>Key discussion points:</p> <ul style="list-style-type: none"> 50km study area does not include any land-based receptors, proposed to scope out SLVIA, including the night-time assessment. NatureScot advised contact with the NatureScot Marine team on receptors. NatureScot advised SLVIA to be included in MS-LOT / NatureScot marine scoping workshop. The EIA team suggested the use of Methodology GLVIA 3, to be also informed by other guidance documents. NatureScot agreed with this approach in the meeting. Cumulative Assessment approach to be confirmed once further Project information is available. 	<p>These will be taken forward, as agreed:</p> <ul style="list-style-type: none"> Further explanation provided in this report and consultation to continue. Consultation will continue. The Scoping workshop was focused on receptor groups in the physical and biological environments and SLVIA was therefore not a discussion point in that workshop. Methodology used by the Project will accord GLVIA 3. Cumulative offshore development is shown in Figure 5.12.1 in Appendix 1A.

Assessment methodology

Introduction

- 5.12.16 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this Section, it is necessary to set out how this methodology will be applied and adapted as appropriate, to address the specific needs of the SLVIA.
- 5.12.17 The assessment will be undertaken in accordance with the Landscape Institute and IEMA (2013) *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition (GLVIA3), and other best practice guidance listed in **Table 5.12.2**. A full description of the SLVIA methodology will be developed and shared with consultees as a result of the scoping exercise and on confirmation of the scope of the SLVIA.

Summary of the SLVIA methodology

- 5.12.18 The seascape, landscape and visual effects (and whether they are significant) are determined by an assessment of the nature or 'sensitivity' of each receptor or group of receptors and the nature of the effect or 'magnitude of change' that will result from the offshore elements of the Project. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the offshore elements of the Project. This is combined with an assessment of the magnitude of change, which takes account of the size and scale of the proposed change, the geographical extent, and the duration of that change. By

combining assessments of sensitivity and magnitude of change, a level of seascape / landscape or visual effect can be evaluated and determined.

- 5.12.19 The resulting level of effect is described in terms of whether it is significant or not significant and the type of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral, or adverse. The assessment will also consider the cumulative effects resulting from the inter-project cumulative effects of the onshore and offshore elements of the Project, and cumulative effects with other similar developments to the onshore elements of the Project within the onshore study area.
- 5.12.20 The time period for the assessment covers the construction period of the offshore elements of the Project, their subsequent operation (the lease agreement allows the Project to remain until 2080, which would be the maximum operational lifetime under the terms of the lease) and decommissioning. The assessment will also allow for embedded environmental measures.
- 5.12.21 The landscape and visual assessment unavoidably involves a combination of quantitative and qualitative assessment and wherever possible a consensus of professional opinion will be sought through consultation, internal peer review, and the adoption of a systematic and impartial approach.

Determining the significance of effects

- 5.12.22 A matrix presented in **Table 5.12.4** is used as a guide to illustrate the SLVIA process. In line with the emphasis placed in GLVIA3 upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor. Such narrative assessments provide a level of detail over and above the outline assessment provided by use of the matrix alone. Wherever possible cross references will be made to baseline figures and/or to photomontage visualisations to support the rationale. The matrix, as presented in **Table 5.12.4**, should therefore be considered as a guide and any deviation from this guide will be clearly explained in the assessment rationale.

Table 5.12.4 Evaluation of landscape and visual effects

Sensitivity	Magnitude of change					
	High	Medium-high	Medium	Medium-low	Low	Very Low - Zero
High	Major (Significant)	Major (Significant)	Major / Moderate (Significant)	Moderate*	Moderate*	Minor
Medium-high	Major (Significant)	Major / Moderate (Significant)	Moderate*	Moderate*	Minor	Minor
Medium	Major / Moderate (Significant)	Moderate*	Moderate*	Minor	Minor	Negligible
Medium-low	Moderate*	Moderate*	Minor	Minor	Negligible	Negligible
Low	Moderate*	Minor	Minor	Negligible	Negligible	Negligible

*Note: Moderate levels of effect may be significant subject to the assessor's opinion, which shall be clearly explained.

- 5.12.23 Significant landscape and visual effects are highlighted in **bold** and shaded in dark green in **Table 5.12.4** and relate to all those effects that result in a '**Major**' or a '**Major / Moderate**' level of effect. In some circumstances, '**Moderate**' levels of effect (shaded green) also have the potential, subject to the assessor's opinion, to be considered as significant and these exceptions are also highlighted in bold and will be explained as part of the assessment, where they occur. White or un-shaded boxes in **Table 5.12.4** indicate a non-significant effect.
- 5.12.24 The type of effect will also be described and may be direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral, or adverse.

Baseline conditions

Introduction

- 5.12.25 Information on the existing seascape / landscape resource or baseline conditions included in the SLVIA will be collected from local plans, Ordnance Survey maps, and relevant literature, as well as information gathered from possible future study area surveys. The baseline information will be set out as an inventory of the existing landscape resource and will focus on those seascape / landscape and visual receptors with most potential to be significantly affected.

Data sources

- 5.12.26 A range of desk-based and site-based data will be sourced to undertake the SLVIA, covering seascape / landscape and visual receptors and other relevant cumulative development. The desk-based data will be drawn from Ordnance survey and a range of document sources, in addition to the relevant planning policy documents outlined in

Chapter 3: Legislative and Policy Context and Appendix 3A: Planning Policy Framework. The principal desk-based data sources used to inform this Section are set out in **Table 5.12.5**.

Table 5.12.5 Key sources of SLVIA data

Source	Date	Summary	Coverage of the study area
NatureScot (formerly SNH)	2005b	An assessment of the sensitivity and capacity of the Scottish seascape in relation to windfarms (available online: https://www.nature.scot/doc/naturescot-commissioned-report-103-assessment-sensitivity-and-capacity-scottish-seascape-relation).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
NatureScot (formerly SNH)	2018	Map and guidance on Coastal Character Assessment (CCA) (available online: https://www.nature.scot/professional-advice/landscape/coastal-character-assessment).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
NorthLink Ferries	Accessed 2022	Ferry routes (available online: https://www.northlinkferries.co.uk/).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.

Note: The following data sources will only be applicable if the SLVIA study area for offshore elements of the Project, located outwith the OAA, overlaps with land-based receptors.

NatureScot	2019	Landscape Character Assessment (LCA) for maps and descriptions of Landscape Character Types (LCTs) (available online: https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
NatureScot	2022	Ancient Woodland Inventory (AWI) (available online: https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-awi).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
Historic Environment Scotland	2019	Gardens and Designed Landscapes of Aberdeenshire (available online: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=7c365ace-e62d-46d2-8a10-a5f700a788f3).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
Aberdeenshire Council	2020b	Aberdeenshire Local Development Plan Appendix 13: Special Landscape Areas (available online: https://online.aberdeenshire.gov.uk/ldpmedi	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.

Source	Date	Summary	Coverage of the study area
		a/pldp2020/Appendix13AberdeenshireSpecialLandscapeAreas.pdf).	
Aberdeenshire Council	2010	Aberdeenshire Open Space Strategy and Audit (available online: https://www.aberdeenshire.gov.uk/leisure-sport-and-culture/parks-and-open-spaces/open-space-strategy-audit/).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
Aberdeenshire Council	2022b	Core Paths in Aberdeenshire (available online: https://wml.io/1u7).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
VisitScotland	2022	Visitor attractions and tourist destinations (available online: https://www.visitscotland.com/destinations-maps/aberdereen-city-shire/).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
Scotland's Great Trails	2018	Scotland's Great Trails map (available online: https://www.scotlandsgreattrails.com).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
Sustrans	2022	Sustrans Cycle Network (available online: https://www.sustrans.org.uk/national-cycle-network/).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
Scottish Rights of Way & Access Society	2022	Heritage Paths (available online: https://scotways.com/heritage-path/#zoom=6&lat=56.7000&lon=-4.9000).	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
Scottish Rights of Way & Access Society	2012	Scottish Hill Tracks, 5 th Edition (not available online)	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
Google Earth Pro	2022	Aerial Photography	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
Ordnance Survey	2022	1:50,000 and 1:25,000 scale mapping	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.
National Trust for Scotland	2022	Any specific visitor attractions / tourist destinations (available online: https://www.nts.org.uk/)	Full coverage of the area within the Scoping Boundary and provisional SLVIA study areas.

SLVIA baseline: Offshore elements located within the OAA

- 5.12.27 The SLVIA baseline within the 50km study area for those offshore elements of the Project located within the OAA comprise one national seascape area and the Aberdeen to Lerwick ferry route. No areas of land or coastline are located within the study area.

Seascape receptors: National Seascape Character

- 5.12.28 In the Scottish Natural Heritage (2005b) Commissioned Report No. 103: An Assessment of the Sensitivity and Capacity of the Scottish Seascape in relation to Windfarms identifies one national seascape within the SLVIA study area and sets of the key characteristics of the Scottish Seascape Area 4: North East Coast on page 53 as follows.

- Scottish Seascape Area 4: North East Coast:
 - ▶ “long, east-facing generally ‘straight’ coastline with many small indentations and few significant headlands and with open views out to North Sea;
 - ▶ mix of long broad sandy beaches backed by dunes and low cliffs/rocky coastline;
 - ▶ farmland predominantly backs coast; flat and low lying against deposition coast; gently rolling against rocky headlands/cliffs – some remnant heathland in places eg Findon Moor;
 - ▶ frequent fishing villages and harbours and several sizeable urban settlements; and
 - ▶ industry is infrequent but large scale where it occurs eg St Fergus and Peterhead power stations are highly visible features within the lower lying north east.”

- 5.12.29 The Commissioned Report also finds that the Seascape Area 4: North East Coast has a very high capacity rating and low visibility/sensitivity ratings for offshore windfarm development.

Visual receptors: ferry routes

- 5.12.30 The route of the Aberdeen to Lerwick ferry is illustrated on **Figure 5.12.1** in **Appendix 1A**. The timetable (Northlink Ferries, 2022) indicates this service operates through the evening and overnight.

SLVIA baseline: Offshore elements located outwith the OAA

- 5.12.31 The SLVIA study area for the offshore elements of the Project located outwith the OAA is anticipated to be a maximum of 25km distance from these offshore elements and may therefore include areas of the coastline or land, overlapping with the baseline receptors for the LVIA.

- 5.12.32 A full description of the LVIA baseline receptors is provided in **Section 6.9: Landscape and visual**. Those coastal and land-based receptors likely to be included in the SLVIA will be confirmed once the design has matured. Main coastal receptors that may be included are listed as follows:

Seascape receptors:

- Coastal Character Types:

These seascape assessments were defined as part of NatureScot's SNH Commissioned Report: *An Assessment of the Sensitivity and Capacity of the Scottish Seascape in Relation to Windfarms* (Scottish Natural Heritage, 2005b):

- ▶ CCT 2: Mainland Rocky Coastline with Open Sea Views:

“Long straight stretches of coastline with cliffs rising to some 30 metres height and often with a raised beach edge. There are few significant headlands although geological differences create variety where softer sandstone forms an indented coast with bays and inlets, arches and caves; harder volcanic rocks produce a more resistant coastline of promontories, low cliffs and rocky shoreline. Notable groups on the north east coast. Productive arable farming occurs up to the cliff edge and tree cover is minimal. Compact fishing villages are located at the base of cliffs in small bays, while castles and cliff-top forts perch on dramatic headland locations, for example Dunottar, near Stonehaven. These are highlighted against the simple sea backdrop. These settlements and built features all appear to be spaced at even intervals and thus provide a visual rhythm of foci along the coast. Views over the North Sea are generally expansive and open, although parts of the Caithness coast have views of Hoy over the Pentland Firth. Shipping is a common feature in gazing out to sea.”

- ▶ CCT 3: Deposition Coastline, Open Views:

“Low-lying coastal sections comprising long, sweeping curved sandy beaches. These are often backed by dunes and form a soft linear edge to the sea. This type is distinguished by a simple horizontal visual composition of sky, sea and land. Grassland and gorse occurs behind dunes and in turn, this is backed by flat, mixed or arable farmland. Some areas of dunes (e.g. Barry Links) are reserved for military live firing. Golf courses occur within this type and settlements are located within farmland. Larger settlements such as Carnoustie, are popular holiday and golf resorts. St Fergus Gas terminal is a distinct, visually prominent feature in Aberdeenshire. Uninterrupted views are long and expansive along beaches with low level, and sealevel views over the North Sea. Shipping traffic is a common feature.”

Visual receptors:

- Coastal Settlements include Fraserburgh, Peterhead, Sandhaven, Inverallochy, St Combs, St Fergus and Boddam.
- Coastal transport routes include the A90 from Aberdeen to Peterhead and Fraserburgh, the B9033 between the A90 and Fraserburgh, via St Combs and a series of minor roads.
- Recreational routes include part of The Formartine and Buchan Way (one of Scotland's Great Trails) the North East 250 and the Coastal Trail between Peterhead and Fraserburgh, via the A90. Part of the Sustrans Cycle Network: Route 1 (parts 1d and 1e); and the Core Path Network.
- Tourist and visitor attractions along the coast include Kinnaird Head Castle Lighthouse, Inverallochy Castle, Fraserburgh, Rattray Head Lighthouse, Seatown, Loch of Strathbeg, Crimond, and a number of coastal beaches, golf course and camp sites.

Future baseline

- 5.12.33 Seascape / landscape change is an ongoing process and would continue across the Scoping Boundary and SLVIA study areas irrespective of whether the Project proceeds. Change can arise through natural processes and systems (for example, coastal erosion) or as a result of human activity including land use and land management.
- 5.12.34 Other offshore wind farm development is illustrated in **Figure 5.12.1** in **Appendix 1A** and the Moray West offshore Wind Farm is currently under construction.
- 5.12.35 The Aberdeenshire LDP 2023 indicates strategic and economic growth within their districts which is likely to affect various settlements along the coastline. Other land management, and consequently landscape character, is dependent on a number of economic and environmental factors including the future effects of climate change and human adaptation which are difficult to predict at a local level and not a matter for this assessment. It is, however, likely that mitigation and adaptation in response to changing climate and biodiversity pressures will continue to have an influence on this area in the form of increased renewable energy and other environmental changes such as changes to the current levels of forestry and woodland.
- 5.12.36 Further information on the future baseline, relevant to the SLVIA is provided in **Section 6.4: Land use**.

Basis for scoping assessment

- 5.12.37 The SLVIA scoping assessment is divided between two potential SLVIA study areas and scope of assessment.
- SLVIA Baseline: Offshore elements located within the OAA; and
 - SLVIA Baseline: Offshore elements located outwith the OAA.
- 5.12.38 Both of the SLVIA study areas will evolve as the project design matures.
- 5.12.39 It should be noted that the boundary of the OAA is located 75km offshore from the nearest point on the north-east Aberdeenshire coastline, in Scotland.
- 5.12.40 The offshore elements located within the OAA include:
- wind turbine generators (WTG), including WTG floating unit;
 - array cables;
 - accommodation platform (if required);
 - offshore substation(s) / high voltage direct current (HVDC) substation (if required) including foundations; and
 - offshore export cables.
- 5.12.41 Due to the large, intervening distance (outwith a nominal 50km SLVIA study area from the OAA), these offshore elements of the Project will be substantially scoped out of the SLVIA. Further explanation of the proposed scope of the SLVIA is provided in this Section.
- 5.12.42 Remaining offshore elements of the Project that will be considered for inclusion within the SLVIA:
- Reactive Compensation Platform (HVAC only) (if required); and
 - offshore export cables (in relation to the presence of vessel activities during installation).

- 5.12.43 The offshore elements will be subject to a temporary construction period with an operational period. As noted in relation to the operation of offshore infrastructure, the lease agreement allows the Project to remain until 2080, which would be the maximum operational lifetime under the terms of the lease. This will be followed by decommissioning.
- 5.12.44 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.12.7**.
- 5.12.45 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 5.12.46 No SLVIA related embedded measures are proposed to reduce the potential for impacts on seascape / landscape and visual receptors in relation to the offshore elements of the Project located within the OAA.
- 5.12.47 A limited number of embedded measures are proposed to reduce the potential for impacts on seascape / landscape and visual receptors in relation to the offshore elements of the Project located outwith the OAA, subject to further design maturity (see **Table.5.12.6**).

Table.5.12.6 Relevant SLVIA embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. Other measures that feed into the CEMP, relevant to this technical assessment include:</p> <ul style="list-style-type: none"> • M-109: Protection of visual receptors. <p>The CEMP will be the securing mechanism for many measures.</p>	Planning conditions, s.36 conditions, marine licence conditions and CEMP.
M-103	<p>On-going design: Where practical, sensitive sites for seascape / landscape and visual receptors will be separated by intervening distance from the offshore elements of the Project (located outwith the OAA and above ground) including:</p> <ul style="list-style-type: none"> • Seascape / Landscape receptors: Coastal and landscape character types, characteristics and elements of high sensitivity (e.g. Special Landscape Areas). • Visual Receptors: 	<p>On-going EIA / SLVIA design and assessment process. CEMP management plans, description of development and planning conditions.</p>

ID	Environmental measure proposed	How the environmental measures will be secured
	Settlements and residential properties, national level recreational routes, important tourist / visitor attractions including beaches, popular hills, gardens and designed landscapes (GDLs), land open to the public and owned by the National Trust for Scotland, Woodland Trust and Historic Environment Scotland, Nature Reserves and Local Wildlife Sites.	
M-109	Protection Visual Receptors: An outline CEMP will be adopted to minimise temporary disturbance to residential properties and tourists / visitor attractions. This may include plans for temporary or permanent screening.	CEMP management plans, description of Project and planning conditions.
M-113	Architectural Strategy Potential to mitigate significant effects through development of an architectural strategy which could include colour schemes or art project, subject to the navigational requirements for colours.	On-going EIA / SLVIA design, consultation and assessment process, CEMP management plans, description of Project and planning conditions.

Likely significant effects

- 5.12.48 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 5.12.49 The likely significant effects on seascape / landscape and visual are summarised in **Table 5.12.7-8**. The scoping assessment is based on a combination of the Project definition of Marram Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for landscape and visual effects and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.12.50 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.
- 5.12.51 Viewpoint analysis and site survey, which includes an assessment of sensitivity and magnitude, will be used as part of the assessment to identify those receptors that are most likely to be significantly affected.
- 5.12.52 It is important to note that whilst some effects can be identified as likely to be significant at this pre-assessment stage, there is the potential for other receptors to be significantly affected and vice-versa, subject to evolution in design and further details of the LVIA.

Likely significant effects: Offshore elements located outwith the OAA

- 5.12.53 Offshore elements of the Project located outwith the OAA are likely to include the Reactive Compensation (“booster”) platform (HVAC only); and Offshore export cables. The SLVIA study area for the offshore elements of the Project (located outwith the OAA) is anticipated to be a maximum of 25km distance from these offshore elements and may therefore include areas of the coastline or land, overlapping with the baseline receptors for the LVIA. According to the distance offshore (magnitude) and the sensitivity of the receptor, significant effects cannot be ruled out. **Figure 5.12.1** in **Appendix 1A** illustrates a 25km and 50km buffer from the Aberdeenshire coast, intersecting with the Scoping boundary as a guide. Offshore elements located within the 25km buffer, for example are likely to require an SLVIA study area that includes land-based receptors. Offshore elements located beyond the 25km buffer would only have a sea-based SLVIA study area and the scope of the assessment would be much reduced.
- 5.12.54 The assessment of these offshore elements of the Project (located outwith the OAA) is likely to develop further as the project matures and a design envelope for development can be established within the Scoping Boundary. The SLVIA will examine further the likely extent or distance beyond which potential significant effects are unlikely, to determine if this can inform the design envelope for the Project, alongside other environmental and technical constraints.
- 5.12.55 Therefore, the offshore elements of the Project (located outwith the OAA) should be scoped into the assessment as long as there remains the potential for a significant effect.

Table 5.12.7 Likely significant seascape / landscape and visual effects

Activity	Embedded measures	Likely effect	Assessment method (Scope in / out)	Landscape receptor	Further data baseline requirements
Offshore elements located <i>within</i> the OAA					
Construction, operation and maintenance and decommissioning activities	N/A	Significant effects not likely due to low sensitivity of receptor.	Scoped out: See rationale in section below paragraph 5.12.56 to 5.12.59.	Seascape / landscape character within the 50km SLVIA study area.	N/A
		Significant effects not likely due to low sensitivity of receptor and intervening distance (lower magnitude).	Scoped out: See rationale in section below paragraph 5.12.56 to 5.12.59.	Visual receptors: people on the night ferry (Aberdeen to Lerwick)	N/A
Construction, and operation and maintenance activities associated with the offshore export cables.	N/A	Significant effects not likely due to location of cables below the sea.	Scoped Out: See rationale in section below paragraph 5.12.60 and 5.12.61.	Seascape / landscape character within the 50km SLVIA study area.	N/A
Offshore elements located <i>outwith</i> the OAA					
Construction, operation and maintenance, and decommissioning activities associated with the:	N/A	Significant effects could occur subject to sensitivity of receptor and magnitude (scale / height of development and intervening distance of development from the coastline).	Scoped in: Receptors within 25km study area and ZTV.	Seascape / landscape character within the 25km SLVIA study area.	Develop optioneering, Targeted site survey, and Develop mitigation measures.

Activity	Embedded measures	Likely effect	Assessment method (Scope in / out)	Landscape receptor	Further data baseline requirements
HVDC substation (HVDC) Reactive Compensation Platform (HVAC) Transport of turbines and other offshore elements from selected port to OAA.		Significant effects could occur subject to sensitivity of receptor and magnitude (scale / height of development and intervening distance of development from the coastline).	Scoped in: Receptors within 25km study area and ZTV.	Visual receptors: people at settlements / residents, on transport and recreational route and at tourist / visitor attractions.	As above.
Construction, and operation and maintenance activities associated with the Offshore export cables.	N/A	Although significant effects not likely due to location of cables below the sea, significant effects could occur during construction, subject to sensitivity of receptor and magnitude (scale / height of development and intervening distance of development from the coastline).	Scoped in: Receptors within 25km study area and ZTV.	Seascape / landscape character within the 25km SLVIA study area.	N/A

Impacts scoped out of assessment

- 5.12.56 Some of the potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and existing best practice evidenced by the potential effects of other offshore wind farm developments (e.g. Morray Offshore Windfarm (West) Limited (2018) EIA Report; Moray Offshore Renewables Limited (2019) Environmental Statement: MacColl, Telford and Stevenson Offshore Wind Farms, Moray East Offshore Wind Farms, Outer Moray Firth; and Seagreen Wind Energy (2018) EIA Report). Each scoped out effect is considered in turn below.
- **Receptors outwith the ZTV:** all receptors within the Scoping Boundary that are outwith the ZTV will have no view of the offshore elements of the Project and are scoped out.
 - Construction, operation and maintenance activities associated with the offshore export cables located below the sea, excepting that there may be some limited significant effects associated with the landfall(s) and associated offshore export cables located close to the shore during the construction period

Offshore elements located within the OAA

- 5.12.57 The SLVIA study area for those offshore elements of the Project located within the OAA is indicted on **Figure 5.12.1** in **Appendix 1A** as a 50km area from the outer-most wind turbine positions, shown in the figures as the maximum possible area or 50km distance from the OAA boundary. This study area is remote from the coastline in an area with limited receptors, indicating that the offshore elements of the Project located within the OAA should be scoped out of the SLVIA. Further evidence to support this position is provided in **Figure 5.12.2: SLVIA Zone of Theoretical Visibility** and **Figure 5.12.3: Scoping wirelines** in **Appendix 1A**.
- 5.12.58 A ZTV based on the maximum extent of offshore elements (wind turbines) within the OAA boundary is illustrated in **Figure 5.12.2** in **Appendix 1A**. This figure indicates that theoretical visibility would cease beyond approximately 75km distance from a notional wind turbine (350m to blade tip height) placed anywhere on or within the OAA. There would be limited ZTV coverage on land beyond this distance, which would be well beyond the SLVIA study area of 50km, used for other comparable offshore wind farm developments and advised by NatureScot (Scottish Natural Heritage (2017c) Visual Representation of Wind Farms, Version 2.2).
- 5.12.59 **Figure 5.12.3** in **Appendix 1A** illustrates wirelines from two viewpoint locations:
- Viewpoint 1: Aberdeen to Lerwick Ferry:
 - ▶ The viewpoint is located at approximately 33km distance from nearest point on the OAA boundary. The night ferry route would have a lower visual receptor sensitivity and the wireline indicates limited visual effects with the offshore elements of the Project appearing low against the horizon, such that significant effects would be unlikely.
 - Viewpoint 2: Rattray Head:
 - ▶ The viewpoint is located at approximately 76km distance from nearest point on the OAA boundary, at the end of a minor road close to Rattray Head. The people on the coast at this point would have a higher visual receptor sensitivity, although the wireline indicates negligible or no visibility of the offshore elements of the Project, such that significant effects would be unlikely.

- 5.12.60 The SLVIA baseline within this study area comprises one national seascape area of documented low sensitivity to offshore wind farm development and the Aberdeen to Lerwick ferry route, which is also likely to be assessed as of lower visual sensitivity due to its operation during the night. No areas of land or coastline are located within the study area.
- 5.12.61 To conclude, due to the large, intervening distance (outwith a nominal 50km SLVIA study area from the OAA) the **offshore elements of the Project** (located within the OAA) are unlikely to significantly affect any seascape / landscape or visual receptors, most of which would be of lower sensitivity. Therefore, the offshore elements of the Project (located within the OAA) should be scoped out of the assessment.

Cumulative effects

- 5.12.62 Cumulative landscape and visual effects resulting from the Project in addition to and in combination with other similar developments will be assessed in accordance with the technical guidance and outline methodologies set out in **Chapter 4: Approach to Scoping and EIA** (including specific LVIA methodology in **Appendix 6.9A**).
- 5.12.63 The cumulative assessment will assess the effects of other similar developments that have been screened in as part of the Cumulative Effects Assessment (CEA) screening exercise.
- 5.12.64 The following Project effects have the potential, to result in cumulative effects:
- Whole project effects resulting from the combined effects of the onshore and offshore elements of the Project.
 - Cumulative seascape / landscape and visual effects during construction, operation and maintenance and decommissioning of the offshore elements (where scoped in):
 - ▶ effects on seascape / landscape character, elements and characteristics as a result of the offshore elements of the Project in addition, and in combination with other similar development;
 - ▶ effects on landscape designations (special landscape qualities and integrity) as a result of the offshore elements of the Project in addition, and in combination with other similar development; and
 - ▶ effects on visual receptors as a result of the offshore elements of the Project in addition, and in combination with other similar development.
- 5.12.65 The cumulative assessment methodology for the SLVIA will be described once the scope of any cumulative assessment is confirmed and agreed with stakeholders and consultees.

Transboundary effects

- 5.12.66 The potential effects from construction, operation and maintenance, and decommissioning on SLVIA receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. No transboundary effects have been identified due to the lack of sensitive receptors in the offshore environment and distance of the offshore infrastructure beyond the limit of visibility from the borders of other nations. There is therefore no potential for offshore elements of the Project to have a significant effect on the SLVIA receptors of an adjacent state.

Proposed approach to the EIA Report

Stakeholder engagement

- 5.12.67 Consultation will be a key feature of the SLVIA process, from the pre-application through to the application stage with relevant statutory, non-statutory organisations, and members of the public.
- 5.12.68 The Applicant is seeking early engagement with stakeholders and consultees to gain input to the methodology for the assessment, and local knowledge on the key landscape and visual constraints / sensitivities and to discuss potential future environmental measures, as appropriate. The Applicant considers it important to engage early to ensure all landscape and visual topic matters are considered appropriately and proportionately with the relevant statutory consultees. Communications will seek to introduce the Project and gain high level insight on issues that key stakeholders would like to see included at scoping through early engagement.
- 5.12.69 The Applicant will engage with stakeholders and consultees seeking early agreement of SLVIA methodology, study areas, extent and scope of assessment, baseline receptors and location of assessment viewpoints to be included in the SLVIA (prior to viewpoint photography) once these have been established.
- 5.12.70 All consultation feedback pertaining to the SLVIA will be summarised in the SLVIA chapter together with information on how feedback has been addressed in the EIA Report.

Approach to design and environmental measures

- 5.12.71 High level landscape and visual assessment work is being undertaken to assist the optioneering and consideration of site and route alternatives for the offshore elements of the Project, within the Scoping Boundary.
- 5.12.72 Embedded environmental measures in respect of the provisional and then the final SLVIA study areas will involve the sensitive siting and design of the offshore elements of the Project as part of the ongoing site selection work.

Baseline (desk based and site survey work)

- 5.12.73 The SLVIA baseline will be undertaken progressively and with increased detail as follows:
- SLVIA 50km study area for offshore elements of the Project (located *within* the OAA); and outline baseline information provided at Scoping stage; and
 - SLVIA 25km study area for offshore elements of the Project (located *outwith* the OAA); and outline baseline information provided at Scoping stage.
- 5.12.74 Optioneering of offshore elements of the Project with full baseline information provided post Scoping.
- 5.12.75 A preliminary desk-based assessment will be undertaken of landscape and visual receptors using ZTV analysis, to identify which receptors are unlikely to be significantly affected, which will be subject to a simple assessment, and those that are more likely to be significantly affected by the onshore elements of the Project.
- SLVIA study areas:
 - ▶ Detailed baseline information provided post optioneering and site / route selection.

- ▶ Site surveys, including appreciation of the 'final' study area and viewpoint photography from public locations in settlements and on roads, recreational routes or places and local attractions and visitor destinations. Viewpoints from ferry routes and areas of sea to be provided as wirelines accordance with SNH (2017c) *Visual Representation of Wind Farms*, Guidance (Version 2.2) and the Landscape Institute (2019b) *Visual Representation of Development Proposals*, TGN 06/19.
- ▶ Field surveys will be undertaken to observe, assess and record landscape and visual receptors and provide a photographic record of each assessment viewpoint in accordance with SNH (2017c) *Visual Representation of Wind Farms*, Guidance (Version 2.2) and the Landscape Institute (2019b) *Visual Representation of Development Proposals*, TGN 06/19. The field studies will include documented visits to all relevant landscape and visual receptors to assess the likely effects of the onshore elements of the Project in the field, checking data, 'ground truthing' and examining landscape elements, characteristics / character and views / visual amenity.

- 5.12.76 The SLVIA presented in the EIA Report will be informed by desk-based studies and where applicable, survey work undertaken within the SLVIA study area.
- 5.12.77 Relevant literature covering legislation, policy, assessment guidance, baseline data within the study area and related library sources will be collated. A review will also be undertaken of existing background technical reports and assessments relevant to landscape and visual amenity.
- 5.12.78 Interactions will be identified between the offshore elements of the Project and seascape / landscape and visual receptors, to predict potentially significant effects arising and measures may be proposed to mitigate effects.
- 5.12.79 Computer modelling of the landscape / landform, other cumulative development and the offshore elements of the Project will be undertaken using a variety of software to support the SLVIA.

Viewpoint selection and production of visualisations:

- 5.12.80 Visual effects will occur when the introduction of the offshore elements of the Project changes or influences the visual amenity and views experienced by people in the SLVIA 25km study area. The visual baseline will be defined by a ZTV for the offshore elements of the Project.
- 5.12.81 Cumulative ZTV analysis will also be provided to illustrate the theoretical cumulative visibility of on and offshore elements of the Project.
- 5.12.82 A viewpoint list will be agreed with stakeholders which will include the name, number, grid coordinates, viewpoint type, distance, receptor, and visualisation method.
- 5.12.83 Stakeholders and consultees will be requested to comment on and suggest any initial viewpoints within the ZTV and SLVIA study area once these have been established.
- 5.12.84 Following viewpoint photography and design freeze, visualisations will be produced in accordance with SNH guidance on *Visual Representation of Windfarms* (2017c) and Landscape Institute guidance on *Visual Representation of Development Proposals* (2019b). Full details of the presentation techniques are described in the example methodology set out in **Appendix 6.9A: LVIA Methodology**.

Assessment of effects in the EIA Report

- 5.12.85 The SLVIA (including the cumulative assessment) will be reported and illustrated in the EIA Report chapters and appendices.

5.13 Infrastructure and other marine users

Introduction

- 5.13.1 The infrastructure and other marine users assessment will consider the potential likely significant effects on industries not already covered by other aspect sections, and those that may arise from the construction, operation and maintenance and decommissioning of the offshore Project elements that are seaward of Mean High Water Springs (MHWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 5.13.2 This topic interfaces with other aspects and as such, should be considered alongside these; namely:
- **Section 5.1: Marine geology, oceanography and physical processes:** This Section describes pathways of effect from marine physical parameters on infrastructure and other marine users.
 - **Section 5.3: Underwater noise and vibration:** The underwater noise section describes pathways of effect from noise sources on other transient marine users.
 - **Section 5.9: Commercial fisheries:** Potential interaction on fisheries and angling from commercial fisheries alongside recreational activities and other infrastructure.
 - **Section 5.10: Shipping and navigation:** Potential shipping and navigation impacts may cause interference or risk to infrastructure and other marine users, for example, oil and gas infrastructure and existing or future vessel access. Therefore, the shipping and navigation assessment will inform the infrastructure and other users assessment.
 - **Section 6.2: Air quality:** This Section provides further assessment where impacts from generated emissions onshore are assessed on other marine users.
 - **Section 6.7: Onshore noise and vibration:** Where impacts from onshore generated noise and vibration are assessed on other marine users.
 - **Section 7.3: Socio-economics:** Where impacts from other energy projects, marine based recreational activities or aquaculture projects are assessed.
 - **Section 7.4: Military and civil aviation and telecommunications:** Where impacts on existing oil and gas infrastructure and telecommunications is assessed.
- 5.13.3 This infrastructure and other marine users assessment will consider all other infrastructure, users and utilities which have not been included in other aspects sections such as subsea cables and utilities, dredging or offshore disposal sites, other marine energy projects and oil and gas infrastructure.

Legislative and policy context

- 5.13.4 This Section identifies the relevant legislation and policy context which has informed the scope of the infrastructure and other marine users assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed

summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.

5.13.5 In order to provide a robust evidence base, **Table 5.13.1** below presents a summary of legislation and policies of relevance for the infrastructure and other marine users assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 5.13.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
No legislation is of specific relevance to this area of technical assessment.	
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • Policy 1: Tackling the climate and nature crises • National Spatial Strategy: North East • National Developments: 3. Strategic Renewable Electricity Generation and Transmission Infrastructure • Policy 18: Infrastructure First
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector.
Scottish Planning Policy (2014) - Paragraph 169	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Consideration will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▸ net economic impacts; ▸ scale of contribution to renewable energy generation; ▸ effect on greenhouse gas emissions; ▸ cumulative impacts; ▸ impacts on communities and individual dwellings; ▸ landscape and visual; ▸ natural heritage; ▸ carbon rich soils impacts; ▸ impacts on historic environment; ▸ impacts on road traffic; and ▸ effects on hydrology.

Relevant legislation and policy	Relevance to the assessment
Relevant UK National Policy Statements (2011): <ul style="list-style-type: none"> - The NPS for Renewable Energy Infrastructure (NPS EN-3) The NPS for Electricity Networks Infrastructure (NPS EN-5) 	<ul style="list-style-type: none"> • Consenting applications will be determined by the Scottish Ministers and Aberdeenshire Council, but UK NPS' remain relevant insofar as informing the consideration through this EIA of some matters relating to reserved matters. • Within EN-3, section 2.4 outlines criteria for “good design” of renewable energy generation infrastructure and section 2.6 provides detail with regards to offshore wind. • Within EN-5, transmission and distribution systems alongside associated infrastructure are covered.

Marine Policy

UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> • Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. • Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all.
Scotland’s National Marine Plan (2015) <ul style="list-style-type: none"> - GEN 1 – General Planning Principle - GEN 4 – Co-existence 	<ul style="list-style-type: none"> • GEN 1 supports sustainable developments which provide economic benefit to Scottish communities and social benefits. • GEN 4 emphasises the need for co-existence between development sectors and activities and requires cumulative impacts to be addressed.
Sectoral Marine Plan – Offshore Wind Energy (2020)	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. • Section 4.1 lists a range of potential negative impacts identified through plan-level SEA, HRA and SEIA which require further consideration through project level assessments, including: <ul style="list-style-type: none"> ▶ “effects on marine and coastal recreation and access; and ▶ contribution to supporting a diverse and decarbonised energy sector”.

Local Planning Policy

Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • C2 – Renewable Energy • PR2 – Preserving and Protecting Important Development Sites <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>
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Technical guidance

- 5.13.6 No technical guidance has been identified that has not already been identified in other aspects sections where an interface with infrastructure and other marine users exists. This will be informed by consultee liaison and engagement and updated for the EIA Report where relevant.

Study area

- 5.13.7 The study area for this assessment is defined as the area that will be directly impacted by the offshore infrastructure (including wind turbine generators (WTGs) (including WTG floating units and WTG station keeping station), export cable, array cables and all other associated structures).
- 5.13.8 A buffer of 10nm has been proposed around the Scoping Boundary to consider the wider area around the Project and consider the movement of other mobile marine users. This is consistent with the buffer used by the shipping and navigation assessment.
- 5.13.9 **Figure 5.10.1: Shipping and navigation study area** in **Appendix 1A** identifies the study area.
- 5.13.10 The study area will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

Assessment methodology

Approach

- 5.13.11 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.13.12 This will be implemented to assess the likely significant effects on infrastructure and other marine users receptors from the construction, operation and maintenance and decommissioning of the Project.
- 5.13.13 The specific legislation and guidance outlined in **Table 5.13.1** will also be considered in relation to the assessment, in addition to consultation with the stakeholders outlined above.

Desk-based review

- 5.13.14 A desk-based review of existing information and current literature on infrastructure and other marine users will be undertaken, notably including any information on all other infrastructure, users and utilities which have not been included in other aspects sections such as subsea cables and utilities, dredging or offshore disposal sites, other marine energy projects and oil and gas infrastructure.
- 5.13.15 This data will be reviewed and used, where applicable, to inform this assessment.

Baseline conditions

Data sources

- 5.13.16 An initial desk-based review has been undertaken of publicly available data sources (see **Table 5.13.2**) in order to determine the baseline character of the study area and inform the assessment.

Table 5.13.2 Key sources of infrastructure and other marine users data

Source	Date	Summary	Coverage of study area
Online GIS data sets	Accessed 2022.	Seabed obstructions including oil and gas wells, pipelines, platforms, and other oil and gas infrastructure. Location of other marine energy projects in the public domain. Location of cables and utilities.	Full coverage of study area.

Current baseline

- 5.13.17 The above desk-based review has identified the following infrastructure and other marine users (not already identified in commercial fisheries, shipping and navigation and socio-economics):
- offshore renewable energy projects;
 - subsea cables and utilities;
 - military and defence activities;
 - oil and gas infrastructure (decommissioned and in operation);
 - licensed disposal sites; and
 - other infrastructure such as unexploded ordnance and carbon capture storage projects.

Offshore renewable energy projects

- 5.13.18 Operational offshore windfarm developments within the wider area of the Project are shown in **Table 5.13.3**. The nearest operational offshore windfarm is Hywind Floating Offshore Wind Farm which is located approximately 66km southwest of the Project.
- 5.13.19 Export cables for Hywind Floating Offshore Wind Farm make landfall at Buchanhaven, Peterhead as shown on **Figure 5.13.1: Infrastructure and other marine users** in **Appendix 1A**.

Table 5.13.3 Offshore windfarm projects and distance to the Project within Scoping Boundary

Offshore windfarm	Distance from the Project (km)
Hywind Floating Offshore Windfarm	65.72
Aberdeen Offshore Windfarm	108.95

- 5.13.20 There are no consented offshore wind projects (and associated export cables) identified with the Scoping Boundary.
- 5.13.21 In addition, there are no other offshore wind projects which are in construction identified within the Scoping Boundary.
- 5.13.22 There are marine energy projects located within the study area. This includes the Green Volt, Orcadian Microgrid and Salamander offshore windfarms. Green Volt has submitted a scoping report whilst the remaining two projects are proposed but have yet to submit a request for Scoping Opinion at the time of writing.

Subsea cables and utilities

- 5.13.23 There are several existing subsea cables within the Scoping Boundary and wider study area. These are shown on **Figure 5.13.1** in **Appendix 1A** and include:

Table 5.13.4 Cable projects within the Scoping Boundary

Subsea cable / utility	Status	Location
Eastern Link	Submitted but not determined	Within Scoping Boundary – landfall at Sandford Bay, Peterhead
NorthConnect High Voltage Direct Current interconnector cable which is proposed to link Norway and Scotland	Scoping stage	Within Scoping Boundary – landfall at Sandford Bay, Peterhead

- 5.13.24 No telecommunications cables exist within the Scoping Boundary, as outlined in **Section 7.4: Military and civil aviation and telecommunications**.

Military and defence activities

- 5.13.25 No military practice and exercise areas (PEXAs) overlap with the Scoping Boundary. The nearest PEXA site is approximately 14km outside the Scoping Boundary and consists of a small firing danger area off the coast of Aberdeenshire to the south of the Project and the Moray Firth practice and exercise areas to the north.

Oil and gas infrastructure

- 5.13.26 Within the northeast region of Scotland, there is a well-established oil and gas industry and the Project overlaps with existing licence blocks. The Option Agreement Area (OAA) avoids

all major hydrocarbon infrastructure apart from one active pipeline (Golden Eagle to Claymore oil export) and several decommissioned wells located in the south of the OAA.

- 5.13.27 There are multiple oil and gas wells which are located within the Scoping Boundary, predominantly abandoned features but some are active or suspended. This is shown on **Figure 5.13.1** in **Appendix 1A**. These are predominantly located in deeper water and towards and within the OAA.
- 5.13.28 There are also multiple pipelines which are located within the offshore Scoping Boundary (as shown on **Figure 5.13.1** in **Appendix 1A**). Several of these converge towards the shoreline at St Fergus gas terminal with another pipeline entering Peterhead via Sandford Bay.
- 5.13.29 The Ettrick pipelines are located towards the northeast corner of the offshore Scoping Boundary, just before the array. These are currently abandoned and further discussions are being undertaken to determine the timing of the decommissioning and whether these will be left in situ.
- 5.13.30 A standard safety zone of 500m has been adopted around any well or pipeline regardless of their operational status.
- 5.13.31 Two oil and gas platforms are located in the Scoping Boundary (Buzzard and Golden Eagle), with a third (Goldeneye) located just outside the northern eastern extent of the offshore Scoping Boundary but within the buffer zone applied for the Scoping study area. These are shown on **Figure 5.13.1** in **Appendix 1A**.
- 5.13.32 A standard safety zone of 3km has been applied to the platforms, acknowledging that further discussions are required with the operators to agree any additional safety requirements.
- 5.13.33 Two other oil and gas features have been identified within the offshore Scoping Boundary, namely in the north-eastern area of the export cable corridor. These include a cement block and a floating production storage and offloading (FPSO) system vessel anchor point. These features are not actively associated with hydrocarbon production and so a 100m safety zone has been applied.

Licensed disposal sites

- 5.13.34 Dredging is important to maintain access to Peterhead Harbour. There are two open disposal sites (the North Buchan Ness and Peterhead disposal sites) and one closed disposal site (the middle Buchan Ness site) within the export cable route corridor. The two open sites have been used for the deposition of dredged harbour material from Peterhead and / or Boddam Harbour. This is shown on **Figure 5.13.1** in **Appendix 1A**.

Other infrastructure

- 5.13.35 There is a charted area of 'foul ground' within the cable route corridor where wires were dumped a number of years ago. Anchoring is not recommended in this area of foul ground as the wires pose a snagging threat. No other potential sea users (other than navigation and commercial fisheries which are discussed elsewhere) have been identified.
- 5.13.36 One UXO constraint area is identified solely within the Scoping Boundary, with a second partially within the Scoping Boundary to the northwest and a third outside the Scoping Boundary but within the Study Area to the east. This is shown on **Figure 5.13.1** in **Appendix 1A**.

- 5.13.37 No baseline research has been undertaken in relation to unexploded ordnance however a technical report will be commissioned as part of the Project development. Suitable mitigation measures will be outlined in the EIA Report.

Future baseline

- 5.13.38 Additional offshore wind projects associated with Scotwind and Innovation and Targeted Oil & Gas (INTOG) will be assessed within the cumulative assessment where these may also be within the same study area, in addition to any other new infrastructure such as interconnectors or other marine uses.

Basis for scoping assessment

- 5.13.39 The infrastructure and other marine users scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: Project Description**:
- impacts from all phases of the Project from mobile transport, such as helicopters and project vessels, on other marine users; and
 - impacts on existing and proposed utilities and installations from all phases of the Project, such as obstruction of operational of oil and gas platforms, existing offshore windfarms (and their export cables) or disposal sites.
- 5.13.40 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 5.13.6**.
- 5.13.41 The Approved NPF4 2023 introduces new requirements which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 5.13.42 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on infrastructure and other marine users (see **Table 5.13.5**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 5.13.43 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 5.13.5 Relevant infrastructure and other marine users embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-030	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins.	s.36 conditions and marine licence conditions.
M-040	Marine coordination and communication to manage project vessel movements. Proactive Kingfisher notifications and other navigational warnings in a timely manner in addition to distribution to the UKHO.	Company Marine Operations Manual and Aids to Navigation (AtN) Plan, inclusion in Admiralty charts by UKHO; condition on the s.36 consent and / or marine licence.
M-042	Development of Emergency Response and Cooperation Plan (ERCOP).	s.36 conditions and marine licence conditions.
M-050	Any objects dropped on the seabed during works associated with the Project will be reported and objects will be recovered where they pose a hazard to other marine users and where recovery is possible.	s.36 conditions and marine licence conditions.
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase.</p> <p>The CEMP will be the securing mechanism for many measures.</p>	s.36 conditions and marine licence conditions.
M-079	Crossing and proximity agreements for any infrastructure with operators and / or asset owners	Via consultation and agreement with operators and / or asset owners.
M-106	The development of and adherence to a decommissioning programme.	Required under Sections 105 and 114 (Energy Act 2004) and Marine Licence consent conditions.
M-115	An UXO Management Plan to mitigate any potential for UXO within the offshore construction area and also disposal once encountered	s.36 conditions and marine licence conditions.

Likely significant effects

- 5.13.44 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 5.13.45 The likely significant effects on infrastructure and other marine users are summarised in **Table 5.13.6**. The scoping assessment is based on a combination of the Project envelope described in **Chapter 2: Project Description**, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for infrastructure and other marine users effects and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.13.46 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed.

Table 5.13.6 Likely significant infrastructure and other marine users effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Temporary obstruction to other renewable energy projects (Construction and Decommissioning)	M-030, M-040, M-042, M-050, M-063, M-079, M-106	No significant effect	Scoped out: see rationale in section below paragraphs 5.13.47– 5.13.51 .	Hywind Floating Offshore Windfarm Aberdeen Offshore Windfarm	n/a
Obstruction to other renewable energy projects (Operation / Maintenance)	M-030, M-040, M-042, M-050, M-079	No significant effect	Scoped out: see rationale in section below paragraphs 5.13.47– 5.13.51 .	Hywind Floating Offshore Windfarm Aberdeen Offshore Windfarm	n/a
Temporary obstruction to subsea cables and utilities (Construction and Decommissioning)	M-030, M-040, M-042, M-050, M-063, M-079, M-106	Likely significant cumulative effects from cable crossings and increased vessels to other marine users.	Scoped in: to be assessed within cumulative assessment.	Eastern Link 2 NorthConnect	Review determination status within EIA Report and assess accordingly
Obstruction to subsea cables and utilities (Operation / Maintenance)	M-030, M-040, M-042, M-050, M-079	Likely significant cumulative effects during operational and maintenance activities.	Scoped in: to be assessed within cumulative assessment.	Eastern Link 2 NorthConnect	Review determination status within EIA Report and assess accordingly
Temporary obstruction of military and defence activities (Construction, Operation / Maintenance and Decommissioning)	M-030, M-040, M-042 M-050, M-063, M-079, M-106	No significant effect	Scoped out: see rationale in section below paragraphs 5.13.47– 5.13.51 .	PEXA site	n/a
Temporary obstruction of oil and gas infrastructure	M-030, M-040, M-042, M-050,	No significant effect	Scoped out: see rationale in section	All oil and gas platforms, and	n/a

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
(Construction and Decommissioning)	M-063, M-079, M-106		below paragraphs 5.13.47– 5.13.51.	decommissioned assets	
Obstruction of oil and gas infrastructure (Operation / Maintenance)	M-030, M-040, M-042, M-050, M-079	No significant effect	Scoped out: see rationale in section below paragraphs 5.13.47– 5.13.51.	All oil and gas platforms, and decommissioned assets	n/a
Temporary obstruction of licensed disposal sites (Construction and Decommissioning)	M-030, M-040, M-042, M-050, M-063, M-079, M-106	Potential for likely significant effects from cable placement (if within feature)	Scoped in: with the potential to scope out subject to offshore cable optioneering.	Open disposal sites and UXO areas	Review of offshore optioneering and routing of offshore export cable. Research on frequency of use to determine likely frequency of disturbance to operations
Obstruction of licensed disposal sites (Operation / Maintenance)	M-030, M-040, M-042, M-050, M-079	Potential for likely significant effects from cable placement (if within feature)	Scoped in: with the potential to scope out subject to offshore cable optioneering.	Open disposal sites and UXO areas	Research on frequency of use to determine likely frequency of disturbance to operations
Disturbance of UXO within identified areas or discovery of unexpected UXO (Construction, Operation / Maintenance and Decommissioning)	M-063, M-115	No significant effects	Scoped out: see rationale in section below paragraphs 5.13.47– 5.13.51.	UXO areas as identified or the discovery of unexpected UXO within the offshore scoping boundary	n/a

Impacts scoped out of assessment

- 5.13.47 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. Each scoped out effect is considered in turn below.
- 5.13.48 No likely significant effects are predicted in relation to **obstruction of other renewable energy** projects due to the distance from both Hywind and Aberdeen Offshore Windfarms and separate landfall locations. Therefore it is highly unlikely that the projects would interact and provide any form of obstruction, therefore this is proposed to be scoped out.
- 5.13.49 Likely significant effects are unlikely to occur in relation to **obstruction of military and defence** activities due to the distance between the Project and the PEXA site. Therefore this is proposed to be scoped out. In addition, due to the application of embedded measures (namely routeing of the offshore export cable and application of a UXO Management Plan), likely significant effects from UXO are unlikely, and therefore is proposed to be scoped out.
- 5.13.50 Due to the implementation of embedded measures, namely routeing to avoid such features and the requirement to agree proximity agreements with the **owners of the operational and / or decommissioned oil and gas assets** within the Project boundary, it is proposed to scope out this aspect.
- 5.13.51 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed. No matters or aspects are being scoped out at this stage but could be subject to further design refinement and stakeholder agreement.

Cumulative effects

- 5.13.52 Cumulative effects on infrastructure and other marine users resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the Cumulative Effects Assessment (CEA) screening exercise.
- 5.13.53 The following impacts from the Project have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:
- increased vessel movements from cumulative projects in all phases to other marine users; and
 - potential for increased obstruction and / or disruption to proposed infrastructure and other marine users such as interconnectors or new INTOG sites which are confirmed as leased.
- 5.13.54 Any additional conflicts with the aviation activities, such as helicopter operations, will be addressed in the Military and Civil Aviation and Telecommunications assessment.

Transboundary effects

- 5.13.55 The potential transboundary effects from construction, operation (including maintenance) and decommissioning are considered in **Appendix 4A: Transboundary Screening Matrix**. No transboundary impacts have been identified due to all likely interactions with infrastructure and other marine users to be within UK territorial waters.

Proposed approach to the EIA Report

- 5.13.56 Further desk-based studies and analysis will be undertaken to identify and assess infrastructure and other marine user receptors. This study will be supplemented with consultation with the relevant statutory and non-statutory organisations as part of the Pre-application Consultation process which as set out in **Chapter 4: Approach to Scoping and EIA**.
- 5.13.57 Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

5.14 Offshore references

- Aberdeenshire Council, (2010). *Aberdeenshire Open Space Strategy and Audit*. [online] Available at: <https://www.aberdeenshire.gov.uk/leisure-sport-and-culture/parks-and-open-spaces/open-space-strategy-audit/> [Accessed 10 October 2022].
- Aberdeenshire Council, (2020a). *Modified Proposed Aberdeenshire Local Development Plan 2020*. [online] Available at: <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/pldp-2020/> [Accessed: 7 December 2022].
- Aberdeenshire Council, (2020b). *Aberdeenshire Council Natural Heritage Strategy 2019 – 2022*. [online] Available at: <http://publications.aberdeenshire.gov.uk/dataset/b71bf9e9-6a19-4d3e-a89e-0a0af7523b15/resource/5596fc91-f5d1-4eb6-971e-695c992b9389/download/natural-heritage-strategy-2019-2022.pdf> [Accessed 26 August 2022].
- Aberdeenshire Council, (2020b). *Appendix 13: Special Landscape Areas*. [online] Available at: <https://online.aberdeenshire.gov.uk/ldpmedia/pldp2020/Appendix13AberdeenshireSpecialLandscapeAreas.pdf> [Accessed 7 December 2022]
- Aberdeenshire Council, (2022b). *Core Paths in Aberdeenshire*. [online] Available at: <https://wml.io/1u7> [Accessed 10 October 2022].
- Aberdeenshire Council, (2022c). *Landscape in the planning process*. [online] Available at: <https://www.aberdeenshire.gov.uk/environment/natural-heritage/landscape/> [Accessed 10 October 2022].
- Aberdeenshire Council, (2022d). *Archaeology Service Historic Environment Record (HER)*. [online] Available at: <https://online.aberdeenshire.gov.uk/smrpub/> [Accessed 10 October 2022].
- Aberdeenshire Council, (2023). *Aberdeenshire Local Development Plan 2023* [online] Available at: <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/ldp-2023/> [Accessed 24 January 2023].
- ABPmer and HR Wallingford, (2009). *Coastal Process Modelling for Offshore Wind farm Environmental Impact Assessment: Best Practice Guide*. [online] Available at: https://www.researchgate.net/publication/228784265_Coastal_Process_Modelling_for_Offshore_Wind_Farm_Environmental_Impact_Assessment_Best_Practice_Guide [Accessed 20 September 2022].
- ABPmer, Met Office and POL, (2008). *Atlas of UK Marine Renewable Energy Resources: Atlas Pages. A Strategic Environmental Assessment Report, March 2008. Produced for BERR*. [online] Available at: <http://www.renewables-atlas.info/> [Accessed 20 September 2022].
- ABPmer, (2017). *UK Renewables Atlas*. [online] Available at: <https://www.abpmer.co.uk/experience/atlas-of-uk-marine-renewable-energy-resources/> [Accessed 4 October 2022]
- Alerstam, T., Rosén, M., Bäckman, J., Ericson, P.G. and Jellgren, O., (2007). Flight Speeds Among Bird Species: Allometric and Phylogenetic Effects. *PLoS Biology*, 5(8), e197.
- Anderwald, P., Evans, P. G., Canning, C., Hepworth, K., Innes, M., Macdonald, P. and Weir, C., (2010). *Cetaceans of the east Grampian region*. Sea Watch Foundation, Aberdeen, UK.
- Arso Civil, M., et al., (2021). Improving understanding of bottlenose dolphin movements along the east coast of Scotland. Final report, provided to EOWDC.

- Arso Civil, M., Quick, N., Cheney, B., Pirotta, E., Thompson, P. and Hammond, P., (2019). Changing distribution of the east coast of Scotland bottlenose dolphin population and the challenges of area-based management. *Aquatic Conservation: Marine and Freshwater Ecosystems*. 29 (178-196).
- Au, W.W.L., Popper, A.N. and Fay, R.R., (2000). *Hearing by Whales and Dolphins*, Springer Handbook of Auditory Research.
- Bailey, H., Brookes, K. and Thompson, P., (2014). Assessing environmental impacts of offshore wind farms: lessons learned and recommendations for the future. *Aquatic Biosystems*. 10, 8.
- Band, B., (2012). Using a Collision Risk Model to Assess Bird Collision Risks for Offshore Windfarms. *SOSS report*, The Crown Estate.
- Barne, J.H., Robson, C.F., Kaznowska, S.S., Doody, J.P. and Davidson, N.C., eds., (1996). *Coasts and seas of the United Kingdom. Region 3 North-east Scotland: Cape Wrath to St. Cyrus*. Peterborough: Joint Nature Conservation Committee.
- Barrett, T., Visser, I. K. G., Mamaev, L., Goatley, L., Van Bressem, M. F. and Osterhaus, A. D. M. E., (1993). *Dolphin and porpoise morbilliviruses are genetically distinct from phocine distemper virus*. *Virology*, 193(2), 1010-1012.
- Bauer, G. B., Reep, R. L. and Marshall, C. D., (2018). *The tactile senses of marine mammals*. *International Journal of Comparative Psychology*. 31.
- Benda-Beckmann, A., Aarts, G., Sertlek, H., Lucke, K., Verboom, W., Kastelein, R., Ketten, D., Bemmelen, R., Lam, F., Kirkwood, R. and Ainslie, M. (2015). *Assessing the Impact of Underwater Clearance of Unexploded Ordnance on Harbour Porpoises (Phocoena phocoena) in the Southern North Sea*. *Aquatic Mammals*. 41(4), 503-523.
- Benjamins, S., Harnois, V., Smith, H.C.M., Johanning, L., Greenhill, L., Carter, C. and Wilson, B. (2014). *Understanding the potential for marine megafauna entanglement risk from renewable marine energy developments*. Scottish Natural Heritage Commissioned Report.
- Blyth-Skyrme, R., (2010a). *Options and opportunities for marine fisheries mitigation associated with wind farms*. [online] Available at: <https://tethys.pnnl.gov/sites/default/files/publications/Blyth-Skyrme-2010.pdf> [Accessed: 20 September 2022].
- Blyth-Skyrme, R., (2010b). Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers.
- Bowgen, K., and Cook, A. S. C. P., (2018). *Bird collision avoidance: Empirical evidence and impact assessments*. BTO Report to JNCC.
- Boyer, F., and Lebastard, V. (2018). Electric sensing for underwater navigation. *Living machines: a handbook of research in biomimetics and biohybrid systems*. Oxford University Press, Oxford.
- Bradbury, G., Trinder, M., Furness, B., Banks, A.N. and Caldow, D.H., (2017). *Correction: Mapping Seabird Sensitivity to Offshore Wind Farms*. *PLOS ONE* 12(1): e0170863.
- British Geological Survey (BGS), (1984). *Peterhead 57N 02W seabed sediments, 1:250,000 geological map*.
- British Geological Survey (BGS), (2022a). *Offshore geoindex*. [online] at: <https://webapps.bgs.ac.uk/data/sea/app/search> [Accessed 26 August 2022].
- British Oceanographic Data Centre, (2022b). *Sitelink*. [online] at: <https://www.bodc.ac.uk/> (Accessed 26 August 2022).

British Standard Institute (BSI), (2015). *PD 6900:2015 Environmental impact assessment for offshore renewable energy projects. Guide*. [online] Available at: <https://knowledge.bsigroup.com/products/environmental-impact-assessment-for-offshore-renewable-energy-projects-guide/standard> [Accessed 26 August 2022].

Brooks, A.J. Kenyon, N.H. Leslie, A., Long, D. and Gordon, J.E. (2011). *Characterising Scotland's marine environment to define search locations for new Marine Protected Areas. Part 2: The identification of key geodiversity areas in Scottish waters*. [online] Available at: https://www.researchgate.net/publication/279440166_Characterising_Scotland's_marine_environment_to_define_search_locations_for_new_Marine_Protected_Areas_Part_2_the_identification_of_key_geodiversity_areas_in_Scottish_waters_interim_report_July_2011 [Accessed 20 September 2022].

Brownlow, A, ten Doeschate, M, and Davison, N., (2020). *Scottish Marine Animal Stranding Scheme (SMASS) Annual Report 2020*; 1 January to 31 December 2020 for Marine Scotland, Scottish Government.

Bureau of Ocean Energy Management (BOEM), (2020). *ENVIRONMENTAL STUDIES Electromagnetic Fields (EMF) from Offshore Wind Facilities*. [online] Available at: <https://www.boem.gov/sites/default/files/documents/renewable-energy/mapping-and-data/Electromagnetic-Fields-Offshore-Wind-Facilities.pdf> [Accessed: 26 August 2022].

Canadian Council of Ministers of the Environment, (1995). Protocol for the Derivation of Canadian Sediment Quality Guidelines for the Protection of Aquatic Life. Reference: CCME EPC-98E

Canadian Council of Ministers of the Environment, (2001). *Canadian Sediment Quality Guidelines for the Protection of Aquatic Life - Introduction*. [online] Available at: <https://www.pla.co.uk/Environment/Canadian-Sediment-Quality-Guidelines-for-the-Protection-of-Aquatic-Life> [Accessed 26 August 2022].

Canadian Council of Ministers of the Environment, (2002). *Canadian Sediment Quality Guidelines for the Protection of Aquatic Life – Summary tables – Updated 2002*.

CANMORE, (2022). *CANMORE: National record of the historic environment*. [online] Available at: <https://canmore.org.uk/> [Accessed 6 October 2022].

Carter, M., Boehmn, L., Cronin, M., Duck, C., Grecian, W., Hastie, G., Jessopp, M., Matthiopoulos, J., McConnell, B., Miller, D., Morris, C., Moss, S., Thompson, D., Thompson, P. and Russell, D. (2022). *Sympatric Seals, Satellite Tracking and Protected Areas: Habitat-Based Distribution Estimates for Conservation and Management*. Front. Mar. Sci.

Carter, M.I.D., Boehme, L., Duck, C.D., Grecian, W.J., Hastie, G.D., McConnell, B.J., Miller, D.L., Morris, C.D., Moss, S.E.W., Thompson, D., Thompson, P.M. and Russell, D.J.F., (2020). *Habitat-based predictions of at-sea distribution for grey and harbour seals in the British Isles*. Sea Mammal Research Unit, University of St Andrews, Report to BEIS, OESEA-16-76/OESEA-17-78, 2020. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/959723/SMRU_2020_Habitat-based_predictions_of_at-sea_distribution_for_grey_and_harbour_seals_in_the_British_Isles.pdf [Accessed 6 December 2022].

Centre for Environment Fisheries and Aquaculture Science (CEFAS), (2004). *Offshore Windfarms: Guidance note for Environmental Impact Assessment in Respect of FEPA and CPA requirements*. [online] Available at: <https://www.cefasc.co.uk/publications/files/windfarm-guidance.pdf> [Accessed 20 September 2022].

Centre for Environment Fisheries and Aquaculture Science (CEFAS), (2012). *Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy*

Projects. [online] Available at: <https://tethys.pnnl.gov/publications/guidelines-data-acquisition-support-marine-environmental-assessments-offshore> [Accessed 20 September 2022].

Centre for Environment Fisheries and Aquaculture Science (CEFAS), (2016). *Suspended Sediment Climatologies around the UK. Report for the UK*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/584621/CEFAS_2016_Suspended_Sediment_Climatologies_around_the_UK.pdf [Accessed 20 September 2022].

Centre for Environment, Fisheries and Aquaculture Science (CEFAS), (2022). *WaveNet data*. [online] at <http://www.cefasc.co.uk/cefasc-data-hub/wavenet/> [Accessed 26 August 2022].

Chartered Institute for Ecology and Environmental Management (CIEEM), (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. [online] Available at: <https://cieem.net/wp-content/uploads/2019/02/Combined-EclA-guidelines-2018-compressed.pdf> [Accessed 26 August 2022].

Cheney, B., Thompson, P., Ingram, S., Hammond, P., Stevick, P., Durban, J., Culloch, R., Elwen, S., Mandleberg, L., Janik, V., Quick, N., Islas-Villanueva, V., Robinson, K., Costa, M., Eisfeld, S., Walters, A., Philips, C., Weir, C., Evans, P., Anderwald, P., Reid, R., Reid, J. and Wilson, B. (2013). *Integrating multiple data sources to assess the distribution and abundance of bottlenose dolphins (Tursiops truncatus) in Scottish waters*. Mammal Review, 43 (71-88).

Civil, M. Louis, S. Hague, E. and Hammond, P. (2019). *Improving understanding of bottlenose dolphin movements along the east coast of Scotland. Interim report 2019*. Report number smruc-vat-2019-001 provided to European offshore wind deployment centre (EOWDC), February 2019 (unpublished).

Cleasby, I.R., Owen, E., Wilson, I., J. and Bolton, M., (2018). *RSPB research report 63*. [online] Available at: https://www.rspb.org.uk/globalassets/downloads/documents/conservation-science/cleasby_owen_wilson_bolton_2018.pdf [Accessed 4 October 2022].

Cleasby, I. R., Owen, E., Wilson, L., Wakefield, E. D., O'Connell, P. and Bolton, M. (2020). *Identifying important at-sea areas for seabirds using species distribution models and hotspot mapping*. Biological Conservation, 241, 108375.

Cook, A., Johnston, A., Wright, L., Burton, N., (2012). *SOSS-02: A review of flight heights and avoidance rates of birds in relation to offshore wind farms*. [online] Available at: https://www.bto.org/sites/default/files/shared_documents/publications/research-reports/2013/rr618.pdf [Accessed 4 October 2022].

Construction Industry Research and Information Association (CIRIA), (2008). *Guidelines in the use of metocean data through the lifecycle of a marine renewables development*. [online] Available at: <https://www.semanticscholar.org/paper/Guidelines-for-the-use-of-metocean-data-through-the-Cooper-Saulter/fea4f52a8af55b2f35fa04765ae47f8033668ffb> [Accessed 20 September 2022].

Cook, A.S.C.P., Humphreys, E.M., Masden, E.A., Burton, N.H.K., (2014). *The Avoidance Rates of Collision Between Birds and Offshore Turbines*. [online] Available at: <https://www.gov.scot/publications/scottish-marine-freshwater-science-volume-5-number-16-avoidance-rates/> [Accessed 4 October 2022].

Cook, A.S.C.P., (2021). *Additional analysis to inform SNCB recommendations regarding collision risk modelling*. [online] Available at: https://www.bto.org/sites/default/files/publications/bto_rr_739_cook_collision_risk_models_final_web.pdf [Accessed 4 October 2022].

Cooper, K.M., Bolam, S.G., Downie, A-L. and Barry, J., (2019). *Biological-based habitat classification approaches promote cost-efficient monitoring: An example using seabed assemblages*. [online] Available at:

<https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2664.13381> [Accessed 26 August 2022].

Copping, A. (2018). *The State of Knowledge for Environmental Effects Driving Consenting/Permitting for the Marine Renewable Energy Industry*. Prepared for Ocean Energy Systems On behalf of the Annex IV Member Nations, January 2018.

Copping, A. E., Hemery, L. G., Overhus, D. M., Garavelli, L., Freeman, M. C., Whiting, J. M., and Tugade, L. G. (2020). *Potential environmental effects of marine renewable energy development—the state of the science*. *Journal of Marine Science and Engineering*, 8(11), 879.

Coull, K. A., Johnstone, R., and Rogers, S. I. (1998). *Fisheries sensitivity maps in British waters*. Published and distributed by UKOOA Ltd, 9.

Council of Europe, (1979). *The Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention')*. [online] Available at: <https://rm.coe.int/1680078aff> [Accessed 12 July 2022].

COWRIE, (2007). *Historic Environment Guidance for the Offshore Renewable Energy Sector*. [online] Available at:

https://www.wessexarch.co.uk/sites/default/files/field_file/COWRIE_2007_Wessex_%20-%20archaeo_%20guidance_Final_1-2-07.pdf [Accessed 6 October 2022].

Czech-Damal, N. U., G. Dehnhardt, P. Manger, and W. Hanke. (2013). *Passive electroreception in aquatic mammals*. *Journal of Comparative Physiology A-Neuroethology Sensory Neural and Behavioral Physiology* 199:555-563.

Department for Business, Enterprise and Regulatory Reform (BERR), (2008). *Fisheries Liaison with Offshore Wind and Wet Renewables Group (FLOWW) Recommendations For Fisheries Liaison: Best Practice guidance for offshore renewable developers*. Available at: <https://www.thecrownestate.co.uk/media/1775/ei-km-in-pc-fishing-012014-floww-best-practice-guidance-for-offshore-renewables-developments-recommendations-for-fisheries-liaison.pdf> [Accessed 6 January 2023].

Department for Environment, Food and Rural Affairs (DEFRA), (2011). *UK Marine Policy Statement*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf [Accessed: 8 July 2022].

Department of Energy and Climate Change (DECC), (2011a). *National Policy Statement for Electricity Networks Infrastructure (EN-5)*. [online] Available at: [1942-national-policy-statement-electricity-networks.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1942-national-policy-statement-electricity-networks.pdf) ([publishing.service.gov.uk](https://assets.publishing.service.gov.uk)) [Accessed 20 September 2022].

Department of Energy and Climate Change (DECC), (2011b). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. [online] Available at: [1940-nps-renewable-energy-en3.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1940-nps-renewable-energy-en3.pdf) ([publishing.service.gov.uk](https://assets.publishing.service.gov.uk)) [Accessed 20 September 2022].

Department of Energy and Climate Change (DECC), (2011c). *Overarching National Policy Statement for Energy (EN-1)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Accessed 11 August 2022].

Department of Energy and Climate Change (DECC), (2012). *Demonstrating Compliance with EMF Public Exposure Guidelines*. [online] Available at: <https://www.gov.uk/government/publications/demonstrating-compliance-with-emf-public-exposure-guidelines-voluntary-code-of-practice> [Accessed: 26 August 2022].

Dierschke, V., Furness, R.W. and Garthe, S., (2016). *Seabirds and offshore wind farms in European waters: Avoidance and attraction*. *Biological Conservation* 202, 59–68. [online] Available at: <https://doi.org/10.1016/j.biocon.2016.08.016> [Accessed 4 October 2022].

Doherty, P., Baxter, J., Gell, F., Godley, B.J., Graham, R.T., Hall, G., Hall, J., Hawkes, L.A., Henderson, S.M., Johnson, L. and Witt, M.J., (2017). *Long-term satellite tracking reveals variable seasonal migration strategies of basking sharks in the north-east Atlantic*. Sci Rep 7, 42837.

Drewitt, A.L., Langston, R.H.W., (2006). *Assessing the impacts of wind farms on birds*. Ibis 148, 29–42. [online] Available at: <https://doi.org/10.1111/j.1474-919X.2006.00516.x> [Accessed 4 October 2022].

Duck, C., Morris, C. and Thompson, D. (2014) *The Status of UK Harbour Seal Populations in 2013, Including Summer Counts of Grey Seals*. SCOS Briefing paper 14/03, University of St Andrews.

Duignan, P. J., Van Bresseem, M. F., Baker, J. D., Barbieri, M., Colegrove, K. M., De Guise, S. and Wellehan, J. F. (2014). *Phocine distemper virus: current knowledge and future directions*. Viruses, 6(12), 5093-5134.

Dynamic Coast, (2022). *The National Overview*. [online] Available at: <http://www.dynamiccoast.com/> [Accessed 26 August 2022].

Edwards, M. and John, W.G., (1996). *Chapter 4.3. Plankton. In: Coasts and seas of the United Kingdom. Region 3 North-east Scotland: Cape Wrath to St. Cyrus*, ed. by J.H. Barne, C.F. Robson, S.S. Kaznowska, J.P. Doody and N.C. Davidson, 65-68. Peterborough, Joint Nature Conservation Committee. (Coastal Directories Series.)

Eleftheriou, A. and Robertson, M.R., (1988). *The intertidal fauna of sandy beaches – a survey of the east Scottish coast*. Department of Agriculture and Fisheries for Scotland, Aberdeen (Scottish Fisheries Research Report, No. 38).

Ellis, J. R., Milligan, S. P., Readdy, L., Taylor, N. and Brown, M. J., (2012). *Spawning and nursery grounds of selected fish species in UK waters*. Science Series Technical Report, CEFAS Lowestoft, 147, 56.

European Environment Agency (EAA), (2022a). *EUNIS habitat classification: Factsheet for A3 – Infralittoral rock and other hard substrata*. [online] Available at: <https://eunis.eea.europa.eu/habitats/440#:~:text=Infralittoral%20rock%20includes%20habitats%20of,limit%20of%20dense%20seaweed%20growth> [Accessed: 26 August 2022].

European Environment Agency (EAA), (2022b). *EUNIS habitat classification: Factsheet for A3.1- Atlantic and Mediterranean high energy infralittoral rock*. [online] Available at: <https://eunis.eea.europa.eu/habitats/441> [Accessed: 26 August 2022].

European Environment Agency (EAA), (2022c). *EUNIS habitat classification: Factsheet for A3.2- Atlantic and Mediterranean moderate energy infralittoral rock*. [online] Available at: <https://eunis.eea.europa.eu/habitats/442> [Accessed: 26 August 2022].

European Environment Agency (EAA), (2022d). *EUNIS habitat classification: Factsheet for A3.3 – Atlantic and Mediterranean low energy infralittoral rock*. [online] Available at: <https://eunis.eea.europa.eu/habitats/443> [Accessed 14 September 2022].

European Environment Agency (EAA), (2022e). *EUNIS habitat classification: Factsheet for A4 – Circalittoral rock and other hard substrata*. [online] Available at: <https://eunis.eea.europa.eu/habitats/445> [Accessed 14 September 2022].

European Environment Agency (EAA), (2022f). *EUNIS habitat classification: Factsheet for A4.1- Atlantic and Mediterranean high energy circalittoral rock*. [online] Available at: <https://eunis.eea.europa.eu/habitats/446> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022g). *EUNIS habitat classification: Factsheet for A4.2 - Atlantic and Mediterranean moderate energy circalittoral rock*. [online] Available at: <https://eunis.eea.europa.eu/habitats/447> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022h). *EUNIS habitat classification: Factsheet for A4.27 - Faunal communities on deep moderate energy circalittoral rock*. [online] Available at: <https://eunis.eea.europa.eu/habitats/2339> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022i). *EUNIS habitat classification: Factsheet for A4.3 – Atlantic and Mediterranean low energy circalittoral rock*. [online] Available at: <https://eunis.eea.europa.eu/habitats/448> [Accessed 14 September 2022].

European Environment Agency (EAA), (2022j). *EUNIS habitat classification: Factsheet for A5 – Sublittoral sediment*. [online] Available at: <https://eunis.eea.europa.eu/habitats/423> [Accessed 14 September 2022].

European Environment Agency (EAA), (2022k). *EUNIS habitat classification: Factsheet for A5.13- Infralittoral coarse sediment*. [online] Available at: <https://eunis.eea.europa.eu/habitats/5423> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022l). *EUNIS habitat classification: Factsheet for A5.14- Circalittoral coarse sediment*. [online] Available at: <https://eunis.eea.europa.eu/habitats/593> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022m). *EUNIS habitat classification: Factsheet for A5.15- Deep circalittoral coarse sediment*. [online] Available at: <https://eunis.eea.europa.eu/habitats/5424> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022n). *EUNIS habitat classification: Factsheet for A5.23- Infralittoral fine sand*. [online] Available at: <https://eunis.eea.europa.eu/habitats/5427> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022o). *EUNIS habitat classification: Factsheet for A5.24- Infralittoral muddy sand*. [online] Available at: <https://eunis.eea.europa.eu/habitats/595> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022p). *EUNIS habitat classification: Factsheet for A5.25- Circalittoral fine sand*. [online] Available at: <https://eunis.eea.europa.eu/habitats/5428> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022q). *EUNIS habitat classification: Factsheet for A5.26- Circalittoral muddy sand*. [online] Available at: <https://eunis.eea.europa.eu/habitats/1689> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022r). *EUNIS habitat classification: Factsheet for A5.27- Deep circalittoral sand*. [online] Available at: <https://eunis.eea.europa.eu/habitats/2731> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022s). *EUNIS habitat classification: Factsheet for A5.37- Deep circalittoral mud*. [online] Available at: <https://eunis.eea.europa.eu/habitats/2733> [Accessed 26 August 2022].

European Environment Agency (EAA), (2022t). *EUNIS habitat classification: Factsheet for A5.45 – Deep circalittoral mixed sediments*. [online] Available at: <https://eunis.eea.europa.eu/habitats/2734> [Accessed 15 September 2022].

European Marine Observation and Data Network (EMODnet), (2019). *EMODnet Seabed Habitats*. [online] Available at: <https://www.emodnet-seabedhabitats.eu/access-data/launch-map-viewer/> [Accessed 26 August 2022].

European Marine Observation and Data Network (EMODnet), (2022). *EMODnet Human Activities*. [online] Available at: <https://www.emodnet-humanactivities.eu/> [Accessed: 8 July 2022].

European Subsea Cable Association (ESCA), (2018). *European Subsea Cable Association Statement on vessels operating in the vicinity of subsea cables*. [online] Available at: <https://www.escaeu.org/documents/> [Accessed: 7 September 2022].

EUSaMap, (2021). *EUSaMap 2021 Broad-Scale Predictive Habitat Map for Europe*. [online] Available at: <http://gis.ices.dk/geonetwork/srv/eng/catalog.search#/metadata/10d3d35c-8f8e-40ff-898f-32e0b037356c> [Accessed 26 August 2022].

Fernandez Betelu, O., Graham, I.M and Thompson, P.M., (2022). *Reef effect of offshore structures on the occurrence and foraging activity of harbour porpoises*. *Frontiers in Marine Science*, 2022. [online] Available at: <https://www.frontiersin.org/articles/10.3389/fmars.2022.980388/full> [Accessed 6 December 2022].

Fisher C. and Slater M., (2010). *Effects of Electromagnetic Fields on Marine Species: A Literature Review*. Prepared for the Oregon Wave Energy Trust by Ecology and Environment, Inc. and Science Applications International Corp.

Fisheries Liaison with Offshore Wind and Wet Renewables group (FLOWW), (2014). *FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison*. [online] Available at: <https://www.thecrownestate.co.uk/media/1775/ei-km-in-pc-fishing-012014-floww-best-practice-guidance-for-offshore-renewables-developments-recommendations-for-fisheries-liaison.pdf> [Accessed: 7 September 2022].

Fisheries Liaison with Offshore Wind and Wet Renewables group FLOWW, (2015). *FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds*. [online] Available at: <https://www.thecrownestate.co.uk/media/1776/floww-best-practice-guidance-disruption-settlements-and-community-funds.pdf> [Accessed: 7 September 2022].

Folk, R.L., (1954). *The distinction between grain size and mineral composition in sedimentary rock nomenclature*. *Journal of Geology*, 62, 344-359.

Forrester, R.W., Andrews, I.J., McInerney, C.J. and Scott, H.I. (Eds), (2007). *The Birds of Scotland*. *Scottish Ornithologists' Club*.

Francis, I., Cook, M., and Watson, A., (2011). *The Breeding Birds of North-East Scotland*. *Scottish Ornithologists' Club*.

Frost, M. and Diele, K., (2022). *Essential spawning grounds of Scottish herring: current knowledge and future challenges*. *Rev Fish Biol Fisheries* (2022) 32:721–744.

Furness R.W. and Wade H.M. (2012). *Vulnerability of Scottish seabirds to offshore wind turbines*. [online] Available at: <https://www.gov.scot/publications/vulnerability-scottish-seabirds-offshore-wind/> [Accessed 4 October 2022].

Furness R. W., Wade, H. M. and Masden E.A. (2013). *Assessing vulnerability of marine bird populations to offshore wind farms*. *Journal of Environmental Management* 119 pp.56-66.

Furness, R., (2015). *Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS)*. [online] Available at: <http://publications.naturalengland.org.uk/publication/6427568802627584> [Accessed 4 October 2022].

Gafeira, J., Green, S., Morando, A., Cooper, R., Long, D., and Gatliff, R., (2010). *Distribution of rock/hard substrate in UK offshore waters and England territorial waters - MB0103*. [online] Available at: https://www.researchgate.net/publication/283637148_Distribution_of_rockhard_substrate_in_UK_offshore_waters_and_England_territorial_waters_-_MB0103 [Accessed 20 September 2022].

Garthe, S. and Hüppop, O. (2004). *Scaling Possible Adverse Effects of Marine Wind Farms on Seabirds: Developing and Applying a Vulnerability Index*. Journal of Applied Ecology, 41, pp724-734.

Gilbert, G., Gibbons, D.W. and Evans, J. (1998). *Bird Monitoring Methods*. RSPB, Sandy.

Gill, A. (2016) *Effects of EMF on Marine Animals from Electrical Cables and Marine Renewable Energy Devices*, In OES-Environmental 2016 State of the Science Report: Environmental Effects of Marine Renewable Energy Development around the World; Copping, A., Sather, N., Hanna, L., Whiting, J., Zydlewski, G., Staines, G., Gill, A., Hutchison, I., O'Hagan, A., Simas, T., Bald, J., Sparling C., Wood, J., and Masden, E. 2016; pp. 107-127, [online] Available at: https://tethys.pnnl.gov/sites/default/files/publications/Annex-IV-2016-State-of-the-Science-Report_MR.pdf [Accessed 5 January 2023].

Gill, A. and Fairbairns, R.S., (1995). *Photo-identification of the minke whale Balaenoptera acutorostrata off the Isle of Mull, Scotland*. Developments in Marine Biology, 1995, 4, p.129-132.

Gill, A. and Desender, M., (2020) *Risk to Animals from Electro-magnetic Fields Emitted by Electric Cables and Marine Renewable Energy Devices*. In OES-Environmental 2020 State of the Science Report: Environmental Effects of Marine Renewable Energy Development around the World; Copping, A.E., Hemery, L.G., Eds.; Ocean Energy Systems (OES): Lisbon, Portugal, 2020; pp. 86–103, [online] Available at: https://tethys.pnnl.gov/sites/default/files/publications/OES-Environmental-2020-State-of-the-Science-Ch-5_final_hr.pdf [Accessed 5 January 2023].

Gill A., and Taylor H., (2001). *The potential effects of electromagnetic fields generated by cabling between offshore wind turbines upon elasmobranch fishes*. Countryside Council for Wales, Contract Science Report 488.

Gill A., Degraer S., Lipsky A., Mavraki N., Methratta E. and Brabant R., (2020). *Setting the Context for Offshore Wind Development Effects on Fish and Fisheries*. Oceanography.

Gill A.B., Huang Y., Gloyne-Philips I., Metcalfe J., Quayle V., Spencer J. and Wearmouth V., (2009). *COWRIE 2.0 Electromagnetic Fields (EMF) Phase 2: EMF-Sensitive Fish Response to EM Emissions from Subsea Electricity Cables of the type Used by the Offshore Renewable Energy Industry*. Commissioned by COWRIE Ltd (project reference COWRIE-EMF-1-06).

Gill, A., and Fairbairns, R.S. (1995). *Photo-identification of the minke whale Balaenoptera acutorostrata off the Isle of Mull, Scotland*.

Graham, I., Merchant, N., Farcas, A., Barton, T., Cheney, B., Bono, S. and Thompson, P., (2019). *Harbour porpoise responses to pile-driving diminish over time*. R. Soc. open sci. 6: 190335.

Gray, M., Stromberg, P-L. and Rodmell, D., (2016). *Changes to fishing practices around the UK as a result of the development of offshore windfarms – Phase 1 (Revised)*. [online] Available at: <https://www.thecrownestate.co.uk/media/2600/final-published-ow-fishing-revised-aug-2016-clean.pdf> [Accessed: 7 September 2022].

Green Volt, (2021). *Green Volt Offshore Windfarm – Offshore Environmental Impact Assessment: Offshore Scoping Report*. [online] Available at: https://marine.gov.scot/sites/default/files/scoping_report_green_volt_offshore_wind_farm.pdf [Accessed: 26 August 2022].

Greenstreet, S., Fraser, H., Armstrong, E. and Gibb, I. (2010). *Monitoring the consequences of the northwestern North Sea sandeel fishery closure*. Scottish Marine and Freshwater Science, 1, 1-34.

Hague E.L., Sinclair, R.R., and Sparling, C.E. (2020). *Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters*. Scottish Marine and Freshwater Science. 11 (12).

- Hammond, P., Lacey, C., Gilles, A., Viquerat, S., Börjesson, P., Herr, H., Macleod, K., Didoux, V., Santos, M., Scheidat, M., Teilmann, J., Vingada, J. and Øien, J., (2021). *Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys*. [online] Available at: <https://edepot.wur.nl/414756> [Accessed 6 December 2022].
- Hansom, J.D., Lees, G., McGlashan, J. and John S., (2004). *Shoreline Management Plans and Coastal Cells in Scotland*. Coastal Management, 32(3), pp.227-242. [online] Available at: <https://www.tandfonline.com/doi/abs/10.1080/08920750490448505> [Accessed 20 September 2022].
- Harsanyi P., Scott K., Easton B.A.A., de la Cruz Ortiz G., Chapman E.C.N., Piper A.J.R., Rochas C.M.V. and Lyndon A.R., (2022). *The Effects of Anthropogenic Electromagnetic Fields (EMF) on the Early Development of Two Commercially Important Crustaceans, European Lobster, Homarus gammarus (L.) and Edible Crab, Cancer pagurus (L.)*. Journal of Marine Science and Engineering.
- Heard, J.R., (2007). *Salmo salar* Atlantic salmon. In Tyler-Walters H. and Hiscock K. *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*, Plymouth: Marine Biological Association of the United Kingdom. [online] Available from: <https://www.marlin.ac.uk/species/detail/2096> [Accessed 7 September 2022].
- Hebridean Whale and Dolphin Trust, (2022). *A picture tells a thousand words*. [online] Available at: <https://hwdt.org/news/photoid> [Accessed 07 October 2022].
- Historic Environment Scotland (HES), (2019a). *Historic Environment Policy for Scotland*. [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7> [Accessed 6 October 2022].
- Historic Environment Scotland (HES), (2019b). *Gardens and Designed Landscapes of Aberdeenshire*. [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=7c365ace-e62d-46d2-8a10-a5f700a788f3> [Accessed 10 October 2022].
- Historic Environment Scotland (HES), (2021). *Scotland's Historic Marine Protected Areas*. [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=fe248e27-0c19-4e4e-8d65-a62d00a2ce6a> [Accessed 6 October 2022].
- Historic Environment Scotland (HES), (2022). *Spatial Datasets Sitelink*. [online] Available at: <https://spatialdata.gov.scot/geonetwork/srv/eng/catalog.search#/metadata/8d34a5b7-3b38-4c69-b145-5875d6b83144> [Accessed 6 October 2022].
- Hitchcock, D. R. and Bell, S., (2004). Physical impacts of marine aggregate dredging on seabed resources in coastal deposits, Journal of Coastal Research. 20, 101-114.
- Holland, G.J., Greenstreet, S.P.R., Gibb, I.M., Fraser, H.M. and Robertson, M.R., (2005). *Identifying sandeel Ammodytes marinus sediment habitat preferences in the marine environment*. Marine Ecological Progress Series, 30, 269–282.
- Holmes R, Bulat J, Henni P, Holt J, James C, Kenyon N, Leslie A, Long D, Musson R, Pearson S, Stewart H (2004). *DTI Strategic Environmental Assessment Area 5 (SEA5): Seabed and superficial geology and processes*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197385/SEA5_TR_Geology_BGS.pdf [Accessed 20 September 2022].
- Horswill, C. and Robinson, R.A., (2015). *Review of seabird demographic rates and density dependence*. [online] Available at: <https://hub.jncc.gov.uk/assets/897c2037-56d0-42c8-b828-02c0c9c12d13> [Accessed 4 October 2022].

- Howson, C.M, Steel, L., Carruthers, M. and Gillham, K., (2012). *Identification of Priority Marine Features in Scottish territorial waters*. Scottish Natural Heritage Commissioned Report No. 388. [online] Available at: <https://www.nature.scot/doc/naturescot-commissioned-report-388-identification-priority-marine-features-scottish-territorial> [Accessed: 26 August 2022].
- Hutchison Z., Gill A., Sigray P., He H., and King J.W., (2020). *Anthropogenic electromagnetic fields (EMF) influence the behaviour of bottom-dwelling marine species*. Scientific Reports 10(1) [online] Available at: <https://pubmed.ncbi.nlm.nih.gov/32144341/#:~:text=Anthropogenic%20electromagnetic%20fields%20%28EMF%29%20influence%20the%20behaviour%20of,mates%20as%20well%20as%20to%20orientate%20and%20migrate.> [Accessed: 26 August 2022].
- Hywind, (2015). *Hywind Scotland Pilot Park Environmental Statement*. [online] Available at: <https://cdn.sanity.io/files/h61q9gi9/global/621c1e2b5c660fddc74a85142e99ac3f29ab0eb2.pdf?hywind-scotland-environmental-statement-april-2015-equinor.pdf> [Accessed 26 August 2022].
- Inter-Agency Marine Mammal Working Group (IAMMWG), (2022). *Updated abundance estimates for cetacean Management Units in UK waters*. JNCC Report No. 680.
- International Association of Lighthouse Authorities (IALA), (2021a). *Recommendation R0139 The Marking of Man-Made Structures*. [online] Available at: <https://www.iala-aism.org/product/r0139/> [Accessed: 21 September 2021].
- International Association of Lighthouse Authorities (IALA), (2021b). *G1162 The Marking of Offshore Man-Made Structures*. [online] Available at: <https://www.iala-aism.org/product/g1162/> [Accessed: 21 September 2021].
- International Cable Protection Committee, (2009). *Fishing and Submarine Cables - Working Together*. [online] Available at: <https://www.iscpc.org/publications/> [Accessed: 7 September 2022].
- International Commission on Non-Ionizing Radiation Protection (ICNIRP), (2020). *ICNIRP Guidelines* [online] Available at: <https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf> [Accessed: 26 August 2022].
- International Council for the Exploration of the Sea (ICES), (2016). *Report of the Working Group of International Pelagic Surveys (WGIPS)*. [online] Available at: <https://archimer.ifremer.fr/doc/00586/69770/67661.pdf> [Accessed 4 October 2022].
- International Council for the Exploration of the Sea (ICES), (2021). Spatial data layers of fishing intensity/pressure for EU vessels operating within ICES defined Celtic Seas Ecoregion and Greater North Sea Ecoregion.
- International Maritime Organization (IMO), (2018). *MSC-MEPC.2/Circ.12/Rev.2 Revised Guidelines for Formal Safety Assessment for use in the IMO Rule-Making Process*. [online] Available at: [https://wwwcdn.imo.org/localresources/en/OurWork/HumanElement/Documents/MSC-MEPC.2-Circ.12-Rev.2%20-%20Revised%20Guidelines%20For%20Formal%20Safety%20Assessment%20\(Fsa\)For%20Use%20In%20The%20Imo%20Rule-Making%20Proces...%20\(Secretariat\).pdf](https://wwwcdn.imo.org/localresources/en/OurWork/HumanElement/Documents/MSC-MEPC.2-Circ.12-Rev.2%20-%20Revised%20Guidelines%20For%20Formal%20Safety%20Assessment%20(Fsa)For%20Use%20In%20The%20Imo%20Rule-Making%20Proces...%20(Secretariat).pdf) [Accessed: 21 September 2021].
- International Union for Conservation of Nature (IUCN). (2017). *The IUCN Red List of Threatened Species*. Version 2017-3. Available at <http://www.iucnredlist.org> [Accessed 7 September 2022].
- Jensen, H., Rindorf, A., Wright, P.J. and Mosegaard, H., (2011). *Inferring the location and scale of mixing between habitat areas of lesser sandeel through information from the fishery*. ICES Journal of Marine Science, 68, 43-51.
- Johnston, A, Cook, A.S.C.P., Wright, L.J., Humphreys, E.M., Burton, N.H.K., (2014a). *Corrigendum*. *Journal of Applied Ecology* 51, 31–41 [online] Available at:

<https://besjournals.onlinelibrary.wiley.com/doi/10.1111/1365-2664.12191> [Accessed 4 October 2022].

Johnston, A., Cook, A. S. C. P., Wright, L. J., Humphreys, E. M. and Burton, N. H. K. (2014b). *Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines*. *Journal of Applied Ecology*, 51: 31–41. doi:10.1111/1365-2664.12191).

Joint Nature Conservation Committee (JNCC) and Department for Environment Food and Rural Affairs (DEFRA), (2012). *UK Post-2010 Biodiversity Framework (2012–2019)*. [online] Available at: <https://data.jncc.gov.uk/data/587024ff-864f-4d1d-a669-f38cb448abdc/UK-Post2010-Biodiversity-Framework-2012.pdf> [Accessed 12 July 2022].

Joint Nature Conservation Committee (JNCC), (2010a). *Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise*. [online] Available at: <https://data.jncc.gov.uk/data/31662b6a-19ed-4918-9fab-8fbcff752046/JNCC-CNCB-Piling-protocol-August2010-Web.pdf> [Accessed 6 December 2022].

Joint Nature Conservation Committee (JNCC), (2010b). *JNCC guidelines for minimising the risk of injury to marine mammals from using explosives*. [online] Available at: <https://data.jncc.gov.uk/data/24cc180d-4030-49dd-8977-a04ebe0d7aca/JNCC-Guidelines-Explosives-Guidelines-201008-Web.pdf> [Accessed 6 December 2022].

Joint Nature Conservation Committee (JNCC), (2018). *Conservation Objectives for Turbot Bank Nature Conservation Marine Protected Area*. [online] Available at: <https://data.jncc.gov.uk/data/63f05a50-a78b-4a58-9bde-d78261780729/TurbotBank-2-ConservationObjectives-V1.0.pdf> [Accessed 26 August 2022].

Joint Nature Conservation Committee (JNCC) and Natural England, (2011). *General advice on assessing potential impacts of and mitigation for human activities on Marine Conservation Zone (MCZ) features, using existing regulation and legislation*. [online] Available at: <https://hub.jncc.gov.uk/assets/6aff8099-10e1-4323-a4d5-b8539b8013b0> [Accessed 20 September 2022].

Joint Nature Conservation Committee (JNCC), (2019a). *European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S1351 - Harbour porpoise (Phocoena phocoena) United Kingdom*. [online] Available at: <https://jncc.gov.uk/jncc-assets/Art17/S1351-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 6 December 2022].

Joint Nature Conservation Committee (JNCC), (2019b). *European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S1349 - Bottlenose dolphin (Tursiops truncatus) United Kingdom*. [online] Available at: <https://jncc.gov.uk/jncc-assets/Art17/S1349-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 6 December 2022].

Joint Nature Conservation Committee (JNCC), (2019c). *European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S2032 - White-beaked dolphin (Lagenorhynchus albirostris) United Kingdom*. [online] Available at: <https://jncc.gov.uk/jncc-assets/Art17/S2032-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 6 December 2022].

Joint Nature Conservation Committee (JNCC), (2019d). *European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S2618 - Minke whale*

(*Balaenoptera acutorostrata*) United Kingdom. [online] Available at: <https://jncc.gov.uk/jncc-assets/Art17/S2618-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 6 December 2022].

Joint Nature Conservation Committee (JNCC), (2019e). *European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S1365 - Common seal (Phoca vitulina) United Kingdom*. [online] Available at: <https://jncc.gov.uk/jncc-assets/Art17/S1365-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 6 December 2022].

Joint Nature Conservation Committee (JNCC), (2019f). *European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S1364 - Grey seal (Halichoerus grypus) United Kingdom*. [online] Available at: <https://jncc.gov.uk/jncc-assets/Art17/S1364-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 6 December 2022].

Joint Nature Conservation Committee (JNCC), (2020). *Seabird Population Trends and Causes of Change: 1986–2018 Report*. [online] Available at: https://jncc.gov.uk/media/3617/smp-annual-report_1986-2018.pdf [Accessed 4 October 2022].

Joint Nature Conservation Committee (JNCC), (2021). *Nature Positive 2030 Summary Report*. [online] Available at: <https://data.jncc.gov.uk/data/6de7bf27-055e-4407-ad29-4814e1613d90/nature-positive-2030-summary-report.pdf> [Accessed 26 August 2022].

Joint Nature Conservation Committee (JNCC), (2022a). *Special Areas of Conservation*. [online] Available at: <https://jncc.gov.uk/our-work/special-areas-of-conservation/> [Accessed 26 August 2022].

Joint Nature Conservation Committee (JNCC), (2022b). *UK Post-2010 Biodiversity Framework (2012–2019)*. [online] Available at: <https://data.jncc.gov.uk/data/587024ff-864f-4d1d-a669-f38cb448abdc/UK-Post2010-Biodiversity-Framework-2012.pdf> [Accessed 12 July 2022].

Judd, A.G., (2001). *Pockmarks in the UK Sector of the North Sea*. [online] Available at: [Microsoft Word - TR_002.doc \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/100202/Word_-_TR_002.doc) [Accessed 20 September 2022].

Judd, A.G., (2012). *Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects*. [online] Available at: https://tethys.pnnl.gov/sites/default/files/publications/CEFAS_2012_Eenvironmental_Assessment_Guidance.pdf [Accessed: 26 August 2022].

Kincardine Offshore Wind Ltd (KOWL), (2019). *Kincardine Offshore Windfarm Project: Project Environmental Monitoring Plan*. [online] Available at: https://marine.gov.scot/sites/default/files/project_environmental_monitoring_plan_pemp_c2.pdf [Accessed 4 October 2022].

Kober, K., Webb, A., Win, I., Lewis, M., O'Brien, S., Wilson, L.J. and Reid, J.B. (2010). *An Analysis of the Numbers and Distribution of Seabirds within the British Fishery Limit Aimed at Identifying Areas that Qualify as Possible Marine SPAs*. [online] Available at: <https://hub.jncc.gov.uk/assets/7db38547-5074-4136-8973-fd7d97666120> [Accessed 4 October 2022].

Kraus, S.D., R.D. Kenney, and L. Thomas. (2019). *A Framework for Studying the Effects of Offshore Wind Development on Marine Mammals and Turtles*. Report prepared for the Massachusetts Clean Energy Center, Boston, MA 02110, and the Bureau of Ocean Energy Management.

Lacey, C., Gilles, A., Börjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M., Scheidat, M., Teilmann, J., Sveegaard, S., Vingada, J., Viquerat, S., Øien, N. and Hammond, P. (2022).

Modelled density surfaces of cetaceans in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys.

Landscape Institute and The Institute of Environmental Management and Assessment (IEMA), (2013). *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition (GLVIA3). [online] Available at: https://www.cheltenham.gov.uk/download/downloads/id/7979/q8a_-_guidelines_for_landscape_and_visual_impact_assessment_3rd_edition.pdf [Accessed 10 October 2022].

Landscape Institute, (2006). *The European Landscape Convention (ELC)*. [online] Available at: <https://www.landscapeinstitute.org/policy/13732-2/> [Accessed 10 October 2022].

Landscape Institute, (2019a). *Residential Visual Amenity Assessment: Technical Information Note*. [online] Available at: <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/03/tgn-02-2019-rvaa.pdf> [Accessed 10 October 2022].

Landscape Institute, (2019b). *Visual Representation of Development Proposals*, Technical Guidance Note 06/19. [online] Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf [Accessed 10 October 2022].

MacArthur Green, (2018). *Auk Tagging and Monitoring Interim Report 2018*. [online] Available at: <https://group.vattenfall.com/uk/siteassets/wind-pdf-documents/eowdc/eowdc-oxford-brookes-interim-report-final-2018.pdf> [Accessed 4 October 2022].

MacArthur Green, (2019). *Auk Tagging and Monitoring. Interim Report 2019*. [online] Available at: <https://group.vattenfall.com/uk/siteassets/wind-pdf-documents/eowdc/auk-and-quillemot-tagging-study-by-macarthur-green.pdf> [Accessed 4 October 2022].

Maclean, I., Wright, L., Showler, D. and Rehfish, M., (2009). *A Review of Assessment Methodologies for Offshore Windfarms*. [online] Available at: <https://tethys.pnnl.gov/sites/default/files/publications/Maclean-et-al-2009.pdf> [Accessed 26 August 2022].

Malcolm, I. A., Godfrey, J. and Youngson, A. F. (2010). *Review of migratory routes and behaviour of Atlantic salmon, Sea trout and European eel in Scotland's coastal environment: implications for the development of marine renewables*. Scottish Marine and Freshwater Science, 1, 14-82.

Marine (Scotland) Act (asp. 5). [online] Available at: <https://www.legislation.gov.uk/asp/2010/5/contents> [Accessed 8 July 2022].

Marine (Scotland) Act 2010. (asp. 5). [online] Available at: <https://www.legislation.gov.uk/asp/2010/5/contents> [Accessed: 23 June 2022].

Marine Coastal and Access Act 2009 (c. 23). [online] Available at: <https://www.legislation.gov.uk/ukpga/2009/23/contents> [Accessed: 23 June 2022].

Marine Data Exchange, (2022). *Marine Data Exchange*. [online] Available at: <https://www.marinedataexchange.co.uk/> [Accessed 26 August 2022].

Marine Mammal Organisation (MMO) (2019). *An Approach to Seascape Sensitivity Assessment*. [online] Available at: <https://www.gov.uk/government/publications/seascapes-methodology-mmo1204> [Accessed 10 October 2022].

Marine Management Organisation (MMO), (2021). *IFISH database with landing statistics data for UK registered vessels for 2016 to 2020 with attributes for: landing year; landing month; vessel length category; country code; ICES rectangle; vessel/gear type; species; live weight (tonnes); and value; and landing year; landing month; vessel length category; country code; vessel/gear type; port of landing; species; live weight (tonnes); and value*. [online] Available at:

<https://www.gov.uk/guidance/fishing-activity-and-landings-data-collection-and-processing>

[Accessed 6 December 2022].

Marine Scotland, (2014). *Guidance on the Offence of Harassment at Seal Haul-out Sites (Protection of Seals Orders) – May 2017*. [online] Available at: https://consult.gov.scot/marine-environment/possible-designation-of-a-seal-haul-out-site/user_uploads/guidance-on-the-offence-of-harassment-at-seal-haul-out-sites.pdf-1#:~:text=Section%20117%20of%20the%20Marine,at%20a%20haul%2Dout%20site. [Accessed 24 October 2022].

Marine Scotland, (2017) *Designated haul-out sites for seals (Protection of Seals Orders) – May 2017*. [online] Available at: <https://marine.gov.scot/maps/446> [Accessed 24 October 2022].

Marine Scotland, (2018a). *EIA Report - Technical Chapters - Seagreen Alpha and Bravo Wind Farms*. [online] Available at: <https://marine.gov.scot/data/eia-report-technical-chapters-seagreen-alpha-and-bravo-wind-farms> [Accessed 8 July 2022].

Marine Scotland, (2020). *Guidance on preparing a Fisheries Management and Mitigation Strategy ("FMMS")*. https://marine.gov.scot/sites/default/files/fmms_draft_guidance_document_1.pdf [Accessed: 7 September 2022].

Marine Scotland, (2021a). *Damage to Gear Compensation Claim Forms*. [online] Available at: <https://marine.gov.scot/data/compensation-claim-form-offshore-renewables-activity> [Accessed: 7 September 2022].

Marine Scotland, (2021b). *Guidance on completing Damage to Gear Compensation Claim Forms*. [online] Available at: <https://marine.gov.scot/data/compensation-claim-form-offshore-renewables-activity> [Accessed: 7 September 2022].

Marine Scotland, (2022). *Aquaculture Spatial Data*. [online] Available at: <https://marine.gov.scot/information/aquaculture-locational-guidance-collection-spatial-data-resources-assist-planning-and> [Accessed: 8 July 2022].

Marine Scotland, (2022a). *Stratification*. <https://marine.gov.scot/sma/assessment/stratification>. [Accessed 26 August 2022].

Marine Scotland, (2022b). *Sitelink*. [online] at: <http://www.marine.gov.scot> [Accessed 26 August 2022].

Marine Scotland, (2022c). *Feature Activity Sensitivity Tool*. [online] Available at: <https://www.marine.scotland.gov.uk/feast/>. [Accessed 26 August 2022].

Marine Scotland, (2022d). *Habitat Maps of Scotland*. [online] Available at: <https://marinescotland.atkinsgeospatial.com/nmpi/default.aspx?layers=958> [Accessed 26 August 2022].

Marine Scotland, (2022e). *Kelp beds*. [online] Available at: <https://marine.gov.scot/node/14689> [Accessed 13 October 2022].

Marine Scotland, (2022f). *Burrow mud*. [online] Available at: <https://marine.gov.scot/node/14626> [Accessed 13 October 2022].

Marine Scotland, (2022g). *Ocean Quahog*. [online] Available at: <https://marine.gov.scot/node/12704> [Accessed 13 October 2022].

Marine Scotland, (2022h). *Maps NMPi*. [online] Available at: <https://marinescotland.atkinsgeospatial.com/nmpi/> [Accessed: 7 September 2022].

Marine Scotland, (2022i). *Historic Marine Protected Areas (HMPAs) - protected wrecks contributing to the MPA network (HES WMS) (OSCP)*. [online] Available at: <https://marine.gov.scot/maps/1469> [Accessed 6 October 2022].

MarineSpace Ltd (2021). *Volume 3. Technical Appendix: 7.2 EMF Assessment*. [online] Available at: [https://www.bluegemwind.com/wp-content/uploads/2020/07/Erebus-ES-Vol-3-Appendix-7.2-EMF-Assessment .pdf](https://www.bluegemwind.com/wp-content/uploads/2020/07/Erebus-ES-Vol-3-Appendix-7.2-EMF-Assessment.pdf) [Accessed: 26 August 2022].

Maritime Coastguard Agency (MCA), (2008). *MGN 372 Offshore Renewable Energy Installations (OREIs): Guidance to Mariners Operating in the Vicinity of UK OREIs*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/940185/MGN_372.pdf [Accessed: 21 September 2021].

Maritime Coastguard Agency (MCA), (2018). *MGN 543 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response*. [online] Available at: <https://www.gov.uk/government/publications/mgn-543-mf-safety-of-navigation-offshore-renewable-energy-installations-oreis-uk-navigational-practice-safety-and-emergency-response> [Accessed: 21 September 2021].

Maritime Coastguard Agency (MCA), (2021). *MGN 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response*. [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/980898/MGN_654 - FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/980898/MGN_654_-_FINAL.pdf) [Accessed: 21 September 2021].

Maritime Coastguard Agency and Health and Safety Executive (MCA and HSE), (2017). *Regulatory expectations on moorings for floating wind and marine devices*. [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/640962/Regulatory expectations on mooring devices from HSE and MCA.PDF](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/640962/Regulatory_expectations_on_mooring_devices_from_HSE_and_MCA.PDF) [Accessed: 21 September 2021].

Masden, E.A., Haydon, D.T., Fox, A.D., Furness, R.W., (2010). *Barriers to movement: Modelling energetic costs of avoiding marine wind farms amongst breeding seabirds*. [Online]. Available at: <https://doi.org/10.1016/j.marpolbul.2010.01.016> [Accessed 4 October 2022].

Masden, E.A., Reeve, R., Desholm, M., Fox, A.D., Furness, R.W., Haydon, D.T., (2012). *Assessing the impact of marine wind farms on birds through movement modelling*. [Online]. Available at: <https://doi.org/10.1098/rsif.2012.0121> [Accessed 4 October 2022].

Maxwell, S., Kershaw, F., Locke, C., Connors, M., Dawson, C., Aylesworth, S., Loomis, R. and Johnson, A. (2022) *Potential impacts of floating wind turbine technology for marine species and habitats*. *Journal of Environmental Management*. 307.

May, R.F., Lund, P.A., Langston, R., Dahl, E.L., Bevanger, K.M., Reitan, O., Nygård, T., Pedersen, H.C., Stokke, B.G. and Røskaft, E., (2010). *Collision risk in white-tailed eagles. Modelling collision risk using vantage point observations in Smøla wind-power plant*. [online] Available at: https://www.researchgate.net/publication/255180488_Collision_Risk_in_White-tailed_Eagles_Modelling_Collision_Risk_Using_Vantage_Point_Observations_in_Smola_Wind-power_Plant [Accessed 4 October 2022].

McGregor, R.M., King, S., Donovan, C.R., Caneco, B. and Webb, A., (2018). *A Stochastic Collision Risk Model for Seabirds in Flight*. [Online]. Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/factsheet/2021/02/stochastic-collision-risk-model-for-seabirds-in-flight/documents/full-report/full-report/govscot%3Adocument/full%2Breport.pdf> [Accessed 4 October 2022].

Meißner K., Schabelon H., Bellebaum J., and Sordyl H., (2006). *Impacts of submarine cables on the marine environment: a literature review*. Federal Agency of Nature Conservation/ Institute of Applied Ecology Ltd.

Merchant Shipping Act 1995 (SI 1995 21). [online] Available at: <https://www.legislation.gov.uk/ssi/2015/193/contents/> [Accessed 6 October 2022].

Met Office, (2018). *UK Climate Projections Science Report: UKCP18 Marine report*. [online] Available at: [ukcp18-marine-report-updated.pdf \(metoffice.gov.uk\)](https://www.metoffice.gov.uk/media/document/ukcp18-marine-report-updated.pdf) [Accessed 20 September 2022].

Mitchell, P.I., Newton, S.F., Ratcliffe, N. and Dunn, T.E. (2004). *Seabird populations of Britain and Ireland*. T. and AD Poyser, London.

Mitchell, I., Aonghais Cook, A., Douse, A., Foster, S., Kershaw, M., Neil McCulloch, N., Murphy, M. and Hawkrigde, J., (2018). *Marine Bird Breeding Success/failure*. [online] Available at: <https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/birds/breedingsuccess/> [Accessed 4 October 2022].

Moray Offshore Renewables Limited, (2012). *Moray Offshore renewables Limited Environmental Statement – Telford, Stevenson and MacColl Offshore Wind Farms and Transmission Infrastructure: Chapter 4 Biological Environment*. [online] Available at: <https://www.morayeast.com/application/files/6915/8013/6681/Chapter-4-Biological-Environment-Baseline.pdf> [Accessed: 26 August 2022].

Moray Offshore Renewables Limited, (2019a). *Telford, Stevenson, MacColl Wind Farms and Associated Transmission Infrastructure Environmental Statement. Technical Appendix 4.3 D-Electromagnetic Field Modelling*. [online] Available at: https://marine.gov.scot/datafiles/lot/morl/Environmental_statement/Volumes%208%20to%2011%20-%20Technical%20Appendices/Volume%2010%20Part%201%20-%20Biological%20Environment%20Technical%20Appendices/Appendix%204.3%20D%20-%20Electromagnetic%20Fields%20Modelling.pdf [Accessed:26 August 2022].

Moray Offshore Renewables Limited, (2019b). *Environmental Statement: MacColl, Telford and Stevenson Offshore Wind Farms, Moray East Offshore Wind Farms, Outer Moray Firth*. [online] Available at: <https://marine.gov.scot/data/environmental-statement-maccoll-telford-and-stevenson-offshore-wind-farms-moray-east-offshore> [Accessed: 6 December 2022].

Morris, C., Duck, C. and Thompson, D., (2021). *Aerial surveys of seals in Scotland during the harbour seal moult, 2016-2019*. NatureScot Research Report 1256.

Mueller-Blenkle, C., McGregor, P.K., Gill, A.B., Andersson, M.H., Metcalfe, J., Bendall, V., Sigray, P., Wood, D.T. and Thomsen, F. (2010). *Effects of Pile-driving Noise on the Behaviour of Marine Fish*. COWRIE Ref: Fish 06-08, Technical Report. [online] Available at: https://tethys.pnnl.gov/sites/default/files/publications/Mueller-Benkle_et_al_2010.pdf [Accessed 2 September 2022].

Multi-Agency Geographic Information for the Countryside (MAGIC), (2022). *Multi-Agency Geographic Information for the Countryside*. [online] Available at: <https://magic.defra.gov.uk/magicmap.aspx> [Accessed: 26 August 2022].

National Biodiversity Network (NBN), (2022). *National Biodiversity Network Data*. [online] Available at: <https://nbn.org.uk/> [Accessed 26 August 2022].

National Grid and Energinet, (2017). *Volume 2L UK Offshore Environmental Statement*. Viking Link Document No VKL-07-30-J800-007/ [online] Availabe at: https://viking-link.com/media/1167/vkl-07-30-j800-086_viking-link-end-to-end-environmental-assessment.pdf [Accessed 6 December 2022].

National Tide and Sea Level Facility (2022). *Sitelink*. [online] at: <http://www.ntsif.org> [Accessed 26 August 2022].

National Trust for Scotland, (2022). *Sitelink*. [online] Available at: <https://www.nts.org.uk/> [Accessed 10 October 2022].

Natural England (2019). *A Population Viability Analysis Modelling Tool for Seabird Species*. [online] Available at: <https://marine.gov.scot/sma/content/population-consequences-displacement-proposed-offshore-wind-energy-developments-seabirds> [Accessed 4 October 2022].

Natural Environment Research Council Special Committee on Seals, (2021). *Scientific Advice on Matters Related to the Management of Seal Populations*: 2021.

Natural Resources Wales (NRW), (2019). *Benthic habitat assessment guidance for marine developments and activities. Guidance for undertaking benthic marine habitats survey and monitoring*. [online] Available at: <https://cdn.naturalresources.wales/media/691900/gn030-guidance-note-final-2-mar2019.pdf> [Accessed: 26 August 2022].

Nature Conservation (Scotland) Act 2004. (asp 6). [online] Available at: <https://www.legislation.gov.uk/asp/2004/6/contents> [Accessed 16 August 2022].

NatureScot. (2018). *Interim Guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs*. [Online] Available at: <https://www.nature.scot/doc/interim-guidance-apportioning-impacts-marine-renewable-developments-breeding-seabird-populations> [Accessed 4 October 2022].

NatureScot, (2020a). *Designated site: Citation for Ythan Estuary, Sands of Forvie and Meikle Loch SPA*. [online] Available at: <https://sitelink.nature.scot/site/8592> [Accessed 26 August 2022].

NatureScot, (2020b). *Southern Trench Marine Protected Area Conservation and Management Advice*. [online] Available at: <https://sitelink.nature.scot/site/10477> [Accessed 26 August 2022].

NatureScot (2020c). *Conservation and Management Advice*. [online] Available at: <https://www.nature.scot/doc/about-conservation-advice-documents-european-sites-scotland> [Accessed 4 October 2022].

NatureScot (2020d). *Seasonal Periods for Birds in the Scottish Marine Environment*. [online] Available at: <https://www.nature.scot/sites/default/files/2020-10/Guidance%20note%20-%20Seasonal%20definitions%20for%20birds%20in%20the%20Scottish%20Marine%20Environment.pdf> [Accessed 4 October 2022].

NatureScot, (2020e). *Draft Landscape Sensitivity Assessment Guidance*. [online] Available at: <https://www.nature.scot/sites/default/files/2020-12/Landscape%20Sensitivity%20Assessment%20Guidance.pdf> [Accessed 10 October 2022].

NatureScot, (2020f). *Landscape Character Assessment Guidance*. [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment> [Accessed 10 October 2022].

NatureScot, (2021). *Assessing the cumulative landscape and visual impact of onshore wind energy developments*. [online] Available at: <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments> [Accessed 10 October 2022].

NatureScot, (2022a) *Marine non-native species*. [online] Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/managing-coasts-and-seas/marine-non-native-species> [Accessed 26 August 2022].

NatureScot, (2022b). *Marine Protected Areas (MPAs)*. [online] Available at: <https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/marine-protected-areas-mpas> [Accessed: 26 August 2022].

NatureScot, (2022c). *Priority Marine Features in Scotland's Seas – Habitats*. [online] Available at: <https://www.nature.scot/doc/priority-marine-features-scotlands-seas-habitats> [Accessed: 26 August 2022].

NatureScot, (2022d). *Ancient Woodland Inventory (AWI)*. [online] Available at: <https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-aw> [Accessed 10 October 2022].

- Nedelec, S.L, Campbell, J., Radford, A.N., Simpson, S.D., and Merchant, N.D., (2016). *Particle motion: the missing link in underwater acoustic ecology*. [online] Available at: <https://besjournals.onlinelibrary.wiley.com/doi/10.1111/2041-210X.12544> [Accessed 14 September 2022].
- Nedwell, J., Barham, R., Brookes, K., Cordes, L., Bailey, H. and McLean, N. (2013) *Framework for assessing impacts of pile-driving noise from offshore wind farm construction on a harbour seal population*. Environmental Impact Assessment Review, 43, 73– 85.
- Noble-James, T. Jesus, A. and McBreen, F., (2018). *Monitoring Guidance for Marine Benthic Habitats Joint Nature Conservation Committee (JNCC) Report No: 598*. [online] Available at: <https://data.jncc.gov.uk/data/9ade4be8-63dd-4bbc-afd0-aefe71af0849/JNCC-Report-598-REVISED-WEB.pdf> [Accessed: 26 August 2022].
- Normandeau Associates, Exponent, Tricas, T. and Gill, A. (2011a). *Effects of EMFs from Undersea Power Cables on Elasmobranchs and Other Marine Species*. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Regulation, and Enforcement, Pacific OCS Region, Camarillo, CA. OCS Study BOEMRE 2011-09. [online] Available at: <https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Pacific-Region/Studies/2011-09-EMF-Effects.pdf> [Accessed: 25 October 2022].
- Normandeau Associates, (2011b). *Effects of EMFs from Undersea Power Cables on Elasmobranchs and Other Marine Species*. [online] Available at: <https://tethys.pnnl.gov/publications/effects-emfs-undersea-power-cables-elasmobranchs-other-marine-species> [Accessed: 26 August 2022].
- NorthConnect, (2018a). *NorthConnect Environmental Statement – Chapter 14: Benthic Ecology*. [online] Available at: https://marine.gov.scot/sites/default/files/14_benthic_ecology_0.pdf [Accessed 26 August 2022].
- NorthConnect. (2018b). *NorthConnect Environmental Statement – Chapter 15: Fish and Shellfish Ecology*. [online] Available at: https://marine.gov.scot/sites/default/files/15_fish_and_shellfish_0.pdf [Accessed 7 September 2022].
- NorthLink Ferries, (2022). *Sitelink*. [online] Available at: <https://www.northlinkferries.co.uk/> [Accessed 10 October 2022].
- OSPAR Commission (1992) *Convention for the Protection of the Marine Environment of the North East Atlantic*. [online] Available at: https://www.ospar.org/site/assets/files/1290/ospar_convention.pdf [Accessed 26 August 2022].
- OSPAR Commission, (2008a). *Assessment of the environmental impact of offshore wind-farms*. [online] Available at: <https://www.ospar.org/documents?v=7114> [Accessed: 26 August 2022].
- OSPAR Commission, (2008b). *OSPAR List of Threatened and/or Declining Species and Habitats*. [online] Available at: <https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats> [Accessed 26 August 2022].
- Ounanian, K., van Tatenhove, J. P., and Ramírez-Monsalve, P. (2020). *Midnight at the oasis: does restoration change the rigs-to-reefs debate in the North Sea?* Journal of Environmental Policy and Planning, 22(2), 211-225.
- Paramor, O.A.L., Allen, K.A., Aanesen, M., Armstrong, C., Hegland, T., Le Quesne, W., Piet, G.J., Raakær, J., Rogers, S., van Hal, R., van Hoof, L.J.W., van Overzee, H.M.J., and Frid C.L.J. (2009). *MEFEPO North Sea Atlas*. University of Liverpool. [online] Available at: https://www.liverpool.ac.uk/media/livacuk/mefepo/documents/wp1/atlas/NS_Atlas_English.pdf [Accessed: 6 December 2022].

- Paxton, C. G., Scott-Hayward, L. A. S., McKenzie, M., Rexstad, E. A., and Thomas, L. (2016). *Revised phase III data analysis of Joint Cetacean Protocol data resources*. Joint Nature Conservation Committee.
- Pearce, B. and Kimber, J., (2018). *The Status of Sabellaria spinulosa Reef off the Moray Firth and Aberdeenshire Coasts and Guidance for Conservation of the Species off the Scottish East Coast*. Scottish Marine and Freshwater Science (11:17). [online] Available at: <https://data.marine.gov.scot/dataset/status-sabellaria-spinulosa-reef-moray-firth-and-aberdeenshire-coasts-and-guidance> [Accessed 13 October 2022].
- Pennycuik, C.J. (1997). *Actual and 'Optimum' Flight Speed: Field Data Reassessed*. Journal of Experimental Biology, 200, 2355-2361.
- Pirotta, E., Merchant, N., Thompson, P., Barton, T. and Lusseau, D. (2015). *Quantifying the effect of boat disturbance on bottlenose dolphin foraging activity*, Biological Conservation. 181 (82-89).
- Planning Inspectorate, (2018). *Advice Note Nine: Rochdale Envelope*. [online] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/> [Accessed 10 October 2022].
- Popper A. N., Hawkins A. D., Fay R. R., Mann D. A., Bartol S., Carlson T. J., Coombs S., Ellison W. T., Gentry R. L., Halvorsen M. B., Lokkeborg S., Rogers P. H., Southall B. L., Zeddis D. G. and Tavalga W. N., (2014). *ASA S3/SC1.4 TR-2014 Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report* prepared by ANSI Accredited Standards Committee S3/SC1.
- Popper, A.N and Hawkins, A.D., (2018). *The importance of particle motion to fishes and invertebrates*. [online] Available at: <https://asa.scitation.org/doi/10.1121/1.5021594>. [Accessed 14 September 2022].
- Protection of Military Remains Act 1986 (SI 1986 35)*. [online] Available at: <https://www.legislation.gov.uk/ukpga/1986/35/contents> [Accessed 6 October 2022].
- Quick, N. J., Arso Civil, M., Cheney, B., Islas Villanueva, V., Janik, V., Thompson, P., and Hammond, P. S. (2014). *The east coast of Scotland bottlenose dolphin population: Improving understanding of ecology outside the Moray Firth SAC*.
- Reid, J., Evans, P. and Northridge, S. (2003) *Atlas of cetacean distribution in north-west European waters*. Joint Nature Conservation Committee.
- Reiss, H., Cunze, S., Konig, K., Neumann, H. and Kroncke, I., (2011). *Species distribution modelling of marine benthos: a North Sea case study*. [online] Available at: <https://www.int-res.com/abstracts/meps/v442/p71-86/> [Accessed 13 October 2022].
- RenewableUK, (2013). *Cumulative Impact Assessment Guidelines – Guiding Principles for Cumulative Impact Assessment in Offshore Wind Farms*. [online] Available at: <https://tethys.pnnl.gov/sites/default/files/publications/Cumulative-Impact-Assessment-Guidelines.pdf> [Accessed: 24 June 2022].
- Robinson, K.P. and Tetley, M.J., (2007) *Behavioural observations of foraging minke whales (Balaenoptera acutorostrata) in the outer Moray Firth, north-east Scotland*. Journal of the Marine Biological Association of the United Kingdom, 87(1), p.85-86. [online] Available at: http://www.crru.org.uk/cust_images/pdfs/robinson_tetley_jmba87_2007.pdf [Accessed 6 December 2022].
- Robinson, K., Tetley, M. and Mitchelson-Jacob, E. (2009). *The distribution and habitat preference of coastally occurring Minke whales (Balaenoptera acutorostrata) in the outer southern Moray firth, Northeast Scotland*. Journal of Coastal Conservation. 13 (1) 39-48.
- Robinson, R.A. (2005). *BirdFacts: profiles of birds occurring in Britain and Ireland*. BTO. [Online] Available at: <http://www.bto.org/birdfacts> [Accessed 4 October 2022].

Rowley, S.J., (2008). *Ammodytes tobianus* Lesser sand eel. In Tyler-Walters H. and Hiscock K. Marine Life Information Network: Biology and Sensitivity Key Information Reviews. [online]. Available at: <https://www.marlin.ac.uk/species/detail/2067> [Accessed 7 September 2022].

Royal HaskoningDHV (2013). *Thanet Offshore Wind Farm Ornithological Monitoring 2012-2013 (Post-construction Year 3)*. [online] Available at: <http://ecologyconsult.co.uk/index.htm/files/Ornithological%20monitoring%202012-13%20v3.pdf> [Accessed 4 October 2022].

Royal Navy, (2022). *Exercise Joint Warrior*. [online] Available at: <https://www.royalnavy.mod.uk/news-and-latest-activity/operations/united-kingdom/exercise-joint-warrior> [Accessed: 8 July 2022].

Royal Yachting Association (RYA), (2019). *The RYA's Position on Offshore Energy Developments: Paper 1 - Wind Energy*.

Royal Yachting Association, (2022a). *UK Coastal Atlas of Recreational Boating*. [online] Available at: <https://www.rya.org.uk/knowledge/planning-licensing/uk-coastal-atlas-of-recreational-boating> [Accessed: 8 July 2022].

Royal Yachting Association, (2022b). *Royal Yachting Association* [online] Available at: <https://www.rya.org.uk/> [Accessed: 8 July 2022].

Russell, D., Hastie, G., Thompson, D., Janik, V., Hammond, P., Scott-Hayward, L., Matthipoulos, J., Jones, E. and McConnell, B. (2016) *Avoidance of wind farms by harbour seals is limited to pile driving activities*. Journal of Applied Ecology, 53 (6).

Russell, D., Jones, E., and Morris, C. (2017). "Updated Seal Usage Maps: The Estimated at-Sea Distribution of Grey and Harbour Seals," in Scottish Marine and Freshwater Science Report. 8, 25.

Salmon and freshwater Fisheries (Consolidation) (Scotland) Act 2003. [online] Available at: <https://www.legislation.gov.uk/asp/2003/15/contents> [Accessed 6 October 2022].

Saunders, G., Bedford, G.S., Trendall, J.R. and Sotheran, I., (2011). *Guidance on survey monitoring in relation to marine renewables deployments in Scotland. Volume 5. Benthic Habitats*. [online] Available at: <https://www.nature.scot/doc/guidance-survey-and-monitoring-relation-marine-renewables-deployments-scotland> [Accessed: 26 August 2022].

Scotland's centre of expertise for waters (CREW), (2017). *Dynamic Coast - National Coastal Change Assessment: Coastal Erosion Policy Context, CRW2014/2*. [online] Available at: <https://www.dynamiccoast.com/files/reports/NCCA%20-%20Coastal%20Erosion%20Policy%20Context.pdf> [Accessed 20 September 2022].

Scotland's Great Trails, (2018a). *Scotland's Great Trails map*. [online] Available at: <https://www.scotlandsgreattrails.com/wp-content/uploads/2018/03/SGTmap-5-March-2018-A2555426.pdf> [Accessed 10 October 2022].

Scotland's Great Trails, (2018b). *Visitor attractions and tourist destinations*. [online] Available at: <https://www.scotlandsgreattrails.com> [Accessed 10 October 2022].

Scottish Coastal Observatory Data (2022) *Sitelink*. [online] at: <https://data.marine.gov.scot/dataset/scottish-coastal-observatory-data> [Accessed 26 August 2022].

Scottish Environment Protection Agency (SEPA) (2021a). *Flood Risk Management Plan: North East Local Plan District*. [online] Available at: <https://www2.sepa.org.uk/frmplans/documents/lpd6-north-east-frmp-2021.pdf> [Accessed 17 November 2022].

Scottish Environment Protection Agency (SEPA) (2021b) *River Basin Management Plan for Scotland 2021-2027*. [online] Available at: <https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf> [Accessed 11 October 2022].

Scottish Environment Protection Agency (SEPA) (2022a). *Sitelink*. [online] at: <https://www.sepa.org.uk/> [Accessed 26 August 2022].

Scottish Environment Protection Agency (SEPA) (2022b). *Water bodies data* [online] at: <https://www2.sepa.org.uk/WaterBodyDataSheets/> [Accessed 26 August 2022].

Scottish Environment Protection Agency (SEPA) (2022c). *Bathing waters* [online] at: <https://www2.sepa.org.uk/bathingwaters/> [Accessed 26 August 2022].

Scottish Government, (2011a). *UK Marine Policy Statement*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf [Accessed 26 August 2022].

Scottish Government, (2011b). *Scotland's Marine Atlas: Information for the National Marine Plan*. [online] Available at: <https://www.gov.scot/publications/scotlands-marine-atlas-information-national-marine-plan/> [Accessed 20 September 2022].

Scottish Government, (2014a). *National Planning Framework 3*. [online] Available at: <https://www.gov.scot/publications/national-planning-framework-3/> [Accessed 6 October 2022].

Scottish Government, (2014b) *Scottish Planning Policy*. [online] Available at: <https://www.gov.scot/publications/scottish-planning-policy/documents/> [Accessed 26 August 2022].

Scottish Government, (2015). *Scotland's National Marine Plan: A single Framework for Managing Our Seas*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2015/03/scotlands-national-marine-plan/documents/00475466-pdf/00475466-pdf/govscot%3Adocument/00475466.pdf> [Accessed: 8 July 2022].

Scottish Government, (2018). *Offshore Wind, Wave and Tidal Energy Applications: Consenting and Licensing Manual*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/consultation-paper/2018/10/marine-scotland-consenting-licensing-manual-offshore-wind-wave-tidal-energy-applications/documents/00542001-pdf/00542001-pdf/govscot%3Adocument/00542001.pdf> [Accessed 1 July 2022].

Scottish Government, (2020a). *Sectoral Marine Plan for Offshore Wind Energy*. [online] Available at: <https://www.gov.scot/publications/sectoral-marine-plan-offshore-wind-energy/> [Accessed 6 October 2022].

Scottish Government, (2020b) *Sectoral Marine Plan: Regional Locational Guidance*. [online] Available at: <https://www.gov.scot/publications/sectoral-marine-plan-regional-locational-guidance/documents/> [Accessed 26 August 2022].

Scottish Government. (2020c). *Scottish Sea Fisheries Statistics 2020* [Online] Available at: [Scottish Sea Fisheries Statistics 2020 - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/scottish-sea-fisheries-statistics-2020/documents/) [Accessed 7 September 2022].

Scottish Government, (2022a). *National Planning Framework 4: Revised Draft*. [online] Available at: <https://www.gov.scot/publications/national-planning-framework-4-revised-draft/documents/> [Accessed 15 November 2022].

Scottish Government, (2022b). *Guidance for Applicants on Using the Design Envelope for Applications under Section 36 of the Electricity Act 1989*. [online] Available at: <https://www.gov.scot/publications/guidance-applicants-using-design-envelope-applications-under-section-36-electricity-act-1989/documents/> [Accessed 11 July 2022].

Scottish Natural Heritage (SNH), (1984). *Designated site: Citation for Bullers of Buchan Coast SSSI*. [online] Available at: <https://sitelink.nature.scot/site/271> [Accessed 26 August 2022].

- Scottish Natural Heritage (SNH), (1985a). *Designated site: Citation for Collieston and Whinnyfold Coast SSSI*. [online] Available at: <https://sitelink.nature.scot/site/392> [Accessed 26 August 2022].
- Scottish Natural Heritage (SNH), (1985b). *Designated site: Citation for Gamrie and Pennan Coast SSSI*. [online] Available at: <https://sitelink.nature.scot/site/666> [Accessed 26 August 2022].
- Scottish Natural Heritage (SNH), (1989). *Designated site: Citation for Rosehearty to Fraserburgh Coast SSSI*. [online] Available at: <https://sitelink.nature.scot/site/1375> [Accessed 26 August 2022].
- Scottish Natural Heritage (SNH), (1991). *Designated site: Citation for Loch of Strathbeg SSSI*. [online] Available at: <https://sitelink.nature.scot/site/1040> [Accessed 26 August 2022].
- Scottish Natural Heritage (SNH), (1995a). *Designated site: Citation for Loch of Strathbeg Ramsar site*. [online] Available at: <https://sitelink.nature.scot/site/8443> [Accessed 26 August 2022].
- Scottish Natural Heritage (SNH), (1995b). *Designated site: Citation for Loch of Strathbeg SPA*. [online] Available at: <https://sitelink.nature.scot/site/8537> [Accessed 26 August 2022].
- Scottish Natural Heritage (SNH), (2000a). *Coastal Cells in Scotland: Cell 2 – Fife Ness to Cairnbulg Point*. [online] Available at: https://snh.koha-ptfs.co.uk/cgi-bin/koha/opac-detail.pl?biblionumber=4768&shelfbrowse_itemnumber=9575 [Accessed 20 September 2022].
- Scottish Natural Heritage (SNH), (2000b). *Coastal Cells in Scotland: Cell 3 – Cairnbulg Point to Duncansby Head*. Scottish Natural Heritage Research, Survey and Monitoring Report No 145. [online] Available at: <https://www.semanticscholar.org/paper/Dynamic-Coast-National-Coastal-Change-Assessment%3A-3-Hansom-Rennie/26c82df3c56c1f38dcc2e17768ab507d0ada7e41> [Accessed 20 September 2022].
- Scottish Natural Heritage (SNH), (2005a). *Designated site: Citation for Buchan Ness to Collieston SAC*. [online] Available at: <https://sitelink.nature.scot/site/8214> [Accessed 26 August 2022].
- Scottish Natural Heritage (SNH), (2005b). *Commissioned Report: An assessment of the sensitivity and capacity of the Scottish seascape in relation to windfarms*. [online] Available at: <https://www.nature.scot/sites/default/files/2017-07/Publication%202005%20-%20SNH%20Commissioned%20Report%20103%20-%20An%20assessment%20of%20the%20sensitivity%20and%20capacity%20of%20the%20Scottish%20seascape%20in%20relation%20to%20windfarms.pdf> [Accessed 10 October 2022].
- Scottish Natural Heritage (SNH), (2009a). *Designated site: Citation for Buchan Ness to Collieston Coast SPA*. [online] Available at: <https://sitelink.nature.scot/site/8473> [Accessed 7 September 2022].
- Scottish Natural Heritage (SNH), (2009b). *Designated site: Citation for Troup, Pennan and Lion's Heads SPA*. [online] Available at: <https://sitelink.nature.scot/site/8587> [Accessed 26 August 2022].
- Scottish Natural Heritage (SNH), (2011). *Characterising Scotland's marine environment to define search locations for new Marine Protected Areas. Part 2: The identification of key geodiversity areas in Scottish waters*. [online] Available at: https://www.researchgate.net/publication/285588075_Characterising_Scotland's_marine_environment_to_define_search_locations_for_new_Marine_Protected_Areas_Part_2_The_identification_of_key_geodiversity_areas_in_Scottish_waters [Accessed 20 September 2022].
- Scottish Natural Heritage (SNH), (2012a). *Sand Dune Vegetation Survey of Scotland*. [online] Available at: <https://map.environment.gov.scot/sewebmap/?layers=HabVegSurvey1&extent=-298028,475191,719972,1268192> [Accessed: 26 August 2022].
- Scottish Natural Heritage (SNH), (2012b) *Offshore Renewables – Guidance on Assessing the Impact on Coastal Landscape and Seascape*. Available at: <https://tethys.pnnl.gov/publications/offshore-renewables-guidance-assessing-impact-coastal-landscape-seascape-guidance> [Accessed 10 October 2022].

Scottish Natural Heritage (SNH), (2017a). *SNH Commissioned Report 406: Descriptions of Scottish Priority Marine Features (PMFs)*. [online] Available at: <https://www.nature.scot/doc/naturescot-commissioned-report-406-descriptions-scottish-priority-marine-features-pmfs> [Accessed 4 October 2022].

Scottish Natural Heritage (SNH), (2017b). *Siting and Designing Windfarms in the Landscape*, Version 3a. [online] Available at: <https://www.nature.scot/doc/siting-and-designing-wind-farms-landscape-version-3a> [Accessed 10 October 2022].

Scottish Natural Heritage (SNH), (2017c). *Visual Representation of Wind Farms*, Version 2.2. [online] Available at: <https://www.nature.scot/doc/visual-representation-wind-farms-guidance> [Accessed 10 October 2022].

Scottish Natural Heritage (SNH), (2017d). *The Scottish Marine Wildlife Watching Code SMWWC*. [online] Available at: <https://www.nature.scot/doc/scottish-marine-wildlife-watching-code-smwwwc> [Accessed 10 October 2022].

Scottish Natural Heritage (SNH), (2018). *Guidance note: Coastal Character Assessment*. [online] Available at: <https://www.nature.scot/sites/default/files/2018-02/Guidance%20Note%20-%20Coastal%20Character%20Assessment.pdf> [Accessed 10 October 2022].

Scottish Natural Heritage (SNH), (2019). *Landscape Character Assessment (LCA) for maps and descriptions of Landscape Character Types (LCTs)*. [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions> [Accessed 10 October 2022].

Scottish Remote Sensing Portal, (2022). *Sitelink*. [online] at: <https://remotesensingdata.gov.scot/> [Accessed 26 August 2022].

Scottish Rights of Way and Access Society, (2022). *Heritage Paths*. [online] Available at: <https://scotways.com/heritage-path/#zoom=6&lat=56.7000&lon=-4.9000> [Accessed 10 October 2022].

Searle, K., Mobbs, D., Butler, A., Bogdanova, M., Freeman, S., Wanless, S. and Daunt, F. (2014). *Population consequences of displacement from proposed offshore wind energy developments for seabirds breeding at Scottish SPAs*. [online] Available at: <https://marine.gov.scot/sma/content/population-consequences-displacement-proposed-offshore-wind-energy-developments-seabirds> [Accessed 4 October 2022].

Searle, K.R., Mobbs, D.C., Butler, A., Furness, R.W., Trinder, M.N. and Daunt, F. (2018). *Finding out the Fate of Displaced Birds*. *Scottish Marine and Freshwater Science Vol 9 No 8*, 149pp.

SEASTATES, (2022). *Sitelink*. [online] at: <http://www.seastates.net/> [Accessed 26 August 2022].

Sharples, R.J., Moss, S.E., Patterson, T.A. and Hammond, P.S. (2012). Spatial variation in foraging behaviour of a marine top predator (*Phoca vitulina*) determined by a large-scale satellite tagging programme. *PLoS ONE*, 7.

Skinner, A., Young, M. and Hastie, L. (2003). *Ecology of the Freshwater Pearl Mussel, Conserving Natura 2000*. Rivers Ecology Series No. 2, English Nature, Peterborough, [Online] Available at: <http://www.snh.gov.uk/docs/B337911.pdf> [Accessed 7 September 2022].

Skov, H., Heinänen, S., Norman, T., Ward, R.M., Méndez-Roldán, S. and Ellis, I., (2018). *ORJIP Bird Collision and Avoidance Study*. Final report – April 2018. [Online]. Available at: <https://tethys.pnnl.gov/publications/orjip-bird-collision-avoidance-study> [Accessed 4 October 2022].

Southall, B., Finneran, J., Reichmuth, C., Nachtigall, P., Ketten, D., Bowles, A., Ellison, W., Nowacek, D. and Tyack, P. (2019). *Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects*. *Aquatic Mammals*. 45(2), 125-232.

Southall, B., J. J. Finneran, C. Reichmuth, P. E. Nachtigall, D. R. Ketten, A. E. Bowles, W. T. Ellison, D. Nowacek, and P. Tyack., (2019). *Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects*. *Aquatic Mammals* 45:125-232.

Speakman, J., Gray, H., Furness, L., (2009). University of Aberdeen report on effects of offshore wind farms on the energy demands of seabirds. *Report to the Department of Energy and Climate Change*.

Special Committee on Seals (SCOS). (2020). *Scientific advice on matters related to the management of seal populations: 2020*. Special Committee on Seals (SCOS) Main Advice Report.

Special Committee on Seals (SCOS). (2021). *Scientific advice on matters related to the management of seal populations: 2021*. NERC: Special Committee on Seals (SCOS) Main Advice Report.

Statutory Nature Conservation Bodies (SNCBs), (2022). *Summary of input requirements for displacement assessment*. [online] Available at: <https://data.jncc.gov.uk/data/9aecb87c-80c5-4cfb-9102-39f0228dcc9a/joint-sncb-interim-displacement-advice-note-2022.pdf> [Accessed 12 July 2022].

Stanbury, A., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., McCulloch, N., Noble, D.G. and Win, I., (2021). *The status of our bird populations: the fifth. Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and the second IUCN Red List assessment of extinction risk for Great Britain British Birds*, [Online]. Available at: <https://www.bto.org/our-science/publications/birds-conservation-concern/status-our-bird-populations-fifth-birds> [Accessed 4 October 2022].

Stienen, E., Waeyenberge, V., Kuijken, E., Seys, J., (2007). *Trapped within the corridor of the Southern North Sea: the potential impact of offshore wind farms on seabirds*, [Online]. Available at: https://www.researchgate.net/publication/267951002_Trapped_within_the_corridor_of_the_Southern_North_Sea_the_potential_impact_of_offshore_wind_farms_on_seabirds [Accessed 4 October 2022].

Stone, C.J., Webb, A., Barton, C., Ratcliffe, N., Reed, T., Tasker, M.L., Camphuysen, C.J. and Pienkowski, M.W., (1995). *An Atlas of Seabird Distribution in North-west European Waters*. Available at: <https://hub.jncc.gov.uk/assets/c132752f-827c-41fc-b617-e681db21eaf5> [Accessed 4 October 2022].

Sumer, B.M. and Kirca, V.S.O., (2021). *Scour and liquefaction issues for anchors and other subsea structures in floating offshore wind farms: A review*. *Water Science and Engineering*, 2021, 15(1), p.3-14.

Sustrans, (2022). *Sustrans Cycle Network*. [online] Available at: <https://www.sustrans.org.uk/national-cycle-network> [Accessed 10 October 2022].

Tethys, (2019). *EMF*. [online] Available at: <https://tethys.pnnl.gov/stressor/emf> [Accessed: 26 August 2022].

The Bathing Water (Scotland) Regulations 2008. (SSI 2008:170). [online] Available at: <https://www.legislation.gov.uk/ssi/2008/170/contents> [Accessed 11 October 2022].

The Conservation (Natural Habitats, &c.) Regulations 1994. (SI 1994 2716). [online] Available at: <https://www.legislation.gov.uk/uksi/1994/2716/made/data.pdf> [Accessed 20 September 2022].

The Conservation of Habitats and Species Regulations 2017a. (SI 2017 1012). [online] Available at: <https://www.legislation.gov.uk/uksi/2017/1012/contents/made> [Accessed 12 July 2022].

The Conservation of Offshore Marine Habitats and Species Regulations 2017b. (SI 2017 1013). [online] Available at: <https://www.legislation.gov.uk/uksi/2017/1013/made/data.pdf> [Accessed: 12 July 2022].

The Control of Electronic Fields at Work Regulations 2016. (SI 2016 588). [online] Available at: <https://www.legislation.gov.uk/uksi/2016/588/contents/made> [Accessed: 26 August 2022].

The Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019a (as amended) (SSI 2019:26). [online] Available at: <https://www.legislation.gov.uk/ssi/2019/26/contents> [Accessed 8 July 2022].

The European Commission, (1992). *Directive 92/43/EEC of the European Parliament and of the Council on the conservation of natural habitats and of wild fauna and flora*. [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043> [Accessed 8 July 2022].

The European Commission, (2000a). *Directive 2000/60/EC of the European Parliament and the Council establishing a framework for Community action in the field of water policy*. [online] Available at: <https://www.legislation.gov.uk/eudr/2000/60/data.pdf> [Accessed 8 July 2022].

The European Commission, (2000b). *Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC*. [online] Available at: <https://www.legislation.gov.uk/eudr/2006/7/data.pdf> [Accessed 11 October 2022].

The European Commission, (2008a). *Directive 2008/105/EC of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council*. [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0105&from=EN> [Accessed 11 October 2022].

The European Commission, (2008b). *Directive 2008/56/EC of the European Parliament and the Council establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)*. [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0056&from=EN> [Accessed 8 July 2022].

The European Commission, (2009). *Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds*. [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0147&from=EN> [Accessed 8 July 2022].

The European Commission, (2013). *Directive 2013/39/EU of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy*. [online] Available at: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:226:0001:0017:en:PDF> [Accessed 11 October 2022].

The Marine Environment (Amendment) (EU Exit) Regulations 2018. (SI 2018 1399). [online] Available at: <https://www.legislation.gov.uk/uksi/2018/1399/contents/made> [Accessed 8 July 2022].

The Marine Life Information Network (MARLIN), (2022). *The Marine Life Information Network information on the biology of species and the ecology of habitats found around the coasts and seas of the British Isles*. [online] Available at: <https://www.marlin.ac.uk/> [Accessed 26 August 2022].

The Marine Strategy Regulations 2010. (SI 2010 1627). [online] Available at: <https://www.legislation.gov.uk/uksi/2010/1627/made/data.pdf> [Accessed 8 July 2022].

The Scottish Marine Regions Order 2015. (SI 2015 193). [online] Available at: <https://www.legislation.gov.uk/ssi/2015/193/contents/> [Accessed 6 October 2022].

Thompson, Paul M., Bernie J. McConnell, Dominic J. Tollit, Ann Mackay, Colin Hunter, and Paul A. Racey. (1996). *Comparative distribution, movements and diet of harbour and grey seals from Moray Firth, NE Scotland*. *Journal of Applied Ecology*; 1572-1584. Thompson, P., Hastie, G.,

- Thomson, P., Graham, I., Cheney, B., Barton, T., Farcas, A. and Merchant, N. *Balancing risks of injury and disturbance to marine mammals when pile driving at offshore windfarms*. (2020). Ecological Solutions and Evidence. 1.
- Todd, V. L. G., Warley, J. C., and Todd, I. B. (2016). *Meals on wheels? A decade of megafaunal visual and acoustic observations from offshore oil and gas rigs and platforms in the North and Irish seas*. PloS one, 11(4), e0153320.
- Tougaard, J., Hermannsen, L. and Madsen, P.T., (2020), *How loud is the underwater noise from operating offshore wind turbines?* J. Acoust. Soc. Am. 148 (5). doi.org/10.1121/10.0002453
- Trabue, S. G., Rekdahl, M. L., King, C. D., Strindberg, S., Adamczak, S. K. and Rosenbaum, H. C. (2022). *Spatiotemporal trends in bottlenose dolphin foraging behavior and relationship to environmental variables in a highly urbanized estuary*. Marine Ecology Progress Series, 690, 219-235.
- Tyler-Walters, H., Tillin, H.M, Perry, F., Stamp, T. and d'Avack, E.A.S., (2018). *Marine Evidence-Based Sensitivity Assessment – A Guide*. [online] Available at: <https://www.marlin.ac.uk/assets/pdf/MarESA-Sensitivity-Assessment-Guidance-Rpt-Dec2018.pdf> [Accessed 26 August 2022].
- UK Fisheries Economist Network (UKFEN) and Seafish, (2012). *Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments*. [online] Available at: <https://www.seafish.org/document/?id=AA0CB236-1E2A-4D2A-9F86-49CEB2B6DD5E> [Accessed: 7 September 2022].
- United Kingdom Hydrographic Office (UKHO), (2021). *The UKHO Archive*. [online] at: <https://www.gov.uk/guidance/the-ukho-archive> [Accessed 26 August 2022].
- United Kingdom Hydrographic Office (UKHO), (2022). *Wrecks and Obstructions data*. [online] at: <https://www.admiralty.co.uk/access-data/marine-data> [Accessed 26 August 2022].
- United Kingdom (UK) Oil and Gas, (2015). *Fisheries Liaison Guidelines - Issue 6*.
- United Kingdom Hydrographic Office, (2018). *Admiralty Sailing Directions North Coast of Scotland Pilot, 10th Edition NP52*. Taunton: United Kingdom Hydrographic Office.
- United Nations, (1992). *Convention on Biological Diversity*. [online] Available at: <https://www.cbd.int/doc/legal/cbd-en.pdf> [Accessed 26 August 2022].
- United Nations, (2021). *Convention on Biological Diversity: First Draft of the Post-2020 Global Diversity Framework*. [online] Available at: <https://www.cbd.int/doc/c/abb5/591f/2e46096d3f0330b08ce87a45/wg2020-03-03-en.pdf> [Accessed: 26 August 2022].
- United Nations Treaty Series, (1971). *Convention on wetlands of international importance especially as waterfowl habitat. Concluded at Ramsar, Iran*. [online] Available at: <https://treaties.un.org/doc/Publication/UNTS/Volume%20996/volume-996-I-14583-English.pdf> [Accessed 26 August 2022].
- United Nations, (1979). *Convention on the Conservation of Migratory Species of Wild Animals (the 'Bonn Convention')*. [online] Available at: <https://www.cms.int/en/convention-text> [Accessed 12 July 2022].
- VisitScotland, (2022). *Visitor attractions and tourist destinations*. [online] Available at: <https://www.visitscotland.com/destinations-maps/aberdeen-city-shire/> [Accessed 10 October 2022].
- Wade, H.M., Masden, E.A., Jackson, A.C. and Furness, R.W. (2016). Incorporating data uncertainty when estimating potential vulnerability of Scottish seabirds to marine renewable energy developments. Marine Policy, 70: 108-113.

Waggitt, J.J., Evans, P.G., Andrade, J., Banks, A.N., Boisseau, O., Bolton, M., Bradbury, G., Brereton, T., Camphuysen, C.J., Durinck, J. and Felce, T. (2019). *Distribution maps of cetacean and seabird populations in the North-East Atlantic*. [Online]. Available at: <https://besjournals.onlinelibrary.wiley.com/doi/10.1111/1365-2664.13525> [Accessed 4 October 2022].

Waggitt, J. J., P. G. H. Evans, J. Andrade, A. N. Banks, O. Boisseau, M. Bolton, G. Bradbury, T. Brereton, C. J. Camphuysen, J. Durinck, T. Felce, R. C. Fijn, I. Garcia-Baron, S. Garthe, S. C. V. Geelhoed, A. Gilles, M. Goodall, J. Haelters, S. Hamilton, L. Hartny-Mills, N. Hodgins, K. James, M. Jessopp, A. S. Kavanagh, M. Leopold, K. Lohrengel, M. Louzao, N. Markones, J. Martinez-Cediera, O. O'Cadhla, S. L. Perry, G. J. Pierce, V. Ridoux, K. P. Robinson, M. B. Santos, C. Saavedra, H. Skov, E. W. M. Stienen, S. Sveegaard, P. Thompson, N. Vanermen, D. Wall, A. Webb, J. Wilson, S. Wanless, and J. G. Hiddink., (2020). *Distribution maps of cetacean and seabird populations in the North-East Atlantic*. [online]. Available at: https://www.researchgate.net/publication/336834551_Distribution_maps_of_cetacean_and_seabird_populations_in_the_North-East_Atlantic [Accessed 4 October 2022].

Wakefield E.D., Bodey T.W., Bearhop S., Blackburn J., Colhoun, K., Davies, R., Dwyer, R.G., Green, J.A., Gremillet, D., Jackson, A.L., Jessopp, M., Kane, A., Langston, R.H.W., Lescroel, A., Murray, S. Le Nuz, M., Patirck, S.C., Peron, C., Soanes, L., Wanless, S., Votier, S.C. and Hamer, K.C., (2013). *Space partitioning without territoriality in gannets*. [Online]. Available at: https://www.researchgate.net/publication/237071008_Space_Partitioning_Without_Territoriality_in_Gannets [Accessed 4 October 2022].

Wakefield, E.D., Owen, E., Baer, J., Carroll, M.J., Daunt, F., Dodd, S.G., Green, J.A., Guilford, T., Mavor, R.A., Miller, P.I., Newell, M.A., Newton, S.F., Robertson, G.S., Shoji, A., Soanes, L.M., Votier, S.C., Wanless, S. and Bolton, M., (2017). *Breeding density, fine-scale tracking, and large-scale modelling reveal the regional distribution of four seabird species*. *Ecological Applications* 27: 2074-91 regional distribution of four seabird species. [online]. Available at: <https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/eap.1591> [Accessed 4 October 2022].

Ware, S.J. and Kenny, A.J., (2011). *Guidelines for the conduct of benthic studies at aggregate dredging sites*. [online] Available at: <https://www.cefas.co.uk/publications/files/02dpl001.pdf> [Accessed: 26 August 2022].

Water Environment and Water Services (Scotland) Act 2003. (asp. 3) [online] Available at: <https://www.legislation.gov.uk/asp/2003/3/contents> [Accessed 8 July 2022].

Weilgart, L., (2018). *The Impact of Ocean Noise Pollution on Fish and Invertebrates*. [online] Available at: https://www.oceancare.org/wp-content/uploads/2017/10/OceanNoise_FishInvertebrates_May2018.pdf [Accessed 14 September 2022].

Weir, C.R., Pollock, C., Cronin, C., and Taylor, S. (2001) *Cetaceans of the Atlantic Frontier, north and west of Scotland*. *Continental Shelf Research*, 21 (8-10) 1047-1071.

Weird, C.R., Stockin, Karen, A. and Pierce, G.J., (2007). *Spatial and temporal trends in the distribution of harbour porpoises, white-beaked dolphins and minke whales off Aberdeenshire (UK), north-western North Sea*. *Journal of the Marine Biological Association of the United Kingdom*, 2007, 87(1), p.327-338.

Wildlife and Natural Environment (Scotland) Act 2011. (asp. 6). [online] Available at: <https://www.legislation.gov.uk/asp/2011/6/contents/enacted> [Accessed 8 July 2022].

Whitlow, W.L., Fay, R.R. and Popper, A.N., (2000). *Hearing by Whales and Dolphins*. Springer Handbook of Auditory Research, 2000.

Witt, M.J., Hardy, T., Johnson, L., McClellan, C.M., Pikesley, S.K., Ranger, S., Richardson, P.B., Solandt, J.L., Speedie, C., Williams, R. and Godley, B.J. (2012). *Basking sharks in the northeast*

Atlantic: spatio-temporal trends from sightings in UK waters. Marine Ecology Progress Series. 459, 121 – 134.

Witte, M., Hanke, W., Wieskotten, S., Miersch, L., Dehnhardt, G., and Leder, A. (2012). *On the Wake Flow Dynamics behind Harbor Seal Vibrissae – A Fluid Mechanical Explanation for an Extraordinary Capability*. In: Tropea, C., Bleckmann, H. (eds) *Nature-Inspired Fluid Mechanics. Notes on Numerical Fluid Mechanics and Multidisciplinary Design*, vol 119.

Woodward, I, Thaxter, C.B., Owen, E. and Cook, A.S.C.P. (2019). *Desk-based revision of seabird foraging ranges used for HRA screening*. BTO Research Report No. 724. [online]. Available at: <https://www.bto.org/our-science/publications/peer-reviewed-papers/seabird-foraging-ranges-preliminary-tool-identifying> [Accessed 4 October 2022].

Wright, L.J., Ross-Smith, V.H., Austin, G.E., Massimino, D., Dadam, D., Cook, A.S.C.P., Calbrade, N.A., Burton, N.H.K., (2012). *Assessing the risk of offshore wind farm development to migratory birds designated as features of UK Special Protection Areas (and other Annex 1 species)* [online]. Available at: <https://tethys.pnnl.gov/sites/default/files/publications/Wrightetal2012.pdf> [Accessed 4 October 2022].

Xodus, (2022). *Good Practice Guidance for assessing fisheries displacement by other licensed marine activities*. [online] Available at: <https://www.gov.scot/publications/good-practice-guidance-assessing-fisheries-displacement-licensed-marine-activities/> [Accessed: 7 September 2022].

6. Environmental Aspects Onshore

6.1 Ground conditions and contamination

Introduction

- 6.1.1 The ground conditions and contamination assessment will consider the potential likely significant effects on geology, minerals, soil, agricultural land (in terms of the national land resource with suitable soil and other conditions for agriculture) and land contamination receptors that may arise from the construction, operation and maintenance and decommissioning of the onshore Project elements that are landward of Mean Low Water Springs (MHLS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 6.1.2 Ground conditions and contamination interfaces with other onshore aspects and as such, should be considered alongside these; namely:
- **Section 6.3: Water resources and flood risk:** The water resources and flood risk section will address the net impact on water quality caused by the mobilisation of historical contamination and the significance of the introduction of new contaminants. Therefore, the ground conditions and contamination section will be used to inform the water resources and flood risk assessment.
 - **Section 6.4: Land use:** Ground conditions and contamination are interrelated with land use as ground conditions may limit or allow certain land uses to take place.
 - **Section 6.5: Terrestrial ecology and ornithology:** Some designated sites have both ecological and geological aspects to their designation. Therefore, ground conditions and changes to may impact on terrestrial ornithology.
 - **Section 6.6: Onshore archaeology and cultural heritage:** Soil functions can include the preservation archaeological remains therefore ground conditions are important and the onshore archaeology and cultural heritage assessment may be informed by the ground conditions and contamination section.
 - **Section 6.9: Landscape and visual:** Geology and soils are integral to landscapes therefore ground conditions and landscape and visual assessment are interrelated.
 - **Section 7.1: Climate resilience:** The interference with climate resilience with ground conditions and contamination is captured in the In-Combination Climate Impacts (ICCI) assessment.
 - **Section 7.3: Socio-economics:** Land contamination and soil / agricultural land health can interact with socio-economics. Therefore, the ground condition and contamination section will inform the socio-economics assessment.

Legislative and policy context

- 6.1.3 This Section identifies the relevant legislative and policy context which has informed the scope of the ground conditions and contamination assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of

relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.

- 6.1.4 In order to provide a robust evidence base, **Table 6.1.1** below presents a summary of legislation and policies relevant for the ground conditions and contamination assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 6.1.1 Relevant legislation and policy

Relevant Legislation and Policy	Relevance to the assessment
Legislation	
Environmental Protection Act (1990)	<ul style="list-style-type: none"> Part 2A of the Act provides a system for the identification of land posing an unacceptable risk to human health or the wider environment, and for securing remediation as appropriate. The legislation is aimed at legacy land contamination arising from historical waste disposal or industrial activities. The overall objectives of Part 2A are to identify and address unacceptable risks to receptors, to bring contaminated land/brownfield sites back into beneficial use, preferably by encouraging voluntary remediation, and to ensure that the costs associated with remediation of contaminated land are proportionate to the level of risk associated with the contamination.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment is</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crisis Policy 23: Health and Safety Policy 5: Soils.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. Spatial strategy identifies where development needs to be balanced with a strategic approach to environmental enhancement
Scottish Planning Policy (2014) <ul style="list-style-type: none"> Paragraph 29 Paragraph 169 Paragraph 237 	<ul style="list-style-type: none"> Sets out principles by which policies and decisions are to be guided, and which interact with ground conditions and contamination and include: having regard to the principles for sustainable land use set out in the Land Use Strategy; reducing waste; and

Relevant Legislation and Policy	Relevance to the assessment
	<p>considering the implications of development for water, air and soil quality.</p> <ul style="list-style-type: none"> Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> net economic impacts; scale of contribution to renewable energy generation; effect on greenhouse gas emissions; cumulative impacts; impacts on communities and individual dwellings; landscape and visual; natural heritage; carbon rich soils impacts; impacts on historic environment; impacts on road traffic; and effects on hydrology. States in relation to minerals that: <i>“Local development plans should safeguard all workable mineral resources which are of economic or conservation value and ensure that these are not sterilised by other development.”</i> <p>Minerals safeguarding areas are identified in the baseline in paragraph 6.1.13 onwards.</p>
Planning Advice Note (PAN) 33: Development of contaminated land (2017)	<ul style="list-style-type: none"> Sets out that developers need to provide sufficient information that the proposed development does not meet the criteria of Part IIA contaminated land. Details that remediation required under the planning framework should be limited to that required to prevent unacceptable risks to human health or the environment in relation to the current use or future use of the land for which planning permission is being sought.
Scottish Environment Protection Agency (SEPA) Position Statement on Planning and Soils (2022)	<ul style="list-style-type: none"> The Position Statement sets out how SEPA will engage with the planning system with the aim of meeting Scottish Government aspirations regarding soil, protecting soils and soil functionality, and meeting SEPA's wider objectives of environmental protection.
SEPA's Position Statement on Land Protection (2022)	<ul style="list-style-type: none"> The Position Statement recognises the importance of good soil quality and its connections with the wider environment and human health. SEPA's stated objectives for land protection include to contribute to the sustainable management and protection of Scotland's land resources; and to promote restoration and remediation of land where there is a statutory duty to do so.

Relevant Legislation and Policy	Relevance to the assessment
Planning Advice Note 60: Natural Heritage (2000)	<ul style="list-style-type: none"> States that planning authorities can contribute to the conservation of earth heritage (rocks, fossils, landforms, soils and landforming processes) including sites selected through the Geological Conservation Review, most of which are now designated as Sites of Special Scientific Interest (SSSIs), by considering the effects of development proposals on geomorphological processes, landforms and soils and actively seeking measures to avoid, reduce, mitigate or compensate for any adverse impacts.
The Scottish Soil Framework (2009)	<ul style="list-style-type: none"> Pressures on soils are identified as including climate change, loss of soil organic matter, acidification and eutrophication, soil sealing, erosion, compaction, contamination, loss of biodiversity and nutrient leaching. Soil quality is defined in the Framework as the ability of fitness of specific soil types to carry out functions including biomass production, regulating water flow and quality, storing carbon and maintaining the balance of gases in air, preserving archaeological remains, providing valued habitats and sustaining biodiversity, providing a raw material and providing a platform for building. The Framework identifies 13 desirable soil outcomes, of which several are relevant to the scope of this assessment, including: <ul style="list-style-type: none"> SO3 – soil structure is maintained; SO5 – soil biodiversity, as well as above ground biodiversity, protected; SO9 – soil contamination reduced; and, SO10 – reduced pressure on soils by using brownfield sites in preference to greenfield.

Marine Policy

No marine policy is of specific relevance to this area of technical assessment.

Local Planning Policy

Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy E1 Natural Heritage; Policy PR1 Preserving and Protecting Important Development Sites; Policy C3 Carbon Sinks; C2 Renewable Energy; and P4 Hazardous and Potentially Polluting Developments and Contaminated Land. <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>
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Technical guidance

6.1.5 Technical guidance that has been used to define the assessment is set out in **Table 6.1.2** below.

Table 6.1.2 Relevant technical guidance

Guidance reference	Relevance for the assessment
Scottish Natural Heritage (2018a), A Handbook on Environmental Impact Assessment	<u>Soils and Geology</u> The handbook includes guidance on how to assess the impacts of developments on soils and geodiversity in EIA, in addition to providing relevant information sources.
Natural England (2006), Geological conservation: a guide to good practice (ST118)	<u>Geology</u> NatureScot identify this document as good practice with respect to developments affecting geological and geomorphological features, and it is case studies include Scottish examples. The guide notes that loss of geological exposure through burial under coastal protection schemes, landfill or other developments, is one of the biggest threats to geological sites.
Scottish Government (2006), Environmental Protection Act 1990 - Part IIA Contaminated Land: statutory guidance edition 2	<u>Land Contamination</u> The Scoping Boundary includes land potentially affected by contamination, and any proposed development in such areas must comply with the legal and policy framework for contaminated land. The Part 2A statutory guidance outlines the legal framework for dealing with contaminated land in Scotland under Part 2A of the Environmental Protection Act 1990. The Part 2A regime is intended to deal with legacy contamination, and the guidance explains how this should be defined, identified, and remediated, in the context of sustainable development. The guidance applies the “ <i>suitable for use</i> ” approach, whereby it is recognised that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. The assessment method for land contamination follows a risk based approach to land contamination assessment which is in accordance with the Part 2A statutory guidance.
BS 10175:2011+A2:2017 Investigation of potentially contaminated sites. Code of practice (BSI, 2017)	<u>Land Contamination</u> BS 10175 sets out the methodology to be followed for investigating sites that may be affected by land contamination. A phased approach is recommended. BS10175 describes how to carry out a preliminary desk-based investigation and subsequent intrusive investigation and field work. The land contamination assessment will be based upon the findings of a Phase 1 Geoenvironmental Desk Study which will follow the methodology set out in BS 10175 for desk based assessment of land contamination risks.
BS 5930:2015+A1:2020 Code of practice for ground investigations (BSI, 2020)	<u>Land Contamination</u> BS 5930 provides guidance on how to carry out ground investigations for geotechnical and environmental purposes. It does not provide guidance specifically on how to carry out contaminated land investigations, however it provides guidance on how to design and implement ground investigations so that reliable data can be obtained on the ground conditions (soil, rock

Guidance reference	Relevance for the assessment
	<p>and groundwater) which can then be used then inform subsequent risk assessment / investigation and potentially remediation, carried out in accordance with BS 10175.</p> <p>All ground investigation completed for the Project will be completed in accordance with BS 5930.</p>
Environment Agency (2020), Land Contamination Risk Management (LCRM)	<p><u>Land Contamination</u></p> <p>The Environment Agency's LCRM guidance provides a technical framework for applying a risk management process when dealing with land affected by contamination, this approach is well established across the UK contaminated land industry. The Scottish Government Part 2A statutory guidance points to the use of technical advice published by DEFRA and the Environment Agency, in addition to SEPA, though not specifically to LCRM. In general, use of the principles and technical framework in LCRM is likely to be acceptable to regulators in Scotland, however SEPA still reference the withdrawn DEFRA and Environment Agency 2004 Model Procedures for the Management of Land Contamination (CLR 11) which the LCRM supersedes. CLR 11 sets out a similar phased approach to land contamination assessment and remediation as in LCRM.</p> <p>The assessment method for land contamination follows a risk based approach to land contamination assessment which is in accordance with LCRM.</p>
Natural Scotland, Scottish Government (2010), Regulatory Guidance, Promoting the sustainable reuse of greenfield soils in construction	<p><u>Soil</u></p> <p>Excess or unsuitable soils from development sites are generally regarded as waste and must be discarded. The SEPA guidance for sustainable reuse of soils relates solely to natural topsoil and subsoil from “greenfield” sites, meaning land that has not been previously developed and is uncontaminated. The guidance is not applicable to peat. SEPA wishes to promote the reuse of greenfield soils to avoid them becoming waste and reuse of greenfield soils on the site of excavation is not regulated as a waste activity.</p> <p>Offsite reuse is allowed on the basis that before excavation operations begin, the person responsible for the excavation site must establish that there is an identified and certain end-use for the greenfield soil, that the use type is covered by the guidance and SEPA's regulatory position, and that the use of soil is in accordance with a current planning permission including approved drawings.</p> <p>The Project is committed to compliance with SEPA guidance on sustainable use if soil (see Table 6.1.4).</p>
Scottish Government, Scottish Natural Heritage (SNH), SEPA (2017), Peatland Survey. Guidance on Developments on Peatland	<p><u>Soil</u></p> <p>Areas of peatland are present within the Scoping Boundary. This guidance includes consideration of how peat surveys interact with other elements of site investigation for proposed developments, to achieve provision of sufficient peat depth and peat quality information to inform: site design and layout, Peat Management Plans, carbon savings and losses evaluation, including informing carbon calculator assessments and post-construction habitat management / site reinstatement and restoration.</p> <p>The assessment, any peat survey requirements and the embedded measures to avoid or minimise effects on peat will be based on the Guidance on Developments on Peatland.</p>

Guidance reference	Relevance for the assessment
SEPA (2022c), Land Remediation and Waste Management Guidelines	<p><u>Soil and Land Contamination</u> Sets out SEPA’s approach to regulating the treatment or reuse of contaminated sites under the waste management regulatory regime. It sets out circumstances under which SEPA will not regulate, under the waste management regime, soils not requiring treatment. Before it can be reused, soil requiring treatment will be regulated under waste management legislation. Waste management license exemptions are available for certain low-risk activities involving soil reuse.</p> <p>The Project is committed to compliance with SEPA guidance on waste management (see Table 6.1.4).</p>
DEFRA (2009), Construction Code of Practice for the Sustainable Use of Soils on Construction Sites	<p>Although it makes reference to legislation that is not relevant to Scotland (and also legislation that is out of date), the DEFRA Construction Code of Practice contains information on best practice for the handling, storage and reinstatement of soil during construction projects in order to protect soil structure and quality.</p> <p>Compliance with the DEFRA Construction Code of Practice is an embedded measure in Table 6.1.4.</p>
Highways England (2021), Design Manual for Roads and Bridges (DRMB) LA 109 - Geology and Soils	<p><u>Soil, Geology, Agricultural Land and Land Contamination</u> Sets out the approach to assessing and reporting the effects of highway projects on geology and soils used on Highways England projects. The DRMB is endorsed by Transport Scotland. As a published approach to assessing the effects of developments on soil in EIA, this can be adapted for use on other projects. The guidance stops short of providing a methodology to assess the effects of a project on agricultural land and soil functions.</p> <p>The methodologies for assessing effects on geology and soils are based upon the methods set out in LA 109.</p>
Institute of Environmental Management & Assessment (IEMA) (2022), IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment	<p><u>Soil, Agricultural Land and Land Contamination</u> Provides information and guidance on how the practical implications of soil functions, soil biodiversity, soil health, ecosystem services and natural capital should be applied within the overarching framework of climate change, to incorporate them effectively into the EIA process.</p> <p>The methodology for assessing effects on soils an agricultural land is based upon the method outlined in the IEMA Guide.</p>
Institute of Civil Engineers (ICE) (2019), The Environmental Impact Assessment Handbook - A Practical Guide for Planners, Developers and Communities (3rd Edition)	<p><u>Soil</u> Provides an approach to assessing the potentially significant effects of development projects on soil and defines the sensitivity of different soil types to handling during construction projects. The guide notes that soil is a non-renewable resource, and that disturbance should be limited as far as possible, that soil is particularly prone to structural degradation if it is handled when too wet, and that adverse effects can be mitigated by following best practice guidance, such as the Defra 2009 Code of Practice for the Sustainable Use of Soils on Construction Sites.</p> <p>The embedded measures include the use of good practice for soil handling as outlined in the Defra 2009 Code of Practice.</p>

Study area

- 6.1.6 The study area for ground conditions and contamination is defined as the Scoping Boundary with a 250m buffer extending around it (inland only). The following figures in **Appendix 1A** identify the study areas for geology, minerals, soils, carbon-rich soils and peatland, agricultural land (capability), and land contamination:
- **Figure 6.1.1a and b: Superficial geology and geological conservation sites;**
 - **Figure 6.1.2: Mineral sites;**
 - **Figure 6.1.3: Soil;**
 - **Figure 6.1.4: Carbon and peatland;**
 - **Figure 6.1.5: Land capability for agriculture; and**
 - **Figure 6.1.6: Land contamination and landfill.**
- 6.1.7 The 250m buffer is considered appropriate based upon professional experience in land contamination assessment in relation to the potential for contaminants to migrate from the site to offsite receptors through the soil or in groundwater, or to migrate onto the site through soil or in groundwater from offsite sources. Geology, soils and agricultural land are geographically discrete and will typically not be substantially influenced by changes to their surroundings or vice versa, however, in relation to excavations, the hydrogeological effects of activities such as dewatering could potentially extend beyond the Project boundary, and use of a 250m boundary therefore ensures that any sensitive receptors beyond the Project boundary that may be affected are identified.
- 6.1.8 The study area will be reviewed and amended in response to such matters as refinement of the onshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

Consultation

- 6.1.9 A data request was made on 2 August 2022 to Aberdeenshire Council requesting details of mineral sites and safeguarding areas, and landfills (current and historical). Historical landfill polygon information was provided by the Council and has been considered in the Scoping Report.
- 6.1.10 An online meeting was held with SEPA on 15 September 2022 to discuss the approach to scoping for topics including ground conditions and land contamination. This confirmed that SEPA accepts the approach to contaminated land risk assessment set out in LCRM 2020. A request for information on landfill status, type and polygons for sites regulated by SEPA was also made. SEPA has confirmed that it does not hold polygon data for landfills, only point data (which has already been used to inform the Scoping Report). Due to the 2020 cyber-attack against SEPA, the data only covers the years 2015-2020 and not later years.

Assessment methodology

- 6.1.11 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this ground conditions and contamination section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the ground conditions and contamination assessment. A full description of the ground conditions and contamination methodology is provided in **Appendix 6.1A: Ground Conditions and Contamination Assessment Methodology**.

Baseline conditions

Data sources

6.1.12 Baseline data will be collected for the ground conditions and contamination study area and presented as a Phase 1 Desk Study report. **Table 6.1.3** outlines the key data sources that will be used to prepare the Phase 1 Desk Study Report.

Table 6.1.3 Key sources of ground conditions and contamination data

Source	Date	Summary	Coverage of study area
Geology / geodiversity:			
NatureScot, SiteLink	Accessed 2022	Details and extents of designated sites including SSSIs, SACs and Geological Conservation Review (GCR) sites (available at: https://sitelink.nature.scot/home).	Full coverage of the study area.
British Geological Survey (BGS) GeoIndex	Accessed 2022	Geological mapping at 1:50,000 scale and borehole records. Geological mapping at 1:625,000 scale – generalised mapping useful for larger study areas (available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/).	Full coverage of the study area.
Soil:			
Scotland's Soils Maps	Accessed 2022	<p>Various soil maps as listed below:</p> <ul style="list-style-type: none"> National Soil Map of Scotland, 1:250,000 scale Soil Map of Scotland (partial cover), 1:25,000 scale Carbon and peatland 2016 map - The dataset used to produce the map combines historical soil information, at 1:25 000 scale where available, and 1:250 000 scale elsewhere, with land cover from 1988 data. The map also shows areas of peat referred to in the Scottish Planning Policy i.e., carbon-rich soil, deep peat, and priority peatland habitat. Carbon and peatland class values from 1 to 5 are assigned to soils, and the map also shows mineral soils, unknown soil types and non-soil, which could include lochs, built up land, rock outcrops or scree. Of the five classes, Classes 1, 2 and 5, where greater than 0.5m depth, are defined in Scottish Planning Policy, in addition to woodland, as being very important carbon sinks and stores. Map of Soil Texture in Nitrate Vulnerable Zones (NVZs), 1:50,000 scale Map of Topsoil Organic Carbon Concentration <p>(Available at: https://soils.environment.gov.scot/maps/).</p>	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
Agricultural Land resource:			
Scotland's Soils Maps	Accessed 2022	<p>Agricultural land capability mapping based on the Macaulay Land Capability for Agriculture (LCA) classification:</p> <ul style="list-style-type: none"> National scale land capability for agriculture map, 1:250,000 scale. Land Capability for Agriculture maps of Scotland at a scale of 1:50 000. <p>(Available at: https://soils.environment.gov.scot/maps/).</p>	Full coverage of the study area.
Land Contamination:			
Google Earth Pro	Accessed 2022	Aerial photography	Full coverage of the study area.
SEPA, Scotland's Waste Sites and Capacity Data Tool	2021	<p>Locations of landfill sites (point only, not polygons), type and status (available at: https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/waste-site-information/).</p>	Full coverage of the study area.
Aberdeenshire Council Planning and Environmental Services Public Register of Contaminated Land	Accessed 2022	<p>Contains details of sites identified within Aberdeenshire as meeting the statutory definition of contaminated land. Documents referenced within the register include grid coordinates/addresses for the sites (available at: https://www.aberdeenshire.gov.uk/environment/environmental-health/contaminated-land/).</p>	Full coverage of the study area.
National Library of Scotland	Accessed 2022	<p>Various historical maps (available at: https://maps.nls.uk/).</p>	Partial coverage of the study area.
Scottish Government, Maps of vacant and derelict land in Aberdeenshire	Accessed 2022	<p>A map and register of vacant and derelict land, includes site names, addresses, and former site use category (available at: https://www.gov.scot/publications/maps-of-vacant-and-derelict-land-in-aberdeenshire-2/).</p>	Full coverage of the study area.
UK Health Security Agency, Interactive UK maps of radon	Accessed 2022	<p>Radon map for UK (available at: https://www.ukradon.org/information/ukmaps).</p>	Full coverage of the study area.
Minerals:			
Modified Proposed Aberdeenshire Council LDP	Accessed 2022	<p>Maps showing Areas safeguarded or identified as areas of search for minerals development (available at: http://publications.aberdeenshire.gov.uk/dataset/f14a62da-30d1-488d-9338-</p>	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
Appendix 14: Areas Safeguarded or Identified as Area of Search for Minerals Development		7b09e82360cf/resource/18cbd522-dd75-4d56-ad0f-e008958af552/download/appendix-14-areas-safeguarded-or-identified-as-areas-of-search-for-minerals-development.pdf	

Current baseline

- 6.1.13 This Section sets out the baseline for geology (including bedrock geology, superficial geology, peat and geodiversity) from **paragraph 6.1.14** onwards, minerals from **paragraph 6.1.38** onwards, soil from **paragraph 6.1.41** onwards, agricultural land (in relation to agricultural land capability classification in the context of Scotland's agricultural land resource) from **paragraph 6.1.50** onwards, and land contamination receptors from **paragraph 6.1.56** onwards.

Geology

Bedrock Geology

- 6.1.14 The Scoping Boundary is to the north of the Highland Boundary Fault and the rocks present are mainly from the Argyll Group of the Dalradian Supergroup, comprising metamorphic rocks (psammites, quartzites and pelites) and intrusive igneous rocks. The metamorphic rocks are typically folded (NatureScot, 2019a)
- 6.1.15 BGS 1:50,000 scale mapping shows most of the Scoping Boundary underlain by the Crinan Subgroup and Tayvallich Subgroup (Undifferentiated), comprised of semipelite, pelite and psammite. The Cairnbulg Diorite (diorite) is present south of Inverallachy and at the eastern edge of Fraserburgh Bay. Metamorphosed igneous rocks (amphibolite and hornblende schist) are present west of St Combs. Metamorphic Inzie Head Gneiss Formation (quartzite) is present southwest of Gallow Hill.
- 6.1.16 Granite bedrock is present at the coast north of St Fergus (St Fergus Pluton) and a much larger area of granite is shown at Peterhead (Peterhead Pluton), west of which bedrock is the Collieston Formation (pelite, semipelite and psammite) and northwest of this the Forest of Deer Pluton – melagranite, biotite, and Forest of Deer Pluton – diorite.
- 6.1.17 Between Smallburn and Stoneygate, bedrock is the Buchan Ridge Gravel Member (clay and gravel), with a small area at Smallburn Hill shown to be underlain by the Moreseat Sandstone Formation (glauconitic sandstone).
- 6.1.18 At New Deer, bedrock is the Maud Pluton (gabbroic rock) and this is surrounded in much of the west of the Scoping Boundary, extending north to Sandhaven, by the Macduff Formation (micaceous psammite, semipelite and pelite), the area between New Pitsligo, Strichen and Tyrie is underlain by the Strichen Pluton (melagranite, biotite). The Mormond Hill Quartzite Member (quartzite and psammite) underlies the area between Newburgh and Lonmay.

Superficial Geology

- 6.1.19 The superficial deposits present across most of the Scoping Boundary are predominantly Quaternary glacial tills. The tills are typically composed of diamictons – poorly sorted,

unstratified, heterogeneous mixtures of gravel, sand, silt and clay, formed from ice transported material.

- 6.1.20 Marine beach deposits (gravel, silt and sand) are present at Broadsea, Fraserburgh Bay, from St Combs to Buchanhaven, and also at Peterhead and Sandford Bays. These typically consist of shoreface and beach deposits, mainly sand and shingle, with saltmarsh deposits (sediments).
- 6.1.21 Deposits of typically well-sorted, fine to medium grained wind-blown sand occur along the coast within the Scoping Boundary, these occur at the coastline from Fraserburgh Bay south to Peterhead.
- 6.1.22 Extensive areas in the northeast and east of the Scoping Boundary are underlain by glaciofluvial ice contact deposits (typically forming hummocky, moundy topography, consisting mainly of sand and gravel, with subsidiary beds of diamicton, silt and clay) and glaciofluvial sheet deposits (gravel, sand and silt).
- 6.1.23 Alluvium is present in the Scoping Boundary on low lying ground along river valleys, and includes gravel, silty sand and peat.
- 6.1.24 Head deposits (flinty gravel) are shown across an extensive area southwest of Peterhead, from the A952 east to Stirling Hill. Blanket head, comprising angular rock fragments, is shown at Waughton Hill, Mormond Hill and Gren Hill. There are some areas across the Scoping Boundary shown to have no superficial deposits, indicating that soils and superficial deposits may be thin (up to a few metres in thickness) or absent in some areas, and rock exposures are known to be present, including the rocky foreshores at Sandhaven, Fraserburgh Bay and Peterhead and Sandford Bay, and some areas of high ground inland, rock outcrops on lower lying land are also possible.
- 6.1.25 Areas of artificial infilled ground are present within the Scoping Boundary. Most of these correspond to areas of sand and gravel deposits (glaciofluvial deposits), indicating likely historical mineral workings. There are several voids, also corresponding with areas of sand and gravel.

Peat

- 6.1.26 Peat deposits are present within the Scoping Boundary, in the form of basin peat within the sites of former lochans, low-lying blanket peat overlying till deposits, and blanket hill peat, which occurs in the Scoping Boundary on granite outcrops on higher lying ground within central Buchan (NatureScot, 2019a). Further details of locations with peat deposits are below.
- 6.1.27 Areas of peat are shown in the northwest of the Scoping Boundary, a large area of peat straddles the western Scoping Boundary at New Pitsligo and extends to Turclossie Moss, which contains a significant area of active raised bog and is designated as a SAC and a SSSI (JNCC, 2005), the designated area is outside the Scoping Boundary, but is just within the study area. There are areas of peat north of Strichen, either side of the A981 road at Moss side of Strichen, and at Waughton Hill, in the north central area of the Scoping Boundary. Several smaller areas of peat are shown southeast of Mormond Hill and in the east of the Scoping Boundary, such as at Tillyduff. Three large areas of peat are shown in the east of the Scoping Boundary, south of Crimond, these include St Fergus Moss, which has been used for peat cutting (Canmore, 2014), and Rora Moss, which has also used for peat cutting and part of which is designated as a SSSI (Scran, 2022). In the south of the Scoping Boundary peat is also shown at Moss of Cruden, some of which is designated as a SSSI and GCR.

- 6.1.28 The generalised superficial and bedrock geology within the Scoping Boundary is shown in **Figure 6.1.1** in **Appendix 1A**, respectively, to provide an overview of the geology described above, the figures also show the extents of the designated sites, as described above.

Geodiversity

- 6.1.29 There are six geological SSSIs of national importance located within the Scoping Boundary, as described below, and one biological SSSI associated with a raised peat bog. All of the geological SSSIs are also designated as Geological Conservation Review (GCR) sites and in general the areas designated are the same, although there are slight discrepancies at Fraserburgh Bay and Loch of Strathbeg. The SSSIs and GCR sites are shown on **Figure 6.1.1** in **Appendix 1A** and described below.
- 6.1.30 In Philorth Valley in the north of the Scoping Boundary, southwest of Inverallochy, there is a large area of alluvium associated with the Water of Philorth which flows into Fraserburgh Bay. A portion of this area is designated as the Philorth Valley SSSI and GCR site. The Philorth Valley is important for studies of relative sea-level change in Scotland during the Holocene and the site contains a sequence of interbedded estuarine deposits and peat.
- 6.1.31 At Kirkhill a small site of 1.35ha in area is designated as a SSSI and GCR site. This site has the most complete stratigraphic record of Middle to Late Quaternary deposits in Scotland, comprising a sequence of glacial, periglacial and glaciofluvial sediments, and buried soils of interstadial and interglacial status. Kirkhill is a unique site of very high importance for Quaternary studies in Scotland (NatureScot, 2022b).
- 6.1.32 Two areas of peat within the Scoping Boundary, Rora Moss and Moss of Cruden, are both designated as SSSIs, and Moss of Cruden is also a GCR site.
- 6.1.33 Rora Moss is the second largest lowland raised bog in Aberdeenshire with a significant area of uncut dome and associated cut-over areas. The area surrounding the primary bog and extending to the edge of the moss has mostly been cut over, meaning that peat has been cut (i.e., removed / worked) to obtain peat for fuel and / or to supply the whisky industry. The cuttings (meaning the worked areas where peat has been removed / harvested) often retain deep peat and are essential for restoring the hydrology of the remaining dome (NatureScot, 2022c).
- 6.1.34 Moss of Cruden is the 'type locality' for a series of flint gravels (known as the Buchan Ridge Gravel Member) that, together with a series of quartzite gravels (the Windy Hills Gravel Member), form a unique set of deposits, the Buchan Gravels Formation, also known as the 'Pliocene' gravels of Buchan. Moss of Cruden is of high importance in providing a uniquely long record of some of the geomorphological processes and environmental conditions that have shaped the landscape of Scotland during and since the Neogene period (NatureScot, 2022d).
- 6.1.35 The Rosehearty to Fraserburgh Coast SSSI and GCR site extends for 10km of coastline, approximately 7km of which is in the north of the Scoping Boundary. The site is an open and exposed coastline with areas of intertidal mud and sand flats interspersed with low rocky outcrops and coastal lagoons, backed by a narrow fringe of sand dune and saltmarsh. In terms of its geology, the site is of high stratigraphical, structural and petrological interest, containing rocks exhibiting the classic "*Buchan type*" of regional metamorphism displaying small-scale sedimentary and tectonic structures. In general, the rocks are well exposed throughout the site, although the full extent of the exposure is only seen at low tide (NatureScot, 2022e).
- 6.1.36 The Cairnbulg to St Combs Coast SSSI and GCR site at Inverallochy in the northeast of the Scoping Boundary comprises three sections of narrow coastal strip with rock exposures, east of the beach at Fraserburgh, between Cairnbulg and Inzie Head. The gneisses

exposed demonstrate the orogenic, mountain forming, evolution of the Dalradian, and are important in understanding Dalradian tectonics. The Inzie Head gneisses are migmatites (mixed rocks), which formed when original sedimentary rocks were partially melted and then cooled again, producing a streaky appearance. The rocky shores of the site are almost entirely above the high-water mark (NatureScot, 2022f).

- 6.1.37 The Loch of Strathbeg SSSI and GCR site is a key geomorphological site for its extensive and varied dune topography. It provides one of the best active examples in Scotland of progradational (accretionary) processes that produce parallel lines of dunes separated by linear depressions and contains some of the most impressive instances of erosional processes in large scale coastal dune ridges to be found in Scotland. The massive high dunes contain spectacular blowouts cut down to a basement of raised beach shingle and in places extensive deflation surfaces have been produced by the coalescence of major blowouts. As a relatively undisturbed area, Strathbeg presents valuable opportunities to study these and other processes of landform evolution in a comparatively natural setting. Additional interest in the site is provided by a variety of raised shoreline features. Strathbeg is therefore a key site for studies in coastal geomorphology (NatureScot, 2022g).

Minerals

- 6.1.38 The Scoping Boundary includes areas of importance for mineral resources, including three active quarries.
- 6.1.39 The Safeguarding Resources proposals map of the Aberdeenshire Local Development Plan (Aberdeenshire Council, 2020b) shows several areas of search for minerals within the Scoping Boundary. These are identified as 'Memsie West', 'Memsie North', 'Newmill West', 'Gaval, Fetterangus', 'Auchlinn, Turiff' (this site crosses the western boundary of the Scoping Boundary), 'Tyrie', 'Tarwathie, Strichen', 'New Leeds', and 'Brownhill, Fetterangus'. All areas are identified as sand and gravel reserves and are shown approximately on **Figure 6.1.2 in Appendix 1A**.
- 6.1.40 The map also shows six mineral safeguarding areas in the south and southeast of the Scoping Boundary. These are identified as 'Peathill, New Pitsligo' (historical quarries used for building material – light grey, porphyritic granite), 'Aikey Brae, New Deer' (disused quarry extracting pink and grey speckled granite), 'Cairngall, Longside' (disused quarry, producing 'Blue Peterhead', muscovite-biotite granite), 'Savock, Longside' (active quarry, extracting the Collieston Formation, metamorphic rock used for crushed rock aggregate, armourstone and other products (sub base)), 'Stirlinghill (Admiralty No 1), Peterhead' (includes active and historical quarries, producing pink with grey 'Peterhead Granite'), and 'Blackhills, Longhaven, Peterhead' (active quarry, producing crushed rock aggregate and dimension stone of red-brown Peterhead Granite). The mineral safeguarding areas are shown on **Figure 6.1.2 in Appendix 1A**.

Soil

- 6.1.41 Soil mapping is available at 1:25,000 scale for the study area and is shown in **Figure 6.1.3**. This map shows the distribution of Soil Mapping Units and individual soil types known as series.
- 6.1.42 The most commonly occurring soil types throughout the study area are mineral podzols and mineral gleys, and to a lesser extent brown soils and alluvial soils. Peat, peaty gleys and peaty podzols are present locally, the most extensive areas of peat occur between New Pitsligo and St Fergus, and southwest of Peterhead.
- 6.1.43 Immature soils are present along the coastline between Fraserburgh and Peterhead, and inland, including at Mormond Hill, these can include shallow or weakly developed soils

including alluvial soils, soils developed on coastal dunes and in relatively flat areas of blown sand (areas known as links or machair), and shallow soils resting almost directly onto rock or shattered rock.

6.1.44 Areas of ‘non-soil’ are shown in the larger urbanised areas within the Scoping Boundary, including Fraserburgh and Peterhead.

6.1.45 The Carbon and Peatland 2016 map (Scotland’s Soils, 2016) shows carbon and peatland class values from 1 to 5, in addition to mineral soils, unknown soil types and non-soil, (which could include lochs, built up land, rock outcrops or scree).

6.1.46 Classes 1, 2 and 5 are the most important carbon-rich soils with regard to their function as carbon sinks and stores. Within the Scoping Boundary, Class 1 peat soil (nationally important carbon-rich soils, deep peat and priority peatland habitat, in areas likely to be of high conservation value), is shown between New Pitsligo, Tyrie and Strichen, between New Leeds and Kirktown, including St Fergus Moss and Rora Moss, and in the southeast, and between Ardallie and the area southwest of Boddam.

6.1.47 Class 5 peat soil (indicating areas where soil information takes precedence over vegetation data and no peatland habitat has been recorded, can also include areas of bare soil) is shown adjoining Class 1 in the areas described above, also at Waughton Hill and Mormond Hill, land north of St Fergus Moss towards Crimond, land within and immediately west of the St Fergus Gas Terminal, an areas at Kirktown, and localised areas in the north of the Scoping Boundary, south of Peathill and southwest of Pitblae.

6.1.48 Some small areas of Class 3, indicating peaty soil with some peat soil (the dominant vegetation cover is not priority peatland habitat, but is associated with wet and acidic type, occasional peatland habitats can be found and the soils are mainly carbon-rich soils, with some areas of deep peat), is shown from New Pitsligo, east to Waughton Hill, and locally in the south of the Scoping Boundary in an area to the west of Fetterangus.

6.1.49 Class 4 soils, predominantly mineral soil with some peat soil (in areas unlikely to be associated with peatland habitats or wet and acidic type, and unlikely to include carbon-rich soils), are also shown, generally in similar areas to where Class 5 is present, at the northern end Loch of Strathbeg, and locally at Sandhaven, Fraserburgh and Peterhead.

Agricultural Land

6.1.50 The Land Capability for Agricultural (LCA) Classification 1:50,000 scale map (see **Figure 6.1.5** in **Appendix 1A**) classifies land based on its potential for growing different types of crops or for grazing use, taking into consideration soils, climate and landscape.

6.1.51 The grading system is summarised below, from highest to lowest land capability, with prime agricultural land defined as land in Classes 1, 2 or 3.1:

- Class 1: Land capable of producing a very wide range of crops. (Prime agricultural land).
- Class 2: Land capable of producing a wide range of crops. (Prime agricultural land).
- Class 3.1: Land capable of producing consistently high yields of a narrow range of crops and/ or moderate yields of a wider range. Short grass leys are common. (Prime agricultural land).
- Class 3.2: Land capable of average production though high yields of barley, oats and grass can be obtained. Grass leys are common.
- Class 4.1: Land capable of producing a narrow range of crops, primarily grassland with short arable breaks of forage crops and cereal.

- Class 4.2: Land capable of producing a narrow range of crops, primarily on grassland with short arable breaks of forage crops.
- Class 5.1: Land capable of use as improved grassland. Few problems with pasture establishment and maintenance and potential high yields.
- Class 5.2: Land capable of use as improved grassland. Few problems with pasture establishment but may be difficult to maintain.
- Class 5.3: Land capable of use as improved grassland. Pasture deteriorates quickly.
- Class 6.1: Land capable of use as rough grazings with a high proportion of palatable plants.
- Class 6.2: Land capable of use as rough grazings with moderate quality plants.
- Class 6.3: Land capable of use as rough grazings with low quality plants.
- Class 7: Land of very limited agricultural value.

6.1.52 Most of the land within the Scoping Boundary is shown as Class 3.2 or lower, down to Class 7, which is the agricultural land with the greatest limitations (e.g., very acid or shallow soils, steeply sloping, poorly drained, unsuitable for crops). The lower grades are unsuitable for grassland improvement by mechanical means (e.g., due to slopes or rocky uneven ground) but the soils present still perform important agricultural and other functions. For example, class 6.1 is of high value for grazing, and soils within Class 7 land are important for their carbon storage and biodiversity functions (Hutton, 2022).

6.1.53 A small percentage of the land within the Scoping Boundary is shown as prime agricultural land. This comprises some localised Class 3.1 land and one area of Class 2 land. No Class 1 land is shown within the Scoping Boundary.

6.1.54 The Class 2 land is shown covering approximately 4.8ha to the south of Little Dens, in the southeast of the Scoping Boundary 5.5km west of Boddam. Localised areas of Class 3.1 land are present in several areas, typically within much larger areas of Class 3.2. land. They include areas in the north of the Scoping Boundary at Tyrie and Crimond, and multiple locations in the southern half of the Scoping Boundary. The Land Capability Classification across the Scoping Boundary is shown on **Figure 6.1.5** in **Appendix 1A**.

6.1.55 The map also shows built up areas with no LCA class including at Tyrie, Memsie, Strichen, Crimond, St Fergus, New Deer, Maud, Mintlaw, Longside and Boddam.

Land Contamination

6.1.56 In accordance with Part 2A of the Environmental Protection Act 1990, Aberdeenshire Council maintains a Public Register of Contaminated Land within Aberdeenshire. This register was reviewed and confirms that no sites within the Scoping Boundary or study area have been identified as contaminated land, as defined by Part 2A of the Environmental Protection Act 1990.

6.1.57 SEPA records eight inert landfills and one non-hazardous landfill several active and closed licensed landfills within the study area (SEPA, 2022a). The non-hazardous landfill is operational and located in the southeast of the Scoping Boundary at Stoneyhill Environmental Park, Stoneyhill, Peterhead. It has an annual capacity of 355,000 tonnes. The inert landfills are recorded as not operational or not regulated by SEPA. The locations of the landfills are shown on **Figure 6.1.6** in **Appendix 1A**.

6.1.58 The Aberdeenshire register of vacant and derelict land identifies 25 sites within the study area, the majority of which occur at the edges of the main settlements along the coast.

Whilst not necessarily affected by land contamination, the status of sites as vacant and derelict means that contamination could be present associated with the historical use that has not been previously investigated, and derelict buildings / structures can result in the release of contaminants to ground as they deteriorate in condition. There are two sites at the outskirts of Fraserburgh, including a former manufacturing site and a cemetery, a former airfield camp west of Inverallochy, a former defence site southwest of Boddam, a pumping station at Lonmay, a former station yard is identified in the south of the study area at Auchnagatt, and two sites at Mintlaw, including a former station.

6.1.59 Current Ordnance Survey mapping (Bing maps, 2022) and aerial and Streetview photography) (Google maps, 2022), and historical maps available to view on the National Library of Scotland (NLS) website (NSL, 2022) indicate that most of the study area is not expected to be affected by land contamination given the mainly rural land uses. However, historical land uses have been identified in the Scoping Boundary and in the wider study area with the potential to give rise to land contamination. In addition to the landfills described above, features within the Scoping Boundary include mineral extraction sites (which are sometimes infilled with wastes following cessation of extraction activities), the St Fergus gas terminal, Peterhead Power Station, former railway land, docks, former military land use (the former Royal Navy Air Station Rattray, aka Crimond Airfield, which is no longer used as an airfield but is still in military use), Longside Airfield (also a former military airfield), sewage works, substations, small-scale agricultural and other sources such as sheep dips, septic tanks, ad hoc waste disposal, fly tipping, fuel tanks and asbestos buildings in poor condition, garages and filling stations. Ordnance survey mapping and aerial photography also reveals sections of infilled canal north of the River Ugie, this includes part of the Saint Fergus And North Ugie Canal, the nature of the fill material used is not known and it may include waste materials. Fraserburgh and Peterhead both have industrialised harbours, with many commercial and industrial land uses present currently and historically, that could give rise to land contamination.

6.1.60 Contaminants that could be associated with the industrial and commercial land uses described above, including include metals, hydrocarbons, volatile organic compounds (VOCs), pathogens, ground gas, herbicides, pesticides, asbestos and persistent organic pollutants.

6.1.61 No potential sources of radioactive contamination have currently been identified within the Scoping Boundary. Aberdeenshire Council record that there is no legacy or current radioactive land use in Aberdeenshire (Aberdeenshire Council, 2012a).

Radon

6.1.62 Due to the nature of the bedrock within the Scoping Boundary, there are areas where radioactive radon gas occurs naturally, however most of the land within the Scoping Boundary is not affected by radon. The maximum radon potential is shown as 3-5 % in localised areas at the coast near St Fergus, and inland at Auchnagatt and southeast of Rathen. Radon gas poses a risk to human health within enclosed spaces, if allowed to accumulate with no suitable gas protection measures in place.

Hydrology, hydrogeology and Ecological Land Contamination Receptors

6.1.63 The hydrology and hydrogeology of the study area is described in **Section 6.3: Water resources and flood risk**. Surface water features and groundwater are potential receptors of land contamination, and groundwater flow can also provide a potential contaminant migration pathway.

6.1.64 Sensitive ecological receptors in the study area are described in **Section 6.5: Terrestrial ecology and ornithology**. Sensitive ecological sites, such as those with international,

national, or local designations for nature conservation, are potential receptors of land contamination, for example by direct release of contaminants in the designated area, or by migration of contaminants onto these sites e.g., windblown dust, lateral migration through the soil profile, or via groundwater flow.

Future baseline

- 6.1.65 Without the Project, the land within the study area is generally likely to remain in its current use.
- 6.1.66 As a result of climate change, the UK is likely to see hotter drier summers and warmer wetter winters, coupled with increased frequency of extreme weather occurrences such as heat waves, dry spells, heavy rain and flooding. This has the potential to affect soils, by changing soil properties and functions related to organic matter, water and soil erosion e.g., soil erosion by wind and water is likely to increase, resulting in loss of soil and loss of organic matter, changes to rainfall patterns and groundwater levels will affect vegetation, in turn affecting soil organisms, and there may be increased potential for soil contamination to occur as a result of contaminants transported in flood waters. At present, the effects of climate change on soils and the rate of change to soils because of climate change, are not sufficiently well understood to be quantified, however, the likely effects of climate change on soils (soil health and soil function) are overall likely to be negative rather than positive.
- 6.1.67 To some extent agriculture can be adapted to mitigate the effects of climate change, for example by changes to tillage, extensions to fallow periods, diversifying crops, changing inputs such as fertilizers, and changes to planting density or planting times. Climate change effects such as increased intensity of flooding could contribute to soil compaction, waterlogging and erosion, which could potentially result in agricultural land capability being reduced / downgraded, however, a reduction in rainfall could also result in higher grades for wetter areas. As is the case for soil generally, there is too much uncertainty over the scale and timing of the effects to predict them accurately, and as agricultural land is already managed there is scope for alternative management approaches to both mitigate negative effects and promote positive effects.
- 6.1.68 Climate change also has the potential to affect geodiversity, for example rock and sediment exposures being sealed behind coast and riverbank defences, exposures being lost (or revealed) through erosion, access to exposures being prevented by their submergence or burial caused by changes in sedimentation or landslides.

Basis for scoping assessment

- 6.1.69 The ground conditions and contamination scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: Project Description**.
- 6.1.70 The onshore Project components of relevance for the ground conditions and contamination assessment are: landfall(s) where transition joint bay(s) will be constructed above MHWS at the landfall(s) to house the joints connecting the offshore export cables and the onshore export cables, onshore export cables will run from the landfall(s) to the onshore substation(s) at Peterhead or New Deer, grid connection cables (connecting the onshore substation(s) to the grid connection point) and the grid connection point (SSEN) substation, which does not form part of the planning application.
- 6.1.71 The estimated permanent site footprint for a 3GW onshore substation is anticipated to be up to 8ha. For a 1.5GW onshore substation it is anticipated to be 4ha. Outside of the permanent footprint of the buildings / equipment at the substation(s), a wider construction area will be required for construction equipment, welfare facilities, laydown and storage, making a total substation construction area of 12ha for 3GW and 6ha for 1.5GW. There may

be a requirement for energy balancing equipment to be constructed close to the onshore substation(s). Construction works for the onshore substation(s) will include creation of site access, site preparation works, installation of underground services and foundations, construction of the building, installation of electrical equipment, installation of perimeter fencing, and landscaping. These areas will be fully reinstated after construction is complete.

- 6.1.72 As defined in **Table 2.3.8** to **Table 2.4.2** in **Chapter 2: Project Description**, the corridor width for the onshore export cables will be approximately 150m, constructed mainly using open-cut trenching, with Horizontal Directional Drilling (HDD) used where necessary to cross sensitive features such as watercourses, roads and railways. Target cable burial depth will typically be 1-2m, dependent on ground conditions. Cables will not be oil-filled. Several temporary construction laydown areas and construction compounds will be required along the temporary construction corridor to accommodate construction equipment, materials, and site offices / welfare. HDD offshore exit pits and temporary working compounds will be needed at the landfall(s).
- 6.1.73 On completion of construction, the onshore export cable construction corridor land will be reinstated, with the haul road, any soil storage and stock fences removed. Where underground cables are installed, a permanent rights or servitude will be agreed to enable access for inspections and maintenance during operation of the Project. This will be up to 50m in width.
- 6.1.74 During operation, maintenance of the onshore export cables is likely to be localised and infrequent, and ground disturbance minimised by the joint bays which can allow cables to be replaced by pulling through rather than digging up sections of cable.
- 6.1.75 During decommissioning of the Project, it is anticipated that electrical cables could be removed or left in-situ onshore to minimise environmental effects associated with removal. The onshore substation(s) will be removed and the sites reinstated. The decommissioning works are likely to be carried out in reverse to the sequence of construction works and will involve similar levels of equipment. All decommissioning activities will be managed in accordance with a Project Decommissioning Plan.
- 6.1.76 During operation, all permanent above ground equipment or structures will be secure to prevent trespassers or theft and will be designed and constructed to comply with industry good practice for pollution prevention (e.g., from oil containing equipment such as electrical transformers). All substation(s), energy balancing equipment and the grid connection point will be located within secure compounds.
- 6.1.77 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 6.1.5**.
- 6.1.78 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 6.1.79 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on ground conditions and contamination (see **Table 6.1.4**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 6.1.80 There is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, and they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 6.1.4 Relevant ground conditions and contamination embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-001	Underground cables will be used to connect from the landfall(s) transition joint bay to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the new onshore substation nominated by NETS grid connection point(s). The installation status of which will be assessed on confirmation of a route of the onshore cable routing. Cables are typically installed in ducts in a standard buried trench arrangement.	Construction Environmental Management Plan (CEMP) management plans and planning conditions.
M-002	Where practical, sensitive sites will be avoided by the temporary and permanent onshore project footprint including SPAs, SACs, SSSIs, National Nature Reserve (NNR), Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, Scottish National Trust Land, Listed Buildings and Scheduled monuments.	CEMP management plans, description of Project and planning conditions.
M-007	Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2014) guidance on the Assessment of Dust from Demolition and Construction in order to avoid adverse effects on sensitive features. Examples of pathway include windblown dust / fibres or tracking back of dust / fibres is a potential contamination migration.	CEMP and planning conditions.
M-013	During both construction and operation phases, vehicle maintenance and refuelling / oil changes for machinery / equipment will be undertaken within designated areas where spillages can be easily contained, and machinery will be routinely checked to ensure it is in good working condition. The areas at risk of spillage or containing hazardous materials, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals), will comply with industry good practice for pollution prevention, be appropriately bunded, have appropriate containment and segregation and will be risk assessed and carefully sited to minimise the risk of hazardous substances entering the drainage system, local watercourses, or sensitive land based receptors. Where feasible, such areas will be sited at least 10m from a watercourse, in accordance with the SEPA CAR General Binding Rules, and away from areas at risk of flooding. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. An Incident Management Plan will be in place during construction and operation. All works will be carried out in accordance with The Pollution Prevention and Control (Scotland) Regulations 2012 and the Water Environment (Controlled Activities) (Scotland) Regulations 2011.	CEMP and planning conditions.
M-015	During construction topsoil and subsoil will be stored within the construction working corridor of the onshore export cable construction corridor. The topsoil and subsoil will be stored in separate stockpiles, in line with the DEFRA Construction Code of	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	Practice for the Sustainable Use of Soils on Construction Sites. Any suspected or confirmed contaminated soils will be separated, contained and tested before removed.	
M-016	In areas (or during periods of adverse weather) there may be the requirement to import aggregates to minimise erosion or transport of sediment from construction. Options such as bog-matting, geotextiles, floating roads will be considered by the principal contractor for sensitive sections of the route to reduce impact.	CEMP and planning conditions.
M-017	Potential risks to human health from any unexpected ground contamination will be avoided by the use of Personal Protective Equipment (PPE) and by adopting appropriate good working practices.	CEMP and planning conditions.
M-018	Prior to construction, an unexpected contamination protocol will be produced in line with UK statutory guidance (LCRM / CLR 11) to minimise the potential risks to human health and the water environment from any unexpected ground contamination. The protocol will take into account the requirements for the use of Personal Protective Equipment (PPE) and adoption of best practice methods during construction.	CEMP and planning conditions.
M-021	All aspects of the construction work will be in accordance with the Health and Safety at Work Act (1974) and regulations made under the Act, and the Construction (Design and Management) Regulations 2015.	CEMP and planning conditions.
M-023	Particular care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion. Temporary cut-off drains will be installed parallel to the trench-line, before the start of construction, to intercept soil and groundwater before it reaches the trench. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release.	CEMP and planning conditions.
M-025	Any disposal off-site of excavated material will be undertaken in accordance with the waste legislation including the Environmental Protection Act 1990, The Environmental Protection (Duty of Care) (Scotland) Regulations 2014 SSI 4, and The Waste (Scotland) Regulations 2012.	CEMP and planning conditions.
M-027	At any sensitive features identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects. Where it is necessary to cross sensitive features, such as watercourses, trenchless construction methods, such as HDD will be used to install ducts under the crossed feature, which the cables are then pulled through via entry and exit pits.	CEMP management plans and planning conditions.
M-063	A CEMP to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A	Planning conditions and CEMP.

ID	Environmental measure proposed	How the environmental measures will be secured
	<p>CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase.</p> <p>The CEMP will be the securing mechanism for many measures.</p>	
M-066	The permanent rights or servitude for the onshore export cable route will be kept to the minimum width needed for safe access for cable maintenance or replacement purposes during operation of the Project.	CEMP management plans and planning conditions.
M-067	A Phase 1 Geoenvironmental Desk Study will be completed prior to submission of the EIA Report to identify the potential for the Project to encounter areas of potential land contamination, this will develop the preliminary conceptual site model (i.e., the plausible sources, pathways and receptors of land contamination) and include a risk assessment to inform any further actions, such as intrusive ground investigation or remediation, needed to ensure that the land is suitable for the intended future use. This is in accordance with the LCRM requirement for a Tier 1: preliminary risk assessment as the first stage of land contamination assessment to determine whether there are any potentially unacceptable risks requiring further assessment / actions.	CEMP and planning conditions.
M-068	Desk-based information review (yet to be supplemented by site investigations) indicates that peat may be encountered by the Project. The Project will therefore apply the general principles in published SEPA guidance 'Developments on Peat and Off-site Uses of Waste Peat' (SEPA, 2017) to peat management, including use of the peat management hierarchy, the first principle of which is to minimise peat excavation and disturbance. A Peat Management Plan will be developed if peat cannot be avoided.	CEMP and planning conditions.
M-069	The construction work will comply with regulations, including the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) and associated SEPA guidance. Any necessary authorisations will be obtained from SEPA and complied with. Construction activities which may require authorisation from SEPA include: discharging run-off from construction areas, work on the riverbank; the installation of coffer dams; dewatering excavations; and use of herbicides.	CEMP and planning conditions.
M-070	Soils and excavated materials will be managed in accordance with SEPA regulatory guidance on Promoting the Sustainable Reuse of Greenfield Soils in Construction, and Waste Management Guidelines for the re-use of excavated materials and remediation. The best practice for soil handling in the Defra Construction Code of Practice will be applied for handling of topsoil and subsoil. A soil management plan (SMP) will be developed for use during construction to protect soil resources and agricultural land quality. The SMP will be used in conjunction with a Peat Management Plan (PMP) as required i.e., if the Project encounters areas of peat.	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-071	During topsoil stripping, machinery with low ground pressure will be used to minimise soil compaction where the soil conditions indicate that compaction is possible. Storage time will be kept to the practicable minimum to prevent the soil deteriorating in quality. Topsoil stripped from different fields will be stored separately, as will soil from hedgerow banks or woodland strips.	CEMP and planning conditions.
M-072	Contamination if found will be subject to appropriate risk assessment and if necessary, either removed, treated and/or mitigated as part of the Project, and the Incident Management Plan will be followed.	CEMP and planning conditions.
M-073	The Applicant will ensure that the land used for the development is suitable for the proposed use with respect to the potential for soil and groundwater contamination and, where necessary, risk-based remediation is undertaken in line with statutory guidance (CLR 11 / LCRM) and other guidance (including BS 10175). The precise design of any remediation strategy will be confirmed in the detailed design after planning consent. If remediation is needed, this will be designed using the sustainable remediation decision-making process set out in the UK Sustainable Remediation Forum (SuRF-UK) Framework for Assessing the Sustainability of Soil and Groundwater Remediation (2010).	CEMP and planning conditions.
M-074	<p>All ground investigation work and construction work associated with the Project will be completed in accordance with the Control of Asbestos Regulations 2012 (CAR 2012).</p> <p>With regard to asbestos containing materials or asbestos fibres encountered on or within the ground during ground works, CAR 2012 requires that measures are taken to prevent fibre release and to prevent the spread of asbestos, the location where asbestos is suspected or confirmed must be recorded and control measures put in place to prevent exposure.</p>	CEMP and planning conditions.
M-075	Where practicable the Project will avoid areas of active mineral extraction, mineral safeguarding or mineral search areas.	CEMP and planning conditions.
M-076	Where crossing techniques such as horizontal directional drilling (HDD) are not required or are not practical, the crossing of drainage ditches or engineered channels may be by open cut techniques or the installation of culverts or bridges to allow water to continue flowing. Where this is the case this will be done in accordance with The Water Environment (Controlled Activities) (Scotland) Regulations 2011 and the General Binding Rules in the SEPA Practical Guide. Appropriate authorisations from SEPA will be applied for, if required for works e.g. for Main Rivers, works on or near sea defences / flood defence structures or in a flood plain), or from the Lead Local Flood Authority (for ordinary watercourse crossings).	CEMP and planning conditions.
M-083	The permanent footprint of the substation(s) and transition joint bays will be minimised to that required for the safe operation and maintenance of the equipment in order to minimise land take.	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-112	The Project will aim avoid permanent development on prime agricultural land (class 1, 2 or 3 LCA grades) with the aim of preserving the best quality agricultural land for its future food / biomass production capability where reasonably possible.	CEMP management plans, description of Project and planning conditions.

Likely significant effects

- 6.1.81 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a potential likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 6.1.82 The likely significant effects on ground conditions and contamination are summarised in **Table 6.1.5**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for ground conditions and contamination effects in relation to geology, soil, agricultural land, minerals and land contamination receptors, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 6.1.83 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 6.1.5 Likely significant ground condition and contamination effects

Activity and impact	Embedded measures	Effect*	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Permanent damage to a locally or nationally important geological feature (Construction and Operation / Maintenance) (see Figures 6.1.1a and 6.1.1b in Appendix 1A).	M-002, M-083	Temporary construction works within locally or nationally important geological features could result in permanent loss of a geological / geomorphological feature e.g., by the removal / reprofiling of a feature at ground surface or accidental damage caused due to the use of construction plant. Maintenance works for the Project during operation could involve the use of plant or vehicles that could cause damage to nearby geological features.	Scoped in.	Geology (geodiversity) (Effects on biological receptors are considered in Section 6.5: Terrestrial ecology and ornithology)	Further surveys to be completed including ecological field surveys as detailed within Section 6.5: Terrestrial ecology and ornithology .
Construction of the landfall(s), onshore export cables and substation(s), transition joint bays – damage to soil during handling, storage, reinstatement or due to use of construction vehicles / plant. Damage to soil (Decommissioning).	M-001, M-002, M-015, M-016, M-068, M-070, M-071, M-083	Damage to soil during activities such as excavation, stockpiling and reinstatement, soil compaction caused by use construction plant / vehicles. The extent of the damage and the time taken for the soil health/soil functions to return to baseline conditions when construction activity has ceased will depend on the type of soil and the measures taken to protect soil during the work. Damage to soil structure/soil health is likely to result in a loss or reduction of soil functions. This could occur due to soil compaction, mixing of topsoil and subsoil during handling or storage, or	Scoped in.	Soil, including peat, Agricultural land.	Desk based review, including ground condition and contamination constraints maps to be used to develop the design of the Project to avoid, or minimise effects on the most sensitive soils and agricultural land. Further data to be collected to support the assessment, see paragraph 6.1.99 .

Activity and impact	Embedded measures	Effect*	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		soil erosion (from areas where vegetation has been stripped or from stockpiles due to wind or water). Soil erosion is likely to result in loss of soil organic matter. Damage to soil such as compaction, or mixing of topsoil and subsoil, could result in agricultural land capability being downgraded.			
Disturbance to / damage to soil or agricultural land, (Operation / Maintenance) of the onshore export cables and grid connection cables.	M-001	No likely significant effects – see paragraph 6.1.74 . Maintenance requirements that would entail disturbance of soil are likely to be minimal, infrequent and localised during operation of the Project. Significant effects on soil or agricultural land during the operation phase are therefore unlikely.	Scoped out: see rationale in section below paragraph 6.1.85 .	Soil, including peat, Agricultural land.	None
Permanent loss of soil / agricultural / other land due to Construction of above ground elements of the Project.	M-001, M-002, M-083	The Project will require permanent development in the form of one or two onshore substations, potentially energy balancing equipment, and link boxes associated with jointing bays at landfall(s) and along onshore export cable routes or grid connection cable routes which will be at or above ground level.	Scoped in.	Soil, including peat, Agricultural land.	Desk based review, including ground condition and contamination constraints maps to be used to develop the design of the Project to avoid, and if that is not possible, to minimise effects on the most sensitive soils and agricultural land.

Activity and impact	Embedded measures	Effect*	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
					Further data to be collected to support the assessment, see paragraph 6.1.99.
Damage to land drainage systems during Construction (excavation).	M-023	Effects may include waterlogging of soils causing damage to soil health/structure, or alternatively result in drying out of peat where new drainage is introduced	Scoped in.	Soil, including peat, Agricultural land	Further data to be collected to support the assessment, see paragraph 6.1.99.
Sterilisation of mineral resources due to permanent development (including substations, transition joint bays and buried cables) (Construction).	M-075, M-083	Potential for the Project to cross areas of mineral safeguarding or mineral search areas resulting in the sterilisation of mineral resources.	Scoped in.	Mineral resources	Desk based review, including ground condition and contamination constraints maps to be used to develop the design of the Project to avoid or minimise effects on mineral resources.
Changes to the level of risk associated with land contamination due to change of land use, introduction of new receptors, and/or changes to ground cover (e.g., removal of vegetation, ground reprofiling, removal of hardstanding) (Construction, Operation /	M-018, M-023, M-067, M-070, M-073, M-074	Development can result in increased risks to receptors due to land contamination e.g., mobilising contaminants by removing vegetation, introducing new receptors or pathways to receptors, or alternatively it can remove or lower risks to receptors e.g., through changes to land use or through remediation.	Scoped in. To be assessed on the basis of the change in the level of risk to land contamination receptors as a result of the Project – effects may be positive or negative (adverse).	Humans (human health) – site users and visitors, neighbouring site users, soil, the water environment (groundwater and surface water), ecological receptors, property (e.g., grazing animals), built	Desk based review, including ground condition and contamination constraints maps and a Phase 1 Geoenvironmental Desk Study to be used to develop the design of the Project to avoid, and if that is not possible, to minimise adverse effects on

Activity and impact	Embedded measures	Effect*	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Maintenance or Decommissioning).				infrastructure (buildings and services).	land contamination receptors, and identify any suitable opportunities for positive effects on land contamination receptors e.g., through remediation of pre-existing contamination.
Health effects on groundworkers due to land contamination (Construction, Operation / Maintenance or Decommissioning).	M-007, M-021, M-074	No likely significant effects – see paragraph 6.1.86.	Scoped out: See rationale in section below paragraph 6.1.86.	Humans (human health) – ground workers during construction or maintenance activities	None
Release of contaminants to ground (soil and/or groundwater) or to surface water during (accidental spills or leaks of fuel / oil leakages from vehicles / plant, spills or leaks during storage of fuels / oils, release of contaminants from wastes by runoff or windblown dust) (Construction or Decommissioning).	M-007, M-013, M-021	Potential to introduce new sources of contamination and cause deterioration of land quality / water quality due to accidental spills or releases.	Scoped in. To be assessed on the basis of the change in the level of risk to land contamination receptors as a result of the Project.	Humans (human health), soil, the water environment (groundwater and surface water), ecological receptors, property (e.g., grazing animals), built infrastructure (buildings and services).	None

Activity and impact	Embedded measures	Effect*	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Accidental release of contaminants to ground (Operation / Maintenance) e.g., leaks from oil containing equipment in substation(s), leaks from vehicles or equipment used for day to day activities.	M-013, M-067, M-073	No likely significant effects – based on paragraph 6.1.76.	Scoped out. See rationale in section below paragraph 6.1.87.	Humans (human health), soil, the water environment (groundwater and surface water), ecological receptors, property (e.g., grazing animals), built infrastructure (buildings and services).	Desk based review including updates to the baseline information, and updated design information.

* Soil functions include a number of ecosystem services as well as other functions such as conserving archaeological remains. Soils on agricultural land act as growing medium for food, timber and other crops, however they are also a store for carbon and water (and actively involved in the carbon and hydrological cycles), a reservoir of biodiversity, and can provide a buffer against pollution e.g., protecting groundwater quality in deeper aquifers and surface water. Scotland has extensive areas of soils with high organic content and functioning peatland, where peat forming vegetation is present, is of high importance. Damaged peatland with potential for restoration is also of high importance.

Impacts scoped out of assessment

- 6.1.84 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works, professional experience and historical evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.
- 6.1.85 **Effects on soils, including peat, and agricultural land, during the operational phase** are scoped out on the basis that any disturbance to the ground during operation is likely to be small-scale and very infrequent, and the use of transition joint bays and link boxes will potentially allow cable repairs to be made by pulling cable through to the next joint bay, rather than re-excavating soil above the cables.
- 6.1.86 All works for the Project from construction through operation and decommissioning must comply with the law. **Health effects on ground workers during construction, maintenance activities during operation, or decommissioning**, caused by direct contact, inhalation and/or ingestion of soils and dusts, are scoped out, as any work which may bring these workers or other site users into contact with contaminants would be subject to The Construction (Design and Management) Regulations 2015 (CDM) and the Health and Safety at Work Act (1974), which require that safe working practices are in place as part of normal construction health and safety management so that risks to these type of workers are controlled. Legal obligations include the requirement for appropriate risk assessments and method statements for all construction related activities and the use of appropriate working methods, training and Personal Protective Equipment (PPE).
- 6.1.87 Following construction, and any ground investigation and remediation required, the land within the footprint of the Project must be suitable for use during operation, i.e. there should be no potential for land contamination to have a significant effect on receptors. Effects on receptors caused by accidental release of contaminants to ground during operation (e.g., leakages of oil from substation equipment) are scoped out on the basis of the Project being designed and constructed to comply with industry good practice for pollution prevention, the above ground infrastructure being secure and only accessible to suitably trained and authorised workers, and all operations being subject to the Health and Safety at Work Act (1974), and regulations made under this Act.

Cumulative effects

- 6.1.88 Cumulative effects on ground conditions and contamination resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the CEA screening exercise.
- 6.1.89 In the absence of a development list, the following impacts from Project have been identified as having the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:
- Adverse effects on geology e.g., permanent loss of all or part of a geodiversity receptor or damage to geodiversity during construction of a development.
 - Adverse effects on soils caused by temporary disturbance or loss due to development.
 - Adverse effects on the national agricultural land resource caused by damage to land and soil during construction, or the permanent loss of an area of agricultural land during construction of a new development.

- Sterilisation of mineral resources due to development.

6.1.90 Given the largely rural nature of the land within the Scoping Boundary, the likely absence of large-scale land contamination, and the linear nature of the Project, there is unlikely to be potential for cumulative effects to occur in relation to land contamination receptors.

6.1.91 For ground conditions and contamination, UK planning legislation requires all developments to be suitable for their proposed use, so that risks posed by land contamination to human health, the water environment, ecological receptors or property receptors (including the built environment and agricultural property including livestock), and the risk of damage to geodiversity sites, have been appropriately controlled / managed. Most of the land along the cable route(s) will be restored to its original land use, and if located within agricultural land, the soil will be reinstated and the land restored back to its original LCA class, prior to the operational Phase of the Project. Therefore, no effects have been identified for the operation phase of the Project that have the potential to act cumulatively with impacts from other developments to contribute to cumulative ground conditions effects.

Transboundary effects

6.1.92 The potential transboundary effects from construction, operation (including maintenance) and decommissioning on ground conditions and contamination are considered in **Appendix 4A: Transboundary Screening Matrix**.

6.1.93 Based on the knowledge of the baseline environment, the nature of planned works, professional experience and the history of evidence on the potential for impact from such projects more widely, there are not considered to be any transboundary effects on ground condition and contamination receptors from the Project.

Proposed approach to the EIA Report

6.1.94 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process which as set out in **Chapter 4: Approach to Scoping and EIA**.

6.1.95 Likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

Development of site-specific environmental measures

6.1.96 The selection of the landfall(s), onshore cable route(s) and substation location(s) at the EIA Report stage will involve the translation of embedded measures into site-specific measures taking into consideration the particular ground conditions and contamination, including geology, soil type, and land contamination status.

6.1.97 This exercise will result in the refinement of the proposed embedded measures and the potential development of some location-specific measures as required to demonstrate how sensitive receptors will be protected.

Undertaking further surveys

6.1.98 As outlined in **paragraph 6.1.12** further baseline data will be obtained to inform the assessment for land contamination receptors in the form of a Phase 1 Geoenvironmental Desk Study. The Phase 1 Geoenvironmental Desk Study will identify areas where intrusive ground investigation will be needed to inform the design of the Project.

- 6.1.99 Peat survey and / or soil survey may be required to inform peat / soil management planning. The scope of future peat or soil surveys will be informed by the latest design information.

Consultation

- 6.1.100 The following statutory bodies will be consulted further prior to completing the assessment:
- SEPA;
 - Aberdeenshire Council; and
 - NatureScot.

6.2 Air quality

Introduction

- 6.2.1 The air quality assessment will consider the potential likely significant effects on air quality, dust and odour that may arise from the construction, operation and maintenance and decommissioning of the onshore Project elements that are landward of Mean Low Water Springs (MLWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how effects will be assessed for the purpose of an EIA.
- 6.2.2 Air quality interfaces with other aspects and as such, should be considered alongside these; namely:
- **Section 5.13: Infrastructure and other marine users:** The infrastructure and other marine users section provides further assessment where impacts from generated emissions onshore are assessed on other marine users.
 - **Section 6.5: Terrestrial ecology and ornithology:** Due to the potential for emissions and dust associated with the Project to negatively affect habitats, flora and fauna. The air quality section will therefore inform the terrestrial ecology and ornithology assessment.
 - **Section 6.8: Traffic and transport:** This Section considers the effects of the Project traffic generation on air quality, the traffic and transport section will therefore inform the air quality assessment.
 - **Section 7.1: Climate resilience:** The interference with climate resilience with air quality is captured in the In-Combination Climate Impacts (ICCI) assessment.

Legislative and policy context

- 6.2.3 This Section identifies the relevant legislative and policy context which has informed the scope of the air quality assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual international, national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 6.2.4 In order to provide a robust evidence base, **Table 6.2.1** below presents a summary of legislation and policies relevant for the air quality assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 6.2.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
The Air Quality (Scotland) Standards Regulations (2010)	<ul style="list-style-type: none"> The Regulations define ambient air as outdoor air, and explicitly exclude workplaces and other places to which members of the public do not have regular access. <p>These standards will be applied to the air quality methodology presented in paragraph 6.2.10.</p>
Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (2008)	<ul style="list-style-type: none"> The Directive sets legally binding limit values (for the protection of human health) and critical levels (for the protection of vegetation and ecosystems) for selected pollutants that are to be achieved by specific dates Regulated pollutants include sulphur dioxide (SO₂), nitrogen dioxide (NO₂), oxides of nitrogen (NO_x), particulate matter smaller than 10 micrometer (µm) (PM₁₀), particulate matter smaller than 2.5µm (PM_{2.5}), lead (Pb), benzene (C₆H₆) and carbon monoxide (CO). It details procedures EU Member States should take in assessing ambient air quality. <p>This guidance is also relevant to the proposed methodology for the full assessment.</p>
The Pollution Prevention and Control (Scotland) Regulations (2012)	<ul style="list-style-type: none"> The Regulations apply an integrated environmental approach to the regulation of certain industrial activities including that prevent harm to the quality of the environment as a whole of relevance to this assessment.
The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations (SI 2018/764) (2018)	<ul style="list-style-type: none"> Introduces emission limits for gaseous and particulate pollutants, as well as type approval for internal combustion engines for non-road mobile machinery (NRMM). <p>This is important due to the large number of NRMM that are likely to be used throughout the Project during the construction stages.</p>
The Air Quality (Scotland) Regulations 2000 (as amended) (UK, Government, 2000) The Air Quality (Scotland) Amendment Regulations (2016)	<ul style="list-style-type: none"> The Regulations outline an air quality objective (AQO) of 40µgm⁻³ for annual mean concentrations of NO₂ and 18µgm⁻³ for annual mean concentrations of PM₁₀. There is an EU limit of 25µgm⁻³ for the annual mean concentration of PM_{2.5}.
Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) later referred to as the Industrial Emissions Directive (2010)	<ul style="list-style-type: none"> Outlines an integrated approach to controlling pollution to air, water and land, alongside setting industry standards for the polluting industries. It aims to prevent and reduce harmful industrial emissions, while promoting the use of techniques to reduce emissions to air, water and land.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework .

Relevant legislation and policy	Relevance to the assessment
	<p>Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crisis Policy 23: Health and Safety.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. Details a commitment to reducing the impacts of environmental pollution.
Scottish Planning Policy (SPP) (2014) <ul style="list-style-type: none"> Paragraph 29 Paragraph 169 	<ul style="list-style-type: none"> Introduces a presumption in favour of proposals that contribute to sustainable development by avoiding over-development, protecting the amenity of new and existing development and considering the implications of development for water, air and soil quality. Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> net economic impacts; scale of contribution to renewable energy generation; effect on greenhouse gas emissions; cumulative impacts; impacts on communities and individual dwellings; landscape and visual; natural heritage; carbon rich soils impacts; impacts on historic environment - including scheduled monuments, listed buildings and their settings; impacts on road traffic; and effects on hydrology.
Cleaner Air for Scotland 2 (CAFS2) – Towards a Better Place for Everyone (2021a)	<ul style="list-style-type: none"> Sets out the Scottish Government's air quality policy framework for the next five years and a series of actions to deliver further air quality improvement. It is accompanied by a delivery plan and aims to fulfil Scotland's legal responsibilities over the period 2021 – 2026.
Marine Policy	
No marine policy is of specific relevance to this area of technical assessment.	
Local Planning Policy	
Modified Proposed Aberdeenshire Local Development Plan 2020	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> C2 Renewable Energy

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> • P4 Hazardous and Potentially Polluting Developments and Contaminated Land • PR1 Protecting Important Resources <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>

Technical guidance

6.2.5 Technical guidance that has been used to define the assessment is set out in **Table 6.2.2** below.

Table 6.2.2 Relevant technical guidance

Technical guidance	Relevant to the assessment
World Health Organisation (WHO) (2021), Air Quality Guidelines	<p>The World Health Organisation's (WHO) Air quality guidelines (AQG) serve as a global target for national, regional and city governments to work towards improving their citizen's health by reducing air pollution.</p> <p>The WHO's Air quality guidelines are a set of evidence-based recommendations of limit values for specific air pollutants developed to help countries achieve air quality that protects public health. The first release of the guidelines was in 1987. Since then, several updated versions have appeared, and the latest global version was published in 2005.</p> <p>The 2021 update of the WHO air quality guidelines is in response to the real and continued threat of air pollution to public health.</p>
Local Air Quality Management (LAQM) Technical Guidance (TG16) (DEFRA, 2018a)	<p>Provides guidance for technical officers and local authorities to discharge their obligations under the LAQM regime. It contains guidance on numerous areas including, for example, screening tools and methodologies, air quality monitoring, estimating emissions and dispersion modelling.</p>
Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), Land-use Planning and Development Control: Planning for Air Quality (2017) (IAQM, 2017)	<p>Suggests how to classify the magnitude and significance of air quality effects from a new development for planning purposes.</p> <p>This guidance also promulgates the term Air Quality Assessment Level (AQAL) as a generic term for the various standards, objectives, limit values etc. against which impacts need to be assessed.</p>
IAQM, A guide to the assessment of air quality impacts on designated nature conservation sites (2020) (IAQM, 2019)	<p>Provides guidance on the assessment of air quality impacts at designated nature conservation sites.</p>
IAQM, Guidance on the assessment of dust from demolition and construction (2014) (IAQM, 2014)	<p>Provides guidance on the assessment of dust from construction activities.</p>

Technical guidance	Relevant to the assessment
Considering air pollution impacts in development management casework (Scottish Natural Heritage, 2017a)	This guidance document reports how Scottish Natural Heritage (now NatureScot) considers potential impacts on protected areas from air emissions produced by certain types of development. It is here where screening criteria is reported for the consideration of whether proposals will have a significant effect and therefore if an assessment is required.
IAQM, Guidance on the assessment of odour for planning (2018) (IAQM, 2018)	Provides guidance on the assessment of odour.

Study area

- 6.2.6 The study area for the air quality assessment is defined as the area of the Project together with the Zones of Influence (ZOIs). ZOIs for air quality are the area immediately around the Project (for a distance based on expert judgement and recognised guidance), plus roads on which traffic related to the Project may travel. Guidance published by the Institute of Air Quality Management, (IAQM) (2014) suggests dust impacts may extend up to 350m from construction site boundaries, and up to 500m from the construction site entrance / exit along roads on which construction traffic is travelling. Guidance published jointly by the IAQM and Environmental Protection UK (EPUK) (2017) recommends a ZOI extending for a distance of 200m from roads on which a significant increase in traffic would occur as a result of the development. The guidance further defines a significant increase in traffic as follows:
- cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors:
 - ▶ more than 100 annual average daily traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA); or
 - ▶ more than 500 AADT elsewhere;
 - cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors:
 - ▶ more than 25 AADT within or adjacent to an AQMA; or
 - ▶ more than 100 AADT elsewhere;
 - realign roads, for instance changing the proximity of receptors to traffic lanes, where the change is 5m or more and the road is within an AQMA; or
 - introduce a new junction or remove an existing junction near to relevant receptors. This applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate (for example, traffic lights, or roundabouts).
- 6.2.7 The study area will be reviewed and amended in response to such matters as refinement of the onshore project components, for example, cable laying, substation construction, etc, along with the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

Consultation

- 6.2.8 A virtual meeting was held with Aberdeenshire Council on 28th September 2022 where air quality was tabled for discussion. Discussions were also undertaken with NatureScot prior to scoping submission. In both instances no specific air quality comments were raised.

Assessment methodology

Introduction

- 6.2.9 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. Whilst this has informed the approach that has been used in this air quality section, the application of the methodology and how it is adapted to address the specific needs of the air quality assessment is set out below.

Air quality

- 6.2.10 Air quality in the UK is often characterised in terms of key pollutants including: NO₂, NO_x, PM10 and PM2.5, SO₂ and ozone (O₃). Although many other pollutants are present in the atmosphere, these key pollutants are recognised for generally being elevated above background levels and most associated with health effects or impacting on natural habitats. This Project will include activities that would potentially give rise to emissions of NO_x, particulates and, to a lesser extent, SO₂. The activities that may generate these emissions include:
- operation of mobile plant and machinery during construction and decommissioning phases; and
 - use of road vehicles during construction, operation (and maintenance) and decommissioning phases.
- 6.2.11 IAQM and EPUK (2017) offers guidance on whether an air quality assessment is required, saying:
- 6.2.12 *"This will need to be a matter of judgement and should take into account:*
- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
 - *the presence and location of AQMAs as an indicator of local hotspots where the air quality objectives may be exceeded;*
 - *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO₂), that would cause unacceptably high exposure for users of the new development; and*
 - *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development."*
- 6.2.1 IAQM AND EPUK (2017) applies a quantitative method to assign standard descriptors to impacts depending on the magnitude of the change and the background concentration, in relation to the relevant assessment level. These are shown in **Table 6.2.3**. Although these descriptors have no official status, they are widely used and accepted.

Table 6.2.3 Impact descriptors for increases in annual mean concentrations

Absolute concentration with scheme, relative to assessment level	Increase in concentration relative to assessment level				
	0%	1%	2–5%	6–10%	>10%
75% or less	Negligible	Negligible	Negligible	Slight	Moderate
76–94%	Negligible	Negligible	Slight	Moderate	Moderate
95–102%	Negligible	Slight	Moderate	Moderate	Substantial
103–109%	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more	Negligible	Moderate	Substantial	Substantial	Substantial

6.2.13 The IAQM AND EPUK guidance also provides qualitative guidance on the assessment of significance. The descriptors above feed into this assessment, but not in a rigorously prescribed way. Rather, the assessment of significance is based on professional judgement, taking into account the guidance and the various relevant factors. Some of the relevant factors the guidance identifies as needing to be taken into account are:

- “the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts; and
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts.”

Odour

6.2.14 If required, the odour assessment will follow IAQM (2018) guidance. In the absence of specific guidance on when an odour assessment may or may not be required, consideration is given to the presence of odour sources associated with the Project and proximity to vulnerable receptors.

Dust

6.2.15 If required, the dust assessment will follow IAQM (2014, 2016 and 2018) guidance. This guidance provides a procedure for a risk-based assessment of potential dust impacts which should be carried out on the assumption that no control or mitigation measures are applied. This risk-based assessment includes criteria about the dust-generating potential of various activities, the number of potential receptors within various distance bands of the activities and the sensitivity of different types of human and ecological receptors to various effects. The guidance then suggests suitable control and environmental measures, and advises that with these measures in place, the residual effect is normally not significant.

Data sources

6.2.16 Key sources of air quality data are summarised in **Table 6.2.4**. As well as baseline concentrations of pollutants, an important input into the assessment is the location of any AQMAs. These are areas designated by local authorities where there is or may be a risk of exceeding the air quality objectives prescribed by the Scottish Government.

Table 6.2.4 Key sources of air quality data

Source	Date	Summary	Coverage of study area
Department for Environment, Food and Rural Affairs (DEFRA) (2018) background maps	2018	Provide forecast concentrations of pollutants at background locations.	Full coverage of study area.
Aberdeenshire Council (2021a) Annual Progress Report (APR)	2021	Provides details of AQMAs and monitoring results on yearly basis. More than 10 years data available.	Full coverage of study area.

6.2.17 It is considered that these data sources are sufficient to characterise the baseline air quality, without the need for further monitoring.

Current baseline

6.2.18 The Scoping Boundary (**Figure 1.1 Scoping Boundary** in **Appendix 1A**) lies within the administrative area of Aberdeenshire Council. Aberdeenshire Council produces an APR which describes air quality in its administrative area, including any AQMAs in force, and the results of air quality monitoring.

6.2.19 There are no AQMAs within 5km of the Scoping Boundary. Additionally, Aberdeenshire Council have not declared any AQMAs and the available evidence suggests that Aberdeenshire benefits from generally good air quality in terms of those emissions currently considered under the LAQM regime (Aberdeenshire Council, 2021a).

6.2.20 Aberdeenshire Council undertook non-automatic (passive) monitoring of NO₂ at 11 sites during 2019. Out of these, diffusion tubes located in Peterhead are the closest to the Scoping Boundary. At these locations, concentrations of NO₂ during 2019 remained between 17.3µg m⁻³ and 19.9µg m⁻³, compared to the annual mean objective of 40 µg m⁻³. 2020 and 2021 data are not considered to be representative of long-term air quality monitoring due to the various Covid lockdowns that were in place, where traffic was vastly reduced.

6.2.21 During the last 5 years, concentrations of NO₂ have decreased at these locations with the highest recorded at 31.4µg m⁻³ in 2015. Therefore, it can be reasonably concluded that Air Quality Objectives (AQOs) are not currently exceeded at the project location.

6.2.22 Ambient levels of dust and odour are typically very low and are not routinely monitored in the UK. Elevated levels of dust and odour can result in complaints which may then result in monitoring taking place in the local area to determine if a nuisance is present.

Future baseline

6.2.23 Defra maintains a nationwide model (the Pollution Climate Mapping (PCM) model) of current and future background air quality concentrations at a 1km grid square resolution. The datasets include annual average concentration estimates for NO₂, as well as other pollutants. The PCM model is semi-empirical in nature: it uses data from the National Atmospheric Emissions Inventory (NAEI) to model the concentrations of pollutants at the centroid of each 1km grid square, but then calibrates these concentrations in relation to actual monitoring data. Concentrations represent background locations, not roadside locations or those particularly influenced by point sources.

- 6.2.24 Data is available for years covering 2017 to 2030, with modelled concentrations generally decreasing over that time period. For the grid squares covered by the study area, concentrations of background annual mean NO₂ concentrations in 2022 and onward years are well within the legal limit of 40µg m⁻³.

Basis for scoping assessment

- 6.2.25 The air quality scoping assessment is based on the following key assumptions (**Table 6.2.5**) which are also set out in **Chapter 2: Project Description**.

Table 6.2.5 Project Description

Development element	Assumption
Landfall(s)	<p>The construction method for the landfall(s) has not yet been determined, and will be specific to the site chosen, its geology, topography and other constraints. Typically, either open cut/cut-and-fill construction or trenchless construction (e.g. HDD) will be used.</p> <p>Transition joint bays will be subsurface structures.</p>
Onshore Cable	<p>Underground cables will be used to connect from the landfall transition joint bays to the Project onshore substation. An additional section of the onshore export cable route will run from the onshore substation site(s) to the grid connection point.</p> <p>The onshore export cable will be typically installed in trenches. Other methods for cable installation such as HDD will be used as required to avoid or minimise potential environmental effects where constraints are identified, including watercourse crossings.</p> <p>It is expected that the width of the onshore export cable construction corridor for surface trenching will be approximately 150m. At any sensitive points identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects.</p>
Onshore substation(s)	<p>The estimated overall permanent site footprint for a proposed 3GW substation is anticipated to be up to 12ha, and a proposed 1.5GW substation is anticipated to be up to 6ha, the exact location of the substation(s) will be refined through the EIA process. If energy-balancing equipment is required, this would feature additional buildings or containers, or further open yard equipment which could be up to an additional 2ha to the proposed permanent onshore substation footprint.</p>
Operation and Maintenance	<p>The lease agreement allows the Project to remain until 2080, which would be the maximum operational lifetime.</p>
Decommissioning	<p>Onshore electrical cables could be removed or left in-situ to minimise environmental effects associated with removal, but this will depend on the relevant regulations and guidance in place at the time of decommissioning. The onshore substation(s) will be removed and the site(s) reinstated.</p> <p>The decommissioning works are likely to be carried out in reverse to the sequence of construction works and will involve similar levels of equipment. Further detail will be provided in the decommissioning plan.</p>

- 6.2.26 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 6.2.7**.
- 6.2.27 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 6.2.28 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on air quality (see **Table 6.2.6**) These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet or exceed existing legislation requirements.
- 6.2.29 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment and are referenced below.

Table 6.2.6 Relevant air quality embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-002	Where practical, sensitive sites will be avoided by the temporary and permanent onshore project footprint including SPAs, SACs, SSSIs, National Nature Reserve (NNR), Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, Scottish National Trust Land, Listed Buildings and Scheduled monuments.	Construction Environmental Management Plan (CEMP).
M-007	Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2014) guidance on the Assessment of Dust from Demolition and Construction in order to avoid adverse effects on sensitive features. Examples of pathway include windblown dust / fibres or tracking back of dust / fibres is a potential contamination migration.	CEMP and planning conditions.
M-019	The onshore export cable will be constructed in sections. The trenches will be excavated, the cable ducts will be laid, the trenches backfilled, and the reinstatement process commenced in as short a timeframe as practicable.	CEMP
M-063	A CEMP to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	managing and reporting on the environmental impact of the construction phase.	
	The CEMP will be the securing mechanism for many measures.	

Likely significant effects

- 6.2.30 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 6.2.31 The likely significant effects on air quality are summarised in **Table 6.2.7**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for air quality effects and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 6.2.32 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by the evidence base.

Table 6.2.7 Likely significant air quality effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Emissions of dust from construction (Construction).	M-019, M-063	Likelihood of significant effects will depend on extent of mitigation applied.	Scoped in.	Residential properties and other locations where people may be exposed. Sensitive ecological receptors.	None
Emissions of odour from construction (Construction).	M-019, M-063	No likely significant effects.	Scoped out (see rationale in section below paragraph 6.2.38).	Residential properties and other locations where people may be exposed.	None
Emissions of air pollutants from construction equipment on site (Construction).	M-002, M-019, M-063	No likely significant effects.	Scoped out (see rationale in section below paragraph 6.2.34).	Residential properties and other locations where people may be exposed over relevant time periods, Sensitive ecological receptors.	None
Emissions of odour during operational phase (Operation / Maintenance).	M-019	No likely significant effects.	Scoped out (see rationale in section below paragraph 6.2.38).	Residential properties and other locations where people may be exposed.	None
Emissions of air pollutants during operational phase (Operation / Maintenance).	M-007	No likely significant effects.	Scoped out (see rationale in section below paragraph 6.2.36).	Residential properties and other locations where people may be exposed over relevant time periods. Sensitive ecological receptors.	None
Emissions of dust during operational phase (Operation / Maintenance).	M-002	No likely significant effects.	Scoped out (see rationale in section below paragraph 6.2.37).	Residential properties and other locations where people may be exposed. Sensitive ecological receptors.	None

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Emissions of dust from decommissioning (Decommissioning).	N/A	Likelihood of significant effects will depend on traffic data which is not yet available.	Scoped out: (see rationale in section below paragraph 6.2.40).	Residential properties and other locations where people may be exposed. Sensitive ecological receptors.	None
Emissions of air pollutants from decommissioning traffic on roads (Decommissioning).	N/A	No likely significant effects.	Scoped out (see rationale in section below paragraph 6.2.39).	Residential properties and other locations where people may be exposed over relevant time periods, within 200m of affected roads. Sensitive ecological receptors within 200m of affected roads.	Monitoring data from local authority monitoring programmes. Baseline traffic data (from Transport assessment)
Emissions of odour from decommissioning (Decommissioning).	N/A	No likely significant effects.	Scoped out (see rationale in section below paragraph 6.2.39).	Residential properties and other locations where people may be exposed.	None
Emissions of air pollutants from decommissioning equipment on site (Decommissioning).	N/A	No likely significant effects.	Scoped out (see rationale in section below paragraph 6.2.39).	Residential properties and other locations where people may be exposed over relevant time periods. Sensitive ecological receptors.	None

Impacts scoped out of assessment

- 6.2.33 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effects. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below. However, if IAQM thresholds are not reached then the scoped in aspects will be reviewed and, if necessary, will be scoped out.
- 6.2.34 **Emissions of air pollutants from mobile plant and construction equipment** on Site during the construction and decommissioning phases, and their effects at human and ecological receptors, have been scoped out of this assessment, resulting from a conclusion of no likely significant effects. The small amount of construction plant required, the short duration of construction activity at any given location (embedded measure M-007), the avoidance of sensitive receptors along the route (embedded measure M-002), and the low background concentrations of air pollutants (**paragraph 6.2.19**) mean that the risk of causing significant air quality impacts at either human or ecological receptors is very low. This is supported by the experience of previous similar projects, such as the Rampion 1 project (Infrastructure Planning Commission, 2010) and the Thanet Extension Offshore Wind Farm (Royal HaskoningDHV, 2016), where these effects were scoped out from the EIA. The Applicant will review other projects within Scotland for applicable and more recent examples of this approach.
- 6.2.35 **Emissions of odour from the construction and decommissioning phases** have been scoped out of this assessment. No likely sources of odour have been identified, the short duration of construction activity at any given location (embedded measure M-007) and the avoidance of historic landfill sites and of sensitive receptors along the route (embedded measure M-002) mean that the risk of causing significant odour impacts at human receptors is very low.
- 6.2.36 **Emissions of air pollutants during the operational phase** have been scoped out of this assessment. There will be no emissions associated with the onshore landfall(s) or substation. The amount of road traffic for servicing this Project will be very low and are highly unlikely to exceed the criteria given in **paragraph 6.2.6**. Therefore, the risk of causing significant air quality impacts at either human or ecological receptors is very low.
- 6.2.37 **Emissions of dust during the operational phase** have been scoped out because there are no dust sources associated with the operation (and maintenance) of this Project.
- 6.2.38 **Emissions of odour during operational phase** have been scoped out because there are no odour sources associated with the operation (and maintenance) of this Project.
- 6.2.39 **Emissions of air pollutants from construction traffic on road during decommissioning** phase have been scoped out as decommissioning is not due to begin for over 30 years.
- 6.2.40 **Emissions of dust from construction during decommissioning phase** have been scoped out as decommissioning is not due to begin for over 30 years.

Impacts remaining in the scope of the assessment

- 6.2.41 A number of potential effects are considered to remain in the scope of assessment:
- emissions of air pollutants from construction traffic on roads (Construction); and
 - emissions of dust from construction (Construction).

- 6.2.42 **Emissions of dust during the construction phase** remain within the scope of the air quality assessment. The IAQM guidance on the assessment of dust (IAQM, 2014) recommends the following procedure for assessing the risk of a construction project causing significant dust impacts:
- first, the risk of significant dust impacts at sensitive receptors in the absence of any mitigation or control measures is assessed;
 - then, suitable mitigation and control measures are identified; and
 - finally, the residual risk is determined.
- 6.2.43 The IAQM guidance identifies 52 specific mitigation and control measures, stating that the measures required at a particular development depends on the outcome of a risk assessment. Therefore, the EIA Report will include a dust risk assessment in order to determine which specific measures are required for this Project; this will provide more detail on embedded measure 6.2c.
- 6.2.44 The **assessment of increased road traffic during construction phase** remains within the scope of the air quality assessment in the absence of traffic data at this time.

Cumulative effects

- 6.2.45 Cumulative effects on air quality resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the CEA screening exercise.
- 6.2.46 The following impacts from the Project have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:
- Construction dust from other construction projects within 350m of the Project; and
 - impacts from road traffic.
- 6.2.47 These cumulative effects remain within the scope of the air quality assessment.

Transboundary effects

- 6.2.48 The potential effects from construction, operation and decommissioning on existing sensitive human and ecological receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. No transboundary effects from air quality, dust or odour are anticipated, consequently these transboundary effects have been scoped out.

Proposed approach to the EIA Report

- 6.2.49 It is expected that most air quality issues can be scoped out. However, consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process as set out in **Chapter 4: Approach to Scoping and EIA**.
- 6.2.50 Air quality issues that cannot be scoped out at this stage include the impacts of dust and road traffic during construction and decommissioning. The assessment of dust will focus on identifying specific dust mitigation measures to be adopted to render residual impacts being negligible. The assessment of road traffic will depend on the provision of data from the transport analysis. It is likely that the construction and decommissioning road traffic will be below IAQM thresholds for scoping out. If so, this will be demonstrated in the EIA Report. If

not, an assessment of the impacts from this source (including cumulative effects) will be included in the EIA Report.

- 6.2.51 Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

6.3 Water resources and flood risk

Introduction

- 6.3.1 The water resources and flood risk assessment will consider the potential likely significant effects on the water environment that may arise from the construction, operation and maintenance and decommissioning of the onshore Project elements that are landward of Mean Low Water Springs (MLWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 6.3.2 Water resources and flood risk interfaces with other aspects and as such, should be considered alongside these, namely:
- **Section 5.1: Marine geology, oceanography and physical processes:** Changes to marine processes physical parameters may result in potential changes to flood risk. Therefore, information from this assessment will inform the water resources and flood risk assessment.
 - **Section 5.2: Marine water and sediment quality:** which addresses potential impacts on marine water and sediment quality from offshore activities towards marine receptors, seaward of the Mean High Water Springs (MHWS) and reaches significance conclusions. The marine water and sediment quality assessment addresses potential impacts upon coastal Water Framework Directive (WFD) water bodies.
 - **Section 6.1: Ground conditions and contamination:** The water resources and flood risk section will address the net impact on water quality caused by the mobilisation of historical contamination and the significance of the introduction of new contaminants. Therefore, the ground conditions and contamination section will be used to inform the water resources and flood risk assessment.
 - **Section 6.5: Terrestrial ecology and ornithology:** The terrestrial ecology and ornithology assessment addresses potential impacts on designated sites and reaches significance conclusions. It will be informed by the conclusions of the assessment on the water environment which supports these sites, and if required a specific water quality and/or quantity assessment of water-dependent sites will be undertaken to support the terrestrial ecology assessment.
 - **Section 7.1: Climate resilience:** The interference with climate resilience with water resources and flood risk is captured in the In-Combination Climate Impacts (ICCI) assessment.

Legislative and policy context

- 6.3.3 This Section identifies the relevant legislative and policy context which has informed the scope of the water resources and flood risk assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.

6.3.4 In order to provide a robust evidence base, **Table 6.3.1** below presents a summary of legislation and policies relevant for the water resources and flood risk assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 6.3.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
EC Directive (2000/60/EC) establishing a framework for Community action in the field of water policy (Water Framework Directive - WFD) (2000)	<ul style="list-style-type: none"> Sets out the requirement to classify water bodies and objectives for the prevention of deterioration and improvement of status.
Water Environment and Water Services (Scotland) Act (WEWS Act) (2003)	<ul style="list-style-type: none"> Sets out arrangements for the protection of the water environment in Scotland. Establishes river basin management plans (RBMPs) for each respective river basin district (RBD).
Water Environment (Controlled Activity) (Scotland) Regulations (as amended) (CAR) (2011)	<ul style="list-style-type: none"> Controls engineering works in the vicinity of inland surface waters including point source discharges, abstractions and impoundments, supporting implementation of the WFD (2006/60/EC) in Scotland.
Flood Risk Management (Scotland) Act (2009)	<ul style="list-style-type: none"> Outlines a framework for coordination and cooperation between all relevant organisations including the Scottish Environment Protection Agency (SEPA), Scottish Water and local authorities. Requires a Flood Risk Assessment (FRA) for developments that fall within a flood zone.
National policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the climate and nature crises Policy 10: Coastal Development Policy 22: Flood risk and water management
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. Section 4.25 covers catchment scale flood risk management considerations in respect to changing weather patterns.
Scottish Planning Policy (2014) - Paragraph 169	<ul style="list-style-type: none"> Discusses how proposals for energy infrastructure development should take account of spatial frameworks

Relevant legislation and policy	Relevance to the assessment
<ul style="list-style-type: none"> - Paragraph 255 - Paragraph 259 - Paragraph 260 	<p>for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include:</p> <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology. <ul style="list-style-type: none"> • Covers the avoidance of flood risk which will inform the scope of the FRA. • Covers flood resilience for developers, which will inform the scope of the FRA. • Covers strategic planning decisions in relation to flood risk constraints, which will inform the scope of the FRA.

Marine policy

<p>Scottish National Marine Plan (2015)</p> <ul style="list-style-type: none"> - GEN 8: Coast Processes and Flooding - GEN 12 Water Quality and Resources 	<ul style="list-style-type: none"> • GEN 8: Requires developments and activities to be resilient to coast change and flooding, and not contribute towards coastal flooding. This will inform the scope of the water resources and flood risk assessment. • GEN 12: Requires that developments and activities do not result in a deterioration of the quality of waters to which the WFD applies. This will inform the scope of the water resources and FRA.
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Local planning policy

<p>Aberdeenshire Council Local Development Plan (LDP) 2023</p>	<p>As detailed in Appendix 3A: Planning Policy Framework, policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • Policy PR1: Protecting important resources. • Policy C4: Flooding.
<p>Aberdeenshire Council Strategic Flood Risk Assessment (SFRA) (2020)</p>	<ul style="list-style-type: none"> • Provides a strategic overview of flood risk in the Aberdeenshire LDP area. It provides information on their LDP allocations including where FRA may be required for future use.

Technical guidance

6.3.5 Technical guidance that has been used to define the EIA is set out in **Table 6.3.2** below.

Table 6.3.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
SEPA (2009) WAT – SG – 29: Engineering in the Water Environment Good Practice Guide, Temporary Construction Methods	A good practice guide which sets out mitigation measures that minimise impacts from construction works upon the water environment. These measures will be considered and incorporated into the development of environmental embedded measures, which are set out in Table 6.3.8 .
SEPA (2022d) The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) A Practical Guide	This practical guide sets out the controlled activities regulations authorisation requirements from general binding rules (GBRs), registrations, registrations and licenses. The guide considers the different levels of authorisation required for the pollution control regime, the abstraction regime and the engineering regime which covers watercourse crossings. These controlled activities regulations requirements will be taken forward and incorporated into embedded environmental measures (in Table 6.3.8).
Netregs Guidance for Pollution Prevention (GPP) (2020)	GPP documents presented good practice guidance to prevent pollution on-site. The documents including GPP in relation to works and maintenance activities in or near water. This good practice will be taken forward and incorporated into embedded environmental measures (in Table 6.3.8).
SEPA (2018) Flood Risk and Land Use Vulnerability Guidance	This guidance classifies land use types by their vulnerability to flood risk to help avoid and manage impacts from development in areas of flood risk. Land use vulnerability guidance will be applied to the Flood Risk Assessment during the at EIA stage.
SEPA (2022e) Climate Change allowances for flood risk assessment in land use planning	This guidance sets out SEPA's recommended allowances that can be applied to FRAs. It provides guidance on climate change allowances as a prediction of anticipated change in peak river flow, peak rainfall intensity and sea level rise caused by future climate change. This guidance has been taken into account within the future baseline assessment (paragraphs 6.3.63 and 6.3.64) and will be applied to the Flood Risk Assessment during the EIA stage.
SEPA (2019) Technical Flood Risk Guidance for Stakeholders - SEPA requirements for undertaking a Flood Risk Assessment	This document outlines what information SEPA requires to be submitted as part of a FRA. It sets out that a FRA should investigate what the likelihood of flooding is and should consider flood risk from all sources. It also sets out that the functional floodplain is defined as land where there is a 0.5% or greater probability of flooding in any year. For development that falls under the 'Most Vulnerable Use' as defined by SEPA's Land Use Vulnerability Guidance, the 0.1% annual probability should be assessed. This has been taken into account in paragraphs 6.3.48 to 6.3.59 and will be applied to the FRA at the EIA Report stage.
Construction Industry Research and Information Association (CIRIA, 2006a) C532 Control of Water Pollution from Construction Sites	This provides guidance on how to plan and manage construction projects to control water pollution. This good practice will be taken forward and incorporated into embedded environmental measures (in Table 6.3.8).
CIRIA (2015) C753 SuDS Manual	This provides best practice guidance on the planning, design, construction, operation and maintenance of Sustainable Drainage Systems (SuDS). This good practice will be taken forward and incorporated into embedded environmental measures (in Table 6.3.8).

Study area

- 6.3.6 The hydrological and hydrogeological study area for the Project will be delineated by the extent of the WFD surface water body sub-catchments (river and transitional) intersected by the Scoping Boundary, as described in **paragraph 6.3.17** below (**Figure 6.3.1: WFD surface water bodies** in **Appendix 1A**). The sub-catchments of these surface water bodies have been delineated based upon the topography within the main river catchment divides. It is assumed that the groundwater flow regime is broadly compliant with the same topographical boundaries as the surface water, and that both surface water and groundwater therefore share the same catchment areas.
- 6.3.7 The study area will be reviewed and amended in response to such matters as refinement of the onshore development components (e.g. the locations of the landfall(s), onshore export cable route and onshore substation), the identification of any additional impact pathways and in response where appropriate to feedback from consultation.

Assessment methodology

Introduction

- 6.3.8 The Project-wide approach to the assessment methodology is set out in **Chapter 4 Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this water resources and flood risk section, it is necessary to set out how this methodology will be applied and adapted as appropriate to address the specific needs of the water resources and flood risk assessment.

Significance evaluation methodology

- 6.3.9 The significance level attributed to each effect will be assessed based on the 'sensitivity' (value) of the affected receptor and the magnitude of change resulting from the development. The level of significance is then determined by the combination of sensitivity and magnitude.
- 6.3.10 Sensitivity is assessed on a four point scale of high, medium, low and very low, whilst magnitude is assessed on a four point scale of high, medium, low and negligible. The criteria for defining sensitivity and magnitude can be found in **Table 6.3.3** and **Table 6.3.4** respectively, along with example applications. These criteria are defined and applied based on professional judgement, using recognised approaches to classification relevant to the receptor types, including WFD water body classifications and reference to the Design Manual for Roads and Bridges (DMRB), and which represent good practice for water environment EIA.
- 6.3.11 The magnitude of change from baseline conditions includes a consideration of the duration and reversibility of the change, and relevant legislation, policy standards and guidance. **Table 6.3.4** provides examples of how various magnitudes of change could be determined with respect to water features.
- 6.3.12 Magnitude of change may be either positive or negative. The criteria and examples in **Table 6.3.4** focus on negative changes, but positive changes may also occur and will be considered on a case-by-case basis as required.

Table 6.3.3 Establishing the sensitivity of receptors

Sensitivity	Criteria	Examples
High	Features with a high yield, quality or rarity, with little potential for substitution.	<ul style="list-style-type: none"> Conditions supporting a site with an international conservation designation (for example, Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall 'High' or 'Good' status / potential. WFD groundwater body (or part thereof) with overall 'High' or 'Good' status.
	Water use supporting human health and economic activity at a regional scale.	Regionally important CAR-licensed public surface water or groundwater supply (and associated catchment) or permitted discharge.
	Features with a high vulnerability to flooding.	Land use type defined as 'Essential Infrastructure' (i.e. critical national infrastructure, such as essential transport and utility infrastructure) and 'Most Vulnerable Use' (e.g. police/ambulance stations that are required to operate during flooding, mobile homes intended for permanent residential use) in the SEPA flood risk and land use vulnerability classification.
Medium	Features with a medium yield, quality or rarity, with a limited potential for substitution.	<ul style="list-style-type: none"> Conditions supporting a site with a national conservation designation (for example, Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR)), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall Moderate or lower status / potential. WFD groundwater body (or part thereof) with overall Poor status.
	Water use supporting human health and economic activity at a local scale.	CAR licensed non-public surface water and groundwater supply abstraction (and associated groundwater catchment) which is relatively large relative to available resource, or where raw water quality is a critical issue, for example: industrial process water, or permitted discharge.
	Features with a moderate vulnerability to flooding.	Land use type defined as 'Highly Vulnerable Use' in the SEPA flood risk and land use vulnerability classification (e.g., most types of residential development, hostels and hotels, landfill and waste management facilities).
Low	Features with a low yield, quality or rarity, with some potential for substitution.	Conditions supporting a site with a local conservation designation (for example, Local Nature Reserve (LNR), Local Nature Conservation Site (LNCs)) where the designation is based specifically on aquatic features, or an undesignated but highly / moderately water-dependent ecosystem, including a Groundwater Dependent Terrestrial Ecosystem (GWDTE).
		Non-reportable WFD surface water or groundwater body (or part thereof), or non-WFD water body.

Sensitivity	Criteria	Examples
	Water use supporting human health and economic activity at household/individual business scale.	CAR registered non-public surface water and groundwater supply abstraction (and associated catchment), which is relatively small relative to available resource, or where raw water quality is not critical, for example: cooling water, spray irrigation, mineral washing or permitted discharge. Unregistered potable surface water and groundwater abstraction (and associated catchment) for example: private domestic water supply, well, spring or permitted discharge.
	Features with a low vulnerability to flooding.	Land use type defined as 'Least Vulnerable uses' in the SEPA flood risk and land use vulnerability classification. (e.g., most types of business premises).
	Commonplace features with very low yield or quality with good potential for substitution.	Conditions supporting undesignated ecosystems or those with low sensitivity to water supply, such as a Local Wildlife Site (LWS), undesignated GWDTE or pond.
Very Low	Water use does not support human health, and of only limited economic benefit.	Unlicensed non-potable surface water and groundwater abstraction (and associated catchment) for example, livestock supply.
	Features that are resilient to flooding.	Land use type defined as 'Water-compatible use' in the SEPA flood risk and land use vulnerability classification and undeveloped land (e.g. flood control infrastructure, or water transmission infrastructure).

Table 6.3.4 Definitions of magnitude of change

Magnitude	Criteria	Examples
High	Results in complete loss or major change to feature, of sufficient magnitude to affect its use / integrity.	Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant conservation objectives or non-temporary downgrading (deterioration) of WFD surface water body status (including downgrading of individual WFD elements), or resulting in the inability of the surface water body to attain Good status by the relevant deadline in line with the measures identified in the RBMP.
		Deterioration in groundwater levels, flows or water quality, leading to non-temporary downgrading of WFD groundwater body status, or the inability of the groundwater body to attain Good status in line with the measures identified in the RBMP.
		Complete or severely reduced water availability and/or quality, compromising the ability of water users to abstract.
		Change in flood risk resulting in potential loss of life or major damage to the property or infrastructure.

Magnitude	Criteria	Examples
Medium	Results in partial loss or noticeable change to feature, of sufficient magnitude to affect its use / integrity in some circumstances.	<p>Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant conservation objectives, or potential temporary downgrading of surface water body status (including potential temporary downgrading of individual WFD elements), although not affecting the ability of the surface water body to achieve future WFD objectives.</p> <p>Deterioration in groundwater levels, flows or water quality, leading to potential temporary downgrading of WFD groundwater body status, although not affecting the ability of the groundwater body to achieve future WFD objectives.</p> <p>Moderate reduction in water availability and/or quality, which may compromise the ability of the water user to abstract on a temporary basis or for limited periods, with no longer-term impact on the purpose for which the water is used.</p> <p>Change in flood risk resulting in potential for moderate damage to the property or infrastructure.</p>
Low	Results in minor change to feature, with insufficient magnitude to affect its use / integrity in most circumstances.	<p>Measurable effect on river flow regime, morphology or water quality, but remaining generally within conservation objectives, and with no short-term or permanent change to WFD surface water body status (of overall status or element status).</p> <p>Measurable effect on groundwater levels, flows or water quality, but with no short-term or permanent downgrading of WFD groundwater body status.</p> <p>Minor reduction in water availability and/or quality, but unlikely to affect the ability of a water user to abstract.</p> <p>Change in flood risk resulting in potential for minor damage to property or infrastructure.</p>
Negligible	Results in little or no change to feature, with insufficient magnitude to affect its use / integrity	<p>No measurable effect on river flow regime, morphology or water quality, and no consequences in terms of conservation objectives or surface water body status.</p> <p>No measurable effect on groundwater levels, flows or water quality, and no consequences in terms of WFD groundwater body status.</p> <p>No measurable change in water availability or quality and no change in ability of the water user to exercise licensed rights.</p> <p>Increased frequency of flood flows, but which does not pose an increased risk to property or infrastructure.</p>

6.3.13

During the assessment of effects for each identified receptor the sensitivity value in **Table 6.3.3** will be combined with the magnitude of change from **Table 6.3.4** to produce an overall

significance rating based on the evaluation matrix shown in **Table 6.3.5**. A 'significant' effect is assessed as a Major rating whereas a Moderate rating will be considered to be 'potentially significant' at this stage of the EIA process. The latter will be subject to further investigation as part of the EIA Report following refinement of design information. This approach will be based on professional judgement and carried out on a precautionary basis.

Table 6.3.5 Significance evaluation matrix

Magnitude of change				
	High	Medium	Low	Negligible
Sensitivity	High	Major (Significant)	Major (Significant)	Moderate (Potentially significant)
	Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
	Low	Moderate (Significant/ Not Significant)	Moderate (Potentially significant)	Negligible (Not significant)
	Very Low	Moderate (Potentially significant)	Negligible (Not significant)	Negligible (Not significant)

Baseline conditions

Data sources

6.3.14 The sources of baseline information used in this Scoping Report are documented in **Table 6.3.6**.

Table 6.3.6 Key sources of water resources and flood risk data

Source	Date	Summary	Coverage of study area
Climate data maintained by Meteorological Office (Met. Office) (2022a) and the UK Climate Resilience Programme (2022)	Date accessed: 04/08/2022 – 19/08/2022	Met. Office climate data to: Identify annual average rainfall and monthly patterns in rainfall, (available online: https://www.metoffice.gov.uk/). To provide a climate risk indicator tool for identifying patterns of future climate change, (available online: https://uk-cri.org/).	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
Mapping and surface water hydrology data	Date accessed: 04/08/2022 – 19/08/2022	Topography, elevation and relief data to confirm surface water catchments based on: Mapping (available online: https://www.bing.com/maps). 1:50,000 OS (Ordnance Survey) mapping; and Flood Estimation Handbook (FEH) web service (CEH, 2022) (available online: https://fehweb.ceh.ac.uk/).	Full coverage of the study area.
Water quality data owned by SEPA and Scottish Government	Date accessed: 04/08/2022 – 19/08/2022	Water quality data to identify existing catchment pressures (e.g. point source and / or diffuse pollution issues), based on: SEPA (2022f) Water Environment Hub (available online: https://informatics.sepa.org.uk/RBMP3/); SEPA (2022g) Water Classification Hub (available online: https://www.sepa.org.uk/data-visualisation/water-classification-hub/); Scottish Government (2021b) RBMP for the Scotland RBD (available online: https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf); and Ugie District Fishery Board (2022), publications (available online: https://ugie.dsfb.org.uk/).	Full coverage of the study area.
Flood risk data owned by SEPA and Aberdeenshire Council	Date accessed: 27/07/2022 – 19/08/2022	SEPA (2022h) flood mapping for surface, costal and flooding (available online: https://www.sepa.org.uk/environment/water/flooding/flood-maps/). SEPA (2022i) flood mapping for reservoir flooding (available online: https://map.sepa.org.uk/reservoirsfloodmap/Map.htm). Aberdeenshire Council provided GIS shapefiles for coastal, fluvial and surface water sources of flood risk within the study area in July 2022	Full coverage of the study area.
Hydrogeological data owned by British Geological Survey (BGS)	Date accessed: 04/08/2022 – 19/08/2022	Hydrogeological data to establish underlying aquifer properties and potential pollution risks across study area. BGS (2022b) (1:625,000 Scale) hydrogeological map (available online: https://www2.bgs.ac.uk/groundwater/datainfo/hydro/maps/home.html).	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
		BGS (2011) User Guide: Groundwater Vulnerability (Scotland) GIS dataset, Groundwater Science Programme, Version 2	
Water resource data owned by Aberdeenshire Council and Scottish Government	Date accessed: 04/08/2022 – 19/09/2022	Private water supply (PWS) data received from Aberdeenshire Council. Drinking Water Protected Areas (DWPAs) in the Scotland RBD maps, Map 9 of 22, Scottish Government, (2022c) (available online: https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/). DWPAs (groundwater) in the Scotland RBD maps, Map 20 of 22, Scottish Government, (2022d) (available online: https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/).	Full coverage of the study area.
Conservation site data owned by NatureScot	Date accessed: 04/08/2022 – 19/08/2022	Conservation site data to identify designated sites of hydrological, geological or hydrogeological interest within study area (available online: https://sitelink.nature.scot/home).	Full coverage of the study area.

Current baseline

Topography and climate

- 6.3.15 The area within the study area ranges in elevation from 9m Above Ordnance Datum (AOD) at MLWS to around 234m AOD along the brow of Waughton Hill (National Grid Reference (NGR) (NJ 96346 57248)) to the north of the study area. In general, the topography undulates along a series of low-lying hills (**Figure 6.3.1** in **Appendix 1A**).
- 6.3.16 The average annual rainfall recorded between 1991 and 2020 within the study area was 759.7mm/a at the Fraserburgh Climate Station (NJ 99742 67074). The Standard Average Annual Rainfall (SAAR) within the largest (River Ugie) catchment in the study area was 811 mm/a between 1961 and 1990 (CEH, 2022).

Surface watercourses and other water features

- 6.3.17 The study area crosses several catchments including the River Ugie, the River Ythan and the Buchan Coastal WFD surface water catchments (**Figure 6.3.1** in **Appendix 1A**).
- 6.3.18 The study area also straddles the edge of the catchment divide of the Idoch Water, which is part of the wider River Deveron catchment. However, the Project is likely to be hydrologically disconnected from the nearest watercourse in this catchment which lies approximately 1.3km to the west and on the other side of Waggle Hill and Corse Hill from the study area. Therefore, at this stage the River Deveron catchment has been screened out and will not be considered further as part of the Scoping Section.
- 6.3.19 The River Ugie catchment covers much of the study area, with headwaters located near New Pitsligo (NJ 87101 55597 and NJ 87895 55953), upstream of the Federate Reservoir (NJ 86447 52292), Bracklamore Hill NJ 84240 60339 and Windyheads Hill (NJ 86156

61517). The tributary watercourses flow in an easterly direction into the River Ugie before it becomes the Ugie Estuary, which enters the North Sea to the north of Peterhead (NK 12345 47401).

- 6.3.20 The study area is intersected by the River Ythan Catchment, including headwaters southeast of New Deer (NJ 89359 46207 and NJ 98041 40952). The watercourses of this catchment generally flow southwest into the River Ythan before discharging into the Ythan Estuary and entering the North Sea at Newburgh (NK 00914 24187).
- 6.3.21 The Buchan Coastal catchment comprises five individual watercourses which drain the eastern parts of the study area before flowing in an easterly direction into the North Sea.
- 6.3.22 The OS mapping indicates that there are several reservoirs situated within these tributary catchments. There are also a range of other small water features including ponds and artificial agricultural and forestry plantation drainage ditches.

Hydrogeology and groundwater vulnerability

- 6.3.23 **Section 6.1: Ground conditions and contamination** provides information on geological conditions whereas this Section focusses on hydrogeological conditions and groundwater vulnerability. In summary though the study area is associated with a mixture of Southern Highland Group to the north and west (psammite, psammite / pelite), Argyll Group within the central and eastern area (quartzite) and an 'Unnamed Igneous Intrusion' of late Silurian to early Devonian age to the southeast.
- 6.3.24 The BGS Online Digital 1:625,000 scale Hydrogeology viewer (BGS, 2022b) indicates that across the study area the bedrock is typically impermeable (essentially low permeability) rocks, generally without groundwater except at shallow depth.
- 6.3.25 The BGS groundwater vulnerability dataset (BGS, 2011) describes the Southern Highland Group, Argyll Group and Unnamed Igneous Intrusion units as low productivity aquifers whereby small amounts of groundwater exist in near-surface weathered zones, secondary fractures and rare springs.
- 6.3.26 There are also likely to be areas of localised groundwater contained within the relatively permeable superficial quaternary deposits of alluvium, sand and gravel along river terrace corridors, and within the isolated pockets of peat situated upon shallow topography, for instance on Waughton Hill (NJ 96346 57248) and near Knowhead (NJ 94694 55164) and New Leeds (NJ 99572 54583) in the headwater tributary sub catchments of the Buchanan Coastal catchment and River Ugie catchment respectively.
- 6.3.27 Groundwater vulnerability is the tendency and likelihood for general contaminants to move vertically through the unsaturated zone and reach the water table after the introduction at the ground surface. The Groundwater (Scotland) vulnerability dataset (BGS, 2011) accounts for properties of the vertical pathway above the water table, whether it is above an aquifer or not. This indicates that the study area is largely classified as either Zone 3, "*Vulnerable to some pollutants; many others significantly attenuated*" or Zone 4c, "*being vulnerable to those pollutants not readily absorbed or transformed*". There is also a very narrow band immediately to the west of the study area associated with an area of Middle Old Red Sandstone and classified as Zone 5, "*being vulnerable to most pollutants with rapid impact in many scenarios*". The above information indicates that there may be localised sources of groundwater present, including abstractions, which are vulnerable to changes in groundwater quality.

Water quality

- 6.3.28 Under the WFD, SEPA has produced a RBMP for the Scotland RBD which was updated in 2021 to manage water quality targets and river basin planning. The aim of the WFD is for all the water bodies to achieve 'Good Status' by 2027 and to ensure no deterioration from current status. The study area is located within the Scotland RBD (Scottish Government 2021b).

WFD surface water bodies

- 6.3.29 There are four WFD river water body catchments with numerous individual tributaries which are either within or potentially connected to the study area. Given the extensive scale of the study area and the numerous associated river water bodies which span it, for the purpose of brevity **Table 6.3.7** lists the relevant WFD river water bodies, summarising their range of current statuses, impacted conditions and pressures. **Figure 6.3.1** in **Appendix 1A** also presents a visual overview of the main river catchments and shows the current overall status of individual WFD water bodies.
- 6.3.30 Each of the river water bodies have been designated as 'heavily modified water bodies' (HMWBs) on account of physical alterations by human activity. In each of these cases the uses of such water bodies (e.g. providing drainage for agriculture) would be significantly affected by the mitigation required to achieve Good ecological status. Where no better environmental options exist, then these water bodies have 'Good ecological potential' set as their environmental objective. Ecological potential is described as the equivalent of achieving a given ecological status (Good, Moderate or Poor) in water bodies once the impact of physical modifications necessary to support land use has been taken into account.
- 6.3.31 There is also three WFD transitional water bodies, with two classified at High overall status, and another at Moderate overall status. There is also one loch WFD water body at Poor overall status as presented in **Table 6.3.7** and **Figure 6.3.1** in **Appendix 1A**.
- 6.3.32 The baseline condition of relevant coastal water bodies is presented within **Section 5.2: Marine water and sediment quality**.
- 6.3.33 Following further design evolution and refinement of the planning application boundary and study area within the EIA Report, this baseline information will be presented at the individual WFD river water body scale.

WFD groundwater water bodies

- 6.3.34 Within the study area there are also six groundwater catchments, with five classified as being at Good status and one classified as being at Poor status as presented in **Table 6.3.7** and **Figure 6.3.2: WFD groundwater bodies** in **Appendix 1A**.

WFD bodies and classifications

- 6.3.35 **Table 6.3.7** presents each of the WFD surface water and groundwater bodies along with the summarised range of their overall status, impacted condition and responsible pressures from the RBMP 2021 (Scottish Government, 2021b).

Table 6.3.7 Baseline information on WFD water bodies

Water bodies (individual WFD river water bodies are listed where applicable)	2021 overall status / potential	Impacted condition – pressures responsible for water body not reaching Good status	Overall objective
WFD River Ugie water body catchment River Ugie North/South (23215), Crooko Burn (23216), Faichfield Burn (23217), South Ugie Water – Stuartford to Longside (23224), Quhomery Burn (23226), Burn of Ludquhar (23225), Crichtie Burn (23227), South Ugie Water – New Deer to Stuartfield (23230), Water of Fedderate (23229), Leeches Burn (23228), North Ugie Water – Lower Catchment (23221), North Ugie Water – Upper Catchment (23222), Greenspeck Burn (23223)	HMWB, Good – Bad status / potential.	Ecological condition – unknown pressure on water animals and plants – cause to be determined. Physical condition – modifications to bed, banks and shores. Water quality – diffuse source (rural sources) and point source (wastewater/sewage disposal). Water flows and levels – agricultural irrigation.	Good ecological potential by 2027.
WFD Buchan Coastal River water body catchment Black Water d/s St Fergus (23062), Black Water – u/s Fergus (23064), Water of Philorth / Water of Tyrie (23059), Kessock Burn (23058), Slains Burn (23199), Laeca Burn (23202), Laeca Burn (23202), Water of Cruden – u/s Hatton WWTP (23201), Water of Curden – d/s Hatton WWTP (23200), Burn of Savoch/Logie Burn (23061), Burn of Strathbeg (23060), Forvie Burn (23203), Burn of Auchmacoy (23204).	HMWB, Good – Poor status / potential.	Physical condition – modifications to bed, banks and shores. Ecological conditions – unknown pressure on water animals and plants.	Good ecological potential by 2027.

Water bodies (individual WFD river water bodies are listed where applicable)	2021 overall status / potential	Impacted condition – pressures responsible for water body not reaching Good status	Overall objective
WFD River Ythan water body catchment Ebrie Burn (23240), Little Water / Black Burn 23237, Burn of Sessnie (23238), Ebrie Burn (23240), Burn of Stonehouse (23236) River Ythan – Upper catchment above Fyvie (23233).	HMWB, Good – Poor status / potential.	Access for fish migration – hydroelectricity generation and business water use. Water quality – diffuse source (urban and rural land uses). Physical condition – modifications to bed, banks and shores.	Good ecological potential by 2027.
WFD River Deveron water body catchment Idoch Water 31249	Moderate status.	Physical condition – modifications to be bed, banks and shores. Water quality – diffuse sources.	Good ecological potential by 2027.
WFD Ugie Estuary transitional water body (2000129)	High	N/A	N/A (already at High status)
WFD Ythan Estuary transitional water body (200113)	Moderate	Water quality – diffuse sources.	Good ecological status by 2027.
WFD Stratheg Estuary transitional water body	High	N/A	N/A (already at High status)
WFD Loch of Strathbeg Loch water body (100136)	Poor	Water quality – naturally high nutrient levels.	SEPA implemented measures to address excess inputs of plant nutrients into the water body. The improvement it was aiming to achieve in the status of the water body is not expected after 2027 because the timescale for the recovery

Water bodies (individual WFD river water bodies are listed where applicable)	2021 overall status / potential	Impacted condition – pressures responsible for water body not reaching Good status	Overall objective
			is dependent on the time for nutrients to be flushed out of the system and healthy communities of aquatic life to re-establish.
WFD Fraserburgh Sand and Gravel groundwater water body (150800)	Good	N/A	N/A (already at Good status)
WFD Fraserburgh groundwater water body (150634)	Good	N/A	N/A (already at Good status)
WFD Mintlaw groundwater water body (150655)	Good	N/A	N/A (already at Good status)
WFD Peterhead groundwater water body (150630)	Good	N/A	N/A (already at Good status)
WFD New Byth groundwater water body (150454)	Good	N/A	N/A (already at Good Status)
WFD Ellon groundwater water body (150676)	Poor	Water quality – diffuse source (rural sources).	Good status by 2027

- 6.3.36 **Table 6.3.7, Figure 6.3.1 and Figure 6.3.2 in Appendix 1A** all indicate that there are a range of existing pressures on water quality, flows, levels, hydromorphology and ecological conditions across the study area.
- 6.3.37 The River Ugie has been identified as holding good quantities of both salmon and sea trout. The Ugie District Salmon Fishery Board, along with Ugie Angling Association and the river management team, operate a hatchery, commission surveys of the juvenile population, repair banks and carry out works to improve spawning bed accessibility to adult salmon and trout (Ugie District Fishery Board, 2022).

Conservation sites

- 6.3.38 The NatureScot website (NatureScot, 2022a) indicates that there are several potentially water dependent conservation sites within the study area.
- 6.3.39 The Loch of Strathbeg (NK 07434 58808) SPA, SSSI and Ramsar site is designated as being the largest dune slack pool in Britain with an area of 200ha. It is situated within the Buchan Coastal catchment and supports a range of wetland habitats including open water transition fen, fen meadow and alder willow carr.
- 6.3.40 The Rora Moss (NK 04200 51600) SAC and SSSI is located within the River Ugie catchment, and 10km northwest of Peterhead. It is the second largest lowland raised bog in Aberdeenshire with a significant area of uncut dome areas. The area surrounding the primary bog and extending to the edge of the moss has mostly been cut over. These cuttings retain deep peat, where the water table is close to the surface and this is essential for restoring the hydrology of the remaining dome.
- 6.3.41 The Turclossie Moss SAC (NJ 88500 57500) is located within the River Ugie catchment and approximately 6.8km to the southwest of Peterhead. It is designated for being an active raised bog and degraded raised bog still capable of natural regeneration. It comprises several hydrological features including marshes, water-fringed vegetation and fens.
- 6.3.42 The Waters of Philorth LNR (NK 02389 64888) incorporates the estuary of the River Philorth and the sand dune complex, which is part of the larger Fraserburgh Bay sand dune system. There are also areas of reed bed, salt marsh and mud flats associated with the estuary.
- 6.3.43 **Section 6.5: Terrestrial ecology and ornithology** also identifies 17 LNCs that are within 2km of the Scoping Boundary (in **Table 6.5.9** and **Figure 6.5.4: Location of Local Nature Conservation sites** in **Appendix 1A**) which will be taken forward and considered in the EIA Report.
- 6.3.44 As noted in **Section 6.5: Terrestrial ecology and ornithology**, habitat surveys will be carried out within 250m of proposed works areas in order to identify groundwater dependent terrestrial ecosystems (GWDTEs).

Private water supplies

- 6.3.45 Aberdeenshire Council and SEPA were contacted in May 2022 to obtain information on private water supplies (PWSs) and licensed abstractions respectively.
- 6.3.46 On 25 May 2022 Aberdeenshire Council provided a list of PWSs within the study area, noting that its records related to the property location only and as such were indicative as they did not specify the source locations or types of PWS (e.g. groundwater or surface water) and that in some cases could potentially be out of date. A map of these indicative PWS locations in relation to the study area comprises **Figure 6.3.3: Indicative private water supply locations** in **Appendix 1A**. Further investigation will be carried out during design evolution to ascertain more information on the types and locations of these supplies

to inform any assessment of potential effects and associated mitigation within the EIA Report.

Licensed abstractions

- 6.3.47 Data on licensed water supplies (including public water supplies) have not yet been received from SEPA. It is considered likely that there will be a range of surface water and groundwater (wells and springs) abstractions present across the study area. Further investigation will be carried out to ascertain more information on the locations of these abstractions to inform any assessment of potential effects and associated mitigation within the EIA Report.

Drinking Water Protection Areas (DWPAs)

- 6.3.48 Within the east of the study area the lower course of River Ugie is designated as a surface water DWPA from the North River Ugie / South River Ugie confluence towards its tidal limit in Peterhead (Scottish Government, 2022d). The entirety of the Scotland RBD is designated as a groundwater DWPA (Scottish Government, 2021b).

Flood risk

Potentially vulnerable areas

- 6.3.49 Within the study area the SEPA online mapping identifies the two Potentially Vulnerable Areas (PVAs) described by the North East Flood Risk Management Plan (Aberdeenshire Council, 2016a), and these are shown on **Figure 6.3.4: Scoping Boundary and fluvial flood risk areas**, **Figure 6.3.5 Scoping Boundary and coastal flood risk areas** and **Figure 6.3.6: Scoping Boundary and surface water flood risk areas** in **Appendix 1A**.
- 6.3.50 PVA 06/08 partially covers the southeast of the study area and the settlements of Peterhead, Stirling and Boddam (Aberdeenshire Council, 2016a). PVA 06/05 is located in the Moray Firth from Pennan to Fraserburgh and is partially within the northeastern part of the study area.

Fluvial flood risk

- 6.3.51 SEPA flood risk mapping shows that within the study area the Medium and High fluvial flood risk zones (0.5% and 10% AEP of flooding respectively) are mainly confined to narrow corridors within steep-sided river channel headwaters, before spreading across wider floodplains within the lower reaches of the catchments (**Figure 6.3.4 in Appendix 1A**). In the east of the study area there are extensive Medium and High fluvial flood risk zones associated with the lower reaches of the main River Ugie and Buchan Coastal catchments, such as the mouths of the River Ugie, the Waters of Philforth and Loch of Strathbeg.
- 6.3.52 Peterhead was flooded by fluvial flooding from the River Ugie in 1881, 1882 and 2015. Fraserburgh also experienced fluvial flooding during various events between 2002 and 2012 caused by the overtopping of small burns including the Kessock Burn (Aberdeenshire Council, 2016a).

Coastal flood risk

- 6.3.53 There is a Medium to High likelihood (0.5% AEP and 10% AEP respectively) of coastal flooding extending along the coastal intertidal sections of the study area. There are also areas of High likelihood associated with the coastal inlets of Sandhaven Harbour,

Fraserburgh Harbour, the Loch of Stathbeg, Waters of Philorth, the Ugie Estuary and Peterhead Bay Harbour (**Figure 6.3.5** in **Appendix 1A**).

- 6.3.54 During 1953, 2012 and 2013, coastal flooding events occurred near the coastal frontage and harbour at Sandhaven and the latter's coastal storms also caused erosion near Kinnaird Head in Fraserburgh.

Surface water flood risk

- 6.3.55 The SEPA flood risk map also indicates that areas of surface water flood risk are largely coincident with fluvial flood risk zones, adjacent to watercourses and urbanised areas around Peterhead and Fraserburgh. There are also small, isolated pockets of surface water flood risk situated within localised depressions across the study area (**Figure 6.3.6** in **Appendix 1A**).
- 6.3.56 The Northeast Flood Risk Management Plan reported that between the period of 2002 and 2016 within PVA 06/08 the majority of floods in Peterhead were associated with surface water. Properties in Peterhead experienced surface water flooding in August 2012; several properties were evacuated during this event. Fraserburgh also experienced surface water flooding on several occasions between 2002 and 2012. SEPA has identified that an objective is to produce a surface water plan/study for both PVA areas (Aberdeenshire Council, 2016a).

Groundwater flood risk

- 6.3.57 The SEPA flood risk mapping (SEPA, 2022h) indicates that there is a Low likelihood of groundwater flooding in the southeastern corner of the study area in the vicinity of Peterhead, Boddam and Stirling (PVA 06/08). The flood risk mapping also indicates that the remainder of the study area is not at risk of groundwater flooding. The Local Flood Risk Management Plan does not hold any information on groundwater flooding for the study area which indicates that groundwater is not a significant source of local flooding (Aberdeenshire Council, 2016a).
- 6.3.58 Given the limited presence of groundwater in the vicinity, it is anticipated that groundwater flooding will be restricted to localised relatively permeable areas, e.g. across alluvium and sand and gravel deposits within river terraces, and localised areas of peat.

Artificial sources of flood risk

- 6.3.59 SEPA has produced Reservoir Inundation Maps (SEPA, 2022i). The Reservoir Inundation Map covering the study area indicates that there are several areas at risk of reservoir inundation in the case of a breach. The Federate Reservoir (NJ 86447 52292) is shown to pose a risk of flood inundation along the Water of Fedderate and South Ugie Water towards Peterhead. There is also shown to be a risk of inundation along South Ugie Water from Pitfour Lake (NJ 97703 48731) to Longside (NK 03709 47470). The Inundation Map also shows that there are two areas at risk of inundation to the west of Peterhead associated with Aberdeen Forehill Reservoir (NK 09520 46270) and Forehill Reservoir (NK 09487 46506).
- 6.3.60 Whilst there are no publicly available historical records or maps of sewer flooding, the Local Flood Risk Management Plan indicates that for PVA 06/05 and 06/08 Scottish Water will undertake further investigation in the Fraserburgh and Peterhead Sewer catchments to improve its understanding of sewer flood risk in those areas. This information will be requested from Scottish Water to inform the EIA.

Data gaps

- 6.3.61 As noted in **paragraph 6.3.47** data on licensed water supplies have not yet been obtained from Scottish Water and SEPA.
- 6.3.62 An appraisal of GWDTEs will be undertaken pending a Phase 1 habitat survey, as described in **Section 6.5: Terrestrial ecology and ornithology**. Should this survey identify potential GWDTEs likely to be impacted by the Project, these will be subjected to a National Vegetation Classification (NVC) survey and a review of the available data will determine whether they can be considered 'true' GWDTEs.

Future baseline

- 6.3.63 Information regarding climate change was obtained from the latest UK Climate Projections (UKCP) as summarised in the most recent SEPA guidance for flood risk assessment (SEPA, 2022e). The UKCP18 is a climate analysis tool which features comprehensive projections for different regions of the UK. The sea level rise allowance set out in the SEPA guidance is for a cumulative rise of 0.85m between 2017 and 2100 for the Northeast Basin Region.
- 6.3.64 SEPA's recommended climate change allowance for extreme sea levels has been based on projections of mean sea level rise. As noted in the SEPA guidance, any change in the offshore wave height or size and number of storm surges is uncertain but is expected to have a much smaller effect on coastal flood risk than sea level rise. The UKCP18 marine report also estimates that changes in extreme sea levels due to changes in storm surge will be an order of magnitude smaller than changes in extreme sea levels due to changes in mean sea level.
- 6.3.65 The UK Climate Resilience Programme Climate Risk Indicator tool (UKCRP, 2022) also indicates that under the RCP 8.5 between the present day and the 2080s, average annual temperatures could increase by approximately 4°C for the northeast of Scotland. The central estimate also predicts that annual median precipitation could increase by 9%, with winter median precipitation increasing by up to 19% and summer median precipitation decreasing by 23%. The SEPA FRA guidance sets out a 37% peak rainfall intensity allowance for the Northeast River Basin Region up to 2080 and recommends that sensitivity testing is carried out to a higher allowance for developments with a longer duration.
- 6.3.66 Therefore, in winter months there could be an increase in rainfall and reduction in snowfall relative to the current baseline. Future projections also indicate that summer storms are likely to be more intense and frequent; this may lead to more extreme flows during and immediately following such events which, in conjunction with sea level rise, could compromise the effectiveness of existing surface water drainage networks discharging to sea.

Basis for scoping assessment

- 6.3.67 The water resources and flood risk scoping assessment is based on information set out in **Chapter 2: Project Description**.
- 6.3.68 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 6.3.9**.
- 6.3.69 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 6.3.70 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on water resources and flood risk (see **Table 6.3.8**). These will evolve through the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include actions that would be undertaken to meet existing legislation requirements and those that have been identified as good or standard practice.
- 6.3.71 there is a commitment to implementing these environmental measures, and to comply with standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 6.3.8 Relevant water resources and flood risk embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-001	Underground cables will be used to connect from the landfall(s) transition joint bay to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the new onshore substation nominated by NETS grid connection point(s). The installation status of which will be assessed on confirmation of a route of the onshore cable routing. Cables are typically installed in ducts in a standard buried trench arrangement.	Construction Environmental Management Plan (CEMP) and planning conditions.
M-002	Where practical, sensitive sites will be avoided by the temporary and permanent onshore project footprint including SPAs, SACs, SSSIs, National Nature Reserve (NNR), Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, Scottish National Trust Land, Listed Buildings and Scheduled monuments.	CEMP, description of Project and planning conditions.
M-003	A crossing schedule of the grid connection crossings will be prepared that includes crossing methodologies, where required, of all roads, rail, core paths, right of way and watercourses.	CEMP and planning conditions.
M-004	At any sensitive features identified along the route, including sensitive crossing locations, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects.	CEMP, description of Project and planning conditions.
M-005	The construction method for the landfall(s) has yet to be determined, and will be specific to the site chosen, its geology, topography and other constraints. Typically either open cut/cut-and-fill construction or trenchless construction (e.g. HDD) will be used. Where it is necessary to cross sensitive features, trenchless construction methods may be used under the cross feature.	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-006	Vegetation will be retained where possible and mapped (Vegetation Retention Plan or similar). Otherwise, vegetation removal will be undertaken in line with British Standard (BS) 5837:2012 (Trees in relation to design, demolition and construction) and scheduled to avoid bird breeding seasons. Ancient woodland will be retained with a stand-off of a minimum of 25m from any surface construction works (HDD a depth >6m). With regards to other woodland / forestry, the onshore export cable construction corridor will be reduced, where practical, to minimise tree loss and where the construction corridor passes close to woodland that is being retained, BS5837:2012 root protection to apply. Hedgerows with trees / tree lines (including hedgerows deemed "important" under the Hedgerows Regulations 1997) which are crossed by the onshore export cable route will be notched to reduce landscape impacts. All hedgerows that are to be retained, coppiced, notched or lost are to be mapped. Vegetation may be coppiced / pruned to allow access and visibility splays at junctions.	CEMP, description of Project and planning conditions.
M-008	Pollution control strategy will be in line with good practice and in accordance with Controlled Activity Regulations (CAR) licence regulations, pollution prevention plans and emergency plans to be drawn up to detail how ground and surface waters and the ecological features they support, would be protected in construction and operation. These will include information on the storage of any fuels, oils and other chemicals and pollution incidence response planning, plus measures for the protection of licenced and private abstractions. This could include a monitoring regime associated with critical or very proximate receptors.	CEMP and planning conditions.
M-013	During both construction and operation phases, vehicle maintenance and refuelling / oil changes for machinery / equipment will be undertaken within designated areas where spillages can be easily contained, and machinery will be routinely checked to ensure it is in good working condition. The areas at risk of spillage or containing hazardous materials, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals), will comply with industry good practice for pollution prevention, be appropriately bunded, have appropriate containment and segregation and will be risk assessed and carefully sited to minimise the risk of hazardous substances entering the drainage system, local watercourses, or sensitive land based receptors. Where feasible, such areas will be sited at least 10m from a watercourse, in accordance with the SEPA CAR General Binding Rules, and away from areas at risk of flooding. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. An Incident Management Plan will be in place during construction and operation. All works will be carried out in accordance with The Pollution Prevention and Control (Scotland) Regulations 2012 and the Water	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	Environment (Controlled Activities) (Scotland) Regulations 2011.	
M-014	No blasting is anticipated to be required and trenchless crossings will be undertaken by non-impact methods.	CEMP and planning conditions.
M-015	During construction topsoil and subsoil will be stored within the construction working corridor of the onshore export cable construction corridor. The topsoil and subsoil will be stored in separate stockpiles, in line with the DEFRA Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Any suspected or confirmed contaminated soils will be separated, contained and tested before removed.	CEMP and planning conditions.
M-016	In areas (or during periods of adverse weather) there may be the requirement to import aggregates to minimise erosion or transport of sediment from construction. Options such as bog-matting, geotextiles, floating roads will be considered by the principal contractor for sensitive sections of the route to reduce impact.	CEMP and planning conditions.
M-019	The onshore export cable will be constructed in sections. The trenches will be excavated, the cable ducts will be laid, the trenches backfilled, and the reinstatement process commenced in as short a timeframe as practicable.	CEMP
M-020	Emergency Response Plans (ERPs) for flood events will be prepared for all construction activities, working areas, access and egress routes in floodplain areas. These plans will be provided for both construction and operation / maintenance phases and will include evacuation procedures for personnel.	CEMP and planning conditions.
M-021	All aspects of the construction work will be in accordance with the Health and Safety at Work Act (1974) and regulations made under the Act, and the Construction (Design and Management) Regulations 2015.	CEMP and planning conditions.
M-022	Following construction, construction compounds will be returned to the standard identified and agreed in the Decommissioning Plan.	CEMP and planning conditions.
M-023	Particular care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion. Temporary cut-off drains will be installed parallel to the trench-line, before the start of construction, to intercept soil and groundwater before it reaches the trench. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release.	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-063	<p>A CEMP to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase.</p> <p>The CEMP will be the securing mechanism for many measures.</p>	CEMP and planning conditions.
M-066	The permanent easement for the onshore export cable route will be kept to the minimum width needed for safe access for cable maintenance or replacement purposes during operation of the Project.	CEMP and planning conditions.
M-069	The construction work will comply with regulations, including the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) and associated SEPA guidance. Any necessary authorisations will be obtained from SEPA and complied with. Construction activities which may require authorisation from SEPA include: discharging run-off from construction areas, work on the riverbank; the installation of coffer dams; dewatering excavations; and use of herbicides.	CEMP and planning conditions.
M-070	Soils and excavated materials will be managed in accordance with SEPA regulatory guidance on Promoting the Sustainable Reuse of Greenfield Soils in Construction, and Waste Management Guidelines for the re-use of excavated materials and remediation. The best practice for soil handling in the Defra Construction Code of Practice will be applied for handling of topsoil and subsoil. A soil management plan (SMP) will be developed for use during construction to protect soil resources and agricultural land quality. The SMP will be used in conjunction with a Peat Management Plan (PMP) as required i.e., if the Project encounters areas of peat.	CEMP and planning conditions.
M-076	Where crossing techniques such as horizontal directional drilling (HDD) are not required or are not practical, the crossing of drainage ditches or engineered channels may be by open cut techniques or the installation of culverts or bridges to allow water to continue flowing. Where this is the case this will be done in accordance with The Water Environment (Controlled Activities) (Scotland) Regulations 2011 and the General Binding Rules in the SEPA Practical Guide. Appropriate authorisations from SEPA will be applied for, if required for works e.g. for Main Rivers, works on or near sea defences / flood defence structures or in a flood plain), or from the Lead Local Flood Authority (for ordinary watercourse crossings).	CEMP and planning conditions.
M-077	Where possible micro-siting will be undertaken during detailed design to avoid ponds and lochs.	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-078	A typical depth of 1-2m to the base of an onshore export cable trench is assumed. In sensitive areas, the amount of topsoil removed will be the width of the trenches only, rather than across the entire temporary construction corridor.	CEMP and planning conditions.
M-080	Drainage design to manage and, if necessary, treat surface water run-off will be included in all elements of temporary construction sites and permanent operational infrastructure. A CAR license will be required for all sites that exceed five hectares in area. Drainage design will follow the SuDS hierarchy with preference being given to local infiltration of surface water run-off from new areas of hardstanding, where possible. Where the development intersects overland flow pathways or areas of known surface water flooding appropriate measures will be embedded into the design. All subsurface infrastructure will be designed to facilitate subsurface flow pathways to avoid any localised increases in groundwater flooding.	CEMP and planning conditions.
M-081	Construction and permanent development in flood plains will be avoided wherever possible. Where this is not possible mitigation will be developed to ensure the works are compliant with policy requirements.	CEMP and planning conditions.
M-082	Licensed and private water supplies will be avoided where practicable; if any impacts are anticipated then appropriate measures will be put in place to avoid impact on the quantity and quality of the supply.	CEMP and planning conditions.

Likely significant effects

- 6.3.72 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 6.3.73 The likely significant effects on water resources and flood risk are summarised in **Table 6.3.9** The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for water resources and flood risk effects and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 6.3.74 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects which are therefore no longer considered is also presented, supported by the evidence base.

Table 6.3.9 Likely significant water resources and flood risk effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Landfall(s) – cable and associated earthworks resulting in potential impacts on surface water quantity / quality and / or flood risk (Construction).	M-001, M-004, M-008, M-015, M-016, M-063, M-069	Works within a tidal flood plain and WFD coastal / transitional water body. Potential for surface water quality impacts and short-term displacement of flood waters. Effect anticipated to be not significant upon assessment of effects associated with specific infrastructure locations and development of environmental measures as required. To be determined through further assessment.	Scoped in as FRA and WFD assessment are required. Anticipated to be a qualitative assessment unless flood modelling is required.	Flood risk receptors; WFD coastal / transitional water body and potentially water dependent conservation sites.	Further information on tidal flood levels and local Water Environment from SEPA and Aberdeenshire Council where applicable.
Landfall(s) – cable and associated earthworks resulting in potential impacts on groundwater levels /quality (Construction).	N/A	No likely significant effect anticipated as works will be limited to the coastal area and the local water table will be connected to sea levels, therefore no impact on freshwater groundwater levels or water quality.	Scoped out. See rationale in section below paragraph 6.3.78.	N/A	N/A
Onshore route – cable route construction (including watercourse crossings) and associated earthworks resulting in a potential impact on surface water	M-001, M-002, M-003, M-005, M-006, M-008, M-008, M-013, M-014, M-015, M-016, M-019, M-020, M-021,	Subsurface works, surface works within fluvial and tidal floodplains, use of fuels oils and other chemicals on site. Effect anticipated to be not significant upon assessment of effects	Scoped in as FRA and WFD assessment are required. Anticipated to be a qualitative	Flood risk receptors; WFD transitional / surface water/ groundwater water bodies, associated PWSs	Further information on historical flooding, flood and flow levels, groundwater levels, water quality, abstractions and hydromorphology of watercourses at proposed

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
quantity / quality, hydromorphology, groundwater levels /quality and / or flood risk (Construction).	M-023, M-063, M-066, M-069, M-070, M-076, M-077, M-078, M-082	associated with specific infrastructure locations and development of environmental measures as required. To be determined through further assessment.	assessment unless flood modelling is required.	and licensed abstractions	crossings points from SEPA and Aberdeenshire Council and site walkover.
Substation – construction and associated earthworks resulting in a potential impact on surface water quantity / quality, groundwater levels / quality and / or flood risk (Construction).	M-002, M-006, M-008, M-013, M-015, M-016, M-020, M-023, M-063, M-069, M-080, M-082	Subsurface works, surface works potentially within fluvial and tidal floodplains, use of fuels oils and other chemicals on site. Effect anticipated to be not significant upon assessment of effects associated with specific infrastructure locations and development of environmental measures as required. To be determined through further assessment.	Scoped in as FRA and WFD assessment are required. Anticipated to be a qualitative assessment unless flood modelling is required.	Flood risk receptors; WFD transitional / surface water / groundwater water bodies and associated PWSs and licensed abstractions.	Further information on historical flooding, flood and flow levels, groundwater levels, water quality, abstractions and hydromorphology of watercourses from SEPA and Aberdeenshire Council and site walkover.
Operation and maintenance activities resulting in a potential impact on surface water quantity / quality, groundwater quality, hydromorphology and / or flood risk (Operation / Maintenance).	M-003, M-008, M-013, M-069, M-080	Surface works potentially within fluvial or tidal floodplains, use of fuels, oils or other chemicals. Effect anticipated to be not significant upon assessment of effects associated with specific infrastructure locations and development of environmental measures as required. To be determined through further assessment.	Scoped in as FRA and WFD assessment are required. Anticipated to be a qualitative assessment unless flood modelling is required.	Flood risk receptors; WFD transitional / surface water/ groundwater water bodies and associated PWSs and licensed abstractions.	Further information on historical flooding, flood and flow levels, groundwater levels, water quality, abstractions and hydromorphology of watercourses from SEPA and Aberdeenshire Council and site walkover.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Operation and maintenance activities resulting in a potential impact on groundwater levels (Operation / Maintenance).	N/A	No likely significant effects anticipated as no dewatering will be associated with operation and maintenance activities.	Scoped out. See rationale in section below paragraph 6.3.79.	N/A	N/A
Decommissioning activities (including the potential removal of watercourse crossings) resulting in a potential impact on surface water quantity / quality, groundwater water quality, hydromorphology and / or flood risk (Decommissioning).	M-008, M-022, M-080	<p>Surface works potentially within fluvial or tidal floodplains, use of fuels, oils or other chemicals.</p> <p>Effect anticipated to be not significant upon assessment of effects associated with specific infrastructure locations and development of environmental measures as required. To be determined through further assessment.</p>	<p>Scoped in as FRA and WFD assessment are required.</p> <p>Anticipated to be a qualitative assessment unless flood modelling is required.</p>	Flood risk receptors; WFD transitional / surface water / groundwater water bodies and associated PWSs and licensed abstractions.	Further information on historical flooding, flood levels, water quality, abstractions and hydromorphology of watercourses at proposed crossings points from SEPA /Aberdeenshire Council and site walkover.
Decommissioning activities resulting in a potential impact on groundwater levels (Decommissioning).	N/A	No likely significant effects anticipated as no dewatering will be associated with decommissioning activities.	Scoped out. See rationale in section below paragraph 6.3.80.	N/A	N/A

Impacts scoped out of assessment

- 6.3.75 As can be seen from **Table 6.3.9**, taking into account the nature of the development and embedded environmental measures, it is not anticipated that the Project will give rise to any significant effects on the water environment. This initial conclusion will be confirmed within the EIA Report once the specific onshore infrastructure locations are known.
- 6.3.76 It is anticipated that the subsequent assessments will be qualitative unless flood modelling is required for specific areas of the Project, in which case a detailed assessment will be produced for those areas to support the appropriate level of FRA.
- 6.3.77 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice.
- 6.3.78 In relation to the **landfall(s), cable and associated earthworks, potential impacts on groundwater levels** have been scoped out from further assessment. This is on the basis that subsurface works will be limited to the coastal area and the local water table will be hydrologically connected to the sea levels, and therefore no impact on freshwater groundwater levels is anticipated.
- 6.3.79 For **operation and maintenance activities, potential impacts on groundwater levels** have been scoped out from further assessment. This is on the basis that operation and maintenance activities will not involve dewatering works, and therefore no impact on groundwater levels is anticipated.
- 6.3.80 In relation to **decommissioning activities, potential impacts on groundwater levels** have been scoped out from further assessment. This is on the basis that during decommissioning sub-surface infrastructure will be left in place and there will be no dewatering works, and therefore no impacts on groundwater levels are anticipated.

Cumulative effects

- 6.3.81 A development list has not been provided at this initial scoping stage due to the extensive scale of Scoping Boundary and associated study area. In the absence of a development list the following bullet points list examples of impacts from the Project that have the potential to act together with impacts from other developments to contribute to cumulative effects on associated receptors:
- impacts on water quality in rivers and groundwater from construction, maintenance and decommissioning activities;
 - impacts on groundwater levels from dewatering activities in construction;
 - impacts on flood risk from construction, maintenance and permanent development; and
 - impacts on hydro-morphology from construction and maintenance activities.

Transboundary effects

- 6.3.82 The potential effects from construction, operation and decommissioning on onshore water resources and flood risk receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. No transboundary impacts beyond the Scottish national borders have been identified for the water resources and flood risk aspect.

Proposed approach to the EIA Report

Introduction

- 6.3.83 The proposed water environment approach for the EIA Report has been set out under the headings below.
- 6.3.84 The desk-study baseline collated for scoping will be augmented at the EIA Report stage by further data collections as detailed in **Table 6.3.10**.

Table 6.3.10 Further third party baseline information collected for the EIA Report

Data Owner	Data to be requested
SEPA	Site climate and rainfall data. Available river flow data and river level data. Surface water and groundwater discharge consents. Licensed abstractions Surface water and groundwater quality data. WFD measures for all water bodies.
Aberdeenshire Council	Records of historical flooding.
Scottish Water	Records of sewer flooding and strategic mapping/ modelling studies. Information on public water supply and sewer assets.

- 6.3.85 In addition, a site walkover of the proposed route(s) and substation location will be undertaken to understand hydromorphology at key crossing points and to support the FRA.

Stakeholder engagement

- 6.3.86 Consultation will be held with relevant statutory and non-statutory organisations as necessary as part of the wider stakeholder engagement programme which is set out in **Section 4.3: Consultation and the evidence plan process**. This will include SEPA and Aberdeenshire Council, and other stakeholders as appropriate. Support will also be given to consultation lead by other aspects as required.

Development of site-specific environmental measures

- 6.3.87 The selection of the potential route(s) and substation location at EIA Report stage will involve the translation of some of the embedded environmental measures into site-specific measures associated with the micro-siting of infrastructure around flood plains, watercourses and abstractions. These measures will be developed in consultation with the wider Project team to ensure that the best environmental and technically feasible option for the proposed infrastructure is selected.
- 6.3.88 This exercise will result in the refinement of the proposed embedded environmental measures and the potential development of some location-specific measures as required to demonstrate how particularly sensitive receptors will be protected.

Undertaking further assessments

6.3.89 The EIA Report will contain assessments which address specific impacts on receptors and demonstrate how the development will comply with relevant legislation and guidance. These will include the following.

- An FRA will discuss the potential risk from all sources of flooding and demonstrate how the Project will be compliant with SPP, including taking into account climate change allowances. The appropriate level of FRA will be agreed with SEPA and Aberdeenshire Council once the onshore infrastructure is known. It is currently anticipated that a Level 1 or 2 study would be carried out however this will be subject to further consideration and stakeholder engagement.
- Consideration of the potential impacts on WFD status and supporting elements (including hydromorphology, ecology, water quality and groundwater tests) for all relevant WFD water bodies to demonstrate how the Project will satisfy the requirements of the WFD and not cause derogation in status or prevent the achievement of good status objectives. This will be presented as a proportionate, concise WFD compliance summary note, the purpose of which will be to signpost and cross reference relevant assessments and their associated embedded measures within the EIA Report.
- An assessment of the potential impacts on surface and groundwater abstractions (including PWSs and licensed abstractions) and GWDTEs, to demonstrate how the Project has been designed to avoid any significant effects on these receptors.
- Assessment of in-combination and cumulative effects on receptors.

6.4 Land use

Introduction

- 6.4.1 The land use assessment will consider the potential likely significant effects on land use, that may arise from the construction, operation and maintenance, and decommissioning of the onshore Project elements that are landward of Mean Low Water Springs (MLWS). This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 6.4.2 Land use interfaces with other aspects, as listed below, but not limited to:
- **Section 6.1: Ground conditions and contamination:** Ground conditions and land contamination are interrelated with land use as ground conditions may limit or allow certain land uses to take place.
 - **Section 6.3: Water resources and flood risk:** Land use interacts with the water environment e.g., in relation to drainage and flood risk, and specific land uses take place in and around water, which are dependent on water availability, water quality, and flood risk.
 - **Section 6.5: Terrestrial ecology and ornithology:** Nature conservation is a type of land use, changes to land use can significantly affect wildlife and biodiversity.
 - **Section 6.8: Traffic and transport:** Land use interacts with transport routes including the local and regional highway network and recreational routes such as the core path network, Sustrans cycle routes and navigable waterways.
 - **Section 6.9: Landscape and visual:** Landscape is in part determined by land use, for example commercial forestry land can undergo rapid change from established forest to felled trees.
 - **Section 7.1: Climate resilience:** The interference with climate resilience with ground conditions and contamination is captured in the In-Combination Climate Impacts (ICCI) assessment.
 - **Section 7.2: Greenhouse gases:** (land use and land management affects land cover and soil, which in turn affects whether soils are storing or generating (releasing) greenhouse gases); and,
 - **Section 7.3: Socio-economics:** Land use and socio-economics are closely interrelated e.g., terms of agricultural production capability, mineral extraction, and the need to use land for housing or industry, balanced with the need to use natural resources sustainably and to conserve biodiversity and geodiversity.

Legislative and policy context

- 6.4.3 This Section identifies the relevant legislative and policy context which has informed the scope of the land use assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of

individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this chapter.

6.4.4 In order to provide a robust evidence base, **Table 6.4.1** below presents a summary of legislation and policies of relevance to the land use assessment of which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 6.4.1 Relevant legislation and policy

Relevant Legislation and Policy	Relevance to the assessment
Legislation	
The Climate Change (Scotland) Act 2009 (Section 57)	Sets out objectives relating to sustainable land use, proposals and policies to achieve the objectives, and timescales for the proposals and policies taking effect.
Land Reform (Scotland) Act 2003	<p>Sets out framework of public access rights to most land and inland water, with obligations both on the access users and on the managers of the land.</p> <p>Guidance on these responsibilities is set out in the Scottish Outdoor Access Code.</p>
The Community Empowerment (Scotland) Act 2015	Established community rights in relation to land, enabled certain bodies to buy abandoned, neglected or detrimental land, and makes provision for registers of common good property and disposal and use of such property.
The Town and Country Planning (Scotland) act 1997 as amended by The Planning (Scotland) Act 2019	Introduced new duties on planning authorities to prepare and publish an Open Space Strategy, and to assess the sufficiency of play opportunities in their area for children.
The Electricity Act 1989	Schedule 9 Preservation of Amenity and Fisheries, paragraphs 3(3) and 3(4), require that <i>“a licence holder, a person authorised by an exemption to generate or supply electricity and the Secretary of State shall avoid, so far as possible, causing injuries to fisheries or to the stock of fish in any waters”</i> .
National Policy	
Approved National Planning Framework (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • National Spatial Strategy: North East • Spatial Planning Priorities: North – Sustainable Places • Spatial Planning Priorities: North – Productive Places • National Developments: 3. Strategic Renewable Electricity Generation and Transmission Infrastructure • Policy 4: Natural Places

Relevant Legislation and Policy	Relevance to the assessment
	<ul style="list-style-type: none"> • Policy 5: Soils • Policy 6: Forestry, woodland and trees • Policy 7: Historic assets and places • Policy 9: Brownfield, Vacant and Derelict Land And Empty Buildings • Policy 11: Energy • Policy 12: Zero Waste • Policy 14: Design, quality and place • Policy 18: Infrastructure First • Policy 20: Blue and Green Infrastructure • Policy 25: Community Wealth Building • Policy 26: Business and industry.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. • Land Use Strategy sets out key principles for the use and management of Scotland's land, and emphasises that land use should deliver multiple benefits, to make best use of assets to support primary activities including food production, flood management and carbon storage. • Urban infrastructure will need to change to adapt to the impacts of climate change, and coastal cities are mentioned as having potential for land use change to be needed to achieve more sustainable and resilient patterns of development in the long-term, in particular, with regard to water management and flooding issues. • States the aim to increase the rate of woodland creation to deliver 100,000 hectares of new woodland over the next 10 years, and made a pledge to plant 100 million trees by 2015. Future reviews will assess what further woodland expansion is required in the 2020s.
Scottish Planning Policy, 2014 <ul style="list-style-type: none"> - Paragraph 28 to 29 - Paragraph 80 - Paragraph 169 	<ul style="list-style-type: none"> • Supports economically, environmentally and socially sustainable places by enabling development that balances the costs and benefits over the long-term. • Sets out the layout and design should minimise the amount of good quality land that is required. Development on prime agricultural land, or land of lesser quality that is locally important should be permitted, except where it is essential for specific development, such as the generation of energy from a renewable source. • Discusses how proposals for energy infrastructure development should take account of spatial framework for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ► net economic impacts;

Relevant Legislation and Policy	Relevance to the assessment
	<ul style="list-style-type: none"> ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology.
Scotland's Third Land Use Strategy 2021 – 2026 – Getting the best from our land	<p>Sets out the Scottish Government's vision for sustainable land use, and notes that the way land is owned, used and managed is integral to the achievement of Scotland's national outcomes in the National Performance Framework (Scottish Government, 2022f).</p> <p>Seven illustrative landscapes are selected in the strategy to represent different aspects of land in Scotland (see paragraph 6.4.14).</p> <p>Annex E – details how monitoring and evaluation of progress with the objectives of the Land Use Strategy is assessed using ten indicators including:</p> <ul style="list-style-type: none"> • <i>Land use, land use change and forestry</i> • <i>Greenhouse gas emissions</i>. • <i>Gross Value Added (GVA) in agriculture and forestry</i>. Effects of the Project on agricultural land quality are considered in Section 6.1: Ground conditions and contamination. • <i>High nature value farming and forestry</i>. • <i>Natural Capital Asset Index (Supplemented with information from UK National Ecosystem Assessment³</i>. Effects of the Project on plants and wildlife are considered in Section 6.5: Terrestrial ecology and ornithology. • <i>Water ecological status</i>. Effects of the Project on water quality are considered in Section 6.3: Water resources and flood risk. • <i>Terrestrial breeding birds</i>. Effects of the Project on birds are considered in Section 6.5: Terrestrial ecology and ornithology.
Scotland's Forestry Strategy 2019 to 2029	<p>Sets out a vision for Scotland to have more forests and woodland and to be better integrated with other land uses.</p>
Scotland's Forestry Strategy Implementation Plan 2022 to 2025	<p>It is noted in the Forestry Strategy Implementation Plan, that: <i>“all of Scotland's forests make a significant contribution to biodiversity but particularly our native, ancient and semi-natural woodlands, as well as appropriately restored plantations on ancient woodland sites (PAWS)...</i></p>

Relevant Legislation and Policy	Relevance to the assessment
	<p><i>As such, supporting biodiversity objectives was identified as a key driver in Scotland's Forestry Strategy. The wider benefits of tree planting for the river environment, and wild salmon in particular, are also recognised. The Woodland Ecological Condition study (Forest Research, 2022) was published in 2020 as official statistics and is the largest and most in-depth assessment of the ecological condition of woodland habitats in Great Britain. The study showed that almost all of Scotland's forests are making a real contribution in terms of environmental benefits. This baseline will enable us to monitor the impact of related policies and initiatives aiming to enhance those benefits into the future."</i></p> <p>The main land use within the Scoping Boundary is agriculture, however the Scottish Government intention to increase woodland cover is noted in the future baseline from paragraph 6.4.54 onwards within the local context of Aberdeenshire.</p>

Marine Policy

No policies are of specific relevance to this area of technical assessment.

Local Planning Policy

Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • C2: Renewable Energy • PR1: Protecting Important Resources • PR2: Protecting Important Development Sites • R2: Development Rural Proposals Elsewhere in the Countryside • P1 Layout, Siting and Design • E3: Forestry and Woodland <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific use.</p>
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Technical guidance

6.4.5 Technical guidance that has been used to define the assessment is set out in **Table 6.4.2** below.

Table 6.4.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Scottish Natural Heritage (SNH), (2018a). Environmental Impact Assessment Handbook.	<p>SNH (now known as NatureScot) identified five broad categories of Land Use and Land Cover, selected to be real, physical, measurable, tangible, as follows:</p> <ul style="list-style-type: none"> • Water. • Forestry, woodland and trees. • Agriculture, fields and boundaries. • Settlements. • Other land uses. <p>The guidance also notes that the landscapes within which these categories exist are dynamic – change occurs through natural processes e.g., maturity of woodlands, coastal accretion, river erosion, however, most change occurs due to human activity, land use, management or neglect.</p> <p>The approach to land use assessment outlined from paragraph 6.4.8 onwards includes consideration of all of the land uses identified in the SNH guidance in order to ensure consistency with other aspects of the EIA.</p>

Study area

- 6.4.6 The study area for the land use assessment is defined as the onshore part of the Scoping Boundary as shown on **Figure 6.4.1a: Land use in Appendix 1A**.
- 6.4.7 The study area will be reviewed and amended in response to such matters as refinement of the onshore infrastructure, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

Assessment methodology

Introduction

- 6.4.8 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. This section sets out at a more detailed level the methodology employed for the land use assessment.
- 6.4.9 The land use assessment focuses on the potentially significant effects of the Project on land use receptors, taking into consideration the current land uses and the nature of the Project, which is predominantly a linear development (landfall(s), onshore export cable corridor and onshore substation). A large area of land will be temporarily affected during construction, however it is likely that the majority of this can be reinstated back to the original land use once the cables are installed. Permanent land use change will take place at the substation(s) and would remain in place up until the point of decommissioning. During operation the onshore export cable route will require rights of servitude which would limit some land uses (e.g. agricultural grazing or crop growing could take place within the area, however tree planting could not).

Land use receptors

- 6.4.10 Key land use receptors that have the potential to be significantly affected based on the current land uses within the Scoping Boundary have been identified, based on the review of the baseline condition and also taking into consideration land use receptors that overlap with those already considered in other sections such as: water resources and nature conservation sites.
- 6.4.11 The assessment takes into consideration the sensitivity of the affected receptor to change in land use and the magnitude of change from the baseline conditions resulting from the Project. This results in an evaluation of significance and an indication of likely significant effects. There is no technical guidance for assessing effects on land use, however this approach to assigning receptor sensitivity and magnitude of change follows an established assessment methodology as set out in **Chapter 4: Approach to Scoping and EIA** and uses land use receptor descriptions from published EIA guidance, as follows.
- 6.4.12 Receptors for land use effects have been identified based on the SNH EIA guidance (SNH, 2018a) categories, also considering the seven illustrative land uses used in the Scottish Government Land Use Strategy, which overlap with the SNH definitions, as illustrated in **Table 6.4.3** and listed below:
- 6.4.13 SNH land cover and land use categories:
- **water** – including the sea, estuaries, intertidal areas, lochs, lochans, pools, rivers, burns (watercourses), drainage ditches, canals and reservoirs;
 - **forestry, woodland and trees** – including plantation woodland, semi natural woodland, copses, shelterbelts, roadside trees, hedgerow trees;
 - **agriculture, fields and boundaries** – including arable, horticulture, intensive livestock, permanent pasture, unimproved grassland, rough hill grazing and moorland;
 - **settlements** – all types; and
 - **other land uses** – including parks, sports grounds, camp sites, nature reserves, docks and harbours, military sites, airfields, mineral sites, industrial, retail, warehousing or utilities sites.
- 6.4.14 The seven illustrative land uses used in the Scottish Government Land Use Strategy are:
- **settlements;**
 - **enclosed farmland** (mainly arable fields, also improved grassland and livestock farms);
 - **semi-natural land** (including mixed farmland, forests, hills, mountains and moors);
 - **rivers and waterbodies;**
 - **coastal;**
 - **islands, and,**
 - **marine.**
- 6.4.15 There is overlap with receptors considered in other sections of this Scoping Report, and **Table 6.4.3** therefore identifies land use receptors considered elsewhere in the Scoping Report.

Table 6.4.3 Land use receptors and approach to assessment

SNH land cover and land use category	Applicable Scottish Government illustrative land use(s) in the Scoping Boundary	Land use receptor examples	Approach to assessment
Water	<ul style="list-style-type: none"> - Rivers and other surface waterbodies - Coastal - Marine 	<ul style="list-style-type: none"> - Members of the public using surface water bodies / the sea for leisure purposes. - Landowners, land managers, businesses or public bodies using surface water bodies / the sea e.g., for water abstraction, as receiving water for point source or other discharges, for water transportation, or other commercial activities. 	<p>Potential effects of the Project on water quality and water availability, and on flood risk receptors are considered in Section 6.3: Water resources and flood risk.</p> <p>Water is also a key landscape element contributing to landscape character and some landscape designations, it also has the potential to influence visual effects which are considered further in Section 6.9: Landscape and visual.</p> <p>Potential effects of the Project on coastal settlement (see Settlements, below).</p>
Forestry, woodland and trees	<ul style="list-style-type: none"> - Semi-natural land (including mixed farmland, forests, hills, mountains and moors) 	<ul style="list-style-type: none"> - Members of the public visiting forested land for leisure purposes. - Land managers of forested land. - Businesses operating in forested areas. 	<p>Vegetation is a key landscape element contributing to landscape character and some landscape designations, it also has the potential to influence visual effects which are considered further in Section 6.9: Landscape and visual.</p> <p>Potential effects of the Project on international, national and local designated ecological sites, and on sensitive habitats or species, are considered further in Section 6.5: Terrestrial ecology and ornithology.</p> <p>Potential effects of the project including fragmentation of forests due to temporary construction work or permanent changes in land cover, and changes to access to / use of these areas, as a result of the Project are considered in the land use assessment.</p>

SNH land cover and land use category	Applicable Scottish Government illustrative land use(s) in the Scoping Boundary	Land use receptor examples	Approach to assessment
Agriculture, fields and boundaries	<ul style="list-style-type: none"> - Enclosed Farmland (mainly arable fields, also improved grassland and livestock farms); - Semi-natural land (including mixed farmland, forests, hills, mountains and moors); 	<ul style="list-style-type: none"> - Farmers, land managers and land owners using agricultural land for farming - Farmers, land managers and land owners using for other activities (e.g., game shooting, deer stalking) - Members of the public using agricultural land for access / leisure 	<p>Potential effects of the Project on soil quality and soil functions, including effects on agricultural land quality and the national agricultural land resource, as a result of temporary or permanent disturbance / loss are considered in Section 6.1: Ground conditions and contamination.</p> <p>Agriculture is a key landscape element contributing to landscape character and some landscape designations, it also has the potential to influence visual effects which are considered further Section 6.9: Landscape and visual.</p> <p>Socio-economic effects of the Project relating to agriculture are considered in Section 7.3: Socio-economics.</p> <p>Effects on agricultural land including change of land use / land cover, severance of land, changes in access to agricultural land, and the introduction of new limitations to current or future agricultural land use because of the Project, are considered in the land use assessment.</p>
Settlements	<ul style="list-style-type: none"> - Settlements - Coastal 	<ul style="list-style-type: none"> - Residents of, or visitors to, settlements 	<p>Potential noise and air quality effects during construction of the Project are considered in Sections 6.7: Onshore noise and vibration, and Section 6.2: Air quality, respectively.</p> <p>Potential effects of the Project in relation to land contamination are considered in Section 6.1: Ground conditions and contamination.</p> <p>Settlement is a key landscape element contributing to landscape character and some landscape designations. People within settlement and local residents are also visual receptors. Landscape and visual effects which are considered further Section 6.9: Landscape and visual.</p> <p>Effects on settlements including severance due to temporary construction work or permanent changes in land cover, and changes to access to / use</p>

SNH land cover and land use category	Applicable Scottish Government illustrative land use(s) in the Scoping Boundary	Land use receptor examples	Approach to assessment
Other land uses	<ul style="list-style-type: none"> - Open space (as defined by PAN 65: amenity green space, green corridors, sports areas, civic space, play space, public parks and gardens, other functional green space and natural / semi-natural areas). - Other development such as mineral extraction, landfill, industry, utilities and renewables. - Semi-natural land (including hills, mountains and moors) - Coastal - Marine 	<ul style="list-style-type: none"> - Members of the public using public open space - Commercial / industrial land uses, land use by public bodies, public utilities, military or other uses. - Nature conservation areas 	<p>of these areas, as a result of the Project are considered in the land use assessment.</p>
			<p>Open space is a key landscape element contributing to landscape character and some landscape designations. Semi-natural land, coastal and marine categories are also recognised as landscape character and often designated. People within open spaces, or other categories of land use are also visual receptors. Landscape and visual effects which are considered further Section 6.9: Landscape and visual.</p> <p>Potential effects of the Project on mineral resources are considered in Section 6.1: Ground conditions and contamination.</p> <p>Potential effects of the Project in relation to land contamination receptors are considered in Section 6.1: Ground conditions and contamination.</p> <p>Potential effects of the Project on international, national or local designated ecological sites, are considered in Section 6.5: Terrestrial ecology and ornithology.</p> <p>Effects of the Project in relation to permanent land use / land cover change to areas of other land use, changes in access to these areas for members of the public, businesses or public bodies, or the introduction of new limitations to current or future land use as a result of the Project, are considered in Section 6.9: Landscape and visual in relation to aesthetic impacts and in Section 6.8: Traffic and transport in relation to effects such as loss of access or severance of recreational routes such as the core path network, Sustrans cycle routes and navigable waterways.</p>

Receptor sensitivity

6.4.16 Descriptions of receptor sensitivity used in the assessment are provided in **Table 6.4.4**. These are not exhaustive as land uses can change rapidly and new land uses may emerge over time e.g. due to use of new technology for energy generation and/or other purposes.

Table 6.4.4 Sensitivity of receptor / resource

Sensitivity	Criteria / description examples
High	<p>Water – water use supporting human health and economic activity at a regional scale, could include regular use for abstraction, larger fisheries or other leisure areas. Water that is part of nationally or locally designated area.</p> <p>Forestry, woodland and trees – irreplaceable habitat including Ancient Woodland, semi-natural woodland, including appropriately restored plantations on ancient woodland sites (PAWS), commercial forestry land undergoing necessary work/rehabilitation (e.g., disease restricting ground disturbance / access to land). Vegetation that is part of nationally or locally designated area.</p> <p>Agriculture, fields and boundaries - Prime agricultural land of LCA Class 1 or 2 in agricultural use. This is the land with highest and most reliable yields. Agriculture that is part of a nationally or locally designated area.</p> <p>Settlements – land in residential use, village scale or larger, and / or settlements important for their local or national historic / heritage characteristics or landscape context, new settlements under construction.</p> <p>Other land use – Areas of open space that are nationally or locally designated, land currently in military, utilities, mineral extraction or other commercial / industrial use, required on an ongoing or regular basis for the operations undertaken there. Land of high nature conservation value (e.g., of international importance) or land undergoing restoration for nature conservation to return it to international conservation value.</p>
Moderate	<p>Water – water use supporting human health and economic activity at a local scale. Water that is part of undesignated area.</p> <p>Forestry, woodland and trees – commercial forestry plantation (any growth stage), established trees / woodland of local importance e.g., Tree Preservation Order, urban and amenity woodland. Vegetation that is part of undesignated area.</p> <p>Agriculture, fields and boundaries – Land in agricultural use (excluding LCA Class 1 or 2 land in agricultural use) where activities such as grazing, crop growing or horticulture have little flexibility to relocate (e.g., due to tenancy arrangements or limited local availability of similar LCA class) or need to be carried out close to specific existing infrastructure. Agriculture that is part of undesignated area.</p> <p>Settlements – isolated residential properties (e.g., scattered properties, steadings).</p> <p>Other land use – Areas of open space that are undesignated, land currently in commercial / industrial use, required occasionally or where alternative land is available for the activities undertaken.</p>
Low	<p>Water – water use supporting human health and economic activity at household/individual business scale e.g. Licensed non-public surface water and groundwater supply abstraction (and associated catchment), which is relatively small relative to available resource, or where raw water quality is not critical, for example: cooling water, spray irrigation, mineral washing</p>

Sensitivity Criteria / description examples

	<p>or permitted discharge, or, unlicensed potable surface water and groundwater abstraction (and associated catchment) for example: private domestic water supply, well, spring or permitted discharge.</p> <p>Forestry, woodland and trees – commercial forestry land plantation harvested and not replanted (but with no specific requirement to remain undisturbed e.g., disease), individual and small groups of trees performing local function (such as screening, amenity). Agriculture – Land in agricultural use where there is flexibility for operations to be relocated (such as grazing of non-dairy cattle where equivalent grazing land is available locally, or crop growth in alternative fields of similar LCA class).</p> <p>Settlements – derelict / abandoned housing.</p> <p>Other land use – disused areas of active commercial land.</p>
Very Low	<p>Water – commonplace features such as engineered drainage ditches with good potential for substitution.</p> <p>Forestry, woodland and trees – not used.</p> <p>Agriculture – not used.</p> <p>Settlements – not used.</p> <p>Other land use – vacant and derelict commercial land.</p>

Magnitude of change

- 6.4.17 Magnitude of change may be either beneficial or adverse. The criteria and examples in **Table 6.4.5** focus on adverse changes, however, beneficial changes may also occur and will be considered as the Project develops further and more information is available.

Table 6.4.5 Magnitude of change for land use

Magnitude of change	Description example
High	Total loss or major alteration of the land use receptor
Medium	Loss of, or alteration to, one or more key elements of the land use receptor
Low	Slight alteration of the land use receptor
Negligible	Barely perceptible alteration of the land use receptor

Evaluation of significance

- 6.4.18 During the assessment of effects for each identified receptor, the sensitivity value in **Table 6.4.4** will be combined with the magnitude of change from **Table 6.4.5** to produce an overall significance rating based on the evaluation matrix shown in **Plate 4.2.2** in **Chapter 4: Approach to Scoping and EIA**. Major effects will always be determined to be significant. Moderate effects can be significant, or not significant, based on specific scenarios and professional judgement, **Plate 4.2.2** therefore identifies these as potentially significant.

Effects assessed as a Moderate or Major rating will be subject to further investigation as part of the EIA following refinement of design information.

6.4.19 The evaluation of significance for land use will be undertaken using professional judgement, drawing upon information about the nature of the land uses and land use receptors present, and the type of construction activity proposed, the nature of the operation of the Project and the activities required for decommissioning.

6.4.20 The Project has the potential to result in negative effects on land use receptors during construction, for example where construction activities have the potential to prevent or limit access to land, or result in temporary severance of land, or to change land use (e.g., construction of the substation(s)). The Project could also result in negative impacts on land use if the operation of the Project creates new limitations to land use such as may be associated with land use restrictions within onshore export cable rights of servitude.

Baseline conditions

Data sources

6.4.21 A list of the key sources of land use baseline data are set out in **Table 6.4.6**.

Table 6.4.6 Key sources of land use data

Source	Date	Summary	Coverage of study area
Scottish Forestry, Forestry Open Data	2022 (unless otherwise stated)	Native Woodland Survey of Scotland data. This identifies the location, type, extent and condition of all native and nearly native woodlands and plantations on ancient woodland sites (PAWS) - as identified from the Ancient Woodland Inventory) in Scotland. National Forest Inventory Woodland GB 2020. The National Forest Inventory (NFI) woodland map covers all forest and woodland area over 0.5 hectare with a minimum of 20% canopy cover, or the potential to achieve it, and a minimum width of 20 metres.	Full coverage of the study area.
Multi-agency partnership, Scotland's Environment website	2022b	Habitat Map of Scotland – contains habitat and land use data for all of Scotland using internationally recognised data and habitat classification standards, including the European Nature Information System (EUNIS) and Habitats Directive Annex I habitat classifications. The woodland component is converted from surveys undertaken by Forestry Commission Scotland.	Full coverage of the study area.
National Library of Scotland, Scotland – Land Use Viewer	2015	The National Library of Scotland (NLS) Scotland – Land Use Viewer shows 2015 and 1930 land use maps. The 2015 map was completed by a partnership of Historic Scotland and the Royal Commission on the Ancient and Historical Monuments of Scotland (now combined as Historic Environment Scotland) and was the first comprehensive survey of the land use of Scotland since land use was first mapped in the 1930s by the Land Utilisation Survey. The two maps are presented together to highlight changes in the Scottish 20th century	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
		landscape, such as tree planting, and urban expansion. The split-screen viewer also allows the user to zoom-in to review more localised land use change, including changing patterns of arable and pastureland.	
Aberdeenshire Parks and Open Spaces Strategy and Audit, December 2010	2010	The Council's Open Space Strategy was undertaken in response to the requirement of Scottish Planning Policy and included an audit of open spaces across Aberdeenshire. The Council defined open space as " <i>Any open space which provides, or has the potential to provide, environmental, social and/or economic benefits to communities, whether direct or indirect, within and around urban area. It includes greenspace and hard landscaped areas with a civic function, as well as aquatic open spaces.</i> " The categories included in the audit are: amenity green space, green corridors, sports areas, civic space, play space, public parks and gardens, other functional green space and natural / semi-natural areas.	Full coverage of the study area.
Historic Environment Scotland	2019b	Gardens and Designed Landscapes of Aberdeenshire	Full coverage of the study area.
Scotland's Soils Maps	2022a	Agricultural land capability mapping based on the Macaulay Land Capability for Agriculture (LCA) classification: <ul style="list-style-type: none"> National scale land capability for agriculture map, 1:250,000 scale (Macauley Institute for Soil Research, 1984). Land Capability for Agriculture maps of Scotland at a scale of 1:50 000 (Soil Survey of Scotland Staff, 1984-87). <p>Available at: https://soils.environment.gov.scot/maps/.</p>	Full coverage of the study area by 1:50,000 scale map.

Current baseline

Land use overview

- 6.4.22 The Scotland – Land Use Viewer provides an overview of land use in Scotland as mapped in 2015. The Land Use Viewer also shows 1930s land use in split screen with the 2015 land use map, and comparison of the two maps shows no significant change in land use during the intervening period. Arable farming is shown as the predominant land use from Jedburgh in the Scottish Borders to Dornoch in the Highlands on both maps. Within the Scoping Boundary and across Aberdeenshire, most of the land is shown, in 2015, to be in arable land use, including rotation grass. Forests and woodland, and heathland and moorland, typically interspersed in and around the wooded areas, are present within the Scoping Boundary, but these occupy small areas by comparison (<10% in total) of land within the Scoping Boundary.
- 6.4.23 The topography within the Scoping Boundary ranges in elevation from 9m Above Ordnance Datum (AOD) to around 234m AOD along the brow of Waughton Hill (National Grid

Reference (NGR) (NJ 96346 57248)) in the northeast. In general, the topography undulates along a series of low-lying hills, and elevation drops towards the coast to the northeast and east.

- 6.4.24 Landscape character and designations are not ‘land uses’ rather they are the result of land use and the component parts of the landscape such as trees, water bodies, and field boundaries that comprise the overall landscape character. The assessment of effects on landscape and the visual amenity is assessed in **Section 6.9: Landscape and visual** and a list of the main visual receptors including recreational routes and tourist / visitor attractions is provided.
- 6.4.25 The following baseline descriptions are provided in the context of the five Land Use and Land Cover categories used in the SNH 2018 Environmental Impact Assessment Handbook i.e.: water; forestry, woodland and trees; agriculture, fields and boundaries; settlements; and, other land uses.
- 6.4.26 The predominant land uses identified within the Scoping Boundary are shown on **Figures 6.4.1a to 6.4.1d in Appendix 1A**.

Settlements

- 6.4.27 Settlements within the Scoping Boundary are predominantly within the Buchan administrative area of Aberdeenshire, which occupies most of the Scoping Boundary. The northern part of the Scoping Boundary includes the eastern extent of the Banff and Buchan administrative area.
- 6.4.28 Coastal settlements in the Scoping Boundary include Sandhaven, Fraserburgh, Inverallochy, St Combs, St Fergus, Peterhead and Boddam, with the towns of Fraserburgh and Peterhead being the largest of these.
- 6.4.29 The Scoping Boundary includes a number of villages present inland. The larger settlements are at Rathen, Strichen and Mintlaw, smaller settlements are present at Tyrie, Memsie, Crimond, St Fergus, Fetterangus, Maud, Longside, New Deer, Stuartfield and Auchnagatt.
- 6.4.30 The draft 2020 Local Plan notes that Fraserburgh serves as a major employment and service centre and “*significant employment and housing land allocations have been made to the north and south of the town, with progress being made on developing the housing sites to the south and southwest*”. Fraserburgh, Peterhead and Mintlaw are identified as having significant allocations for housing.

Agriculture, fields and boundaries

- 6.4.31 All land within the Scoping Boundary is covered by Land Capability for Agricultural (LCA) Classification. This classifies land based on its potential for growing different types of crops or for grazing use, taking into consideration soils, climate and landscape. The LCA grading system (Macauley Institute for Soil Research, 1984) is explained in **Section 6.1: Ground conditions and contamination** and in **Appendix 1B: Glossary** in this section. **Figure 6.1.5: Land capability for agriculture in Appendix 1A** accompanying **Section 6.1 Ground conditions and contamination** shows the LCA classifications within the study area. Prime agricultural land is defined as land capable of supporting arable agriculture, in Classes 1, 2 and 3.1 and details of all the land classes are provided in the Glossary at the end of this section.
- 6.4.32 Most of the land in the Scoping Boundary is shown as Class 3.2, typically improved grassland, and in arable use for growing cereals, such as barley and oats, or potatoes. Production levels on this land are average. Grass leys (i.e. arable land used temporarily for hay or grazing, typically sown with grass and clover, either in use for pasture, or left for a

season or a few years) are common. This is shown on **Figure 6.1.5** in **Appendix 1A** accompanying **Section 6.1: Ground conditions and contamination**.

- 6.4.33 A small percentage of land in the Scoping Boundary is shown as prime agricultural land. This comprises some localised Class 3.1 land and one area of Class 2 land. No Class 1 land is present within the Scoping Boundary. Grades 4.1 to 7 are present within the Scoping Boundary.
- 6.4.34 The Class 2 land is shown covering approximately 4.8ha to the south of Little Dens, in the southeast of the Scoping Boundary 5.5km west of Boddam. Class 3.1 land is present in several areas, typically within much larger areas of Class 3.2 land (see **Figure 6.1.5** in **Appendix 1A** accompanying **Section 6.1: Ground conditions and contamination**). These include areas in the north of the Scoping Boundary at Tyrie and Crimond, and multiple locations in the southern half of the Scoping Boundary. The 1:50,000 scale LCA mapping (Soil Survey of Scotland Staff, 1984-87) was produced in 1987 and does not reflect changes in land use that have taken place since this time, for instance, the land shown as Class 2, and some of the land shown as Class 3.1, has been partially developed, typically with farm buildings / residential properties and roads, and also residential development at the outskirts of Longside. A portion of the former airfield at Crimond is also shown as Class 3.1.
- 6.4.35 Aberdeenshire is known for its livestock sector, and The North East Scotland Agriculture Advisory Group (NESAAG) (Aberdeenshire Council, 2016) information indicates that the profile of agriculture across Aberdeenshire in 2014 comprised: beef cattle 38.5%, cereals 17.4%, pigs 11.9%, sheep 7.9%, potatoes 6.9%, poultry and eggs 6%, dairy 4.6%, intensive crops 41% and oilseed rape 2.7%. In 2014, NESAAG records that farms in Aberdeenshire (199ha – assumed to reflect average farm size) were smaller in size than in Angus (322ha – assumed average) and Moray (277ha – assumed average), however farm size was noted to be increasing, with farmers selling faster than the average for Scotland and the ‘hollowing out’ of farm size occurring, meaning increases in numbers of both large farms and smallholdings. Updated equivalent information has not been available to review.
- 6.4.36 Within the agricultural land areas there is no mapping available showing the areas utilised for game sports; however these activities are likely to take place on a seasonal basis, and in a variety of areas, within the Scoping Boundary.

Forestry, woodland and trees

- 6.4.37 Woodland is present within the Scoping Boundary, comprising a mixture of Ancient Woodland, woodland mapped by the Native Woodland of Scotland Survey (NWSS), which identifies the location, type, extent and condition of all native and nearly native woodlands and plantations on ancient woodland sites (PAWS) - as identified from the Ancient Woodland Inventory), and ‘woodland, forest and other wooded land’ as shown on the Habitat Map of Scotland, which shows data compiled from many different sources, which have all been re-classified into EUNIS, the European Nature Information System.
- 6.4.38 The largest area of Ancient Woodland within the study area is Loudon Wood at Old Deer, and comprises approximately 453ha of woodland located centrally within the Scoping Boundary. Approximately 1,296ha of ancient semi-natural woodland is present in Scoping Boundary.

Water

- 6.4.39 The Scoping Boundary crosses several surface water catchments including the River Ugie Catchment, the River Ythan Catchment and the Buchan Coastal Catchment in the north. The River Ugie Catchment covers most of the Scoping Boundary, the Buchan Coastal

Catchment the north and east of Scoping Boundary, narrowing in the east towards the coast at Peterhead, and the River Ythan Catchment extends across the southwest of the Scoping Boundary. Full details are included in **Section 6.3: Water resources and flood risk** and surface waterbodies are shown on **Figure 6.3.1: WFD surface water bodies** in **Appendix 1A**.

- 6.4.40 Headwaters of the River Ugie Catchment are located near New Deer and Hill of Turlundie, the watercourses flow in an easterly direction into the River Ugie before joining the Ugie Estuary, which enters the North Sea immediately north of Peterhead.
- 6.4.41 The Buchan Coastal Catchment comprises of five watercourses which drain the eastern parts of the Scoping Boundary, before flowing in an easterly direction into the North Sea.
- 6.4.42 The Scoping Boundary is also intersected by the headwaters of the River Ythan Catchment near Nethermuir, located between New Deer and Auchnagatt. The watercourses of this catchment generally flow southwest into the River Ythan before discharging into the Ythan Estuary at Newburgh, 14.5km south of the Scoping Boundary and entering the North Sea.
- 6.4.43 Other surface water features of note within the Scoping Boundary include the Loch of Strathbeg, which is designated as a Special protection Area (SPA), Site of Special Scientific Interest (SSSI) and Ramsar Site. Loch of Strathbeg is designated as being the largest dune slack pool in Britain with an area of 200ha. It is situated within the Buchan Coastal catchment and supports a range of wetland habitats including open water transition fen, fen meadow and alder willow carr.
- 6.4.44 A disused canal is located northwest of Inerugie, roughly following the route of the River Ugie to Ardlaw, however aerial photography indicates that majority of the canal has been infilled.

Other land uses

- 6.4.45 Numerous land uses falling into the category of 'other land uses' as defined in the SNH EIA Handbook are present within the scoping boundary. Most of the Scoping Boundary is rural in character and significant industrial and commercial activity is generally limited to the harbours of Fraserburgh and Peterhead.
- 6.4.46 The harbours at Fraserburgh and Peterhead are highly industrialised, with dry dock and shiplift facilities, and capacity to accommodate commercial cargo ships and tankers in addition to fishing boats, cruise ships and other vessels. Industrial facilities in Fraserburgh and Peterhead provide a range of services to the petrochemical industry, in addition to marine and offshore renewable sectors.
- 6.4.47 Several windfarms are present within the Scoping Boundary, including at St Fergus Moss, Greenwellheads, and Corhill, windfarms are shown on **Figures 6.4.1a to 6.4.1d** in **Appendix 1A**.
- 6.4.48 Military land uses, and airfields are present within the Scoping Boundary including the former Royal Navy Air Station Rattray, aka Crimond Airfield, which is no longer used as an airfield but is still in military use including radio towers. Longside Airfield is also a former World War II military airfield however it is no longer used for military purposes. The Mormond Hill Telecoms Facility is located on the top of Mormond Hill, used historically to communicate with an Royal Air Force (RAF) radar site at Buchan, and now used for commercial radio towers. Notable features are shown on **Figures 6.4.1a to 6.4.1d** in **Appendix 1A**.
- 6.4.49 Current land uses with potential to give rise to land contamination are identified in **Section 6.1: Ground conditions and contamination** as including one active landfill, the St Fergus

gas terminal, Peterhead Power Station, docks, sewage works, substations, various works and manufacturing sites, distilleries, garages and filling stations.

- 6.4.50 There are numerous quarries (former and active) within the Scoping Boundary (see **Figure 6.1.6: Land contamination and landfill** in **Appendix 1A**). Minerals safeguarding and minerals search areas are also present within the Scoping Boundary (also detailed in **Section 6.1: Ground conditions and contamination** and shown on **Figure 6.1.2: Mineral sites** in **Appendix 1A**).
- 6.4.51 Most retail activity within the Scoping Boundary takes place in the larger towns of Fraserburgh and Peterhead.
- 6.4.52 Areas with ecological and geological conservation designations are present within the Scoping Boundary, most are coastal features, other sites inland include Philorth Valley, Rora Moss, Kirkhill Sites of Special Scientific Interest (SSSI). These are detailed in **Section 6.1** (geological designations) and **Section 6.5: Terrestrial ecology and ornithology** (ecological designations) and nature conservation sites are shown on **Figures 6.5.2: Location of European sites** to **6.5.5: Location of Ancient Woodland** in **Appendix 1A**.
- 6.4.53 Open space is mostly within settlements and is set out in the Aberdeenshire Open Space Audit (2010). This identifies land meeting the definition of open space provided by Aberdeenshire Council as follows: *“Any open space which provides, or has the potential to provide, environmental, social and/or economic benefits to communities, whether direct or indirect, within and around urban area. It includes greenspace and hard landscaped areas with a civic function, as well as aquatic open spaces”*.

Future baseline

- 6.4.54 The LDP for Aberdeenshire confirms there are housing allocations, and in many instances employment allocations associated with most of the main settlements in Aberdeenshire. This is likely to result in change of land use from agricultural to settlement, or other land use, such as commercial / industrial, typically at the edges of the coastal towns and villages, and potentially taking place within the Scoping Boundary. As noted above there are significant housing allocations at Fraserburgh and Peterhead, and also inland at Mintlaw, and smaller allocations at other inland settlements within the Scoping Boundary such as Memsie, Inverallochy, St Combs, Rathen, Strichen, Fetterangus, New Deer, Maud, Old Deer, St Fergus and Longside.
- 6.4.55 Aberdeenshire Council information shows several consented windfarms within the Scoping Boundary which are likely to be located mainly within land currently falling in semi-natural landscapes and / or agricultural land, and which will increase the use of land for renewable energy generation.
- 6.4.56 Farming activities are likely to change over time and could change rapidly in the short term due to factors including increasing costs of raw materials such as feed and fertilizers, increased energy costs, and policy changes affecting farming subsidies or land management schemes.
- 6.4.57 Climate change effects will also alter the viability of the land for growing crops. This could result in changes to the type of agriculture carried out or a complete change of land use e.g. to solar farms or woodland or other commercial activity.
- 6.4.58 Aberdeenshire Council has developed a Forestry and Woodlands Strategy. Policy E3.4 of the draft 2020 Local Plan includes a map of Preferred Areas for New Woodland Creation in the Aberdeenshire Forestry and Woodland Strategy to identify where new woodlands could go to maximise benefits and promote integrated land use. This shows a large area within

the Scoping Boundary, which is currently in predominantly agricultural use, covered by woodland.

- 6.4.59 Minerals safeguarding areas and minerals search zones are present within the Scoping Boundary and could be developed in the future for mineral extraction.

Basis for scoping assessment

- 6.4.60 The land use scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: Project Description**.
- 6.4.61 The onshore Project components of relevance for the land use assessment are: landfall(s) where transition jointing bays will be constructed above Mean High Water Springs (MHWS) to house the joints connecting the offshore export cables from the wind farm array and the onshore export cables which will run from the landfall(s) to the onshore substation(s).
- 6.4.62 The overall permanent site footprint, or permanent land take, for the proposed onshore substation(s) is anticipated to be up to 8ha. Outside of the permanent footprint of the buildings / equipment at the substations(s), a wider area will be required for construction equipment, welfare facilities, laydown and storage, and an additional 4ha for temporary works is allowed for this, making a total substations(s) construction area of 12ha (of which 8ha is permanent development). Energy-balancing equipment, if deemed necessary, require an additional 2ha to the proposed onshore substation(s) footprint. Construction works for the onshore substation(s) will include creation of site access, site preparation works, installation of underground services and foundations, construction of the building, installation of electrical equipment, installation of perimeter fencing, and landscaping. This area will be fully reinstated after construction is complete.
- 6.4.63 As defined in **Table 2.4.1 in Chapter 2: Project Description**, the construction corridor width for the onshore export cables will be up to 150m, constructed mainly using open-cut trenching, or Horizontal Directional Drilling (HDD) where necessary to cross sensitive features such as watercourses and roads. Several temporary construction laydown areas and construction compounds will be required along the temporary construction corridor to accommodate construction equipment, materials, and site offices / welfare. Temporary working compounds and potentially HDD offshore exit pits (if trenchless technique is used) will be needed at the landfall(s).
- 6.4.64 On completion of construction, the onshore export cable construction corridor will be reinstated, with the haul road, any soil storage and stock fences removed. Where underground cables are installed, a permanent rights of servitude will be obtained to enable access for inspections and maintenance during operation of the Project. In most instances it will be possible for the existing land use to be reinstated within the area during the operational phase.
- 6.4.65 The lease agreement allows the Project to remain until 2080, which would be the maximum operational lifetime under the terms of the lease. During decommissioning of the Project, it is anticipated that the export cables are likely to be left in-situ onshore to minimise environmental effects associated with removal. The onshore substation(s) will be removed and the sites reinstated. The decommissioning works are likely to be carried out in reverse to the sequence of construction works and will involve similar levels of equipment, however the temporary working area would be significantly reduced as compared to the construction phase due to the export cables being left in-situ.
- 6.4.66 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 6.4.8**.

- 6.4.67 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 6.4.68 A number of embedded measures are proposed to reduce the potential for impacts on land use (see **Table 6.4.7**). These will evolve through the design process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that are proposed to be undertaken to meet existing legislation requirements.
- 6.4.69 There is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 6.4.7 Relevant land use embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-001	Underground cables will be used to connect from the landfall(s) transition joint bay to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the new onshore substation nominated by NETS grid connection point(s). The installation status of which will be assessed on confirmation of a route of the onshore cable routing. Cables are typically installed in ducts in a standard buried trench arrangement.	Construction Environmental Management Plan (CEMP) management plans and planning conditions.
M-003	A crossing schedule of the grid connection crossings will be prepared that includes crossing methodologies, where required, of all roads, rail, core paths, right of ways and watercourses.	CEMP management plans and planning conditions.
M-005	The construction method for the landfall(s) has yet to be determined, and will be specific to the site chosen, its geology, topography and other constraints. Typically either open cut/cut-and-fill construction or trenchless construction (e.g. HDD) will be used. Where it is necessary to cross sensitive features, trenchless construction methods may be used under the cross feature.	CEMP management plans, description of Project and planning conditions.
M-027	At any sensitive features identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects. Where it is necessary to cross sensitive features, such as watercourses, trenchless construction methods, such as HDD will be used to install ducts under the crossed feature, which the cables are then pulled through via entry and exit pits.	CEMP management plans and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-063	A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. The CEMP will be the securing mechanism for many measures.	Planning conditions and CEMP.
M-066	The permanent rights of servitude for the onshore export cable route will be kept to the minimum width needed for safe access for cable maintenance or replacement purposes during operation of the Project.	CEMP management plans and planning conditions.
M-071	During topsoil stripping, machinery with low ground pressure will be used to minimise soil compaction where the soil conditions indicate that compaction is possible. Storage time will be kept to the practicable minimum to prevent the soil deteriorating in quality. Topsoil stripped from different fields will be stored separately, as will soil from hedgerow banks or woodland strips.	CEMP management plans and planning conditions.
M-083	The permanent footprint of the substation(s) and transition jointing bays will be minimised to that required for the safe operation and maintenance of the equipment in order to minimise land take.	CEMP management plans and planning conditions.
M-084	Avoidance of settlement, open space and land used by the community that might be directly affected or severed from the community.	CEMP management plans, description of Project and planning conditions.
M-085	The Project will avoid causing fragmentation of woodland, semi-natural land or sensitive habitats where possible, through the use of existing breaks in land use or use of HDD (or alternative crossing methods) to avoid disturbance of / change to land cover.	CEMP management plans, description of Project and planning conditions.
M-086	Compliance with the Wildlife and Countryside Act 1981 (as amended by the Wildlife and Natural Environment (Scotland) Act 2012) the use of tried and tested onshore invasive species control and biosecurity measures to avoid the spread of infested materials will be applied.	CEMP management plans, description of Project and planning conditions.
M-112	The Project will aim to avoid permanent development on prime agricultural land (Class 1, 2 or 3.1 LCA grades) with the aim of preserving the best quality agricultural land for its future food / biomass production capability where reasonably possible.	CEMP management plans, description of Project and planning conditions.

Likely significant effects

- 6.4.70 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where professional judgment supported by available evidence indicates an effect-receptor pathway will not lead to a significant impact in accordance with the EIA Regulations 2017, the pathway is scoped out from assessment.
- 6.4.71 The likely significant effects on land uses are summarised in **Table 6.4.8**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for land use effects and professional judgement.
- 6.4.72 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by the evidence base.

Table 6.4.8 Likely significant land use effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction					
Temporary change to land use and / or land cover during construction (working corridor / temporary compounds temporarily restricting access to / use of land)	M-005, M-063, M-085, M-112	Temporary loss of land or access to land or severance for farming, forestry or commercial activity	Scoped in.	<ul style="list-style-type: none"> • Agriculture and field boundaries • Woodland and trees • Other land uses 	<p>Constraints plans will be produced and further desk based reviews carried out to inform the assessment and optioneering / design decisions in relation to onshore infrastructure.</p> <p>Site visits for landscape and visual, ecological survey, and ground conditions purposes will be undertaken to inform further assessment.</p>
Temporary change to land use and / or land cover during construction (working corridor / temporary compounds temporarily restricting access to / use of land)	M-005, M-063, M-084, M-085, M-086, M-112	Temporary loss of land or public access to land including open space and other land use used by the community due to construction activity	Scoped in.	<ul style="list-style-type: none"> • Settlements • Open Space • Water • Other land uses (nature conservation) 	<p>Constraints plans will be produced and further desk based review carried out to inform the assessment, based on the Aberdeenshire Open Space Audit.</p> <p>Site visits for landscape and visual, ecological survey, and ground conditions purposes will be undertaken to inform further assessment.</p>

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
					Optioneering / design decisions in relation to onshore infrastructure.
Operation					
Permanent change to land use and / or land cover due to construction of permanent features including the onshore substation(s), and transition joint bays. Original land use cannot be reinstated as a result of the Project.	M-001, M-066, M-083	Land take, change in land cover (from vegetation and soil to hardstanding or engineering materials)	Scoped in.	<ul style="list-style-type: none"> • Settlements • Agriculture, field and boundaries • Woodland and trees • Other land uses including open space and nature conservation areas. 	Constraints plans will be produced and further desk based reviews carried out to inform the assessment. Site visits for landscape and visual, ecological survey, and ground conditions purposes will be undertaken to inform further assessment. Optioneering / design decisions in relation to onshore infrastructure.
Permanent limitation to land use due to rights of servitude required along cable routes during operation.	M-001, M-066	Limiting future land use options on the affected land during operation to maintain access within land subject to servitude e.g., future tree planting not possible, certain commercial	Scoped in.	<ul style="list-style-type: none"> • Agriculture, field and boundaries • Woodland and trees* • Other land uses including open space and nature conservation areas. 	Constraints plans will be produced and further desk based review carried out to inform the assessment. Site visits for landscape and visual, ecological survey, and ground conditions purposes will

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		activities may not be possible		*Effects of the Project on ancient woodland and veteran trees are considered in Section 6.5: Terrestrial ecology and ornithology .	be undertaken to inform further assessment. Optioneering / design decisions in relation to onshore infrastructure.
Effects during decommissioning are assumed to be similar to those during construction, however of smaller scale due to the cables being left in situ and only the substation being decommissioned and removed.					

Impacts scoped out of assessment

- 6.4.73 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed. No impacts are being scoped out at this stage, although this is likely to change as the design matures.

Cumulative effects

- 6.4.74 Cumulative effects on land use resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the cumulative effects assessment screening exercise.
- 6.4.75 The following impacts from Project have been identified as having the potential to act cumulatively with impacts from other developments to contribute to cumulative effects and these will be considered once the cumulative project list is agreed.
- Cumulative adverse effects such as fragmentation of agricultural land or forested land if other linear projects are planned in similar areas.
 - Cumulative adverse effects on future nature conservation schemes (e.g. woodland creation schemes) due to land use limitations within the cable rights of servitude which will form a linear feature of some kms in length.
 - Cumulative permanent loss of land for agricultural, woodland or other use due to hard development / change of land cover.
 - Cumulative effects on recreational routes, requiring multiple diversions / temporary disruption or closure.

Transboundary effects

- 6.4.76 The potential effects from construction, operation and maintenance, and decommissioning on land use receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. No transboundary impacts have been identified due to the relatively localised nature of the potential effects.

Proposed approach to the EIA Report

- 6.4.77 Land use assessment is contributing to the optioneering process and the design evolution. Desk based assessment of the baseline receptors will be complied during this stage and assessment methodologies refined.
- 6.4.78 Consultation will be held with relevant statutory and non-statutory organisations and as part of the Pre-application Consultation process which as set out in **Chapter 4: Approach to Scoping and EIA**. Key aspects that shall be consulted on include:
- Methodology.
 - Baseline data sources and desk based survey methods.
 - Project design and mitigation in relation to specific / 'other' land use, where required.
 - Approach to and scope of site survey for specific areas and alignment / use of survey, material from other aspects.

6.4.79 The following statutory bodies will be consulted prior to completing the assessment:

- Scottish Environment Protection Agency (SEPA).
- Scottish Forestry.
- Aberdeenshire Council.
- NatureScot.

6.4.80 Once the design envelope is confirmed, the assessment will be completed and the likely significant effects will be described. The assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

6.5 Terrestrial ecology and ornithology

Introduction

- 6.5.1 The terrestrial ecology and ornithology assessment will consider the potential likely significant effects on terrestrial and freshwater habitats, and legally protected and notable species that may arise from the construction, operation and maintenance, and decommissioning of the onshore Project elements that are landward of Mean High Water Springs (MHWS). Intertidal ecology and ornithology (defined as the zone between MHWS and Mean Low Water Springs (MLWS)) is covered in **Section 5.5: Benthic, epibenthic and intertidal ecology** and **Section 5.7: Offshore and intertidal ornithology**. This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potentially significant effects to be considered, and how these effects will be assessed for the purpose of the EIA.
- 6.5.2 Terrestrial ecology and ornithology interfaces with other aspects and as such, should be considered alongside these sections; namely:
- **Section 5.2: Marine water and sediment quality:** The terrestrial ecology and ornithology section includes consideration of effects on freshwater fish. Depending on the selected landfall(s), there is potential for this receptor to be affected by changes in marine water and sediment quality if these obstruct fish migration into and through estuaries.
 - **Section 5.5: Benthic, epibenthic and intertidal ecology:** The benthic, subtidal and intertidal ecology assessment will interlink with this Section due to the intersections of habitats up to MHWS.
 - **Section 5.7: Offshore and intertidal ornithology:** The offshore and intertidal ornithology assessment will interlink with terrestrial ecology and ornithology due to the presence of bird species that use both intertidal and offshore habitats.
 - **Section 5.8: Fish and shellfish ecology:** This Section includes fish and shellfish species that spend some of their life cycle within both the aquatic and marine environment. Therefore, there is potential for species to overlap between the onshore and offshore environment. Information from this Section will be used to inform the fish and shellfish ecology section.
 - **Section 6.1: Ground conditions and contamination:** Some designated sites have both ecological and geological aspects to their designation. Therefore, ground conditions and changes to may impact on terrestrial ornithology.
 - **Section 6.2: Air quality:** Due to the potential for emissions and dust associated with the Project to negatively affect habitats, flora and fauna. The air quality section will therefore inform the terrestrial ecology and ornithology assessment.
 - **Section 6.3: Water resources and flood risk:** The terrestrial ecology and ornithology assessment addresses potential impacts on designated sites and reaches significance conclusions. It will be informed by the conclusions of the assessment on the water environment which supports these sites, and if required a specific water quality and/or quantity assessment of water-dependent sites will be undertaken to support the terrestrial ecology assessment.

- **Section 6.4: Land use:** Nature conservation is a type of land use and changes to land use can significantly affect wildlife and biodiversity due to potential overlap between priority habitats such as peatlands and soil type for example.
- **Section 6.7: Onshore noise and vibration:** There is the potential for fauna to be disturbed or displaced by noise and vibration associated with the Project, therefore, the noise and vibration section will be used to inform the terrestrial ecology and ornithology assessment.
- **Section 6.8: Traffic and transport:** There is the potential for vehicle emissions associated with the Project to negatively affect habitats therefore the traffic and transport section will inform the terrestrial ecology and ornithology assessment.
- **Section 6.9: Landscape and visual:** With regard to proposed design for embedded environmental mitigation such as landscape protection and planting schemes (where required), and the assessment of common landscape and visual receptors such as visual effects on nature reserves which are open to the public.
- **Section 7.1: Climate resilience:** The interference with climate resilience with terrestrial ecology and ornithology is captured in the In-Combination Climate Impacts (ICCI) assessment.

Legislation and policy context

- 6.5.3 This Section identifies the relevant legislative and policy context which has informed the scope of the Terrestrial ecology and ornithology assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 6.5.4 In order to provide a robust evidence base, **Table 6.5.1** below presents a summary of legislation and policies of relevance for the Terrestrial ecology and ornithology assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 6.5.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
<p>The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) as transposed into Scottish law by:</p> <ul style="list-style-type: none"> - The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) ("Habitat Regulations"); and - The Conservation of Habitats and Species 	<p>The Habitats Directive and Habitats Regulations offer protection to a network of protected areas for specific habitats and species of importance (known as 'European sites') (e.g. Special Protection Areas (SPA), Special Areas of Conservation (SAC), Ramsar sites etc). The scoping assessment identifies all European sites within the Scoping Boundary or a potential zone of influence. Based on a suite of potential impact pathways, the assessment will identify where there is a risk of a likely significant effect.</p> <p>The four-stage process of determining the absence of adverse effects on European sites under the Habitats</p>

Relevant legislation and policy	Relevance to the assessment
<p>Regulations 2017 which apply in Scotland in relation to certain specific activities (reserved matters), including consents granted under section 36 or section 37 of the Electricity Act 1989.</p> <p>Together known as the Habitats Regulations.</p>	<p>Directives/Regulations is known as a Habitat Regulations Assessment (HRA). Stage 1 of this process is known as HRA Screening. This will be provided separately to the Scoping Report.</p> <p>As part of the EIA assessment, baseline data pertinent to European sites will be collated and the significance of impacts resulting from the Proposed Development on these sites will be considered.</p>
<p>The Nature Conservation (Scotland) Act 2004</p>	<p>Under the Nature Conservation (Scotland) Act 2004, public bodies in Scotland have a duty to further the conservation of biodiversity. Fulfilling the Biodiversity duty will allow wider outcomes to be addressed, such as:</p> <ul style="list-style-type: none"> • “ensuring compliance with the legislation and helping Scotland to meet its nation and international biodiversity targets; • helping Scotland address biodiversity loss and the climate emergency, and contributing to a Green recovery and a Net Zero future; • improving image and demonstrating working in a socially responsible and ethical way by, safeguarding biodiversity and environmental assets for future generations; and • contributing to sustainable development and the quality of life in Scotland” (NatureScot, 2022). <p>The Act offers protection to nature conservation sites, species and habitats which will be identified for consideration within scoping assessment and Ecological Impact Assessment (EclA) and biodiversity will be preserved and promoted through the application of the mitigation hierarchy.</p>
<p>The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)</p>	<ul style="list-style-type: none"> • Animals and plants listed on Schedules 2 and 4 of the Regulations respectively are protected as European Protected Species (EPS). Animals listed on Schedule 3 of the Regulations are protected against certain methods of capture or killing. • In relation to protected species of animal, licences can be issued under Regulation 44 to permit, for specific purposes, certain actions that would otherwise be against the law. NatureScot is responsible for all EPS licensing under the Habitats Regulations, with the exception of some areas of licensing for whales and dolphins, for which Marine Scotland is responsible.
<p>The Wildlife & Countryside Act 1981 (as amended)</p>	<ul style="list-style-type: none"> • The Wildlife and Countryside Act 1981 (as amended) gives protection to specific birds, animals and plants. • All wild birds are given protection under the Act. Specially protected birds are listed on Schedule 1, A1 and 1A of the 1981 Act. Protected animals are listed on Schedule 5 of the 1981 Act. • In relation to protected species of animal, licences can be issued under Section 16(3) of the 1981 Act to permit,

Relevant legislation and policy	Relevance to the assessment
	for specific purposes, certain actions that would otherwise be against the law.
The Wildlife and Natural Environment (Scotland) Act 2011 (as amended) (WANE Act)	<ul style="list-style-type: none"> This Act amends existing legislation in relation the protection of wildlife, biodiversity and nature conservation. Following its introduction, NatureScot is now responsible for all wildlife licensing in Scotland. This is with the exception of licensing for seals and some areas of licensing for whales and dolphins, for which Marine Scotland is responsible.
Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003	<ul style="list-style-type: none"> The 2003 Act consolidated the vast majority of the Scottish salmon and freshwater fisheries law into a single Act. The 2003 Act is the key governing legislation for Scotland's district salmon fishery boards, and it sets out the provisions for the constitution, composition and financing of the boards and general powers relating to enforcement of salmon and freshwater fisheries law.
The Protection of Badgers Act 1992 (as amended by the Nature Conservation (Scotland) Act 2004)	<ul style="list-style-type: none"> The Protection of Badgers Act 1992 protects badgers and their setts. It has been amended by the Nature Conservation (Scotland) Act 2004. Licences can be issued under Section 10 of the 1992 Act to permit, for specific purposes, certain actions that would otherwise be against the law.
The Electricity Act, 1989	<ul style="list-style-type: none"> Schedule 9 of the Electricity Act outlines duties with respect to flora, fauna, fish and fisheries. The Act sets out a duty in respect of Scotland, to conserve flora and fauna and to do what can be done to mitigate effects. There is also a duty to avoid as far as possible causing injuries to the stock of fish in any waters.

National Policy

Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crises Policy 3: Biodiversity Policy 4: Natural Places Policy 6: Forestry, Woodland and Trees Policy 9: Brownfield, Vacant and Derelict Land and Empty Buildings Policy 20: Blue and Green Infrastructure
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Recognition of the presence of numerous internationally and nationally important habitats and species with a diverse network of protected sites, concentrated particularly in the north and west of Scotland, along coasts, estuaries and upland areas. Acknowledgement that biodiversity is not just confined to our rural areas. It states that our built environment, key infrastructure corridors and the greenspaces within our cities and towns also provide important habitats, and

Relevant legislation and policy	Relevance to the assessment
	<p>together contribute to a wider national ecological network.</p> <p>Within the assessment, the precautionary principle will be applied in respect to important ecological features including protected sites, habitats and species and potential adverse impacts will be minimised through careful planning and design, and opportunities for ecological enhancement and delivery of biodiversity net gain will also be considered.</p>
<p>Scottish Planning Policy (2014)</p> <ul style="list-style-type: none"> - Paragraph 169 - Paragraph 193 – 199 - Paragraph 203 - Paragraph 214 - Paragraph 216 - Paragraph 225 - Paragraph 230 	<ul style="list-style-type: none"> • The SPP discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology. • Key policy principles within the SPP relating to the natural environment include conserving and enhancing protected sites and species; protecting and enhancing ancient semi-natural woodland as an important and irreplaceable resource, together with other native or long-established woods, hedgerows and individual trees with high nature conservation or landscape value; and seeking benefits for biodiversity from new development where possible, including the restoration of degraded habitats and the avoidance of further fragmentation or isolation of habitats.
<p>National Policy Statement EN-3 2011</p> <ul style="list-style-type: none"> - Paragraph 2.4.2 	<p>Criteria for “<i>good design</i>” for energy infrastructure’ states that proposals for renewable energy infrastructure and should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.</p>
<p>Scottish Government (2013). The Scottish Biodiversity List (SBL)</p>	<p>The Scottish Biodiversity List is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The spreadsheet containing the Scottish Biodiversity List identifies broad categories of action, together with information on the selection criteria which have been met.</p> <p>The assessment will identify the presence or potential presence of any priority habitats and species (as listed in the SBL) and will consider whether these features are likely to be sensitive to</p>

Relevant legislation and policy	Relevance to the assessment
	impact pathways associated with the Project. Where sensitivities are identified, suitable mitigation measures will be proposed.
Marine Policy	
No policy is of specific relevance to this onshore area of technical assessment.	
Local Planning Policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • Policy E1 Natural Heritage • Policy E3 Forestry and Woodland • Policy PR1 Protecting Importance Resources <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses</p>
Aberdeenshire Council Natural Heritage Strategy 2019-2022 <ul style="list-style-type: none"> - Aim 1 – Protection of Natural Heritage; - Aim 2 – Enhancement of Natural Heritage; and - Aim 3 – Promotion of Natural Heritage 	<p>This Strategy is primarily an Aberdeenshire Council working document to help manage and deliver national and local priorities in relation to the natural heritage within the region. The aims of Aberdeenshire Council's Natural Heritage Strategy are of relevance to this area of technical assessment and align with the policies of the Aberdeenshire LDP 2023 above.</p>
North East Local Biodiversity Action Plan (NELBAP)	<p>The NELBAP is a locally driven process developed to meet the requirements of the UK and EU Biodiversity Action Plans and ultimately the Convention on Biological Diversity 1992. The NELBAP provides a strategy for halt the decline in biodiversity within Aberdeenshire. This includes the development of species action plans for local priority species. The action plan works at a local level to conserve and enhance national priorities identified in the UK BAP. Through the NELBAP, the North East Scotland Biological Records Centre (NESBReC) was setup in order to collect, store, manage and disseminate biological data for organisations and groups including local authorities.</p> <p>The assessment includes an ecological data search from NESBReC, which includes all protected and notable species records and non-statutory designated sites. Identified features will be taken through and scoped in or out of further assessment based on potential sensitivities to the Project. Opportunities for ecological enhancement and delivery of biodiversity net gain pertinent to these species and habitats will also be considered.</p>

Technical guidance

6.5.5 Technical guidance that has been used to define the assessment is set out in **Table 6.5.2** below.

Table 6.5.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.	Industry guidance for EclA.
SEPA (2008). Engineering in the water environment good practice guide: construction of river crossings;	Industry guidance for the water environment
SEPA (2017). LUPS-GU4 Land Use Planning System SEPA Guidance Note 4;	
SEPA (2017). LUPS-GU31 Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3;	
CIRIA C648 (2006), Control of water pollution from linear construction projects.	
Scottish Natural Heritage., Natural England, Natural Resource Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd., University of Exeter, Bat Conservation Trust. (2019). Bats and Onshore Wind Turbines: Survey, Assessment and mitigation.	Industry guidance relating to bat survey, assessment and mitigation.
Aberdeenshire Council Planning advice: Number 1/2015 – Protected Species Surveys.	Local authority planning advice for developers from Aberdeenshire Council with respect to nature conservation interest.
Aberdeenshire Council Planning advice: Number 4/ 2015 – Biodiversity & Development.	
Aberdeenshire Council Planning advice: Number 5/2015 – Opportunities for biodiversity enhancement in new development.	
Aberdeenshire Council Planning advice: Number 6/2015 – Baseline Ecological Survey.	
Aberdeenshire Council Planning advice: Number 7/2015 – Bats and Development.	

Study area

6.5.6 The study area for the terrestrial ecology and ornithology assessment encompasses the land above MHWS, which comprises the area over which all desk-based and field data will be gathered to inform the terrestrial ecology and nature conservation scoping assessment presented in this Section. It should be noted that **Section 5.5: Benthic, epibenthic and**

intertidal ecology and **Section 5.7: Offshore and intertidal ornithology** both provide coverage for the ‘intertidal’ zone of the Study area between MLWS and MHWS for ecological and ornithological features utilising these habitats. Associated effects will be considered for these features within this zone in these respective chapters. Due to the presence of multiple ecological features⁴ and many potential effects, the level and type of data collection varies across the study area. The ‘study area’ comprises:

- all land within the Scoping Boundary⁵ (as shown on **Figure 6.5.1: Land within the Scoping Boundary** in **Appendix 1A**);
- the desk study areas (known as ‘areas of search’) for sites designated for their nature conservation interest at the international, European, national and local levels;
- the area of search for legally protected and notable ecological features; and
- the area of search for any legally controlled species.

6.5.7 The extent of the areas of search were determined based on best practice guidance (See **Table 6.5.6**) and a high level overview of the types of ecological features present, and the potential effects that could occur. The study area was defined on a precautionary basis to ensure that the Zones of Influence (ZOI) relevant to all ecological features (as detailed in **Table 6.5.6** and **Table 6.5.7**) were covered during baseline data collection activities. ZOIs are the areas within which a potentially significant effect associated with the Project may be identified for a particular ecological feature.

6.5.8 The study area and a future field survey area will be reviewed and amended in response to such matters as refinement of the onshore components, the identification of additional impact pathways and where appropriate in response to feedback from consultation, to ensure that there is sufficient data on which to conduct the assessment. These refinements are expected to reduce the extent of the study area as the Project progresses, whilst still reflecting recognised good practice.

Consultation

6.5.9 This Section has been informed by engagement and discussion with various stakeholders. **Table 6.5.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

⁴ ‘Ecological feature’ is used within Ecological Impact Assessment (EcIA) published by the Chartered Institute of Ecology and Environmental Management (2018) in place of the term ‘terrestrial ecology receptor’. The term ecological feature is used throughout this section.

⁵ The term Scoping Boundary in this Section refers to onshore elements of the Project only. This is defined as all habitats above mean high water springs (MHWS).

Table 6.5.3 Consultation

Consultee	Comments and considerations	How this is accounted for
NatureScot (09/09/22)	European sites including Loch of Strathbeg SPA/Ramsar and their qualifying interest features will require consideration as part of the EclA and HRA Screening assessments. Background and rationale behind the survey work in the EIA scoping report should be provided, particularly if there is any deviation from published guidance.	Baseline winter field surveys for over-wintering geese (with a primary focus on the wintering population of pink-footed geese) are being undertaken (September – April) across potential functionally linked within the Scoping Boundary. Rationale and methodology for over-wintering geese baseline surveys is provided in Appendix 6.5A .
RSPB (27/10/22)	Request to see the year 1 data following completion of over-wintering geese surveys.	Confirmation that baseline data from the current Autumn/winter geese surveys would be provided to RSPB on completion. Data would also be reviewed in order to inform the optioneering process and the requirement for further potential survey in 2023/24.
SEPA (15/09/22)	No comments provided at this stage.	

Assessment methodology

Introduction – scoping assessment

- 6.5.10 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this terrestrial ecology and ornithology section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the terrestrial ecology and ornithology assessment.
- 6.5.11 The starting point for defining the scope of the terrestrial ecology and ornithology assessment was to use the baseline data collected through the desk study (see **paragraphs 6.5.38 to 6.5.45**) to determine which of the identified ecological features are ‘important’. Following CIEEM guidance (2018, updated 2022), the importance of each ecological feature was determined using a geographic scale⁶ (see **Table 6.5.4**). The importance of the ecological features has been described in relation to UK legislation and policy and with regard to the extent of habitat or size of population that may be significantly affected by the Project.
- 6.5.12 As the importance of ecological features is determined with regard to the extent of habitat or size of population that may be affected by the Project, the level of importance can differ from that which would be conferred by legislative protection or identification as a conservation notable species and from one development to another. For example, water vole is important at a national level because it is a Scottish Biodiversity List (SBL) species and has experienced a population decline of more than 25% in the last 25 years. However,

⁶ Where this was not possible due to the level of baseline information currently available the highest relevant level of importance is assumed to ensure no ecological features are scoped out of future assessment when not appropriate.

a small population that could be affected by a development would be assessed as being of less than national importance if there is alternative well-connected and suitable habitat nearby that has the capacity to support individuals that may be displaced.

- 6.5.13 Wherever possible, information regarding the extent and population size, population trends and distribution of the ecological features has been used to inform the categorisation and determine importance at the project level. Where detailed criteria or contextual data were not available at this stage of the Project, professional judgement was used to determine the level of importance.

Table 6.5.4 Defining importance of ecological features

Geographic context of importance	Example / description
International or European	<ol style="list-style-type: none"> 1. European sites including SACs, candidate SACs and Sites of Community Importance (SCI), Special Protection Areas (SPAs), potential SPAs (pSPA) and possible SACs (pSACs) should also be considered in the same manner in accordance with National Planning Policy. 2. Areas of habitat or populations of species which meet the published selection criteria based on discussions with NatureScot and field data collected to inform the EcIA for designation as a European site or Ramsar site, but which are not themselves currently designated at this level.
National	<ol style="list-style-type: none"> 1. A nationally designated site including Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs). 2. Areas (and the populations of species which inhabit them) which meet the published selection criteria guidelines for selection of biological SSSIs, but which are not themselves designated based on field data collected, and in agreement with NatureScot. 3. Scottish Biodiversity List (SBL) habitats and species, and legally protected species that are not addressed directly in Part 2 of the “<i>Guidelines for Selection of Biological SSSIs</i>”, but can be determined to be of national importance using the principles described in Part 1 of the guidance. 4. Large areas of priority habitats listed on Annex 1 of the Habitats Directive and smaller areas that are essential to maintain the viability of that ecological resource. 5. Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory (AWI).
Regional	<ol style="list-style-type: none"> 1. Regionally occurring populations of SBL species will be considered to be of regional importance in the context of published information on population size and distribution. 2. Large areas of modified or degraded priority habitats, which are important in a regional context.
Council area/District	<ol style="list-style-type: none"> 1. Local Nature Reserves and Non-statutory designated sites (i.e. Local Nature Conservation Sites – LNCSS in Aberdeenshire). 2. Areas which, based on field data collected to inform the EcIA, meet the published selection criteria for those sites listed above (for habitats or species, including those listed in relevant Local Biodiversity Action Plans) but which are not themselves designated.

Geographic context of importance	Example / description
Local	<ol style="list-style-type: none"> 1. SBL habitats and species and legally protected species that based on their extent, population size, quality etc are determined to be at a lesser level of importance than the geographic contexts above. 2. Common and widespread semi-natural habitats occurring in proportions greater than may be expected in the local context. 3. Common and widespread native species occurring in numbers greater than may be expected in the local context.
Negligible	<ol style="list-style-type: none"> 1. Common and widespread semi-natural habitats and species that do not occur in levels elevated above those of the surrounding area. 2. Areas of heavily modified or managed land uses (e.g. hard standing used for car parking, as roads etc.)

6.5.14 Where protected species are present and there is the potential for a breach of the legislation, those species should always be considered as 'important' features. With the exception of such species receiving specific legal protection, or those subject to legal control (e.g. invasive species), all ecological features that were determined to be of negligible importance are scoped out of the assessment at this stage. This approach is consistent with that described in CIEEM (2018).

6.5.15 Legally protected species and ecological features that are of sufficient importance that effects upon them from the Project could be significant, were then taken through to the next stage of the scoping assessment. Through an understanding of the activities associated with the Project and the resulting environmental change, it is possible to identify ecological features that may be subject to potentially significant effects. In order to identify such ecological features, all the activities and consequent environmental changes associated with the construction, operation and decommissioning of the Project have been considered. Given the ongoing design process, at this stage of the Project the environmental changes have been considered in broad categories only. Wherever there is uncertainty as to the potential level of effect or the occurrence of a particular ecological feature, a precautionary approach has been taken.

Spatial scope

6.5.16 Key to establishing a potentially significant effect is the determination of a ZOI for each ecological feature (in other words the area within which a significant effect on an ecological feature may occur as a result of the Project). ZOIs differ depending on the type of environmental change (in other words the change from the existing baseline) as a result of the Project, and the ecological feature being considered.

6.5.17 The construction, operation and maintenance, and decommissioning phases of the Project may result in the following broad environmental changes:

- permanent or temporary land take / land cover change (resulting in habitat loss or degradation and/or loss of fauna);
- fragmentation of habitats (resulting in a reduction in connectivity);
- increased noise and vibration (resulting in disturbance / displacement);
- increased light levels (resulting in disturbance / displacement);

- changes in hydrology (ground water levels and surface water run-off rates resulting in habitat change);
- pollution events to water sources, soil and groundwater contamination (including the liberation of dust, sediments and chemicals resulting in loss or degradation of fauna and flora);
- emissions events⁷ (changes in concentrations and deposition rates of nitrogen resulting in habitat degradation); and
- introduction of invasive non-native species (resulting in habitat degradation).

6.5.18 The most straightforward ZOI to define is the area affected by land-take and direct land-cover changes associated with the Project. This ZOI is the same for all affected ecological features. By contrast, for each environmental change that can extend beyond the area affected by land-take and land-cover change (for example noise created by construction and decommissioning), the ZOI may vary between ecological features, dependent upon their sensitivity to the change and the precise nature of the change. For example, a dormouse might only be disturbed by noise generated very close to its nest, whilst nesting lapwing might be disturbed by noise generated at a much greater distance; other species (for example many invertebrates) may be unaffected by changes in noise. In view of these complexities, the definition of the ZOI that extends beyond the land-take area is based upon professional judgement informed, as far as possible, by a review of published evidence (see **Table 6.5.6** and **Table 6.5.7**).

6.5.19 It should be noted that the avoidance of potential effects through design are implicitly taken into account through the consideration of each ZOI. Furthermore, when scoping in or out ecological features from further assessment, embedded environmental measures (see **Table 6.5.7**) associated with good practice have been taken into account (for example dust suppression, appropriately scheduled vegetation removal etc.).

Introduction – Future Assessment

6.5.20 The assessment methodology within the EIA Report will be aligned with the standard industry guidance provided by CIEEM (2018) and informed by the general approach described in **Chapter 4: Approach to Scoping and EIA, Section 4.4**. The assessment will be based not only upon the results of the desk study and field surveys, but also relevant published information (for example on the status, distribution, sensitivity to environmental changes and ecology of the features scoped into the assessment, where this information is available), technical engagement with NatureScot and others, and professional knowledge of ecological processes and functions.

6.5.21 For each scoped-in ecological feature (see **Table 6.5.8**) - Likely terrestrial ecology and nature conservation effects), effects will be assessed against the baseline conditions for that feature during construction, operation and maintenance. Throughout the assessment process, findings about likely significant effects will be used to inform the definition of requirements for additional baseline data gathering and the identification of environmental measures to avoid or reduce adverse effects or to deliver enhancements.

6.5.22 The spatial extent of the assessment of each likely significant effect (see **Table 6.5.8**) will reflect the area occupied by the ecological feature that is being assessed and the ZOI of the changes that are likely to affect it. Where part of a designated biodiversity site is located within the ecological feature's ZOI relating to a particular biophysical change as a result of the Project, an assessment will be made of the effects on the designated site as a whole. A similar approach will be taken for areas of important habitat. For species that occur within

⁷Emissions are considered with regards to European sites and SSSIs only.

the ZOI, the assessment will consider the total area that is used by the affected individuals or the local population of the species (for example for foraging or as breeding territories).

- 6.5.23 The temporal scope of the terrestrial ecology and ornithology assessment will be consistent with the period over which the Project will be carried out and therefore covers the construction and operational periods (construction considered to be 2-3 years (for the onshore infrastructure), with operation being a minimum of 35 years. The decommissioning works are likely to be carried out in reverse to the sequence of construction works over a similar time period to construction.

Significance evaluation methodology

- 6.5.24 CIEEM (2018) defines a significant effect as one “*that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general*”.
- 6.5.25 The term “*potentially significant effects*” is used to describe effects that have the potential to be significant prior to their assessment (i.e. until the end of the “*scope of the assessment*”), and the term “*likely significant effects*”, only once assessment has determined that they would indeed be significant.
- 6.5.26 When considering likely significant effects on ecological features, whether these are negative or positive, the following characteristics of environmental change will be taken into account:
- extent – the spatial or geographical area and sensitivities over which the environmental change may occur;
 - magnitude – the size, amount, intensity or volume of the environmental change;
 - duration – the length of time over which the environmental change may occur;
 - frequency – the number of times an environmental change may occur;
 - timing – the periods of the day / year / season during which an environmental change may occur; and
 - reversibility – whether the environmental change can be reversed through restoration actions or regeneration.
- 6.5.27 Although the characteristics described above are all important in assessing effects, a scale of the environmental change as a result of the Project will also be used (following CIEEM, (2018)), as described in **Table 6.5.5**, to provide a contextual understanding of the relative change from the baseline position.

Table 6.5.5 Guidelines for the assessment of the scale of magnitude

Scale of change	Criteria and resultant effect
High	The change permanently (or over the long-term) affects the conservation status of a habitat/species, reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area e.g. Natural Heritage Zone (NHZ) and relative to the wider habitat resource/species population, a large area of habitat or large proportion of the wider species population is affected (e.g. $\geq 50\%$ of population/habitat affected). For designated sites, integrity is compromised. There may be a change in the level of importance of the receptor in the context of the Project ZOI.
Medium	The change permanently (or over the long-term) affects the conservation status of a habitat/species reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area and relative to the wider habitat resource/ species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected (e.g. 10-49 % of population/habitat affected). There may be a change in the level of importance of this receptor in the context of the Project ZOI.
Low	The quality or extent of designated sites or habitats or the sizes of species' populations experience some small-scale reduction or increase. These changes are likely to be within the range of natural variability (e.g. 1-9 % of population/habitat affected). and they are not expected to result in any permanent change in the conservation status of the species/habitat or integrity of the designated site. The change is unlikely to modify the evaluation of the receptor in terms of its importance in the context of the Project ZOI.
Negligible	Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of species populations, means that they would experience little or no change. Any changes are also likely to be within the range of natural variability and there would be no short-term or long-term change to conservation status of habitats/species receptors or the integrity of designated sites.

Negative effects

- 6.5.28 A negative effect is assessed as being significant if the favourable conservation status of an ecological feature would be compromised or lost as a result of the Project. Conservation status is defined in CIEEM (2018) as follows:
- *'habitats - conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area'; and*
 - *'species - conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area'.*
- 6.5.29 The decision as to whether the conservation status of an ecological feature has been compromised will be made using professional judgement, drawing upon the results of the assessment of how each feature is likely to be affected by the Project.
- 6.5.30 A similar procedure will be used where designated sites may be affected by the Project, except the focus will be on the effects on the integrity of each site; defined as: 'the coherence of its ecological structure and function, across its whole area, that enables it to

sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified’.

- 6.5.31 The assessment of effects on integrity will draw upon the assessment of effects on the conservation status of the features for which the site has been designated.

Positive effects

- 6.5.32 A development may result in positive effects where there is a resulting change from baseline that improves the quality of the environment (for example increases species diversity or increases the extent of a particular habitat), or halts or slows down an existing decline. For a positive effect to be considered significant, the level of importance of an ecological feature determined at the baseline state would need to increase by one or more geographical levels (for example where an ecological feature of local importance becomes of Council area importance following delivery of the Project).
- 6.5.33 In light of the Approved NPF4 2023, opportunities will be sought to implement proposals which are nature-positive through provision of significant enhancement, including nature based solutions, nature networks and local community benefits (of biodiversity and nature networks). The Applicant will ensure that adverse impacts, including cumulative impacts, of development proposals on the natural environment will be minimised through careful planning and design, and measures identified to enhance biodiversity in proportion to the opportunities available and the scale of the development.

Baseline conditions

Data sources – desk study

- 6.5.34 A data gathering exercise was undertaken to obtain existing information relating to relevant statutory and non-statutory biodiversity sites, habitats and species of principal importance, legally protected and controlled species and other notable species that have been recorded over the previous 10 years (2012 – 2022). **Table 6.5.6** lists the data compiled within the study area.

Table 6.5.6 Key sources of terrestrial ecology and ornithology data

Ecological feature	Example / definition	Source	Coverage of study area
Statutory sites designated under international conventions or European Directives	SCI, SAC, candidate SAC (cSAC), SPA, proposed pSPA, Ramsar sites and proposed Ramsar sites	NatureScot Sitelink https://sitelink.nature.scot/home	SPAs, proposed SPAs, Ramsar sites and proposed Ramsar sites searched for within a 20km buffer of the onshore element of the Scoping Boundary reflecting the upper foraging distances of pink-footed geese during the winter season (SNH, 2016b – Assessing connectivity with special protection areas). These species being identified as the species with the largest foraging distances for terrestrial habitats for any SPA features within the wider area.

Ecological feature	Example / definition	Source	Coverage of study area
	Winter goose count data for Loch of Strathbeg will be obtained	Royal Society for Protection of Birds (RSPB)	SACs and possible ⁸ SACs searched for inside and within a 5km buffer of the onshore element of the Scoping Boundary. Partial coverage of study area.
Statutory sites designated under national legislation	SSSIs, NNRs and Local Nature Reserves (LNRs)	NatureScot Sitelink	SSSIs and NNRs searched for inside and within 5km of the Scoping Boundary following precedent for other large infrastructure projects and LNRs within 1km reflecting the purpose of their designation.
Locally designated sites	In Aberdeenshire these are termed as LNCS	North East Scotland Biodiversity Record Centre (NESBReC)	LNCSs searched for within the Scoping Boundary.
Scottish Biodiversity List (SBL); Red listed species; and Legally protected species.	Flora, fauna and habitats of principal importance for the conservation of biodiversity in Scotland. Species recorded on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species and/or local Red Lists for the UK or relevant sub-units (e.g. regions or counties) and legally protected habitats and non-avian species. These include those listed on Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended in Scotland) and those included on Schedules 2 and 5 of the Habitats Regulations. Badgers are protected under the Protection of Badgers Act 1992.	NESBReC British Trust for Ornithology (BTO) Scottish Ornithologists' Club (SOC)/County/Local Bird Recorders North East Raptor Study Group (NERSG) Ugie District Salmon Fisheries Board	SBL, Red-listed species and legally protected species have been searched for inside the Scoping Boundary unless otherwise specified. Summary Wetland Bird Survey (WeBS) data available from the BTO will be obtained for all count sectors within the Scoping Boundary or within 1km of it at the closest point. All data for identified protected or notable species will be obtained from available online or published literature including annual reports, or liaison with fisheries boards.

⁸ Sitelink identifies possible SACs as a category, as opposed to candidate SACs. Possible SACs are sites that have been identified but have not been submitted to the European Commission for designation (cSACs are the same except they have been submitted but are not yet designated). There are no candidate SACs currently for the UK – possible SACs were included to ensure completeness.

Ecological feature	Example / definition	Source	Coverage of study area
Legally controlled species	Legally controlled species include those listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended in Scotland).	NESBReC	Legally controlled species searched for within the Scoping Boundary.
Bat roosting locations	Bat roost locations are considered separately from other species records in accordance with guidance.	-	Bat records have been provided by NESBReC within the Scoping Boundary, however roosting locations will be searched for following further optioneering and refinement of the onshore infrastructure proposals.

Future data sources – field survey

- 6.5.35 Field surveys are proposed to take place between September 2022 and 2023 to inform the next phases of the Project. The proposed field survey programme outlined in **Table 6.5.7** is based on the results of the desk study, industry guidance and discussions with NatureScot and RSPB. The scope of future field surveys are still to be determined following further optioneering, but all surveys will be undertaken in the appropriate season. Further engagement with NatureScot and RSPB regarding the field survey programme will take place as it progresses.
- 6.5.36 The areas that will be the focus of survey will not encompass the whole Scoping Boundary. This is because as the design evolves the ZOIs will become refined allowing for a more targeted survey programme to take place to inform future assessment. In relation to the ongoing winter geese survey programme, review of the baseline data following completion of surveys in April will be used to inform the optioneering process and any requirements for a second year of surveys.

Table 6.5.7 Field survey programme

Survey	Summary	Coverage of study area
Extended Phase 1 Habitat/ UK Habitat Classification Survey (UKHABS)	An Extended Phase 1 Habitat Survey/ (UKHABS) will be used to provide general information on each habitat within the study area (as it becomes refined as cable corridor, substation and landfall options become more defined). Surveys will follow the methods described in the Biodiversity Metric 3.1 (BNG Metric), where distinct habitats are identified and assigned a condition.	Surveys will focus on areas where direct land take may occur and within 50m of this. The extent of the survey area will reduce as cable corridor, substation and landfall options become more defined.
National Vegetation Classification	The NVC survey will help identify and map the vegetation communities present within the	The extent of the survey area will reduce as cable corridor, substation and landfall options

Survey	Summary	Coverage of study area
(NVC) Surveys	Scoping Boundary in order to identify those areas of greatest ecological interest (i.e. Annex I habitats; potential Groundwater Dependent Terrestrial Ecosystems (GWDTE), and Scottish Biodiversity List (SBL) priority habitats).	and locations become more defined. NVC surveys will be undertaken where the presence of Annex 1 habitat types or potential GWDTEs have been identified, following completion of desk study and UKHABS survey. Surveys will be undertaken within 250m of proposed works areas.
Otter (<i>Lutra</i> surveys)	Otter surveys, looking for signs of activity and resting places, will take place using techniques described by Chanin in “ <i>Monitoring the Otter</i> ” (2003).	The extent of the survey area will reduce as cable corridor, substation and landfall options and locations become more defined. Surveys will take place in areas where direct land take may occur and within 50m of suitable wetland habitats. Wider search areas (up to 250m upstream and downstream) will take place on large rivers and streams with potential for otter that will be crossed and directly affected by the cable installation, substation or landfall(s).
Water vole (<i>Arvicola</i> surveys)	Water vole surveys, looking for signs of activity, places, will take place using techniques described in the “ <i>Water Vole Mitigation Handbook</i> ” (Dean <i>et al.</i> 2016).	The extent of the survey area will reduce as cable corridor, substation and landfall options and locations become more defined. Surveys will take place in areas where direct land take may occur and within 50m of a waterbody or watercourse. Wider search areas (up to 250m upstream and downstream) will take place on large rivers, streams and ditches with potential for water vole that will be crossed and directly affected by the cable installation, substation or landfall(s).
Badger (<i>Meles</i> surveys)	Badger surveys, informed by good practice guidelines by Scottish Badgers (2018), will focus on identifying signs of activity and places of shelter (setts).	The extent of the survey area will reduce as cable corridor, substation and landfall(s) options and locations become more defined. Surveys will focus on areas where direct land take or disturbance relating to the cable installation, substation or landfall(s) may occur and within 50m of this.
Bat surveys	A habitat assessment will be undertaken alongside the	The extent of the survey area will reduce as cable corridor,

Survey	Summary	Coverage of study area
	Extended Phase 1 Habitat survey/UKHABS survey walkover to observe, assess and record any habitats suitable for bats to commute and forage. Any areas with high bat potential within 250m of the site boundary will be investigated in order to identify potentially important roost sites. If any potential roosts are identified, these may need to be subject to internal roost surveys and/or external emergence surveys. Any survey effort will adhere to Bat Conservation Trust (BCT) (2016) and Bats and Onshore Wind Turbines: Surveys, Assessment and Mitigation (NatureScot, 2019).	substation and landfall options and locations become more defined. Surveys will focus on areas where direct land take may occur or disturbance relating to the cable installation, substation or landfall(s) and within 250m of this.
Freshwater fish Freshwater invertebrates (inc. Freshwater pearl mussel)	Requirements for fisheries and freshwater invertebrates surveys will be scoped by a Scottish Fisheries Co-Ordination Centre (SFCC) accredited surveyor in order to identify the suitability of watercourses within the Scoping Boundary to support potential fisheries interest/risks (e.g. including salmon, lamprey, trout, fresh water pearl mussel etc.)	The extent of the survey area will reduce as cable corridor, substation and landfall options and locations become more defined. Survey scope will be determined following further desk study, optioneering and consultation with NatureScot and the Ugie District Salmon Fishery Board as necessary.
Schedule 1 breeding bird surveys	Breeding bird surveys will be targeted on particular habitats and species identified during the desk study that could be subject to disturbance due to construction works.	The extent of the survey area will reduce as cable corridor, substation and landfall options and locations become more defined. Habitats with the potential to support schedule 1 birds outside of the proposed working areas, but within 500m of it.
Wintering bird surveys (Pink-footed goose)	In light of the current optioneering process, which is still progressing, there is potential for works associated with potential landfall options and associated onshore cable route corridors to impact pink-footed geese (and potentially other geese and swans) associated with the Loch of Stathbeg SPA/Ramsar, which are known to utilise farmland within the wider environs of the SPA/Ramsar. Consequently, there is a requirement to	Distribution surveys will focus on land identified as 'functionally linked' within the Scoping Boundary i.e. where SPA species utilise non-designated habitats within the wider vicinity of the European site.

Survey	Summary	Coverage of study area
	<p>undertake a programme of onshore ornithological surveys during the non-breeding season in order to understand the distribution and likely sensitivity associated with any future proposals.</p> <p>A Survey Method and Rationale for the winter geese surveys is presented in Appendix 6.5A.</p>	

Baseline – site context and surrounding habitats

- 6.5.37 Lowland farmland comprises the majority of the landscape within the Scoping Boundary and the wider Aberdeenshire area. These agricultural areas include a mix of broadleaved and conifer woodlands and small river valleys. There are discrete parcels of moorland or raised bog within the Scoping Boundary, but no extensive or contiguous areas, which are found further to the west towards the Grampians. The coast shows a wide variety in landform, from rocky cliffs and sheltered coves to extensive beaches and broad dynamic duneland that runs along sections of the eastern shore.

Baseline – statutory designated sites

- 6.5.38 **Figure 6.5.2: Location of European sites** in **Appendix 1A** illustrates the locations of the sites designated through international convention and European directives, whilst **Figure 6.5.3: Location of national nature conservations sites (SSSIs and LNRs)** in **Appendix 1A** shows the locations of sites designated via national legislation. **Table 6.5.8** provides summary details of the designations.

Table 6.5.8 Details of statutorily designated sites

Site name	Designated feature summary	Distance and direction from Scoping Boundary
Loch of Strathbeg SPA	<p><u>Qualifying Species:</u></p> <ul style="list-style-type: none"> • Barnacle goose (<i>Branta leucopsis</i>); • Greylag goose (<i>Anser anser</i>); • Pink-footed goose (<i>Anser brachyrhynchus</i>); • Sandwich tern (<i>Sterna sandvicensis</i>); • Teal (<i>Anas crecca</i>); • Whooper swan (<i>Cygnus cygnus</i>); • Goldeneye (<i>Bucephala clangula</i>); • Waterfowl assemblage. 	Within the Scoping Boundary.
Loch of Strathbeg Ramsar	<p><u>Ramsar criterion 5 - Assemblages of international importance:</u></p> <p>Species with peak counts in winter:</p> <ul style="list-style-type: none"> • 47841 waterfowl (5 year peak mean 1998/99-2002/2003). <p><u>Ramsar criterion 6 – species/populations occurring at levels of international importance.</u></p> <p>Qualifying Species/populations (as identified at designation):</p> <ul style="list-style-type: none"> • Species with peak counts in spring/autumn - Pink-footed goose; • Species with peak counts in winter - Whooper swan. <p>Species/populations identified subsequent to designation:</p> <ul style="list-style-type: none"> • Species with peak counts in winter - Barnacle goose. 	Within the Scoping Boundary.
Buchan Ness to Collieston Coast SPA	<p><u>Qualifying Species:</u></p> <ul style="list-style-type: none"> • Fulmar (<i>Fulmarus glacialis</i>); • Guillemot (<i>Uria aalge</i>); • Herring gull (<i>Larus argentatus</i>); • Kittiwake (<i>Rissa tridactyla</i>); • Shag (<i>Phalacrocorax aristotelis</i>); • Seabird assemblage. 	Within the Scoping Boundary.

Site name	Designated feature summary	Distance and direction from Scoping Boundary
Buchan Ness to Collieston SAC	<u>Annex I habitats that are a primary reason for selection of this site</u> <ul style="list-style-type: none"> • Vegetated sea cliffs of the Atlantic and Baltic Coasts. 	Within the Scoping Boundary.
Turclossie Moss SAC	<u>Annex I habitats that are a primary reason for selection of this site</u> <ul style="list-style-type: none"> • Active raised bogs. <p><u>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site</u></p> <ul style="list-style-type: none"> • Degraded raised bogs still capable of natural regeneration. 	250m, W
Troup, Pennan and Lion's Heads SPA	<u>Qualifying features:</u> <ul style="list-style-type: none"> • Fulmar; • Guillemot; • Herring gull; • Kittiwake; • Razorbill (<i>Alca torda</i>); • Seabird assemblage. 	2.6km, W
Ythan Estuary, Sands of Forvie and Meikle Loch SPA	<u>Qualifying features:</u> <ul style="list-style-type: none"> • Sandwich tern (<i>Sterna sandvicensis</i>); • Common tern (<i>Sterna hirundo</i>); • Little tern (<i>Sterna albifrons</i>); • Pink-footed goose (<i>Anser brachyrhynchus</i>); • Common eider (<i>Somateria mollissima mollissima</i>); • Lapwing (<i>Vanellus vanellus</i>); • Redshank (<i>Tringa tetanus</i>); • Non-breeding waterbird assemblage. 	7.9km, S
Ythan Estuary and Meikle Loch Ramsar	<u>Ramsar Criterion 2:</u> Supporting species with up to 2% of the GB population: <ul style="list-style-type: none"> • Common tern (<i>Sterna hirundo</i>); • Little tern (<i>Sternula albifrons</i>). 	7.9km, S

Site name	Designated feature summary	Distance and direction from Scoping Boundary
	<p><u>Ramsar Criterion 4:</u> Supporting the following waterbird species at a critical stage in their life cycles:</p> <ul style="list-style-type: none"> • Eider (<i>Somateria mollissima</i>); • Lapwing; • Redshank; • Sandwich tern; • Pink-footed goose; <p><u>Ramsar criterion 5:</u> Regularly supporting waterbirds in numbers of 20,000 individuals or more. In the five-year period 1988/89 to 1992/93 a winter peak mean of 26,400 individual waterbirds recorded, comprising 8,000 waders and 18,400 Wildfowl.</p>	
Loch of Strathbeg SSSI	<ul style="list-style-type: none"> • Important passage/wintering wildfowl assemblage. • Diverse breeding bird community. • The loch itself is the largest waterbody in the north-east lowlands and is the largest dune lake in Britain. It is a particularly good example of a shallow and naturally eutrophic (nutrient-rich) open water body, with an unusual water chemistry and biology. <p>The Loch of Strathbeg SSSI is designated as the Loch of Strathbeg SPA, for the birds listed below:</p> <ul style="list-style-type: none"> • Waterfowl assemblage, non-breeding • Greylag goose non-breeding • Pink-footed goose non-breeding • Sandwich tern, breeding • Svalbard barnacle goose, non-breeding • Teal, non-breeding • Whooper swan, non-breeding 	Within the Scoping Boundary.
Rora Moss SSSI	The second largest lowland raised bog in Aberdeenshire with a significant area of uncut dome and associated cut-over areas.	Within the Scoping Boundary.

Site name	Designated feature summary	Distance and direction from Scoping Boundary
Bullers of Buchan Coast SSSI	<p>Maritime cliff habitat: The sea-cliffs and slopes support a wide range of maritime habitats including grassland, crevice and ledge communities. The cliff top has some of the best examples of heath and brackish flushes on the coast of north-east Scotland.</p> <p>Birds: The sea-cliffs and inshore stacks support a colony of breeding seabirds which is of international importance. This assemblage includes nationally important populations of kittiwake and guillemot. Shag, herring gull, fulmar, razorbill, and puffin are also present.</p>	Within the Scoping Boundary.
Rosehearty to Fraserburgh Coast SSSI	<p>This open and exposed coastline is unusual in containing fairly extensive areas of intertidal mud and sand flats interspersed with low rocky outcrops and coastal lagoons backed by a narrow fringe of sand dune and saltmarsh.</p> <p>The site is important for the numbers of passage and wintering seaduck and waders which it supports. It is of national importance for turnstone and purple sandpiper, regularly holding over 500 and 250 individuals respectively. Nationally significant concentrations of eider and curlew also occur, and a wide variety of other waders and wildfowl.</p>	Within the Scoping Boundary.
Turclossie Moss SSSI	The Moss combines features of blanket bogs with those of raised bogs and has therefore been classified as an intermediate or mixed raised and blanket bog. The moss is thought to have been part of a much larger peatland with characteristics of blanket bogs including a range in altitude.	250m, W
Waters of Philorth Local Nature Reserve (LNR)	The reserve incorporates the estuary of the River Philorth and the sand dune complex, which is part of the larger Fraserburgh Bay sand dune system. There are also areas of reed bed, salt marsh and mud flats associated with the estuary.	Within the Scoping Boundary.

Baseline – Non-statutory nature conservation sites

6.5.39 **Table 6.5.9** provides the details of the 17 LNCSS that are within 2km of the Scoping Boundary. **Figure 6.5.4: Location of local nature conservation sites** in **Appendix 1A** shows the location of the LNCSS identified.

Table 6.5.9 Details of non-statutorily designated sites

Site name	Designated feature summary
Aberdour Bay to Kinnaird Head	High seacliffs, sandy bays wave cut platforms, rocky shores, intertidal mud and sand flats. Important for overwintering birds. Old Red Sandstone.
Cairnbulg to St Combs	Important geological site with good examples of rock exposures along the shore and a raised beach/ fossil cliff/sand dune complex. Important for breeding, overwintering and feeding birds.
Cortes Redbeed	Small site with open water, reedbed and fen habitat.
Cowbog_Raised_Bogs	Series of four lowland raised peat bogs at Cowbog, Corthie Moss, Cowieshall and Cairnywhing. All have been cut over in the past but retain some areas of primary peat. Good diversity of peatland and wetland.
Cruden Bay	Sheltered sandy bay with rocky coastline to the north and south. A golf course covers much of site, but patches of base rich dune grassland support a good diversity of plants. White colon moth found here at its northern limit.
Den of Auchmedden	Series of steep sided meltwater channels. The steep slopes are wooded in parts with rocky outcrops, grassland and scrub and small areas of rush pasture and wetland along the valley bottom. Botanically rich.
Gight	A section of the valley of the River Ythan with the steep wooded valley sides. Gight Woods one of the largest and least disturbed native oak woodlands in lowland Aberdeenshire.
Pitfour Lake	Pitfour Lake forms a fairly large area of standing open water which supports a good variety of plants and in particular, a number of pondweeds. The loch is surrounded by a mix of woodland types and scrub.
Rattray Head to Peterhead Coast	Variety of coastal habitats including sand dunes. Good diversity of plant species including several species that are rare in NE Scotland. Adjacent fields important for roosting and feeding geese, waders and wildfowl.
Rora Moss	Lowland raised bog with acid grassland, ponds and rush pasture. Good variety of peatland species. The southern part of the site is commercial forestry with bog habitat in the unplanted areas.
Sinclair Hills	Extensive fluvio-glacial deposits which form a good suite of landforms which are of Scottish significance, and form part of a set of features within the surrounding area. Small areas of botanical interest.

Site name	Designated feature summary
Skelmanae Raised Bogs	A series of three lowland raised bogs at Red Moss of Blackrigg, Auchmacleddie and Prattshaugh. Much of the peat has been cut over but some patches of primary bog remain and the sites remain quite wet.
Skelmuir Hill, Stirling Hill, Dudwick	Preglacial Buchan Gravels Formation, which is rich in flints, blankets the ridge of Stirling Hill, Hill of Dudwick and Skelmuir Hill. Den of Boddam glacial meltwater channel.
Strathbeg to Rattray	Loch of Strathbeg is one of the largest coastal freshwater lochs in the UK. Swamp, reedbed, fen, marsh and wet woodland surrounds with coastal sand dune on seaward side. Fields important for resident and migrant birds.
Towie Wood	Towie Wood represents one of the most compact and well-exposed localities to feature the characteristics of Ordovician-age ‘Younger Basic’ intrusions that are prevalent in the north-eastern Grampian area of Scotland.
Fraserburgh Bay⁹	Extensive coastal area with sand dunes. Includes the estuary of the Water of Philorth. The site supports a diverse flora and the shoreline and offshore areas are of ornithological interest. The dunes are of geomorphological interest.
Middlemuir⁸	This site forms an extensive peatland site, which supports a good diversity of peatland and wetland habitats and has potential for restoration. Strong and diverse ornithological interest including breeding waders.

Baseline – habitats and flora

- 6.5.40 Woodland listed on the Ancient Woodland Inventory (AWI) is present within the Scoping Boundary (see **Figure 6.5.5: Location of Ancient Woodland** in **Appendix 1A**). Approximately 1,296ha of ancient semi-natural woodland is present. These habitats occur within a network of woodlands of various sizes and are often immediately adjacent to other woodland types. These habitats are relatively common across the area encompassed by the Scoping Boundary.
- 6.5.41 The habitat map derived from the Habitat Map of Scotland (Land Cover Classification) information is shown on **Figure 6.5.6: Land cover classification map** in **Appendix 1A**. Within the area that has had its habitats classified the main habitat types are regularly or recently cultivated agricultural, horticultural and domestic habitats, grasslands and lands dominated by forbs, mosses and lichens and woodland, forest and other wooded land. **Table 6.5.10** provides the habitat types (EUNIS landcover level 1) identified within the Scoping Boundary.

⁹ Proposed Aberdeenshire Local Nature Conservation Sites (Aberdeenshire LDP 2023)

Table 6.5.10 Land cover classification information

Habitat type	
Surface standing and running waters	Temperate shrub heathland
Raised and blanket bogs	Riverine and fen scrub
Valley mires, poor fens and transition mires	Broadleaved deciduous woodland
Base-rich fens and calcareous mires	Coniferous woodland
Dry grasslands	Mixed deciduous woodland and coniferous woodland
Mesio grasslands	Lines of trees, small anthropogenic woodlands, early stage woodland and coppice
Seasonally wet and wet grasslands	Screes
Alpine and subalpine grasslands	Cliffs and rock pavements
Woodland fringes and clearings and tall forb stands	Arable land and market gardens
Arctic, alpine and subalpine scrub	Built up
Temperate and Mediterranean scrub	Bare field

Baseline - species

6.5.42 The area within the Scoping Boundary supports a wide range of legally protected and notable species. **Table 6.5.11** provides a list of Legally protected and notable mammal species recorded within the Scoping Boundary.

Table 6.5.11 Legally protected and notable species recorded within Scoping Boundary

Species	Scientific name	Species	Scientific name
Badger	<i>Meles meles</i> ;	Otter	<i>Lutra lutra</i> ;
Brown hare	<i>Lepus europaeus</i> ;	Water vole	<i>Arvicola amphibius</i> ;
Common pipistrelle	<i>Pipistrellus pipistrellus</i> ;	Eurasian red squirrel	<i>Sciurus vulgaris</i> ;
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i> ;	Pine marten	<i>Martes martes</i> ;
Nathusius's pipistrelle	<i>Pipistrellus nathusii</i>	Wildcat	<i>Felis silvestris</i> ;
Brown long-eared bat	<i>Plecotus auritus</i> ;	Common lizard	<i>Zootoca vivipara</i> ;
Daubenton's bat	<i>Myotis daubentonii</i> ;	Slow-worm	<i>Anguis fragilis</i> ;
Leisler's bat	<i>Nyctalus leisleri</i> ;	Common toad	<i>Bufo bufo</i> ;
Serotine	<i>Eptesicus serotinus</i> ;	Atlantic salmon	<i>Salmo salar</i> ;
Hedgehog	<i>Erinaceus europaeus</i> ;	Brown/Sea trout	<i>Salmo trutta</i> ;
Noctule	<i>Nyctalus noctula</i> ;	River lamprey	<i>Lampetra fluviatilis</i> .

- 6.5.43 A search for all conservation sites, habitats, protected or notable bird species, bats, freshwater fishes, reptiles, amphibians, and invertebrates recorded within a 20km radius of the centre point of the Scoping Boundary. A summary of the Data Search Report as provided by NESBReC is provided below:
- 6.5.44 NESBReC has provided records of 37 EC Directive Annex 1 species, 8 Annex 2.1 species, 8 Annex 2.2 species; 58 UKBAP/SBL species and two other notable species including goshawk *Accipiter gentilis* and grey phalarope *Phalaropus fulicarius*. These include a wide-range of species including wildfowl (e.g. Bewick's swan *Cygnus columbianus*, whooper swan *Cygnus cygnus*, pink-footed goose *Anser brachyrhynchus*, white-fronted goose *Anser albifrons*, waders (e.g. lapwing *Vanellus vanellus*, golden plover *Pluvialis apricaria*, curlew *Numenius arquata*, snipe *Gallinago gallinago*, woodcock *Scolopax rusticola*, raptors (e.g. peregrine *Falco peregrinus*, hen harrier *Circus cyaneus*, merlin *Falco columbarius*) and passerines (e.g. kingfisher *Alcedo atthis*, bullfinch *Pyrrhula pyrrhula*, corn bunting *Emberiza calandra*.
- 6.5.45 Bat species recorded within the study area include brown-long eared, common pipistrelle, dabenton's bat, Leisler's bat, Nathusius bat and soprano pipistrelle.
- 6.5.46 Herptiles present in the study area that are either legally protected or notable include common toad *Bufo bufo*, adder *Vipera berus*, grass snake *Natrix helvetica*, slow worm *Anguis fragilis* and common lizard *Zootoca vivipara*. The majority of these are reasonably widespread according to desk study records, with only adder being restricted to particular areas.
- 6.5.47 Large numbers of invertebrate records have been returned through the desk study, with particular emphasis on lepidoptera, and included 51 species listed on UKBAP/SBL.

- 6.5.48 There are several locations where large aggregations of over-wintering birds are regularly recorded during the BTO's regularly undertaken Wetland Bird Survey. Coastal sites include Fraserburgh to Rosehearty and Fraserburgh Bay (Philorth Estuary) in the north, and Rattrayhead to St Combs, Ugie to Rattrayhead, Ugie Estuary, Peterhead Bay and Sandford Bay to the east of the Scoping Boundary. Inland sites associated with river, marshes or natural inland still water include Philorth Marsh, Loch of Strathbeg and Pittenheath Dune Slack. As the design optioneering process progresses, WeBS datasets of the wintering/wetland bird assemblages will be obtained for any sites likely to fall within a zone of influence of the Project.

Future baseline

- 6.5.49 According to SNH (2018), baseline studies should identify the existing processes of change in the environment, which are likely to influence the character of the Site or its surrounds, so that any changes that are predicted to occur due to the Project can be distinguished from those which are expected to occur anyway. The predicted future environmental conditions which would exist if the Project did not materialise is known for EIA purposes as the 'do nothing scenario'.
- 6.5.50 Determining a future baseline draws upon information about the likely future use and management of the Site in the absence of development, known population trends (for species), climate change and any other proposed developments (consented or otherwise) that may act cumulatively with the Project components to affect ecological features.
- 6.5.51 The majority of the landscape across the Scoping Boundary is presently managed for livestock grazing, arable cropland, and occasional commercial forestry plantation. The 'do nothing scenario' would therefore likely be for the area to remain primarily unchanged if the Project did not go ahead.

Basis for scoping assessment

- 6.5.52 The terrestrial ecology and ornithology scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: Project Description**.
- Underground cables will be used to connect from the landfall(s) transition joint bays to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the grid connection point.
 - During construction, a temporary construction corridor will be defined, which will incorporate temporary working areas to provide suitable access and allow for safe construction. It is expected that the width of the cable construction corridor for surface trenching will be approximately 150m. At any sensitive features identified along the route, the working width of the construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects.
 - The construction method for the landfall(s) has yet to be determined, and will be specific to the site chosen, its geology, topography and other constraints. Typically either open cut/cut-and-fill construction or trenchless construction (e.g. HDD) will be used. Depending on the site characteristics and the landfall design(s) taken forward, cofferdam construction may also be required.
 - Onshore cable installation practices are well-established and incorporate environmental management and mitigation measures as standard. These will be described in the EIA Report where appropriate as environmental measures.

- Construction works for the onshore substation/s will include creation of site access, site preparation works, installation of underground services and foundations, construction of the building, installation of electrical equipment, installation of perimeter fencing, and landscaping. This area will be fully reinstated after construction is complete.

6.5.53 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 6.5.13**.

6.5.54 The Approved NPF4 2023 introduces new requirements and responds to the global climate and nature crises (Policy 1). These, amongst other requirements, will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

6.5.55 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on terrestrial ecology and ornithology (see **Table 6.5.12**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

6.5.56 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 6.5.12 Relevant terrestrial ecology and ornithology embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-001	Underground cables will be used to connect from the landfall(s) transition joint bay to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the new onshore substation nominated by NETS grid connection point(s). The installation status of which will be assessed on confirmation of a route of the onshore cable routing. Cables are typically installed in ducts in a standard buried trench arrangement.	The Construction Environment Management Plan (CEMP) management plans and planning conditions.
M-002	Where practical, sensitive sites will be avoided by the temporary and permanent onshore project footprint including European sites (including functionally linked land), SSSIs, LNRs, LNCSSs, Ancient Woodland.	CEMP management plans, description of Project and planning conditions.
M-005	The construction method for the landfall(s) has yet to be determined, and will be specific to the site chosen, its geology, topography and other constraints. Typically, either open cut/cut-and-fill construction or trenchless construction (e.g. HDD) will be used. Where it is necessary to cross	CEMP management plans, planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	sensitive features, trenchless construction methods may be used under the crossed feature.	
M-006	Vegetation will be retained where possible and mapped (Vegetation Retention Plan or similar). Otherwise, vegetation removal will be undertaken in line with British Standard (BS) 5837-2012 (Trees in relation to design, demolition and construction) and scheduled to avoid bird breeding seasons. Ancient woodland will be retained with a stand-off of a minimum of 25m from any surface construction works (HDD a depth >6m). With regards to other woodland / forestry, the onshore export cable construction corridor will be reduced, where practical, to minimise tree loss and where the construction corridor passes close to woodland that is being retained, BS5837:2012 root protection to apply. Hedgerows with trees / tree lines (including hedgerows deemed "important" under the Hedgerows Regulations 1997) which are crossed by the onshore export cable route will be notched to reduce landscape impacts. All hedgerows that are to be retained, coppiced, notched or lost are to be mapped. Vegetation may be coppiced / pruned to allow access and visibility plays at junctions.	CEMP management plans, description of Project and planning conditions.
M-007	Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2014) guidance on the Assessment of Dust from Demolition and Construction in order to avoid adverse effects on sensitive features. Examples of pathway include windblown dust / fibres or tracking back of dust / fibres is a potential contamination migration.	CEMP and planning conditions.
M-008	Pollution control strategy will be in line with good practice and in accordance with Controlled Activity Regulations (CAR) licence regulations, pollution prevention plans and emergency plans to be drawn up to detail how ground and surface waters and the ecological features they support, would be protected in construction and operation. These will include information on the storage of any fuels, oils and other chemicals and pollution incidence response planning, plus measures for the protection of licenced and private abstractions. This could include a monitoring regime associated with critical or very proximate receptors.	CEMP and planning conditions.
M-009	Areas of temporary habitat loss will be reinstated, wherever practicable, following the completion of construction in each area. Wherever possible reinstatement will be back to the type of habitat crossed.	CEMP management plans, description of Project and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-010	Opportunities for enhancements through the delivery of new or improved habitats or measures to boost populations of certain species (as compliant with requirements) will be identified following further evolution of the Project design and through engagement with stakeholders. These enhancements may be delivered directly by the Applicant within or close to the Site boundary or via collaboration with independent organisations.	CEMP management plans, description of Project and planning conditions. Habitat Management Plan (HMP).
M-011	A lighting design of all temporary and permanent lighting will be developed once contractors are appointed; however, the principles of lighting design will be detailed at the time of application and informed by the joint guidance provided by the Bat Conservation Trust and Institution of Lighting Professionals (2018). The lighting design will account of the potential effects on terrestrial ecology and people (residents) by taking measures to minimise lighting usage, minimise light spill, use most appropriate wave lengths of light and locate lighting in the most appropriate locations – this is to decrease the potential displacement effects on light sensitive fauna, such as bats.	CEMP management plans, description of Project and planning conditions.
M-012	Speed limits will be imposed on all construction haul roads and access tracks to minimise the risk of road traffic collisions with fauna such as badgers, otters, bats and barn owls.	CEMP management plans, description of Project and planning conditions.
M-027	At any sensitive features identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects. Where it is necessary to cross sensitive features, such as watercourses, trenchless construction methods, such as HDD will be used to install ducts under the crossed feature, which the cables are then pulled through via entry and exit pits.	CEMP and planning conditions.
M-063	A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. The CEMP will be the securing mechanism for many measures.	Planning conditions and CEMP.

ID	Environmental measure proposed	How the environmental measures will be secured
M-066	The permanent rights or servitude for the onshore export cable route will be kept to the minimum width needed for safe access for cable maintenance or replacement purposes during operation of the Project.	CEMP management plans and planning conditions.
M-085	The Project will avoid causing fragmentation of woodland, semi-natural land or sensitive habitats where possible, through the use of existing breaks in land use or use of HDD (or alternative crossing methods) to avoid disturbance of / change to land cover.	CEMP management plans, description of Project and planning conditions.
M-086	Compliance with the Wildlife and Countryside Act 1981 (as amended by the Wildlife and Natural Environment (Scotland) Act 2012) the use of tried and tested onshore invasive species control and biosecurity measures to avoid the spread of infested materials will be applied.	CEMP management plans, description of Project and planning conditions.

6.5.57 Ecological features have been scoped in on the basis of spatial proximity to the Scoping Boundary, but as the onshore infrastructure is refined, the likely significant effects to specific features outside the final site boundary will be scoped out with agreement from stakeholders in advance of the EIA Report development. This will allow for a more proportionate EIA following the scoping opinion.

Likely significant effects

6.5.58 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.5.59 The likely significant effects on terrestrial ecology and ornithology are summarised in **Table 6.5.13** The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for Terrestrial Ecology and Ornithology effects, CIEEM guidance on Ecological Impact Assessment (2018), and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.

6.5.60 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by the evidence base.

Table 6.5.13 Likely significant terrestrial ecology and ornithology effects

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
European sites	International	International	Land take / land cover change	Within the Scoping Boundary.	M-002	<p>Scoped in. The Scoping Boundary currently overlaps with the Loch of Strathbeg SPA/Ramsar, the Buchan Ness to Collieston Coast SPA/SAC (see Table 6.5.8).</p> <p>Scoped out. All European sites located outside of the Scoping Boundary.</p>	N/A
European sites	International	International	Fragmentation of habitats	<p>20km (for geese)</p> <p>5km (for swans)</p> <p>5km (precautionary buffer for waders and waterbirds)</p> <p>All distances currently apply to the Scoping</p>	M-002	<p>Scoped in.</p> <ul style="list-style-type: none"> Loch of Strathbeg SPA/Ramsar supports pink-footed goose, barnacle goose and greylag goose, which may utilise habitats within 20km of the SPA; whooper swan that may utilise habitats within 5km of the SPA; and that may be subject to construction. Ythan Estuary and Meikle Loch SPA/Ramsar supports pink-footed goose, which may utilise habitats within 20km of the SPA that may be subject to construction. <p>Scoped out. The Scoping Boundary is over 5km from the Ythan Estuary, Sands of</p>	Over-wintering goose distribution surveys.

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
				Boundary. As optioneering progresses, these will apply to a Project site boundary.		Forvie and Meikle Loch SPA boundary meaning fragmentation effects on sandwich tern, common tern, little tern, common eider, lapwing, redshank and the non-breeding waterbird assemblage can be scoped out.	
European sites	International	International	Increased human presence, noise and vibration	500m	M-002	Scoped in. Qualifying interest species for Loch of Strathbeg SPA/Ramsar site could forage in areas within 500m of construction works areas.	Winter bird survey information and breeding bird surveys, as required.
European sites	International	International	Increased light levels	500m	M-002	Scoped in. Qualifying interest species for Loch of Strathbeg SPA/Ramsar site could be disturbed/displaced from areas artificially lit by construction/security lighting.	Winter bird survey information and breeding bird surveys, as required.
European sites	International	International	Changes in hydrology	250m	M-002, M-027	Scoped in. Loch of Strathbeg SPA/Ramsar are also located within the Scoping Boundary, and habitats supporting ornithological features could be affected by changes in hydrology or pollution events associated with proposed construction works.	Winter bird survey information and breeding bird surveys as required.
European sites	International	International	Pollution events	500m	M-002, M-008	Scoped out.	Habitat survey Information.

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
						The Scoping Boundary is over 250m from Turclossie Moss SAC, with no identified hydrological or pollution impact pathways. No identified hydrological or pollution impact pathways were identified for qualifying features (vegetated sea cliffs) associated with Buchan Ness to Collieston Coast SAC,	Outputs of hydrological assessment.
European sites	International	International	Emissions events	200m	M-002, M-007	<p>Scoped in. Loch of Strathbeg SPA/Ramsar and Buchan Ness to Collieston SAC are located within the Scoping Boundary.</p> <p>Following further design optioneering, those sites within 200m of a road that could be used by construction traffic can be discounted as the increase in traffic will be temporary and limited ensuring that the extent of the effect will be low, temporary and reversible.</p>	N/A
European sites	International	International	Introduction of invasive non-native species	Within the European site	M-002, M-086	<p>Scoped in. Loch of Strathbeg SPA/Ramsar and Buchan Ness to Collieston SAC are located within the Scoping Boundary.</p>	N/A
SSSIs	National	National	Land take / land cover change	Within the Scoping Boundary	M-002	<p>Scoped in. There are 4 SSSIs within the Scoping Boundary (see Table 6.5.8).</p>	Habitat survey Information.

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
						Scoped out. All SSSIs outside of the Scoping Boundary.	
SSSIs	National	National	Fragmentation of habitats	20km (Geese and swans)	M-002	<p>Scoped in. Pink-footed geese from Loch of Strathbeg SSSI could forage in areas within the Scoping Boundary.</p> <p>Waders and waterbirds associated with Loch of Strathbeg SSSI and Rosehearty to Fraserburgh Coast SSSI could forage within the Scoping Boundary.</p>	Habitat survey information and Over-wintering goose distribution surveys and Intertidal bird surveys
				2km (Waders and waterbirds)		<p>Scoped out. All other SSSIs identified in Table 6.5.8 as the designated features would not be expected to move regularly between the given designated site and the construction area.</p>	
SSSIs	National	National	Increased human presence, noise and vibration	500m	M-002	<p>Scoped in. Pink-footed geese and waders and waterbirds associated with the Loch of Strathbeg SSSI could forage in areas within 500m of the construction area.</p> <p>Waders and waterbirds associated with the Rosehearty to Fraserburgh Coast SSSI could forage within 500m of the construction area.</p>	Habitat survey information and Over-wintering goose distribution surveys and Intertidal bird surveys

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
						Scoped out. All other SSSIs identified in Table 6.5.8 as their designated features are outside of the ZOI.	
SSSIs	National	National	Increased light levels	200m	M-011	Scoped out. There are no SSSIs identified within 5km of the Scoping Boundary that support bats as designated features.	N/A
SSSIs	National	National	Changes in hydrology	250m	M-002, M-027	Scoped in. There are 4 SSSIs within a potential ZOI (See Table 6.5.8). Scoped out. All SSSIs outside of the ZOI (see paragraphs 6.5.61 to 6.5.65).	Outputs of hydrological assessment.
SSSIs	National	National	Pollution events	500m	M-002, M-008	Scoped in. There are 4 SSSIs within the Scoping Boundary (See Table 6.5.8). Scoped out. All SSSIs outside of the ZOI of the Scoping Boundary (see paragraphs 6.5.61 to 6.5.65).	Habitat survey information.
SSSIs	National	National	Emissions events	200m	M-002, M-007	Scoped in. There are 4 SSSIs within the Scoping Boundary (See Table 6.5.8).	N/A

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
						<p>Scoped out.</p> <p>Following further design optioneering, SSSIs within 200m of a road that could be used by construction traffic can be discounted as the increase in traffic will be temporary and limited ensuring that the extent of the effect will be low, temporary and reversible (see paragraphs 6.5.61 to 6.5.65).</p>	
SSSIs	National	National	Introduction of invasive non-native species	Within the SSSI site	M-002, M-086	<p>Scoped in. There are 4 SSSIs within the Scoping Boundary (See Table 6.5.8).</p> <p>Scoped out. All SSSIs outside of the ZOI of the Scoping Boundary (see paragraphs 6.5.61 to 6.5.65).</p>	Habitat survey information.
LNCSs and Local Nature Reserves	County	County	Land take / land cover change	Within the Scoping Boundary	M-002	<p>Scoped in. There are 21 LNCSs and 1 LNR within the Scoping Boundary.</p> <p>Scoped out. All LWS outside of the Scoping Boundary.</p>	Habitat survey information.
LNCSs and Local Nature Reserves	County	County	Fragmentation of habitats	Within the Scoping Boundary	M-002	<p>Scoped in. There are 21 LNCSs and 1 LNR within the Scoping Boundary.</p> <p>Scoped out. All LNCSs outside of the Scoping Boundary.</p>	Habitat survey information.

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
LNCSSs and Local Nature Reserves	County	County	Increased human presence, noise and vibration	500m	M-002	Scoped in. There are LNCSSs and LNRs potentially within 500m of construction works.	Habitat survey information.
LNCSSs and Local Nature Reserves	County	County	Increased light levels	200m	M-011	Scoped out. There are no LNCSSs or LNRs identified within the Scoping Boundary or 200m of it that support bats as a recognised feature.	N/A
LNCSSs and Local Nature Reserves	County	County	Changes in hydrology	250m	M-002, M-027	Scoped in. There are LNCSSs and LNRs within a potential ZOI (See Table 6.5.8).	Outputs of hydrological assessment.
LNCSSs and Local Nature Reserves	County	County	Pollution events	500m	M-002, M-008	Scoped in. There are LNCSSs and LNRs within a potential ZOI (See Table 6.5.8). Scoped out. All LNCSSs and LNRs outside the ZOI (see paragraphs 6.5.61 to 6.5.65).	Habitat survey information.
LNCSSs and Local Nature Reserves	County	County	Introduction of invasive non-native species	Within the Site	M-002, M-086	Scoped in. There are 21 LNCSSs and 1 LNR within the Scoping Boundary (See Table 6.5.8). Scoped out.	Habitat survey information.

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
						All LNCs and LNRs outside the Scoping Boundary (see paragraphs 6.5.61 to 6.5.65).	
Ancient woodland and veteran trees	National	National	Land take / land cover change	Within the Scoping Boundary	M-002	Scoped in. Ancient woodland is present within the Scoping Boundary.	Habitat survey information.
Ancient woodland and veteran trees	National	National	Fragmentation of habitats	Within the Scoping Boundary	M-002	Scoped in. Ancient woodland is present within the Scoping Boundary.	Habitat survey information.
Ancient woodland and veteran trees	National	National	Changes in hydrology	250m	M-002, M-027	Scoped in. Ancient woodland is present within the Scoping Boundary.	Habitat survey information.
Ancient woodland and veteran trees	National	National	Pollution events	500m	M-002, M-008	Scoped in. Ancient woodland is present within the Scoping Boundary.	Habitat survey information.
Ancient woodland and veteran trees	National	National	Emissions events	200m	M-002, M-007	Scoped in. Ancient woodland is present within the Scoping Boundary.	Habitat survey information.
Ancient woodland	National	National	Introduction of invasive non-native species	Within the Scoping Boundary	M-002, M-086	Scoped in. Ancient woodland is present within the Scoping Boundary.	Habitat survey information.

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
and veteran trees							
All habitats within the Scoping Boundary with a level of importance of local or above¹⁰	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Land take / land cover change	Within the Scoping Boundary	M-002, M-009, M-010	Scoped in. Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information.
			Fragmentation of habitats	Within the Scoping Boundary	M-002, M-009, M-010	Scoped in. Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information.
			Changes in hydrology	250m	M-002, M-027	Scoped in. Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information.
			Pollution events	500m	M-002, M-008	Scoped in. Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information.
			Emissions events	200m	M-002, M-007	Scoped in. Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information.

¹⁰ Habitats will be considered individually at future stages of the application process

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
			Introduction of invasive non-native species	Within the Scoping Boundary	M-002, M-086	Scoped in. Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information
All protected and notable species¹¹	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Land take / land cover change	Up to 500m – dependent on species	M-002, M-010	Scoped in. Species of local importance or above are present within the Scoping Boundary.	Field survey information
			Fragmentation of habitats	Up to 500m – dependent on species	M-002, M-010	Scoped in. Species of local importance or above are present within the Scoping Boundary.	Field survey information
			Increased human presence, noise and vibration	Up to 500m – dependent on species	M-002, M-012	Scoped in. Species of local importance or above are present within the Scoping Boundary.	Field survey information
			Increased light levels	Up to 200m – dependent on species	M-002, M-011	Scoped in. Species of local importance or above are present within the Scoping Boundary.	Field survey information
			Changes in hydrology	Up to 500m – dependent on species	M-002, M-027	Scoped in. Species of local importance or above are present within the Scoping Boundary.	Field survey information

¹¹ Legally protected and notable species will be considered individually, or in relevant groups, at future stages of the application process

Ecological feature	Importance – legislation and policy	Importance – Proposed Development Level	Effect	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
			Pollution events	Up to 500m – dependent on species	M-002, M-008, M-086	Scoped in. Species of local importance or above are present within the Scoping Boundary.	Field survey information

Impacts scoped out of assessment

- 6.5.61 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned work and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. Each scoped out effect is considered in turn below.
- 6.5.62 All likely significant effects identified will be considered at further stages of the assessment with EIA submission as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed.
- 6.5.63 The following European sites have been scoped out of the assessment (See **Table 6.5.12**) as there are no pathways of likely effect identified:
- Ythan Estuary, Sands of Forvie and Meikle Loch SPA.
 - Ythan Estuary and Meikle Loch Rasmar.
 - Turclossie Moss SAC.
 - Buchan Ness to Collieston Coast SPA – features of this SPA are considered within the assessment of offshore and intertidal ornithology (see **Section 5.7: Offshore and intertidal ornithology**).
 - Troup, Pennan and Lion's Heads SPA - features of this SPA are considered within the assessment of offshore and intertidal ornithology (see **Section 5.7: Offshore and intertidal ornithology**).
- 6.5.64 The following SSSIs have been scoped out of the assessment as there are no pathways of effect identified:
- Turclossie Moss SSSI.
- 6.5.65 The following habitats and species have been scoped out of further assessment:
- Habitats of negligible importance. Based on the landcover data (to be supplemented by field survey data captured in 2023), this will include hard standing (including roads, built development etc.), arable fields, improved pasture and amenity grassland.
 - Breeding birds (other than those listed on Schedule 1 of the WCA, or as a qualifying interest species or assemblage species of a SPA or SSSI) have been scoped out of the assessment due to the temporary nature of the works across the majority of the area, the narrow, linear working area and the embedded environmental measures in place to maintain legal compliance.
 - Great crested newt are not known to be present within the Scoping Boundary. In Scotland, two great crested newt populations are present with largest numbers in southern parts of the country and a smaller, separate population further north in the Highlands. The nearest population is found east of Inverness, approximately 100km east of the Scoping Boundary.

Cumulative effects

- 6.5.66 Cumulative effects on terrestrial ecology and ornithology resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and

methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the CEA screening exercise.

6.5.67 The following impacts from Project have the potential to act cumulatively with impacts from intra-project effects and from other developments to contribute to cumulative effects.

- permanent and temporary habitat loss and degradation of notable habitats with corresponding effects on local populations;
- permanent and temporary fragmentation of the landscape reducing the viability of some local populations to access sufficient resources; and
- temporary disturbance caused by construction activity resulting in the displacement of local populations.

Transboundary effects

6.5.68 The potential effects from construction, operation and maintenance, and decommissioning on terrestrial ecology and ornithology features are considered in **Appendix 4A Transboundary Screening Matrix**. No transboundary impacts have been identified as there is no potential for onshore elements of the Project to have a significant effect on the onshore ecology and ornithology, including the qualifying interest features of European sites of an adjacent state.

Proposed approach to the EIA Report

Introduction

6.5.69 The proposed approach to terrestrial ecology and ornithology between Scoping and the EIA Report are set out below.

Stakeholder engagement

6.5.70 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process which is set out in **Chapter 4: Approach to Scoping and EIA**.

6.5.71 Technical engagement will be sought with a range of stakeholders in order to inform the terrestrial ecology and ornithology assessment. This will include seeking engagement with government advisors NatureScot, SEPA, and non-governmental organisations such as RSPB. Local voluntary groups such as the North East Scotland Bat Group (NESBG) will be contacted should the assessment process identify a need to engage detailed local knowledge to address identified issues.

6.5.72 This technical engagement will take place within the wider context of the consultation strategy. Public consultation will be conducted primarily through a series of Public Information Days (PIDs) and public meetings. Details of the proposed consultation phases are set out in **Chapter 4: Approach to Scoping and EIA** of this Scoping Report.

Baseline

6.5.73 Future baseline data collection will consist of a programme of field surveys as outlined in **Table 6.5.6**. This programme will be regularly reviewed in light of the results of the surveys and the evolution of the design of the Project.

Approach to design and environmental measures

- 6.5.74 During the design process, the terrestrial ecology and ornithology constraints will be identified and highlighted to enable the “*mitigation hierarchy*” of avoidance, mitigation and then compensation to be implemented as required through the CIEEM (2018) guidance. Through the design process the refinement of the location of infrastructure and the method of installation will consider ecological features as required.

Assessment of effects in the EIA Report

- 6.5.75 Assessment of effects in the EIA Report will follow that described in **paragraphs 6.5.20 to 6.5.31**.
- 6.5.76 Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

6.6 Onshore archaeology and cultural heritage

Introduction

- 6.6.1 The onshore archaeology and cultural heritage assessment will consider the potential likely significant effects on buried and upstanding cultural heritage assets that may arise from the construction, operation and maintenance and decommissioning of the onshore Project elements that are landward of Mean Low Water Springs (MLWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions, the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 6.6.2 Onshore archaeology and cultural heritage interfaces with other aspects and as such, should be considered alongside these sections; namely:
- **Section 5.11: Marine archaeology and cultural heritage:** As the marine and terrestrial historic environment are linked, with onshore features influencing factors such as shipping routes, deposits of geoarchaeological interest reflecting former terrestrial environments, and remains in the intertidal zone reflecting both marine and terrestrial historic environments. The marine archaeology and cultural section will be considered alongside this onshore archaeology and cultural heritage assessment.
 - **Section 6.7: Onshore noise and vibration:** There is the potential for onshore archaeology and cultural heritage receptors and resources to be impacted by noise and vibration, therefore the noise and vibration section will inform the archaeology and cultural heritage assessment.
 - **Section 6.9: Landscape and visual:** To inform understanding of the visibility and appearance of visible elements of the Project in the setting of identified heritage assets within the terrestrial zone. The landscape and visual section will be used to inform the onshore archaeology and cultural heritage assessment.

Legislative and policy context

- 6.6.3 This Section identifies the relevant legislative and policy context which has informed the scope of the onshore archaeology and cultural heritage assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 6.6.4 In order to provide a robust evidence base, **Table 6.6.1** below presents a summary of legislation and policies relevant for the onshore archaeology and cultural heritage assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 6.6.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
Historic Environment Scotland (HES) Act (2014)	<ul style="list-style-type: none"> Established Historic Environment Scotland (HES) and defines its role as a consultee in respect of designated heritage assets.
Historic Environment (Amendment) Act Scotland (2011)	<ul style="list-style-type: none"> Provides statutory designation for certain designed landscapes identified as being of national importance.
Ancient Monuments and Archaeological Areas Act (1979)	<ul style="list-style-type: none"> Provides statutory designation for certain archaeological sites and features identified as being of national importance, prohibits unauthorised works and sets out a consent regime to authorise necessary works.
Protection of Military Remains Act (1986)	<ul style="list-style-type: none"> Provides (in the terrestrial zone) statutory protection for aircraft lost in military service and sets requirements for their protection and a consenting regime to authorise works.
Planning (Listed Buildings and Conservation Areas) (Scotland) Act (1997)	<ul style="list-style-type: none"> Provides statutory protection for certain historic buildings and other structures and their settings, and for the character of designated conservation areas. The relative importance of the different categories of listed buildings is set out in policy and guidance which will be followed during the assessment.
Town and Country Planning (General Development Procedure) Scotland Order (1992)	<ul style="list-style-type: none"> Requires that planning authorities should consult with the Secretary of State where development may affect a historic garden or designed landscape, a scheduled monument or its setting or a category A listed building or its setting.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the climate and nature crises Policy 7: Historic assets and places
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. NPF3 does not set specific policies for the historic environment, but acknowledges and seeks to preserve and enhance the contribution of the historic environment to the other themes identified in NPF3.
Scottish Planning Policy (SPP) (2014) <ul style="list-style-type: none"> Paragraphs 135 to 151 Paragraph 169 	<ul style="list-style-type: none"> Sets out policy for the treatment of the historic environment in planning, considering sources of information, types of heritage assets and sets out requirements for the consideration of these heritage assets in the planning process, specifically:

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> ▶ protection and management of the historic environment within the planning process; ▶ siting of development to respect all aspects of the historic environment; ▶ managing change to listed buildings and their settings; ▶ managing change to the character of conservation areas; ▶ protection of scheduled monuments; ▶ protection of HMPAs; ▶ protection of inventory gardens and designed landscapes; ▶ protection of non-designated heritage assets. <ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment - including scheduled monuments, listed buildings and their settings; ▶ impacts on road traffic; and ▶ effects on hydrology.
PAN 2/2011 Planning and Archaeology (2011)	This document provides advice on dealing with archaeological remains in development.
Historic Environment Policy for Scotland (HEPS) Historic Environment Scotland (2019a)	The document is designed to support SPP (2014) and other policy documents, to enable good decision-making about changes to the historic environment. HEPS sets out a series of principles and policies for the recognition, care and sustainable management of the historic environment.
Marine Policy	
No policy is of specific relevance to this onshore area of technical assessment.	
Local Planning Policy	
Aberdeen City and Shire Strategic Development Plan (2020) - Chapter 3: Our Resources	References the need to protect and enhance the coastal setting and maritime history of the coastal towns.
Modified Proposed Aberdeenshire Local Development Plan 2020	As detailed in Appendix 3A: Planning Policy Framework , modified proposed policies of relevance to this area of technical assessment are:

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> Policy HE1 Protecting Listed Buildings, Schedules Monuments and Archaeological Sites (including other historic buildings); and Policy HE2 Protecting Historic, Cultural and Conservation Areas.

Technical guidance

- 6.6.5 Technical guidance that may be used to inform the assessment is set out in **Table 6.6.2** below.

Table 6.6.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Managing Change in The Historic Environment: Setting (HES, 2016)	This guidance note sets out an assessment methodology that will be used in the assessment of effects arising through change to setting of heritage assets.
Chartered Institute for Archaeologists Standard and guidance for desk-based assessments (CiFA, 2014a)	The baseline data gathering will follow the standards set out for the production of desk-based assessments of the historic environment.

Study area

- 6.6.6 Initial data gathering to support development of the Scoping Report has used the Scoping Boundary above MLWS, shown at **Figure 6.6.1: Designated heritage assets** in **Appendix 1A**.
- 6.6.7 The study area will be reviewed and amended in response to such matters as refinement of the onshore infrastructure components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

Consultation

- 6.6.8 This Section has been informed by engagement and discussion with relevant stakeholders. **Table 6.6.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.
- 6.6.9 Initial scoping workshops have been held with Historic Environment Scotland (HES) and with Aberdeenshire Council Archaeological and Built Heritage officers. At this stage, discussion has focused on assessment scope and methodology. Key points of agreement are as follows:
- It has been agreed with all parties that optioneering will take account of designated heritage assets as recorded by the HES spatial datasets, with Historic Environment Record (HER searches) to be undertaken once preferred route corridors have been identified.

- It has been agreed with all parties that assessment will be informed by relevant CiFA and HES guidance (reference is made in **Table 6.6.2** above to the relevant guidance which will be used).
- It has been agreed with all parties Searches of the Aberdeenshire HER will be undertaken. It is noted that Aberdeenshire HER data includes some marine data and that data relevant to the marine archaeology assessment will be used to inform that assessment.
- An initial study will be carried out of heritage assets likely to be affected following identification of preferred onshore export cable route corridor(s) option area to allow the assessment to be better focused. This assessment will identify heritage assets to be taken forward for detailed assessment of effects on setting, and provide rationales for scoping out heritage assets that would not be affected. Assessment will consider only designated heritage assets by change to setting as agreed with Aberdeenshire Council and HES.

Assessment methodology

Introduction

- 6.6.10 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. This Section develops that generic methodology to make it more appropriate to address the specific needs of the onshore archaeology and cultural heritage assessment.
- 6.6.11 The methodology for establishing a detailed onshore archaeology and cultural heritage baseline is provided below, together with the methodology for assessing the significance of effects.
- 6.6.12 To establish a detailed baseline, appropriate and proportionate assessments and surveys will be carried out following refinement of the onshore project components. These are expected to include:
- a review of desk-based data within the study area defined below in **paragraph 6.6.19**, using sources detailed in **Table 6.6.5**, as well as relevant readily available regional and local contextual studies, desk and field studies, geological and geotechnical data, historic mapping and aerial photographs;
 - national and local archive information to source relevant cartographic, documentary and photographic evidence;
 - review of readily available LiDAR data;
 - site walkovers of the landfall site(s), temporary construction corridor, temporary construction laydown areas and substation construction plot, and site visits to offsite heritage assets to inform the assessment of effects arising from change to setting;
 - representative viewpoints for the Landscape and Visual Impact Assessment (LVIA) assessment will be used to inform the settings assessment, where appropriate; and
 - cross-referencing with the LVIA and other workstreams (including Noise) where appropriate to ensure an integrated approach to assessment.

Assessment of effects and determining significance

- 6.6.13 The sensitivity or value of a receptor is largely a product of its importance, as informed by legislation and policy, and as qualified by professional judgement. The rationale contained

within **Table 6.6.3** is predominantly based on information provided within the SPP (Scottish Government 2014a) and the associated supporting documents; HEPS (HES, 2019a) and the Historic Environment Circular 1, Planning Advice Note (PAN) 2/2011. Note that the categorisation of the relative importance of those assets which are of less than national importance generally relies on professional judgement applied within the context of the supporting policy and guidance.

6.6.14 **Table 6.6.3** sets out the generic guidelines for the assessment of sensitivity and value of a receptor or feature.

Table 6.6.3 Generic guidelines for the assessment of sensitivity or value

Value or sensitivity	Guidelines
High	<p>World Heritage Sites are designated on the basis of 'Outstanding Universal Value' and would normally be considered of international importance.</p> <p>By legal definition, Scheduled Monuments are considered as being of national importance. As the process of scheduling is ongoing and as scheduling is a representative designation, there are further assets which are not scheduled but which may be of equivalent importance. HES describes Category A listed buildings as 'Buildings of special architectural or historic interest which are outstanding examples of a particular period, style or building type' (HES 2019a) and these would normally be considered as of national importance.</p> <p>The SPP states that sites identified within the Inventory of Historic Battlefields and the Inventory of Gardens and Designed Landscapes are of national and/or international importance.</p>
Medium	<p>These include archaeological sites which do not merit scheduling but which are nevertheless of interest or which could make a substantial contribution to established regional research agendas.</p> <p>HES describes Category B listed buildings as of 'special architectural or historic interest which are major examples of a particular period, style or building type' and Category C listed buildings as 'special architectural or historic interest which are representative examples of a particular period, style or building type.' (HES, 2019a) While the listing criteria do not explicitly include valuations, these heritage assets would normally be considered as of regional importance.</p> <p>The principles of selection for designation of conservation areas do not explicitly include valuations of national, regional or local importance, although most examples would be of importance on a regional level.</p> <p>Designed landscapes that are recognised by local authorities but not included within the Inventory of Gardens and Designed Landscapes would usually be considered to be regionally important.</p>
Low	The majority of non-designated assets would normally be considered of local importance.
Very low	These include those features which are no longer extant, where there are no further known or surviving remains (e.g. locations of previous archaeological work), or where assets may have minimal importance, such as modern quarries.

6.6.15 The magnitude of change affecting a receptor that would result from the Project will be identified on a scale from minor alterations of change, up to major changes or the total or substantial loss of the receptor. For others it will be a matter of professional judgement applied within the context of the supporting policy and guidance to determine the magnitude of change, using descriptive terminology as a narrative assessment.

6.6.16 **Table 6.6.4** sets out the generic criteria of the assessment of the magnitude of change.

Table 6.6.4 Generic criteria for the assessment of magnitude

Magnitude	Criteria (adverse)	Criteria (beneficial)
High	Total or substantial change to an asset or complete alteration of the characteristics of an asset's setting.	Sympathetic restoration of an at-risk or otherwise degraded heritage asset and/or its setting. Bringing an at-risk heritage asset into sustainable use, with robust long-term management secured.
Medium	Partial alteration of an asset. Substantial change to the key characteristics of an asset's setting, or a more total alteration which is temporary and/or reversible. Significant alteration to those elements of the setting which directly contribute to the understanding of the cultural value of the asset.	Appropriate stabilisation and/or enhancement of a heritage asset and, or its setting that that contribute to a long-term sustainable use and/or management regime.
Low	Minor alteration of an asset. Changes to a setting which do not affect the key characteristics, or which is short term and/or reversible. Insignificant alteration to those elements of the setting which directly contribute to the understanding of the cultural value of the asset.	Minor enhancements to a heritage asset and, or its setting that contribute to sustainable use and/or management.
Very low	Minor alteration of an asset. Minor and short term or very minor and reversible changes to its setting which do not affect the key characteristics.	Minor alteration of an asset or its setting which are sensitive but do not contribute discernibly to sustainable use and/or management.

6.6.17 The matrix in Table 6.6.5 has been prepared to guide the assessment of whether effects on the historic environment for the purposes of EIA are to be considered significant or not. The classification of the effect is judged on the relationship of the magnitude of impact to the assessed heritage significance of the resource.

Table 6.6.5 Significance Assessment Matrix

Receptor Value	Magnitude of Change			
	High	Medium	Low	Very Low
High	Significant	Significant	Not Significant	Not Significant
Medium	Significant	Not Significant	Not Significant	Not Significant
Low	Not Significant	Not Significant	Not Significant	Not Significant
Very Low	Not Significant	Not Significant	Not Significant	Not Significant

6.6.18 All assessments will be presented as narrative discussions, setting out the significance of the relevant heritage asset(s), and where appropriate contribution of their settings to

significance, providing a description of the anticipated change and setting out the magnitude of change in line with the definitions set out Table 6.6.5.

Study area

- 6.6.19 The study area for historic environment assessment is defined as extending 500m from buried elements of the Project and landfall(s), and 2km from visible elements of the Project. Two kilometres has been identified as the maximum distance at which the Project will appear with sufficient prominence in the settings of heritage assets in this specific historic landscape context to give rise to a significant adverse effect. Effects on heritage assets outwith this study area will be considered by exception in response to a specific consultee request. 500m is identified as a sufficient distance to identify heritage assets which may be affected by physical disturbance and to understand the context of individual HER records to allow an informed assessment of the potential presence of archaeological remains.
- 6.6.20 The study area will be reviewed and amended in response to such matters as refinement of the onshore project components, the identification of additional impact pathways and through ongoing consultation.

Baseline conditions

Data sources

Table 6.6.6 Key sources of onshore archaeology and cultural heritage data

Source	Date	Summary	Coverage of study area
Historic Environment Scotland (2022)	Date accessed: 2022	HES Spatial datasets for information on designated heritage assets (Scheduled Monuments, Listed Buildings, Gardens and Designed Landscapes, Registered Battlefields and World Heritage Sites) (available online: http://portal.historicenvironment.scot/).	Full coverage of the Scoping Boundary and to be refreshed when study area is defined to capture any change.
Aberdeenshire Council Archaeology (2022c) Service on behalf of Aberdeenshire, Aberdeen City and Angus	Date accessed: 2022	Contains information on non-designated sites of archaeological and historical interest ranging from Mesolithic flints to World War II airfields. The information comprises a computerised database linked to a GIS with further physical records of maps, photographs, articles and reports. The online resource was used to gather information on general site types and distribution for scoping. A full HER search will be requested from Aberdeen Council Archaeology Service when cable route corridor(s) and options areas for landfall(s), substation(s) and grid connection have been established.	Full coverage of the study area when this can be defined.

Source	Date	Summary	Coverage of study area
National Library of Scotland Map Library (2022)	Date accessed: 2022	Online resource containing historic mapping for the whole of Scotland. This resource will be used when cable route corridor(s) and options areas for landfall(s), substation(s) and grid connection have been established.	Full coverage of the study area when this can be defined.
PastMap (2022)	Date accessed: 2022	Online resource containing data on designated and non-designated heritage assets in Scotland.	Full coverage of the study area when this can be defined.

Current baseline

- 6.6.21 There are 802 Listed Buildings within the Scoping Boundary. The vast majority of these comprise buildings within the larger settlements, ten of which are designated as conservation areas, as well as isolated farmhouses, other agricultural buildings, and churches. There are also some more important structures, including high status houses and associated structures, such as the Category A listed Memsie House (LB16146), Aden House Stables (LB16096), Cairnbulg Castle (LB16143), and maritime structures, including the Former Kinnaid Head lighthouse (LB31888) and Buchan Head Lighthouse (LB16376).
- 6.6.22 Many of these listed buildings are associated with the Inventory Gardens and Designed Landscapes at Cairness, which contains eight listed buildings, including the Category A Cairness House (LB9263) and South Lodge (LB9264), and at Crimongate, which contains 24 listed buildings including the Category A Crimongate House (LB9270).
- 6.6.23 The 56 scheduled monuments within the Scoping Boundary reflect all periods of past activity from late prehistory onwards, and include castles such as Inverallochy Castle (SM97) and prehistoric monuments such as Netherton Standing Stones and Stone Circle (SM35).
- 6.6.24 There are no World Heritage Sites, Inventory Battlefields or Historic Marine Protected Areas within the Scoping Boundary.
- 6.6.25 An initial review of baseline data using Historic Environment Scotland's 'Pastmap' online resource, and the HER map, maintained by Aberdeenshire Council, shows numerous non-designated heritage assets within the Scoping Boundary ranging in date from early prehistory to the modern period. The non-designated heritage assets within the Scoping Boundary represent numerous site and feature types, including Mesolithic flint scatters, cropmarks of possible later prehistoric settlements and field systems and medieval and post-medieval farmsteads.
- 6.6.26 More site-specific assessment will be undertaken when the onshore export cable corridor, landfall(s) and substation(s) has been determined. These are shown at **Figure 6.6.1** in **Appendix 1A**.

Future baseline

- 6.6.27 No significant changes to the current baseline are anticipated.

Basis for scoping assessment

- 6.6.28 The onshore archaeology and cultural heritage scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: Project Description**:
- The Project will be constructed in line with the Project Description, and will require works that have the potential to give rise to adverse effects on the historic environment through disturbance and change to setting. The principal elements that may give rise to direct disturbance during the construction period are:
 - ▶ landfall(s), consisting of offshore export cable corridor and associated transition joint bays and construction compound;
 - ▶ onshore export cables between the landfall(s) and the onshore substation(s);
 - ▶ onshore substation(s) with any associated temporary construction compound; and
 - ▶ grid connection cables between the onshore substation(s) and grid connection point.
 - The principal elements of the Project that would give rise to change to setting during the construction and operational periods are:
 - ▶ perceptible construction work, whether visible or audible, and loss or alteration of existing features in the setting of heritage assets; effects would reduce on completion of construction, but may persist while work areas are reinstated; and
 - ▶ the completed above-ground infrastructure, principally the onshore substation(s);
 - On completion of the operational period, the substation(s) would be removed and the site reinstated to its original state.
 - While there may be some theoretical visibility of offshore infrastructure from heritage assets on the coast, the distance of this infrastructure from shore means that even where visible, would be perceived as a very distant and minor element of the background to sea views, and would be insufficient to give rise to any change to setting.
- 6.6.29 More detailed definition and description of these elements of the Project is set out in **Chapter 2: Project Description**.
- 6.6.30 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 6.6.8**.
- 6.6.31 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 6.6.32 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on onshore archaeology and cultural heritage (see **Table 6.6.7**). These will evolve over the project development and refinement as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 6.6.33 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been included in the scoping assessment.

Table 6.6.7 Relevant onshore archaeology and cultural heritage embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-001	Underground cables will be used to connect from the landfall(s) transition joint bay to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the new onshore substation nominated by NETS grid connection point(s). The installation status of which will be assessed on confirmation of a route of the onshore cable routing. Cables are typically installed in ducts in a standard buried trench arrangement.	Construction Environmental Management Plan (CEMP) and planning condition.
M-002	Where practical, sensitive sites will be avoided by the temporary and permanent onshore project footprint including SPAs, SACs, SSSIs, National Nature Reserve (NNR), Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, Scottish National Trust Land, Listed Buildings and Scheduled monuments.	Project Design
M-006	Vegetation will be retained where possible and mapped (Vegetation Retention Plan or similar). Otherwise, vegetation removal will be undertaken in line with British Standard (BS) 5837-2012 (Trees in relation to design, demolition and construction) and scheduled to avoid bird breeding seasons. Ancient woodland will be retained with a stand-off of a minimum of 25m from any surface construction works (HDD a depth >6m). With regards to other woodland / forestry, the onshore export cable construction corridor will be reduced, where practical, to minimise tree loss and where the construction corridor passes close to woodland that is being retained, BS5837:2012 root protection to apply. Hedgerows with trees / tree lines (including hedgerows deemed " <i>important</i> " under the Hedgerows Regulations 1997) which are crossed by the onshore export cable route will be notched to reduce landscape impacts. All hedgerows that are to be retained, coppiced, notched or lost are to be mapped. Vegetation may be coppiced / pruned to allow access and visibility splays at junctions.	CEMP, description of Project and planning conditions.
M-007	Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2014) guidance on the Assessment of Dust from Demolition and Construction in order to avoid adverse effects on sensitive features. Examples of pathway include windblown dust / fibres or tracking back of dust / fibres is a potential contamination migration.	CEMP and planning conditions.
M-063	A CEMP to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the	CEMP and planning conditions

ID	Environmental measure proposed	How the environmental measures will be secured
	<p>project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. Other measures that feed into the CEMP relevance to this technical assessment include:</p> <ul style="list-style-type: none"> • M-090: Construction noise and vibration; and • M-109: Protection of visual receptors. <p>The CEMP will be the securing mechanism for many measures.</p>	
M-087	Archaeological and paleoenvironmental mitigation will entail an agreed programme of archaeological recording and dissemination of onshore archaeological and built heritage assets where avoidance is not feasible to mitigate any significant adverse effects during construction. This will be set out in a Written Scheme of Investigation to be agreed with Aberdeenshire Council and HES as appropriate.	Planning conditions.
M-088	Any significant effects on the settings of heritage assets remaining after design iterations will be mitigated as far as reasonably practical through sensitive design treatment of visible elements of the Project, and by restoration and enhancements of historic landscape elements, landscape planting and/or screening.	Description of Project and planning conditions.
M-089	Removal of above-ground infrastructure and restoration of sites at the end of the operational period.	Description of Project and planning conditions.
M-090	Construction noise and vibration to be managed within a CEMP to minimise temporary disturbance to residential properties, recreational users and existing land users.	CEMP and planning conditions.
M-109	Protection Visual Receptors during construction: An outline CEMP will be adopted to minimise temporary disturbance to residential properties and tourists / visitor attractions. This may include plans for temporary or permanent screening.	CEMP management plans, description of Project and planning conditions.

Likely significant effects

- 6.6.34 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 6.6.35 The likely significant effects on onshore archaeology and cultural heritage are summarised in **Table 6.6.8**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for historic environment effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.

6.6.36

The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 6.6.8 Likely significant onshore archaeology and cultural heritage effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction					
Onshore land preparation (earthworks, excavation).	M-002, M-087	Potential disturbance from permanent loss of paleoenvironmental and archaeological remains.	Scoped in.	Non-designated heritage assets	National and local archive records. Historic Mapping, Geotechnical information/data. Site visit. Intrusive archaeological investigations may be required.
All construction phases.	M-063, M-088, M-090, M-109	Potential for temporary change to setting caused during construction activities.	Scoped in.	Heritage assets within the Scoping Boundary and extended study area.	National and local archive records. Historic mapping. Site visit. Substation design parameters.
Operation / Maintenance					
Onshore substation- all buildings and above ground infrastructure.	M-002, M-088	Potential for change to setting cause during operation of the Project.	Scoped in.	Designated heritage assets within study area.	National and local archive records. Historic mapping. Site visit.
Offshore elements of the Project (Wind turbines and Offshore substations)	N/A	Potential change to setting of onshore heritage assets arising from visibility of offshore infrastructure.	Scoped out. See rationale in section below paragraph 6.6.40.	Designated heritage assets within study area.	n/a.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Onshore landfall(s) and onshore export cable corridor.	M-001	No potential for disturbance or change to setting following reinstatement.	Scoped out. See rationale in section below paragraph 6.6.38.	Designated heritage assets within study area.	n/a

Decommissioning

Onshore export cabling, landfall(s) and substation-removal and reinstatement.	M-089	Effect during decommissioning would be significantly reduced to that experienced during operation with no potential for disturbance or change to setting following decommissioning. No further disturbance of archaeological remains or built heritage assets is anticipated.	Scoped out. See rationale in section below paragraph 6.6.39.	Designated heritage assets within the study area.	n/a
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Impacts scoped out of assessment

- 6.6.37 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.
- 6.6.38 The design preference is that the **onshore landfall(s) and onshore export cable corridor** will be buried, and following appropriate restoration, will not give rise to adverse change to setting. Where elements of the proposed export cable corridor will remain visible, the potential for lasting change to setting will remain and potential effects will be considered.
- 6.6.39 The **decommissioning** period is not expected to give rise to any significant adverse effects. Change to setting experienced during operation will persist though this period, but it is expected that this would gradually reduce as intrusive elements were removed. Any works will also be anticipated to affect only previously disturbed areas and no further disturbance or damage to heritage assets is anticipated.
- 6.6.40 **Potential effects arising from visibility of offshore infrastructure during construction and operation** of the Project have been scoped out of further assessment. During construction, there will be visibility of construction activity, but this will be restricted to cabling operations relatively close to shore, which will be experienced as a brief and transitory period of operation of very limited magnitude. In most cases these works will appear broadly in keeping with normal maritime traffic. Works within the intertidal zone could become more prominently perceptible in the settings of heritage assets, but these works will be limited in duration and restored completely on completion. As a result, they will not be experienced as a lasting change and no significant effect is anticipated. On completion of the construction period, no offshore elements of the proposed development Project will be perceptible in the settings of onshore designated heritage assets with sufficient prominence to give rise to change to setting of onshore heritage assets. Some elements of the westernmost WTGs may be visible under ideal conditions in some views from heritage assets in elevated positions on the coast. The proposed WTGs would be visible only as very distant features and would not appear with sufficient prominence to give rise to any discernible change to setting.
- 6.6.41 It is anticipated that a number of individual potential receptors will be scoped out as a result of the scoping assessment for effects arising through change to setting, to be carried out once a preferred landfall(s), onshore export cable route corridor and substation(s) option area are identified. Rationales for this scoping out will be provided in that assessment.
- 6.6.42 Any potential likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed.

Cumulative effects

- 6.6.43 Cumulative effects on onshore archaeology and cultural heritage resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the cumulative effects assessment screening exercise.
- 6.6.44 There is the potential for cumulative effects on onshore archaeology and cultural heritage assets to arise, although it is anticipated that as a result of the character of the receiving

environment and the nature of the Project that the number of potential receptors of cumulative effects would be limited.

6.6.45 Cumulative effects on setting may arise where other proposed developments are present in the settings of designated heritage assets that might also be affected by the Project.

6.6.46 Cumulative disturbance of archaeological remains may arise where a discrete archaeological site or group of related heritage assets that would be disturbed by the Project is likely to be disturbed by other development. Owing to the localised nature of the majority of archaeological sites in this area, it is anticipated that only other developments in very close proximity to onshore infrastructure of the Project would have the potential for this type of effect.

Transboundary effects

6.6.47 The potential effects from construction, operation and decommissioning on onshore archaeology and cultural heritage receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. No transboundary impacts have been identified due to the relatively localised nature of the potential effects.

Proposed approach to the EIA Report

6.6.48 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process which as set out in **Chapter 4: Approach to Scoping and EIA**. Consultees are expected to include:

- Historic Environment Scotland; and
- Aberdeenshire Council.

6.6.49 Disturbance of archaeological remains is likely to occur during construction phase activity. However, change to the setting of heritage assets may occur either during construction or operation, through the continued presence of certain Project components in the landscape. Consequently, both construction and operational phases are scoped into the assessment. Likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

6.6.50 The spatial scope for assessment during construction will be defined by the study area as described above and refined through consultation with key stakeholders.

6.6.51 Due to the buried nature of the onshore export cable, the spatial scope of assessment during the operation phase will be confined to a maximum 2km study area around the substation(s) as set out at **paragraph 6.6.19** above). This may be refined following the selection of component locations and consideration of topography and the sensitivity of surrounding heritage assets. Any refinements will be agreed through consultation with key stakeholders.

6.6.52 The study area will be revised following refinement of the onshore infrastructure components, the identification of additional impact pathways and in response to feedback from consultation where appropriate.

6.6.53 Once the construction and operational components of the Project have been fixed, the following principles will be used to identify receptors for assessment:

- Built heritage assets and archaeological remains within the construction footprint will be assessed.

- Heritage assets within 500m of the construction footprint which may be affected through change to setting caused by the construction of the Project.
- Further, heritage assets within 2km of the visible elements which might be affected through change to setting caused by the operation of the Project. This will include non-designated heritage assets whose significance may be affected. Factors to be considered in the identification of asset will include distance to the asset; topography; relationship to other assets; and duration of any effect. Effects are not confined to visual change but may include changes from noise, dust, vibration, and severance.

6.6.54

Likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

6.7 Onshore noise and vibration

Introduction

- 6.7.1 The onshore noise and vibration assessment will consider the potential likely significant effects on residential and non-residential receptors that may arise from the construction, operation, maintenance, and decommissioning of the Project. The offshore components of the Project, including the operational noise from the wind farm itself, are proposed to be scoped out of airborne noise and vibration assessment, for reasons discussed in **paragraph 6.7.7**. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these effects will be assessed for the purpose of the EIA.
- 6.7.2 Noise and vibration interfaces with other aspects and as such, should be considered alongside these; namely:
- **Section 5.13: Infrastructure and other marine users:** Where impacts from onshore generated noise and vibration are assessed on other marine users
 - **Section 6.1: Ground conditions and contamination:** Soil functions can include the preservation archaeological remains therefore ground conditions are important and the onshore archaeology and cultural heritage assessment may be informed by the ground conditions and contamination section.
 - **Section 6.5: Terrestrial ecology and ornithology:** There is the potential for fauna to be disturbed or displaced by noise and vibration associated with the Project, therefore, the noise and vibration section will be used to inform the terrestrial ecology and ornithology assessment.
 - **Section 6.6: Onshore archaeology and cultural heritage:** There is the potential for onshore archaeology and cultural heritage receptors and resources to be impacted by noise and vibration, therefore the noise and vibration section will inform the archaeology and cultural heritage assessment.
 - **Section 6.8: Traffic and transport:** Noise and vibration impacts could arise from Project traffic flow data is used for both road movements and along construction accesses in the noise and vibration assessment.
 - **Section 6.9: Landscape and visual:** There may be sensitive landscapes or receptors that could be affected by noise mitigation in the form of screening and enclosures, therefore the landscape and visual assessment will consider the noise and vibration section to identify any such impact.
 - **Section 7.3: Socio-economics:** Noise and vibration changes caused by the Project could impact on sensitive receptors and resources within this aspect, therefore the noise and vibration section will inform the socio-economic assessment.
- 6.7.3 This section considers the potential onshore noise and vibration effects on receptors above Mean Lower Water Springs (MLWS). Noise and vibration effects on receptors seaward of Mean High Water Springs (MHWS) are addressed in **Section 5.3: Underwater noise and vibration**.

Legislative and policy context

- 6.7.4 This section identifies the relevant legislative and policy context which has informed the scope of the onshore noise and vibration assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine, and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 6.7.5 In order to provide a robust evidence base **Table 6.7.1** below presents a summary of legislation and policies relevant for the onshore archaeology and cultural heritage assessment for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section. Many of the policy documents have a high level consideration of noise rather than requiring specific impact on the methodology of the noise assessment. Also, legislation often places the ground work for more detailed guidance, with the guidance directly used within the assessment process.

Table 6.7.1 Relevant legislation and policy

Relevant Legislation and Policy	Relevance to the assessment
Legislation	
Control of Pollution Act 1974	<ul style="list-style-type: none"> The Act provides the basis for defining codes of practice. It applies the BS 5228: 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise and Part 2: Vibration are of relevance to this assessment.
Environmental Noise (Scotland) Regulations 2006	<ul style="list-style-type: none"> The Regulations require regular noise mapping and the production of Noise Action Plans for the management of noise. The study area includes data from road noise, which may be referenced for the purposes of a construction noise baseline should this be required by the assessment (i.e. predicted noise levels at receptor locations above the threshold value within BS 5228). These Regulations also provide the legal means by which the following are defined and protected: <ul style="list-style-type: none"> ▶ Quiet Areas and ▶ Noise Important Areas are defined and protected. Both of which would be considered as resources for the assessment, if they are identified to be within the study area.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the Climate and Nature Crises Policy 23: Health and Safety.

Relevant Legislation and Policy	Relevance to the assessment
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development.
Scottish Planning Policy (SPP) 2014 <ul style="list-style-type: none"> Paragraph 169 	<ul style="list-style-type: none"> Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> net economic impacts; scale of contribution to renewable energy generation; effect on greenhouse gas emissions; cumulative impacts; impacts on communities and individual dwellings; landscape and visual; natural heritage; carbon rich soils impacts; impacts on historic environment; impacts on road traffic; and effects on hydrology.
Planning Advice Note 1/2011 (PAN 1/2011) ‘Planning and Noise’	<p>PAN 1/2011 provides guidance on the assessment of noise in Scotland. Whilst it does not aim to provide a definitive source of guidance on noise issues, it does set out the range of noise issues that determining authorities need to be aware of in formulating development plans and making decisions on planning applications. It refers to the Assessment of noise: technical advice note (Scottish Government, 2011) for further information on noise impact assessments.</p> <p>The information within the technical advice note provides guidance on the setting out of assessment parameters for significant effect referencing the sensitivity of receptors and magnitude of impact. This guidance will be taken into consideration within the methodology for the noise and vibration assessment.</p>
Marine Policy	
No policy is of specific relevance to this onshore area of technical assessment.	
Local Planning Policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> C2 Renewable Energy P4 Hazardous and Potentially Polluting Development and Contaminated Land <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>

Technical guidance

6.7.6 Technical guidance that has been used to define the assessment is set out in **Table 6.7.2** below.

Table 6.7.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Association of Noise Consultants (ANC) BS 4142:2014+A1:2019 Technical Note, version 1.0	Provides discussion from the ANC Good Practice Working Group on the applicability and use of BS 4142:2014+A1:2019.
BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound	<p>Presents guidance on the monitoring and assessment of industrial and commercial sound sources and is particularly orientated to the assessment of sound from factories, industrial premises, fixed installations or sources of an industrial / commercial nature affecting dwellings. BS4142 will be used for the methodological approach and assessment criteria of the onshore substation.</p> <p>Low frequency noise (substations generally produce tonal sound in harmonics of 50 Hz and in particular at 100Hz) will be assessed through the application of tonal penalties in the Rating sound correction.</p>
BS 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise	Detailed guidance on assessing noise from construction sites to be used for the construction of the cable route and substation.
BS 5228-2:2009+A1:2014 Noise and vibration on construction and open sites. Part 2: Vibration	Provides methods and criteria for assessing ground borne vibration, which have been used when considering the potential for significant effects due to vibration. This standard is to be used for the assessment of the construction of the cable route and substation.
BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings – Vibration sources other than blasting	BS 6472-1 provides best available information on the application of methods of measuring and evaluating vibration in order to assess the likelihood of adverse comment. This standard is to be used for the assessment of the construction of the cable route and substation.
BS 7445:2003 Description and measurement of environmental noise	This three part standard presents a guide to quantities and procedures, the acquisition of data pertinent to land use and the application to noise limits. This standard is to be used for the survey method.
BS 8233:2014 Guidance on sound insulation and noise reduction for buildings	This standard provides the calculation methodology for determination of noise break-in from external sources along with providing guidance on suitable internal ambient noise levels inside buildings depending on their use
Calculation of Road Traffic Noise (CRTN)	Describes the procedures for calculating road traffic noise, to be used for the predictions of construction traffic noise.

Guidance reference	Relevance to the assessment
Design Manual for Roads and Bridges (DMRB) LA111: Noise and vibration	Provides guidance on the assessment of impacts that road projects may have on levels of noise and vibration. Provides criteria for assessing changes in road traffic noise levels, which will be used in the assessment of increases in road traffic noise due to vehicle movements associated with the Proposed Works.
Guidelines for Environmental Impact Assessment	Presents guidance on how the assessment of noise effects should be presented within the Environmental Impact Assessment (EIA) process. The Institute of Environmental Management and Assessment guidelines cover aspects such as scoping, baseline, prediction and examples of significance criteria. Guidance within this document will be used for the assessment of noise and vibration.
ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors: Part 2 General Method of Calculation	Describes the method of calculating the attenuation of sound to predict environmental noise. This standard will be used within the computer noise modelling of the substation.
TAN /2011 Assessment of Noise	Provides guidance to assist the technical evaluation of noise assessments, to be used as a basis for the sensitivity of receptor and magnitude of impacts. The TAN refers to as being the basis for the assessment of noise from new industrial uses affecting existing receptors

Study area

- 6.7.7 The study area for the construction, operation, maintenance, and decommissioning noise and vibration assessment is defined as the onshore elements of the Scoping Boundary.
- 6.7.8 Once the Project infrastructure has been defined, a 1 km buffer zone around the onshore export cable route, including any limits of deviation, and substation boundary will be implemented. For the EIA, this study area will be used to identify key noise and vibration sensitive receptors for noise and vibration predictions and assessment on the basis of proximity and sensitivity.
- 6.7.9 There is no study area for operational noise from the offshore WTGs and ancillary equipment (such as offshore substations), as the wind farm is 70km offshore, and is scoped out of the assessment on the basis that there is very little likelihood of any noise transmission to receptors
- 6.7.10 Reference may be made to potential receptors outside of the study areas defined above, such as receptors of special interest (for example designated tranquil areas or precision engineering premises). Where this is the case, those potential receptors will also be considered as part of the noise and vibration assessment.
- 6.7.11 The study area will be reviewed and amended in response to such matters as refinement of the onshore infrastructure components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

Consultation

- 6.7.12 An online meeting was held between the Applicant and Aberdeenshire Council on the 28 September 2022 to discuss the approach to the scoping of noise and vibration and the following specific aspects:
- scope of works;
 - high level approach to the methodology and assessment criteria; and
 - approach to surveys.
- 6.7.13 Aberdeenshire Council noted their general agreement on the approach to the assessment method. Concern was raised in relation to substation noise, and the potential for low frequency issue if in close proximity to residents. At this stage it is considered that the approach of BS4142 is sufficient to protect amenity from substation noise. Additional concern by Aberdeenshire Council was raised regarding construction vehicles using low trafficked routes. It is considered that the use of the BS 5228 minimum threshold levels are sufficient to protect amenity where flows are very low that they cannot be predicted using CRTN.

Assessment methodology

Introduction

- 6.7.14 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this noise and vibration chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the noise and vibration assessment.

General approach

Baseline survey methodology

- 6.7.15 As the locations of the onshore infrastructure continue to be refined, a desk-based review will be undertaken to identify potentially sensitive receptors and appropriate monitoring requirements. The identified approach will be refined and agreed through further consultation with Aberdeenshire Council.
- 6.7.16 Baseline monitoring will be required to establish baseline conditions to inform the assessment of likely effects on noise sensitive receptors (NSRs) during the relevant phases of the Project.
- 6.7.17 Where required, baseline noise monitoring will be conducted for informing the assessment of construction and decommissioning noise using methods within BS 5228-1:2009+A1:2014 (BSI, 2014a). Monitoring will only be considered necessary where noise predictions show that there would be significant exceedances of minimum threshold levels as determined within BS 5228. It is assumed that the receptors would all be in the lowest noise threshold category from Annex E of BS 5228. This will lead to a conservative assessment
- 6.7.18 Sound monitoring for the new Project onshore substation will be undertaken in accordance with the methodologies advocated within British Standard (BS) BS 7445-1:2003 Description and measurement of environmental noise (BSI, 2014b) and BS 4142:2014 Methods for rating and assessing industrial and commercial sound (BSI, 2014c). The survey will cover

day and night-time for a period of at least 5 days including both weekdays and the weekend. Measurements will be used to characterise the baseline environment for both the construction and operational phases of the substation.

- 6.7.19 Monitoring will be undertaken at locations representative of Noise Sensitive Receptors (NSRs) to determine baseline ambient ($L_{Aeq,T}$) and background (L_{A90}) sound levels. Meteorological data (wind speed, direction, temperature, precipitation) will be logged concurrently at one of the sound monitoring survey locations to allow exclusion of sound level data acquired during unrepresentative meteorological conditions. Baseline monitoring will be a mix of long-term (LT) and short-term (ST) locations during school term time. At this time, it is not possible to identify the potential NSRs, however usually the representative NSRs are usually chosen to be the closest residential (or other sensitive) receptors at directions from the operational substation. Depending on the location and density of residential or industrial development, this will generally lead to monitoring being carried out at between 2 to 10 locations.
- 6.7.20 A survey management plan will be prepared and submitted to Aberdeenshire Council to agree monitoring locations and survey methodology once the design is refined.
- 6.7.21 Baseline vibration surveys are not considered necessary as it is understood that there are no significant vibration generating sources in the study area.

Construction assessment

- 6.7.22 Noise predictions will be made based on anticipated construction methodologies and plant components (including mobile plant on specially created haul routes). The predictions will incorporate all noise sensitive receptors (such as residential dwellings, schools, medical facilities etc.) within the study area. The predictions will utilise BS 5228-1 (BSI, 2014) methodology to predict noise, the results of which will be compared with the criteria within Method 2 of Annex E (5 dB(A) change). Periods of higher noise levels than lower cut-off levels shorter than a month will be assessed using the trigger levels for temporary rehousing and noise insulation eligibility in Appendix E of BS 5228-1.
- 6.7.23 Construction road traffic noise will be initially predicted using a Basic Noise Level prediction calculation within the Calculation of Road Traffic Noise to compare 'with' and 'without' construction traffic scenarios. The difference between the 'with' and 'without' scenarios will be assessed using short-term criteria within the Design Manual For Roads And Bridges (DMRB) (Highways England, 2020) updated noise assessment section (Volume 11, Section 3, Part 7, LA111). Detailed noise modelling for construction road traffic will be undertaken where potential significant effect is identified and likely from the initial calculations. Where traffic flows (either 'with' or 'without' scenarios) are not sufficiently high enough to be able to undertake CRTN calculations, predictions of noise will be undertaken using BS 5228 haul route method and compared against BS 5228 criteria (BSI, 2014).
- 6.7.24 Due to the uncertainties regarding ground conditions and final plant equipment, the assessment of vibration from likely sources, such as onshore piling equipment, will be undertaken qualitatively, but with consideration of empirical levels provided within BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 2 Vibration (BSI, 2014).

Operational assessment

- 6.7.25 An assessment of operational sound generated by the onshore substation will be undertaken using prediction methodology within ISO 9613-2 (BSI, 1996) and assessed in accordance with BS 4142 (BSI, 2019).

- 6.7.26 In consideration of the low-frequency component of the operational sound, the ANC Working Group Technical Note (ANC, 2020) reports that the scope (Subclause 1.3) of BS 4142 (BSI, 2019) states that the Standard is not applicable to the assessment of low frequency noise. However, the Working Group considered that it would be reasonable to use BS 4142 down to 50 Hz and possibly lower as part of a tonality assessment. Following the Working Group's rationale, it is considered that the operational sound of interest to the assessment will be encapsulated by the frequency range described in BS 4142. Therefore, BS 4142 will be used to evaluate the low-frequency components of operational sound. Where an adverse impact is indicated, further assessment of noise impact will be conducted including an assessment of noise break-in calculations, using guidance from BS 8233 (BSI, 2014).
- 6.7.27 Maintenance road traffic will be predicted using a Basic Noise Level prediction calculation within the Calculation of Road Traffic Noise to compare 'with' and 'without' operational traffic scenarios. The difference between the 'with' and 'without' scenarios will be assessed using short-term criteria within the DMRB (Highways England, 2020) updated noise assessment section (Volume 11, Section 3, Part 7, LA111). Detailed noise modelling for operational road traffic will be undertaken where potential likely significant effects are identified as likely from the initial calculations.
- 6.7.28 Vibration, either from the substation, maintenance traffic will be considered qualitatively and against criteria set out within BS 5228-2 (BSI, 2014).

Decommissioning

- 6.7.29 Noise predictions would be made based on anticipated decommissioning methodologies and plant components (including mobile plant on specially created haul routes), and a decommissioning management plan to be developed in the future. The predictions will incorporate all noise sensitive receptors (such as residential dwellings, schools, medical facilities etc.) within the study area. The predictions would utilise BS 5228-1 (BSI, 2014) methodology to predict noise, the results of which will be compared with the criteria within Method 2 of Appendix E. Periods of higher noise levels than lower cut-off levels shorter than a month would be assessed using the trigger levels for temporary rehousing and noise insulation eligibility in Appendix E of BS 5228-1.
- 6.7.30 Decommissioning road traffic has been scoped out of the Transport and Traffic Chapter. As such, it is considered that decommissioning traffic will not be the source of significant noise and will be scoped out of this assessment.
- 6.7.31 Due to the uncertainties regarding ground conditions and final plant equipment, the assessment of vibration from likely sources, such as concrete breaking equipment, would be undertaken qualitatively, but with consideration of empirical levels provided within BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 2 Vibration (BSI, 2014).

Establishing receptor sensitivity

- 6.7.32 The EIA Regulations 2017 recognise that developments will affect different environmental elements to differing degrees and that not all of these are of sufficient concern to warrant detailed investigation through the EIA process. The EIA Regulations 2017 identify those environmental resources that warrant investigation as those that are "*likely to be significantly affected by the development*".
- 6.7.33 The significance of an effect resulting from a development during construction, operation and maintenance or decommissioning is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect. This approach provides

a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.

- 6.7.34 TAN Assessment of Noise (Scottish Government 2011) provides guidance on the proposed sensitivity of various classes of receptor for noise-generating development within Scotland. The sensitivities are reproduced below in **Table 6.7.3**:

Table 6.7.3 Noise receptor sensitivities according to TAN

Sensitivity	Description	Examples
High	Receptors where people or operations are particularly susceptible to noise.	<ul style="list-style-type: none"> Residential, including private gardens where appropriate, Quiet outdoor areas used for recreation, Conference facilities, Theatre / auditoria / studios, Schools during the daytime, Hospitals / residential care homes and Places of worship.
Medium	Receptors moderately sensitive to noise, where it may cause some distraction or disturbance.	<ul style="list-style-type: none"> Offices, Bars / cafes / restaurants where external noise may be intrusive, and Sports grounds where spectator noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf, bowls).
Low	Receptors where distraction or disturbance from noise is minimal.	<ul style="list-style-type: none"> Buildings not occupied during working hours, Factories and working environments with existing high noise levels, Sports ground where spectator noise is a normal part of the event, Night clubs, and Other industrial sites.

- 6.7.35 In addition to the sensitivities above, there may be certain industrial receptors that are not noise-sensitive, but might be highly sensitive to vibration. Such activities tend to be, but are not exclusively, located at precision engineering or manufacturing facilities. It is not always obvious which premises will contain vibration-sensitive activities.

Establishing the magnitude of impact

Construction noise

- 6.7.36 The magnitude of impact due to construction noise will be assessed using magnitude of change due to the works. This is based on the guidance (Example method 2 – “5 dB[A] change”) provided in Annex E of BS 52281:2009+A1:2014 (British Standards Institution, 2014).

- 6.7.37 The guidance states “Noise levels generated by site activities are deemed to be potentially significant if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,T}$ from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect”.
- 6.7.38 The descriptions of the magnitude of impact due to construction noise are summarised below.

Table 6.7.4 Establishing the magnitude of impact – Noise

Magnitude	Description
High	Levels very much greater than baseline and very disruptive.
Medium	Levels greater than baseline and disruptive.
Low	Levels greater than baseline.
Negligible	Levels less than baseline.

Construction traffic noise

- 6.7.39 **Table 6.7.5** provides the proposed impact magnitude categories for assessing traffic noise associated with the Project, determined based on the guidance contained within the Design Manual for Roads and Bridges (DMRB) (Transport Scotland et al., 2020) and using professional judgement. This is based on Basic Noise Level (BNL) calculations indicating the increase in road traffic noise level due to increases in flows on the road network from additional vehicle movements generated by the proposed works. The BNL is the calculated sound level due to road traffic, accounting for the traffic flow, speed and percentage of Heavy Goods Vehicles (HGVs), at 10 m from the carriageway edge, as set out in Calculation of Road Traffic Noise (CRTN) (HMSO, 1988).
- 6.7.40 Although there are methods to predict noise from low-flow (fewer than 200 vehicle movements per hour) road links, it is expected that construction traffic will not give rise to significant noise at receptors adjacent to these low flow roads, although relatively speaking, the change in noise from HGV traffic on these links will be disproportionately higher than for busier roads.

Table 6.7.5 Establishing the magnitude of impact at receptors due to increased road traffic noise associated with the Proposed Works

Magnitude	Increase in BNL of closest public road used for construction traffic (dB)
High	Greater than or equal to 5.0
Medium	Greater than or equal to 3.0 and less than 5.0
Low	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

Construction vibration

Human response

6.7.41 The assessment of human response due to vibration from construction works will be assessed in accordance with BS 5228-2:2009+A1:2014 (BSI, 2014) and although BS 6472 (BSI, 2014) is the prime standard for use in assessment of human response to vibration, BS5228-2 (BSI, 2014) states that:

“Whilst the assessment of the response to vibration in BS 6472 is based on the VDV (vibration dose value) and weighted acceleration, for construction, it is considered more appropriate to provide guidance in terms of the peak particle velocity (PPV), since the parameter is likely to be more routinely measured based upon more usual concern over potential building damage.”

6.7.42 Table B.1 of BS 5228-2:2009+A1:2014 (BSI, 2014) provides guidance on the effect of vibration levels in terms of PPV. This has been replicated in **Table 6.7.6** and the guidance sets out typical effects at certain levels of vibration.

Table 6.7.6 Criteria for construction vibration – human response

Vibration Level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

6.7.43 The effect levels that will be used as part of the assessment will also be applied to define trigger levels to be included in a Construction Environmental Management Plan (CEMP) and used for compliance monitoring during construction.

6.7.44 Construction vibration levels in excess of 1.0mm/s PPV will be considered as the threshold above which a significant effect could occur dependent on the duration of exposure.

6.7.45 Based upon professional judgement, in the absence of guidance on the temporal scope for construction vibration, a significant effect would be confirmed if PPVs in excess of 1mm/s were recorded at a sensitive receptor location in four or more 30-minute intervals on a single day for five or more days in any rolling 15-day period.

Cosmetic damage to buildings

6.7.46 BS 7385-2:1993 (BSI, 2014) sets out transient vibration values for cosmetic damage to buildings and these values are presented below in **Table 6.7.7**.

Table 6.7.7 Threshold of effect for construction vibration – cosmetic damage

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings.	50 millimetres per second (mm/s) at 4 Hz and above.	
Unreinforced or light framed structures. Residential or light commercial type buildings.	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz.	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above.

Vibration-sensitive industry

- 6.7.47 There are potentially vibration-sensitive processes that will need to be taken account of. The respective magnitudes of impact will be derived on a case-by-case basis following the canvass of the businesses in the area. All premises housing processes identified as being at risk from construction vibration will be considered and assessed.

Operational substation noise

- 6.7.48 Operational substation noise will be assessed using BS 4142:2014+A1:2019 (BSI, 2014). Propagation of sound will be calculated using ISO 9613-2:1996 (BSI, 2019).
- 6.7.49 BS 4142:2014+A1:2019 provides a methodology and criteria for assessing new or existing industrial sound sources by comparing the operational sound (rating level) at the location of a sensitive receptor, with the background sound levels (L_{A90}) that are currently experienced without the development.

Determination of significance

- 6.7.50 The language used in BS 4142:2014+A1:2019 (BSI, 2019) does not readily align with that in EIA. In EIA terms, there is a point at which the change in noise (which in EIA terms would be described as impacts) would indicate a significant effect, depending on the context and the absolute level of the noise.
- 6.7.51 BS 4142:2014+A1:2019 emphasises the requirement to fully understand the context in which the sound occurs and therefore context will need to be considered in the assessment process before determining the potential significant effect resulting from the impacts identified. For this reason, defining a scale for magnitude of change, or values for the purposes of identifying Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) are not considered possible at this stage. However, the basis on which those decisions will be made is set out below. The levels will be reported in appropriate detail in the EIA Report once baseline surveys have been completed.
- 6.7.52 The determination of significance for residential receptors exposed to operational noise will be based on the information in **Table 6.7.8** below and professional judgement taking into account the consideration of context.
- 6.7.53 A significant effect will be identified in two ways: (1) if the SOAEL is exceeded, as noise emitted by the substation in day-to-day operation will be continuous and/or (2) considering

the advice of BS 4142:2014+A1:2019 based on the difference between the rating level and the background sound level, and contextual considerations (once established).

6.7.54 For the operational substation, the LOAEL and SOAEL will be set with reference to absolute levels and BS 4142:2014+A1:2019 with the understanding of site context (once established). The absolute noise levels that will be considered in setting the LOAEL and SOAEL are based on WHO Community Noise Guidelines (WHO, 1999) for daytime and WHO Night Noise Guidelines for Europe (WHO, 2009) for night-time. In **Table 6.7.8** below, no absolute value is suggested as the basis for daytime SOAEL, as this will be based on consideration of existing noise levels for each location.

Table 6.7.8 Proposed LOAELs and SOAELs for assessing operational noise

Assessment Period	Standard	Metric, dB	LOAEL and SOAEL criteria
Daytime (07:00 – 23:00 hours) Night-time (23:00 – 07:00)	BS 4142:2014+A1:2019 Absolute level: WHO	L _{Aeq} (16 hour)	LOAEL and SOAEL will be determined following site surveys as context is key to determination of significant effects, using the methodology outlined in BS 4142:2014+A1:2019, but with consideration of role of absolute levels within WHO guidance.

6.7.55 Impacts and effects for non-residential noise sensitive receptors will be considered on an individual and representative receptor basis, initially guided by the sensitivities set out in **Table 6.7.3**. Aberdeenshire Council will be consulted on the screening and assessment criteria.

Operational wind farm noise

6.7.56 Operational wind farm noise is scoped out of the assessment.

Baseline conditions

Data sources

6.7.57 No baseline survey has yet been undertaken for the noise and vibration assessment of the Project. Online mapping using Google Earth Pro (version 7.3.2.5776) has been used to identify current baseline conditions.

Current baseline

6.7.58 As surveys have not yet been carried out, the description of the existing baseline sound climate is based on professional judgement following examination of the area covered by the Scoping Boundary.

6.7.59 Land use in the Scoping Boundary is predominantly semi-rural with interspersed communities, including the large settlements of Peterhead, Fraserburgh and Mintlaw. It is anticipated that the baseline ambient noise levels in the rural and residential areas will generally be low, except where close to major transportation routes. Near to industrial and commercial sites, as well as major transportation routes, it is anticipated that baseline noise levels will be higher than those in rural or residential areas.

Future baseline

- 6.7.60 The future baseline sound climate is not anticipated to change for the majority of the areas where the Project is proposed to be located.
- 6.7.61 Where new industrial or residential development occurs within the Zone of Influence (Zol) for noise and vibration of the Project, local sound levels would be expected to change if that use was new to the area.

Basis for scoping assessment

- 6.7.62 The noise and vibration scoping assessment is based on the project description in **Chapter 2: Project Description**, with particular reference to the following key assumptions.
- 6.7.63 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 6.7.10**.
- 6.7.64 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Construction noise and vibration

- 6.7.65 Sound generated from construction activities will be temporary. Noise and vibration effects will most likely result from the following onshore construction activities:
- staged trenching of onshore export cable route, potentially including horizontal directional drilling (HDD) at the landfall(s) and, as required, at proposed crossing points along the onshore export cable route (for example at landfall, sensitive watercourses or roads);
 - construction works for the onshore substation/s will include the creation of site access, site preparation works, installation of underground services and foundations, construction of the buildings, installation of electrical equipment, installation of perimeter fencing, and landscaping; and
 - construction traffic will be made up of heavy goods vehicles (HGVs) and Abnormal Indivisible Load (AIL) transporters delivering or removing equipment, materials and plant.
- 6.7.66 The construction of the Project is illustrated by the Scoping Boundary, see **Figure 1.1: Scoping Boundary** in **Appendix 1A**.

Operational noise

- 6.7.67 The offshore wind farm is at least 75 km distance from onshore noise sensitive receptors. As such, this is scoped out of the assessment.
- 6.7.68 The Project encompasses up to two onshore substations (not including a grid connection substation) and onshore export cable routes from the landfall(s), with standard construction and operation practices.
- 6.7.69 The operation of the Project is bound by the Scoping Boundary, see **Figure 1.1** in **Appendix 1A**.

Decommissioning

- 6.7.70 Buried cables will likely be left in-situ when decommissioning and removing the onshore substation/s.
- 6.7.71 The decommissioning of the Project is bound by the Scoping Boundary, see **Figure 1.1** in **Appendix 1A**.

Embedded environmental measures

- 6.7.72 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on noise and vibration (see **Table 6.7.9**). These will evolve through the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that will be undertaken to meet existing legislation requirements.
- 6.7.73 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 6.7.9 Relevant noise and vibration embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-063	A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. The CEMP will be the securing mechanism for many measures.	CEMP and planning conditions.
M-090	Construction noise and vibration to be managed within a CEMP to minimise temporary disturbance to residential properties, recreational users, and existing land users.	CEMP and planning conditions.
M-091	Road condition surveys will be undertaken before, during and after the construction phase and repairs conducted to any damage to roads, as a result of construction heavy goods vehicles (HGVs) on the roads related to the Project and included within the HGV Access Strategy. This commitment is included within this chapter as it minimises the risk from vibration effects at residences from HGVs passing over holes in the road.	CEMP and planning conditions.

Likely significant effects

- 6.7.74 In line with the EIA Regulations 2017 (Scottish Government, 2011), the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and

available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.7.75 The likely significant effects of noise and vibration are summarised in **Table 6.7.10**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for noise and vibration effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.

6.7.76 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 6.7.10 Likely significant noise and vibration effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction					
Site construction noise	M-063, M-090	Disturbance and annoyance	Scoped in for Onshore infrastructure, Scoped out for Offshore construction (for rationale see section below paragraph 6.7.78).	Residences, sensitive services (healthcare, education, religious, ceremonial), ecological designations	Survey if baseline ambient will affect criteria (minimum threshold values in BS 5228).
Construction traffic noise	M-063, M-090	Disturbance and annoyance	Scoped in.	Residences, sensitive services (healthcare, education, religious, ceremonial), ecological designations	N/A
Site construction vibration	M-063, M-090	Disturbance and annoyance, structural damage	Scoped in.	Residences, sensitive services (healthcare, education, religious, ceremonial), ecological designations, engineering and scientific premises	N/A
Construction traffic vibration	M-091 Road surveys and repair	Disturbance and annoyance, structural damage	Scoped out (for rationale see section below paragraph 6.7.80).	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Operation and maintenance					
Operational site noise	-	Disturbance and annoyance	Scoped in for onshore substation(s), Scoped out for offshore elements (see paragraph 6.7.79).	Residences, sensitive services (healthcare, education, religious, ceremonial), ecological designations	Baseline noise measurements at nearest residences.
Operational traffic noise	-	Disturbance and annoyance	Scoped out (for rationale see section below paragraph 6.7.81).	N/A	N/A
Operational site vibration	-	Disturbance and annoyance, structural damage	Scoped out (for rationale see section below paragraph 6.7.82).	N/A	N/A
Operational traffic vibration	-	Disturbance and annoyance, structural damage	Scoped out (for rationale see section below paragraph 6.7.81).	N/A	N/A
Decommissioning					
Decommissioning site noise	M-063, M-090	Disturbance and annoyance	Scoped out (for rationale see section below paragraph 6.7.83).	N/A	N/A
Decommissioning traffic noise	M-063, M-090	Disturbance and annoyance	Scoped out (for rationale see section below paragraph 6.7.83).	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			below paragraph 6.7.83).		
Decommissioning site vibration	M-063, M-090	Disturbance and annoyance, structural damage	Scoped out (for rationale see section below paragraph 6.7.83).	N/A	N/A
Decommissioning traffic vibration	M-091 Road surveys and repair	Disturbance and annoyance, structural damage	Scoped out (see paragraph 6.7.83).	N/A	N/A

Impacts scoped out of assessment

- 6.7.77 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned work and the professional judgement on the potential for impact from such projects more widely. Offshore elements, at the location of the wind farm, are significantly distant (up to 75km) from residential receptors. This is reflected in the decision to scope out noise assessments that would otherwise be expected on similar projects, located closer to receptors. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.
- 6.7.78 Offshore construction works (piling being the most notable noise source) will result in negligible effect at onshore receptors. This takes into account the reflective effect on noise propagation due to the water surface. This conclusion is based on professional judgement, a knowledge of the propagation of noise and experience on other offshore wind farms.
- 6.7.79 Similarly, operational noise from the wind farm is also highly unlikely to propagate to onshore receptors at significant levels and as such has been scoped out.
- 6.7.80 With the embedded measures in place for the review of road condition and road repair, it is considered that there is negligible risk of significant vibration from heavy vehicles using roads affecting nearby sensitive receptors.
- 6.7.81 Operational traffic will be limited to infrequent and small-scale vehicular traffic for the purposes of maintenance and repair of the substation site and onshore export cable route. The traffic flows will be substantially below the level required for an adverse noise or vibration effect to be apparent at sensitive receptors.
- 6.7.82 The activities associated with the operation of the Project are not expected to generate significant vibration levels at sensitive receptors. There is no rotating or reciprocating machinery to give rise to vibration associated with out-of-balance forces.
- 6.7.83 It is assumed decommissioning will be similar to construction, but result in substantially less impact than construction. As such, the effect of decommissioning will be represented as a worst case by construction requiring no more mitigation than the earlier phase, and with no higher residual effect.

Cumulative effects

- 6.7.84 Cumulative effects on noise and vibration resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the cumulative effects assessment screening exercise.
- 6.7.85 The following impacts from the Project have the potential, combined with impacts from other developments, to contribute to cumulative effects:
- construction noise and vibration, if occurring at the same time with other major infrastructure projects; and
 - operational noise, if other industrial sites are close to the same identified receptors as the Project.

Transboundary effects

- 6.7.86 The potential effects from construction, operation and decommissioning on onshore noise and vibration receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. No transboundary impacts have been identified due to noise and vibration.

Proposed approach to the EIA Report

- 6.7.87 Consultation will be held with relevant statutory and non-statutory organisations and other stakeholders as necessary and as part of the Pre-application Consultation process as set out in **Chapter 4: Approach to Scoping and EIA**.
- 6.7.88 It is anticipated that the EIA Process will include a draft of the full noise and vibration assessment which will be taken forward into the EIA Report. This will likely include the following:
- collected baseline information;
 - noise and vibration predictions for the construction site works, noise predictions from construction traffic and noise predictions from substation operation; and
 - likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate.
- 6.7.89 The baseline surveys to inform the EIA Report will encompass measurements of the existing sound environment at locations representing residential receptors around the chosen substation site. For HDD sites, where affected noise sensitive receptors are close to high volume roads, noise monitoring will be undertaken if predicted HDD noise levels would exceed criteria within BS 5228-1 (BSI, 2014). Where noise sensitive receptors potentially affected by the HDD are not near high volume roads, the use of lower cut-off values for noise will be used within the assessment. These surveys will be unattended sound measurements for a period of at least 24 hours for construction and 7 days for the substation baseline.
- 6.7.90 Due to the anticipated low levels of existing vibration, vibration measurements would not be considered beneficial to the assessment process.
- 6.7.91 Consideration of comments received through further consultation with Aberdeenshire Council and design refinement of the Project will necessitate updates to predictions and the full assessment and results will then be presented in the EIA Report.
- 6.7.92 Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

6.8 Traffic and transport

Introduction

- 6.8.1 The traffic and transport assessment will consider the potential likely significant effects on the receptors of the local and regional highways network that may arise from the construction, operation and maintenance and decommissioning of the onshore Project elements that are landward of Mean Low Water Springs (MLWS). This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 6.8.2 Traffic and transport interfaces with other aspects and as such, should be considered alongside these sections; namely:
- **Section 6.2: Air quality:** this considers the effects of the Project traffic generation on air quality, the traffic and transport section will therefore inform the air quality assessment.
 - **Section 6.5: Terrestrial ecology and ornithology:** There is the potential for vehicle emissions associated with the Project to negatively affect habitats therefore the traffic and transport section will inform the terrestrial ecology and ornithology assessment.
 - **Section 6.7: Onshore noise and vibration:** Noise and vibration impacts could arise from Project traffic flow data is used for both highway movements and along construction accesses in the noise and vibration assessment.
 - **Section 7.2: Greenhouse gases:** Due to effects of the Project traffic generation on the greenhouse gas assessment, therefore the greenhouse gases assessment will consider the traffic and transport section.
- 6.8.3 This section only considers the onshore impacts of traffic and transport associated with onshore or offshore works. Offshore traffic and transport effects of the Project are assessed in **Chapter 5: Environmental Aspects Offshore**, in the following sections:
- **Section 5.9: Commercial fisheries** which considers the effects on commercial fisheries that may arise from the Project;
 - **Section 5.10: Shipping and navigation** which considers the effects on shipping and navigation which may arise from the Project;
 - **Section 5.13: Infrastructure and other marine users** which considers the effects on other marine users which may arise from the Project; and
 - **Section 7.4: Military and civil aviation and telecommunications** which considers the effects on civil and military aviation that may arise from the Project.

Legislative and policy context

- 6.8.4 This Section identifies the relevant legislative and policy context which has informed the scope of the traffic and transport assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.

6.8.5 In order to provide a robust evidence base, **Table 6.8.1** below presents a summary of legislation and policies relevant for the traffic and transport assessment, for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 6.8.1 Relevant legislation and policy

Relevant Legislation and Policy	Relevance to the assessment
Legislation	
No legislation is of specific relevance to this area of technical assessment.	
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • Policy 1: Tackling the climate and nature crises • Policy 13: Sustainable Transport • Policy 14: Design, quality and place • Policy 20: Blue and Green Infrastructure
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. • States the need for further improvements to ensure that the best value from transport infrastructure is seen.
Scottish Planning Policy (SPP) (2014) - Paragraph 169	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology.
Planning Advice Note (PAN) 75: Planning for Transport (2005)	<ul style="list-style-type: none"> • PAN75 provides guidelines for planning authorities and developers. One of the objectives of the document is

Relevant Legislation and Policy	Relevance to the assessment
	<p>to highlight the link between planning and transportation systems.</p> <ul style="list-style-type: none"> The objectives of PAN75 and Scottish Planning Policy are to integrate planning and transport at the national, regional, strategic, and local level and to promote more sustainable transport modes for both carrying people and moving freight. The objectives of the SPP and PAN75 will be embedded into the Project as appropriate.
Marine Policy	
No policy is of specific relevance to this onshore area of technical assessment.	
Local Policy	
NESTRANS (the transport partnership for Aberdeen City and Shire) Regional Freight Action Plan (FAP) (2014)	<ul style="list-style-type: none"> The FAP provides information on optimum freight routes and roads to avoid, which will need to be taken into account as part of the HGV access strategy for the Project. The FAP recognises the importance of Peterhead Port for the movement of freight traffic which has resulted in investment of Smith Quay (part of the port). It also recognised the importance of Fraserburgh and Macduff harbours.
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A – Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> R2 Development Rural Proposals Elsewhere in the Countryside P1 Layout, Siting and Design C2 Renewable Energy RD1 Providing Suitable Services <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>

Technical guidance

6.8.6 Technical guidance that has been used to define the assessment is set out in **Table 6.8.2** below.

Table 6.8.2 Relevant technical guidance

Guidance reference	Relevance for the assessment
Design Manual for Roads and Bridges (DRMB) (Highways England, 2021)	The DMRB is a suite of technical documents that set out the design standards for roads and will inform the design of any new roads infrastructure proposed as part of the Project.
The Institute of Environmental Assessment (IEA) publication Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic (GEART) (IEA, 1993)	This document sets out a methodology for assessing traffic and transport related environmental effects and has been applied to this assessment.
Guide to Transport Assessment for Development Proposals in Scotland (Transport Scotland, 2012)	This document provides advice and guidance, and in terms of environmental assessment refers to PAN 58: Environmental Impact Assessment (Scottish Government, 1999), which has been superseded by PAN 1/2013 Environmental Impact Assessment (Scottish Government, 2017b). Both PAN 58 and PAN 1/2013 provide information and advice on the need for, and processes of, environmental assessment in general, but does not provide any detail on traffic and transport assessments.

Study area

- 6.8.7 The transport and traffic study area has been informed by the following elements:
- all roads within the proposed Scoping Boundary (**Figure 1.1: Scoping Boundary in Appendix 1A**) that could potentially be affected by the Project directly or used as roads to access the Project;
 - roads outside of the Scoping Boundary that may be required for access from the SRN to the Project;
 - Core Paths within the Scoping Boundary that could potentially be affected by the Project; and
 - National Cycle Network routes within the Scoping Boundary that could potentially be affected by the project.
- 6.8.8 The traffic and transport study area is set out in in **Figure 6.8.1: Transport study area in Appendix 1A**. The study area will be reviewed and amended, if required, as the Project develops in response to the identification of any additional impacts, estimates of construction traffic levels, identification of working and laydown areas and in response to feedback from consultation.

Consultation

- 6.8.9 An initial online meeting was held on the 28th September 2022 to provide Aberdeenshire Council with an overview of the project and to request seek feedback from the Traffic and Transport Officer present on the call. The only key comment raised by Aberdeenshire Council at this meeting was regarding the accesses for construction compounds and need for appropriate visibility splays. This information will be made available as part of separate discussions with the Council as the Project design progress.

Assessment methodology

Introduction

- 6.8.10 The Project approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this traffic and transport section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the traffic and transport assessment.

General approach

- 6.8.11 The guidance that will be followed to assess the potential significance of road traffic effects is GEART which states that:

"The detailed assessment of impacts is likely to concentrate on the period during which the absolute level of an impact is at its peak, as well as the hour at which the greatest level of change is likely to occur." (Paragraph 3.10, IEA,1993).

- 6.8.12 To assess the impact at its peak, the likely percentage increase in traffic is determined by comparing estimates of traffic generated by the Project with future predicted baseline traffic flows on the road links within the defined study area.

- 6.8.13 GEART sets out that the following transport effects need to be considered in any assessment:

- severance: the separation of people from places and other people and places or impede pedestrian access to essential facilities;
- driver delay: traffic delays to non-development traffic;
- pedestrian amenity: the effect on the relative pleasantness of a pedestrian journey as a result of changes in traffic flow, traffic composition and pavement width / separation from traffic;
- pedestrian delay: the ability of pedestrians to cross roads as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions;
- fear and intimidation: these may be experienced by pedestrians as a result of an increase in traffic volume and its proximity or the lack of protection caused by such factors as narrow pavement widths;
- accidents and safety: the risk of traffic accidents occurring where the Project is expected to produce a change in the character of traffic; and
- hazardous loads.

Determination of significance

- 6.8.14 The EIA Regulations 2017 recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient significance for detailed investigation or assessment through the EIA process. The EIA Regulations 2017 identify those environmental resources that may require further investigation as those that are likely to be significantly affected by the Project.

- 6.8.15 The EIA Regulations 2017 do not define significance and it is necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during

construction, operation or decommissioning is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the change. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the Project.

6.8.16 GEART provides two rules that are used to establish whether an environmental assessment of traffic effects should be carried out on receptors:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%).
- Rule 2: Include sensitive areas where traffic flows are predicted to increase by 10% or more. These include locations with vulnerable road users, such as schools, nursing homes, and locations with high pedestrian activity.

6.8.17 It should be noted that, according to GEART, predicted traffic flow increases below 10% are generally not considered to be significant as daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flows below this level are, therefore, assumed not to result in significant environmental effects and have therefore not been assessed further as part of this report.

6.8.18 **Table 6.8.3** sets out how significance will be determined based on receptor sensitivity and the magnitude of change.

Table 6.8.3 Significance evaluation matrix

		Magnitude of change			
		High	Medium	Low	Negligible
Sensitivity	High	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
	Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Moderate (Significant/ Not Significant)	Moderate (Potentially significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Potentially significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

Receptor sensitivity

6.8.19 The sensitivity of each highway link to be included in the assessment will be assigned a sensitivity in accordance with the advice provided in the GEART, as summarised in **Table 6.8.4** and based on professional judgement.

Table 6.8.4 Receptor sensitivity

Sensitivity	Description/Reason	Receptor
High	Receptors of high sensitivity to change in traffic flows: schools, colleges, playgrounds, accident blackspots, retirement homes and urban/residential homes without footways that are used by pedestrians and cyclists.	Occupants of buildings alongside the roads within the study area. Transport users using the roads within the study area.
Medium	Receptors of medium sensitivity to change in traffic flows including congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycle ways, community centres, parks and recreation facilities.	Occupants of buildings alongside the roads within the study area. Transport users using the roads within the study area.
Low	Receptors with low sensitivity to change in traffic flows: places of worship, public open space, nature conservation areas, listed buildings, tourist/visitor attractions and residential areas with adequate footway provision.	Occupants of buildings alongside the roads within the study area. Transport users using the roads within the study area.
Negligible	Receptors with negligible sensitivity to change in traffic flows including Motorways and Dual Carriageways and/or land uses sufficiently distant from affected routes and junctions.	Occupants of buildings alongside the roads within the study area. Transport users using the roads within the study area.

6.8.20 In accordance with GEART, where the sensitivity of a road link is judged as high or medium, Rule 2 will be applied and where traffic flows are predicted to increase by 10% or more, an assessment of environmental effects will be undertaken. Where the sensitivity is judged as low or negligible results, Rule 1 will be applied and where traffic flows are predicted to increase by more than 30%, or where the number of HGVs is predicted to increase by more than 30%, an assessment of environmental effects will be undertaken of the road link.

Magnitude of change

6.8.21 GEART recognises that professional judgement should be used as part of the assessment and states the following:

"For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources." (Paragraph 4.5, IEA, 1993).

6.8.22 Based on the Rule 1 and Rule 2 and the sensitivity of the receptors, **Table 6.8.5** shows the magnitude of change will be applied to the environmental effects to help identify levels of significance. The indicators to assess the magnitude of change are based on advice included within GEART and professional judgement.

Table 6.8.5 Magnitude of change

Transport Effect	High	Medium	Low	Negligible
Severance	Change in total traffic or HGV flows over 90%.	Change in total traffic or HGV flows of 60%-90%.	Change in total traffic or HGV flows of 30-60%.	Change in total traffic or HGV flows of less than 30%.
Driver Delay	Change in traffic results in significant queuing or increase in queuing at junctions and/or congestion on road links resulting in noticeable increase in delay.	Change in traffic results in moderate queuing or increase in queuing at junctions and/or congestion on roads links resulting in moderate increase in delay.	Change in traffic results in minimal queuing or increase in queuing at junctions and/or congestion on roads links resulting in minor increase in delay.	Change in traffic has no impact on queuing at junctions and/or congestion on roads links.
Pedestrian amenity	Based on general level of pedestrian activity, visibility and physical conditions such as traffic flow, traffic composition, crossing points and pavement width/separation from traffic.			
Pedestrian delay				
Pedestrian fear and intimidation				
Accident and Safety	Informed by a review of existing collision patterns and trends based upon the existing personal injury accident records and the forecast increase in traffic.			

Desk-based assessment

- 6.8.23 An initial desk-based baseline assessment will be undertaken to gather information on highway infrastructure, construction routes and road restrictions. Bing Maps, Google Maps UK and Google Street View will be used to provide an overview of the study area and the highway network and connections. This will then be supplemented with a site visit to the required areas.
- 6.8.24 Traffic generation as a result of the Project will be identified as the project progresses and the transport related environmental effects will be assessed.
- 6.8.25 Baseline traffic and accident data will be sought from existing sources such as:
- traffic count data available from the Department for Transport (DfT);
 - data held by Local Highways Authorities; and
 - accident Data – personal injury accident (PIA) data will be required to identify road safety issues that may be affected by the traffic generated by the Project. This data will be obtained from relevant highway authorities.

Site based assessment

- 6.8.26 Two elements of site-based work will inform the baseline:
- commissioned traffic counts - to supplement the available traffic data from DfT and the highway authorities;

- site observations - a site visit will be undertaken to inform the assessment and the high-level desktop-based assessments. Detailed notes and a photographic record will be undertaken on the site visit and consideration will be given to the identification of receptor locations.

Baseline conditions

Data sources

6.8.27 The data sources used to inform this Section are summarised in **Table 6.8.6:**

Table 6.8.6 Key sources of traffic and transport data

Source	Date	Summary	Coverage of study area
Ordnance Survey (OS) Mapping	6 th September 2022	Use of online mapping of 1:50,000 and 1:25,000 OS Mapping from Bing Maps.	Full coverage of study area.
Google Traffic	7 th September 2022	Use of online congestion data from Google Maps. Traffic data for key local roads was reviewed.	Full coverage of study area.
Crashmap	29 th August 2022	Use of Crashmap, a free online resource for looking at the accident record of road networks.	Full coverage of study area.
Google Street View	6 th September 2022	Use of street view views of local road network from Google Maps.	Full coverage of study area.
Core Path Routes	6 th September 2022	Core Path information from online Core Path maps from Aberdeenshire Council.	Full coverage of study area.
DfT Traffic Data	6 th September 2022	Existing Traffic and Transport data on local and strategic road network.	Full coverage of study area.

6.8.28 Further data will be required to inform the assessment of environmental traffic effects. These data sets will be collated, reviewed and updated as the Project progresses to enable a robust assessment to be undertaken.

Current baseline

6.8.29 To understand the baseline conditions of the local and strategic highways network, the baseline assessment is based on the Traffic and Transport study area relating to the Scoping Boundary are set out in **Figure 1.1** in **Appendix 1A** and described in **Chapter 1: Introduction**. The Transport study areas are illustrated on **Figure 6.8.1** in **Appendix 1A**.

Road network

6.8.30 The roads included in the transport study area are set out in **Figure 6.8.2: The road network** in **Appendix 1A**. There are a number of 'A', 'B', 'C' and unclassified roads within the study area which have the potential to be affected directly by the Project and which will form part of the assessment. This Section summarises the key 'A' and 'B' classified roads

located within the traffic and transport study area. Further consideration of the local road network will be made as the Project progresses and the traffic routeing strategy has been identified.

Strategic road network

- 6.8.31 The A90 is a two-lane single carriageway road running through the Scoping Boundary. The road has some smaller sections of dual carriageway. The road runs from Fraserburgh to Edinburgh passing through Aberdeen and Dundee. The road has the National Speed Limit (NSL) of 60mph in rural areas and in urban settlements it has a speed limit of 40mph. Through smaller settlements such as Crimond the speed limit is 30mph and through Longhaven the speed limit is 50mph. Within the Scoping Boundary the route passes through Peterhead forming a junction with the A950 and north to Fraserburgh along the East Coast. In built up areas the road has streetlighting and footways.

Local road network

- 6.8.32 The key routes on the local road network are summarised below and shown in **Figure 6.8.2: in Appendix 1A**.
- 6.8.33 The A948 south of the Scoping Boundary is two lane single carriageway that runs from Ellon to New Deer passing through the hamlets of Cookston, Mill of Elrick, and Auchngatt. The road starts at a roundabout with the A90 the routes west (north of Ellon), then north to New Deer. In rural sections the speed limit is the NSL (60mph) and in built up areas the speed limit is 30mph. This road is locally important as it connects the A90 to rural areas inland in Aberdeenshire and has junctions with other B, C and unclassified roads. In settlements there are streetlights and footways present on at least one side of the carriageway.
- 6.8.34 The A950 two lane single carriageway road forms an east west link through the study area, linking Peterhead town centre to the A98. The road within the built-up areas has a speed limit of 30mph, streetlights and has footways either side. The road runs through the settlements of Mintlaw and New Pitsligo and has a key junction with the SRN (A90) west of Peterhead. Outside of built-up areas the speed limit is NSL (60mph).
- 6.8.35 The A952 is a two lane single carriageway that forms a key north/south corridor through the Scoping Boundary. The road has a junction with the A90 at Toll of Birness and routes 16 miles north to a junction with the SRN (A90) South of Rathen. The road is rural in nature and subject to the NSL (60mph). The road passes through Mintlaw where the speed limit is reduced to 40/30mph and provided with footways and streetlights.
- 6.8.36 The A975 is a two lane single carriageway road that has a junction with the A90 at Longhaven and runs along the coast to Cruden Bay, subject to the NSL (60mph), and has no footways. In the rural areas the route is 60mph and in urban areas the speed limit is 30mph. Street lighting and footways are present in urban settlements.
- 6.8.37 The A98 is a two-lane single carriageway rural/urban road which runs between Fraserburgh and Fochabers in North-East Scotland. Within the Scoping Boundary the road runs between Fraserburgh and Craigmaud. The road has footways and streetlights in some settlements. Outside of settlements the speed limit is the NSL (60mph). The road is one of the key routes in the area for vehicles accessing along the north coast of Aberdeenshire.
- 6.8.38 The A981 is a two-lane single carriageway rural/urban road which runs north-south between New Deer and Fraserburgh. The NSL (60mph) applies on the rural sections of the road, with the speed limit reducing to 30mph in built up areas. The road runs through the settlements of Strichen and Memsie before reaching Peterhead.

- 6.8.39 The A982 is an urban two lane single carriageway that links the A90 at Burnhaven to the Peterhead town centre. The speed limit through this route is 30mph. Throughout the town of Peterhead there are ample footways and streetlight, and appropriate pedestrian crossings.
- 6.8.40 The B9028 is a two lane carriageway (without centre lines) from a crossroads north-east of New Deer with the A981 and the B9029 to a T-junction with the A948 to the south. It runs parallel to the town of New Deer. The speed limit is the NSL (60mph) and there are no footways or streetlights on this route.
- 6.8.41 The B9029 begins at a junction with the A981 heading east to Old Deer. The route is rural and urban, in urban areas maintaining a speed limit of 30mph, with streetlights and footways present, and on rural stretches the NSL (60mph). The route passes through Maud, Waterhill of Bruxie and finishes in Old Deer.
- 6.8.42 The B9030 runs from Auchnagaht to a crossroad junction with the A960 north of Old Deer. The road is a 60mph rural/urban two-lane single carriageway road. The road routes through Old Deer and Stuartfield, which both have streetlights and footways present. The speed limit in these built-up areas is 30mph.
- 6.8.43 The B9031 is approximately 20 miles long running along the coast from Banff to Fraserburgh. The only part of the road that is within the Scoping Boundary is the section closer to Fraserburgh where the rural sections of the road have a speed limit of 60mph and the urban areas a limit of 30mph. The road is a two-lane single carriageway. Within Fraserburgh the road has footways and streetlights present.
- 6.8.44 The B9032 runs between a T-junction with the A90 east of Memsie to a junction with the B9031 leaving Coburty. The road is a two-lane single carriageway road with speed limit of 60mph in rural areas. The route passes through only one main settlement, Memsie, where there are footways and streetlights with speed limit of 30mph.
- 6.8.45 The B9033 is a two-lane single carriageway between the eastern edge of Fraserburgh before routing east and south to a junction with the A90 near Crimonmogate. The route does not cross through any settlements and is subject to the NSL (60mph).
- 6.8.46 The B9093 is a short two-lane single carriageway road from New Pitsligo to a T-junction with the A952 north of Mintlaw at Denhead. The road is a two-lane single carriageway route operating at the NSL (60mph). The route passes through the urban area of Strichen where speed limit is 30mph. Throughout this area there are footways and streetlights on at least one side of the road.
- 6.8.47 The B9170 is a single lane carriageway between Inverurie and Turriff. However, within the Scoping Boundary the B9170 runs from Cumiestown to Cairnorrie via New Deer. On the rural roads the NSL (60mph) applies and within New Deer the speed limit is 30mph. The town has streetlights either side and footways at least on one side at all points throughout.

Traffic data

- 6.8.48 Traffic data has been obtained from the latest available DfT traffic data to understand the existing traffic flows on the SRN routes within the transport study area. **Table 6.8.7** summarises the two-way traffic data on the SRN and other key 'A' Roads. The data is shown as 24-hour Annual Average Daily Traffic Flows (AADF) from 2019, the last year of data before the effects of the Coronavirus (COVID-19) pandemic.

Table 6.8.7 Annual average daily traffic flows

Road	DfT Count Point ID	Two-Way Traffic Flows
A90 – Longhaven	20803	9658
A90 – between Blackhills Road and A982	80572	7917
A90 – between A950 and A982 (North Road)	80537	4065
A90 – St Fergus	50805	4707
A90 – North of Rathen	78586	8573
A981 - Memsie	1194	2484
A981 – Newburgh	31009	1686
A981 – South of Strichen	11007	1274
A98 – North of Craigmaud	91248	2858
A952 - Denhead	20852	4988
A950 – West of Peterhead	80476	7904
A950 - Mintlaw	811615	3524
A950 between B9106 and B9030	20990	2413
A950 between A981 and A981	50859	3204
A950 between A981 and Craigculter	1181	1749
A981 North of the B9029	41009	1397
A981 New Deer	21004	2870
A948 West of B9028	1180	928
A948 - Nethermuir	50860	1904
A948 – Mill of Elrick	81404	2063

Core paths

6.8.49 The Core Path network in the Scoping Boundary can be seen in **Figure 6.8.3: Core path in Appendix 1A**. Some Core Paths have utilised the disused branches of the Great North of Scotland Railway (GNSR) for routes between Ellon, Maud, Peterhead and Fraserburgh, which were closed as part of Beeching cuts through the 1960s and 1970s. These form strong Core Paths for walking throughout the Scoping Boundary area.

6.8.50 Of the network of Core Paths in the Scoping Boundary there is one National Trail, the Formartine and Buchan Way. One spur of the route runs from Peterhead to Maud and the

another from Fraserburgh to Maud. At Maud the routes meet and then a southern route runs from Maud to Ellon outside of the Scoping Boundary.

Local cycling routes

- 6.8.51 The National Cycle Network (NCN) Route 1 passes through the Scoping Boundary and is the longest in the UK, running from John O’Groats, along the Scottish and English east coast to Dover. More locally the route runs from Inverness to Aberdeen.
- 6.8.52 The section of road that runs through the Scoping Boundary enters the boundary via an on-road section on a single-track road near Corsegight routing to Maud. At Maud the route then becomes an off carriageway route on an abandoned rail line continuing south.
- 6.8.53 The National Cycle Network Route is shown as **Figure 6.8.4: National cycle network** in **Appendix 1A**.

Rail network

- 6.8.54 There is no active railway line in the Scoping Boundary. The nearest active railway line is that of Inverurie to Inch. The full service runs from Aberdeen to Inverness via Huntly and Elgin, with a section of the route making the journey to Dufftown.
- 6.8.55 Within the Scoping Boundary there are several inactive railways which have been converted to footpaths constituting much of the north-south Core Path network.

Navigable waterways

- 6.8.56 There are no navigable waterways in the Scoping Boundary.

Identified access pinch points

- 6.8.57 Based on the baseline assessment, a review has been made of the highways network within the Scoping Boundary and transport study area and any local restrictions that will need to be considered as the Project evolves. A review of Aberdeenshire Council’s bridge restrictions database has identified the following location:
- U106B – Abbey, New Deer (Between A950 and B9029) - 3 tonne weight limit.
- 6.8.58 This is not a comprehensive list of local highways restrictions and will be updated as the Project progresses, following more detailed consultation.

Wider high level accident review

- 6.8.59 A review of accident data from Crashmap has indicated that there have been hundreds of accidents in the last five years across the study area, with clusters of accidents noted in certain locations. As construction traffic routes for the Project are not yet fixed it is not possible at this stage to identify all clusters of accidents that need to be considered in detail, however the following have been noted as accident hotspot locations on the local road network:
- A90 – Bridge Over River Ugie North of Peterhead;
 - A98/B9032 - Mid Ardlaw;
 - A90/A982/S Base Road – Peterhead;
 - A90/A975 - Longheaven;

- A590 at Whitehill; and
- A595 at Ardallie.

6.8.60 An accident assessment of key routes for construction traffic will be undertaken as project progresses within EIA.

Future baseline

6.8.61 In accordance with GEART, the period in which the level of traffic is at its peak will be considered within the assessment. The peak construction period will be based on the indicative construction programme and the anticipated construction traffic movements. The future baseline will take into account traffic growth as a result of new development, which will be based on growth factors from the DfT National Trip End Model (NTEM) derived from the Trip End Model Presentation Programme (TEMPro). The use of TEMPro will include for cumulative traffic growth within the study area.

6.8.62 At this stage anticipated future years of construction and completion of the Project are not known and as such no identified future years can be set out in this Scoping Report section.

6.8.63 At this stage, the construction for the onshore and offshore elements is proposed to last for up to eight years although with a shorter period expected for the onshore infrastructure works in the range of two to three years.

6.8.64 Engagement with the highways authorities will identify appropriate growth rates based on the traffic data available, future year of assessment and location of the Project. This engagement will also seek to agree any significant development adjacent to the proposed study area and the agreed TEMPro growth rate.

6.8.65 The future baseline will also consider the implications of changes to the transport infrastructure, such as changes to roads and or junctions and new infrastructure. This will be established during consultation.

Basis for scoping assessment

6.8.66 The traffic and transport scoping assessment is based on the traffic related assumptions set out in **Chapter 2: Project Description**.

6.8.67 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 6.8.9**.

6.8.68 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

6.8.69 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on Traffic and Transport (see **Table 6.8.8**). These will evolve as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet legislation requirements.

6.8.70 There is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 6.8.8 Relevant traffic and transport embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-001	Underground cables will be used to connect from the landfall(s) transition joint bay to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the new onshore substation nominated by NETS grid connection point(s). The installation status of which will be assessed on confirmation of a route of the onshore cable routing. Cables are typically installed in ducts in a standard buried trench arrangement.	Construction Environmental Management Plan (CEMP) and planning conditions.
M-003	A crossing schedule of the grid connection crossings will be prepared that includes crossing methodologies, where required, of all roads, rail, core paths, right of way and watercourses.	CEMP and planning conditions.
M-004	At any sensitive features identified along the route, including sensitive crossing locations, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects.	CEMP, description of Project and planning conditions.
M-026	Signage and/or temporary core path / ROW diversions will be provided during construction where necessary to avoid the construction working areas.	Outline Core Paths Management Plan (CPMP) and planning conditions.
M-063	CEMP to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. Other measures that feed into the CEMP include: <ul style="list-style-type: none"> • M-099: CEMP to include measures to minimise emissions. The CEMP will be the securing mechanism for many measures.	CEMP and planning conditions.
M-092	Construction accesses to the public highway will be provided with required visibility splays, where permanent accesses are required as well as major construction accesses are proposed. All other locations will be managed via traffic management processes (signage, speed limit reductions and banksmen).	Visibility splays will be provided on the relevant planning application plans and planning conditions.
M-094	A road and Core Path condition survey will be undertaken on roads and Core Paths affected by construction traffic before, during and after the construction phase of the Project. The results of these surveys will be used to identify the requirement for any repairs needed as a result of Project related damage.	Outline CPMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
M-095	All road crossings will be agreed with the relevant highway authority. Road closures will be avoided where possible, and where they are required will be scheduled to avoid other local scheduled road works on the highways network.	Outline Construction Traffic Management Plan (CTMP) and planning conditions.
M-096	Access locations and access routes from the SRN will be planned to avoid settlements and villages where possible. The use of haul roads and loop road arrangements will be proposed where appropriate and possible to mitigate proposed environmental effects of traffic and transport.	Outline CTMP and planning conditions.
M-099	The CEMP will include measures to minimise emissions from construction traffic. This will include measures such as consolidating deliveries where possible and policies such as 'no idling'. Consideration will be given towards the impact of construction traffic, road traffic and adjacent trunk roads. Sustainable modes of travel for the construction workforce will be encouraged.	CEMP and planning conditions.

Likely significant effects

- 6.8.71 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a potential likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 6.8.72 The likely significant effects on Traffic and Transport are summarised in **Table 6.8.9**. The scoping assessment is based on a combination of the Project definition at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for Traffic and Transport effects and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 6.8.73 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 6.8.9 Likely significant traffic and transport effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Onshore – construction phase					
Landfall(s) – cable installation, transition joint bays and associated earthworks resulting in potential impacts on roads, Core Paths and users of these routes.	M-001, M-003, M-026, M-063, M-092, M-094, M-095, M-096, M-099	Impact of construction traffic at sensitive highway receptors. Impact of construction traffic and proposed route on Core Paths. Effect anticipated to not be significant based on magnitude of change, receptor sensitivity and mitigation to be identified. To be confirmed through assessment.	Scoped in.	Transport receptors will be defined based on: • occupants of buildings alongside the roads within the study area; and • transport users using the roads within the study area.	Traffic Data from local highways network at the receptor locations.
Onshore route – onshore export cable route construction (including highways and Core Path crossings) and associated earthworks resulting in a potential impact roads, Core Paths and users of these routes.	M-001, M-003, M-004, M-026, M-063, M-092, M-094, M-095, M-096, M-099	Impact of construction traffic at sensitive highway receptors. Impact of construction traffic and proposed route on Core Paths. Effect anticipated to not be significant based on magnitude of change, receptor sensitivity and mitigation to be identified.	Scoped in.	Transport receptors will be defined based on: • occupants of buildings alongside the roads within the study area; and • transport users using the roads within the study area.	Traffic Data from local highways network at the receptor locations.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
To be confirmed through assessment.					
Substation construction and associated earthworks resulting in potential impacts on roads, Core Paths and users of these routes.	M-001, M-003, M-004, M-026, M-063, M-092, M-094, M-095, M-096, M-099	<p>Impact of construction traffic at sensitive highway receptors.</p> <p>Impact of construction traffic and proposed route on Core Paths.</p> <p>Effect anticipated to not be significant based on magnitude of change, receptor sensitivity and mitigation to be identified. To be confirmed through assessment.</p>	Scoped in.	<p>Transport receptors will be defined based on:</p> <ul style="list-style-type: none"> • occupants of buildings alongside the roads within the study area; and • transport users using the roads within the study area. 	Traffic Data from local highways network at the receptor locations.
Onshore – operation and maintenance phase					
Onshore – Operation and maintenance activities resulting in potential impact on roads, Core Paths and users of these routes.	N/A	<p>No likely significant Effect.</p> <p>Operational traffic anticipated to be negligible and infrequent. Magnitude of change and significance of effect will be negligible. Further rationale provided in the section below (paragraph 6.8.75).</p>	Scoped out. See rationale in section below paragraph 6.8.75 .	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Onshore – decommissioning phase					
Onshore - Decommissioning activities resulting in a potential impact on local roads, and Core Paths and the users of these routes.	N/A	<p>No likely significant Effect.</p> <p>Decommissioning activities will be less than construction.</p> <p>Further rationale provided in the section below (paragraph 6.8.76).</p>	Scoped out. See rationale in section below paragraph 6.8.76 .	N/A	N/A
Offshore – construction phase					
Offshore Construction Phase – The Onshore Impacts of the offshore cable route, turbines and other required infrastructure (materials and staff) resulting in a potential impact on local roads and users of these routes	M-096	<p>Impact of construction traffic at sensitive highway receptors around ports used for construction activities.</p> <p>Scale of construction traffic may not result in significant effects, to be identified through further project development.</p>	TBC – could be scoped out subject to further project development.	<p>Transport receptors will be defined based on:</p> <ul style="list-style-type: none"> • occupants of buildings alongside the roads within the study area; and • transport users using the roads within the study area. 	Traffic Data from local highways network at the receptor locations.
Offshore – operation and maintenance phase					
Offshore Operation and Maintenance Phase activities (staff) resulting in potential impact on roads around proposed port for Operation and Maintenance activities.	M-096	Impact of operation and maintenance Traffic (staff traffic) at sensitive highway receptors around ports used for construction activities.	Scoped out. See rationale in section below paragraph 6.8.77 .	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		Vehicle movements will be small, and this traffic effect will be negligible.			
Offshore – decommissioning phase					
Offshore - Decommissioning activities (staff and materials) resulting in a potential impact on local roads.	N/A	<p>No likely significant Effect.</p> <p>Decommissioning activities will be less than construction.</p> <p>Further rationale provided in the section below (paragraph 6.8.78).</p>	Scoped out. See rationale in section below paragraph 6.8.78 .	N/A	N/A
Hazardous loads (all phases – onshore and offshore)					
Hazardous Loads on the local and strategic highways network related to any phase of the project on and offshore.	N/A	<p>No likely significant Effect.</p> <p>No hazardous loads are anticipated. Further rationale provided in the section below (paragraph 6.8.79).</p>	Scoped out. . See rationale in section below paragraph 6.8.79 .	N/A	N/A

Impacts scoped out of assessment

Overview

- 6.8.74 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect which has been based on the knowledge of the baseline environment, the nature of planned work and the professional judgment on the potential for impact from such project more widely. Each scoped out effect is considered in turn below.

Onshore – operation and maintenance

- 6.8.75 The **vehicle movements during operation and maintenance** of the Project's onshore infrastructure will be small, comprising occasional inspection and maintenance requirements. It is considered this traffic will be negligible and has therefore been scoped out of the assessment, in keeping with other projects of this nature.

Onshore – decommissioning

- 6.8.76 The assessment of **onshore decommissioning phase activities** of the Project have been scoped out of further assessment as these are considered to be limited from an onshore perspective and the traffic will be significantly less than that for the construction phase as only above ground infrastructure will be removed. For example, the cable will remain in-situ underground and there will be no requirement for vehicles to transport equipment or staff to remove cables and to reinstate earth works. Therefore, the construction phase is the maximum development case scenario in terms of traffic generation for onshore works and disturbance to constraints such as Core Paths and roads.

Offshore – operation and maintenance

- 6.8.77 The **vehicle movements during operation and maintenance of the Project's offshore infrastructure** will be small, comprising occasional inspection and maintenance requirements. It is considered this traffic will be negligible and has therefore been scoped out of the assessment, in keeping with other projects of this nature.

Offshore – decommissioning

- 6.8.78 As for the onshore decommissioning phase, the **offshore decommissioning phase** will result in an overall lower traffic generation onshore as some elements of the offshore infrastructure will be left in situ such as the offshore export cables, and as such there will be less of a requirement for staff and material movements onshore in this phase than the construction phase.

On and offshore – hazardous loads

- 6.8.79 **Hazardous loads** are not anticipated and are therefore scoped out of the assessment.

Cumulative effects

- 6.8.80 Cumulative effects on Traffic and Transport resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other

developments that have been screened in as part of the cumulative effects assessment screening exercise.

6.8.81 The following impacts from Project have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects.

- Permitted/committed developments within and in the vicinity of the transport study areas that will result in additional traffic on the road network. As set out earlier in this Section, it is considered that permitted/committed developments will be included within the agreed TEMPro traffic growth rate. However, the highway authorities may require that specific developments are included (usually developments outside of local plan allocations), as the development traffic from these will have localised impacts on specific parts of the road network. This will be identified with the highway authorities through further consultation.
- Committed transport schemes that will affect the transport network, such as junction improvements and new road links. These will be identified with the highway authorities through further consultation.

Transboundary effects

6.8.82 The potential effects from construction, operation and decommissioning on onshore traffic and transport receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. The need for an assessment of transboundary effects will be identified once the port required for construction activities has been identified.

6.8.83 Should this change during the life cycle of the Project then this may need to be reviewed and appropriate assessment/mitigation provided.

Proposed approach to the EIA Report

6.8.84 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process which as set out in **Chapter 4: Approach to Scoping and EIA**. This will include the key stakeholders and discussion topics set out in **Chapter 4: Approach to Scoping and EIA**.

6.8.85 Whilst no consultation has taken place to date, engagement with other relevant statutory stakeholders shall be undertaken, including the national highways authority (Transport Scotland) These discussions will consider and agree the following:

- proposed traffic growth to future years;
- committed highways schemes that may affect the future baseline;
- committed development that may affect the future baseline;
- scope of the assessment;
- existing traffic data and additional data collection;
- Core Path management;
- potential traffic generation;
- HGV management;
- identification of additional transport evidence base documents to support the application, such as a Construction Traffic Management Plan (CTMP) and Core Path Management Plan (CPMP); and

- permanent access design to the landfall(s) site (transition joint bays) and substations.

6.8.86 Further collection of baseline data will be carried out through a desk-based assessment supplemented with site-based information (for example traffic count data and site visit data).

6.8.87 The approach to the transport assessment as set out in this Section will be in accordance with the GEART (IEA, 1993). The main transport effects will be associated with the construction phase and the traffic movements of the following to and from the transport study area:

- construction staff vehicles, including cars and light vans;
- HGVs – vehicles 3.5t gross weight (>3.5t) delivering materials and equipment; and
- Abnormal Indivisible Loads (AILs) – vehicles longer than 17m and/or wider than 4m.

6.8.88 Additional transport related technical documents will be identified through the EIA process. including a requirement for a CTMP, Abnormal Indivisible Load (AIL) Study and a CPMP.

6.8.89 A full Transport Assessment may not be required as the peak hour traffic flows associated with the Project are anticipated to be very low. At this stage this is assumed not to form part of the assessments for the Project but will be reviewed following scoping response and initial consultation.

6.9 Landscape and visual

Introduction

- 6.9.1 The landscape and visual impact assessment (LVIA) will consider the potential likely significant effects on the landscape resource and visual amenity that may arise from the construction, operation and maintenance and decommissioning of the onshore Project elements that are landward of Mean Low Water Springs (MLWS). This Section of the Scoping Report describes the methodology to be used within the LVIA (see **Appendix 6.9A: LVIA Methodology** for the full description), an overview of the baseline conditions, the datasets to be used to inform the LVIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 6.9.2 The LVIA interfaces with many other aspects and as such, should be considered alongside these; namely:
- **Section 6.1: Ground conditions and contamination:** Geology and soils are integral to landscapes therefore ground conditions and landscape and visual assessment are interrelated.
 - **Section 6.4: Land use:** With regard to landscape effects on agriculture and soils and the proposed design for embedded environmental mitigation and the assessment of common landscape and visual receptors associated with land use such as recreational routes and open spaces.
 - **Section 6.5: Terrestrial ecology and ornithology:** With regard to proposed design for embedded environmental mitigation such as landscape protection and planting schemes (where required), and the assessment of common landscape and visual receptors such as visual effects on nature reserves which are open to the public.
 - **Section 6.6: Onshore archaeology and cultural heritage:** To inform understanding of the visibility and appearance of visible elements of the Project in the setting of identified heritage assets within the terrestrial zone. The landscape and visual section will be used to inform the onshore archaeology and cultural heritage assessment.
 - **Section 6.7: Onshore noise and vibration:** There may be sensitive landscapes or receptors that could be affected by noise mitigation in the form of screening and enclosures, therefore the LVIA will consider the noise and vibration section to identify any such impact.
 - **Section 7.1: Climate resilience:** The interference with climate resilience with LVIA is captured in the In-Combination Climate Impacts (ICCI) assessment.
 - **Section 7.3: Socio-economics:** With regard to the assessment of common landscape and visual receptors such as visual effects on recreational receptors and tourist attractions.
- 6.9.3 In addition, the LVIA should be considered alongside **Section 5.12: Seascape, landscape and visual** noting the close association between the LVIA and Seascape, Landscape and Visual Impact Assessment (SLVIA), and the potential inter-project effects of the onshore and offshore elements of the Project.
- 6.9.4 This Section is supported by **Figure 6.9.1: Landscape and Visual Impact Assessment Scoping Boundary** in **Appendix 1A** which illustrates the main landscape receptors within the onshore Scoping Boundary and the onshore substation search areas and should be read in conjunction with **Chapter 2: Project Description**.

Legislative and policy context

- 6.9.5 This Section identifies the relevant legislative and policy context which has informed the proposed scope of the LVIA. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework**, which provides detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 6.9.6 In order to provide a robust evidence base, **Table 6.9.1** below presents a summary of legislation and policies relevant for the LVIA, for which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 6.9.1 Relevant legislation and Policy

Relevant Legislation and Policy	Relevance to the assessment
Legislation	
The Electricity Act (1989)	<ul style="list-style-type: none"> • Requirements to have regard to the desirability of preserving natural beauty. • Requirements to mitigate an effect which the proposals would have on the natural beauty of the countryside.
The European Landscape Convention (ELC) (2006)	<ul style="list-style-type: none"> • Provides a people-centred and forward-looking way to reconcile management of the environment with the social and economic challenges of the future, and aims to help people reconnect with place. • The ELC cover land and water (inland and seas), and natural, rural, urban and peri-urban landscapes. Significantly, it includes every-day or degraded landscapes as well as those that might be considered outstanding. • Sets the need to recognise landscapes in law, to establish policies aimed at landscape planning, protection and management and the integration of landscape into other policy areas.
Nature Conservation (Scotland) Act (2004)	<ul style="list-style-type: none"> • Public bodies in Scotland have a duty to further the conservation of biodiversity under the Nature Conservation (Scotland) Act 2004. Fulfilling the Biodiversity duty will allow wider outcomes to be addressed, such as: <ul style="list-style-type: none"> ▶ “ensuring compliance with the legislation and helping Scotland to meet its nation and international biodiversity targets; ▶ helping Scotland address biodiversity loss and the climate emergency, and contributing to a Green recovery and a Net Zero future; ▶ improving image and demonstrating working in a socially responsible and ethical way by, safeguarding biodiversity and environmental assets for future generations; and

Relevant Legislation and Policy	Relevance to the assessment
	<ul style="list-style-type: none"> ▶ <i>contributing to sustainable development and the quality of life in Scotland</i>" (NatureScot, 2022h).
National Policy	
National Planning Statement (NPS) EN-3 (2011)	<ul style="list-style-type: none"> • States proposals of renewable energy infrastructure and should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.
Approved National Planning Framework 4 (NPF4) 2023	<ul style="list-style-type: none"> • A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are: <ul style="list-style-type: none"> ▶ Policy 1: Tackling the climate and nature crises ▶ Policy 9: Brownfield, Vacant and Derelict Land and Empty Buildings ▶ Policy 4: Natural Places ▶ Policy 6: Forestry, woodland and trees
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. • States the 2020 Challenge for Scotland's Biodiversity aims to promote and enhance Scotland's nature, and to better connect people with the natural world. Spatial strategy identifies where development needs to be balance with a strategic approach to environmental enhancement.
Scottish Planning Policy (2014) <ul style="list-style-type: none"> – Paragraph 169 – Paragraph 199 – Paragraph 202-203 	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology, the water environment and flood risk. • Sets out how plans should make sure they address the potential effects of development on the natural environment. They must consider the natural and

Relevant Legislation and Policy	Relevance to the assessment
	<p>cultural components together and promote opportunities for enhancement.</p> <ul style="list-style-type: none"> Sets out how the siting and design of a proposed development should take account of the local landscape character. It also sets out that planning permission will be refused if the nature or scale of the project has an unacceptable impact on the natural environment.
Scottish Government’s Programme for Government 2022-2023 (2022)	The Programme for Government defines the response to the challenges ahead, and the better tomorrow the government want to secure. It details that Scotland’s journey to net zero, is an investment in a strong economy, and in building a fairer society.
The Environment Strategy for Scotland (2020)	<p>This Strategy has a 2045 vision, whereby, restoring nature and ending Scotland’s contribution to climate change, Scotland will be transformed for the better, therefore helping to secure the wellbeing of Scottish people and the planet.</p> <p>The contribution of the Environment Strategy vision and outcomes will contribute to National Outcomes and the UN Sustainable Development Goals.</p> <p>The outcomes that are relevant to the Project, include:</p> <ul style="list-style-type: none"> tackling the global climate emergency Scotland’s nature is protected and restored thriving sustainable economy conserves and grows our natural assets
Marine Policy	
There are no policies of specific relevance to this area of technical assessment.	
Local Planning Policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> R1 Special Rural Areas R2 Development Proposals Elsewhere in the Countryside P1 Layout, Siting and Design E2 Landscape E3 Forestry and Woodland PR1 Protecting Important Resources C2 Renewable Energy C3 Carbon Sinks and Stores <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific use.</p>
Aberdeenshire Council Natural Heritage Strategy (2019-2022) <ul style="list-style-type: none"> Aim 1: Protection of Natural Heritage Aim 2: Enhancement of Nature Heritage 	<ul style="list-style-type: none"> Objective 1.5 – Protect trees of visual and cultural important. Objective 1.6 – Protect locally significant sites for nature conservation. Objective 2.1 - Use Council managed land to enhance natural heritage and engage communities.

Relevant Legislation and Policy	Relevance to the assessment
<ul style="list-style-type: none"> - Aim 3: Promotion of Natural Heritage 	<ul style="list-style-type: none"> • Objective 2.4 – Creation and management of woodlands in Aberdeenshire. • Objective 3.2 – Promote, protect and enhance natural heritage through cross-organisation partnership working.

Technical guidance

6.9.7 The assessment will be undertaken in accordance with the Landscape Institute and IEMA (2013) *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition (GLVIA3), and other technical guidance set out in **Table 6.9.2** below.

Table 6.9.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
IEMA (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3),	This is the main technical guidance on LVIA including seascape assessment.
Landscape Institute (2019a) Visual Representation of Development Proposals, Technical Guidance Note 06/19	Technical guidance governing the visual representation of development proposals – how visualisations (photography, wirelines and photomontages) should be presented.
Landscape Institute, (2019b) Residential Visual Amenity Assessment: Technical Information Note	Technical guidance on Residential Visual Amenity Assessment, sets out a consistent methodology and provides advice.
NatureScot (2020b) Landscape Sensitivity Assessment Guidance	Provides advice and guidance on landscape sensitivity assessment, at a more detailed level than GLVIA and is specific to Scotland.
NatureScot (2021) Assessing the cumulative landscape and visual impact of onshore wind energy developments	Provides advice and guidance on the cumulative assessment of onshore wind farms, although the methodology and principles may also be applied to offshore wind farm development.
Scottish Natural Heritage (SNH), (2018b) Guidance note: Coastal Character Assessment	Provides advice and guidance on coastal character assessment, at a more detailed level than GLVIA and is specific to Scotland.
NatureScot (Consultation DRAFT 2020a) Landscape Character Assessment Guidance	Provides advice and guidance on landscape character assessment, at a more detailed level than GLVIA and is specific to Scotland.
Scottish Natural Heritage (2017c) Siting and Designing Windfarms in the Landscape, Version 3a	Technical guidance on designing onshore wind farm development, including onshore wind farm infrastructure such as access tracks and substations.
Scottish Natural Heritage (2017d) Visual Representation of Wind Farms, Version 2.2	Technical guidance governing the visual representation of wind farm development proposals – how visualisations (photography, wirelines and photomontages) should be presented.

Study area

- 6.9.8 Institute of Environmental Management and Assessment (IEMA) Guidance (IEMA, 2015 and 2017) recommends a proportionate EIA focused on the potential likely significant effects of a development. The LVIA study area must therefore be large enough to capture all likely significant effects. However, an overly large LVIA study area may be considered disproportionate if it makes understanding the key impacts of the Project more difficult by including extraneous baseline information, and hence receptors which are unlikely to be significantly affected by the Project.
- 6.9.9 This is supported by the Landscape Institute (GLVIA3) (Landscape Institute, 2013) (paragraph 3.16) which recommends that *‘The level of detail provided should be that which is reasonably required to assess the likely significant effects’*. Paragraph 5.2 also states that *‘The study area should include the site itself and the full extent of the wider landscape around it which the Project may influence in a significant manner’*.
- 6.9.10 The study area therefore is based on professional judgement which aims to include those areas which are potentially and likely to be significantly affected by the Project. This judgement is based on early understanding of the local landscape character and the scale of the construction and development proposed within the Scoping Boundary as well as a review of study areas used for similar projects including Moray West, Moray East and Beatrice Offshore Wind Farm.
- 6.9.11 The study area will be reviewed and amended in response to the Project evolution and refinement of the onshore components, the identification of any additional effects pathways, and in response to consultation.

LVIA study areas

- 6.9.12 The LVIA study area will therefore cover the following areas:
- Landfall(s) and onshore export cable corridor route:
The study area will extend 2km either side of the selected landfall(s) and onshore export cable corridor route option. It is likely to be supported by a small number of elevated, long-distance panoramic viewpoint locations within the wider landscape.
 - Onshore substation(s):
The study area will extend 5km from the site boundary of the selected substation(s).

Consultation

- 6.9.13 This Section has been informed by engagement and discussion with stakeholders. **Table 6.9.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

6.9.14

Table 6.9.3 Consultation

Consultee	Comments and considerations	How this is accounted for
On-line Teams Meeting: 9th August 2022		
NatureScot	<p>LVIA parameters were proposed by the Applicant:</p> <ul style="list-style-type: none"> • Methodology GLVIA 3 • Study area ~5km substation reducing to 1-2km in relation to construction of the onshore export onshore export cable corridor • Cumulative Assessment • Consultation and Scoping <ul style="list-style-type: none"> – Survey Areas – Baseline data and sources – Viewpoint Selection process • Going forward: <ul style="list-style-type: none"> – Design Process – mitigation and enhancement – Assessment – Specialist subjects 	<p>These will be taken forward:</p> <ul style="list-style-type: none"> • Methodology to accord with GLVIA 3 is provided in Appendix 6.9A: LVIA Methodology. • Provisional LVIA study areas accepted. • Consultation and Scoping – ongoing to cover each of these requirements, including the design process, assessment and specialist subject areas.

Assessment methodology

Introduction

6.9.15 The project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, it is also necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the LVIA.

6.9.16 The assessment will be undertaken in accordance with the Landscape Institute and IEMA (2013) *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition (GLVIA3), and other best practice guidance listed in **paragraph 6.9.7**. A full description of the LVIA methodology is provided in **Appendix 6.9A: LVIA Methodology**.

Summary of the LVIA methodology

6.9.17 The landscape and visual effects (and whether they are significant) are determined by an assessment of the nature or 'sensitivity' of each receptor or group of receptors and the nature of the effect or 'magnitude of change' that will result from the onshore elements of the Project. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the onshore elements of the Project. This is combined with an assessment of the magnitude of change which takes account of the size and scale of the proposed change, the geographical extent, and the duration of that change. By combining assessments of sensitivity and magnitude of change, a level of landscape or visual effect can be evaluated and determined.

- 6.9.18 The resulting level of effect is described in terms of whether it is significant or not significant and the type of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse. The assessment will also consider the inter-project cumulative effects resulting from the onshore and offshore elements of the Project, and cumulative effects with other similar developments to the onshore elements of the Project within the onshore study area.
- 6.9.19 The time period for the assessment covers the construction period of the onshore elements of the Project, their subsequent operation / maintenance and decommissioning. The assessment will also include the implementation and establishment of embedded landscape measures which are likely to overlap with the construction and or operation / maintenance periods.
- 6.9.20 The landscape and visual assessment involves a combination of quantitative and qualitative assessment and wherever possible a consensus of professional opinion will be sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

Determining the significance of effects

- 6.9.21 A matrix presented in **Table 6.9.4** is used as a guide to illustrate the LVIA process. In line with the emphasis placed in GLVIA3 upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor. Such narrative assessments provide a level of detail over and above the outline assessment provided by use of the matrix alone. Wherever possible, cross references will be made to baseline figures and/or to photomontage visualisations to support the rationale. The matrix, as presented in **Table 6.9.4**, should therefore be considered as a guide and any deviation from this guide will be clearly explained in the assessment rationale.

Table 6.9.4 Evaluation of Landscape and Visual Effects

Sensitivity	Magnitude of change					
	High	Medium-high	Medium	Medium-low	Low	Very Low - Zero
High	Major (Significant)	Major (Significant)	Major / Moderate (Significant)	Moderate*	Moderate*	Minor
Medium-high	Major (Significant)	Major / Moderate (Significant)	Moderate*	Moderate*	Minor	Minor
Medium	Major / Moderate (Significant)	Moderate*	Moderate*	Minor	Minor	Negligible
Medium-low	Moderate*	Moderate*	Minor	Minor	Negligible	Negligible
Low	Moderate*	Minor	Minor	Negligible	Negligible	Negligible

***Note:** Moderate levels of effect may be significant subject to the assessor's opinion, which shall be clearly explained.

6.9.22 Significant landscape and visual effects are highlighted in **bold** and shaded in dark green in **Table 6.9.4** and relate to all those effects that result in a '**Major**' or a '**Major / Moderate**' level of effect. In some circumstances, '**Moderate**' levels of effect (shaded light green also have the potential, subject to the assessor's professional opinion, to be considered as significant and these exceptions are also highlighted in bold and will be explained as part of the assessment, where they occur. White or un-shaded boxes in **Table 5.12.4** indicate a non-significant effect.

6.9.23 The type of effect will also be described and may be direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral, or adverse.

Baseline conditions

Introduction

6.9.24 Information on the existing landscape resource or baseline conditions included in the LVIA will be collected from local plans, Ordnance Survey maps, and relevant literature, as well as information gathered from Site and study area surveys. The baseline information will be set out as an inventory of the existing landscape resource and will focus on those landscape and visual receptors with most potential to be significantly affected.

Data sources

6.9.25 A range of desk-based and site-based data will be sourced to undertake the LVIA, covering landscape and visual receptors and other relevant cumulative development. The desk-based data will be drawn from Ordnance survey and a range of document sources, in addition to the relevant planning policy documents outlined in **Chapter 3: Legislative and**

Policy Context and **Appendix 3A: Planning Policy Framework**. The principal desk-based data sources used to inform this Section are set out in **Table 6.9.5**.

Table 6.9.5 Key sources of LVIA data

Source	Date	Summary	Coverage of the study area
Scottish Natural Heritage	2005	An assessment of the sensitivity and capacity of the Scottish seascape in relation to windfarms. (available online: https://www.nature.scot/doc/naturescot-commissioned-report-103-assessment-sensitivity-and-capacity-scottish-seascape-relation).	Full coverage of study area.
Scottish Natural Heritage	2019	Landscape Character Assessment (LCA) for maps and descriptions of Landscape Character Types (LCTs). (available online: https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions).	As above.
NatureScot	2022	Ancient Woodland Inventory (AWI). (available online: https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-awi).	As above.
Historic Environment Scotland	2019	Gardens and Designed Landscapes of Aberdeenshire (available online: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=7c365ace-e62d-46d2-8a10-a5f700a788f3).	As above.
Aberdeenshire Council	2020	Aberdeenshire Local Development Plan Appendix 13: Special Landscape Areas (https://www.aberdeenshire.gov.uk/media/20071/9-special-landscape-areas-part-1.pdf).	As above.
Aberdeenshire Council	2010	Aberdeenshire Open Space Strategy and Audit (available online: https://www.aberdeenshire.gov.uk/leisure-sport-and-culture/parks-and-open-spaces/open-space-strategy-audit/).	As above.

Source	Date	Summary	Coverage of the study area
Aberdeenshire Council	2021b	Core Paths in Aberdeenshire (available online: https://wml.io/1u7).	As above.
VisitScotland	2022	Visitor attractions and tourist destinations (available online: https://www.visitscotland.com/destinations-maps/aberddeen-city-shire/).	As above.
Scotland's Great Trails	2018	Scotland's Great Trails map. (available online: https://www.scotlandsgreattrails.com).	As above.
Sustrans	2022	Sustrans Cycle Network (available online: https://www.sustrans.org.uk/national-cycle-network/).	As above.
Scottish Rights of Way & Access Society	2022	Heritage Paths (available online: https://scotways.com/heritage-path/#zoom=6&lat=56.7000&lon=-4.9000).	As above.
Scottish Rights of Way & Access Society	2012	Scottish Hill Tracks, 5 th Edition (not available online).	As above.
Google Earth Pro	2022	Aerial Photography.	As above.
Ordnance Survey	2022	1:50,000 and 1:25,000 scale mapping.	As above.
National Trust for Scotland	2022	Any specific visitor attractions / tourist destinations (available online: https://www.nts.org.uk/).	As above.

Landscape baseline within the Scoping Boundary

- 6.9.26 Within the Scoping Boundary the landscape topography is generally 'flat' or undulating / rolling with the exception of Waughton Hill (234m AOD). There are numerous watercourses, including the River Ugie, River Ythan, and Buchan Coastal catchment. Much of the landscape is characterised by undulating or rolling, mixed farmland with numerous small settlements and scattered residential properties. There are occasional large blocks of forestry and more frequent smaller areas of woodland and shelterbelts. Although the area comprises mainly arable farmland, there are extensive patches of moss, wetland, heathland and moorland. Between New Deer and Peterhead lies a distinct area of diverse beech and coniferous woodland cover with woodland often appearing on small hill tops and slopes.
- 6.9.27 The main settlements are Fraserburgh and Peterhead and other smaller coastal and inland settlements in the Buchan and Banff administrative area.
- 6.9.28 This north-eastern region of Aberdeenshire is connected by the A90 from Edinburgh to Fraserburgh passing around Aberdeen, Dundee, and Peterhead. Other 'A' class roads

connect the settlements within the Scoping Boundary, including the A950, A952, A948, A975, A98, A981, A982.

6.9.29 There are no active railway lines, although the disused railway lines between Peterhead, Mintlaw and Maud; and Fraserburgh, Strichen, and Maud, are now recreational routes and form part of the long distance Formartine and Buchan Way (one of Scotland's Great Trails). Other recreational routes and facilities include the Castle Trail (A98), the Coastal Trail (A90), and the Aden Country Park at Mintlaw.

6.9.30 The coastline is a series of broad sandy bays, many of which are promoted beaches, backed by sand dunes and coastal grasslands, as at Fraserburgh Bay, Back Bar, and St Fergus. These are interrupted by rocky headlands, most of which form the basis of settlements, as at Fraserburgh, Inverall, St Combs and Peterhead, but there are also largely, undeveloped headlands as at Rattray Head and Scotstown Head. Just back from the coastline and south of St Combs is Loch of Strathbeg, which is the only large loch in the area and also an RSPB reserve, adjacent to a disused airfield and series of telecommunications masts. The St Fergus Gas Terminal is a large industrial area, located on the coast further south, near St Fergus. Onshore wind farm development is also present at St Fergus Moss, and near Kirktown and Mintlaw and a series of overhead electrical transmission lines cross the area, notably at Peterhead.

Peterhead onshore substation search area

6.9.31 The Peterhead onshore substation search area is indicated in **Figure 6.9.1** in **Appendix 1A**. The area stretches from the River Ugie, north of Peterhead, along the coastline south as far as the collapsed sea caves at Bullers of Buchan and approximately 5km inland. Apart from the developed coast at Peterhead Bay and Sandford Bay, the coastline is rocky and undeveloped south of Boddam. Inland the landform is gently undulating and increasing in elevation to the west at Hill of Dens (114m AOD). Beyond the main areas of settlement at Peterhead and Boddam the landscape is mixed agricultural, with occasional shelterbelts and blocks of woodland. The A90 skirts along the western side of Peterhead and the coastline to the south and west of this there is a network of minor roads connecting scattered farmsteads and residential properties. The landscape is crossed by a number of overhead electricity transmission lines emanating from the substation near the Peterhead Power Station on the coast, north of Boddam. Other landuse, outwith the main settlements, includes small wind farms, transmission masts and quarries, a number of which are southwest of Boddam. Longside Airfield is located further north and west of Peterhead.

New Deer onshore substation search area (contingent)

6.9.32 The New Deer onshore substation search area is also indicated in **Figure 6.9.1** in **Appendix 1A**. The area broadly stretches north from the wooded, River Ythan valley and the B9005, in the south, across an undulating, mixed agricultural landscape, north almost as far as the settlement of New Deer and the B9170. The landform includes the lowland hills of Deer's Hill (178m AOD), Balquhindachy (145m AOD), Moss of Blackhillock (108m AOD) and the Braes of Gight (152m AOD). The undulating landscape includes occasional shelterbelts and blocks of woodland, scattered farmsteads and residential properties, a network of minor roads and occasional small wind farms. An overhead electricity transmission line crosses the area, northeast to southwest.

Landscape character within the Scoping Boundary

6.9.33 There are six LCTs within the Scoping Boundary as classified by the NatureScot's Landscape Character Assessment (NatureScot, 2019c). These are illustrated in **Figure**

6.9.2: Landscape Character and Special Landscape Areas in Appendix 1A. An overview of each is provided as follows:

- **LCT 10: Cliffs and Rocky Coast – Moray & Nairn:**

“This Landscape Character Type continues the Cliffs and Rocky Coast – Moray & Nairn Landscape Character Type, extending eastwards to Fraserburgh, forming a stretch of cliffs and predominantly rocky shorelines. The cliffs of this character type are generally higher than in Moray, culminating in the dramatic Troup Head east of Macduff. The inland extent of this Landscape Character Type is marked by a series of small hills and ridges which provide a rim of slightly higher ground containing the hinterland of open and gently undulating farmland of the Gently Undulating Coastal Farmland character type.” (Scottish Natural Heritage, 2019c).

- **LCT 12: Beaches, Dunes and Links – Aberdeenshire:**

“The Beaches, Dunes and Links – Aberdeenshire Landscape Character Type extends from Fraserburgh to Peterhead, and from Collieston to Aberdeen on the eastern coast of Aberdeenshire. The areas form consistent stretches of long, broad sandy beaches backed by rolling extensive dunes. The coastline is even with Rattray Head, Scotstown Head and Forvie Ness forming subtle points edging long gently curving beaches. A very wide, gentle gradual transition occurs between this low-lying landscape and the very gently undulating and open Coastal Agricultural Plain to the west with largely uninterrupted views occurring from adjoining farmed coastal plains to sea.” (Scottish Natural Heritage, 2019d).

- **LCT 16: Coastal Farmland with Ridges and Valleys:**

“Extending from the northern coast of Aberdeenshire, down to the village of New Pitsligo, including the north-west facing slopes of Mormond Hill, the low-lying Coastal Farmland with Ridges and Valleys Landscape Character type forms a transition between the dramatic sculpted sandstone ridges to the west and the flatter, lower coastal plain to the east.” (Scottish Natural Heritage, 2019e).

- **LCT 17: Coastal Agricultural Plain:**

“The Coastal Agricultural Plain is an extensive Landscape Character Type comprising a low-lying and often very open sweep of exposed farmland in eastern Aberdeenshire where the influence of the sea is particularly strong. It is characterised by its gently undulating landform, relatively large scale, extensive mosses and the influence of development including transmission masts, electricity transmission lines, the A90 and A953, and the gas terminal at St Fergus on its eastern edge. The transition between the Beaches Dunes and Links Landscape Character Type in the east and the hinterland formed by this landscape is very gradual.” (Scottish Natural Heritage, 2019f).

- **LCT 20: Undulating Agricultural Heartland:**

“The Undulating Agricultural Heartland Landscape Character Type is an extensive area of gently undulating farmland lying at the core of north-eastern Aberdeenshire. It merges gradually with the lower-lying character areas within the Coastal Agricultural Plain – Aberdeenshire and different coastal farmland Landscape Character Types to the north and east. Its southern and western boundary is formed by the Farmed and Wooded River Valleys. A distinct higher ridge within the Farmed Rolling Ridges and Hills provides a more marked change along the south-eastern boundary near the Ythan valley.” (Scottish Natural Heritage, 2019g).

- **LCT 21: Farmland and Wooded Policies:**

“The Farmland and Wooded Policies Landscape Character Type is concentrated around the South Ugie Water valley in Aberdeenshire. The dominance of woodland cover is an unusual feature in north-east Aberdeenshire. The gently rolling hills of this character area rise to between 120-148 metres and stand out above the lower-lying adjacent Undulating Agricultural Heartlands and Coastal Agricultural Plain Landscape Character Types.” (Scottish Natural Heritage, 2019h).

Coastal character within the Scoping Boundary

6.9.34 The Scoping Boundary contains two national Coastal Character Types (CCTs) (Scottish Natural Heritage, 2005) as illustrated in **Figure 6.9.2** in **Appendix 1A**. These seascape assessments were defined as:

- **CCT 2: Mainland Rocky Coastline with Open Sea Views:**

“Long straight stretches of coastline with cliffs rising to some 30 metres height and often with a raised beach edge. There are few significant headlands although geological differences create variety where softer sandstone forms an indented coast with bays and inlets, arches and caves; harder volcanic rocks produce a more resistant coastline of promontories, low cliffs and rocky shoreline. Notable groups on the north east coast. Productive arable farming occurs up to the cliff edge and tree cover is minimal. Compact fishing villages are located at the base of cliffs in small bays, while castles and cliff-top forts perch on dramatic headland locations, for example Dunottar, near Stonehaven. These are highlighted against the simple sea backdrop. These settlements and built features all appear to be spaced at even intervals and thus provide a visual rhythm of foci along the coast. Views over the North Sea are generally expansive and open, although parts of the Caithness coast have views of Hoy over the Pentland Firth. Shipping is a common feature in gazing out to sea. Some isolated industry occurs along this coast, for example the cement works and Torness Power Station, south of Dunbar.”

- **CCT 3: Deposition Coastline, Open Views:**

“Low-lying coastal sections comprising long, sweeping curved sandy beaches. These are often backed by dunes and form a soft linear edge to the sea. This type is distinguished by a simple horizontal visual composition of sky, sea and land. Grassland and gorse occurs behind dunes and in turn, this is backed by flat, mixed or arable farmland. Some areas of dunes (e.g. Barry Links) are reserved for military live firing. Golf courses occur within this type and settlements are located within farmland. Larger settlements such as Carnoustie, are popular holiday and golf resorts. St Fergus Gas terminal is a distinct, visually prominent feature in Aberdeenshire. Uninterrupted views are long and expansive along beaches with low level, and sealevel views over the North Sea. Shipping traffic is a common feature.”

Peterhead onshore substation search area

6.9.35 The Peterhead onshore substation search area comprises three LCTS. The main one is LCT 17: *Coast Agricultural Plain* and there are two others along the coast. LCT 12: *Beaches, Dunes and Links* covers the coast at Peterhead and LCT 11: *Fragmented Rocky Coast* covers the coastline further to the south.

6.9.36 The Peterhead onshore substation search area also falls within the national CCT 2: *Mainland Rocky Coastline with Open Sea Views*.

New Deer onshore substation search area (contingent)

- 6.9.37 The New Deer onshore substation search area also comprises three LCTS. The main one is LCT 20: *Undulating Agricultural Heartland* and there are two others to the south including LCT 25: *Farmed Strath — Aberdeenshire* and LCT 19: *Farmed Rolling Ridges and Hills*.

Designated landscapes and Wild Land Areas within the Scoping Boundary

- 6.9.38 There are no nationally designated landscapes (National Parks and National Scenic Areas) or Wild Land Areas within the Scoping Boundary.

Special Landscape Areas

- 6.9.39 Two local landscape designations, termed Special Landscape Areas (SLA) are included in the Aberdeenshire LDP 2023 Appendix 13: Aberdeenshire Special Landscape Areas (Aberdeenshire Council, 2020e). Each of these are described in the supplementary guidance as follows:

• North Aberdeenshire Coast SLA:

- ▶ *“Abrupt land/sea coastal edge with relative long stretches of cliffs in comparison with other parts of Aberdeenshire.*
- ▶ *Rugged coastal cliffs and headlands, forming an intricate coast of inlets and rocky bays with important outcrops of rocks and fossils, e.g. the sandstone caves at New Aberdour beach.*
- ▶ *The accessibility to the wild sense of place felt in the area.*
- ▶ *Pristine beaches infrequently interrupt cliff edge.*
- ▶ *Settlement is defined by its relationship to the sea and with smaller villages running in a linear form parallel to the cliff edge and granite buildings, densely spaced with gable ends facing to the sea. Larger settlements tend to have a distinctive historic core, with granite cottages often in a network of narrow lanes .*
- ▶ *Traditional fishing villages are nestled at the base of cliffs, including Pennan and Crovie, distinguished by diminutive form and difficulty of access.*
- ▶ *Historic harbours such as Portsoy, Banff, and Macduff which epitomise the northeast’s trade and fishing heritage.*
- ▶ *Larger settlements such as Banff and Macduff retain characteristic links to maritime industry.*
- ▶ *The Tore of Troup is the largest example of the many coastal dens, a deep-wooded ravine with its own distinct, tranquil character, linked to the north coast.*
- ▶ *Panoramic views from higher headlands, some of which can be appreciated from the A98 and B9031 coastal roads.*
- ▶ *Elemental qualities include experience of exposure, wilderness, remoteness and drama associated with rugged cliffs.*
- ▶ *Nature conservation interest contributes to appreciation of this coastal landscape, with a focus for bird life around Troup Head, and extensive undeveloped coastlines.*
- ▶ *Fortified historic sites spread along the coast, including prehistoric promontory forts such as Cullykhan, and later castles such as Findlater and Pitsligo.*

- ▶ *Ancient and historic structures include the Bronze Age burial mound of Law of Melrose, ancient churches such as Inverboyndie and St John's Gamrie, the healing Red Well at Whitehills and Macduff War Memorial.*
- ▶ *A recreational coast, with beaches coastal paths enabling good access to the outdoors, as well as more formal recreation such as the historic Tarlair swimming pool.*
- ▶ *Elemental qualities of the rugged north coast: a strong relationship with the sea and sky, offering an accessible experience of wildness."*
- **North East Aberdeenshire Coast:**
 - ▶ *"Overriding horizontal composition, emphasised by low-laying landform and "soft" gradual transition from land to sea.*
 - ▶ *Expansive beaches backed by rolling dunes, views from beaches are typically directed out to sea or along the coast.*
 - ▶ *Rugged and dramatic cliffs to the south of Boddam, with intricate landforms such as the Bullers of Buchan.*
 - ▶ *Important nature conservation sites: Forvie National Nature Reserve covering an extensive area around the mouth of the Ythan; and the Loch of Strathbeg.*
 - ▶ *Lighthouses such as Rattray form landmark features along the coast as by necessity they have prominent locations and colours, and a vertical form.*
 - ▶ *A popular coast for visitors, with coastal paths, accessible dunes, golf courses and popular beaches.*
 - ▶ *Prehistoric sites of national importance, including the Mesolithic landscapes at Sands of Forvie and Blackdog.*
 - ▶ *Features of built heritage typically prominent in the open landscape.*
 - ▶ *The iconic Slains Castle and its association with Bram Stoker.*
 - ▶ *Remains of World War II anti-invasion defences along the beaches, in particular at the mouth of the Ythan River and around Rattray Head.*
 - ▶ *Coastal settlement generally associated with small harbours, such as at Collieston and Cruden Bay. The siting and orientation of buildings can be highly distinctive, as seen at Inverallochy.*
 - ▶ *Panoramic views out to sea from cliff tops and open beaches."*

Peterhead onshore substation search area

- 6.9.40 The Peterhead onshore substation search area is partly overlapped by the *North East Aberdeenshire Coast* SLA.

New Deer onshore substation search area (contingent)

- 6.9.41 The New Deer onshore substation search area is not overlapped by the SLA landscape designations.

Visual baseline within the Scoping Boundary

- 6.9.42 The visual baseline will be further defined by further Zone of Theoretical Visibility (ZTV) plots for the onshore elements of the Project.
- 6.9.43 The main visual receptors within the Scoping Boundary are however noted as follows:

Main settlements within the Scoping Boundary

- 6.9.44 The main settlements within the Scoping Boundary include, but are not limited to Fraserburgh, Peterhead, Sandhaven, Inverallochy, St Combs, St Fergus and Boddam. Further inland other smaller settlements of note including Rathen, Strichen and Mintlaw, Tyrie, Memsie, Crimond, St Fergus, Fetterangus, Maud, Longside, New Pitsligo New Deer, Stuartfield and Auchnagatt.
- 6.9.45 Elsewhere there are numerous scattered hamlets, farmsteads and residential properties across the Aberdeenshire agricultural heartlands.

Main transport routes within the Scoping Boundary

- 6.9.46 The main transport routes include, but are not limited to:
- A90 from Aberdeen to Peterhead and Fraserburgh;
 - A950 from Peterhead to New Pitsligo;
 - A952 north from Mintlaw;
 - A981 north from New Deer, Strichen and Fraserburgh;
 - A98 between Fraserburgh and New Pitsligo; and
 - There is also a dense network of 'B' class roads and minor roads.

Main recreational routes within the Scoping Boundary

- 6.9.47 The main recreational routes include but are not limited to:
- Scotland's Great Trails: The Formartine and Buchan Way;
 - The North East 250 route leads through Peterhead to Fraserburgh along the coast;
 - The Castle Trail (A98);
 - The Coastal Trail (A90);
 - Sustrans Cycle Network: Route 1 (parts 1d and 1e); and
 - The local Core Path Network.

Main recreational attractions within the Scoping Boundary

6.9.48 Key outdoor tourist and visitor attractions within the Scoping Boundary include, but are not limited to:

- Tourist Attractions:
 - ▶ The White Horse, Mormond Hill, near Strichen;
 - ▶ The White Stag, Mormond Hill near Strichen;
 - ▶ Kinnaird Head Castle Lighthouse;
 - ▶ Inverallochy Castle, Fraserburgh;
 - ▶ Rattray Head Lighthouse, Seatown;
 - ▶ Memsie Round Cairn;
 - ▶ Berrybrae Stone Circle, Dartfield;
 - ▶ Aikey Brae Stone Circle;
 - ▶ Aden Country Park, Old Deer;
 - ▶ Drinnie's Wood Observatory, Mintlaw; and
 - ▶ Loch of Strathbeg, Crimond.
- Beaches:
 - ▶ Scotstown Beach, St Fergus;
 - ▶ Lido Beach, Peterhead;
 - ▶ Cruden Bay Beach;
 - ▶ Waters of Philorth and Tigerhill Beach, Fraserburgh.
- Golf Courses:
 - ▶ Inverallochy Golf Club;
 - ▶ Fraserburgh Golf Club;
 - ▶ Longside Golf Club; and
 - ▶ Peterhead Golf Club.
- Caravan and camp Sites:
 - ▶ Peterhead Marina Bay Holiday Park;
 - ▶ Aden Caravan & Camping;
 - ▶ East Balthangie Caravan & Camping Park; and
 - ▶ Smiddy Croft Caravan Club.

Peterhead onshore substation search area

6.9.49 Visual receptors within the Peterhead onshore substation search area are listed as follows:

- Settlements include Peterhead and Boddam.
- Transport Routes include the A90, A950 and a network of minor roads. The North East 250 is routed along the A982 through Peterhead. There are no rail links.
- Recreational Routes and locations include:
 - ▶ Scotland's Great Trails: The Formartine and Buchan Way; and a Core Path Network including the Peterhead Trail through the settlement, linking historic and cultural attractions and scenic views along the coast.
 - ▶ Another core path leads north from Peterhead to Rattray along the coast.
 - ▶ Craigewan Golf Links.
- Tourist and Visitor Attractions include:
 - ▶ Lido Beach;
 - ▶ Longhaven Cliffs Nature Reserve;

- ▶ Bullers of Buchan (collapsed caves); and
- ▶ birdwatching areas between Boddam and Cruden Bay.

6.9.50 Further south is Slains Castle, known as the inspiration for Bram Stoker's Dracula and the sandy beach at Cruden Bay and Cruden Bay Golf Club. Further north there is Scotstown Beach.

New Deer onshore substation search area (contingent)

6.9.51 Visual receptors within the Peterhead onshore substation search area are listed as follows:

- Settlements include New Deer, and numerous scattered hamlets, farmsteads and residential properties.
- Transport Routes include the B9170, the B9005 and a network of minor roads. There are no rail links.
- Recreational Routes and locations include:
 - ▶ The Sustrans Cycle Route 1 is routed to the north of New Deer.
 - ▶ The Core Path Network includes two Core Paths (ID Ref 211.01) within New Deer, a core path following the River Ythan (ID Ref 308.02) and further core paths between Woodhead and Fyvie (ID Ref 307.02 and 307.04).
- Tourist and Visitor Attractions include:
 - ▶ The Culsh Monument north of New Deer, with views towards Fedderate Castle and the Mormond Hill White Horse;
 - ▶ New Deer Showground (notable annual two-day agricultural show in Aberdeenshire); and
 - ▶ Gight Castle and Gight Wood near Methlick.

Future baseline

6.9.52 Landscape change is an ongoing process and will continue across the Scoping Boundary irrespective of whether the Project proceeds. Change can arise through natural processes (for example, the maturity of woodlands) and natural systems (for example, river erosion) or as a result of human activity including land use and land management.

6.9.53 The Aberdeenshire LDP 2023 indicates strategic and economic growth within their districts which is likely to affect Peterhead and other settlements within the Scoping Boundary. Other land management, and consequently landscape character, is dependent on a number of economic and environmental factors including the future effects of climate change and human adaptation which are difficult to predict at a local level and not a matter for this assessment. It is however likely that mitigation and adaptation in response to changing climate and biodiversity pressures will continue to have an influence on this area in the form of increased renewable energy and other environmental changes such as changes to the current levels of forestry and woodland.

6.9.54 Further information on the future baseline, relevant to the LVIA is provided in **Section 6.4: Land use**.

Basis for scoping assessment

- 6.9.55 The LVIA scoping assessment is based on information set out in **Chapter 2: Project Description**. Optioneering to inform the selection of the onshore elements will include reference to baseline landscape and visual receptors. The onshore elements will be subject to a temporary construction period, the lease agreement allows the Project to remain until 2080, which would be the maximum operational lifetime under these terms of the lease.
- 6.9.56 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 6.9.8**.
- 6.9.57 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 6.9.58 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on landscape and visual receptors (see **Table 6.9.6**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 6.9.59 There is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.
- 6.9.60 Although the embedded environmental measures cannot be fully identified at this stage, the principles proposed to mitigate and reduce potential landscape and visual effects undertaken as part of the optioneering are likely to include, but not limited to the following:
- Elimination of permanent landscape and visual effects that might otherwise result from the landfall(s) and cable route following its restoration and reinstatement.
 - During construction, mitigate and reduce potential landscape and visual effects through the following means:
 - ▶ Where appropriate, undertake surveys and develop avoidance / retention plans for particular landscape elements and other environmental receptors.
 - ▶ Where practical, effects on landscape elements and features such as ancient woodlands, important field boundaries, veteran tree specimens, and sensitive sites such as nature reserves, visitor attractions, and Gardens and Designed Landscapes, will be minimised or avoided. Where this is unavoidable, a combination of alternative construction techniques and a compensatory / new planting strategy would be developed as an integral part of the overall design of the Project.
 - ▶ Alternative construction techniques may include reductions to the working width of the onshore export cable corridor during construction and use of trenchless crossing techniques such as horizontal directional drilling.
 - ▶ Construction work will occur progressively along the onshore export cable corridor and the time during which trenches remain open would be reduced to a minimum practical, allowing for quicker backfilling and early restoration and reinstatement of the landscape.
 - Care and preservation of soils will follow best practice and seek to limit the area of soil stripping and the time period for storage of material, in accordance with a vegetation

clearing / soil management plan. Storage along the working width will assist in visually screening open trench works and activity within the corridor.

- Should the cable route unavoidably lead to the disturbance of hedgerows / vegetation, their removal will be kept to a practical minimum with replacements being planted and protected during the first planting season following construction, to minimise landscape and visual effects, and enable previous conditions to be re-established. The guidance in BS 5837: 2012 Trees in Relation to Construction will be followed, and measures such as the erection of protective fencing will be put in place in order to minimise effects on trees and their roots. Wherever possible, established trees will be fenced off and worked around.
- Where recreational routes are crossed by the proposed onshore elements, appropriate route management and signage will be provided.

Approach to design and environmental measures

6.9.61 High level landscape and visual assessment work is being undertaken to assist the optioneering and consideration of site and route alternatives for the onshore elements of the Project, within the Scoping Boundary. This is a key component of the design and environmental measures process and will include use of baseline landscape and visual data, including the location of similar infrastructure and site / field surveys. The design measures will consider the potential to reduce overall landscape and visual effects as well as the use of other landscape design techniques.

6.9.62 Embedded environmental measures in respect of the provisional and then the final LVIA study area will involve the sensitive siting and design of the onshore elements of the Project as part of the ongoing site selection work. The ongoing work will consider constraints and potential effects relating to physical landscape elements (such as woodlands, trees and hedgerows), and landscape character, landscape designations and visual amenity, together with other environmental and technical constraints. The sensitivity of the surrounding landscape and of residents, road / rail users, and recreational users of the landscape will be a key consideration in the siting and design of the onshore elements of the Project within the 'final' study area.

6.9.63 An outline landscape strategy (the Landscape Design and Environmental Management Plan or 'LDEMP') will be prepared to mitigate the landscape and visual effects and help to 'fit' or better assimilate the proposed onshore substation(s) into its landscape setting. The LDEMP may include the following:

- Advance survey of landscape elements and other environmental receptors.
- Retention plans to ensure the protection of particular landscape elements.
- Advance landscape works to 'grow' proposed planting as early as possible, where practical.
- Restoration of temporary construction works, (post construction).
- Implementation of landscape works which are likely to include earthworks and drainage, fencing / boundary, colour coordination, hard works, soft works / planting and maintenance.
- Enhancement works.
- A maintenance period of five years will be implemented to ensure the establishment of proposed landscape planting works.

- A management plan will be implemented to care for the landscape and environmental measures as part of the on-going operational period.

6.9.64

The LVIA proposes to assess the potential landscape and visual effects of the proposed onshore substation(s) during the construction period and at Year five post implementation of the landscape planting works.

Table 6.9.6 Relevant LVIA embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
During Construction		
M-001	Underground cables will be used to connect from the landfall(s) transition joint bay(s) to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the new onshore substation nominated by NETS grid connection point(s). The installation status of which will be assessed on confirmation of a route of the onshore cable routing. Cables are typically installed in ducts in a standard buried trench arrangement.	Construction Environment Management Plans (CEMP) and planning conditions.
M-002	Where practical, sensitive sites will be avoided by the temporary and permanent onshore project footprint including SPAs, SACs, SSSIs, National Nature Reserve (NNR), Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, Scottish National Trust Land, Listed Buildings and Scheduled monuments.	CEMP, description of Project and planning conditions.
M-005	The construction method for the landfall(s) has yet to be determined, and will be specific to the site chosen, its geology, topography and other constraints. Typically either open cut/cut-and-fill construction or trenchless construction (e.g. HDD) will be used. Where it is necessary to cross sensitive features, trenchless construction methods will be used under the cross feature.	CEMP and planning conditions.
M-006	<u>Vegetation (Trees / Woodland / Hedgerows):</u> Vegetation will be retained where possible and mapped (Vegetation Retention Plan or similar). Otherwise, vegetation removal will be undertaken in line with British Standard (BS) 5837-2012 (Trees in relation to design, demolition and construction) and scheduled to avoid bird breeding seasons. Ancient woodland will be retained with a stand-off of a minimum of 25m from any surface construction works (HDD a depth >6m). With regards to other woodland / forestry, the onshore export cable construction corridor will be reduced, where practical, to minimise tree loss and where the construction corridor passes close to woodland that is being retained, BS5837:2012 root protection to apply. Hedgerows with trees / tree lines (including hedgerows deemed "important" under the Hedgerows Regulations 1997) which are crossed by the onshore export cable route will be notched to reduce landscape impacts. All hedgerows that are to be retained, coppiced, notched or lost are	CEMP, description of Project and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	to be mapped. Vegetation may be coppiced / pruned to allow access and visibility splays at junctions.	
M-011	A lighting design of all temporary and permanent lighting will be developed once contractors are appointed; however, the principles of lighting design will be detailed at the time of application and informed by the joint guidance provided by the Bat Conservation Trust and Institution of Lighting Professionals (2018). The lighting design will account of the potential effects on terrestrial ecology and people (residents) by taking measures to minimise lighting usage, minimise light spill, use most appropriate wave lengths of light and locate lighting in the most appropriate locations – this is to decrease the potential displacement effects on light sensitive fauna, such as bats.	CEMP, description of Project and planning conditions.
M-019	The onshore export cable will be constructed in sections. The trenches will be excavated, the cable ducts will be laid, the trenches backfilled, and the reinstatement process commenced in as short a timeframe as practicable.	CEMP
M-024	<u>Inspection and Completion:</u> Condition surveys and inspections will be undertaken before, during and after the construction phase. If damage has been identified during the construction phase, the damage will be repaired.	CEMP, description of Project and planning conditions.
M-026	Signage and / or temporary core path / RoW diversions will be provided during construction where necessary to avoid the construction working areas.	Outline Core Paths Management Plan (CPMP) and planning conditions.
M-027	At any sensitive features identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential environmental effects. Where it is necessary to cross sensitive features, such as watercourses, trenchless construction methods, such as HDD will be used to install ducts under the crossed feature, which the cables are then pulled through via entry and exit pits.	CEMP and planning conditions.
M-063	A CEMP to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. Other measures that feed into the CEMP relevant to this technical assessment include: <ul style="list-style-type: none"> • M-109: Protection of visual receptors. The CEMP will be the securing mechanism for many measures.	CEMP and planning conditions.
M-070	Soils and excavated materials will be managed in accordance with SEPA regulatory guidance on Promoting the Sustainable Reuse of Greenfield Soils in Construction, and Waste Management Guidelines for the re-use of excavated materials	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	<p>and remediation. The best practice for soil handling in the Defra Construction Code of Practice will be applied for handling of topsoil and subsoil. A soil management plan (SMP) will be developed for use during construction to protect soil resources and agricultural land quality. The SMP will be used in conjunction with a Peat Management Plan (PMP) as required i.e., if the Project encounters areas of peat.</p>	
M-103	<p>On-going design: Where practical, sensitive sites for landscape and visual receptors will be avoided by the onshore project footprint (above ground) including:</p> <ul style="list-style-type: none"> Landscape receptors: Landscape character types, characteristics and elements of high sensitivity (e.g., ancient woodland and veteran trees / tree preservation orders and other valued trees / woodland), and Special Landscape Areas. Visual Receptors: Settlements and residential properties, national level recreational routes, important tourist / visitor attractions including beaches, popular hills, GDLs, land open to the public and owned by the National Trust for Scotland, Woodland Trust and Historic Environment Scotland, Nature Reserves and Local Wildlife Sites. <p>Loss or disturbance of sensitive sites for landscape and visual receptors, arising from temporary works will be mitigated, as far as possible, through sensitive design restoration and enhancements.</p>	<p>Ongoing EIA / LVIA design and assessment processes, CEMP, description of Project and planning conditions.</p>
M-104	<p><u>Construction Access and Compounds:</u> All temporary construction access and contractor's compounds / laydown areas will be sensitively sited to avoid and / or reduce and mitigate adverse landscape and visual effects. Following construction, these areas will be returned to previous conditions where reasonably possible.</p>	<p>CEMP, description of Project and planning conditions.</p>
M-108	<p><u>Onshore Cable: Landscape Design and Ecology Management Plan (LDEMP):</u> The LDEMP will be developed to reinstate landscape elements (e.g., trees, woodland and hedgerows) which have been removed as a result of construction, including construction / HDD compounds and construction access. Attention will be given to species selection and landscape patterns within each Landscape Character Area / habitat type.</p> <p>Woodland cannot be replaced above the onshore cable, but hedgerows and grassland can be reinstated:</p>	<p>CEMP management plans -LDEMP, description of Project and planning conditions.</p>

ID	Environmental measure proposed	How the environmental measures will be secured
	<ul style="list-style-type: none"> • Areas of temporary vegetation loss will be reinstated at the first available planting / seeding season following completion. • Reinstatement of vegetation will seek to provide landscape enhancement. <p>Opportunities for enhancement will be identified following further evolution of the Project design and with stakeholder engagement.</p> <p>All new planting will be subject to a five-year establishment period with appropriate maintenance and on-going management.</p>	
M-109	<p><u>Protection Visual Receptors During Construction:</u> An outline CEMP will be adopted to minimise temporary disturbance to residential properties and tourists / visitor attractions. This may include plans for temporary or permanent screening.</p>	<p>CEMP, description of Project and planning conditions.</p>
M-110	<p><u>Recreational Routes:</u> A crossing schedule / RoW Management Plan will be prepared which includes crossing methodology for each crossing of a recreational route. Signage and / or temporary recreational route diversions will be provided during construction and opportunities taken where possible to provide a diversion of similar or enhanced amenity.</p>	<p>CEMP (crossing schedule / RoW Management Plan), description of Project and planning conditions.</p>
M-111 (see also M-108)	<p><u>Onshore Substation(s): Landscape Design and Ecology Management Plan (LDEMP):</u> The final form of the onshore substation(s) will be finished to a high standard of design, using quality materials and integrated into the surrounding environment through the adoption of a robust, sustainable landscape planting strategy, taking account of the landscape character and related environmental receptors. The LDEMP will be developed to mitigate landscape and visual effects and where possible, protect landscape character, key characteristics and elements, and enhance landscape quality through use of sustainable landscape design techniques.</p> <p>Opportunities for enhancement will be identified following further evolution of the Project design and with stakeholder engagement.</p> <p>All new planting will be subject to a five-year establishment period with appropriate maintenance and on-going management.</p>	<p>CEMP management plans - LDEMP, description of Project and planning conditions.</p>
M-113	<p><u>Architectural Strategy:</u> Potential to mitigate significant effects through development of an architectural strategy which could include colour schemes or art project.</p>	<p>On-going EIA / LVIA design, consultation and assessment process, CEMP management plans, description of Project and planning conditions.</p>

ID	Environmental measure proposed	How the environmental measures will be secured
During Operation / Maintenance		
M-066	The permanent easement for the onshore export cable route will be kept to the minimum width needed for safe access for cable maintenance or replacement purposes during operation of the Project.	Planning conditions.
M-093	<p><u>Landscape Maintenance / Management:</u> All permanent sites (land fall and substations(s)) will be maintained.</p> <p>All new planting will be subject to an establishment period with appropriate maintenance and management to a time-scale to be agreed as part of the EIA Report.</p>	Planning conditions.
During Decommissioning		
M-107	A decommissioning plan will be prepared for the Project in line with the latest relevant available guidance.	Planning conditions.

Likely significant effects

- 6.9.65 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from the assessment.
- 6.9.66 The likely significant effects on landscape and visual are summarised in **Table 6.9.7** and **Table 6.9.8**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for landscape and visual effects and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 6.9.67 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects which are therefore no longer considered is presented after the table, supported by evidence base.
- 6.9.68 Viewpoint analysis and site survey, which includes an assessment of sensitivity and magnitude, will be used as part of the assessment to identify those receptors which are most likely to be significantly affected.
- 6.9.69 It is important to note that whilst some effects can be identified as likely to be significant at this pre-assessment stage, there is the potential for other receptors to be significantly affected and vice-versa, subject to evolution in design and further details of the LVIA. As an example, the operation / maintenance of the onshore export cable corridor is ‘scoped in’ but it may be scoped out’ once further details of the route location are known.

Table 6.9.7 Likely significant landscape effects

Activity	Embedded measures	Landscape Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
Construction: landfall(s), onshore export cable corridor and substation(s)					
Land preparation: site clearance and earthworks. Construction activity: including presence of cranes, people plant and vehicle movements, contractor's facilities and site access.	M-001, M-002, M-005, M-006, M-011, M-019, M-024, M-026, M-027, M-063, M-070, M-103, M-104, M-108, M-109, M-110, M-111	Landscape elements within the onshore export cable corridor / substation site(s) e.g. trees, hedges, woodland.	Significant effects likely assuming some high value and sensitive elements cannot be avoided / mitigated.	Scoped in: assess as per LVIA Methodology Appendix 6.9A: LVIA Methodology.	Develop optioneering, Targeted site survey, and Develop mitigation measures.
	M-001, M-002, M-005, M-006, M-011, M-019, M-024, M-026, M-027, M-063, M-070, M-103, M-104, M-108, M-109, M-110, M-111	Landscape Character	Significant effects likely within and close to the onshore export cable corridor and substation(s).	Scoped in: LCTs <2-5km LVIA study area and ZTV:	Develop optioneering, Targeted site survey, and Develop mitigation measures and LDEMP.
	M-001, M-002, M-005, M-006, M-011, M-019, M-024, M-026, M-027, M-063, M-070, M-103, M-104, M-108, M-109, M-110, M-111	Landscape Designations (SLA)	Significant effects likely within and close to the onshore export cable corridor and substation(s) depending on the special landscape qualities / character underpinning the designation.	Scoped in: SLAs <2-5km LVIA study area and ZTV:	Develop optioneering, Targeted site survey, and Develop mitigation measures and LDEMP.

Activity	Embedded measures	Landscape Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
Operation / Maintenance : onshore substation(s)					
Operation / maintenance of substation(s)	M-066, M-093	Landscape character of the substation site	Significant effects may be likely due to the operation / maintenance of the substation(s)	Scoped in: Operation / maintenance of substation.	Develop requirements for further baseline data as part of mitigation measures and LDEMP – model planting growth rates for Year 5 from selected viewpoints.
Implementation of LDEMP		Landscape elements (e.g. trees, hedges, landscape features).	Positive or neutral effects may be likely due to the implementation of LDEMP and establishment of associated landscaping.	Scoped in: New landscape established as a result of the LDEMP.	
	M-066, M-093	Landscape Character	As above	Scoped in: LCTs <5km LVIA study area and ZTV: New landscape established as a result of the LDEMP.	As above
	M-066, M-093	Landscape Designations (SLA)	As above	Scoped in: SLAs <5km LVIA study area and ZTV: New landscape established as a result of the LDEMP.	As above

Activity	Embedded measures	Landscape Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
Operation / maintenance: landfall(s) and onshore export cable corridor					
Operation / maintenance of landfall(s) and onshore export cable corridor	M-066, M-093	Landscape elements (e.g. trees, hedges, landscape features).	Possible residual effects on landscape elements / patterns which may have been permanently disrupted / removed from the onshore export cable corridor, subject to design and mitigation.	Scoped in: Receptors within the onshore export cable corridor:	Review requirements for further baseline data as part of mitigation measures to ensure avoidance of operational effects. Scoped out where possible as design matures.
Implementation of LDMP	M-066, M-093		Positive or neutral significant effects may be likely due to implementation of LDMP and establishment of associated landscape planting.	Scoped in: New landscape established as a result of the LDMP.	Review requirements for further baseline data as part of developing mitigation measures and LDMP – model planting growth rates for Year 5 from selected viewpoints where applicable.
	M-066, M-093	Landscape Character	Significant effects unlikely post construction.	Scoped out: Subject to no effects on landscape elements that could in turn affect the LCT (for rational see section below paragraphs 6.9.70-6.9.72).	
	M-066, M-093	Landscape Designations (SLA)	Significant effects unlikely post construction.	Scoped out: Subject to no effects on landscape elements that could in turn affect the	

Activity	Embedded measures	Landscape Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
				SLA (for rational see section below paragraphs 6.9.70-6.9.72).	
Decommissioning: onshore substation(s)					
Construction activity as per construction period – Restoring site to previous land use	M-107	Landscape elements (e.g. trees, hedges, landscape features).	Positive or neutral significant effects may be likely due to a new and mature landscape (resulting from the LDEMP) and the restoration to previous land use.	Scoped In: Retain new landscape resulting from LDEMP and provide additional landscape in line with Decommissioning Landscape Plan.	Re-survey and review requirements for further baseline data as part of developing outline strategy for future LDEMP / Decommissioning Landscape Plan.
	M-107	Landscape Character	As above	Scoped In: LCTs <5km LVIA study area and ZTV: Retain LDEMP, implement Decommissioning Landscape Plan.	As above
	M-107	Landscape Designations (SLA)	As above	Scoped In: LCTs <5km LVIA study area and ZTV: Retain LDEMP, implement Decommissioning Landscape Plan.	As above

Activity	Embedded measures	Landscape Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
Decommissioning: landfall(s) and onshore export cable corridor					
Landfall(s) to be left underground	N/A	Landscape elements Landscape Character (LCT) Landscape Designations (SLA)	No significant landscape effects.	Scoped out (for rational see section below paragraphs 6.9.70- 6.9.72). Any remaining manhole access and any on-going easement restrictions would not be significant.	Confirm detailed decommissioning of ground level manhole access and any on-going easement restrictions.
Onshore export cable corridor - cables to be left underground	N/A	Landscape elements Landscape Character (LCT) Landscape Designations (SLA)	No significant landscape effects.	Scoped out: Any remaining manhole access and any on-going easement restrictions would not be significant (for rational see section below paragraphs 6.9.70- 6.9.72).	Confirm details of any on-going access / easement restrictions.

Table 6.9.8 Likely significant visual effects

Activity	Embedded measures	Visual Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
Construction: landfall(s), onshore export cable corridor and onshore substation(s)					
Land preparation: site clearance and earthworks. Construction activity: including presence of cranes, people plant and vehicle movements, contractor's facilities and site access.	M-001, M-002, M-005, M-006, M-011, M-019, M-024, M-026, M-027, M-063, M-070, M-103, M-104, M-108, M-109, M-110, M-111	Settlement / residents:	Significant effects likely assuming residents are within 250m of onshore export cable corridor with clear views that cannot be mitigated.	Scoped in: Residents <250m of onshore export cable corridor / substation site(s) and settlements within 5km study area and ZTV.	Develop optioneering, Targeted site survey, and Develop mitigation measures.
	M-001, M-002, M-005, M-006, M-011, M-019, M-024, M-026, M-027, M-063, M-070, M-103, M-104, M-108, M-109, M-110, M-111	Transport and recreational routes	Significant sequential effects likely within and close to the onshore export cable corridor and substation(s) for prolonged route sections / and at key 'gateways' or vistas.	Scoped in: Receptors <2-5km LVIA study area and ZTV:	Develop optioneering, Targeted site survey, and Develop mitigation measures and LDEMP.
	M-001, M-002, M-005, M-006, M-011, M-019, M-024, M-026, M-027, M-063, M-070, M-103, M-104, M-108, M-109, M-110, M-111	Visitor / Tourist attractions and locations	Significant effects likely within the onshore export cable corridor and substation(s) depending on the particular nature of the receptor and the effect.	Scoped in: Receptors <2-5km LVIA study area and ZTV:	Develop optioneering, Targeted site survey, and Develop mitigation measures and LDEMP.

Activity	Embedded measures	Visual Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
Operation / maintenance: onshore substation(s)					
Operation / maintenance of substation(s)	M-066, M-093	Settlement / residents:	Significant effects may be likely due to the operation / maintenance of the substation(s)	Scoped in: Residents <250m of onshore export cable corridor / substation site(s) and settlements within 5km study area and ZTV.	Review requirements for further baseline data as part of mitigation measures and LDEMP – model planting growth rates for Year 5 from selected viewpoints.
Implementation of LDEMP			Positive or neutral effects may be likely due to the implementation of LDEMP and establishment of associated landscaping.	New views established as a result of the LDEMP.	
	M-066, M-093	Transport & recreational routes	As above	Scoped in: LCTs <5km LVIA study area and ZTV: New landscape established as a result of the LDEMP.	As above
	M-066, M-093	Visitor / Tourist attractions and locations	As above	Scoped in: SLAs <5km LVIA study area and ZTV: New landscape established as a result of the LDEMP.	As above

Activity	Embedded measures	Visual Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
Operation / maintenance: landfall(s) and onshore export cable corridor					
Operation / maintenance of landfall(s) and onshore export cable corridor	M-066, M-113, M-093	Settlement / residents	Possible residual effects resulting from loss of landscape elements / features in the view / on-going changes to the view - subject to design and mitigation.	Scoped in: Residents <250m and settlements within 2-5km study area and ZTV.	Review mitigation measures to ensure avoidance of operational effects. Scoped out where possible as design matures.
Implementation of LDEMP			Positive or neutral significant effects may be likely due to implementation of LDEMP and establishment of associated landscape planting.		Develop mitigation measures and LDEMP – model planting growth rates for Year 5 from selected viewpoints where applicable.
	M-066, M-093	Transport & recreational routes	As above	Scoped in: LCTs <2-5km LVIA study area and ZTV: New landscape established as a result of the LDEMP.	As above
	M-066, M-093	Visitor / Tourist attractions and locations	As above	Scoped in: SLAs <2-5km LVIA study area and ZTV: New landscape established as a result of the LDEMP.	As above

Activity	Embedded measures	Visual Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
Decommissioning: onshore substation(s)					
Construction activity as per construction period – Restoring site to previous land use	M-107	Settlement / residents:	Positive or neutral significant effects may be likely due to a new and mature landscape (resulting from the LDEMP) and the restoration to previous land use.	Scoped in: Retain new landscape resulting from LDEMP and provide additional landscape in line with Decommissioning Landscape Plan.	Re-survey and develop outline strategy for future LDEMP / Decommissioning Landscape Plan.
	M-107	Transport & recreational routes	As above	Scoped in: LCTs <5km LVIA study area and ZTV: Retain LDEMP, implement Decommissioning Landscape Plan.	As above
	M-107	Visitor / Tourist attractions and locations	As above	Scoped in: LCTs <5km LVIA study area and ZTV: Retain LDEMP, implement Decommissioning Landscape Plan.	As above

Activity	Embedded measures	Visual Receptor	Likely Effect	Assessment Method (Scope in / out)	Further data baseline requirements
Decommissioning: landfall(s) and onshore export cable corridor					
Landfall(s) to be left underground	N/A	Settlement / residents: Transport & recreational routes Visitor / Tourist attractions and locations	No significant visual effects.	Scoped out: Any remaining manhole access and any on-going easement restrictions would not be significant (for rational see section below paragraphs 6.9.70- 6.9.72).	Confirm detailed decommissioning of ground level manhole access and any on-going easement restrictions.
Onshore export cable corridor - Cables to be left underground	N/A	Settlement / residents: Transport & recreational routes Visitor / Tourist attractions and locations	No significant visual effects.	Scoped out: Any remaining manhole access and any on-going easement restrictions would not be significant (for rational see section below paragraphs 6.9.70- 6.9.72).	Confirm details of any on-going access / easement restrictions.

Impacts scoped out of assessment

- 6.9.70 Some of the potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. Each scoped out effect is considered in turn below.
- Receptors outwith the ZTV: all receptors within the Scoping Boundary that are outwith the ZTV will have no view of the onshore elements of the Project and are scoped out.
 - Landscape Effects Scoped Out:
 - ▶ Operational effects of the landfall(s) and onshore export cable corridor on landscape character and designations.
 - ▶ Decommissioning effects of the landfall(s) and onshore export cable corridor on landscape character and designations.
 - Visual Effects Scoped Out:
 - ▶ Operational effects of the landfall(s) and onshore export onshore export cable corridor on visual receptors (residents / settlements, transport and recreational routes and tourist / visitor attractions) have the potential to be scoped out as the design matures.
 - ▶ Decommissioning effects of the landfall(s) and onshore export onshore export cable corridor on visual receptors (residents / settlements, transport and recreational routes and tourist / visitor attractions).
- 6.9.71 There will be no decommissioning of the landfall(s) and onshore export cable corridor at the end of their operational life, as the electrical cables will be likely left in-situ to minimise the landscape and visual effects associated with removal.
- 6.9.72 Although the electrical cables would be underground and not visible following restoration and reinstatement, there remains the possibility of landscape and visual effects, resulting from the construction works, leading to an on-going operational effect. For example, the loss of vegetation leading to the opening up a of a view, or the disruption of landscape pattern and character that might be important to a designed landscape or particular place could result in an on-going significant effect on the landscape and or visual resource during the operational period. It is recommended that as the design and assessment is developed further, through optioneering and embedded environmental measures, the operational effects of the landfall(s) and onshore export cable corridor on visual receptors have the potential to be scoped out as the design matures, where possible, with the appropriate supporting analysis.

Cumulative effects

- 6.9.73 Cumulative landscape and visual effects resulting from the Project in addition to and in combination with other similar developments will be assessed in accordance with the technical guidance and outline methodologies set out in **Chapter 4: Approach to Scoping and EIA** (including specific LVIA methodology in **Appendix 6.9A: LVIA Methodology**).
- 6.9.74 The cumulative assessment will assess the effects of other similar developments that have been screened in as part of the cumulative effects assessment (CEA) screening exercise.
- 6.9.75 The following Project effects have the potential to result in cumulative effects:

- Whole project effects resulting from the combined effects of the onshore and offshore elements of the Project.
- Cumulative landscape and visual effects during construction, operation / maintenance and decommissioning of the onshore elements (landfall(s), onshore export cable corridor and substation(s)):
 - ▶ effects on landscape character, elements and characteristics as a result of the onshore elements of the Project in addition, and in combination with other similar development;
 - ▶ effects on landscape designations (special landscape qualities and integrity) as a result of the onshore elements of the Project in addition, and in combination with other similar development; and
 - ▶ effects on visual receptors as a result of the onshore elements of the Project in addition, and in combination with other similar development.

6.9.76 The cumulative assessment methodology for the LVIA will be described in the EIA report once the scope of any cumulative assessment is confirmed and agreed with stakeholders and consultees.

Transboundary effects

6.9.77 The potential effects from construction, operation (and maintenance) and decommissioning on LVIA features are considered in **Appendix 4A: Transboundary Screening Matrix**. No transboundary impacts have been identified as there is no potential for onshore elements of the Project to have a significant effect on the LVIA features of an adjacent state.

Proposed approach to the EIA Report

Stakeholder engagement

6.9.78 Consultation will be a key feature of the LVIA process, from pre-application through to the application stage with relevant statutory, non-statutory organisations, and members of the public.

6.9.79 The Applicant is seeking early engagement with stakeholders and consultees to gain input to the methodology for the assessment, and local knowledge on the key landscape and visual constraints / sensitivities and to discuss potential future environmental measures, as appropriate. The Applicant considers it important to engage early to ensure all landscape and visual topic matters are considered appropriately and proportionately with the relevant statutory and non-statutory consultees. Communications will seek to introduce the Project and gain high level insight on issues that key stakeholders would like to see included at scoping through early engagement.

6.9.80 The Applicant will engage with stakeholders and consultees seeking early agreement of LVIA methodology, study areas, extent of baseline receptors and location of assessment viewpoints to be included in the LVIA (prior to viewpoint photography) once these have been established.

6.9.81 All consultation feedback pertaining to the LVIA will be summarised in the LVIA Chapter together with information on how feedback has been addressed in the EIA Report.

Baseline (desk based and site survey work)

6.9.82 The LVIA baseline will be undertaken progressively and with increased detail as follows:

- Scoping Boundary:
 - ▶ Outline baseline information provided at scoping stage.
- Provisional LVIA study area:

6.9.83 Optioneering of landfall(s), onshore export cable corridor, route options and onshore substation search areas with full baseline information provided post scoping.

6.9.84 A preliminary desk-based assessment will be undertaken of landscape and visual receptors using ZTV analysis, to identify which receptors are unlikely to be significantly affected, which will be subject to a simple assessment, and those that are more likely to be significantly affected by the onshore elements of the Project, which require a detailed assessment.

- LVIA study area:
 - ▶ Detailed baseline information provided post optioneering and site / route selection.
 - ▶ Site surveys, including appreciation of the 'final' study area and viewpoint photography from public locations in settlements and on roads, recreational routes or places and local attractions and visitor destinations.
 - ▶ Field surveys will be undertaken to observe, assess and record landscape and visual receptors and provide a photographic record of each assessment viewpoint in accordance with SNH (2017) *Visual Representation of Wind Farms*, Guidance (Version 2.2) and the Landscape Institute (2019) *Visual Representation of Development Proposals*, TGN 06/19. The field studies will include documented visits to all relevant landscape and visual receptors to assess the likely effects of the onshore elements of the Project in the field, checking data, 'ground truthing' and examining landscape elements, characteristics / character and views / visual amenity.

6.9.85 The LVIA presented in the EIA Report will be informed by desk-based studies and field survey work undertaken within the study area.

6.9.86 Relevant literature covering legislation, policy, assessment guidance, baseline data within the study area and related library sources will be collated. A review will also be undertaken of existing background technical reports and assessments relevant to landscape and visual amenity.

6.9.87 Interactions will be identified between the onshore elements of the Project and landscape and visual receptors, to predict potentially significant effects arising and measures may be proposed to mitigate effects.

6.9.88 Computer modelling of the landscape / landform, other cumulative development and the onshore elements of the Project will be undertaken using a variety of software to support the LVIA.

Viewpoint selection and production of visualisations:

6.9.89 Visual effects will occur when the introduction of the onshore elements of the Project changes or influences the visual amenity and views experienced by people in the study area. The visual baseline will be defined by a ZTV for the onshore elements of the Project.

6.9.90 Cumulative ZTV analysis will also be provided to illustrate the theoretical cumulative visibility of on and offshore elements of the Project.

- 6.9.91 A viewpoint list will be agreed with stakeholders which will include the name, number, grid coordinates, viewpoint type, distance, receptor and visualisation method. It is likely that the majority of the viewpoints will be located within 2km of the onshore development (landfall(s), onshore export cable corridor and substation(s)) with a small number of elevated, long-distance locations beyond (if required).
- 6.9.92 Stakeholders and consultees will be requested to comment on and suggest any initial viewpoints within the ZTV and LVIA study area once these have been established.
- 6.9.93 Following viewpoint photography and design freeze, visualisations will be produced in accordance with SNH guidance on Visual Representation of Windfarms (2017) and Landscape Institute guidance on Visual Representation of Development Proposals (2019). Full details of the presentation techniques are described in the example methodology set out in **Appendix 6.9A: LVIA Methodology**.

Assessment of effects in the EIA Report

- 6.9.94 The LVIA (including the cumulative assessment) will be reported and illustrated in the EIA Report chapters and appendices as described in the assessment methodology in **Appendix 6.9A: LVIA Methodology**.

6.10 Onshore references

Aberdeen City Council, (2012). *North East Scotland Local Biodiversity Action Plan (NELBAP)*. [online] Available at: <https://committees.aberdeencity.gov.uk/documents/s18301/NELBAP.pdf> [Accessed 21 September 2022].

Aberdeenshire City and Shire, (2020). *Aberdeen City and Shire Strategic Development Plan*. [online] Available at: <http://publications.aberdeenshire.gov.uk/dataset/b5991364-41ff-4827-b5d4-06aa48c0616a/resource/27bcc9ff-8b5f-4dc3-b322-519f9800ac2c/download/abdnandshirestrategicdevplanfinal2020.pdf> [Accessed 21 September 2022].

Aberdeenshire Council and Aberdeen City Council, (2009). *Walking and Cycling Action Plan*. [Online] Available at: <https://www.aberdeenshire.gov.uk/media/2517/walkingcyclingactionplan.pdf> [Accessed: 26 August 2022].

Aberdeenshire Council, (2010). *Aberdeenshire Parks and Open Spaces Strategy and Audit*. [online]. Available at: <https://www.aberdeenshire.gov.uk/leisure-sport-and-culture/parks-and-open-spaces/open-space-strategy-audit/> [Accessed: 1 September 2022].

Aberdeenshire Council, (2012a). *The Aberdeenshire Local Development Plan Main Issues Report Policy Review*. [online] Available at: <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/the-aberdeenshire-local-development-plan-main-issues-report-policy-review/> [Accessed: 26 August 2022].

Aberdeenshire Council, (2012b). *Local Transport Strategy*. [online] Available at: <https://www.aberdeenshire.gov.uk/media/2374/2012finalts.pdf> [Accessed: 26 August 2022].

Aberdeenshire Council, (2015a). *Aberdeenshire Council Planning advice: Number 1/2015 – Protected Species Surveys*. [online] Available at: https://www.aberdeenshire.gov.uk/media/19591/2015_01-protected-species-surveys.pdf [Accessed: 25 August 2021].

Aberdeenshire Council, (2015b). *Aberdeenshire Council Planning advice: Number 4/ 2015 – Biodiversity and Development*. [online] Available at: https://www.aberdeenshire.gov.uk/media/19592/2015_04-biodiversity-and-development.pdf [Accessed: 25 August 2021].

Aberdeenshire Council, (2015c). *Aberdeenshire Council Planning advice: Number 5/2015 – Opportunities for biodiversity enhancement in new development*. [online] Available at: https://www.aberdeenshire.gov.uk/media/19598/2015_05-opportunities-for-biodiversity-enhancement-in-new-development.pdf [Accessed: 25 August 2021].

Aberdeenshire Council, (2015d). *Aberdeenshire Council Planning advice: Number 6/2015 – Baseline Ecological Survey*. [online] Available at: https://www.aberdeenshire.gov.uk/media/19595/2015_06-baseline-ecological-survey.pdf [Accessed: 25 August 2021].

Aberdeenshire Council, (2015e). *Aberdeenshire Council Planning advice: Number 7/2015 – Bats and Development*. [online] Available at: https://www.aberdeenshire.gov.uk/media/19594/2015_07-bats-and-development.pdf [Accessed: 25 August 2021].

Aberdeenshire Council, (2016a). *Flood Risk Management (Scotland) Act 2009 North East Local Plan District - Local Flood Risk Management Plan 2016 – 2022*. [online] Available at: <https://www.aberdeenshire.gov.uk/media/17174/north-east-local-flood-risk-management-plan-2016-2022-web-version.pdf> [Accessed 1 September 2022].

Aberdeenshire Council, (2016b). *The Land Based Sector in NE Scotland: facing the future*. [online] Available at: <https://www.aberdeenshire.gov.uk/business/support-and-advice/industry-sectors/agriculture-and-rural-development/the-north-east-scotland-agriculture-advisory-group-nesaaq/> [Accessed 1 September 2022].

Aberdeenshire Council, (2019a). *Aberdeenshire Council Strategic Landscape Assessment for Wind Energy*. [online]. Available at: <https://www.aberdeenshire.gov.uk/media/11384/section5windturbinesinthestudyareaasslcaesssmentmarch2014.pdf> [Accessed 1 September 2022].

Aberdeenshire Council, (2019b). *Aberdeenshire Council Open Space Strategy Audit 2020*. [online] Available at: <https://www.aberdeenshire.gov.uk/leisure-sport-and-culture/parks-and-open-spaces/open-space-strategy-audit/> [Accessed 1 September 2022].

Aberdeenshire Council, (2020a). *Modified Proposed Aberdeenshire Local Development Plan 2020*. [online] Available at: <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/pldp-2020/> [Accessed: 7 December 2022].

Aberdeenshire Council, (2020b). *Appendix 14: Areas Safeguarded or Identified as Area of Search for Minerals Development*. [online] Available at: https://www.aberdeenshire.gov.uk/ldpmedia/6_Area_of_search_and_safeguard_for_minerals.pdf. [Accessed: 7 December 2022].

Aberdeenshire Council, (2020c). *Strategic Flood Risk Assessment (SFRA)*. [online] Available at: <https://www.aberdeenshire.gov.uk/media/23720/final-strategic-flood-risk-assessment-in-respect-of-the-aberdeenshire-council-main-issues-report-2018.pdf> [Accessed: 25 September 2022].

Aberdeenshire Council, (2020d). *Aberdeenshire Council Natural Heritage Strategy 2019-2022*. [online] Available at: <http://publications.aberdeenshire.gov.uk/dataset/b71bf9e9-6a19-4d3e-a89e-0a0af7523b15/resource/5596fc91-f5d1-4eb6-971e-695c992b9389/download/natural-heritage-strategy-2019-2022.pdf> [Accessed 10 October 2022].

Aberdeenshire Council, (2020e). *Appendix 13: Special Landscape Areas*. [online] Available at: <https://online.aberdeenshire.gov.uk/ldpmedia/pldp2020/Appendix13AberdeenshireSpecialLandscapeAreas.pdf> [Accessed 7 December 2022].

Aberdeenshire Council, (2021a). *Air Quality Annual Progress Report (APR)*. [online] Available at: https://www.aberdeencity.gov.uk/sites/default/files/2021-09/APR_2021_001.pdf [Accessed: 20 September 2022].

Aberdeenshire Council, (2021b). *Core Paths in Aberdeenshire*. [online] Available at: https://gis.aberdeenshire.gov.uk/maps/Map.aspx?x=360052&y=814536&resolution=200&epsg=27700&mapname=paths&baseLayer=OS%20Greyscale&datalayers=selectFeaturesControl_containe r%2CAccepted%20Core%20Paths%20Plan [Accessed 10 October 2022].

Aberdeenshire Council, (2021c). *Bridge Restrictions*. [online] Available at: <https://www.aberdeenshire.gov.uk/roads-and-travel/roads/maintenance/bridges/bridge-restriction/> [Accessed: 26 August 2022].

Aberdeenshire Council, (2022a). *Public Register of Contaminated Land*. [online] Available at: <https://www.aberdeenshire.gov.uk/environment/environmental-health/contaminated-land/> [Accessed: 26 August 2022].

Aberdeenshire Council, (2022b). *Aberdeenshire Council Archaeology Service (ACAS)*. [online] Available at: <https://www.aberdeenshire.gov.uk/leisure-sport-and-culture/archaeology/> [Accessed: 26 August 2022].

Aberdeenshire Council, (2022c). *Landscape in the planning process*. [online] Available at: <https://www.aberdeenshire.gov.uk/environment/natural-heritage/landscape/> [Accessed 10 October 2022].

Ancient Monuments and Archaeological Areas Act 1979 (c.46). [online] Available at: <https://www.legislation.gov.uk/ukpga/1979/46/contents> [Accessed: 2 October 2022].

Aberdeenshire Council, (2023). *Aberdeenshire Local Development Plan 2023* [online] Available at: <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/ldp-2023/> [Accessed 24 January 2023].

Association of Noise Consultants (ANC), (2020). *BS 4142:2014+A1:2019 Technical Note*, Version 1.

Bat Conservation Trust (BCT), (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)*. [online] Available at: https://cdn.bats.org.uk/uploads/pdf/Resources/Bat_Survey_Guidelines_2016_NON_PRINTABLE.pdf?v=1542281971 [Accessed 10 October 2022].

Bat Conservation Trust (BCT) and Institution of Lighting Professionals, (2018). *Bats and artificial lighting in the UK*. [online] Available at: <https://cdn.bats.org.uk/uploads/pdf/Resources/ilp-guidance-note-8-bats-and-artificial-lighting-compressed.pdf?v=1542109349> [Accessed 10 October 2022].

Bibby, J., Fisher, G., Douglas, A., and Thomasson, J., (1991). Land Capability Classification for Agriculture. *The Geographical Journal*. November 1991

Bing Maps, (2022). *Sitelink*. [online] Available at: <https://www.bing.com/maps/> [Accessed: 26 August 2022].

British Geological Survey (BGS), (2009). *Baseline Scotland: groundwater chemistry data*. [online] Available at: <https://www2.bgs.ac.uk/groundwater/quality/baselineScotland/home.html> [Accessed 26 August 2022].

British Geological Survey (BGS), (2011). *User Guide: Groundwater Vulnerability (Scotland) GIS dataset, Groundwater Science Programme, Version 2*. [online] Available at: <https://nora.nerc.ac.uk/id/eprint/17084/1/OR11064.pdf> [Accessed: 25 September 2022].

British Geological Survey (BGS), (2022a). *GeoIndex Sitelink*. [online] Available at: <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/> [Accessed: 26 August 2022].

British Geological Survey (BGS), (2022b). *BGS Online 625:000 Hydrogeology Map*. [online] Available at: <https://mapapps2.bgs.ac.uk/geoindex/home.html?layer=BGSHydroMap> [Accessed: 26 August 2022].

British Geological Survey (BGS), (2022c). *BGS Online 625:000 Geology Digital Viewer*. [online] Available at: https://geologyviewer.bgs.ac.uk/?_ga=2.254157064.142499006.1664556584-569234733.1664556584 [Accessed: 26 August 2022].

British Trust for Ornithology (BTO), (2022). *WeBS data*. [online] Available at: <https://www.bto.org/our-science/projects/wetland-bird-survey/data> [Accessed: 26 August 2022].

British Standards Institution (BSI), (1993). *BS 7385-2:1993 – Evaluation and measurement for vibration in buildings - Part 2: Guide to damage levels from groundborne vibration*. [online] Available at: <https://knowledge.bsigroup.com/products/evaluation-and-measurement-for-vibration-in-buildings-guide-to-damage-levels-from-groundborne-vibration/standard> [Accessed: 19 August 2022].

British Standards Institution (BSI), (2003). *British Standard BS 7445 Description and measurement of environmental noise*. [online] Available at <https://knowledge.bsigroup.com/products/description-and-measurement-of-environmental-noise-guide-to-quantities-and-procedures/standard> [Accessed: 3 October 2022].

British Standards Institution (BSI), (2008). *British Standard BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings – Vibration sources other than blasting*. [online] Available

at <https://knowledge.bsigroup.com/products/guide-to-evaluation-of-human-exposure-to-vibration-in-buildings-vibration-sources-other-than-blasting/standard/preview> [Accessed: 3 October 2022].

British Standards Institution (BSI), (2012). *British Standard BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations*. [online] Available at <https://beta.bathnes.gov.uk/sites/default/files/2020-01/BS5837%202012%20Trees.pdf> [Accessed: 3 October 2022].

British Standards Institution (BSI), (2014a). *British Standard BS 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites, Part 1: Noise*. [online] Available at https://www.warrington.gov.uk/sites/default/files/2020-08/cf53_bs_5228_pt1-2009a1-2014.pdf [Accessed: 3 October 2022].

British Standards Institution (BSI), (2014b). *British Standard BS 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites, Part 2: Vibration*. [online] Available at <https://knowledge.bsigroup.com/products/code-of-practice-for-noise-and-vibration-control-on-construction-and-open-sites-noise/standard> [Accessed: 3 October 2022].

British Standards Institution (BSI), (2014c). *British Standard BS 8233 Guidance on sound insulation and noise reduction for buildings*. BSI; London. [online] Available at <https://www.omegawestdocuments.com/media/documents/43/43.20%20BS%2082332014%20Guidance%20on%20Sound%20Insulation%20and%20Noise%20Reduction%20for%20Buildings.%20London%20BSi.pdf> [Accessed: 3 October 2022].

British Standards Institution (BSI), (2015). *BS 5930:2015 Code of practice for ground investigations (+A1:2020)*. [online] Available at: <https://www.thenbs.com/PublicationIndex/documents/details?DocID=329369> [Accessed 26 August 2022].

British Standards Institution (BSI), (2017). *British Standard BS 10175:2011+A2:2017 Investigation of potentially contaminated sites. Code of practice*. BSI; London. [online] Available at: <https://www.en-standard.eu/bs-10175-2011-a2-2017-investigation-of-potentially-contaminated-sites-code-of-practice-code-of-practice/> [Accessed 26 August 2022].

British Standards Institution (BSI), (2019). *British Standard BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound*. BSI; London. [online] Available at: <https://www.en-standard.eu/bs-4142-2014-a1-2019-methods-for-rating-and-assessing-industrial-and-commercial-sound/> [Accessed 26 August 2022].

British Standards Institution (BSI), (2020). *British Standard BS 5930:2015+A1:2020 Code of practice for ground investigations. Code of practice*. BSI; London. [online] Available at: <https://www.en-standard.eu/bs-5930-2015-a1-2020-code-of-practice-for-ground-investigations/> [Accessed 26 August 2022].

Canmore, (2014). *Blique aerial view of the St Fergus Moss peat cuttings and the wind turbines*. [online] Available at: <https://www.ukradon.org/information/ukmaps> [Accessed: 26 August 2022].

Centre of Ecology and Hydrology (CEH), (2022). *Flood Estimation Handbook (FEH) web service*. [online] Available at: <https://fehweb.ceh.ac.uk/> [Accessed: 25 September 2022].

Chanin, P., (2003). *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10. [online] Available at: <http://publications.naturalengland.org.uk/publication/78009> [Accessed: 8 July 2022].

Chartered Institute for Archaeologists (CiFA), (2014a). *Standard and guidance for desk-based assessments*. [online] Available at: https://www.archaeologists.net/sites/default/files/CiFAS%26GDBA_4.pdf#:~:text=STANDARD%20AND%20GUIDANCE%20for%20historic%20environment%20desk-

[based%20assessment,expand%20and%20explain%20general%20definitions%20in%20the%20Co de.](#) [Accessed: 3 October 2022].

Chartered Institute for Archaeologists (CiFA), (2014b). *Standard and guidance for desk-based assessments*. [online] Available at: https://www.archaeologists.net/sites/default/files/CIfAS&GDBA_2.pdf [Accessed: 2 October 2022].

Construction Industry Research and Information Association (CIRIA), (2006a). *C532 Control of Water Pollution from Construction Sites*. [online] Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532&Category= [Accessed: 25 September 2022].

Construction Industry Research and Information Association (CIRIA), (2006b). *C648 Control of water pollution from linear construction projects*. [online] Available at: <https://www.ciria.org/ItemDetail?iProductCode=C649&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91> [Accessed: 25 September 2022].

Construction Industry Research and Information Association (CIRIA), (2015). *C753 The SuDS Manual*. [online] Available at: <https://www.ciria.org/ItemDetail?iProductCode=C753F&Category=FREEPUBS> [Accessed: 25 September 2022].

Control of Asbestos Regulations 2012 (CAR 2012) (SI 2012 632). [online] Available at: <https://www.legislation.gov.uk/ukxi/2012/632/contents/made> [Accessed 4 October 2022]

Crashmap, (2022). *Sitelink*. [online] Available at: <https://www.crashmap.co.uk/> [Accessed 26 August 2022].

Dean, M., Strachan, R., Gow, D. and Andrews, R., (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. [online] Available at: https://gat04-live-1517c8a4486c41609369c68f30c8-aa81074.divio-media.org/filer_public/1e/30/1e3072bf-0ffe-4df2-8ee2-e1af6f66755e/d93_-_water_vole_mitigation_handbook81824175_1.pdf [Accessed: 8 July 2022].

Department for Environment, Food and Rural Affairs (DEFRA), (2009). *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf [Accessed: 26 August 2022].

Department for Environment, Food and Rural Affairs (DEFRA), (2018a). *Local Air Quality Management Technical Guidance (TG16)*. [online] Available at: <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf> [Accessed: 20 September 2022].

Department for Environment, Food and Rural Affairs (DEFRA), (2018b). *Background Mapping data for local authorities*. [online] Available at: <https://uk-air.defra.gov.uk/data/laqm-background-home> [Accessed: 20 September 2022].

Department for Transport (DfT), (2022). *Road Traffic Data*. [online] Available at: <https://roadtraffic.dft.gov.uk> [Accessed: 26 August 2022].

Department of Energy and Climate Change (DECC), (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. [online] Available at: [1940-nps-renewable-energy-en3.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1940-nps-renewable-energy-en3.pdf) (publishing.service.gov.uk) [Accessed 20 September 2022].

Electricity Act 1989 (c.29) [online] Available at: <https://www.legislation.gov.uk/ukpga/1989/29/contents> [Accessed 10 October 2022].

Environment Agency, (2004). *Model procedures for the management of land contamination - CLR11*. [online]. Available at: <https://www.gov.uk/government/publications/withdrawn-model-procedures-for-the-management-of-land-contamination-clr11>. [Accessed: 26 August 2022].

Environment Agency, (2020). *Land Contamination Risk Management (LCRM)*. [online]. Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> [Accessed: 26 August 2022].

Environmental Protection Act 1990, Part IIA. (SI 1990 43). [online] Available at: <https://www.legislation.gov.uk/ukpga/1990/43/part/IIA>. [Accessed 4 October 2022]

European Commission, (2000). Directive (2000/60/EC) Establishing a framework for Community action in the field of water policy (Water Framework Directive - WFD). [online] Available at: <https://www.legislation.gov.uk/eudr/2000/60/contents> [Accessed: 20 September 2022].

European Commission, (2008). Directive 2008/50/EC of the European Parliament and of The Council of 21 May 2008 on ambient air quality and cleaner air in Europe. [online] Available at: <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32008L0050> [Accessed: 20 September 2022].

European Commission, (2010). Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control. [online] <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32010L0075> [Accessed: 20 September 2022].

Flood Risk Management (Scotland) Act 2009 (asp 6). [online] Available at: <https://www.legislation.gov.uk/asp/2009/6/content> [Accessed: 25 September 2022].

Forest Research, (2022). *Tools and Resources, NFI Woodland Ecological Condition: The Woodland Ecological Condition study*. [online] Available at: <https://www.forestresearch.gov.uk/tools-and-resources/national-forest-inventory/what-our-woodlands-and-tree-cover-outside-woodlands-are-like-today-nfi-inventory-reports-and-woodland-map-reports/nfi-woodland-ecological-condition/> [Accessed:1 September 2022].

Google Maps, (2022). *Sitelink*. [online] Available at: <https://www.google.co.uk/maps/> [Accessed:1 September 2022].

Google Earth Pro, (2022). *Aerial photography Sitelink*. [online] Available at: <https://earth.google.co.uk/> [Accessed:1 September 2022].

Google Traffic, (2022). *Live traffic map Sitelink*. [online] Available at: https://www.google.com/maps/d/viewer?mid=1WUGwFZslutO-8eOKDMxmJ6D4QOI&hl=en_US&ll=55.75901702712209%2C-3.4359725000000108&z=5 [Accessed:1 September 2022].

Health and Safety at Work etc. Act 1974. (SI 1974 43). [online] Available at: <https://www.legislation.gov.uk/ukpga/1974/37/contents> [Accessed 4 October 2022].

Highline Medical Services Organization (HMSO), (1988). *Calculation of Road Traffic Noise. Acoustics Bulletin*, January 1989, p4-9. [online] Available at: [file:///C:/Users/laura.villar/Downloads/Calculation_of_Road_Traffic_Noise_\(Size_Reduced\).pdf](file:///C:/Users/laura.villar/Downloads/Calculation_of_Road_Traffic_Noise_(Size_Reduced).pdf) [Accessed 4 October 2022].

Highways England, (2019). *LA 109 - Geology and soils*. [Online] Available at: <https://www.standardsforhighways.co.uk/prod/attachments/adca4c7d-4037-4907-b633-76eaed30b9c0?inline=true> [Accessed: 26 August 2022].

Highways England, (2020). *Design Manual for Roads and Bridges DMRB, LA111: Noise and vibration. Revision 2*. [online] Available at: <https://www.standardsforhighways.co.uk/prod/attachments/cc8cfcf7-c235-4052-8d32-d5398796b364?inline=true> [Accessed: 3 October 2022].

Highways England, (2021). *GG 101, Design Manual for Roads and Bridges (DRMB)*. [online] Available at: <https://www.standardsforhighways.co.uk/prod/attachments/25cefc4d-3464-4e41-8e4f-fffc155723ea?inline=true> [Accessed: 26 August 2022].

Highways England, (2022). *Design Manual for Roads and Bridges Index* [online]. Available at: <https://www.standardsforhighways.co.uk/prod/attachments/5b37f129-a6fd-4ec1-8d15-ea22c4fe72b9?inline=true> [Accessed 1 September 2022].

Historic Environment (Amendment) (Scotland) Act 2011 (asp 3). [online] Available at: <https://www.legislation.gov.uk/asp/2011/3/contents> [Accessed: 2 October 2022].

Historic Environment Scotland (HES), (2016). *Managing Change in The Historic Environment: Setting*. [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549> [Accessed: 3 October 2022].

Historic Environment Scotland (HES), (2019a). *Historic Environment Policy for Scotland (HEPS)*. [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7> [Accessed: 3 October 2022].

Historic Environment Scotland (HES), (2019b). *Gardens and Designed Landscapes of Aberdeenshire*. [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=7c365ace-e62d-46d2-8a10-a5f700a788f3> [Accessed 10 October 2022].

Historic Environment Scotland (HES), (2020). *Managing Change in the Historic Environment: Historic Battlefields*. [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=b7a05b45-f2a9-4c71-8450-a60b0094c62e> [Accessed: 3 October 2022].

Historic Environment Scotland (HES), (2021). *Scotland's Inventory of garden Landscapes and Design*. [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=7c365ace-e62d-46d2-8a10-a5f700a788f3> [Accessed: 1 September 2022].

Historic Environment Scotland (HES), (2022). *Sitelink*. [online] Available at: <http://portal.historicenvironment.scot> [Accessed: 2 October 2022].

Historic Environment (Amendment) (Scotland) Act 2011 (asp 3). [online] Available at: <https://www.legislation.gov.uk/asp/2011/3/contents> [Accessed: 2 October 2022].

Historic Environment Scotland Act 2014 (asp 19). [online] Available at: <https://www.legislation.gov.uk/asp/2014/19/contents/enacted> [Accessed: 2 October 2022].

Hutton Limited, (2022). *Land Capability for Agriculture in Scotland*. [online]. Available at: https://www.hutton.ac.uk/sites/default/files/files/soils/lca_leaflet_hutton.pdf [Accessed 4 October 2022]

Infrastructure Planning Commission, (2010). *Rampion Offshore Wind Farm - Scoping Report*. [online] Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2010/09/Rampion-Scoping-Report.pdf> [Accessed: 20 September 2022].

Institute of Acoustics, Institute of Environmental Management and Assessment (IOA, IEMA), (2016). *Guidelines for Environmental Noise Impact Assessment*. [online] Available at: <https://www.iema.net/articles/qmark-guidelines-for-environmental-noise-assessment> [Accessed: 3 October 2022].

Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), (2017). *Land-use Planning and Development Control: Planning for Air Quality*. [online] Available at:

<https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf> [Accessed: 20 September 2022].

Institute of Air Quality Management (IAQM), (2014). *Guidance on the Assessment of Dust from Demolition and Construction 2014, version 1.1*. [online]. Available at: <https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>.

Institute of Air Quality Management (IAQM), (2016). *Guidance on the Assessment of Mineral Dust Impacts for Planning*. [online] Available at: https://iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf [Accessed: 20 September 2022].

Institute of Air Quality Management (IAQM), (2018). *Guidance on the assessment of odour for planning*. [online] Available at <https://www.iaqm.co.uk/text/guidance/odour-guidance-2014.pdf> [Accessed: 20 September 2022].

Institute of Air Quality Management (IAQM), (2019). *A guide to the assessment of air quality impacts on designated nature conservation sites*. [online] Available at: <https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf> [Accessed: 20 September 2022].

Institute of Civil Engineers (ICE), (2019). *The NatureScot - A Practical Guide for Planners, Developers and Communities*. [online]. Available at: https://www.researchgate.net/publication/268036685_Environmental_Impact_Assessment_Handbook_A_Practical_Guide_for_Planners_Developers_and_Communities [Accessed 4 October 2022]

Institute of Ecology and Environmental Management (CIEEM), (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. September 2018. Version 1.2 - Updated April 2022. [online] Available at: <https://cieem.net/wp-content/uploads/2019/02/Combined-EcIA-guidelines-2018-compressed.pdf> [Accessed: 02/09/2022].

Institute of Environmental Management and Assessment (IEMA), (2022). *A New Perspective on Land and Soil in Environmental Impact Assessment*. [online]. Available at: <https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils> [Accessed 4 October 2022]

International Standards Organisation (ISO), (1996). International Standard ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. [online] Available at: <https://www.iso.org/standard/20649.html> [Accessed: 3 October 2022].

James Hutton Institute, (2022). *Land Capability for Agriculture in Scotland: The Macaulay System Explained*. [online]. Available at: https://www.hutton.ac.uk/sites/default/files/files/soils/lca_leaflet_hutton.pdf [Accessed 1 September 2022].

Joint Nature Conservation Committee (JNCC), (2005). *Turclossie Moss, Designated Special Area of Conservation*. [online] Available at: <https://sac.jncc.gov.uk/site/UK0019800> [Accessed: 26 August 2022].

Joint Nature Conservation Committee (JNCC), (2010). *Handbook for Phase 1 habitat survey - a technique for environmental audit*. [online] Available at: <https://data.jncc.gov.uk/data/9578d07b-e018-4c66-9c1b-47110f14df2a/Handbook-Phase1-HabitatSurvey-Revised-2016.pdf> [Accessed 26 August 2022].

Joint Nature Conservation Committee (JNCC), (2022). *National Vegetation Classification (NVC)*. [online] Available at: <https://jncc.gov.uk/our-work/nvc/#:~:text=The%20NVC%20is%20a%20detailed,about%2035%2C000%20samples%20of%20vegetation> [Accessed 26 August 2022].

Land Reform (Scotland) Act 2003 (asp 2). [online] Available at: <https://www.legislation.gov.uk/asp/2003/2/contents> [Accessed: 1 September 2022].

Land Reform (Scotland) Act 2016 (asp 18). [online] Available at: <https://www.legislation.gov.uk/asp/2016/18/contents/enacted> [Accessed 1 September 2022].

Landscape Institute and The Institute of Environmental Management and Assessment (IEMA), (2013). *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)*. [online] Available at: https://www.cheltenham.gov.uk/download/downloads/id/7979/g8a_-_guidelines_for_landscape_and_visual_impact_assessment_3rd_edition.pdf [Accessed 10 October 2022].

Landscape Institute, (2006). *The European Landscape Convention (ELC)*. [online] Available at: <https://www.landscapeinstitute.org/policy/13732-2/> [Accessed 10 October 2022].

Landscape Institute, (2019a). *Visual Representation of Development Proposals, Technical Guidance Note 06/19*. [online] Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf [Accessed 10 October 2022].

Landscape Institute, (2019b). *Residential Visual Amenity Assessment: Technical Information Note*. [online] Available at: <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/03/tgn-02-2019-rvaa.pdf> [Accessed 10 October 2022].

Littlewood, N.A. and Sideris, K., (2016). *A survey of the feeding distribution of geese around the Loch of Strathbeg*. Scottish Natural Heritage Commissioned Report No. 937. [online] Available at: <https://www.nature.scot/doc/naturescot-commissioned-report-937-survey-feeding-distribution-geese-around-loch-strathbeg> [Accessed 16 August 2022].

Macaulay Institute, (2006). *The Potential Use of the Land Capability for Agriculture Classification for Determining Support to Disadvantaged Areas of Scotland*. [online] Available at <https://macaulay.webarchive.hutton.ac.uk/ruralsustainability/LFAreport.pdf> [Accessed: 26 August 2022].

Meteorological Office, (2022a). *Sitelink*. [online] Available at: <https://www.metoffice.gov.uk/> [Accessed: 25 September 2022].

Meteorological Office, (2022b). *UK Climate Sitelink*. [online] Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages> [Accessed: 25 September 2022].

National Library of Scotland, (2015). *Land Use Viewer*. [online]. Available at: <https://maps.nls.uk/projects/landuse/#zoom=8&lat=56.7000&lon=-4.0000> [Accessed September 2022].

National Library of Scotland, (2022). *Map Library*. [online] Available at: <https://maps.nls.uk/> [Accessed: 2 October 2022].

National Trust for Scotland, (2022). *Sitelink*. [online] Available at: <https://www.nts.org.uk/> [Accessed 10 October 2022].

Natural England, (2006). *Geological conservation: a guide to good practice (ST118)*. [online]. Available at: <https://webarchive.nationalarchives.gov.uk/ukgwa/20150902202243/http://publications.naturalengland.org.uk/publication/83048?category=48011> [Accessed 26 August 2022].

Natural Scotland, (2010). *Regulatory Guidance, Promoting the sustainable reuse of greenfield soils in construction*. [online]. Available at: https://www.sepa.org.uk/media/154233/reuse_greenfield_soils_construction.pdf

Nature Conservation (Scotland) Act 2004 (asp.6). [online] Available at: <https://www.legislation.gov.uk/asp/2004/6/contents> [Accessed 10 October 2022].

NatureScot, (2018). *Interim Guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs*. [Online] Available at: <https://www.nature.scot/doc/interim-guidance-apportioning-impacts-marine-renewable-developments-breeding-seabird-populations> [Accessed 4 October 2022]

NatureScot, (2019a). *Landscape Character Assessment: Aberdeenshire - Landscape Evolution and Influences*. [online] Available at: <https://www.nature.scot/sites/default/files/2021-08/NatureScot%20LCA%20Review%20-%20ABERDEENSHIRE%20-%20LANDSCAPE%20EVOLUTION%20AND%20INFLUENCES%20-%20pdf%20-%20July%202021%20%28A3509458%29.pdf> [Accessed 26 August 2022].

NatureScot, (2019b). *Bats and Onshore Wind Turbines: Survey, Assessment and mitigation*. [online] Available at: https://tethys.pnnl.gov/sites/default/files/publications/Connectivity_Tool_Review.pdf
<https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation> [Accessed 8 July 2022].

NatureScot, (2019c). *Landscape Character Assessment (LCA) for maps and descriptions of Landscape Character Types (LCTs)*. [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions> [Accessed 10 October 2022].

NatureScot, (2020a). *Landscape Character Assessment Guidance*. [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment> [Accessed 10 October 2022].

NatureScot, (2020b). *Landscape Sensitivity Assessment Guidance*. [online] Available at: <https://www.nature.scot/sites/default/files/2020-12/Landscape%20Sensitivity%20Assessment%20Guidance.pdf> [Accessed 10 October 2022].

NatureScot, (2021). *Assessing the cumulative landscape and visual impact of onshore wind energy developments*. [online] Available at: <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments> [Accessed 10 October 2022].

NatureScot, (2022a). *SiteLink* [online] Available at: <https://sitelink.nature.scot/home> [Accessed 26 August 2022].

NatureScot, (2022b). *Kirkhill SSSI*. [online] Available at: <https://sitelink.nature.scot/site/872> [Accessed: 26 August 2022].

NatureScot, (2022c). *Rora Moss SSSI*. [online] Available at <https://sitelink.nature.scot/site/1371> [Accessed: 26 August 2022].

NatureScot, (2022d). *Moss of Cruden SSSI*. [online] Available at: <https://sitelink.nature.scot/site/1197> [Accessed: 26 August 2022].

NatureScot, (2022e). *Rosehearty to Fraserburgh Coast SSSI*. [online] Available at: <https://sitelink.nature.scot/site/1375> [Accessed: 26 August 2022].

NatureScot, (2022f). *Cairnbulg to St Combs Coast SSSI*. [online] Available at: <https://sitelink.nature.scot/site/287> [Accessed: 26 August 2022].

NatureScot, (2022g). *Loch of Strathbeg SSSI*. [online] Available at: <https://sitelink.nature.scot/site/1040> [Accessed: 26 August 2022].

NatureScot, (2022h). *Ancient Woodland Inventory (AWI)*. [online] Available at: <https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-aw> [Accessed 10 October 2022].

NESTRANS, (2014). *Nestrans Freight Action Plan 2014* [online]. Available at: <https://www.nestrans.org.uk/projects/freight/documents-freight/> [Accessed 26 August 2022].

Netregs, (2020). *Environmental guidance for business in Northern Ireland and Scotland, Guidance for Pollution*. [online] Available at: [https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/#:~:text=Guidance%20for%20Pollution%20Prevention%22%20\(GPPs,Ireland%2C%20Scotland%20and%20Wales%20only](https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/#:~:text=Guidance%20for%20Pollution%20Prevention%22%20(GPPs,Ireland%2C%20Scotland%20and%20Wales%20only) [Accessed: 25 September 2022].

North East Raptor Study Group (NERSG), (2022). *Sitelink*. [online]. Available at: <https://www.scottishraptorstudygroup.org/north-east/> [Accessed 1 September 2022].

North East Scotland Agriculture Advisory Group (NESAAG), (2016). *Land Based Sector Infographic Aberdeenshire*. [online]. Available at: <https://www.aberdeenshire.gov.uk/business/support-and-advice/industry-sectors/agriculture-and-rural-development/the-north-east-scotland-agriculture-advisory-group-nesaag/> [Accessed 1 September 2022].

North East Scotland Biodiversity Record Centre (NESBReC), (2022). *Sitelink*. [online] Available at: <https://nesbrec.org.uk/> [Accessed: 2 October 2022].

Pastmap, (2022). *Sitelink*. [online] Available at: <https://pastmap.org.uk/> [Accessed: 2 October 2022].

Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 (c.9). [online] Available at: <https://www.legislation.gov.uk/ukpga/1997/9/contents> [Accessed: 2 October 2022].

Protection of Badger Act 1992 (c. 51). [online] Available at: <https://www.legislation.gov.uk/ukpga/1992/51/data.pdf> [Accessed 21 September 2022].

Protection of Military Remains Act 1986 (c.35). [online] Available at: <https://www.legislation.gov.uk/ukpga/1986/35/contents> [Accessed: 2 October 2022].

Royal HaskoningDHV, (2016). *Thanet Extension Offshore Wind Farm Environmental Impact Assessment: Report to Inform Scoping*. [online] Available at: <https://tethys.pnnl.gov/publications/thanet-extension-offshore-wind-farm-environmental-impact-assessment-report-inform> [Accessed: 20 September 2022].

Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 (asp.15). [online] Available at: <https://www.legislation.gov.uk/asp/2003/15/contents> [Accessed 21 September 2022].

Scotland's Environment, (2014a). *State of the environment report 2014: People and the environment – Land use strategy*. [online] Available at: <https://www.environment.gov.scot/search/?search=land%20use> [Accessed 1 September 2022].

Scotland's Environment, (2014b). *State of the environment report 2014: Land – Farmland*. [online] Available at: <https://www.environment.gov.scot/search/?search=land%20use> [Accessed 1 September 2022].

Scotland's Environment, (2014c). *State of the environment report 2014: Land - Crops and livestock*. [online] Available at: <https://www.environment.gov.scot/search/?search=land%20use> [Accessed 1 September 2022].

Scotland's Environment, (2014d). *State of the environment report 2014: Land – Woodlands and forests*. [online] Available at: <https://www.environment.gov.scot/search/?search=land%20use> [Accessed 1 September 2022].

Scotland's Environmental, (2022a). *Scotland's Soils Maps* [online] Available at: <https://soils.environment.gov.scot/maps/> [Accessed 26 August 2022].

Scotland's Environmental, (2022b). *Habitat Map of Scotland*. [online]. Available at: <https://www.environment.gov.scot/our-environment/habitats-and-species/habitat-map-of-scotland/> [Accessed September 2022].

Scotland's Great Trails, (2018). *Visitor attractions and tourist destinations*. [online] Available at: <https://www.scotlandsgreattrails.com> [Accessed 10 October 2022].

Scotland's Soils, (2016). *The Carbon and Peatland 2016 map*. [online]. Available at: https://map.environment.gov.scot/Soil_maps/?layer=10# [Accessed 4 October 2022]

Scotland's Soils, (2017). *Sitelink*. [online] Available at: <https://soils.environment.gov.scot/> [Accessed: 25 September 2022].

Scottish Badgers, (2018). *Best Practice Badger Survey Guidance Note*. [online] Available at: <https://www.nature.scot/sites/default/files/2018-05/Guidance-Licencing-Best-practice-badger-survey-methodology-%20on%20website.pdf> [Accessed 16 August 2022].

Scottish Environment Protection Agency (SEPA), (2008). *Engineering in the water environment good practice guide: construction of river crossings*. [online] Available at: <https://www.sepa.org.uk/media/151036/wat-sg-25.pdf> [Accessed 02/09/2022].

Scottish Environment Protection Agency (SEPA), (2009). *WAT – SG – 29: Engineering in the Water Environment Good Practice Guide, Temporary Construction Methods*. [online] Available at: https://www.sepa.org.uk/media/150997/wat_sg_29.pdf [Accessed: 25 September 2022].

Scottish Environment Protection Agency (SEPA), (2017a). *SEPA Guidance – WST-G-52: Developments on Peat and Off-Site Uses of Waste Peat*. [online] Available at: <https://www.sepa.org.uk/media/287064/wst-g-052-developments-on-peat-and-off-site-uses-of-waste-peat.pdf> . [Accessed: 26 August 2022].

Scottish Environment Protection Agency (SEPA), (2017b). *LUPS-GU4 Land Use Planning System SEPA Guidance Note 4*. [online] Available at: <https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf> . [Accessed: 26 August 2022].

Scottish Environment Protection Agency (SEPA), (2017c). *LUPS-GU31 Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3*. [online] Available at: <https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf> [Accessed: 02/09/2022].

Scottish Environment Protection Agency (SEPA), (2018). *Flood Risk and Land Use Vulnerability Guidance*. [online] Available at: <https://www.sepa.org.uk/media/143416/land-use-vulnerability-guidance.pdf> [Accessed: 25 September 2022].

Scottish Environment Protection Agency (SEPA), (2019). *Technical Flood Risk Guidance for Stakeholders - SEPA requirements for undertaking a Flood Risk Assessment*. [online] Available at: <https://www.sepa.org.uk/media/162602/ss-nfr-p-002-technical-flood-risk-guidance-for-stakeholders.pdf> [Accessed 18 October 2022]

Scottish Environment Protection Agency (SEPA), (2021a). *Waste sites and capacity tool*. [online]. Available at: <https://informatics.sepa.org.uk/WasteSiteCapacity/> [Accessed 18 October 2022]

Scottish Environment Protection Agency (SEPA), (2021b). *The River Basin Management Plan for Scotland 2021 - 2027*. [online]. Available at: <https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf> [Accessed 18 October 2022]

Scottish Environment Protection Agency (SEPA), (2022a). *Position Statement on Planning and Soils*. [online] Available at: <https://www.sepa.org.uk/media/138611/position-statement-on-planning-and-soils.pdf> [Accessed 16 November 2022].

Scottish Environment Protection Agency (SEPA), (2022b). *Position Statement on Land Protection*. [online] Available at: https://www.sepa.org.uk/media/159201/ep-054_position_statement_on_land_protection.pdf [Accessed 16 November 2022].

Scottish Environment Protection Agency (SEPA), (2022c). *Land Remediation and Waste Management Guidelines*. [online]. Available at: <https://www.sepa.org.uk/media/28317/land-remediation-and-waste-management-guidelines.pdf>. [Accessed: 26 August 2022].

Scottish Environment Protection Agency (SEPA), (2022d). *The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), A Practical Guide, Version 9.1* [online]. Available at: https://www.sepa.org.uk/media/34761/car_a_practical_guide.pdf.

Scottish Environment Protection Agency (SEPA), (2022e). *Climate Change allowances for flood risk assessment in land use planning*. Version 2. [online] Available at: <https://www.sepa.org.uk/media/594168/climate-change-guidance.pdf> [Accessed: 25 September 2022].

Scottish Environment Protection Agency (SEPA), (2022f). *Water Environment Hub*. [online] Available at: <https://informatics.sepa.org.uk/RBMP3> [Accessed: 25 September 2022].

Scottish Environment Protection Agency (SEPA), (2022g). *Water Classification Hub*. [Online] Available at: <https://www.sepa.org.uk/data-visualisation/water-classification-hub/>. [Accessed 18 October 2022]

Scottish Environment Protection Agency (SEPA), (2022h). *Online Flood Mapping available*. [online] Available at: <https://www.sepa.org.uk/environment/water/flooding/flood-maps/>. [Accessed 18 October 2022]

Scottish Environment Protection Agency (SEPA), (2022i). *Reservoirs Inundation Map*. [online] Available at: <https://map.sepa.org.uk/reservoirsfloodmap/Map.htm> [Accessed: 25 September 2022].

Scottish Forestry, (2022). *Scottish Forestry Open Data*. [online] Available at: https://open-data-scottishforestry.hub.arcgis.com/datasets/6d27b064fcba471da50c8772ad0162d7_0/about. [Accessed: 20 September 2022].

Scottish Government, (1999). *PAN 58 Environmental impact assessment*. [online] Available at: <https://www.thenbs.com/PublicationIndex/documents/details?Pub=SEDD&DocID=318973> [Accessed: 26 August 2022].

Scottish Government, (2000). *Planning Advice Note 60: Natural Heritage*. [online] Available at: <https://www.gov.scot/publications/pan-60-natural-heritage/> [Accessed: 26 August 2022].

Scottish Government, (2005). *Planning Advice Note: PAN75 – Planning for Transport*. [online] Available at: <https://www.gov.scot/publications/planning-advice-note-pan-75-planning-transport/> [Accessed 26 August 2022].

Scottish Government, (2006). *Environmental Protection Act 1990 - Part IIA Contaminated Land: statutory guidance*. [online]. Available at: <https://www.gov.scot/publications/environmental-protection-act-1990-part-ii-a-contaminated-land-statutory-guidance/documents/> [Accessed National Planning Framework 3: 26 August 2022].

Scottish Government, (2008). *Planning Advice Note 65: Planning and open space*. [online] Available at: <https://www.gov.scot/publications/planning-advice-note-pan-65-planning-open-space/> [Accessed: 3 October 2022].

Scottish Government, (2009). *The Scottish Soil Framework*. [online]. Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2009/05/scottish-soil-framework/documents/0081576-pdf/0081576-pdf/govscot%3Adocument/0081576.pdf> [Accessed: 26 August 2022].

Scottish Government, (2011a). *State of the environment report 2011: Land - Land use and management*. [online] Available at: <https://www.environment.gov.scot/search/?search=land%20use> [Accessed 1 September 2022].

Scottish Government, (2011b). *Planning Advice Note 2/2011: Planning and archaeology*. [online] Available at: <https://www.gov.scot/publications/pan-2-2011-planning-archaeology/> [Accessed: 2 October 2022].

Scottish Government, (2011c). *Planning Advice Note 1/2011 (PAN 1/2011) 'Planning and Noise'*. [online] Available at: <https://www.gov.scot/publications/planning-advice-note-1-2011-planning-noise/> [Accessed: 3 October 2022].

Scottish Government, (2011d). *Technical Advice Note Assessment of Noise 2011*. [online] Available at: <https://www.gov.scot/publications/technical-advice-note-assessment-noise/> [Accessed: 3 October 2022].

Scottish Government, (2013). *The Scottish Biodiversity List (SBL)*. Available at: <https://www.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL> [Accessed: 26 August 2022].

Scottish Government, (2014a). *Scotland National Planning Framework 3*. Available at: <https://www.gov.scot/publications/national-planning-framework-3/documents/> [Accessed: 26 August 2022].

Scottish Government, (2014b). *Scottish Planning Policy*. [online]. Available at: <https://www.gov.scot/publications/scottish-planning-policy/documents/> [Accessed: 26 August 2022].

Scottish Government, (2015a). *Scottish National Marine Plan*. [online] Available at: <https://www.gov.scot/publications/scotlands-national-marine-plan/> [Accessed: 25 September 2022].

Scottish Government, (2015b). *HE1: Historic and archaeological feature protection*. [online] Available at: <https://www.gov.uk/countryside-stewardship-grants/historic-and-archaeological-feature-protection-he1> [Accessed: 2 October 2022].

Scottish Government, (2016). *Economic Report on Scottish Agriculture, 2016*. [online] Available at: <https://www.gov.scot/publications/economic-report-scottish-agriculture-2016/> [Accessed 4 October 2022]

Scottish Government, (2017a). *Planning Advice Note (PAN) 33: Development of contaminated land*. [online]. Available at: <https://www.gov.scot/publications/pan-33-development-of-contaminated-land/>. [Accessed: 26 August 2022].

Scottish Government, (2017b). *Planning Advice Note 1/2013: Environmental Impact Assessment*. [online] Available at: <https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/> [Accessed: 26 August 2022].

Scottish Government, (2019). *Scotland's Forestry Strategy 2019 to 2029*. [online] Available at: <https://forestry.gov.scot/forestry-strategy> [Accessed 1 September 2022].

Scottish Government, (2020a). *Scottish agriculture tables - economic report: 2020 edition*. [online] Available at: <https://www.gov.scot/publications/economic-report-on-scottish-agriculture-tables-2020-edition/> [Accessed 4 October 2022]

Scottish Government, (2020b). *The Environment Strategy for Scotland: vision and outcomes*. [online] Available at: <https://www.gov.scot/publications/environment-strategy-scotland-vision-outcomes/> [Accessed: 25 August 2021].

Scottish Government, (2021a). *Cleaner Air for Scotland 2 (CAFS2) - Towards a Better Place for Everyone*. [online] <https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/> [Accessed: 20 September 2022].

Scottish Government, (2021b). *River Basin Management Plan for the Scotland River Basin District*. [online] Available at: <https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf> [Accessed: 25 September 2022].

Scottish Government, (2021c). *Scotland's Third Land Use Strategy 2021 – 2026 – Getting the best from our land*. [online] Available at: <https://www.gov.scot/publications/scotlands-third-land-use-strategy-2021-2026-getting-best-land/documents/> [Accessed 1 September 2022].

Scottish Government, (2021d). *A Fairer, Greener Scotland: Programme for Government 2021-22*. [online] Available at: <https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/#:~:text=We%20will%20invest%20in%20opportunities,people%20to%20access%20those%20opportunities> [Accessed: 25 September 2022].

Scottish Government, (2022a). *National Planning Framework 4: revised draft*. [online]. Available at: <https://www.gov.scot/publications/national-planning-framework-4-revised-draft/documents/> [Accessed: 26 August 2022].

Scottish Government, (2022b). *Maps of vacant and derelict land in Aberdeenshire*. [online] Available at: <https://www.gov.scot/publications/maps-of-vacant-and-derelict-land-in-aberdeenshire-2/> [Accessed 26 August 2022].

Scottish Government, (2022c). *Drinking Water Protected Area (DWPA) (surface water) in the Scotland River Basin District maps (Map 9 of 22)*. [online] Available at: <https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/> Accessed: 25 September 2022].

Scottish Government, (2022d). *Drinking Water Protection Area (DWPA) (groundwater) in the Scotland River Basin District (Map 20 of 22)*. [online] Available at: <https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/> [Accessed: 25 September 2022].

Scottish Government, (2022e). *National Performance Framework*. [online] Available at: <https://nationalperformance.gov.scot/> [Accessed: 20 September 2022].

Scottish Government, (2022f). *Scotland's Forestry Strategy Implementation Plan 2022 to 2025*. [online] Available at: <https://forestry.gov.scot/publications/1413-scotland-s-forestry-strategy-implementation-plan-2022-2025/viewdocument/1413> [Accessed 1 September 2022].

Scottish Government, (2022g). *A stronger and more resilient Scotland: the Programme for Government 2022 to 2023* [online] Available at: <https://www.gov.scot/publications/stronger-more-resilient-scotland-programme-government-2022-23/> [Accessed 1 September 2022].

Scottish Government, Scottish Natural Heritage (now NatureScot), SEPA, (2017). *Peatland Survey. Guidance on Developments on Peatland*. [online]. Available at: <https://www.gov.scot/publications/peatland-survey-guidance/> [Accessed: 26 August 2022].

Scottish Natural Heritage (now NatureScot), (2005). *An assessment of the sensitivity and capacity of the Scottish seascape in relation to windfarms*. [online] Available at: <https://www.nature.scot/doc/naturescot-commissioned-report-103-assessment-sensitivity-and-capacity-scottish-seascape-relation> [Accessed 10 October 2022].

Scottish Natural Heritage (SNH) (now NatureScot), (2016a). *Carbon-rich soils, deep peat and priority peatland habitat mapping. Consultation analysis report*. [online]. Available at: <https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map> [Accessed: 26 August 2022].

Scottish Natural Heritage (SNH) (now NatureScot), (2016b). *Assessing connectivity with Special Protection Areas (SPAs) Guidance*. [online] Available at: https://tethys.pnnl.gov/sites/default/files/publications/Connectivity_Tool_Review.pdf [Accessed 8 July 2022].

Scottish Natural Heritage (SNH) (now NatureScot), (2017a). *Considering air pollution impacts in development management casework*. [online] Available at: <https://www.nature.scot/sites/default/files/2018-08/Guidance%20-%20Considering%20air%20pollution%20impacts%20in%20development%20management%20casework.pdf> [Accessed: 20 September 2022].

Scottish Natural Heritage (SNH) (now NatureScot), (2017b). *Recommended bird survey methods to inform impact assessment of onshore wind farms*. [online] Available at: <https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms> [Accessed 8 July 2022].

Scottish Natural Heritage (SNH) (now NatureScot), (2017c). *Siting and Designing Windfarms in the Landscape*, Version 3a. [online] Available at: <https://www.nature.scot/doc/siting-and-designing-wind-farms-landscape-version-3a> [Accessed 10 October 2022].

Scottish Natural Heritage (SNH) (now NatureScot), (2017d). *Visual Representation of Wind Farms*, Version 2.2. [online] Available at: <https://www.nature.scot/doc/visual-representation-wind-farms-guidance> [Accessed 10 October 2022].

Scottish Natural Heritage (SNH) (now NatureScot), (2018a). *A handbook on environmental impact assessment: Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland*. [online] Available at: <https://www.nature.scot/doc/handbook-environmental-impact-assessment-guidance-competent-authorities-consultees-and-others> [Accessed: 26 August 2022].

Scottish Natural Heritage (SNH) (now NatureScot), (2018b). *Guidance Note: Coastal Character Assessment*. [online] Available at: <https://www.nature.scot/sites/default/files/2018-02/Guidance%20Note%20-%20Coastal%20Character%20Assessment.pdf> [Accessed 10 October 2022].

Scottish Natural Heritage (now NatureScot), (2019a). *Landscape Character Assessment (LCA) for maps and descriptions of Landscape Character Types (LCTs)*. [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions> [Accessed 10 October 2022].

Scottish Natural Heritage (now NatureScot), (2019b). *Scottish Landscape Character Types Map and Descriptions*. [online] Available at: <https://www.nature.scot/sites/default/files/LCA/LCT%20010%20-%20Cliffs%20and%20Rocky%20Coast%20-%20Aberdeenshire%20-%20Final%20pdf.pdf>
<https://www.nature.scot/sites/default/files/LCA/LCT 010 - Cliffs and Rocky Coast - Aberdeenshire - Final pdf.pdf> [Accessed 10 October 2022].

Scottish Natural heritage (now NatureScot), (2019c). *Landscape Character Type 10, Cliffs and Rocky Coast – Aberdeenshire*. [online] Available at: <https://www.nature.scot/sites/default/files/LCA/LCT%20010%20-%20Cliffs%20and%20Rocky%20Coast%20-%20Aberdeenshire%20-%20Final%20pdf.pdf> [Accessed 10 October 2022].

Scottish Natural Heritage (now NatureScot), (2019d). *Landscape Character Type 12, Beaches, Dunes and Links – Aberdeenshire*. [online] Available at: <https://www.nature.scot/sites/default/files/LCA/LCT%20012%20-%20Beaches%20Dunes%20and%20Links%20-%20Aberdeenshire%20-%20Final%20pdf.pdf> [Accessed 10 October 2022].

Scottish Natural Heritage (now NatureScot), (2019e). *Landscape Character Type 16, LCT 016 - Coastal Farmland with Ridges and Valleys - Aberdeenshire*. [online] Available at: <https://www.nature.scot/sites/default/files/LCA/LCT%20016%20-%20Coastal%20Farmland%20with%20Ridges%20and%20Valleys%20-%20Final%20pdf.pdf>
<https://www.nature.scot/sites/default/files/LCA/LCT 010 - Cliffs and Rocky Coast - Aberdeenshire - Final pdf.pdf> [Accessed 10 October 2022].

Scottish Natural Heritage (now NatureScot), (2019f). *Landscape Character Type 17, Coastal Agricultural Plain – Aberdeenshire*. [online] Available at: <https://www.nature.scot/sites/default/files/LCA/LCT%20017%20-%20Coastal%20Agricultural%20Plain%20-%20Aberdeenshire%20-%20Final%20pdf.pdf>
<https://www.nature.scot/sites/default/files/LCA/LCT 010 - Cliffs and Rocky Coast - Aberdeenshire - Final pdf.pdf> [Accessed 10 October 2022].

Scottish Natural Heritage (now NatureScot), (2019g). *Landscape Character Type 20, Undulating Agricultural Heartland – Aberdeenshire*. [online] Available at: <https://www.nature.scot/sites/default/files/LCA/LCT%20020%20-%20Undulating%20Agricultural%20Heartland%20-%20Final%20pdf.pdf>
<https://www.nature.scot/sites/default/files/LCA/LCT 010 - Cliffs and Rocky Coast - Aberdeenshire - Final pdf.pdf> [Accessed 10 October 2022].

Scottish Natural Heritage (now NatureScot), (2019h). *Landscape Character Type 21, Farmland and Wooded Policies – Aberdeenshire*. [online] Available at: <https://www.nature.scot/sites/default/files/LCA/LCT%20021%20-%20Farmland%20and%20Wooded%20Policies%20-%20Final%20pdf.pdf>
<https://www.nature.scot/sites/default/files/LCA/LCT 010 - Cliffs and Rocky Coast - Aberdeenshire - Final pdf.pdf> [Accessed 10 October 2022].

(2019g). *Landscape Character Type 21, Farmland and Wooded Policies – Aberdeenshire*. [online] Available at: <https://www.nature.scot/sites/default/files/LCA/LCT%20021%20-%20Farmland%20and%20Wooded%20Policies%20-%20Final%20pdf.pdf>
<https://www.nature.scot/sites/default/files/LCA/LCT 010 - Cliffs and Rocky Coast - Aberdeenshire - Final pdf.pdf> [Accessed 10 October 2022].

Scottish Ornithologists' Club (SOC), (2022). *Local Bird Recorders*. [online] Available at: <https://www.the-soc.org.uk/bird-recording/overview> [Accessed: 26 August 2022].

Scran, (2022). *Peat cutters at Rora moss*. [online] Available at: https://www.scran.ac.uk/database/results.php?searchdb=scran&no_results=16&sortby=relevance&view=grid&field=what&searchterm=%22peat%22&scache=57hfz8gzht&offset=65&PHPSESSID=f7nlm98ct5edl0g0dpprb1fvv6 [Accessed: 26 August 2022].

Soil Survey of Scotland, (1981). *Land Capability for Agriculture maps of Scotland at a scale of 1:250 000. Macaulay Institute for Soil Research, Aberdeen.*

Sustrans, (2022). *Sustrans Cycle Network*. [online] Available at: <https://www.scotlandsgreattrails.com> [Accessed 10 October 2022].

The Air Quality (Scotland) Amendment Regulations 2016 (SI 2016 162). [online] Available at: <https://www.legislation.gov.uk/sdsi/2016/9780111030837> [Accessed: 20 September 2022].

The Air Quality (Scotland) Regulations 2000 (as amended) (SI 2017 97). [online] Available at: <https://www.legislation.gov.uk/ssi/2000/97/made> [Accessed: 20 September 2022].

The Air Quality Standards (Scotland) Regulations 2010. (SI 2010 204). [online] Available at: <https://www.legislation.gov.uk/ssi/2010/204/contents/made> [Accessed: 20 September 2022].

The Climate Change (Scotland) Act 2009 (asp 12). [online] Available at: <https://www.legislation.gov.uk/asp/2009/12/contents> [Accessed 1 September 2022].

The Conservation (Natural Habitats, &c.) Regulations 1994. (SI 1994 2716). [online] Available at: <https://www.legislation.gov.uk/ukxi/1994/2716/made/data.pdf> [Accessed 8 July 2022].

The Conservation of Habitats and Species Regulations 2017. (SI 2017 1012). [online] Available at: <https://www.legislation.gov.uk/ukxi/2017/1012/contents/made> [Accessed 12 July 2022].

The Construction (Design and Management) Regulations 2015. (SI 2015 51). [online] Available at: <https://www.legislation.gov.uk/ukxi/2015/51/contents/made> [Accessed 4 October 2022]

The Control of Pollution Act 1974 (c.40). [online] Available at <https://www.legislation.gov.uk/ukpga/1974/40/contents/made> [Accessed: 3 October 2022].

The Environmental Noise (Scotland) Regulations 2006 (SI 2006 465). [online] Available at: <https://www.legislation.gov.uk/ssi/2006/465/contents/made> [Accessed: 3 October 2022].

The Environmental Protection Act 1990 (c.43). [online] Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents/made> [Accessed: 3 October 2022].

The Environmental Protection (Duty of Care) (Scotland) Regulations 2014 (SI 2014 4). [online] Available at: <https://www.legislation.gov.uk/ssi/2014/4/contents/made> [Accessed: 3 October 2022].

The Hedgerows Regulations 1997 (SI 1997 1160). [online] Available at: <https://www.legislation.gov.uk/ukxi/1997/1160/contents/made> [Accessed: 3 October 2022].

The Institute of Environmental Assessment (IEA), (1993). *Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic (GEART)*. [online] Available at: https://gat04-live-1517c8a4486c41609369c68f30c8-aa81074.divio-media.org/filer_public/dc/df/dcdfa287-b475-4fbb-bd4e-a1e96b06be5d/cd71-guideline-for-the-environmental-assessment-of-road-traffic-institute-of-environmental.pdf [Accessed: 26 August 2022].

The Noise Insulation Regulations 1975 (SI 1975 1763). [online] Available at: <https://www.legislation.gov.uk/ukxi/1975/1763/made> [Accessed: 20 September 2022].

The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (SI 2018 764). [online] Available at: <https://www.legislation.gov.uk/ukxi/2018/764/contents> [Accessed: 20 September 2022].

The Planning (Scotland) Act 2019 (asp 13). [online] Available at: <https://www.legislation.gov.uk/asp/2019/13/contents/enacted> [Accessed 1 September 2022].

The Pollution Prevention and Control (Scotland) Regulations 2012 (SI 2012 360). [online] Available at: <https://www.legislation.gov.uk/ssi/2012/360/contents/made> [Accessed: 20 September 2022].

The Town and Country Planning (Development Management Procedure) (England) Order 2015. (SI 2015 595). [online] Available at: <https://www.legislation.gov.uk/ukxi/2015/595/contents/made> [Accessed 4 October 2022]

The Town and Country Planning (General Development Procedure) (Scotland) Order 1992 (SI 1992 22). [online] Available at: <https://www.legislation.gov.uk/ukxi/1992/224/contents/made> [Accessed: 2 October 2022].

The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (SI 2011 209). [online] Available at: <https://www.legislation.gov.uk/ssi/2011/209/contents/made> [Accessed: 25 September 2022].

The Community Empowerment (Scotland) Act 2015 (asp 6). [online] Available at: <https://www.legislation.gov.uk/asp/2015/6/contents/enacted> [Accessed 1 September 2022].

Transport Scotland (2012), *Transport Assessment Guidance*. [online] Available at: https://www.transport.gov.scot/media/4589/planning_reform_-_dpmtag_-_development_management_dpmtag_ref_17_-_transport_assessment_guidance_final_-_june_2012.pdf [Accessed: 26 August 2022].

Transport Scotland, (2019). *Strategic Transport Projects Review 2*. [online] Available at: <https://www.transport.gov.scot/our-approach/strategy/strategic-transport-projects-review-2/> [Accessed 26 August 2022].

Ugie District Fishery Board, (2022). *Ugie District Salmon Fishery Board*. [online] Available at: <https://ugie.dsfb.org.uk/> [Accessed: 25 September 2022].

UK Climate Resilience Programme, (2022). *Climate Risk Indicators*. [online] Available at: <https://uk-cri.org/> [Accessed: 25 September 2022].

UK Health Security Agency, (2022). *Interactive UK maps of radon*. [online] Available at: <https://www.ukradon.org/information/ukmaps> [Accessed 26 August 2022].

UK Sustainable Remediation Forum (SuRF UK), (2010). *A Framework for Assessing the Sustainability of Soil and Groundwater Remediation*. [online] Available at: <https://www.claire.co.uk/component/phocadownload/category/16-surf-uk-bulletins?download=61:surf-uk-framework-final-march-2010> [Accessed 4 October 2022]

United States Environmental Protection Agency (USEPA), (2022). *Report on the Environment: Land Use*. [online] Available at: <https://www.epa.gov/report-environment/land-use> [Accessed 1 September 2022]

VisitScotland, (2017). *Visitor attractions and tourist destinations*. [online] Available at: <https://www.visitscotland.com/destinations-maps/aberdeen-city-shire/> [Accessed 10 October 2022].

Water Environment and Water Services (Scotland) Act 2003 (asp 3). [online] Available at: <https://www.legislation.gov.uk/asp/2003/3/contents> [Accessed: 25 September 2022].

Wildlife and Countryside Act 1981 (asp 69). [online] Available at: <https://www.legislation.gov.uk/ukpga/1981/69> [Accessed 12 July 2022].

Wildlife and Natural Environment (Scotland) Act 2011 (asp 6). [online] Available at: <https://www.legislation.gov.uk/asp/2011/6/contents/enacted> [Accessed: 12 July 2022].

World Health Organization (WHO), (1999). *Guidelines for community noise*. [online] Available at: <https://apps.who.int/iris/handle/10665/66217> [Accessed: 20 September 2022].

World Health Organization (WHO), (2009). *Night Noise Guidelines for Europe*. [online] Available at: https://www.euro.who.int/_data/assets/pdf_file/0017/43316/E92845.pdf [Accessed: 20 September 2022].

World Health Organization (WHO), (2021). WHO global air quality guidelines: particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. [online] Available at: <https://apps.who.int/iris/handle/10665/345329> [Accessed: 20 September 2022].

7. Environmental Aspects Whole Project

7.1 Climate resilience

Introduction

- 7.1.1 The Climate Change Resilience (CCR) assessment will consider the potential likely significant effects of climate change on the construction, operation, and decommissioning of the onshore and offshore Project elements. This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered within the EIA, and how these effects will be assessed for the purpose of the EIA.
- 7.1.2 CCR interfaces with other aspects of an EIA and as such, should be considered alongside these; namely:
- **Section 5.1: Marine geology, oceanography and physical processes;**
 - **Section 5.2: Marine water and sediment quality;**
 - **Section 5.5: Benthic, epibenthic and intertidal ecology;**
 - **Section 5.6: Marine mammals;**
 - **Section 5.7: Offshore and intertidal ornithology;**
 - **Section 5.8: Fish and shellfish ecology;**
 - **Section 5.12: Seascape, landscape and visual;**
 - **Section 6.1: Ground conditions and contamination;**
 - **Section 6.2: Air quality;**
 - **Section 6.3: Water resources and flood risk;**
 - **Section 6.5: Terrestrial ecology and ornithology;** and
 - **Section 6.9: Landscape and visual.**
- 7.1.3 The interface with CCR and the other EIA aspects identified above is captured in the In-Combination Climate Impacts (ICCI) assessment. This is an assessment of how the effects of climate change could exacerbate or ameliorate potential environmental effects or affect the efficacy of the proposed environmental measures in the future. The ICCI will inform the cumulative effects section.

Legislative and policy context

- 7.1.4 This Section identifies the relevant legislative and policy context which has informed the scope of the CCR assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA.
- 7.1.5 In order to provide a robust evidence base, **Table 7.1.1** below presents a summary of legislation and policies relevant for the CCR assessment or which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states their relevance to this Section.

Table 7.1.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
Climate Change Act (2008)	<ul style="list-style-type: none"> Sets out the reporting requirements of the UK Government to produce a UK Climate Change Risk Assessment (CCRA). The Third CCRA (HM Government, 2022) was published in January 2022 and draws from the latest evidence prepared by the Adaptation Committee presented in the Independent Assessment of UK Climate Risk 2021 (Betts and Brown, 2021).
The Climate Change (Scotland) Act (2009)	<ul style="list-style-type: none"> Sets out the Scottish Parliament's objectives in relation to climate change adaptation.. Progress towards these objectives includes the integration of climate change adaptation and infrastructure resilience in the National Planning Framework (NPF4).
United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement (2015)	<ul style="list-style-type: none"> The UNFCCC is one of the major international bodies responsible for managing climate change and carbon emissions. In 2015, it adopted the Paris Agreement, the aims to increase the ability to adapt to adverse impacts of climate change.
UNFCCC Glasgow Climate Pact (2021)	<ul style="list-style-type: none"> The Glasgow Pact emphasised the urgency of the scaling up of action and support to strengthen resilience.
National Policy	
Overarching National Policy Statement (NPS) for Energy (EN-1) (2011) <ul style="list-style-type: none"> Paragraph 4.8.5: Climate change adaptation 	<ul style="list-style-type: none"> States that new energy infrastructure will typically be a long-term investment and will need to remain operational over many decades, in the face of a changing climate. Consequently, applicants must consider the impacts of climate change when planning the location, design, build, operation and, where appropriate, decommissioning of new energy infrastructure.
National Policy Statement for Renewable Energy Infrastructure (EN-3) (DECC, 2011b) <ul style="list-style-type: none"> Paragraph 2.3.4: Climate change adaptation 	<ul style="list-style-type: none"> States that offshore and onshore wind farms should consider how the proposal would be resilient to storms.
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy 1: Tackling the climate and nature crises Policy 2: Climate mitigation and adaptation National Spatial Strategy: North East National Developments: 3. Strategic Renewable Electricity Generation and Transmission Infrastructure Policy 10: Coastal Development Policy 11: Energy Policy 12: Zero Waste

Relevant legislation and policy	Relevance to the assessment
	<p>These policies emphasise the importance of tackling the climate emergency and provide strong support for renewable energy developments.</p>
<p>National Planning Framework 3 (NPF3) (2014)</p>	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector. • Sets out climate change impacts on Scotland's coastline, there will be a need to address the long-term resilience of some coastal communities.
<p>Scottish Planning Policy (SPP) (2014) - Paragraph 169</p>	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology.
<p>A Stronger & More Resilient Scotland (2022)</p>	<ul style="list-style-type: none"> • Sets out the actions it will take in the coming year and beyond. It acknowledges the climate crisis and commits to building climate resilience through working with stakeholders to develop enhanced approaches. Development of Scotland's next statutory climate change adaptation programme for publication in 2024.
<p>Environment Strategy for Scotland (2020)</p>	<ul style="list-style-type: none"> • Sets out a vision for Scotland's environment, including tackling the global climate emergency. This includes ensuring that Scotland is resilient to the future impacts of climate change through adaptation measures. Actions to deliver this outcome are currently set out in our Climate Change Plan (The Scottish Government, 2018) and the Scottish Climate Change Adaptation Programme (The Scottish Government, 2014c).
<p>25 Year Environmental Plan (2018)</p>	<ul style="list-style-type: none"> • Sets out how government action will help the natural world and how the UK Government will tackle the effects of climate change, by ensuring all policies, programmes and investment decisions take into account the possible extent of climate change this century.

Relevant legislation and policy	Relevance to the assessment
Marine Policy	
UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. Recognises the marine environment plays an important role in mitigating climate change.
Scottish National Marine Plan (2015) <ul style="list-style-type: none"> GEN 5 Climate change 	<ul style="list-style-type: none"> GEN 5: Requirement to act in the way best calculated to mitigate and adapt to climate change.
Local Planning Policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy C2 Renewable Energy Policy C4 Flooding <p>These policies emphasise the importance of tackling the climate emergency and provide strong support for renewable energy developments.</p>

Technical guidance

7.1.6 Technical guidance that has been used to define the assessment is set out in **Table 7.1.2**.

Table 7.1.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
UK Climate Projections 2018 (UKCP18) (Met Office, 2021a)	<p>UKCP18 has been produced by the Met Office and provides the latest set of climate change projections for the UK. It includes projections of how key climate parameters could change in the coming decades, as well as forecasts for sea level rise.</p> <p>UKCP18 projections will be used in defining the future baseline and the vulnerability assessment. Should a new version of UK Climate Projections be produced during the assessment period, they will be used instead of UKCP18.</p>
UKCP18 technical notes including: <ol style="list-style-type: none"> Science Overview Report (Met Office, 2018a) UKCP18 Land projections: Science Report (Met Office, 2018b) 	<p>The UKCP18 Climate Projections were issued with a suite of accompanying scientific reports. The Overview Report, Land Projections and Marine Report give a summary of the anticipated climate change trends found within the projection data, evaluating the projection pathways, and provide direction on the use of the data in terms of the nature and degree of consistency within the modelling results. The Factsheets are available as a short qualitative overview of the UKCP18 results for the climate parameters. The reports will be used in developing the future baseline and climate trends used in the vulnerability assessment.</p>

Guidance reference	Relevance to the assessment
<p>3. UKCP18 Marine Report (Met Office, 2018c)</p> <p>3. UKCP18 Factsheets (Met Office, 2018d,e,f)</p>	
<p>European Commission Notice – Technical guidance on the climate proofing of infrastructure in the period 2021 – 2027 (EC, 2021)</p>	<p>This note gives technical guidance on the climate proofing of infrastructure, which includes the adaptation to climate change (climate change resilience). The note contains guidance on the methodology of assessments, include the role within Environmental Impact Assessments (EIAs). The methodology for the CCR vulnerability assessment detailed draws from principles within this guidance.</p>
<p>ISO14091:2021 Adaptation to climate change – Guidelines on vulnerability, impacts and risk assessment (ISO, 2021)</p>	<p>This international standard provides guidelines on approaches to assessing climate change-related risks. It highlights the role of risk assessments in improving climate change adaptation planning and informing climate change adaptation activities from their implementation through to monitoring.</p>
<p>EIA Guide to: Climate Change Resilience and Adaptation 2020 (IEMA, 2020)</p>	<p>This IEMA guidance provides a framework for the effective consideration of climate change resilience and adaptation in the EIA process.</p>
<p>Climate Change allowances for flood risk assessment in land use planning (SEPA, 2022)</p>	<p>This guidance sets out SEPA's recommended allowances that can be applied to FRAs. It provides guidance on climate change allowances as a prediction of anticipated change in peak river flow, peak rainfall intensity and sea level rise caused by future climate change.</p>
<p>UK Climate Risk Independent Assessment 2021 (Betts and Brown, 2021) and UK Climate Change Risk Assessment 2022 (DEFRA, 2022)</p>	<p>The UK Government Third CCRA fulfils the requirement under the Climate Change Act 2008 for the UK Government to produce a five-yearly assessment of the risks for the UK of the current and predicted impacts of climate change. The CCRA highlights key climate risks and opportunities that have been used to inform the assessment within this Section.</p>
<p>Climate Ready Scotland: Scottish Climate Change Adaptation Programme (Scottish Government, 2013)</p>	<p>This Scottish Climate Change Adaptation Programme addresses the impacts identified for Scotland in the UKCCRA. It recognises that due to the inherent uncertainty in some aspects of climate change, adaptation policies need to be flexible and adjusted as and when new information becomes available. The Programme is part of an iterative process and subsequent programmes are required to address impacts and opportunities identified in progressive CCRA's due every 5 years.</p>

Study area

- 7.1.7 The study area for the CCR assessment is defined by the spatial extent of the Project, illustrated as the Scoping Boundary in **Figure 1.1: Scoping Boundary of Appendix 1A** and described in **Chapter 2: Project Description**.

- 7.1.8 The CCR assessment considers the Project receptors within the Scoping Boundary as defined below. However, the resilience of the Project is also assessed by its interdependencies with external infrastructure beyond the spatial scope of the Scoping Boundary. For example, the resilience of telecommunication networks operated by a third party.
- 7.1.9 The study area will be reviewed and amended with the ongoing refinement of the onshore/offshore components and in response, where appropriate, to feedback from consultation.

Assessment methodology

Introduction

- 7.1.10 The Project approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this CCR section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the CCR assessment.
- 7.1.11 The assessment methodology for the CCR is set out into two stages. The first stage is the Climate Vulnerability Assessment which is used at Scoping stage to evaluate the vulnerability of the identified receptors to climate change across the Project lifetime. The vulnerability of the receptors will depend on the sensitivity and exposure of the receptors to climate trends identified within the future baseline. The outcome of the scoping assessment will identify likely significant effects where there are receptors of 'medium' or 'high' vulnerability to climate impacts to be taken forward within the EIA Report. This will scope out any receptors considered to be of 'low' vulnerability.
- 7.1.12 The second stage is the Climate Change Risk Assessment, used at the EIA Report stage to assess the likelihood and the consequence (magnitude of climate change impacts) to determine the significance of the effect.
- 7.1.13 The CCR and ICCI assessments will be undertaken by climate change topic specialists in collaboration with relevant design teams and topic specialists, e.g., ecologists, design engineers.

Receptors

- 7.1.14 Receptors for consideration within the CCR assessment can be grouped into the following:
- building and infrastructure receptors, i.e. the Project assets, both temporary and permanent, throughout the lifecycle of the Project;
 - human health receptors, i.e. construction workers, maintenance staff; and
 - environmental receptors, i.e. habitats and species associated with any landscaping and biodiversity planting.
- 7.1.15 The potential receptors under consideration for the CCR assessment will be collated based on the Project design details. The asset design life for each asset will also be ascertained.

Stage 1 Climate vulnerability assessment

- 7.1.16 The future baseline presented in the Future baseline section will be analysed to provide an understanding of the climate trends that have the potential to affect the Project. The climate variables will be assessed for the time periods across the Project lifetime.

- 7.1.17 The vulnerability assessment is the outcome of an assessment of the sensitivity and exposure of the receptors to the climate trends. This is used to identify those impacts with a potential likely significant effect.

Sensitivity of the receptor to the climate impact

- 7.1.18 The sensitivity of a receptor can be defined by ISO14091 as “*the degree to which a system or species is affected, either adversely or beneficially, by climate variability or change*”.
- 7.1.19 The definitions of the levels of sensitivity experienced by a receptor to the climate impact are contained within **Table 7.1.3**.

Table 7.1.3 Definitions of levels of sensitivity of the receptor to the climate impact

Level of Sensitivity	Definition
High	The receptor has no ability to withstand/not be substantially altered by the projected climate impacts. It will lose much of its original function and form.
Moderate	The receptor has some limited ability to withstand/not be altered by the projected climate impacts. It can retain elements of its original function and form.
Low	The receptor has the ability to withstand/not be altered much by the projected climate impacts. It can retain much of its original function and form.

Exposure of the receptor to the climate impact

- 7.1.20 The exposure assessment will assess the degree to which the receptor would be affected by the climate impact. The definition of exposure used within ISO14091 is the “*presence of people, livelihoods, species or ecosystems, environmental functions, services, resources, infrastructure, or economic, social or cultural assets in places and settings that could be affected*”.
- 7.1.21 The construction phase would be assessed as exposure of the construction assets to climate trends of the ‘2030s’ (2020 – 2039), and the operational phase will use analysis from the ‘2030s’, ‘2050s’ and ‘2070s’ where it is likely that the level of exposure will increase over time. The decommissioning phase will focus on the 2090s (2080 – 2099). Definitions of increasing levels of exposure are contained within **Table 7.1.4**.

Table 7.1.4 Definitions of levels of exposure of the receptor to the climate impact

Level of Exposure	Definition
High	The receptor is highly affected by the climate impact and is only able to tolerate a very limited variation in climate conditions.
Medium	The receptor is able to tolerate a range of climate conditions but is affected by the climatic impact.
Low	The receptor is influenced very little by the climate impact.

Vulnerability of the receptor

- 7.1.22 The vulnerability of a receptor to climate impacts is defined as the “*propensity or predisposition to be adversely affected*”.
- 7.1.23 The exposure and sensitivity of the receptor to climate impacts will be assigned a level of vulnerability, as shown in **Table 7.1.5**.

Table 7.1.5 Matrix showing vulnerability of receptors to climate impacts

Sensitivity	Exposure		
	Low	Medium	High
Low	Low Vulnerability	Low Vulnerability	Low Vulnerability
Moderate	Low Vulnerability	Medium Vulnerability	Medium Vulnerability
High	Low Vulnerability	Medium Vulnerability	High Vulnerability

- 7.1.24 Where the vulnerability of the receptor to a climate impact is assessed to be ‘medium’ or ‘high’, this would be considered as a likely significant effect and would be scoped in to the full CCR risk assessment to be presented in the EIA Report.

Stage 2 Climate Change Risk Assessment and determining significance

Likelihood

- 7.1.25 The likelihood of the climate change impact on the receptor occurring takes into account the climate change trends and the anticipated exposure of the receptor to the trend. An indicative scale used for assessing the likelihood of the climate change impact on the receptor is contained in **Table 7.1.6**.

Table 7.1.6 Indicative scale for assessing the likelihood of a climate change impact on the receptor

Likelihood category	Description (probability and frequency of occurrence)
Very likely	The impact is almost certain to occur during the phase of the project considered.
Likely	The impact is considered likely to occur during the phase of the project considered.
Possible	The impact is as likely as not to occur during the phase of the project considered.
Unlikely	The impact is unlikely to occur during the phase of the project considered, but still could occur at least once.
Very unlikely	The impact is high unlikely to occur during this phase of the project considered and is considered rare.

Consequence

- 7.1.26 The consequence if the climate change impact occurs is the magnitude of change felt by the receptor. The vulnerability of the receptor to the climate change impact is considered when assessing the consequence level by incorporating the sensitivity analysis considered during EIA Scoping. An indicative scale used for assessing the consequence of the climate change impact on the receptor is contained within **Table 7.1.7**.

Table 7.1.7 Indicative scale for assessing the consequence (magnitude of change) of a climate change impact on the receptor.

Consequence category	Consequence criteria
Catastrophic	The impact could lead to complete shutdown of operations, loss of the asset, or collapse. There could be single or multiple fatalities and significant harm to the environment with limited prospect of full recovery. Social implications could lead to community protests and high financial implications.
Major	The impact could lead to disruption to activities lasting more than 1 week. There could be major or multiple injuries which could be permanent. Environmental damage could be significant with recovery times over a year and non-compliance with regulations and consents. National and long-term social impacts could be endured. The impact would require extensive mitigation actions.
Moderate	The impact could lead to disruption to activities lasting more than 1 day but less than 1 week. There could be moderate environmental damage with wider effects and recovery of up to a year. Moderate cost and social implications which are localised yet long-term. This could lead to a serious injury requiring lost time. The impact would require emergency mitigation actions to be in place.
Minor	The impact could lead to disruption to activities lasting less than 1 day. There could be localised environmental impact within the site boundary, localised and temporary social or reputational impacts, and a minor cost implication. This could lead to a minor injury requiring medical treatment. The impact could be rectified through additional mitigation actions to be put in place.
Minimal	The impact could lead to disruption to an isolated section of activity with limited social, economic and environmental consequences. It could equate to a minor first aid case. The impact could be rectified through usual activity.

Significance of effects

- 7.1.27 The level of the risk of the climate change impacts on the Project is concluded in this risk assessment as a function of the likelihood and magnitude. This will identify any significant potential risks and where further mitigation and adaptation measures will be required, shown as significant effects within the matrix in **Table 7.1.8**.

Table 7.1.8 Significance of CCR effects

Likelihood	Magnitude				
	Minimal	Minor	Moderate	Major	Catastrophic
Very unlikely	Negligible (NS)	Negligible (NS)	Minor (NS)	Moderate (S)	Moderate (S)
Unlikely	Negligible (NS)	Minor (NS)	Minor (NS)	Moderate (S)	Major (S)
Possible	Minor (NS)	Minor (NS)	Moderate (S)	Major (S)	Major (S)
Likely	Moderate (S)	Moderate (S)	Major (S)	Major (S)	Major (S)
Very likely	Moderate (S)	Major (S)	Major (S)	Major (S)	Major (S)

Note: (S) denotes a significant or potentially significant effect, (NS) denotes a not significant effect.

Improving resilience

- 7.1.28 Embedded measures will be developed as required and will occur as early in the design process as possible to ensure resilience is built into the design of the Project

Baseline conditions

- 7.1.29 This Section sets out the current baseline for the Project in relation to the Climate Change Resilience and a summary of the future baseline which the assessments will be based on.

Data sources

- 7.1.30 The following desk-based data sources were utilised to gather the information, as shown in **Table 7.1.9**.

Table 7.1.9 Key sources of climate data

Source	Date	Summary	Coverage of study area
Met Office Eastern Scotland: Climate. (Met Office, 2016)	Accessed 2022	This document describes the main features of the climate for the region over a 30-year average period of 1981 – 2010.	Full coverage of the study area.
UKCP18 User Interface (Met Office, 2018g)	Accessed 2022	This data source was used to obtain quantitative land projection data to inform future climate.	For the onshore part of the Scoping Boundary, data taken as an average of the full coverage of the study area, see Plate 7.1.1 . For the offshore elements, data taken from most appropriate grid square, see Plate 7.1.2 .
UKCP18 Marine Report (Met Office, 2018c).	Accessed 2022	This data source was used to ascertain the future climate trends for the offshore elements.	Offshore part of the Scoping Boundary.
UK CCRA 2021, Chapter 4: Infrastructure (Jaroszweski, D., et al., 2021)	Accessed 2022	This chapter provides an assessment of risks and opportunities associated with climate change on infrastructure, such as energy, and includes an assessment of offshore infrastructure.	Full coverage of the study area.

Current baseline

- 7.1.31 The baseline for the CCR assessment is the current climatic conditions representative of the Scoping Boundary. This is used to provide context of the climate change impacts throughout the construction, operation and decommissioning of the Project.
- 7.1.32 The current baseline has been derived from the UK regional climate summary for 1981 – 2010 for Eastern Scotland (Met Office, 2016), within which the onshore elements are located.
- 7.1.33 Within Eastern Scotland, the mean annual temperature for this region varies between 6-9°C, whereas the rest of the UK averages 11°C. The average number of days with air frost varies from less than 40 a year on the coast of Fife to more than 90 a year over the higher ground of the Lammermuir Hills and Grampians.
- 7.1.34 Much of Eastern Scotland is sheltered from the rain-bearing westerly winds. This shelter reaches its greatest potential along the coasts and these areas receive less than 700mm of rainfall in an average year. In contrast, the wettest area is the southern Grampians where the average annual rainfall is over 1500mm. The area of Fraserburgh, within the Scoping Boundary, experiences an average of 750mm of rain annually.
- 7.1.35 Eastern Scotland is one of the windier parts of the UK, being relatively close to the track of Atlantic depressions. The strongest winds are associated with the passage of deep areas of low pressure close to or across the UK. The frequency and strength of these depressions

is greatest around the winter months, especially from December to February, and this is when mean speeds and gusts (short duration peak values) are high.

- 7.1.36 **Table 7.1.10** sets out the observed climate data from Fraserburgh climate station (the nearest Climate Station to the Project) for the period 1981 – 2010 and contextualises this against the regional data for Eastern Scotland and the country as a whole.

Table 7.1.10 Baseline climate data 1981 – 2010 (Met Office, 2022)

1981 - 2010	Nearest Climate Station - Fraserburgh	Regional: Eastern Scotland	Scotland
Monthly average rainfall (mm)	62.30	97.10	129.25
Days of rainfall > 1mm (days)	146.43	160.59	188.18
Minimum Annual Temperature (°C)	6.14	3.81	4.18
Maximum Annual Temperature (°C)	11.40	10.86	10.80
Mean wind speed at 10m (knots)	12.61	10.35	10.90
Air frost (days)	27.63	84.80	75.33

Future baseline

- 7.1.37 UKCP18 provides probabilistic data on projected climate variables for the UK for administrative regions. The data provides RCP projections until the end of the 21st century for different emissions scenarios.
- 7.1.38 RCP8.5 is considered a high emissions pathway and represents a potential future which is slow to transfer to low-carbon energy provision. With progress towards achieving National Determined Contributions, RCP8.5 is considered a possible, but conservative, emission scenario suitable for evaluating the Climate Change Resilience of long-lifetime projects.
- 7.1.39 In accordance with National Policy Statement EN-1 (DECC, 2011a), the 10%, 50% and 90% probability levels will be considered in the CCR assessment as a minimum. Probabilistic climate projections, such as UKCP18, assign a probability to climate change outcomes based on a probability distribution function (PDF), which shows the possible range of climate change with the 50% probability level the median value.
- 7.1.40 The future baseline is used to set out general climatic conditions that would be experienced over the project lifetime based on the following:
- The overall duration of the construction period is anticipated to be up to eight years and is expected to be fully commissioned by 2035.
 - The lease agreement allows the Project to remain until 2080, which would be the maximum operational lifetime under the terms of the lease. This is the assumption for the purposes of the EIA.

- Decommissioning would take place at the end of the operational lifetime.

Onshore

7.1.41 **Plate 7.1.1** shows the study area for the onshore elements of the Project with each grid square representing 25km². The climate data was extracted from UKCP18 and averaged over the study area. This data is tabulated in **Table 7.1.11**.

Plate 7.1.1 Study area for UKCP18 data extraction

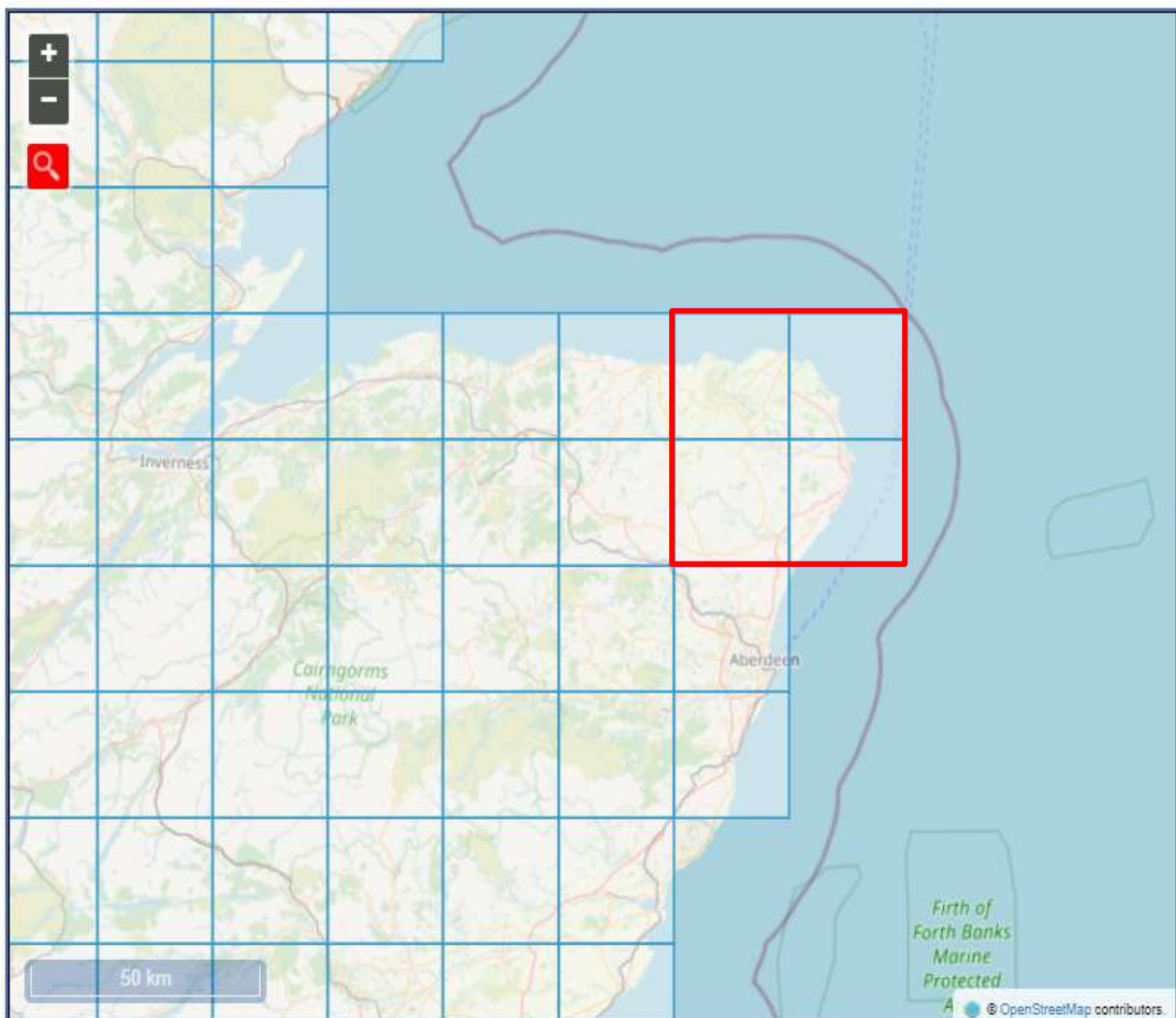


Table 7.1.11 Future climate projections for the study area from UKCP18 - onshore

Climate Variable		Time Period and Projected Change				Trend line
		2030s (2020-2039)	2050s (2040-2059)	2070s (2060-2079)	2090s (2080 – 2099)	
Mean temperature change (Summer) (°C)	10%	0.03	0.34	0.77	1.48	↑
	50%	0.77	1.45	2.32	3.65	↑
	90%	1.54	2.55	3.97	5.86	↑
Mean temperature change (Winter) (°C)	10%	-0.09	0.09	0.21	0.51	↑
	50%	0.74	1.22	1.69	2.51	↑
	90%	1.62	2.37	3.27	4.59	↑
Maximum temperature anomaly (Summer) (°C)	10%	-0.19	0.05	0.45	1.13	↑
	50%	0.69	1.40	2.37	3.81	↑
	90%	1.61	2.73	4.28	6.44	↑
Mean precipitation change (Summer) (%)	10%	-12.48	-23.45	-32.19	-45.55	↓
	50%	-0.20	-6.21	-12.31	-22.53	↓
	90%	12.36	12.37	9.58	6.24	↓
Mean precipitation change (Winter) (%)	10%	-4.56	-0.63	-2.86	-0.65	↑
	50%	12.98	19.43	22.07	32.92	↑
	90%	32.25	42.78	52.66	73.68	↑
5-day total summer precipitation (mm)	10%	75.15	73.06	69.72	65.71	↓
	50%	81.80	82.07	82.35	82.72	↔
	90%	89.78	93.42	93.03	105.72	↑
5-day total winter precipitation (mm)	10%	73.46	74.61	75.58	76.09	↑
	50%	80.45	83.36	87.15	91.32	↑
	90%	88.80	94.09	101.55	110.70	↑

- 7.1.42 **Table 7.1.11** shows the projected changes in future climate variables across the chosen time periods. Mean temperatures are increasing across all seasons but especially in the summer. The extremes are greater than the mean values, with extreme maximum temperatures increasing throughout the time periods. This could lead to frequent and prolonged hot spells. Hot spells are defined as maximum temperatures exceeding 30°C for two or more consecutive days. By the 2090s the frequency of hot spells is expected to increase (Met Office, 2018g).
- 7.1.43 Precipitation (rainfall) is anticipated to increase in the winter months, with a clear shift to drier summers across all time periods. This is also reflected in the 5-day winter precipitation events, with an increasing trend towards greater intensity and prolonged rainfall events. Despite an overall trend towards drier summers, summer rainfall events are still expected (Met Office, 2018d), however there is not a discernible trend within the 5-day summer precipitation event data to define this trend for the Scoping Boundary area.
- 7.1.44 UKCP18 indicates an increase in surface wind speeds over the UK for the second half of the 21st century during the winter season, where more significant impacts of wind are experience. The frequency of winter storms would increase, however the increase in wind speeds is modest (Met Office, 2018e).

- 7.1.45 The UKCP18 projects by the 2070s show a decrease in lying winter snow of around 80-100% for the east of Scotland in both local (2.2km) and regional (12km) projections. Snowfall will also substantially decrease (Met Office, 2018f).
- 7.1.46 Coastal risk across the UK is anticipated to increase under all RCP climate change scenarios throughout the century. This results in an increase in the frequency and magnitude of extreme water levels and coastal flood events (Met Office, 2018d), reflected in mean sea level rise data in **Table 7.1.12**.

Offshore

- 7.1.47 Data from UKCP18 marine projections was extracted from the nearest grid cell shown in **Plate 7.1.2** and tabulated in **Table 7.1.12**.

Plate 7.1.2 Study area for marine UKCP18 projections

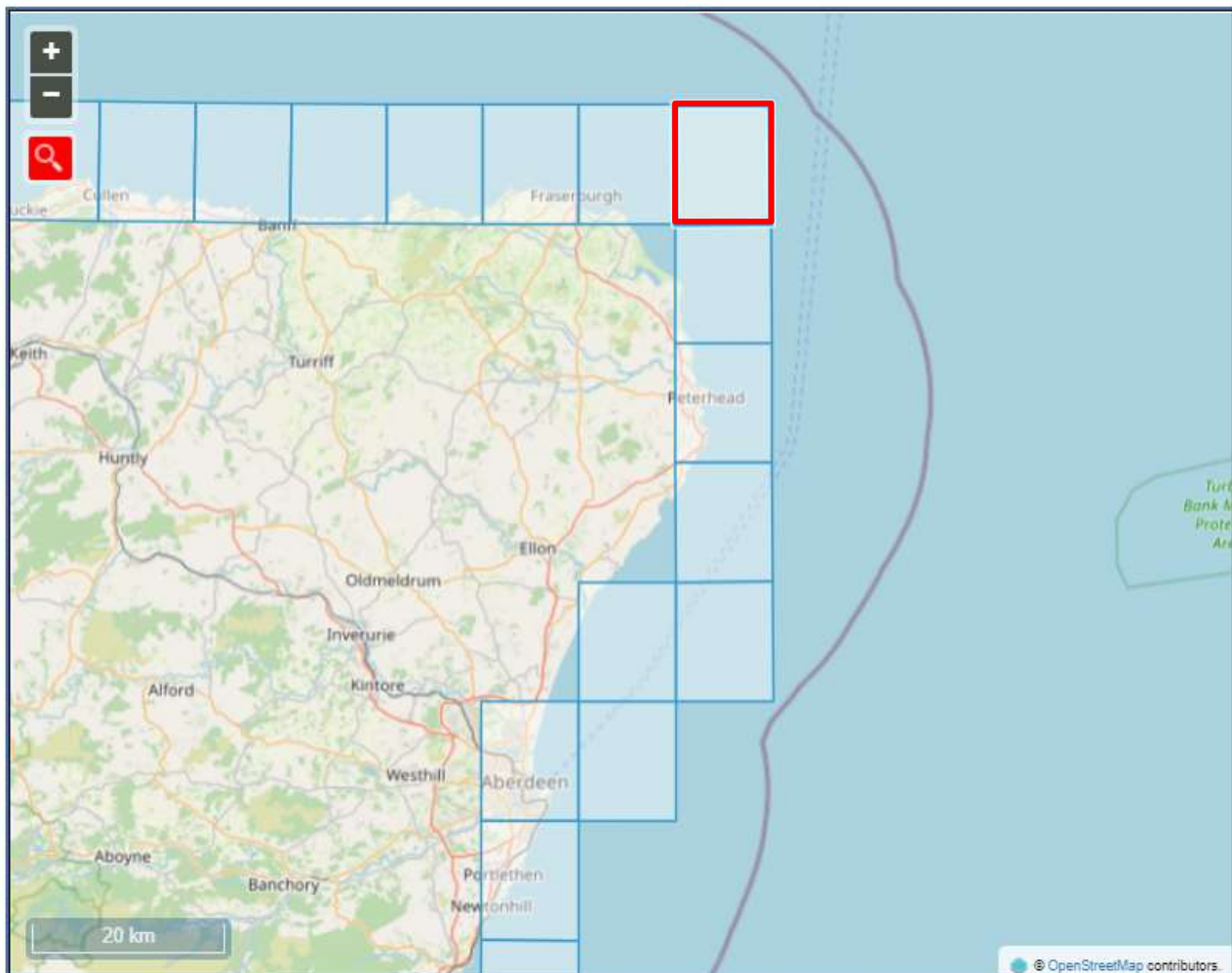


Table 7.1.12 Future climate projections for the study area from UKCP18 - offshore

Climate Variable	Time Slice and Projected Change					Trend line
Time Period		2030	2050	2070	2090	
Mean sea level rise (m)	10%	0.07	0.15	0.24	0.35	↑
	50%	0.10	0.21	0.35	0.52	↑
	90%	0.14	0.29	0.49	0.73	↑

- 7.1.48 At the study area, a mean sea level rise of 0.52m could be experienced by 2090 (RCP8.5, 50%). Sea level rise over the considered time periods of the Project is expected to affect tidal characteristics substantially, however there is no evidence for significant changes in future storm surges, although confidence in this trend is low (Met Office, 2018d).
- 7.1.49 The marine projections also consider that there is no significant additional increase in the statistics of extreme water levels associated with atmospheric storminess only (Met Office, 2018d).
- 7.1.50 The projections for the 21st century suggest a general reduction in wave heights and extreme waves in the order of 10-20%, however this is specific to the location and some coastal regions may remain dominated by local weather variability. This understanding will be developed further at the EIA Report and throughout the design of the Project.
- 7.1.51 UKCP18 does not provide information on changes to coastal water properties, such as sea surface temperature and acidification (Met Office, 2018d).

Basis for scoping assessment

- 7.1.52 The CCR scoping assessment is based on the key assumptions which are set out in **Chapter 2: Project Description**:
- 7.1.53 The CCR assessment is associated with a range of assumptions and limitations including:
- Uncertainties with climatic trends and how they are presented at the regional scale. For the CCR assessment, a range of projections would be used from UKCP18. The full details and references of data used from UKCP18 are contained in **Table 7.1.9**.
 - Design information will be gathered as it becomes available to be able to refine the scope of the CCR assessment.
 - Limited quantitative climate data is available for offshore locations in a format applicable to this assessment.
- 7.1.54 The scope, baseline and assessment will be further refined and agreed upon to ensure a proportionate scope.
- 7.1.55 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 7.1.14** to **Table 7.1.16**.
- 7.1.56 The Approved NPF4 2023 introduces new requirements that respond to the global climate and nature crisis (Policy 1), develop Scotland's circular economy (Policy 12) and contribute towards the expansion of renewable energy generation (Policy 11). These, amongst other requirements set out, will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 7.1.57 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on CCR (see **Table 7.1.13**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 7.1.58 As there is a commitment to implementing these environmental measures, and to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 7.1.13 Embedded measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-007	Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2014) guidance on the Assessment of Dust from Demolition and Construction in order to avoid adverse effects on sensitive features. Examples of pathway include windblown dust / fibres or tracking back of dust / fibres is a potential contamination migration.	Construction Environmental Management Plan (CEMP) and planning conditions.
M-016	In areas (or during periods of adverse weather) there may be the requirement to import aggregates to minimise erosion or transport of sediment from construction. Options such as bog-matting, geotextiles, floating roads will be considered by the principal contractor for sensitive sections of the route to reduce impact.	CEMP and planning conditions.
M-020	Emergency Response Plans (ERPs) for flood events will be prepared for all construction activities, working areas, access and egress routes in floodplain areas. These plans will be provided for both construction and operation / maintenance phases and will include evacuation procedures for personnel.	CEMP and planning conditions.
M-063	A CEMP to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. The CEMP will be the securing mechanism for many measures.	Planning conditions, s.36 conditions, marine licence conditions and CEMP.
M-080	Drainage design to manage and, if necessary, treat surface water run-off will be included in all elements of temporary construction sites and permanent operational infrastructure. A CAR license will be	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	required for all sites that exceed five hectares in area. Drainage design will follow the SuDS hierarchy with preference being given to local infiltration of surface water run-off from new areas of hardstanding, where possible. Where the development intersects overland flow pathways or areas of known surface water flooding appropriate measures will be embedded into the design. All subsurface infrastructure will be designed to facilitate subsurface flow pathways to avoid any localised increases in groundwater flooding.	
M-081	Construction and permanent development in flood plains will be avoided wherever possible. Where this is not possible mitigation will be developed to ensure the works are compliant with policy requirements.	CEMP management plans and planning conditions.
M-097	Construction activities will be planned through use of a Risk Assessment Method Statement (RAMS) alongside safety bulletins as part of the CEMP. The RAMS will put in place procedures in the case of extreme weather (high temperatures, extreme winds, flooding, wildfire risk). This may include altering the construction programme to delaying affected activities, changing shift patterns, Personal Protective Equipment (PPE) and toolbox talks.	CEMP management plans and planning conditions.

Likely significant effects

- 7.1.59 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment. This is done through the vulnerability assessment as described in this Section. The outcome from this is contained in **Appendix 7.1A: Climate Change Vulnerability Assessment**.
- 7.1.60 Those climate change impacts assessed in **Appendix 7.1A** as having a 'medium' or 'high' vulnerability to the projected climate change trends have been included in the likely significant CCR effects summarised in **Table 7.1.14**, **Table 7.1.15** and **Table 7.1.16** for construction, operation and decommissioning phases, respectively.
- 7.1.61 The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for CCR effects the operability and lifespan of the wind farm, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 7.1.62 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects is presented after the table, supported by evidence base.

Table 7.1.14 Assessment of the likely significant effects to be scoped into the EIA – Construction

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability	Further baseline data requirements
Onshore						
Increased annual mean temperatures, especially in the summer months, and an increase in the frequency and intensity of hot spells.	M-063, M-097	Increased heat stress or heat exhaustion experienced by the construction workforce.	Scoped in.	Human health	Medium Vulnerability	N/A
	M-063, M-097	Restriction of certain construction activities during hot weather, for example, the pouring of concrete in higher temperatures could reduce the strength and durability of the finished product, and the laying of asphalt could become difficult as it fails to maintain profile during compaction. This could cause programme delay and increased costs.	Scoped out, see rationale in section below paragraph 6.7.1.70.	Building and infrastructure assets	Low Vulnerability	N/A
Increased annual mean temperatures and frequency and intensity of hot spells,	M-007, M-063, M-097	Increased dust creation from construction activities, leading to impacts on the health of construction workers and the failure of machinery and equipment.	Scoped out, see rationale in section below paragraph 6.7.1.66.	Human health	Low Vulnerability	N/A

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability	Further baseline data requirements
coupled with decreased summer precipitation.	M-063, M-097	Risk of wildfires affecting the construction workforce.	Scoped out, see rationale in section below paragraph 6.7.1.69.	Human health	Low Vulnerability	N/A
Decrease in summer precipitation leading to drought conditions	M-063, M-097	Drought conditions impacting water available to use during construction, e.g. for dust suppression	Scoped out, see rationale in section below paragraph 6.7.1.67.	The natural environment	Low Vulnerability	N/A
Increase in precipitation resulting in tidal, fluvial or pluvial flooding.	M-020, M-063, M-097	Wet weather leading to increased possibility of slips, trips and falls.	Scoped out, see rationale in section below paragraph 6.7.1.68.	Human health	Low Vulnerability	N/A
	M-016, M-020, M-063 M-081, M-097	Flooding of construction site access roads causing delays to construction programme.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	See Section 6.3: Water resources and flood risk.
	M-020, M-063, M-081, M-097	Water ingress to equipment or machinery related to construction activities or permanent assets in place during construction, leading to equipment failures or damage.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	See Section 6.3: Water resources and flood risk.
	M-063, M-097, M-080, M-081	Overwhelming of the construction site drainage system causing flooding across the site.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	See Section 6.3: Water resources and flood risk.

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability	Further baseline data requirements
Increased in frequency and intensity of storm events.	M-063, M-097	There is an increased risk of disruption to construction work, such as cranes unable to operate in high winds.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	N/A
Offshore						
Increased annual mean temperatures, especially in the summer months, and an increase in the frequency and intensity of hot spells.	M-063, M-097	Increased heat stress or heat exhaustion experienced by the construction workforce.	Scoped in.	Human health	Medium Vulnerability	N/A
	M-063, M-097	Restriction of certain construction activities during hot weather, for example, the pouring of concrete in higher temperatures could reduce the strength and durability of the finished product, and the laying of asphalt could become difficult as it fails to maintain profile during compaction. This could cause programme delay and increased costs.	Scoped out, see rationale in section below paragraph 6.7.1.70.	Building and infrastructure assets	Low Vulnerability	N/A
Increased frequency and intensity of storm events	M-063, M-097	Extreme storminess leading to increased unsafe working environments and delays to construction programme.	Scoped in.	Human health	Medium Vulnerability	N/A

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability	Further baseline data requirements
and wave heights	M-063, M-097	There is an increased risk of disruption to construction work, such as cranes/barges/rigs unable to operate in high winds.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	N/A

Table 7.1.15 Assessment of the likely significant effects to be scoped into the EIA - Operation

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability (worst case across lifetime)	Further baseline data requirements
Onshore						
Sea level rise.	M-020, M-080, M-081	Risk to the onshore infrastructure, such as substations, from coastal flooding and erosion.	Scoped in.	Building and infrastructure	High Vulnerability	N/A.
Increase in precipitation resulting in tidal, fluvial or pluvial flooding.	M-020, M-080, M-081	Risk to the onshore infrastructure, such as substations, from river, surface water and groundwater flooding.	Scoped in.	Building and infrastructure	High Vulnerability	See Section 6.3: Water resources and flood risk.
	N/A	Drought conditions undermining tree roots leading to damage to infrastructure due to falling trees.	Scoped out, see rationale in section below paragraph 7.1.71.	Building and infrastructure	Low Vulnerability	N/A
	M-020, M-080, M-081	Restriction of access during flood events, preventing maintenance activities.	Scoped in.	Building and infrastructure	Medium Vulnerability	See Section 6.3: Water resources and flood risk.
Fluctuations in mean rainfall across the year, coupled with an increase in mean	N/A	Risk to subterranean and surface infrastructure from subsidence, such as cables and substations.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability (worst case across lifetime)	Further baseline data requirements
temperatures, resulting in changes to soil moisture.						
Decrease in summer precipitation, leading to drought conditions.	N/A	Changes in water content of soil has an adverse effect on soil resistivity leading to a reduction in cable ratings and the effectiveness of earthing systems at substations.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
	N/A	Drought conditions undermining tree roots leading to damage to infrastructure due to falling trees.	Scoped out, see rationale in section below paragraph 6.7.1.71.	Building and infrastructure	Low Vulnerability	N/A
Increased annual mean temperatures, especially in the summer months, and an increase in the frequency and intensity of hot spells.	N/A	Reduction in the amount of power which can be transmitted and distributed.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
	N/A	Overheating of mechanical and electrical (M&E) assets such as onshore substations, leading to a decrease in asset performance and rating and/or requiring additional electricity demand for mechanical cooling units.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability (worst case across lifetime)	Further baseline data requirements
	N/A	Increased heat stress or heat exhaustion experienced by the operational and maintenance workforce.	Scoped in.	Building and infrastructure	High Vulnerability	N/A
	N/A	Underground cable systems affected by the increase in ground temperatures, reducing cable ratings.	Scoped in.	Human health	Medium Vulnerability	N/A
	N/A	Extended growing season leading to encroachment of vegetation in substations.	Scoped out, see rationale in section below paragraph 7.1.71.	Building and infrastructure	Low Vulnerability	N/A
	N/A	Wildfire affecting electrical infrastructure.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
Low temperatures and cold snaps could still occur.	N/A	Cold weather leading to ice accretion causing damage to the infrastructure.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
Increased frequency and intensity of storm events.	N/A	Lightning causing physical damage, fire, power surge, and shock wave at grid connection points.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
	N/A	Increased wind loading on substation equipment and	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability (worst case across lifetime)	Further baseline data requirements
	N/A	security fencing leading to damage. Wind blown debris leading to risk to maintenance personnel.	Scoped in.	Human health	Medium Vulnerability	N/A
Offshore						
Increased frequency and intensity of storm events and wave heights	N/A	Destabilisation or degradation of Wind Turbine Generators mechanical systems and structures.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
	N/A	Loading and sediment transport across seabed leading to loss of integrity of foundations from scour and exposure.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
	N/A	Loading and sediment transport across seabed leading to loss of integrity of cabling systems from scour and exposure.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
	M-081	Impeded access for maintenance and inspection.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
Increased annual mean	N/A	Overheating of mechanical and electrical (M&E) assets	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability (worst case across lifetime)	Further baseline data requirements
temperatures, especially in the summer months, and an increase in the frequency and intensity of hot spells.		such as offshore substations, leading to a decrease in asset performance and rating and/or requiring additional electricity demand for mechanical cooling units.				
Low temperatures and cold snaps could still occur.	N/A	Cold weather leading to ice accretion affecting the efficiency and performance of turbines.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A
Increase sea surface temperatures and ocean acidification	N/A	Increased corrosion of the structures.	Scoped in.	Building and infrastructure	Medium Vulnerability	N/A

Table 7.1.16 Assessment of the likely significant effects to be scoped into the EIA - Decommissioning

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability	Further baseline data requirements
Onshore						
Increased annual mean temperatures, especially in the summer months, and an increase in the frequency and intensity of hot spells.	N/A	Increased heat stress or heat exhaustion experienced by the workforce associated with decommissioning.	Scoped in.	Human health	High Vulnerability	N/A
Increased annual mean temperatures and frequency and intensity of hot spells, coupled with decreased summer precipitation.	N/A	Increased dust creation from decommissioning activities, leading to impacts on the health of workers and the failure of machinery and equipment.	Scoped in.	Human health	Medium Vulnerability	N/A
	N/A	Risk of wildfires affecting the workforce.	Scoped in.	Human health	Medium Vulnerability	N/A
Decrease in summer precipitation leading to drought conditions	N/A	Drought conditions impacting water available to use during decommissioning, e.g. for dust suppression.	Scoped in.	The natural environment	Medium Vulnerability	N/A

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability	Further baseline data requirements
Increase in precipitation resulting in tidal, fluvial or pluvial flooding.	N/A	Wet weather leading to increased possibility of slips, trips and falls.	Scoped in.	Human health	Medium Vulnerability	N/A
	N/A	Flooding of the site access roads causing delays to decommissioning programme.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	See Section 6.3: Water resources and flood risk.
	N/A	Water ingress to equipment or machinery related to decommissioning activities, leading to equipment failures or damage.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	See Section 6.3: Water resources and flood risk.
	N/A	Overwhelming of the site drainage system causing flooding across the site.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	See Section 6.3: Water resources and flood risk.
Increased in frequency and intensity of storm events.	N/A	There is an increased risk of disruption to decommissioning work, such as cranes unable to operate in high winds.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	N/A
Offshore						
Increased annual mean temperatures, especially in the summer months, and an increase in the	N/A	Increased heat stress or heat exhaustion experienced by the workforce associated with decommissioning.	Scoped in.	Human health	High Vulnerability	N/A

Climate trend	Embedded measures	Effect	Proposed Approach	Receptor	Vulnerability	Further baseline data requirements
frequency and intensity of hot spells.						
Increased frequency and intensity of storm events and wave heights	N/A	Extreme storminess leading to increased unsafe working environments and delays to decommissioning programme.	Scoped in.	Human health	Medium Vulnerability	N/A
	N/A	There is an increased risk of disruption to decommissioning work, such as cranes unable to operate in high winds.	Scoped in.	Building and infrastructure assets	Medium Vulnerability	N/A

- 7.1.63 The climate impacts resulting from interdependencies, such as the resilience of telecommunication networks operated by a third party, will be developed throughout the EIA Report following receipt of design information and review of third-party Climate Change Adaptation Reporting. As such, all impacts from interdependencies across the lifetime of the Project have been scoped in.

Impacts scoped out of assessment

- 7.1.64 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect through the vulnerability assessment. These conclusions have been made through the vulnerability assessment contained in **Appendix 7.1A: Climate Change Vulnerability Assessment**, based on the knowledge of the baseline environment, the nature of planned works and professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.
- 7.1.65 The climate change impacts considered at the construction stage focus on projected climate trends for the 2030s and therefore the assessment of exposure and sensitivity to the climate trends takes into account that there is a minimal change from the baseline, as shown in **Table 7.1.11** and **Table 7.1.12**. As a result of this, some **climate impacts during construction** have been scoped out, as detailed below.
- 7.1.66 The impact of **increased dust creation from construction activities** and the effect on the health of construction workers resulting from increasing temperatures has been scoped out due to the exposure on the construction workers assessed as being a minimal change in the 2030s from the baseline. This is based on the results of the future baseline presented in **Table 7.1.11** showing the minimal change in exposure, for instance the mean summer temperature is anticipated to increase by 0.77°C coupled with an anticipated 0.20% decrease in summer precipitation for the 50th percentile in the 2030s. The sensitivity of the receptor to changes in dust creation is also considered to be low.
- 7.1.67 Similarly, the **impact of drought conditions** on the water available for use during construction is of low exposure in the 2030s (i.e. the negligible 0.20% decrease in summer precipitation), in addition to the low sensitivity of the activity due to alternatives for sourcing water for dust suppression. Therefore, this has been scoped out.
- 7.1.68 The **increase in precipitation in winter resulting in an increased possibility of slips, trips and falls during construction** has been scoped out due to the exposure being of minimal change from the baseline (12.98% increase in winter precipitation from the baseline) coupled with the sensitivity of increased precipitation on the possibility of on-site incidents is low.
- 7.1.69 The sensitivity of the construction workforce to the **risk of wildfire** is assessed as high however, the exposure of this risk due to increasing temperatures and decreased summer precipitation is low. This results in a low vulnerability and is therefore scoped out of the assessment.
- 7.1.70 The minimal change in average summer temperatures in the 2030s from the baseline (0.77°C) was also considered in the **exposure assessment of certain construction activities during hot weather**, such as pouring concrete.
- 7.1.71 Due to the anticipated climate trend projections across the lifetime of the Project and the vulnerability of the assets to changes, the majority of the operational impacts have been scoped in for further assessment. Although this means receptors will experience an increase in exposure of climate change trends, in some instances the sensitivity of the receptor remains low, resulting in an overall low vulnerability. The exposure to changes in precipitation levels is increasing (22% increase in winter precipitation by 2070 and

decreased summer precipitation by 12% by 2070), the sensitivity of mature vegetation to these gradual changes resulting in subsequent failure and damage to above ground equipment remains low resulting in the climate impact to be scoped out. Similarly, the effect of vegetation growth resulting from longer growing seasons has been scoped out due to the low sensitivity of the assets, such as substations, to encroaching vegetation.

- 7.1.72 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed.

Cumulative effects

- 7.1.73 The CCR assessment is an assessment of the resilience of the Project to projected climate change. The resilience of the Project assets is unaffected by other developments.
- 7.1.74 The ICCI assessment reflects the receptors identified in the environmental aspects and would utilise the topic-specific assessment methodologies to assess likelihood and magnitude of the impact, with the combined consideration of future climate change trends and impacts. The assessment uses expert judgement on whether climate change would have a combined effect with the effects already identified by the technical topics. Where a combined effect is identified, additional embedded mitigation measures would be proposed.

Transboundary effects

- 7.1.75 The potential effects from construction, operation and decommissioning on climate resilience receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. The CCR assessment assesses the effects of climate change on the Project as a receptor. No transboundary effects are anticipated on the basis that climate change adaptation effects and impacts are specific to the development and will not result in impacts to an adjacent state.

Proposed approach to the EIA Report

- 7.1.76 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Pre-application Consultation process which is set out in **Chapter 4: Approach to Scoping and EIA**.
- 7.1.77 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the wider stakeholder engagement programme. This will be through both informal and statutory consultation throughout the pre-application stages of the Project. The outcome of the consultation will be recorded within the EIA Report.
- 7.1.78 For the CCR assessment, consultation will be undertaken with Aberdeenshire Council, the Scottish Environment Protection Agency, NatureScot, amongst others, as part of the consultation process. Technical support will be given where consultation intersects with and is led by other topics, for example Water Resources and Flood Risk consultation will be informed by UKCP18 data.
- 7.1.79 Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.
- 7.1.80 Within the EIA Report, the climate impacts which have been scoped into the assessment will undergo a risk assessment which takes into account the likelihood and magnitude of consequences of the impact occurring. The assessment will conclude on the significance

of any risk of future climatic conditions. The EIA Report will identify measures to improve the resilience of the Project.

- 7.1.81 The ICCI assessment will consider the extent to which climate change exacerbates effects on receptors identified by the other environmental topics. It also considers whether climate change effects the efficacy of proposed environmental measures. It is the combination of effects from both the Project and climate change on environmental receptors.

7.2 Greenhouse gases

Introduction

- 7.2.1 The greenhouse gas (GHG) emissions assessment will consider the potential likely significant effects of the Project with respect to climate change, specifically GHG emissions that may arise from the construction, operation and maintenance, and decommissioning of the onshore and offshore Project elements. This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these effects will be assessed for the purpose of the EIA.
- 7.2.2 The EIA Regulations 2017 require consideration of the impact of the Project on climate (for example the nature and magnitude of GHG emissions) and the vulnerability of the Project to climate change (climate change resilience (CCR)). The scope of the CCR assessment is reported in **Section 7.1: Climate resilience**.
- 7.2.3 The aim of the GHG assessment is to determine the impact of GHG emissions arising from the construction, operation and maintenance, and decommissioning of the Project. These calculations have been used to inform assessment of the extent to which the Project would affect the ability to achieve national, regional and local targets for decarbonisation.
- 7.2.4 Greenhouse gases interfaces with other aspects and as such, should be considered alongside these, namely
- 7.2.5 This Section should be read in conjunction with the description of the Project provided in **Chapter 2: Project Description** and with respect to relevant parts of **Section 6.8: Traffic and transport** where there is a relationship between the assessment of effects.

Legislative and policy context

- 7.2.6 This Section identifies the relevant legislative and policy context which has informed the scope of the technical assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 7.2.7 In order to provide a robust evidence base, **Table 7.2.1** below presents a summary of legislation and policies relevant for the GHG assessment or which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full but rather states the relevance to this Section.

Table 7.2.1 Relevant legislation and policy

Relevant legislation and policy	Relevance to the assessment
Legislation	
The Climate Change Act 2008 (2050 Target Amendment) Order (2019)	The Act (as amended in 2019) commits the UK government by law to reducing its net GHG emissions by at least 100% below 1990 levels (net zero) by 2050. It requires the UK Government to establish carbon budgets and produce a UK Climate Change Risk Assessment (CCRA) every five years.
The Carbon Budgets Order <ul style="list-style-type: none"> - The Carbon Budget Order (2009) - The Carbon Budget Order (2011) - The Carbon Budget Order (2016) - The Carbon Budget Order (2021) 	<p>This legislation implements the carbon budgets set out in the Climate Change Act (2008). The carbon budgets of relevance to this assessment are:</p> <ul style="list-style-type: none"> • third carbon budget, 2018 to 2022, 2,544MtCO₂e representing 37% reduction below 1990 levels by 2020; • fourth carbon budget, 2023 to 2027, 1,950MtCO₂e representing 51% reduction below 1990 levels by 2025; • fifth carbon budget, 2028 to 2032, 1,725MtCO₂e representing 57% reduction below 1990 levels by 2030; and • sixth carbon budget, 2033 to 2037, 965MtCO₂e representing 78% reduction below 1990 levels by 2035.
Climate Change (Emissions Reduction Targets) (Scotland) Act 2019	<p>The Act increased the ambition of Scotland's emissions reduction targets to net zero by 2045, with GHG emissions required to be 100% below 1990 levels. The Act also revised interim targets for emissions reductions and sets annual targets up to 2045. The following interim targets are of relevance to this assessment:</p> <ul style="list-style-type: none"> • 2020 is at least 56% lower than the baseline; • 2030 is at least 75% lower than the baseline; and • 2040 is at least 90% lower than the baseline.
The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement (2015)	The Agreement sets targets for the UK's GHG emissions. It is of note that the treaty is not legally binding, but provides opportunities for updates (protocols) that can be used to set legally binding emissions limits.
UNFCCC Kyoto Protocol (1997)	<p>The Kyoto Protocol commits industrialised countries and economies to transition to limit and reduce GHG emissions in accordance with agreed individual targets. The UK agreed to ensure that emissions of greenhouse gases were at least 12.5% lower than base year levels, on average, over the period 2008 to 2012.</p> <p>The Convention itself asks countries to adopt policies and measures on mitigation, and to report periodically.</p>
UNFCCC Glasgow Climate Pact (2021)	The Conference of the Parties (COP 26) resulted in almost 200 countries agreeing on the acceleration of action on mitigation, adaptation, financing and collaboration in the aim of reaching long-term goal to limit global warming to 1.5°C above pre-industrial levels.
National Policy	
Approved National Planning Framework (NPF4) 2023	<p>A full review of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical system are:</p> <ul style="list-style-type: none"> • Policy 1: Tackling the Climate and Nature Crisis

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> • Policy 2: Climate Mitigation and Adaptation • Policy 11: Energy • National Spatial Strategy: North East • Spatial Planning Priorities: North – Sustainable Places • National Developments 3: Strategic Renewable Electricity Generation and Transmission Infrastructure.
National Planning Framework 3 (NPF3) (2014) <ul style="list-style-type: none"> - Paragraphs 2.6-2.11 - Paragraph 3.41 	<ul style="list-style-type: none"> • The strategy aims to ensure all parts of Scotland make best use of their assets to build a sustainable future. Ensuring developments lower greenhouse gases. • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development.
Scottish Planning Policy (SPP) (2014) <ul style="list-style-type: none"> - Paragraph 169 - Paragraph 154 	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Considerations will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology. • It also states that the planning system should: “<i>support the transformational change to a low carbon economy, consistent with the targets such as 30% of overall energy demand from renewable sources by 2020.</i>”
The UK’s Nationally Determined Contribution (NDC) under the Paris Agreement (2020)	<p>The UKs has established a NDC target to reduce all GHG emissions by at least 68% by 2030 on 1990 levels (1995 levels for F-gases), aligned with the UK’s 2050 net zero GHG emissions target.</p>
Clean Growth Strategy (2017)	<ul style="list-style-type: none"> • Sets out a comprehensive set of policies and proposals that aim to accelerate the pace of ‘clean growth’ (i.e. deliver increased economic growth and decreased emissions). • Provides the strategy for the UK’s future clean growth to allow carbon budgets to be met and support economic growth. It sets out policies and targets out to 2050 for reducing GHG emissions across a number of sectors.
The Ten Point Plan for a Green Industrial Revolution (2020)	<ul style="list-style-type: none"> • Demonstrates the UK’s significant and continuing commitment to tackling greenhouse gas emissions. • It acknowledges the Governments legally binding obligation to reach net zero GHG emissions by 2050, and includes details of how the Government intend to accelerate the path to net zero.

Relevant legislation and policy	Relevance to the assessment
	<ul style="list-style-type: none"> The assessment methodology is based on assessing whether the Project would impede the UK path to net zero by 2050.
Net Zero Strategy: Build Back Greener (2021)	<ul style="list-style-type: none"> Enables the delivery of the objectives set out in the Ten Point Plan (2020), by setting out sectoral policies and proposals for decarbonising all sectors of the UK economy to meet the requirements of the coming carbon budgets, the NDC and the net zero target by 2050.
The Scottish Energy Strategy (2017)	<ul style="list-style-type: none"> Sets out the Scottish Government's vision for the future energy system in Scotland. It acknowledges that renewable energy is a core part of our planning policy, as it provides a key means of reducing greenhouse gas emissions as well as significant economic opportunities.
National Planning Statement (NPS) EN-1 (2011) - Paragraph 2.2.6	<ul style="list-style-type: none"> States that the UK needs to reduce its reliance on a high carbon energy mix to reduce GHG emissions and improve the security, availability and affordability of energy through diversification.
Marine Policy	
Scotland's National Marine Plan (2015) - GEN 5 – Climate Change	<ul style="list-style-type: none"> GEN 5 sets a requirement to act in the way best calculated to mitigate and adapt to climate change.
Local Planning Policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> Policy C2 - Renewable Energy Policy PR2 – Preserving and Protecting Important Development Sites.

Technical guidance

7.2.8 Technical guidance that has been used to define the assessment is set out in **Table 7.2.2**.

Table 7.2.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition (IEMA, 2022)	The IEMA provides guidance on GHG emissions assessment, mitigation and reporting within an EIA context, and this is the primary source of guidance for assessing GHG emissions considered in the assessment methodology. The 2022 guidance further builds upon the 2017 guidance, with key changes including an emphasis on mitigation at the project outset and throughout its lifetime, and more nuanced levels of GHG emissions significance. It provides detail on the application of the five IEMA Principles on Climate Change Mitigation and EIA:

Guidance reference	Relevance to the assessment
	<p><i>“The GHG emissions from all projects will contribute to climate change, the largest inter-related cumulative environmental effect. The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g. human health, biodiversity, water, land use, air quality). The UK has legally binding GHG reduction targets – EIA must therefore give due consideration to how a project will contribute to the achievement of these targets. GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant. The EIA process should, at an early stage, influence the location and design of projects to optimise GHG performance and limit likely contribution to GHG emissions.”</i></p>
Publicly Available Standard (PAS) 2080: 2016 – Carbon management in infrastructure (BSI, 2016)	PAS 2080:2016 provides an approach to reducing GHG emissions from infrastructure projects including working with stakeholders throughout the project lifecycle. This has been considered in the assessment methodology, in particular in providing a framework to assess different phases in the project lifecycle
The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (GHG Protocol) (World Resources Institute and World Business Council for Sustainable Development, 2015)	Provides standards and guidance for preparing a GHG emissions inventory. It covers the accounting and reporting of the six GHGs covered by the Kyoto Protocol. These six GHGs have been collectively considered as CO ₂ e in the assessment methodology.
BS EN ISO 14064-1 (BSI, 2019a) and 14064-2 (BSI, 2019b)	ISO 14064 sets out guidance for quantification and reporting of GHG emissions and GHG removals. The methodology for quantification of GHGs follows this guidance and the stated guidance on reporting will be taken into account as part of this assessment.
Methodology to calculate embodied carbon 1st edition, (RICS, 2012)	The Royal Institution of Chartered Surveyors (RICS) guidance note represents best practice on how to estimate carbon emissions associated with product and construction process stages. The aim of the guidance is to provide a framework of practical guidance on how to calculate embodied carbon emissions associated with projects. This will be used in the assessment methodology to calculate embodied carbon.
Net Zero – The UK’s contribution to stopping global warming (CCC, 2019)	This report prepared by the CCC to the UK Government reassesses the UK’s long-term emission target. In the UK, the report recommends a net zero date of 2050 achieved through known technologies, improvements in people’s lives and policy updates. As a result of this report, emission targets in the UK were updated in the Climate Change Act 2008. These emissions targets will contextualise emissions in the GHG assessment
Progress in reducing emissions in Scotland	This CCC annual report sets out the UK’s progress for 2021 against emissions reduction targets to 2030 and beyond.

Guidance reference	Relevance to the assessment
– 2021 Report to Parliament (CCC, 2021)	These targets provide contextualisation for achievement of the UK emissions reductions targets.
Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6): Climate Change 2021 - The Physical Science Basis (IPCC, 2021)	In August 2021 the contribution of Working Group I to AR6 was published by the IPCC. The publication reinforces the evidence presented in the previous IPCC report (Assessment Report 5 (AR5)) and, through the utilisation of updated climate model simulations and analyses, states that “ <i>it is unequivocal that human influence has warmed the atmosphere, ocean and land</i> ”. It is highlighted that “ <i>global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO₂ and other greenhouse gas emissions occur in the coming decades</i> ”. The publication states that “ <i>limiting human-induced global warming to a specific level requires limiting cumulative CO₂ emissions, reaching at least net zero CO₂ emissions, along with strong reductions in other greenhouse gas emissions</i> ” and it is this assertion which will underpin the international response to global warming. This Report provides the latest climate science evidence base that informs the response of the UK and Scottish governments to Climate Change.
IPCC AR6: Climate Change 2022 – Mitigation of Climate Change (IPCC, 2022)	The IPCC finalised the third part of AR6, the Working Group III contribution, in April 2022. It provides an updated global assessment of climate change mitigation progress and pledges, and examines the sources of global emissions. It explains developments in emission reduction and mitigation efforts, assessing the impact of national climate pledges in relation to long-term emissions goals. This Report provides the latest climate science evidence base that informs the response of the UK and Scottish governments to GHG mitigation.
CCC Sixth Carbon Budget Report Sector Summaries – Electricity Generation (CCC, 2020)	This document contains a summary of content for the electricity generation sector from the CCC’s Sixth Carbon Budget Advice. The CCC’s recommended carbon budget sector allocations for the electricity generation sector are: <ul style="list-style-type: none"> • remaining third carbon budget, 2022 only, 48.48MtCO₂e; • fourth carbon budget, 2023 to 2027, 189.16MtCO₂e; • fifth carbon budget, 2028 to 2032, 92.57MtCO₂e; and • sixth carbon budget, 2033 to 2037, 35.74MtCO₂e. The assessment will contextualise emissions within the sectoral allocation.

Study area

- 7.2.9 The spatial scope for the GHG emissions assessment will be informed by the spatial extent of the Project, including all activities within the Site during its construction, operation and maintenance, and decommissioning, as well as the GHG emissions associated with transport movements, both onshore and offshore, to and from the Project in the construction phase, and transport movements offshore, in the operation and maintenance phase.
- 7.2.10 The temporal scope of the GHG emissions assessment is consistent with the anticipated up to eight year period over which the Project will be under construction. The lease agreement allows the Project to remain until 2080, which would be the maximum operational lifetime under the terms of the lease.

Assessment methodology

Introduction

- 7.2.11 The Project approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. However, whilst this has informed the approach that has been used in this GHG section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address any specific needs of the GHG assessment.
- 7.2.12 The approach to the technical assessment is to quantify and contextualise the GHG emissions of the Project. The GHG emissions sources to be considered in the assessment span the whole lifetime of the Project and include as follows:
- Materials – GHG emissions associated with the materials used to construct the Project including wind turbine generators (WTGs), foundations, onshore and offshore cables, onshore and offshore substations, scour protection and concrete transition joint bays.
 - Transport of materials to/from site and onshore labour movements – GHG emissions associated with the transport of materials, vessels, equipment and workers to onshore and offshore sites by road and sea routes.
 - Construction and installation processes – GHG emissions associated with the installation works including onshore on-site plant equipment, and GHG emissions associated with ships used for installation of offshore works and helicopters associated with offshore worker movements.
 - Operation and maintenance GHG emissions – GHG emissions associated with operation and maintenance onshore and offshore activities including the embodied carbon of raw materials required for replacement, and offshore vessel and helicopter movements required for operation and maintenance activities.
 - Decommissioning activities – GHG emissions associated with onshore and offshore decommissioning activities. This is assumed to generally be the reverse of the construction sequence and involve similar types and numbers of vessels and equipment with some materials left in-situ, as described below.
 - Avoided GHG emissions – the GHG emissions avoided from fossil fuel-based energy generation as a result of the Project.
- 7.2.13 Effects will be quantified by comparing the ‘with Project’ scenario and the ‘without Project’ scenario. The ‘with Project’ scenario will consider emissions from the life cycle stages of the Project as set out within **Plate 7.2.1**.

- 7.2.14 Emissions from a 'without project' case in the future baseline is represented by the existing GHG emissions from the Site prior to construction and operation of the Project or by the GHG emissions arising from an alternative project design and assumptions. Since there is no physical development and activity at the location of the Project in the 'without Project' scenario, the GHG emissions from the assessment prior to construction and operation will be zero. Therefore, for this assessment, generation mechanisms of other fuels (including coal, gas, all fossil fuels and all fuels (including nuclear and renewables) will be considered.

Quantification of GHG emissions

- 7.2.15 The approach to quantifying the GHG emissions associated with the Project will consider the whole infrastructure life cycle. The phases as described within PAS 2080: Carbon Management in Infrastructure (BSI, 2016) will be used. These phases are the 'before use' stage (A0-5), the 'use' stage (B1-9) and 'end of life' stage (C1-4) and are illustrated in **Plate 7.2.1** and are summarised below.

Plate 7.2.1 Infrastructure life cycle stages



- 7.2.16 These phases will allow for the identification of the GHG emission sources associated with the Project. The assessment will present a reasonable worst-case. This methodology is in line with the latest IEMA guidance (IEMA, 2022).

- 7.2.17 GHG emissions associated are generally calculated using the following equation:

$$\text{Activity data} \times \text{GHG emissions factor} = \text{GHG emissions value}$$

- 7.2.18 Assumptions will be made to characterise the likely activities associated with the Project and therefore enable GHG emissions to be determined. These assumptions will ensure a

proportionate assessment has been carried out. All assumptions made will be clearly stated in the EIA Report.

- 7.2.19 Detailed below is the proposed overarching methodology for each defined PAS 2080 infrastructure lifecycle stage which will be used to characterise the GHG emission sources during the Project.

A1-A2-A3 – Product stage: raw material supply, transport and manufacture

- 7.2.20 Embodied carbon represents the sum of GHG emissions covering extraction of raw and primary materials, their manufacture and refinement into products and construction materials, as well as the transport and supply logistics to the factory gate. For the project this will include the raw and primary materials for project assets which will include WTGs, foundations, onshore and offshore cables, onshore and offshore substations, scour protection and concrete transition joint bays. RICS methodology to calculate embodied carbon (RICS, 2012) along with the Inventory of Carbon and Energy (ICE) Database (Circular Ecology, 2020) will be used.
- 7.2.21 Using the estimated material quantities and types, the embodied carbon of the raw and primary material assets is calculated, giving its contribution to the overall GHG emissions, which will be allocated to the construction phase.

A4 – Construction transport

- 7.2.22 GHG emissions associated with the transport of materials, vessels, equipment and workers to onshore and offshore sites by road and sea routes.
- 7.2.23 For onshore sites, surface access emissions associated with construction activities will be estimated based on trip length and using the Department for Environment, Food and Rural Affairs (DEFRA) Emissions Factors Toolkit (EFT) (version 11) (DEFRA, 2021). Details on the number and type of construction vehicles will be estimated through the traffic and transport workstream (**Section 6.8: Traffic and transport**). The distances travelled by construction vehicles will be estimated using Department for Transport (DfT) datasets (DfT, 2021) or any further information available.
- 7.2.24 The industry benchmark from the Environment Agency Carbon Calculator (Environment Agency, 2016) and DfT data on commuting distances (DfT, 2021), or other information which becomes available, will be used to determine the GHG emissions from construction workers travelling to and from Site.
- 7.2.25 For offshore sites, access emissions associated with construction activities will be estimated based on trip length and using the Greenhouse gas reporting: conversion factors (BEIS, 2021b). Details on the number and type of vessels will be estimated through the shipping and navigation workstream (**Section 5.10: Shipping and navigation**) and the number and type of helicopters will be estimated through the civil and military aviation workstream (**Section 7.4: Military and civil aviation and telecommunications**). The distances travelled by vessels and helicopters will be used to calculate these emissions.

A5 – Construction process stage

- 7.2.26 GHG emissions associated with the installation works including onshore on-site plant equipment, and GHG emissions associated with ships used for installation of offshore infrastructure, and helicopters associated with offshore worker movements will be calculated from any available information on construction activities (nature and quantity of plant, type of fuel and machinery for each sub-phase), or should such information not be

available, the RICS' construction KPI for process emissions of 1,400kgCO₂e per £100,000 construction cost will be used (RICS, 2017).

B2-B5 - Maintenance, repair, replacement and refurbishment

7.2.27 For operation and maintenance, repair, refurbishment, and replacement throughout the use stage, an estimate of GHG emissions will be informed by any available data. These emissions are likely to include emissions associated with operation and maintenance activities including the embodied carbon of raw materials required for replacement, and vehicles for onshore operation and maintenance activities, offshore vessel and helicopter movements required for operation and maintenance activities. If such data is unavailable, emissions will be calculated based on proxy information, including modelling completed by the Royal Institute of British Architects (RIBA).

C1-C4 – End of life stage: deconstruction, transport, waste processing for recovery and disposal

7.2.28 The decommissioning phase of the Project is assumed to include the decommissioning and removal of all structures above the seabed or ground level. Following the approach set out in **Chapter 4: Approach to Scoping and EIA**, it will be assumed for the GHG assessment that the wind farm array and export cables are removed, although this will be determined at the time of decommissioning and included in Decommissioning Plans.

7.2.29 Decommissioning will occur far into the future and therefore attempting to account for the fate of materials and the activity required for the end-of-life phase are associated with significant uncertainty. GHG emissions are therefore estimated on the assumption that decommissioning will be based on reverse installation and the assumptions are therefore the same as described for construction of the Project.

Avoided emissions

7.2.30 The carbon payback period will be calculated. The carbon payback period represents the time required before GHG emissions averted due to the Project equal the life cycle GHG emissions for the Project, (i.e. the Project has saved more GHG emissions relative to electricity production by other means than will be produced by its construction, operation and maintenance, and decommissioning).

7.2.31 The annual energy generation from the Project during the operation and maintenance phase will be calculated using a high-level approach advocated by Renewables UK (Renewables UK, 2021). This will be a calculation which includes total capacity and the load factor of the Project.

7.2.32 The load factor provides an indication of the ratio of electricity that will realistically be generated as a proportion of the total generating capacity.

7.2.33 It is recognised that there is potential for improved load factors of offshore wind farms in the UK as future technologies become commercially viable. In particular, deployment of next generation offshore WTGs, together with other technology and operational improvements, are anticipated to result in higher load factors. BEIS provides an anticipated load factor for offshore wind developments delivered between 2023 and 2025 of 58.4% (BEIS, 2019). This load factor will be used in the GHG assessment as representative of the Project.

7.2.34 The average annual availability factor for the Project is dependent on the model of WTGs selected at detailed design stage.

7.2.35 It is not known exactly which form of conventional electricity generation the Project will replace. The assessment of GHG emissions considers the carbon payback period of the

Project relative to coal, gas, all fossil fuels and all fuels (including nuclear and renewables) generation mechanisms. Assumptions and limitations

- 7.2.36 Where specific details of works activity data are not available for the assessment, assumptions will be made to characterise the GHG emissions including using any previous data or based on proxy information from relevant case studies and literature reviews. All assumptions made will be clearly stated in the EIA Report.

Assessment of significance

- 7.2.37 Current IEMA guidance (2022) states that: *“The crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050”*.
- 7.2.38 The significance of GHG emissions associated with the Project will be evaluated based on the extent to which the Project materially affects the ability to achieve national, regional and local targets for decarbonisation. The primary basis of contextualisation will be UK and Scotland carbon budgets (see **Table 7.2.1**), including the relevant CCC sectoral allocations (see **Table 7.2.2**), and the UK carbon target of ‘net zero’ in 2050 and the Scottish Government target of net zero by 2045. Regional and local policy for reducing GHG emissions will also be considered but are not the basis of assessment. Consideration will also be given as to whether GHG emissions are appropriately mitigated and compliant with relevant policy.
- 7.2.39 The significance of the GHG emissions from the Project is determined based on the criteria from the IEMA guidance (IEMA, 2022). Major or moderate adverse effects and beneficial effects are considered to be significant. Minor adverse and negligible effects are not considered to be significant.

Table 7.2.3 Significance criteria

Significance	Significance criteria
Major adverse	The Project does not make a meaningful contribution to both the UK and Scottish Governments meeting their carbon budgets / targets. Adverse GHG impacts are not mitigated / do-minimum and are not compliant with requirements of national, regional and local policy.
Moderate adverse	The Project falls short of fully contributing to both the UK and Scottish Governments meeting their carbon budgets / targets. Adverse GHG impacts are partially mitigated and partially meet the requirements of national, regional and local policy.
Minor adverse	The Project is fully in line with the trajectory of the UK and Scottish Governments meeting their carbon budgets / targets. Adverse GHG impacts are mitigated with good practice design standards and meet the requirements of national, regional and local policy.
Negligible	The Project has minimal residual GHG emissions and is ‘ahead of the curve’ for the trajectory of the UK and Scottish Governments meeting their carbon budgets / targets. GHG impacts are mitigated through measures that go beyond good practice design standards and the requirements of national, regional and local policy.

Beneficial	The Project has net GHG emissions below zero, causing a direct or indirect reduction in atmospheric GHG emissions which has a positive impact on the UK and Scottish Governments meeting their carbon budgets / targets.
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Baseline conditions

Data sources

- 7.2.40 The UK and Scotland carbon budgets and the CCC's recommended sector allocations have been used to establish the assessment baseline. No other data sources have been gathered to inform the baseline for the GHG emissions assessment. Data sources to be used for the GHG assessment are discussed in the assessment methodology.

Current Baseline

- 7.2.41 The third carbon budget (2018 to 2022) of 2,544MtCO₂e and Scotland's 2022 annual target of 34.2MtCO₂e (representing a 59.8% reduction from the 1990 baseline of 85.1MtCO₂e), can be considered as the current baseline for the GHG emissions assessment. The 2022 CCC sector allocations for electricity generation are 48.5 MtCO₂e under the UK carbon budget and 1.2MtCO₂e within Scotland's 2022 annual target.
- 7.2.42 Current baseline emissions at the Site are assumed to be nil. The change in GHG emissions associated with the Project are evaluated against national, regional and local targets for decarbonisation (the future baseline).

Future Baseline

- 7.2.43 GHG emissions are required to reduce in the future to meet government targets. The UK Government has set a net zero target which requires the UK to reduce GHG emissions by 100% below 1990 levels by 2050 and the Scottish Government has a more ambitious target of net zero by 2045. Policy has been implemented at national, regional and local scales in order to achieve targets for decarbonisation. The future baseline considers relevant policy and a number of the UK carbon budgets (including sectoral allocations) over the lifetime of the Project: the fourth carbon budget (2023 to 2027) of 1,950MtCO₂e, the fifth carbon budget (2028 to 2032) of 1,725MtCO₂e and the sixth carbon budget (2033 to 2037) of 965MtCO₂e.
- 7.2.44 Emissions from a 'no development' case in the future baseline is represented by the existing GHG emissions from the Site prior to construction and operation of the Project or by the GHG emissions arising from an alternative project design and assumptions. Since there is no physical development and activity at the location of the Project in the no development scenario, the GHG emissions from the EIA prior to construction and operation will be zero. Therefore, for this assessment, the use of other alternative electricity generation methods, including coal, gas, all fossil fuels and all fuels (including nuclear and renewables) has been considered.

Basis for scoping assessment

- 7.2.45 The EIA scoping exercise has been undertaken with reference to **Chapter 2: Project Description** as detailed in **paragraph 7.2.12** and **Table 7.2.5**.
- 7.2.46 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 7.2.5**.

- 7.2.47 The Approved NPF4 2023 introduces new requirements and responds to the global climate and nature crisis (Policy 1), develop Scotland's circular economy (Policy 12) and contribute towards the expansion of renewable energy generation (Policy 11). These, amongst other requirements set out, will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 7.2.48 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on GHG emissions (see **Table 7.2.4**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 7.2.49 There is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 7.2.4 Relevant GHG embedded environmental measures

ID	Environmental measure proposed	How the environmental measure will be secured
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase. Other measures that feed into the CEMP relevant to this technical assessment include:</p> <ul style="list-style-type: none"> • M-098: Reduce greenhouse gases emissions; and • M-099: CEMP to include measures to minimise emissions. <p>The CEMP will be the securing mechanism for many measures.</p>	Planning conditions, s.36 conditions, marine licence conditions and CEMP.
M-098	Measures to minimise lifecycle GHG emissions from construction plant and equipment will be detailed in the CEMP. The use of efficient and well-maintained plant and equipment and using mains electricity, if available, rather than diesel-fuelled portable generators, will reduce GHG emissions from fuel and energy consumption.	CEMP and planning conditions.
M-099	The CEMP will include measures to minimise emissions from construction traffic. This will include measures such as consolidating deliveries where possible and policies such as 'no idling'. Consideration will be given towards the impact of construction traffic, road traffic and adjacent trunk roads. Sustainable modes of travel for the construction workforce will be encouraged.	CEMP and planning conditions.

ID	Environmental measure proposed	How the environmental measure will be secured
M-120	GHG emissions reduction opportunities will be embedded throughout the project life cycle. These will be determined at each of phase of the Project and will include sustainable product selection and raw material use.	HSE/Sustainability programme

Likely significant effects

- 7.2.50 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 7.2.51 The potential likely significant GHG emissions effects that have been taken forward for assessment in the EIA Report are summarised in **Table 7.2.5**.
- 7.2.52 This is based on phases as defined within PAS 2080: Carbon Management in Infrastructure (see **Plate 7.2.1**).
- 7.2.53 This scoping exercise is based on a combination of the project description of the Project at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for GHG effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 7.2.54 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented, supported by evidence base.
- 7.2.55 **Table 7.2.5** presents the likely significant GHG effects, the table is presented in accordance with the lifecycle stages of PAS2080 and is standard for greenhouse gases in EIA.

Table 7.2.5 Likely significant GHG effects

Phase of Project	Embedded measures	Main stages of Project life cycle	Sources of GHG emissions	Proposed approach to assessment (scoped in or scoped out)
Pre-Construction	N/A	A0 – Pre-construction stage	See rationale in section below paragraph 7.2.57.	Scoped out.
Construction	M-063	A1-A2-A3 – Product stage: raw material supply, transport and manufacture	Embodied GHG emissions associated with the raw material assets required to construct the Project, including WTGs, foundations, onshore and offshore cables, onshore and offshore substations, scour protection and concrete transition joint bays.	Scoped in.
	M-099	A4 – Construction transport	GHG emissions associated with the transport of materials, vessels, equipment and workers to onshore and offshore sites by road and sea routes.	Scoped in.
	M-098	A5 – Construction process stage	GHG emissions associated with the installation works including onshore on-site plant equipment, and GHG emissions associated with ships used for installation of offshore works, and helicopters associated with offshore worker movements.	Scoped in.
Operation	N/A	B1 – Boundary of use stage: installed products and materials	See rationale in section below paragraph 7.2.58.	Scoped out.
	N/A	B2-B5 – Maintenance, repair, replacement and refurbishment	Represents the works activities and new materials for the maintenance, repair, replacement and refurbishment of the infrastructure during the use stage / operation of infrastructure. This includes GHG emissions from the embodied carbon of raw materials required for replacement, onshore vehicle movements and offshore vessel and helicopter movements required for operation and maintenance activities.	Scoped in.

Phase of Project	Embedded measures	Main stages of Project life cycle	Sources of GHG emissions	Proposed approach to assessment (scoped in or scoped out)
	N/A	B6 – Operational energy use	<p>This stage has been scoped out as it is not relevant to the Project.</p> <p>Emissions resulting from the energy used by the Project to enable it to deliver its service during operation. This stage has been scoped out as it is assumed that the operational energy requirements of the Project will be delivered by the Project itself.</p>	Scoped out.
	N/A	B7 – Operational water use	See rationale in section below paragraph 7.2.59.	Scoped out.
	N/A	B8 – Other operational processes	See rationale in section below paragraph 7.2.60.	Scoped out.
	N/A	B9 – User's utilisation of infrastructure	See rationale in section below, paragraph 7.2.61.	Scoped out.
Decommissioning	N/A	C1-C4 – End of life stage: deconstruction, transport, waste processing for recovery and disposal	<p>Represents the on-site activities of deconstructing, dismantling and demolishing the infrastructure. GHG emissions associated with onshore and offshore decommissioning activities. All GHG emissions due to transport to disposal and / or until the end-of-waste state of waste materials arising. Activities associated with treatment and processing for recovery, reuse and recycling of waste materials arising from infrastructure. GHG emissions resulting from final disposal of demolition materials. This is assumed to generally be the reverse of the construction sequence and involve similar activities.</p>	Scoped in.
General	N/A	D – Benefits and loads beyond the infrastructure life cycle	The GHG emissions avoided from fossil fuel-based energy generation as a result of the Project.	Scoped in.

Impacts scoped out of assessment

- 7.2.56 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned work and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered below.
- 7.2.57 Pre-construction GHG emissions are the emissions arising from preliminary studies and works e.g. strategy and brief development, architecture, design efforts, EIA and cost planning. Emissions in this stage are not likely to be significant and have been scoped out of the assessment. Most, if not all, of these functions will be largely office-based contributions from across the value chain. In accordance with IEMA guidance for GHG assessments, activities that do not significantly change the result of the assessment can be excluded from the assessment where expected emissions are less than 1% of total emissions.
- 7.2.58 GHG emissions related to installed products and materials are the carbon emitted directly from the fabric of products and materials once they have been installed as part of infrastructure and it is in normal use. At this stage of the design it is not anticipated that any of the materials used in the construction of the Project will be capable of being 'regenerative', in that they absorb carbon dioxide from the atmosphere. This stage has been scoped out as it is not relevant to the Project.
- 7.2.59 There are GHG emissions associated with operational water use. These are the emissions resulting from the consumption of water required by the Project to operate and deliver its service. This stage has been scoped out as it has been considered that the GHG emissions associated to this stage will be negligible and not likely to be significant. This stage has been scoped out as it is not relevant to the Project.
- 7.2.60 GHG emissions arising from other operational process relate to those emissions arising from the Project to enable it to operate and deliver its service including management of operational waste. No other operational processes of the Project have been identified, additional to the transport of workforce associated with the maintenance and repair of materials, considered in stage B2-B5. This stage has been scoped out as it is not relevant to the Project.
- 7.2.61 GHG emissions from user's utilisation are the carbon emitted as a result of activities associated with user's utilisation of the Project during the use stage. This is defined by the principle of control and influence whereby the GHG emissions are B9 (user's utilisation) when they arise from an activity that the user has control over. This stage has been scoped out as it is not relevant to the Project.

Cumulative effects

- 7.2.62 The approach to cumulative effects assessment (CEA) for GHGs differs from that for many EIA topics. All global cumulative GHG sources are relevant to the effect on climate change, and this is taken into account in defining the receptor as being of 'high' sensitivity'. Effects of GHG emissions from specific cumulative projects are not assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other. Additionally, the contextualisation of GHG emissions, by its nature, incorporates the cumulative contributions of other GHG sources which make up that context. Therefore, it will not be necessary to carry out a separate CEA of GHG emissions as part of this EIA. This approach is in accordance with IEMA guidance

- 7.2.63 Consideration has been given as to whether any of the climate change receptors that have been taken forward for assessment in this Section are likely to be subject to cumulative intra-project effects because of other environmental topic effects upon the same receptor. The global climate is the only receptor for the climate change assessment and the effect is not expected to result in any significant intra-project effects.

Transboundary effects

- 7.2.64 The potential effects from construction, operation and maintenance, and decommissioning in respect to climate change, specifically GHG emissions are considered in **Appendix 4A: Transboundary Screening Matrix**. The assessment methodology includes contextualisation against the UK and Scottish carbon budgets and net zero targets, which have been set under international commitments to the Paris Agreement. The contextualisation of GHG emissions, by its nature, incorporates the transboundary effects.

Proposed approach to the EIA Report

- 7.2.65 The methodology outlined in this Section will be used to quantify the GHG emissions from the potential likely significant sources scoped into the assessment as detailed in **Table 7.2.5**.
- 7.2.66 Activity data will inform the assessment and will be collected from the Project design / engineering team and any publicly available benchmarking sources.
- 7.2.67 No engagement has been undertaken to date with respect to the scope or assessment methodology for this chapter. Consultee comments received in the Scoping Opinion will be considered and any further technical engagement will be undertaken as required to agree the scope or assessment methodology for the GHG assessment.

7.3 Socio-economics

Introduction

- 7.3.1 The onshore socio-economics assessment will consider the potential likely significant effects on local communities and the economy that may arise from the construction, operation and maintenance, and decommissioning activities of the onshore and offshore Project elements. This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these will be assessed for the purpose of the EIA.
- 7.3.2 Socio-economics interfaces with other aspects and as such, should be considered alongside these; namely:
- **Section 5.4: Electromagnetic fields (EMF):** There is potential for EMF emissions to affect human health as a result of EMF emissions. Therefore, information from this Section will inform the socio economic assessment.
 - **Section 5.9: Commercial fisheries:** Potential effects on the fishing sector and fishing communities will impact the socio-economics assessment. Therefore, the commercial fisheries assessment will inform the socio-economic assessment.
 - **Section 5.10: Shipping and navigation:** for possible effects on the shipping and recreational boating sectors, the shipping and navigation assessment will inform the socio-economic assessment.
 - **Section 5.12: Seascape, landscape and visual (SLVIA) and Section 6.9: Section 6.9: Landscape and visual (LVIA)** These Sections will inform the socio-economic section regarding visual effects on marine related visual receptors, such as viewpoints relevant to recreation and the visitor economy.
 - **Section 5.13: Infrastructure and other marine users:** Where impacts from other energy projects, marine based activities or aquaculture projects are assessed.
 - **Section 6.1: Ground conditions and contamination:** Land contamination and soil / agricultural land health can interact with socio-economics. Therefore, the ground condition and contamination section will inform the socio-economics assessment.
 - **Section 6.2: Air quality and Section 6.7: Onshore noise and vibration** for possible effects arising at locations such as transport routes on nearby communities.
 - **Section 6.4: Land use:** For possible effects related to current, designated and planned uses.
 - **Section 6.7: Onshore noise and vibration:** There may be sensitive landscapes or receptors that could be affected by noise mitigation in the form of screening and enclosures, therefore the landscape and visual assessment will consider the noise and vibration section to identify any such impact.
 - **Section 6.8: Traffic and transport:** for possible effects on nearby residents and visitors onshore of additional traffic generated by the works.
 - **Section 6.9: Landscape and visual:** With regard to the assessment of common landscape and visual receptors such as visual effects on recreational receptors and tourist attractions.

- **Section 7.1: Climate resilience** and **Section 7.2: Greenhouse gases** as the effects on local society include benefits from reduced emissions and more resilient infrastructure.

Legislative and policy context

- 7.3.3 This Section identifies the relevant legislative and policy context which has informed the scope of the socio-economics assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework**, which provides a detailed summary of individual international, national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 7.3.4 In order to provide a robust evidence base, **Table 7.3.1** below presents a summary of legislation and policies relevant for the socio-economics assessment or which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues. This table does not quote the policies in full, but rather states their relevance to this Section.

Table 7.3.1 UK Legislation and Policy

Relevant Legislation and Policy	Relevance to the assessment
Legislation	
United Nations Biodiversity Conference (COP 15) (2022)	<ul style="list-style-type: none"> • Target 12 sets to increase the area of access to, and benefits from green and blue space, for human health and well-being in urban areas.
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A: Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • Policy 1: Tackling the Climate and Nature Crises • Policy 3: Biodiversity • Policy 7: Historic Assets and Places • Policy 9: Brownfield, Vacant and Derelict Land and Empty Buildings • Policy 23: Health and Safety • Policy 25: Community Wealth Building • Policy 26: Business and Industry.
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland's marine renewable energy sector.
Scottish Planning Policy (SPP) (2014)	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant.

Relevant Legislation and Policy	Relevance to the assessment
	<p>Considerations will vary relative to the scale but are likely to include:</p> <ul style="list-style-type: none"> ▶ net economic impacts; ▶ scale of contribution to renewable energy generation; ▶ effect on greenhouse gas emissions; ▶ cumulative impacts; ▶ impacts on communities and individual dwellings; ▶ landscape and visual; ▶ natural heritage; ▶ carbon rich soils impacts; ▶ impacts on historic environment; ▶ impacts on road traffic; and ▶ effects on hydrology.
A Fairer, Greener Scotland: Programme for Government (2021)	<ul style="list-style-type: none"> • Sets out aims for all parts of communities to share in the benefits of green developments. • Priority 3 sets out for a net zero nation, ending Scotland's contribution to climate change in a fair way.
Scottish Government, The Environment Strategy for Scotland (2020)	<ul style="list-style-type: none"> • Sets out a 2045 vision which recognises the relationship between environment, society and economy with outcomes that are relevant to the Project which include: <ul style="list-style-type: none"> ▶ Scotland's nature is protected and restored; and ▶ sustainable economy conserves and grows our natural assets.
Scottish Government, The Scottish Energy Strategy (2017)	<ul style="list-style-type: none"> • Identifies the energy sector as the cornerstone of Scotland's modern, industrialised economy and the wide range of stakeholders and actors in the system – local government, organisations, regulators, individuals, businesses and others. • Emphasises the reputation for innovation in Scotland and sets out the tremendous economic opportunities for the Scottish supply chain, manufacturers and consumers of energy. • Recognises the transition to a low carbon economy over the coming decades and the need for this to happen in a way that tackles inequality and poverty and promotes a fair and inclusive jobs market.
Scottish Government, Offshore Wind Policy Statement (2020)	<ul style="list-style-type: none"> • Sets out the overarching economic context arising from the major expansion foreseen for offshore wind in Scotland together with the considerations related to supply chains, skills and export potential.
Overarching National Policy Statement for Energy (EN-1) (2011) <ul style="list-style-type: none"> - Paragraph 2.1.2 - Paragraph 4.1.3 – 4.1.4 - Paragraph 5.12.1 – 5.12.3 - Paragraph 5.12.5 	<ul style="list-style-type: none"> • Sets out that energy is vital to economic prosperity and social wellbeing and the importance of affordable energy. • Advises that the need for energy infrastructure and job creation and the environment, social and economic benefits should be taken into account at nation, regional and local levels. • Sets out that assessments should consider all relevant socio-economic impacts, including job creation and

Relevant Legislation and Policy	Relevance to the assessment
	<p>training, provision of additional local services, effects on tourism, effects of the influx of construction workers and cumulative effects.</p> <ul style="list-style-type: none"> • Recognises socio-economics impacts may be linked to other impacts such as visual impacts on tourism and local businesses.
<p>Draft Overarching National Policy Statement for Energy (EN-1) (Draft) (2021)</p> <ul style="list-style-type: none"> - Paragraph 5.3.1 - Paragraph 5.13.3 - Paragraph 5.13.6 - Paragraph 5.13.9 	<ul style="list-style-type: none"> • Addresses significant greenhouse gas emissions and that significant levels of energy infrastructure development are needed for the decarbonisation of the UK economy. • Sets out the need for development of low-carbon industries at the local and regional level. • Sets out the potential for accommodation strategies, especially during construction and decommissioning phases. • Sets out requirements that specifies the approval by the local authority of an employment and skills plan.
<p>The Ten Point Plan, November (2020)</p>	<ul style="list-style-type: none"> • Sets out the vision for the UK to become a global leader in green technologies as well as delivering significant numbers of new jobs.
Marine Policy	
<p>UK Marine Policy Statement (2011)</p>	<ul style="list-style-type: none"> • Sets out high-level objectives for the marine space, including achieving a sustainable marine economy and identifies a wide range of relevant marine uses. • Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. • Requires for the use of the marine environment benefits society as a whole, contributing to resilient and cohesive communities that can adapt to coastal erosion and flood risk, as well as contributing to physical and mental wellbeing.
<p>Scotland's National Marine Plan (2015)</p> <ul style="list-style-type: none"> - GEN 1 – General Planning Principle - GEN 4 – Co-existence - Transport 2 	<ul style="list-style-type: none"> • GEN 1 supports sustainable developments which provide economic benefit to Scottish communities and social benefits. • GEN 4 emphasises the need for co-existence between development sectors and activities and requires cumulative impacts to be addressed. • Requirement for marine development not to be permitted where it will restrict access to, or future expansion of, major commercial ports or existing or proposed ports and harbours, for example Peterhead.
<p>Offshore Wind Policy Statement 2020</p>	<ul style="list-style-type: none"> • The Statement sets out ambitions for the future of offshore wind in Scotland and provides the context for Sectoral Marine Plan (as below). • The scale of economic opportunity is identified along with the associated requirements for the supply chain and provision of skills. • Specific reference is made to the large potential export market for floating wind technology.

Relevant Legislation and Policy	Relevance to the assessment
Sectoral Marine Plan – Offshore Wind Energy (2020)	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment. • Section 4.1 lists a range of potential negative impacts identified through plan-level SEA, HRA and SEIA which require further consideration through project level assessments, including: <ul style="list-style-type: none"> ▶ <i>“effects on marine and coastal recreation and access; and</i> ▶ <i>contribution to supporting a diverse and decarbonised energy sector”.</i>
Local Planning Policy	
Aberdeen City and Shire Strategic Development Plan 2020	<ul style="list-style-type: none"> • Provides a framework for development relevant to Aberdeen City. • Identifies four geographic Strategic Growth Areas and an ambition to a world-leading offshore technology base. • Identifies planned increase in harbour capacity through the development of Aberdeen South Harbour and the need for upgrades to energy networks in the Strategic Growth Areas.
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • C2: Renewable Energy • PR1: Protecting Important Resources • PR2 – Preserving and Protecting Important Development Sites <p>These focus on the importance of renewable energy deployment and safeguarding sites for specific uses.</p>

Technical guidance

- 7.3.5 Technical guidance that has been used to define the assessment is set out in **Table 7.3.2** below. It covers overarching national and international recommendations on topics to be included, detailed methodologies, and guidance related specifically to offshore wind farms.

Table 7.3.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
The Green Book (and supplementary guidance) (HM Treasury, 2018).	The advice in The Green Book provides a broad framework for how policies, programmes and projects in the UK should be appraised and evaluated to inform decision making. Published by UK Government's HM Treasury, it covers assessment guidelines for economic and social effects and advice on the scoping of costs and benefits, the selection of time periods for and the use of discount rates. It contains and references further supplementary guidance on specific socio-economic effects, such as health, crime and air quality.
The Additionality Guide (HCA, 2014).	Provides more specific guidance on how to assess impact of a policy intervention (or a private sector investment) on the local, regional and national economy. Additionality is the <i>"extent to which something happens as a result of an intervention that would have not occurred in the absence of intervention."</i>
Draft Advice on Net Economic Benefit and Planning (Scottish Government, 2016)	This summarises economic methodologies relevant to the application of planning legislation and policy in Scotland. The topics covered include study area and the specification of impacts as well as the need for a proportionate approach to the level of evidence.
The Department of Housing, Communities and Local Government (DCLG) Appraisal Guide (DCLG, 2016).	This is a guidance document provided by the Ministry of Levelling Up, Housing and Local Government (previously Department of Communities and Local Government and Department of Housing, Communities and Local Government) directed at Government economists in their assessment of economic appraisal of development proposals, including housing and other commercial development. Whilst not aimed at socio-economic assessment in EIA which does not involve cost benefit analysis calculations or assessing value for money, it contains relevant technical guidance for socio-economic impact assessment and links to data sources.
Defining 'Local Area' for assessing impact of offshore renewables and other marine developments (Marine Scotland, 2022).	This provides a structured approach to identifying impacts and their relevant spatial areas. The guidance is provided by Marine Scotland who refer to it as a contribution to the evidence base that they have been developing in support of Socio-Economic Impact Assessment Guidance for Offshore Renewable Energy ORE which is <i>"due to be published shortly"</i> (as of June 2022). It specifies how geographical scope should be interpreted and makes reference to the use of the concept of epicentres. Marine Scotland indicate that revisions are likely to be made when it is incorporated in the new guidance.
Methods of Environmental and Social Impact Assessment, Socio-economic impacts 1: economic impacts (Glasson, J., 2009).	This general reference for Environmental Impact Assessment is an established source of socio-economic guidance for practitioners.
Guidance on assessing the socio-economic impacts of offshore wind farms (Glasson, J., et al., 2020).	This guidance has been recently recommended by Marine Scotland (2022) and provides an effective source of best practice advice. It provides illustrative lists of potential impacts and an example of a wind farm with very similar characteristics to that of the Project. The approach to scoping used here follows the methodology and impacts identified in the example.

Guidance reference	Relevance to the assessment
International Association for Impact Assessment: Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects (IAIA, 2015).	The guidance provides a thorough source of detailed methodologies for conducting activities supporting social assessment particularly those for identifying and representing community issues and assessing methods of resolution.
The World Health Organization Health Impact Assessment guidance, tools and methods (WHO, 2021).	The guidance, tools and methods are recognised as the leading international authority on the completion of human health impact assessments. The guidance covers a number of topic areas that are linked to health impacts from projects, including transport, housing, water and sanitation.

Study area

- 7.3.6 The study area for the socio-economic assessment used for assessing impacts will be identified with reference to recently published guidance from Marine Scotland on definition of the 'Local Area' (Marine Scotland, 2022). This guidance provides a more detailed and specific approach to defining the study area where previous practice has been ad-hoc. It identifies six main principles:
- impacts should be identified prior to specifying assessment areas;
 - areas for supply chain and investment impacts and wider socio-economic impacts are inherently different;
 - impacts may radiate from multiple geographic locations ("*epicentres*");
 - pre-existing economic or political geographies should be used, to enhance accountability;
 - local areas should be chosen to be understandable to relevant communities; and
 - local areas should consist of connected pre-existing economic or political geographies.
- 7.3.7 In addition:
- impacts should be measured at as small a spatial extent area as possible; and
 - multiple epicentres may be required if project decisions are not yet made, or for reasons of commercial confidentiality.
- 7.3.8 Following the guidance, the consideration of the study area:
- uses, in the identification of epicentres, a list all of the political and economic organisations that represent that area; and
 - excludes the wider socio-economic impacts that are covered by the guidance, but do not form part of planning assessment.
- 7.3.9 The study area will be reviewed and amended in response to such matters as refinement of the Project, the identification of epicentres and in response to feedback from consultation.
- 7.3.10 The spatial area used as the basis for scoping is the Aberdeenshire Council area as it includes the onshore Project area defined by the Scoping Boundary and the population that is likely to experience many of the related offshore effects, such as through demand for labour.

Assessment methodology

Introduction

- 7.3.11 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. Whilst this has informed the approach that has been used in this socio-economics section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the socio-economics assessment.
- 7.3.12 There are no specific guidelines or requirements for socio-economic assessments set out in any statutory guidance regarding the preparation of an EIA. However, such assessments have an established practice of including a description of the direct socio-economic consequences of the effects on the environment as experienced by people and communities locally and, where appropriate, more widely. The method adopted is therefore one of determining the existing and future circumstances for these communities (the baseline) followed by the assessment of relevant topics and effects on individual receptors. The approach uses desk-based analysis, drawing on statistical information and professional judgment/opinion as well as relevant government advice and other guidance.

Identification of effects

- 7.3.13 The simplest specification of the topics covered by socio-economics are those affecting 'people', commonly supplemented by more specific characterisations of groups or organisations they belong to, such as 'workforce', or according to religious beliefs. In assessment, individuals and groups are termed receptors. An individual may appear under more than one receptor heading, for example, as a member of the workforce and as a local resident.
- 7.3.14 The identification of possible effects on these receptors follows the principles underpinning EIA, including the principle of scoping. The impacts resulting from the activities related to the Project are identified and described according to knowledge of how activities related to it will occur. Such knowledge is continuously evolving as the design and understanding of the Project advances. Socio-economic effects may also arise from specific changes to the environment and be assessed using evidence provided in support of assessment of other EIA topics.
- 7.3.15 The likely significant effects are presented in **Table 7.3.10** and comprise those that are currently understood to require assessment. The list is based on information currently available regarding the Project, review of previous impact assessments for similar developments and consideration of the range of potential socio-economic and health impacts that may occur.

Assessment of significance

- 7.3.16 The assessment of the significance of the effects is the primary concern and main output of the analysis. Significance is assessed including embedded environmental measures. Where the potential for a significant environmental effect remains, additional measures can be considered to avoid, enhance, reduce or compensate for this effect. The assessment will report on the anticipated effects of the Project following the implementation of all mitigation to determine the residual effects.
- 7.3.17 Criteria for significance will be developed alongside the estimates of effects to meet the requirements for assessment of the specific types of effects according to the characteristics of receptors, as well as meeting good practice for criteria (such as being easy-to-use).

Outcomes for assessments of significance will use the categories of 'Major', 'Moderate', 'Minor' or 'Negligible'. Effects can be either beneficial or adverse.

- 7.3.18 The significance of effects will be assessed through the evaluation of the combination of the magnitude of effects and sensitivity of receptors using the matrix defined in the generic project-wide approach.

Magnitude of change

- 7.3.19 The magnitude of change is a summary term used to describe the features of an effect which can be represented as varying over a range. Straightforward effects may be represented with quantitative indicators, such as employment relative to a national average, but other effects may need a semi-quantitative or qualitative approach to account for variation. A range with four levels to represent the magnitudes of effects (high, medium, low and very low) is used and covers features such as:

- a more general concept of scale or extent (for example, number of groups and/or people, households or businesses affected; spatial area affected);
- the duration and frequency of effects and whether they are permanent or time-limited (short, medium, long);
- the direction of change and its reversibility; and
- the probability of occurrence.

- 7.3.20 The assessment of the magnitude of change is based on a comparison with baseline conditions which show outcomes without the Project, and with comparators from similar developments or modelled scenarios.

Receptor sensitivity

- 7.3.21 The sensitivity of a receptor is a summary term that describes the ability of the receptor to withstand or absorb change within the period of time the impact is expected to occur and without a fundamental change to its character or attributes. Sensitivity to socio-economic and health effects has no single interpretation and can be seen as capturing the concept of a value that is potentially threatened or enhanced. A range with four levels of sensitivity (high, medium, low and very low) is used to describe receptors.

- 7.3.22 Sensitivity of receptors may depend on their current and future characteristics as well as the nature of the impact, reflecting aspects such as:

- capacity and availability of community resources;
- previous experience of socio-economic change;
- vulnerability from pre-existing social circumstances or health conditions;
- cultural values, including public interest, perceptions towards a risk or potential change, and acceptability;
- environmental vulnerability of habitats important to the socio-economic and health context (such as open space and public parks); and
- the direction, duration and reversibility of the specific impacts.

Determination of significance

- 7.3.23 The evaluation of significance will be based on a set of customised criteria which:

- are widely agreed, such as legal and physical thresholds including health and environmental standards;
- can be consistently and rationally applied and documented;
- meet public concerns (particularly over health and safety);
- reflect procedure and guidance; and
- reflect precedent experience.

7.3.24 Quantitative thresholds for criteria related to specific effects are referenced if relevant and available, supplemented by professional judgement that aims to reflect whether impacts threaten or enhance socio-economic conditions, health or quality of life and/or whether the general population would judge the impacts to be of concern or not. In this context the criteria identified in guidance will be used in considering the magnitude of effects, sensitivity of receptors and significance, particularly at individual locations.

7.3.25 The assessment of significance is based on a combination of the receptor sensitivity and the magnitude of change (**Table 7.3.3**) and the final summary of significance is to be presented in a table showing each effect and identifying whether it is beneficial or adverse together with the accompanying rationale.

Table 7.3.3 Significance assessment matrix

Receptor Sensitivity	Magnitude of Change			
	High		Medium	Low Very Low
High	Major (significant)	Major (significant)	Moderate (potentially significant)	Minor (not significant)
Medium	Major (significant)	Moderate (potentially significant)	Minor (not significant)	Minor (not significant)
Low	Moderate (potentially significant)	Minor (not significant)	Minor (not significant)	Negligible (not significant)
Very Low	Minor (not significant)	Not Significant	Negligible (not significant)	Negligible (not significant)

Baseline conditions

Data sources

7.3.26 **Table 7.3.4** sets out the main data sources used in this scoping assessment.

Table 7.3.4. Key sources of socio-economic data

Source	Date	Summary	Coverage of study area
Office of National Statistics	ongoing	This is the national statistical institute of the UK and publishes a range of socio-economic statistics on an ongoing basis.	Full coverage of the study area, at varying levels of disaggregation
National Records of Scotland	ongoing	This non-ministerial department of the Scottish Government publishes a range of socio-economic statistics on an ongoing basis.	Full coverage of the study area, at varying levels of disaggregation
Aberdeenshire Council	ad-hoc	The local authority provides some regular statistical information as well as ad-hoc specialist reporting.	Partial coverage of the study area, at varying levels of disaggregation
Visit Scotland	ongoing	This provides a summary of tourism statistics for the Grampian region, which includes Aberdeenshire.	Full coverage of the study area, at summary level

Current baseline

Demography

7.3.27 Aberdeenshire is the 6th largest, by size of population, of the 32 administrative areas of Scotland and has approximately 260,00 people making up 4.8% of the national total. While not used further for comparison in this assessment, Aberdeen City, the regional centre, is within a separately administrated district, with an additional 230,00 people. In Aberdeenshire, the proportion of population that is female (50.31%) is more similar to that of Great Britain than Scotland (See **Table 7.3.5** (ONS, 2022)).

Table 7.3.5 Population size in Aberdeenshire and comparators in 2020

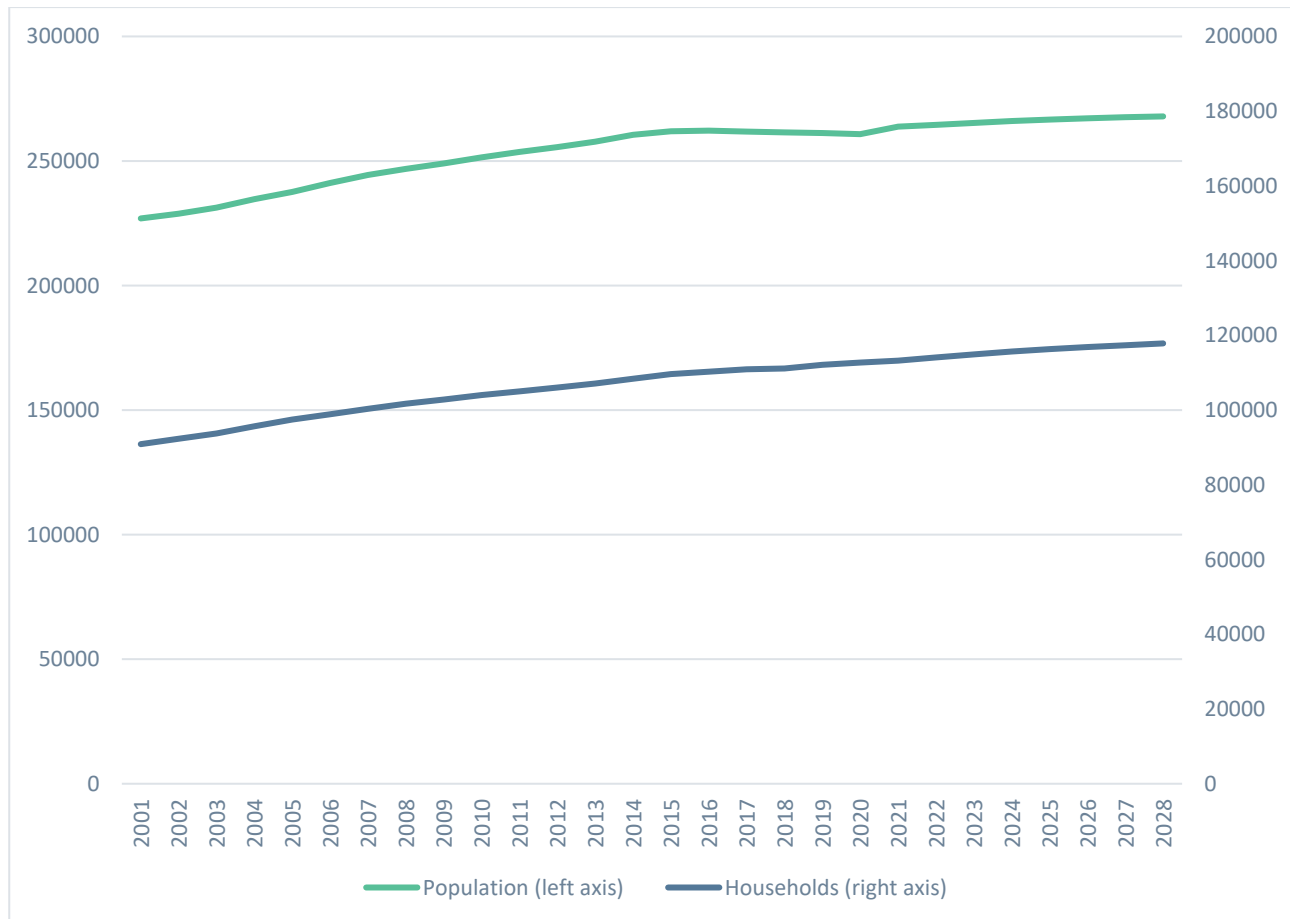
	Population		
	Aberdeenshire	Scotland	Great Britain
All People	260,800	5,466,000	65,185,700
Males	129,600	2,665,200	32,211,600
Females	131,200	2,800,800	32,974,200
% female	50.31%	51.24%	50.59%

7.3.28 Over the 20-year period from 2001 to 2020, the population in Aberdeenshire has grown by 15%, almost double the national rate of 8% for Scotland. However, the last five years have seen significant differences with an average annual growth rate in Aberdeenshire of -0.1% compared to +0.4% for Scotland (ONS, 2022).

7.3.29 Over the same period, the number of households in Aberdeenshire has increased by over 24%, greater than the increase in population and implying fewer occupants per household and a corresponding growth in housing demand. **Plate 7.3.1** shows the past trends

combined with government projections to 2028 (National Records of Scotland, 2022). For the period 2022 to 2028, the population is currently forecast to grow annually by 0.2% and the number of households by 0.6%.

Plate 7.3.1 Trends in population and numbers of households in Aberdeenshire from 2001 to 2028



Employment

7.3.30 There were 117,00 jobs in Aberdeenshire in 2020 which results in a jobs density (jobs per population aged 16-64) of 0.73, lower than the 0.8 for Scotland and the 0.84 for Great Britain (See **Table 7.3.6** ONS, 2022). Scotland as a whole has both Weekly and Hourly pay levels which are on average approximately 1.5% above Great Britain, reaching £622 in Scotland compared to £613 in Great Britain). In Aberdeenshire, pay levels are more diverse with Weekly pay levels 4% above, but Hourly pay less than 1% above, the level for Great Britain. Measures of unemployment are relatively low in Aberdeenshire. The claimant count in October 2022 was 1.8%, compared to 3.1% in Scotland and 3.6% in Great Britain.

Table 7.3.6 Recent labour market metrics for Aberdeenshire and comparators

		Aberdeenshire	Scotland	Great Britain
Jobs density (2020): jobs per population (1)	[ratio]	0.73	0.8	0.84
Full-Time Workers (2021) - Gross Weekly Pay	£/week	639.00	622.00	613.10
Full-Time Workers (2021) - Hourly Pay - Excluding Overtime	£/hour	15.77	15.93	15.65
Claimant Count (August 2022) (2)	%	1.8	3.1	3.6

Notes: (1) The density figures represent the ratio of total jobs to population aged 16-64; (2) Not seasonally adjusted

7.3.31 Of the 117,000 jobs across all ages reported in 2020, there are 96,250 employee jobs for ages 16-64 in Aberdeenshire in 2021, just over a third of the population (See **Table 7.3.7** (ONS, 2022). The greatest percentage of these (15%) are in Sector G: Wholesale and Retail trade and Repair of vehicles, a similar percentage to Scotland and Great Britain. The second largest sector in Aberdeenshire is C: Manufacturing which has 13.0% of employees, almost double the average for Scotland of 7.1%. The other sectors with noticeably higher employment in Aberdeenshire are: B: Mining and Quarrying which has 3.5% of the workforce compared to 1.0% in Scotland; M: Professional, Scientific And Technical Activities with 10.0% compared to Scotland's 6.5%; and F: Construction with 9.0% compared to Scotland's 6.1%.

7.3.32 In contrast, sectors which are less well represented in Aberdeenshire are: Q: Human Health And Social Work Activities, with 10.0% of the workforce compared to 15.9 in Scotland; J: Information And Communication with only 1.5% of the workforce compared to 3.1% in Scotland, K: Financial And Insurance Activities with only 0.6% of the workforce compared to 3.1% in Scotland; and the administrative sectors (N and O) which together have 8.5% in Aberdeenshire compared to 14.6% in Scotland.

Table 7.3.7 Employee jobs in Aberdeenshire in economic sectors 2021

Sector	Number		% of total (*)	
	Aberdeenshire	Aberdeenshire	Scotland	Great Britain
B: Mining And Quarrying	3,500	3.5	1.0	0.1
C: Manufacturing	13,000	13.0	7.1	7.6
D: Electricity, Gas, Steam and Air Conditioning Supply	600	0.6	0.7	0.4
E: Water Supply; Sewerage, Waste Management and Remediation Activities	800	0.8	0.8	0.7
F: Construction	9,000	9.0	6.1	4.9
G: Wholesale and Retail Trade; Repair of Motor Vehicles And Motorcycles	15,000	15.0	14.4	14.4
H: Transportation and Storage	4,000	4.0	4.2	5.1
I: Accommodation and Food Service Activities	6,000	6.0	7.6	7.5
J: Information and Communication	1,500	1.5	3.1	4.5
K: Financial and Insurance Activities	600	0.6	3.1	3.6
L: Real Estate Activities	1,000	1.0	1.5	1.8
M: Professional, Scientific and Technical Activities	10,000	10.0	6.5	8.9
N: Administrative and Support Service Activities	5,000	5.0	8.0	8.9
O: Public Administration and Defence; Compulsory Social Security	3,500	3.5	6.6	4.6
P: Education	9,000	9.0	8.7	8.8
Q: Human Health and Social Work Activities	10,000	10.0	15.9	13.7
R: Arts, Entertainment and Recreation	2,250	2.2	2.5	2.3
S: Other Service Activities	1,500	1.5	1.8	1.9
Total	96,250	96.2	99.6	99.7

Notes: (*) Totals in data sources do not add to 100% due to the approach taken to statistical uncertainty.

Education

7.3.33 The population between 16 and 64 in Aberdeenshire has an almost identical proportion (50%) of people with the highest level of qualification (National Vocational Qualification (NVQ) level 4 and above) as Scotland, which is significantly above the proportion in Great Britain (43.6%) (see **Table 7.3.8** (ONS, 2022)). Aberdeen also shows the smallest proportion of people in the lower categories (Other qualification and No qualifications). At all levels in between, Aberdeenshire exceeds the proportion for Scotland and England, except in the category NVQ3 and Above, where the proportion is slightly below Scotland, but still above Great Britain. The overall summary is that Aberdeenshire has a workforce educated significantly above national averages.

Table 7.3.8 Level of educational qualifications for the population between 16 and 64 in Aberdeenshire and comparators in 2021

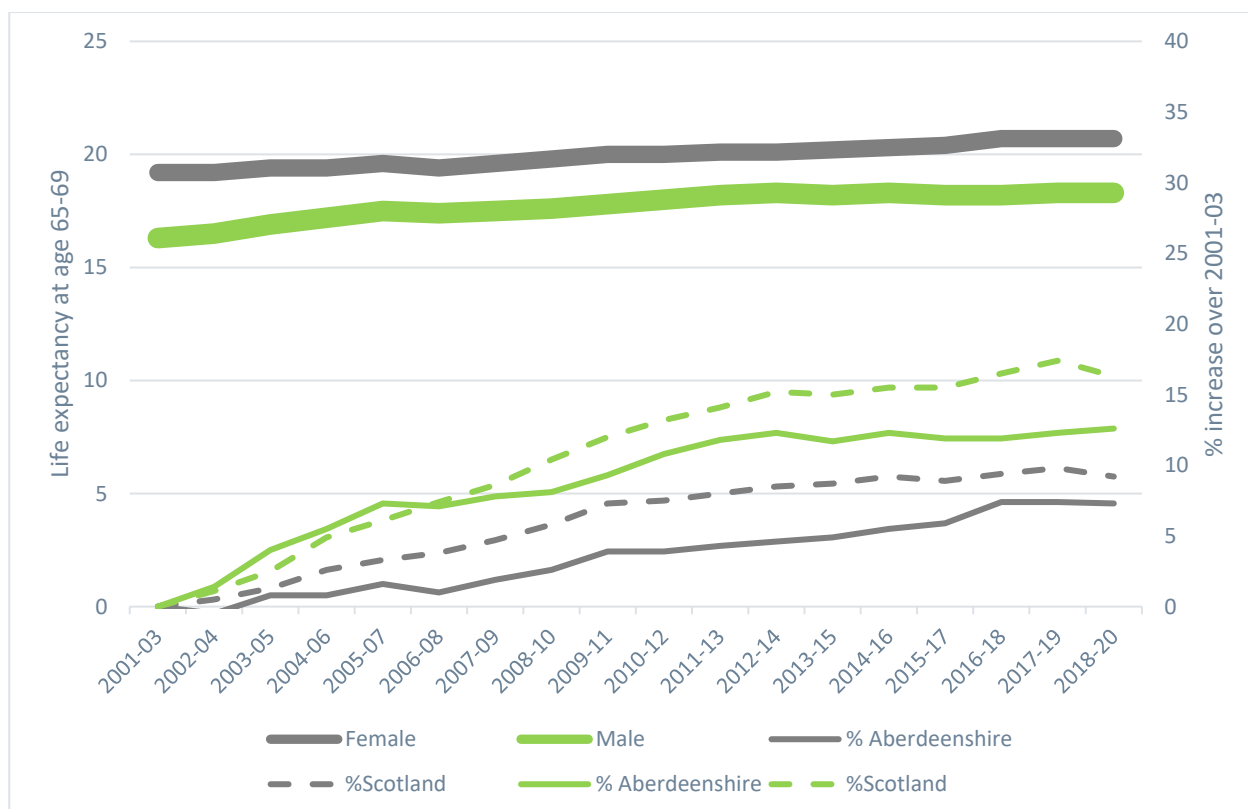
Level of qualification	Number		%	
	Aberdeenshire	Aberdeenshire	Scotland	Great Britain
NVQ4 and Above	82,200	49.7	50	43.6
NVQ3 and Above	103,800	62.7	64.8	61.5
NVQ2 and Above	137,700	83.2	79.6	78.1
NVQ1 and Above	149,000	90.1	86.4	87.5
Other Qualifications	5,600	3.4	5.8	5.9
No Qualifications	10,800	6.5	7.8	6.6

Notes: For period January 2021 to December 2021

Health

7.3.34 Life expectancy provides a general indicator of overall health. Life expectancy for people aged 65 to 69 has increased since 2001 in Aberdeenshire (National Records of Scotland, 2022). **Plate 7.3.2** shows life expectancy, plotted against the left-hand axis as the thick lines in grey for women and in green for men. Over the period from 2001-03 to 2018-20, life expectancy has risen by about 1.5 years for women and 2 years for men. The thinner lines in the same colours show the increase as a percentage, with Aberdeenshire as a solid line compared with the greater increase achieved in Scotland, shown as a dotted line.

Plate 7.3.2 Life expectancy at age 65 to 69 in Aberdeenshire (2001-03 to 2018-20)



Health service provision

7.3.35 The level of primary care provision is an indicator of access to health services and the number of patients per general practitioner (GP) a commonly used metric. The average number of patients per GP in Scotland is 1,127 (Public Health Scotland, 2021), while in Aberdeenshire it is 1,191, 6% higher, and making it 10th on the list of 32 Scottish administrative areas.¹²

Housing market

7.3.36 Aberdeenshire Council recently published research on the local housing market which shows a generally stable picture over the period since 2014 (See **Plate 7.3.3**) (Aberdeenshire Council, 2021). The average house price in April-June 2021 was £217,449, above the average in Scotland of £191,583 though the difference, of approximately £25,900, has closed since 2015 when it was £70,500.

¹² Reference is to 2020 reporting by local authority before the change to reporting by Health Boards.

Plate 7.3.3 House price trends in Aberdeenshire 2014 - 2022



Tourism

7.3.37 Tourism is a key sector in Scotland's economy. In 2019, the Grampian region, which includes Aberdeenshire saw 230,000 overnight visits by international visitors and 1,093,000 visits from domestic (GB) visitors, associated with spending of £114m, and £203m respectively. Compared to 2018, international visits were down by 25% and domestic visits down by 4%. Total day tourism in 2019 was 14,603,000 visits, down by 5% compared to 2018 levels. The region has seen significant change recently with demand from domestic (Scottish) visitors replacing both international visitors and visitors from England and Wales. This is reflected as a shift to day tourism and fewer overnight visits with a fall in overall expenditure at the sector level (Visit Scotland, 2020).

Future baseline

7.3.38 The relatively low levels of change in population size over the past five years, together with corresponding low levels of growth forecast for the period to 2028, indicate stability in the underlying socio-economic circumstances. Expected employment levels are likely to have been developed to reflect commercial commitments in the energy sector which extend over a number of years and may have reflected a similar stability in their underlying outlook, particularly in established sectors.

7.3.39 However, the effects of the significant growth in the offshore wind sector, which is now anticipated to be above levels previously expected (as a result of the major awards in the recent Scotwind leasing round as well as the newer Innovation and Targeted Oil and Gas leasing process (INTOG)), may not have been included in government forecasts and there is also limited information in the public domain regarding the plans of offshore wind farm developers. Furthermore, the significant changes in global energy prices have the potential to affect incentives for oil and gas companies with North Sea interests which draw from the labour market in Aberdeen and Aberdeenshire. As a result, the expectations at the current time for labour markets and the supply chain are particularly uncertain.

7.3.40 Little information is available currently to represent these factors of the baseline, but further information if become available from government will be used in production of the EIA Report.

Basis for scoping assessment

7.3.41 The socio-economic scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: Project Description**:

- the overall duration of construction is anticipated to be up to eight years. A shorter period is expected for construction of the onshore infrastructure; in the range of two to three years (falling within the overall duration as above);
- underground cables will be used to connect from the landfall transition joint bays to the Project onshore substation(s). An additional section of the onshore export cable route will run from the onshore substation site(s) to the grid connection point. The temporary onshore export cable construction corridor width will have a width of up to 150m; and
- an offshore accommodation platform may be required.

7.3.42 Furthermore, the assessment takes account of the following:

- demand by the workforce for accommodation and services leading to potential knock-on (indirect and induced) impacts and increased monetary flows in the local economy;
- the workforce and other associated impacts may be spread over different epicentres and be significant according to the characteristics of particular locations, such as ports, construction corridors, or assembly areas when these are determined;
- offshore wind experience to date is primarily based on fixed installations and so does not reflect the use of the floating technology which shall be used for the Project, which may therefore require different assumptions for the fabrication supply chain and for the duration of construction;
- the Project will require use of a supply chain that is likely to come under pressure from demand from other offshore wind developments and from established oil and gas operations;
- the Project design will progress and become more refined over time, leading to the possibility of more detailed analysis;
- for reasons resulting from the previous assumptions, the approach adopted is to scope-in possible impacts, noting that there is appreciable potential for mitigation to be designed in at the detailed level; and
- the impacts during decommissioning are expected to be of a similar type as during construction, but of a lesser magnitude and are scoped in.

7.3.1 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 7.3.10**.

7.3.2 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated documents.

Embedded environmental measures

7.3.43 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on socio-economics (see **Table 7.3.9**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

- 7.3.44 There is a commitment to implementing environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 7.3.9 Relevant socio-economic embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be implemented
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase.</p> <p>The CEMP will be the securing mechanism for many measures.</p>	Planning conditions, s.36 conditions, marine licence conditions and CEMP.

Likely significant effects

Approach to scoping

- 7.3.45 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017, the pathway is scoped out from the assessment.
- 7.3.46 The likely significant effects on socio-economics are summarised in **Table 7.3.10**. The scoping assessment is based on a combination of the Project definition at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for socio-economics effects, and professional judgement.
- 7.3.47 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Initial assessment

- 7.3.48 The overall scale and duration of the investment indicates that a range of types of impacts may occur and have significant effects. The approach taken in this scoping assessment is to include the majority of types of impacts which are identified in general guidance and are illustrated by offshore wind farm precedents elsewhere. More detailed assessment in the EIA Report will provide evidence of the level of impacts and the extent to which they can be avoided or mitigated in each of the construction, operation and maintenance, and decommissioning phases.

Table 7.3.10 Likely significant socio-economic effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Project demand for labour	N/A	Likely adverse significant effect – Project requirements for labour raises demand locally (through direct, indirect and induced effects) above current levels of supply and may increase wage rates because of limited labour capacity in local markets. It may encourage migration into the area.	Scoped in – Desk-based study with expert consultation advice.	Employment markets	Disaggregated labour market statistics.
Supply of labour to meet project demand	N/A	Likely beneficial significant effect – Project demand for labour provides opportunities for people seeking employment (though currently relatively few people are out of work).	Scoped in – Desk-based study with expert consultation advice.	Potential workers	Labour availability in local markets.
Project demand for products and services	N/A	Likely adverse significant effect – Project requirements for materials equipment and service raises demand above current levels of supply and may reach limits with potential mitigation as some supply chains extend more widely (e.g. nationally) and demand for local services can be resolved through programme design.	Scoped in – Desk-based study with expert consultation advice.	Materials, equipment and services markets	Supply chain capacity in relevant markets.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Supply of products and services	N/A	Likely beneficial significant effect – Increased demand for materials, equipment and services provides opportunities for suppliers.	Scoped in – Desk-based study with expert consultation advice.	Potential private sector suppliers, including local business	Supplier availability
Use of land and marine areas	N/A	Likely adverse significant effect – Future development uses of land and marine areas may be influenced by Project infrastructure with potential mitigation as spatial constraints can be resolved through programme design.	Scoped in – Desk-based study with expert consultation advice.	Landowners and developers; local authorities with statutory responsibility for planning	Potential future uses of land
Project expenditure increasing economic activity (GVA) within the local and wider economies	N/A	Likely beneficial significant effect – Economic activity and investment will be increased by Project expenditure, leading to increases in Gross Value Added (GVA) at the sectoral, regional and national levels from direct, indirect and induced effects.	Scoped in – Desk-based study with expert consultation advice.	The economy	Disaggregated economic information
Increase in population	N/A	Likely adverse significant effect – Temporary and potentially permanent change in population size leading to change in demand for public and private services, including accommodation and education, health and commercial services (including tourism);	Scoped in – Desk-based study with expert consultation advice.	Individuals and communities living and working in the area of the Project	Local information on community infrastructure and services

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Disruption to community access to recreational, tourism and other amenity resources	M-063	Likely adverse significant effect – There may be effects in hotspots, depending on onshore export cable route choice, potentially mitigated by the low population density on average which will reduce the risk of and minimise impacts and facilitate the provision of substitutes as well as impacts being likely to be temporary.	Scoped in – Desk-based study with expert consultation advice.	Businesses in the area of the Project	Local information on community facilities and resources
Disruption to commercial activities	M-063	Likely adverse significant effect – Disruption to business operations such as to tourism or fishing may occur at hotspots, potentially mitigated where activities are offshore and/or away from centres of commercial activity as well as in locations onshore where infrastructure development is relatively small scale, temporary and localised. Effects on fishing and navigation are assessed in Section 5.9: Commercial fisheries and Section 5.10: Shipping and navigation .	Scoped in – Desk-based study with expert consultation advice.	Businesses in the area of the Project	Local information on commercial activities
Project transport and access requirements	M-063	Likely adverse significant effect – Changes in travel times, alternative routes and change in access to some locations, temporarily and potentially permanently, potentially mitigated as	Scoped in – Desk-based study with expert consultation advice.	Individuals and communities travelling and accessing land and	Localised traffic and transport estimates

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		disruption is likely to be limited in time and residual effects may be resolved through programme design. Effects on traffic and transport are assessed in Section 6.8: Traffic and transport .		amenities within the area of the Project	
Activities affecting specific natural assets with socio-economic importance	M-063	Likely adverse significant effect – Change in the perceived nature and quality of tourism assets may occur at specific locations such as landfall(s); potentially mitigated where activities are offshore and/or away from key assets as well as in locations onshore where infrastructure development is relatively small scale, temporary and localised. Effects on fishing and navigation are assessed in Section 5.9: Commercial fisheries and Section 5.10: Shipping and navigation .	Scoped in – Desk-based study with expert consultation advice	Visitors to the area of the Project	Natural assets with local socio-economic importance
Socio-cultural and distributional effects	M-063	Potential effects on local society arising from the characteristics of new workforces and the distribution of project impacts between groups in society.	Scoped out – See rationale in section below paragraph 7.3.50 .	Local communities.	Not required.

Impacts scoped out of assessment

- 7.3.49 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned work and the professional judgement on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice.
- 7.3.50 The concentration of impacts within specific groups or communities is not expected to occur due to the largely offshore location of the Project when constructed and the temporary nature of the onshore works. Socio-cultural and distributional effects are therefore scoped out as reported in **Table 7.3.10** above.
- 7.3.51 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed.

Cumulative effects

- 7.3.52 Cumulative socio-economics effects resulting from the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the cumulative effects assessment screening exercise.
- 7.3.53 The impacts from the Project which have the potential to act cumulatively with impacts from other developments include the majority of those identified in **Table 7.3.10** depending on implementation plans and will be considered in the EIA Report using the latest information available at the time.

Transboundary effects

- 7.3.54 The potential effects from construction, operation and maintenance, and decommissioning on socio-economics receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. An extended supply chain for labour, services, equipment or materials may lead to transboundary socio-economic impacts outside the UK. However, the level of purchases arising from the Project is considered small compared to the size of the well-developed international markets in which they take place and the assessment of effects is proposed to be scoped out.

Proposed approach to the EIA Report

- 7.3.55 The socio-economics aspect of the EIA report will reflect the detailed description of the Project and follow the best practice approach referred to above. It will draw on the latest datasets that are available and be conducted at an appropriate geographic scale.
- 7.3.56 Consultation will be held with relevant organisations. This will include consultation with relevant socio-economic, tourism and recreation stakeholders from within the study area (such as Aberdeenshire Council), relevant sector bodies, key recreational and interest groups and local communities as part of the Pre-application Consultation process, which is set out in **Chapter 4: Approach to Scoping and EIA**.
- 7.3.57 Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects, as appropriate.

7.4 Military and civil aviation and telecommunications

Introduction

- 7.4.1 The military and civil aviation and telecommunications assessment will consider the potential likely significant effects on military and civil aviation and telecommunications that may arise from the construction, operation and maintenance, and decommissioning of the onshore and offshore Project elements. This Section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions within the Scoping Boundary (as defined in **Chapter 1: Introduction**), the datasets to be used to inform the EIA, the potential likely significant effects to be considered, and how these likely significant effects will be assessed for the purpose of the EIA.
- 7.4.2 This topic interfaces with other aspects and as such, should be consider alongside these; namely:
- **Section 5.13: Infrastructure and other marine users** (which considers Military Practice and Exercise Areas (PEXA), marine renewables and utilities).

Legislative and policy context

- 7.4.3 This Section identifies the relevant legislation and policy context which has informed the scope of the military and civil aviation and telecommunications assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislative and Policy Context** which provides an overview of the relevant legislative and policy context for the Project. **Chapter 3** is supported by **Appendix 3A: Planning Policy Framework** which provides a detailed summary of individual national, marine and local planning policies of relevance to this EIA. **Chapter 3** and **Appendix 3A** should be read in conjunction with this Section.
- 7.4.4 In order to provide a robust evidence base, **Table 7.4.1** below presents a summary of legislation and policies relevant for the civil and military aviation and telecommunications assessment or which this Section takes account of specific requirements to assess and address likely impacts on receptors and relevant environmental issues.. This table does not quote the policies in full but rather states the relevance to this Section.

Table 7.4.1 Relevant legislation and policy

Relevant Legislation and Policy	Relevance to the assessment
	Legislation
Civil Aviation Act 1982, the Rules of the Air Regulations 2015 and the Air Navigation Order 2016	<ul style="list-style-type: none">• The Civil Aviation Act 1982 currently governs air flight in the UK and defines the powers of the UK Civil Aviation Authority• The Air navigation Order 2016 forms the legal foundation for almost all areas of civil aviation that are still regulated at national level.• The Rules of the Air Regulations 2015 are the provision of the code of regulations governing matters of air traffic such as requirements for collision avoidance and requirements relating to visual flight and instrument flight rules.

Relevant Legislation and Policy	Relevance to the assessment
National Policy	
Approved National Planning Framework 4 (NPF4) 2023	<p>A full review of the relevance of the Approved NPF4 2023 for this EIA is provided in Appendix 3A – Planning Policy Framework. Revised draft policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> • Policy 1: Tackling the Climate and Nature Crises. • Policy 11: Energy (criterion e, sub-criteria iv and v)
National Planning Framework 3 (NPF3) (2014)	<ul style="list-style-type: none"> • Identifies Peterhead as a focus for important projects for carbon capture storage, North Sea interconnectors and offshore renewable energy development. • Notes the need for major infrastructure investment to unlock the growth of Scotland’s marine renewable energy sector.
Scottish Planning Policy (2014) - Paragraph 169	<ul style="list-style-type: none"> • Discusses how proposals for energy infrastructure development should take account of spatial frameworks for wind farms and heat maps where relevant. Consideration will vary relative to the scale but are likely to include: <ul style="list-style-type: none"> ▸ net economic impacts; ▸ scale of contribution to renewable energy generation; ▸ effect on greenhouse gas emissions; ▸ cumulative impacts; ▸ impacts on communities and individual dwellings; ▸ landscape and visual; ▸ natural heritage; ▸ carbon rich soils impacts; ▸ impacts on historic environment; ▸ impacts on road traffic; and ▸ effects on hydrology.
Marine Policy	
UK Marine Policy Statement (2011)	<ul style="list-style-type: none"> • Requires use of the marine environment and its resources to maximise sustainable activity, prosperity and opportunities for all. Also emphasises the importance of safety.
Scotland’s National Marine Plan (2015): - GEN 1 General Planning Principle - GEN 4 Coexistence	<ul style="list-style-type: none"> • GEN 1 supports sustainable developments which provide economic benefit to Scottish communities and social benefits. • GEN 4 emphasises the need for co-existence between development sectors and activities and requires cumulative impacts to be addressed.
Sectoral Marine Plan – Offshore Wind Energy (2020)	<ul style="list-style-type: none"> • Confirms Plan Options for ScotWind leasing (including NE7) and provides a spatial strategy for offshore wind development. • Highlights the need for this strategy to minimise the potential adverse effect on other marine users, economic sectors and the environment.

Relevant Legislation and Policy	Relevance to the assessment
	<ul style="list-style-type: none"> Section 4.1 lists a range of potential negative impacts identified through plan-level SEA, HRA and SEIA which require further consideration through project level assessments, including: <ul style="list-style-type: none"> “Issues relating to navigational safety, aviation and collision risk”.
Local Planning Policy	
Aberdeenshire Local Development Plan (LDP) 2023	<p>As detailed in Appendix 3A: Planning Policy Framework, modified proposed policies of relevance to this area of technical assessment are:</p> <ul style="list-style-type: none"> C2 – Renewable Energy <p>Identifies aviation safeguarding as a relevant consideration in the determination of consenting applications for renewable energy infrastructure proposals.</p>

Technical guidance

7.4.5 Technical guidance that has been used to define the assessment is set out in **Table 7.4.2**.

Table 7.4.2 Relevant technical guidance

Guidance reference	Relevance to the assessment
CAP393 Air Navigation: The Order and the Regulations (CAA, 2021)	States the Rules of the Air regarding civil aviation in the UK.
CAP 670 – Air Traffic Safety Requirements (CAA, 2019)	Outlines the regulatory framework and requirements for safety.
CAP 764 CAA Policy and Guidance on Wind Turbines (CAA, 2016)	Outlines Civil Aviation Authority (CAA) policy and guidance with respect to wind turbines and impacts on aviation receptors, and how these should be considered by stakeholders, developers and competent authorities when assessing projects.
CAP 774 The UK Flight Information Services (CAA, 2015)	The UK Flight Information Services are a suite of air traffic services that are provided in class G airspace. When notified, elements of these services can also be provided in other airspace classifications. The document is applicable to both civil and military pilots and providers of air traffic services in class G airspace.
MAA: MAA Regulatory Publication 3000 Series: Air Traffic Management Regulations (MMA, 2014a)	Regulatory framework for military personnel and military air traffic control.

Guidance reference	Relevance to the assessment
MAA: Manual of Military Air Traffic Management (MAA, 2014b)	Outlines the regulations for military air traffic control and emergency procedures for military designated airspace.
UK Aeronautical Information Publication (AIP) (AIP, 2022)	Provides information on civilian aerodromes and aviation procedures within UK airspace.
UK MIL AIP (AIP, 2022)	Provides information on military aerodromes in the UK and guidance to military aircrew on in-flight navigation procedures.
Marine Guidance Note (MGN) 543: Offshore Renewable Energy Installations – Guidance on UK Navigational Practice, Safety and Emergency Response Issues (MCA, 2018)	Provides guidance on assessing impacts on navigational safety and emergency response from offshore windfarms (and other technologies) in the UK (in addition to the Territorial Sea and EEZ).

Study area

- 7.4.6 The study area for the military and civil aviation and interference assessment will be defined in relation to the maximum operating ranges of any applicable radar systems relevant in the area including civil, military and national air traffic services. This will be identified and agreed in consultation with stakeholders.
- 7.4.7 The study area for the telecommunications assessment is the area that will be directly impacted by the offshore infrastructure (including export cable, wind turbine generators (WTGs) and platforms). **Figure 1.1: Scoping Boundary in Appendix 1A** identifies the study area.
- 7.4.8 The study areas will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

Consultation

- 7.4.9 This assessment will be informed by engagement and discussion with various stakeholders such as the Ministry of Defence (MOD), CAA and National Air Traffic Services (NATS) (En Route) (NERL) in addition to helicopter operations and telecommunication bodies. **Table 7.4.3** provides a summary of consultation to date, along with a response to identify how the matter is dealt with in this report.

Table 7.4.3 Consultation

Consultee	Comments and considerations	How this is accounted for
National Air Traffic Services (NATS)	Impact on NATS radar A mitigation will have to be identified to mitigate the impact on the NATS radar. There has been some initial discussion with NATS on this.	Ongoing work through the Offshore Wind Industry Council (OWIC) may have identified a strategic solution but there remains an option for a bespoke deployment for the Project.
Ministry of Defence (MOD)	Impact on Air Defence radar The MOD Air Defence radar will require mitigation. The technical solution for this has not yet been identified.	The Applicant is actively involved with the OWIC Industry Group working with MOD on identifying and procuring a solution for the Air Defence radar network which will ultimately benefit the Project.

Assessment methodology

- 7.4.10 The Project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to Scoping and EIA**. This will be implemented to assess the likely significant effects on military and civil aviation and telecommunications receptors from the construction, operation and maintenance, and decommissioning of the Project.
- 7.4.11 The specific legislation and guidance outlined in **Table 7.4.1** will also be considered in relation to the assessment, in addition to consultation with the stakeholders outlined above.

Baseline conditions

Data sources

- 7.4.12 An initial desk-based review has been undertaken of publicly available data sources Table 7.4.4 in order to determine the baseline character of the study area and inform the assessment process.

Table 7.4.4 Key sources of aviation data

Source	Date	Summary	Coverage of study area
Online GIS data sources¹³	Accessed 2022	Locations of the NERL and military radar sites, plus danger areas. Locations of tele - communications.	Study areas to be defined
CAA	Accessed 2022	Locations of UK certificated aerodromes.	Study areas to be defined
NATS	2018	Routes for helicopter main routes (HMRs)	Study areas to be defined
Kingfisher Regional Charts	Accessed 2022	Locations of telecommunications cables	Full coverage within Scoping Boundary
UK MiL AIP (AIP 2019)	2019	Location of managed danger areas.	Study areas to be defined

Current baseline

- 7.4.13 The above desk-based review has identified the following military and civil aviation and telecommunications receptors:

Civil aviation

- 7.4.14 The Project is within the Scottish Flight Information Region (FIR) for air traffic control, the air space regulated by the UK CAA. The airspace above the Project is uncontrolled Class G airspace.
- 7.4.15 NERL provides en-route civil air traffic services within the Scottish FIR. There are two NERL primary surveillance radars in NE Scotland, Perwinnes near Aberdeen Airport and Allanshill on the north coast. These are shown on **Figure 7.4.2: Existing offshore and coastal infrastructure within the study area** in **Appendix 1A** as being physically outside of the Scoping Boundary.
- 7.4.16 The offshore infrastructure of the Project is generally northeast of both radars and at its closest point to the OAA (southwest corner), is 91km from Allanshill and 121km from Perwinnes.
- 7.4.17 The Project is outside any safeguarding areas for civil airports and aerodromes as detailed in CAP764.

Helicopter operations

- 7.4.18 A number of helicopter main routes (HMRs) occur over the OAA. These may be associated with the oil and gas platforms and / or other offshore assets.
- 7.4.19 The AIP in ENR1.6 states:
- “4.5.2.3.1 Helicopter Main Routes are routes typically and routinely flown by helicopters operating to and from off-shore destinations and are promulgated for the purpose of signposting concentrations of helicopter traffic to other airspace users. HMR promulgation*

¹³ Such as Canmore.org, Geohack, Google maps, Kis-orca.org, geograph.org.uk

does not predicate the flow of helicopter traffic. Whilst HMRs have no airspace status and assume the background airspace classification within which they lie (in the case of the Northern North Sea, Class G), they are used by the air navigation service provider (NATS Ltd/ Aberdeen) and helicopter operators for flight planning and management purposes.

4.5.2.3.2 HMRs have no lateral dimensions. Vertically the HMRs over the Northern North Sea (55°N to 62°N) extend from 1500 FT AMSL to FL 85 (inclusive),

4.5.2.3.3 Compliance with the HMR structure is not compulsory.”

- 7.4.20 Although these routes are not compulsory and are in uncontrolled airspace, due to the high volume of helicopter traffic in the area there will need to be consultation with CAA, NERL and the helicopter operators.

Military aviation – air defence radar

- 7.4.21 The nearest military air defence radar is located at Buchan which is approximately 86.5km SW of the OAA (as shown on **Figure 7.4.2** in **Appendix 1A**).
- 7.4.22 No other military radars have been identified as being potentially impacted by the MarramWind Offshore Wind Farm site.

Military aviation – MOD ATC radar

- 7.4.23 No MOD air traffic control (ATC) radars are active or in use within the study area.

Military aviation – MOD operations / danger areas

- 7.4.24 The Project lies beneath MOD Air-to Air refuelling area 4, which extends from 7,000ft – 24,000ft above mean sea level (amsl) (FL70 to FL240).
- 7.4.25 Danger Area D809 is located to the west of the Scoping Boundary, as shown on **Figure 7.4.2** in **Appendix 1A**
- 7.4.26 Danger Area D712D is located just outside but above the Scoping Boundary, within the airspace between 24,500ft – 66,000ft amsl, as shown on **Figure 7.4.2** in **Appendix 1A**.

Oil and gas infrastructure

- 7.4.27 Two oil and gas platforms are located in the Scoping Boundary (Buzzard and Golden Eagle), with a third (Goldeneye) located just outside the northern eastern extent of the offshore Scoping Boundary but within the buffer zone applied for the Scoping study area. These are shown on **Figure 7.4.1: Civil and military aviation receptors** in **Appendix 1A**

Telecommunications

- 7.4.28 There are no telecommunications cables within the offshore Scoping Boundary, as shown on **Figure 7.4.2** in **Appendix 1A**.

Future baseline

- 7.4.29 Additional offshore wind projects associated with Scotwind and INTOG will be assessed within the cumulative assessment where these may also be within the same radar line of sight (RLOS).

- 7.4.30 It is not anticipated that there will be any material future baseline assessment required in relation to military and civil aviation or telecommunication receptors. However this will be confirmed during ongoing liaison and consultation with stakeholders.

Basis for scoping assessment

- 7.4.31 The military and civil aviation and telecommunications scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: Project Description**.
- 7.4.32 Preliminary analysis undertaken for the Project indicates that based on the maximum height parameters of the WTGs and offshore platforms (as outlined in **Chapter 2: Project Description**) that it is likely that the offshore WTG array will be within the RLOS of the following radars:
- civil aviation - Perwinnes and Allanshill radars; and
 - military aviation – Buchan radar.
- 7.4.33 Based on the maximum height parameters of the WTGs and offshore platforms, it is unlikely that the Project will have any impact on MOD low flying activities.
- 7.4.34 The source-pathway-receptor linkage between Project infrastructure and / or activities and the receptor groups for this aspect are described in **Table 7.4.5** to **Table 7.4.6**.
- 7.4.35 The Approved NPF4 2023 introduces new requirements, which will be taken account of in the EIA and associated consenting documents.

Embedded environmental measures

- 7.4.36 As part of the Project design process, a number of embedded measures are proposed to reduce the potential for impacts on military and civil aviation and telecommunications (see **Table 7.4.5**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 7.4.37 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.
- 7.4.38 In addition to the specific measures identified in **Table 7.4.5**, consultation will be undertaken with all relevant consultees such as the MOD, CAA, NERL and helicopter operators will be required to address any concerns or issues.

Table 7.4.5 Relevant aviation embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
M-042	Development of Emergency Response and Cooperation Plan (ERCOP).	s.36 conditions and marine licences conditions.
M-047	Appropriate marking of the Project on Admiralty and aeronautical charts. All offshore infrastructure structures (WTGs, platforms and other structures) of more than 91.4m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre (DGC). This is to update the UK's database of tall structures (Digital Vertical Obstruction File) and will be submitted at least ten weeks prior to construction. This will include provision of the positions and heights of structures to the UKHO, Civil Aviation Authority, Ministry of Defence and Defence Geographic Centre.	s.36 conditions and marine licences conditions.
M-063	<p>A Construction Environmental Management Plan (CEMP) to be implemented by the contractor. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. A CEMP will identify the project management structure roles and responsibilities with regard to managing and reporting on the environmental impact of the construction phase.</p> <p>The CEMP will be the securing mechanism for many measures.</p>	Planning conditions, s.36 conditions, marine licences conditions and CEMP.
M-100	A Lighting Management Plan (LMP) will be agreed and implemented in consultation with the CAA, MCA and MOD. This will contain specific requirements in terms of military and civil aviation lighting to be installed on WTGs incorporating the requirements of CAP393 and other relevant legislation and guidance.	s.36 conditions and marine licences conditions.
M-101	Any temporary obstacles associated with offshore infrastructure (such as WTGs and platforms) which are of more than 91.4 m in height (e.g. construction infrastructure such as cranes and/or meteorological masts) are to be identified to military and civil aviation aircrews by notifying the Notice to Airmen (NOTAM) system.	s.36 conditions and marine licences conditions.
M-106	The development of and adherence to a decommissioning programme.	Required under Sections 105 and 114 (Energy Act 2004) and marine licences consent conditions.
M-116	CAA will be notified of the confirmed locations, heights and lighting status of the WTGs and platforms within the offshore infrastructure, including estimated and actual dates of construction, the maximum heights of any construction equipment to be used. This will be undertaken at least two months prior to the start of construction.	s.36 conditions and marine licences conditions.

Likely significant effects

- 7.4.39 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.
- 7.4.40 The likely significant effects on military and civil aviation and telecommunications are summarised in **Table 7.4.6**. The scoping assessment is based on a combination of the Project definition of MarramWind Offshore Wind Farm at the Scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for military and civil aviation and telecommunications effects further consultation with consultees, and professional judgement. The approach to this assessment is set out in **Chapter 4: Approach to Scoping and EIA**.
- 7.4.41 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 7.4.6 Likely significant military and civil aviation and telecommunications effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Impacts on civil radar and creation of an aviation obstacle during construction and decommissioning	M-047, M-063, M-100, M-101, M-106	Likely Significant Effect. Increased collision risk and interference due to presence of high structures such as cranes and partial offshore structures	Scoped in.	Civil Aviation, helicopter operators, military air defence radar	Further consultation with CAA, NERL and MOD.
Impacts on military aviation and creation of an aviation obstacle during construction and decommissioning	M-047, M-063, M-100, M-101, M-106	No Significant Effect. Due to the height of the airspace for MOD Danger Areas and the absence of any MOD ATC radar.	Scoped out – see rationale in section below paragraph 7.4.44.	MOD ATC Radar, MOD Operations / Danger Area	n/a
Impacts on civil radar and creation of an aviation obstacle such as WTGs during operation	M-047, M-042, M-116	Likely Significant Effect. Increased collision risk and interference due to presence of permanent offshore infrastructure	Scoped in	Civil Aviation, helicopter operators, military air defence radar	Further consultation with CAA, NERL and MOD.
Impacts on military activities and creation of an aviation obstacle such as WTGs during operation	M-047, M-042, M-116	No Significant Effect. Due to the height of the airspace for MOD Danger Areas and the absence of any MOD ATC radar	Scoped out – see rationale in section below paragraph 7.4.45.	MOD ATC Radar, MOD Operations / Danger Area	n/a
Impacts on telecommunications and power cables during construction, operation and maintenance, and decommissioning	M-047	No Significant Effect. Due to absence of any telecommunication or power cables within the study area.	Scoped out – see rationale in section below paragraph 7.4.46.	Telecommunications and power cables	n/a

Impacts scoped out of assessment

- 7.4.42 Potential effects on MOD ATC radar and MOD Operations / Danger Areas have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment and the nature of planned works on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. Each scoped out effect is considered in turn below.
- 7.4.43 Potential effects on **MOD ATC radar** are scoped out due to the absence of any RLOS from any application radar facilities within the study area.
- 7.4.44 Potential effects on **MOD Operations / Danger Areas** are scoped out due to the distance (both vertical upwards and horizontally) and between the maximum height parameters of the WTGs and platforms and the named receptors in **paragraphs 7.4.24 to 7.4.26**. In addition, WTG rotors will be static and so as there should be no interference with radar systems (specifically in terms of data display), there is therefore no impact pathway during construction.
- 7.4.45 Potential effects on **military and civil aviation from the construction, operation and maintenance, and decommissioning of the onshore infrastructure** are also scoped out of the assessment (from landfall(s) to point of grid connection) given that the onshore export cable is buried underground and therefore would have no potential effects. In addition, the likelihood of potential effects to military and civil aviation from the point of connection to the grid is also considered to be negligible, with any high structures during construction and decommissioning (such as cranes) would have embedded measures implemented (such as aviation lighting should the height require this).
- 7.4.46 Potential effects on **telecommunications and power cables** are also scoped out as none are present within the study area.

Cumulative effects

- 7.4.47 Cumulative effects on military and civil aviation resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA** and considering the other developments that have been screened in as part of the CEA screening exercise.
- 7.4.48 The following impacts from Project have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:
- increased creation of an aviation obstacle environment to military and civil aviation; and
 - increased interference to radar and telecommunications on shared receptors.
- 7.4.49 Cumulative effects on telecommunications receptors is scoped out.

Transboundary effects

- 7.4.50 The potential effects from construction, operation and maintenance, and decommissioning on civil and military aviation and telecommunications receptors are considered in **Appendix 4A: Transboundary Screening Matrix**. Due to the localised nature of potential impacts, transboundary impacts are considered unlikely to occur and therefore it is proposed that military and civil aviation and telecommunications is considered scoped out from further consideration within the EIA with regard to transboundary effects.

Proposed approach to the EIA Report

- 7.4.51 Further desk-based studies and analysis will be undertaken to identify and assess military and civil aviation receptors. This study will be supplemented with consultation with the relevant statutory and non-statutory organisations as necessary.
- 7.4.52 As part of the assessment process, a preliminary technical report will be prepared and submitted to NERL and the MOD to facilitate further technical discussions on the potential impacts and likely additional mitigation strategies which may be required. For example, this may extend to mitigation strategies for NERL and MoD radar infrastructure and airspace usage as a result of the construction, operation and maintenance, and decommissioning of the Project.
- 7.4.53 Likely significant effects will be assessed and described as per the guidance in **Table 7.4.6** and the assessment will also include consideration of potential significant cumulative effects as appropriate, as set out in **Chapter 4: Approach to Scoping and EIA**.

7.5 Whole-project references

Aberdeenshire Council, (2020). *Aberdeenshire Proposed Local Development Plan*. [online] Available at: <http://publications.aberdeenshire.gov.uk/dataset/f14a62da-30d1-488d-9338-7b09e82360cf/resource/82d8dd37-c834-44c0-809d-d495e3873cdb/download/proposed-local-development-plan-2020---introduction-and-policies.pdf> [Accessed: 25 August 2021].

Aberdeenshire Council, (2021). *Aberdeenshire's Housing market*. [Online] Available at: <https://www.aberdeenshire.gov.uk/council-and-democracy/statistics/housing-market/> [Accessed: 20 September 2022].

Aberdeenshire Council, (2022). *Finalised Modified Aberdeenshire Local Development Plan*. [online] Available at: <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/pldp-2020/> [Accessed 06 January 2023].

Aberdeenshire Council, (2023). *Aberdeenshire Local Development Plan 2023* [online] Available at: <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/ldp-2023/> [Accessed 24 January 2023].

Betts, R.A. and Brown, K., (2021). *Introduction*. In: *The Third UK Climate Change Risk Assessment Technical Report*. [online] Available at: <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/Technical-Report-The-Third-Climate-Change-Risk-Assessment.pdf> [Accessed: 25 August 2021].

British Standards Institution (BSI), (2016). *PAS 2080: 2016 – Carbon management in infrastructure*. [online] Available at: https://gat04-live-1517c8a4486c41609369c68f30c8-aa81074.divio-media.org/filer_public/96/0c/960c6791-c2f4-4add-b791-84a42a884da6/8210.pdf [Accessed:19 August 2022].

British Standards Institution (BSI), (2019a). *BS EN ISO 14064-1: 2019 Greenhouse gases. Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. [online] <https://www.iso.org/standard/66453.html> [Accessed:19 August 2022].

British Standards Institution (BSI), (2019b). *BS EN ISO 14064-1: 2019 Greenhouse gases. Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements*. [online] Available at: <https://www.iso.org/obp/ui/#iso:std:iso:14064:-2:ed-2:v1:en> [Accessed 19: August 2022].

Circular Ecology, (2020). *Inventory of Carbon and Energy (ICE) Database V3.0 Beta*. [online] Available at: <https://circularecology.com/embodied-carbon-footprint-database.html> [Accessed 18 August 2022].

Civil Aviation Act 1982 (c.16). [online] Available at: <https://www.legislation.gov.uk/ukpga/1982/16/contents> [Accessed: 25 August 2021].

Civil Aviation Authority (CAA), (2015). *CAP 774 The UK Flight Information Services*. [online] Available at: https://publicapps.caa.co.uk/docs/33/CAP%20774Issue2_3.pdf [Accessed: 23 November 2022].

Civil Aviation Authority (CAA), (2016). *CAP 764: Policy and Guidance on Wind Turbines*. [online] Available at: <https://publicapps.caa.co.uk/docs/33/CAP764%20Issue6%20FINAL%20Feb.pdf> [Accessed: 23 November 2022].

Civil Aviation Authority (CAA), (2019). *CAP 670 – Air Traffic Safety Requirements*. [online] Available at: [https://publicapps.caa.co.uk/docs/33/CAP670%20Issue3%20Am%201%202019\(p\).pdf](https://publicapps.caa.co.uk/docs/33/CAP670%20Issue3%20Am%201%202019(p).pdf) [Accessed: 23 November 2022].

Civil Aviation Authority (CAA), (2021). *CAP393 Air Navigation: Regulations made under powers in the Civil Aviation Act 1982 and the Air Navigation Order 2016*. [online] Available at: <https://publicapps.caa.co.uk/docs/33/CAP393%20Regulations%20made%20under%20powers%20in%20the%20Civil%20Aviation%20Act%201982%20and%20the%20Air%20Navigation%20Order%202016.pdf> [Accessed: 23 November 2022].

Civil Aviation Authority (CAA), (2022). *Sitelink*. [online] Available at: <https://www.caa.co.uk/> [Accessed: 23 November 2022].

Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. (asp.15). [online] Available at: <https://www.legislation.gov.uk/asp/2019/15/enacted> [Accessed: 1 July 2022].

Climate Change (Scotland) Act 2009. (asp 15). [online] Available at: <https://www.legislation.gov.uk/asp/2009/12/contents> [Accessed: 21 September 2022].

Climate Change Act 2008. (c.27). [online] Available at: <https://www.legislation.gov.uk/ukpga/2008/27/contents> [Accessed: 25 August 2021].

Climate Change Committee (CCC), (2019). *Net Zero – The UK's contribution to stopping global warming*. [online]. Available at: <https://www.theccc.org.uk/publication/sixth-carbon-budget/> [Accessed: 19 August 2022].

Climate Change Committee (CCC), (2020). *Sixth Carbon Budget Report Sector Summaries – Electricity Generation*. [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf> [Accessed 19 August 2022].

Climate Change Committee (CCC), (2021). *Progress in reducing emissions in Scotland 2021 Report to Parliament*. [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2021/12/Progress-reducing-emissions-in-Scotland-2021-Report-to-Parliament-1.pdf> [Accessed: 19 August 2022].

Department for Business Energy and Industrial Strategy (BEIS), (2017). *Clean Growth Strategy*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf [Accessed 19 August 2022].

Department for Business Energy and Industrial Strategy (BEIS), (2019). *Contracts for difference scheme for renewable electricity generation – Allocation Round 3: Allocation Framework*. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/799074/Allocation_Round_3_Allocation_Framework_2019.pdf [Accessed: 19 August 2022].

Department for Business Energy and Industrial Strategy (BEIS), (2020a). *The UK's Nationally Determined Contribution under the Paris Agreement*. [online] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1109429/uk-nationally-determined-contribution.pdf [Accessed 19 August 2022].

Department for Business Energy and Industrial Strategy (BEIS), (2020b). *The Ten Point Plan for a Green Industrial Revolution*. [online] Available at: <https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution> [Accessed: 19 August 2022].

Department for Business Energy and Industrial Strategy (BEIS), (2021a). *Net Zero Strategy: Build Back Greener*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf [Accessed 19 August 2022].

Department for Business Energy and Industrial Strategy (BEIS), (2021b). *Greenhouse gas reporting: conversion factors 2021*. [online] Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021> [Accessed 19 August 2022].

Department for Business Energy and Industrial Strategy (BEIS), (2021c). *Draft Overarching National Policy Statement for Energy (EN-1)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf [Accessed 19 August 2022].

Department for Business Energy and Industrial Strategy (BEIS), (2021d). *Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf [Accessed: 20 September 2022].

Department for Communities and Local Government (DCLG), (2016). *The DCLG Appraisal Guide*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/576427/161129_Appraisal_Guidance.pdf [Accessed: December 2021].

Department for Environment, Food and Rural Affairs (DEFRA), (2011). *UK Marine Policy Statement*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf [Accessed: 8 July 2022].

Department for Environment Food and Rural Affairs (DEFRA), (2018). *A Green Future: Our 25 Year Plan to Improve the Environment*. [online] Available at: <https://www.gov.uk/government/publications/25-year-environment-plan> [Accessed: 25 August 2021].

Department for Environment Food and Rural Affairs (DEFRA), (2021). *Emissions Factors Toolkit v11*. [online] Available at: <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/> [Accessed 19 August 2022].

Department for Environment, Food and Rural Affairs (DEFRA), (2022). *UK Climate Change Risk Assessment 2022*. [online] Available at: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022> [Accessed: 25 August 2021].

Department for Transport (DfT), (2021). *TSGB0430 (RFS0105): Goods lifted and moved by commodity and length of haul*. [online] Available at: <https://www.gov.uk/government/statistical-data-sets/tsgb04-freight> [Accessed 19 August 2022].

Department of Energy and Climate Change (DECC), (2011a). *Overarching National Policy Statement for Energy (EN-1)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Accessed: 25 August 2021].

Department of Energy and Climate Change (DECC), (2011b). *Overarching National Policy Statement for Renewable Energy Infrastructure (EN-3)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf [Accessed: 25 August 2021].

Department of Energy and Climate Change (DECC), (2011c). *National Policy Statement for Electricity Networks Infrastructure (EN-5)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47858/1942-national-policy-statement-electricity-networks.pdf (Accessed: 20 September 2022).

Department of Energy and Climate Change (DECC), (2017). *The Future of energy in Scotland: Scottish Energy Strategy*. [online] Available at: <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> [Accessed: 19 August 2022].

Department of Energy and Climate Change (DECC), (2018). *Climate Change Plan: third report on proposals and policies 2018-2032 (RPP3)*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/corporate-report/2018/02/scottish-governments-climate-change-plan-third-report-proposals-policies-2018/documents/00532096-pdf/00532096-pdf/govscot%3Adocument/00532096.pdf> [Accessed: 25 August 2021].

Environment Agency, (2016). *Carbon planning tool*. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/571707/LIT_7067.pdf [Accessed: 26 August 2022].

European Commission, (2021). *Commission Notice – Technical guidance on the climate proofing of infrastructure in the period 2021 – 2017*. [online] Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021XC0916\(03\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021XC0916(03)&from=EN) [Accessed: 25 August 2021].

Glasson, J., (2009). *Methods of Environmental and Social Impact Assessment 4th Edition*. Oxfordshire: Routledge.

Glasson, J., Durning, B., Tokunbo O., and Welch, K., (2020). *Guidance on assessing the socio-economic impacts of offshore wind farms*. [online] Available at: <https://group.vattenfall.com/uk/contentassets/c66251dd969a437c878b5fec736c32aa/best-practice-guidance---final-oct-2020.pdf> (Accessed: 20 September 2022).

Her Majesty's (HM) Treasury and Government Finance Function, (2018). *The Green Book: appraisal and evaluation in central government*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938046/The_Green_Book_2020.pdf [Accessed: 20 September 2022].

Homes and Communities Agency (HCA), (2014). *Additionality Guide Fourth Edition*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/378177/additionality_guide_2014_full.pdf [Accessed: 20 September 2022].

Institute of Environmental Management and Assessment (IEMA), (2010). *IEMA Principles Series: Climate Change Mitigation and EIA*. [online] Available at: <https://www.iema.net/download-document/33006> [Accessed: 19 August 2022].

Institute of Environmental Management and Assessment (IEMA), (2020). *EIA Guide to: Climate Change Resilience and Adaptation*. [online] Available at: <https://www.iema.net/resources/reading->

[room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020](#) [Accessed: 25 August 2021].

Institute of Environmental Management and Assessment (IEMA), (2022). *Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance*. [online] Available at: <https://www.iema.net/preview-document/assessing-greenhouse-gas-emissions-and-evaluating-their-significance> [Accessed: 19 August 2022].

Intergovernmental Panel on Climate Change (IPCC), (2021). *The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. [online] Available at: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf [Accessed 19 August 2022].

Intergovernmental Panel on Climate Change (IPCC), (2022). *Climate Change 2022: Mitigation of Climate Change*. [online] Available at: https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf [Accessed 19 August 2022].

International Association for Impact Assessment (IAIA), (2015). *Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects*. [online] Available at: https://www.iaia.org/uploads/pdf/SIA_Guidance_Document_IAIA.pdf [Accessed: 20 September 2022].

International Organization for Standardization (ISO), (2021). *ISO 14091:2021 Adaptation to climate change — Guidelines on vulnerability, impacts and risk assessment*. [online] Available at: <https://www.iso.org/obp/ui/#iso:std:iso:14091:ed-1:v1:en> [Accessed: 25 August 2021].

International Union for the Conservation of Nature (IUCN), (2016). *Environmental and Social Management System: Social Impact Assessment (SIA)*. [Online] Available at: https://www.iucn.org/sites/dev/files/iucn_esms_sia_guidance_note.pdf [Accessed: 20 September 2022].

Jaroszweski, D., Wood, R., and Chapman, L., (2021). *Infrastructure In: The Third UK Climate Change Risk Assessment Technical Report*. [online] Available at: <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/Technical-Report-The-Third-Climate-Change-Risk-Assessment.pdf> [Accessed: 25 August 2021].

Kingfisher Regional Charts, (2020). *Subsea Cables and Renewable Energy Structures*. [online] Available at: https://kis-orca.org/wp-content/uploads/2020/12/Kingfisher-Regional-Charts_NSC_2022.pdf [Accessed: 23 November 2022].

Marine Scotland, (2022). *Defining 'Local Area' for assessing impact of offshore renewables and other marine developments, Guidance principles*. [online] Available at: <https://www.gov.scot/publications/defining-local-area-assessing-impact-offshore-renewables-marine-developments-guidance-principles/> [Accessed: 20 September 2022].

Maritime and Coastguard Agency (MCA), (2021). *MGN 654 (M+F) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/980898/MGN_654_-_FINAL.pdf [Accessed: 23 November 2022].

Met Office, (2016). *Eastern Scotland: Climate*. [online] Available at: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk->

[past-events/regional-climates/eastern-scotland_-climate---met-office.pdf](#) [Accessed: 25 August 2021].

Met Office, (2018a). *UKCP18 Science Overview Report (Updated March 2019)*. [online] Available at: <https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Overview-report.pdf> [Accessed: 25 August 2021].

Met Office, (2018b). *UKCP18 Land Projections: Science Report (Updated March 2019)*. [online]. Available at: <https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Land-report.pdf> [Accessed: 25 August 2021].

2018 Met Office, (2018c). *UKCP18 Marine report*. [online] Available at: <https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Marine-report.pdf> [Accessed: 21 September 2022].

Met Office, (2018d). *UKCP18 Factsheet: Precipitation*. [online] Available at: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-factsheet-precipitation.pdf> [Accessed: 25 August 2021].

Met Office, (2018e). *UKCP18 Factsheet: Wind*. [online] Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-wind_march21.pdf [Accessed: 25 August 2021].

Met Office, (2018f). *UKCP18 Factsheet: Snow*. [online] Available from: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18_factsheet_snow_jul-2021.pdf [Accessed: 25 August 2021].

Met Office, (2018g). *UK Climate Projections User Interface*. [online] Available at: <https://ukclimateprojections-ui.metoffice.gov.uk/ui/home> [Accessed: 25 August 2021].

Met Office, (2021a). *UK Climate Projections: Headline Findings*. [online] Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18_headline_findings_v3.pdf [Accessed: 25 August 2021].

Met Office, (2021b). *UKCP18 UK Climate Projections Data*. [online] Available at: <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/download-data> [Accessed: 25 August 2021].

Met Office, (2022). *UK Climate Averages: Fraserburgh*. [online] Available at: <https://www.metoffice.gov.uk/weather/forecast/gfq84qg2b#?date=2022-11-21> [Accessed: 25 August 2021].

Military Aviation Authority (MAA), (2014a). *Air Traffic Management (ATM) 3000 series: air traffic management regulations*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1108208/atm3000seriesprint_2022_09_30.pdf [Accessed: 23 November 2022].

Military Aviation Authority (MAA), (2014b). *Manual of Military Air Traffic Management (MMATM)*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835083/MMATM_Issue_12.pdf [Accessed: 23 November 2022].

National Records of Scotland, (2022). *Life Expectancy for Administrative Areas within Scotland*. [Online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by->

[theme/life-expectancy/life-expectancy-in-scotland/2018-2020/data-table](#) [Accessed: 12 September 2022].

National Air Travel Services (NATS), (2022). Sitelink. [online] Available at: <https://www.nats.aero/> [Accessed: 23 November 2022].

Office of National Statistics (ONS), (2022a). Sitelink. [Online] Available at: <https://www.ons.gov.uk/> [Accessed: 25 August 2021].

Office of National Statistics (ONS), (2022b). *Labour Market Profile – Aberdeenshire*. [Online] Available at: <https://www.nomisweb.co.uk/reports/lmp/la/1946157405/report.aspx?town=Aberdeen> [Accessed: 25 August 2021].

Office of National Statistics (ONS), (2022c). *Annual population survey*. [Online] Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/annualpopulationsurveyapsqmi> [Accessed: 25 August 2021].

Public Health Scotland, (2021). *Table 3: Number of GPs at Local Authority level by designation and sex 2010 - 2020 and Table 5: Practice list sizes by Local Authority and age group 2010 - 2020*. [Online] Available at: <https://beta.isdscotland.org/find-publications-and-data/health-services/primary-care/general-practice-gp-workforce-and-practice-list-sizes/> [Accessed: 21 September 2022].

Renewables UK, (2021). *Statistics Explained*. [online]. Available at: <https://www.renewableuk.com/page/UKWEDEExplained> [Accessed: 19 August 2022].

Royal Institute of Chartered Surveyors (RICS), (2012). *Methodology to calculate embodied carbon*. [online] Available at: https://www.igbc.ie/wp-content/uploads/2015/02/RICS-Methodology_embodied_carbon_materials_final-1st-edition.pdf [Accessed 19 August 2022].

Royal Institute of Chartered Surveyors (RICS), (2017). *Whole life carbon assessment for the built environment*. [online]. Available at: <https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf> [Accessed 19 August 2022].

Scottish Environment Protection Agency (SEPA), (2022). *Climate Change allowances for flood risk assessment in land use planning*. Version 2. [online] Available at: <https://www.sepa.org.uk/media/594168/climate-change-guidance.pdf> [Accessed: 25 August 2021].

Scottish Government, (2013). *Climate Ready Scotland: Scottish Climate Change Adaptation Programme*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/consultation-paper/2013/06/scottish-climate-change-adaptation-programme-programme/documents/00426516-pdf/00426516-pdf/govscot%3Adocument/00426516.pdf> [Accessed: 25 August 2021].

Scottish Government, (2014a). *National Planning Framework 3*. [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2014/06/national-planning-framework-3/documents/00453683-pdf/00453683-pdf/govscot%3Adocument/00453683.pdf> [Accessed: 25 August 2021].

Scottish Government, (2014b). *Scottish Planning Policy*. [online]. Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/factsheet/2021/05/transport-scotland-core-documents/documents/policy/scottish-planning-policy-spp/scottish-planning-policy-spp/govscot%3Adocument/scottish-planning-policy.pdf> [Accessed: 25 August 2021].

Scottish Government, (2015). *Scotland's National Marine Plan A Single Framework for Managing Our Seas*. [online] Available at:

<https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2015/03/scotlands-national-marine-plan/documents/00475466-pdf/00475466-pdf/govscot%3Adocument/00475466.pdf> [Accessed: 25 August 2021].

Scottish Government, (2016). *Draft Advice on Net Economic Benefit and Planning*. [online]

Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2016/03/draft-advice-on-net-economic-benefit-and-planning/documents/draft-advice-net-economic-benefit-planning-pdf/draft-advice-net-economic-benefit-planning-pdf/govscot%3Adocument/Draft%2BAdvice%2Bon%2BNet%2BEconomic%2BBenefit%2Band%2BPlanning.pdf> [Accessed: 12 September 2022].

Scottish Government, (2020a). *The Environment Strategy for Scotland: vision and outcomes*. [online] Available at:

<https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2020/02/environment-strategy-scotland-vision-outcomes/documents/environment-strategy-scotland-vision-outcomes/environment-strategy-scotland-vision-outcomes/govscot%3Adocument/environment-strategy-scotland-vision-outcomes.pdf> [Accessed: 25 August 2021].

Scottish Government, (2020b). *Sectoral marine plan for offshore wind energy*. [online] Available at:

<https://www.gov.scot/publications/sectoral-marine-plan-offshore-wind-energy/documents/> [Accessed: 12 September 2022].

Scottish Government, (2021). *A Fairer, Greener Scotland Programme for Government 2021-2022*.

[online] Available at: <https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/documents/> [Accessed: 24 June 2022].

Scottish Government, (2022b). *A Stronger and More Resilient Scotland*. [online] Available at:

<https://www.gov.scot/publications/stronger-more-resilient-scotland-programme-government-2022-23/> [Accessed: 21 September 2022].

Scottish Government, (2022c). *Reducing greenhouse gas emissions: Annual targets*. [online]

Available at <https://www.gov.scot/policies/climate-change/reducing-emissions/> [Accessed: 1 July 2022].

The Air Navigation Order 2016. (SI 2016 765). [online]. Available at:

<https://www.legislation.gov.uk/ukxi/2016/765/contents/made> [Accessed: 19 August 2022].

The Carbon Budget Order 2009. (SI 2011 1259). [online]. Available at:

<https://www.legislation.gov.uk/ukxi/2009/1259/contents/made> [Accessed: 19 August 2022].

The Carbon Budget Order 2011. (SI 2011 1603). [online]. Available at:

<https://www.legislation.gov.uk/ukxi/2011/1603/contents/made> [Accessed: 19 August 2022].

The Carbon Budget Order 2016. (SI 2016 785). [online]. Available at:

<https://www.legislation.gov.uk/ukxi/2016/785/contents/made> [Accessed: 19 August 2022].

The Carbon Budget Order 2021. (Draft SI). [online]. Available at:

<https://www.legislation.gov.uk/ukxi/2021/750/contents/made> [Accessed: 19 August 2022].

The Climate Change Act 2008 (2050 Target Amendment). (SI 2018 1056). [online]. Available at:

<https://www.legislation.gov.uk/ukxi/2019/1056/contents/made> [Accessed 19 August 2022].

The Rules of the Air Regulations 2015. (SI 2015 840). [online]. Available at: https://www.legislation.gov.uk/uksi/2015/840/pdfs/uksi_20150840_en.pdf [Accessed:19 August 2022].

The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. (SI 2017 102). [online] Available at: <https://www.legislation.gov.uk/ssi/2017/102/contents/made> [Accessed: 23 June 2022].

UK Aeronautical Information Publication (AIP), (2022). *Sitelink*. [online] Available at: <https://nats-uk.ead-it.com/cms-nats/opencms/en/Publications/AIP/> [Accessed: 23 November 2022].

UK Finance Export, (2021). *Climate Change Strategy 2021-2024*. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1019141/UKEF_Climate_Change_Strategy_2021.pdf [Accessed 19 August 2022].

UK Military Aeronautical Information Publication (AIP), (2019). *UK Managed Danger Areas (MDAs)*. [online] Available at: <https://www.aidu.mod.uk/aip/pdf/enr/ENR-6-2.pdf> [Accessed: 29 November 2022].

UK Military Aeronautical Information Publication (AIP), (2022). *UK MiL AIP Sitelink*. [online] Available at: <https://www.aidu.mod.uk/aip/> [Accessed: 23 November 2022].

United Nations Framework Convention of Biodiversity (COP15), (2022). *UN Biodiversity Conference (COP 15)*. [online]. Available at: <https://www.unep.org/events/conference/un-biodiversity-conference-cop-15> [Accessed: 21 September 2022].

United Nations Framework Convention on Climate Change (UNFCCC), (1992). *United Nations Framework Convention on Climate Change*. [online] Available at: <https://unfccc.int/resource/docs/convkp/conveng.pdf> [Accessed 15 August 2022].

United Nations Framework Convention on Climate Change (UNFCCC), (1997). *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. [online] Available at: <https://unfccc.int/resource/docs/convkp/kpeng.pdf> [Accessed 19 August 2022].

United Nations Framework Convention of Climate Change (UNFCCC), (2015). *Paris Agreement*. [online] Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf [Accessed: 21 September 2022].

United Nations Framework Convention of Climate Change (UNFCCC), (2021). *Glasgow Climate Pact*. [online]. Available at: https://unfccc.int/sites/default/files/resource/cop26_auv_2f_cover_decision.pdf [Accessed: 21 September 2022].

Visit Scotland, (2019). *Insight Department: Grampian Factsheet* [Online] Available at: <https://www.visitscotland.org/binaries/content/assets/dot-org/pdf/research-papers-2/regional-factsheets/grampian-factsheet-2019.pdf> [Accessed 19 August 2022].

World Health Organisation, (2021). *Health impact assessment (HIA) tools and methods*. [online] Available at: <https://www.who.int/tools/health-impact-assessments> [Accessed: 19 August 2022].

World Resources Institute and World Business Council for Sustainable Development, (2015). *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)* [online] Available at: <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf> [Accessed 19 August 2022].

8. Summary and Next Steps

8.1 Introduction

- 8.1.1 The information included in this Scoping Report is provided to support the Applicant's request for Scoping Opinions from Aberdeenshire Council and MS-LOT.
- 8.1.2 The main aspects of the offshore and onshore environment likely to be significantly affected by the construction, operation and decommissioning of the Project have been identified. For each of the identified aspects, the Scoping Report has identified the extent of relevant environmental studies to be undertaken as part of an EIA. The EIA Report will outline the full EIA process and will be submitted alongside applications for: Marine licences under the Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010; consent under the Electricity Act 1989, Section 36 for the offshore infrastructure and planning permission made in accordance with Town and Country Planning (Scotland) Act 1997 for the onshore infrastructure.

8.2 Scope of the assessment

- 8.2.1 Likely significant effects of the Project have been identified according to each EIA aspect. For some of these, further data collection and an assessment will be required in order to determine the significance of the effects. These have been scoped-in and an appropriate level of assessment proposed.
- 8.2.2 For other potential effects it is proposed that they be scoped out of the EIA (i.e. no further data collection or assessment is proposed). These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the available evidence on the potential for impact from such projects more widely. **Table 8.2.1** below provides a summary confirmation of the aspects and matters that are proposed to be scoped out of the EIA.
- 8.2.3 Cumulative effects resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: Approach to Scoping and EIA Approach to Scoping and EIA**. In this Scoping Report, for each aspect, potential impacts of the Project that may contribute to cumulative effects on resources and receptors are set out in **Chapter 5: Environmental Aspects Offshore** **Chapter 6: Environmental Aspects Onshore** ; and **Chapter 7: Environmental Aspects Whole Project**.
- 8.2.4 **Appendix 4A** presents a **Transboundary Screening Matrix** for the Project.

Table 8.2.1 Summary of activities and impacts to be scoped out of the EIA

Aspect	Phase	Activities and impacts scoped out
Environmental Aspects Offshore		
Marine geology, oceanography and physical processes	-	None at this stage
Marine water and sediment quality	Construction, Operation and Maintenance, and Decommissioning	Accidental pollution events. Sewage disposal from accommodation platform(s), most likely to sea via a treatment plant.
Underwater noise and vibration	-	None at this stage
Electromagnetic fields (EMF)	Operation	Onshore EMF exposure in the terrestrial environment from cables and onshore substation.
Benthic, epibenthic and intertidal ecology	Construction, Operation and Maintenance, and Decommissioning	Accidental pollution events.
Marine mammals	Construction	Increased above-water noise during installation. Disturbance of habitat from sea floor attachments, e.g. anchors. Chemical pollution.

Aspect	Phase	Activities and impacts scoped out
	Operation and Maintenance	Disturbance of habitat from sea floor attachments, e.g. anchors. Chemical pollution.
	Decommissioning	Increased above-water noise during decommissioning. Chemical pollution.
Offshore and intertidal ornithology	Construction	Accidental pollution during construction (including indirect effects).
	Operation and Maintenance	Operational disturbance and displacement (offshore export cable). Barrier effects.
Fish and shellfish ecology	Construction, Operation and Maintenance, and Decommissioning	Accidental pollution impacts during the resulting in potential effects on fish and shellfish receptors. Collision or entanglement risk.
Commercial fisheries	-	None at this stage.
Shipping and navigation	-	None at this stage.
Marine archaeology and cultural heritage	Construction	Change of setting of terrestrial heritage assets arising from visibility of offshore infrastructure during construction.
	Operation and Maintenance	Change of setting of terrestrial heritage assets arising from visibility of offshore infrastructure during operation.
	Decommissioning	Disturbance to marine heritage assets arising from the decommissioning of the Project.

Aspect	Phase	Activities and impacts scoped out
Seascape, landscape and visual	Construction, Operation and Maintenance, and Decommissioning	<p>Change to seascape / landscape character within the 50km SLVIA study area by the offshore elements located within the Option Agreement Area (OAA).</p> <p>Visibility of the offshore elements located within the OAA to people on the night ferry (Aberdeen to Lerwick).</p> <p>Visual effects on seascape / landscape character within the 50km SLVIA study area by activities associated with the offshore export cables.</p>
	Construction	<p>Temporary obstruction to other renewable energy projects.</p> <p>Temporary obstruction of military and defence activities.</p> <p>Temporary obstruction of oil and gas infrastructure.</p> <p>Disturbance of UXO within identified areas or discovery of unexpected UXO.</p>
	Operation and Maintenance	<p>Obstruction to other renewable energy projects.</p> <p>Temporary obstruction of military and defence activities.</p> <p>Obstruction of oil and gas infrastructure.</p> <p>Disturbance of UXO within identified areas or discovery of unexpected UXO.</p>
Infrastructure and other marine users	Decommissioning	<p>Temporary obstruction to other renewable energy projects.</p> <p>Temporary obstruction of military and defence activities.</p> <p>Temporary obstruction of oil and gas infrastructure.</p> <p>Disturbance of UXO within identified areas or discovery of unexpected UXO.</p>

Aspect	Phase	Activities and impacts scoped out
Environmental Aspects Onshore		
Ground conditions and contamination	Construction	Health effects on groundworkers due to land contamination.
	Operation and Maintenance	Disturbance to / damage to soil or agricultural land, during operation and maintenance of the onshore export cables and grid connection cables. Health effects on groundworkers due to land contamination. Accidental release of contaminants to ground e.g., leaks from oil containing equipment in substation(s), leaks from vehicles or equipment used for day-to-day activities.
	Decommissioning	Health effects on groundworkers due to land contamination.
Air quality	Construction	Emissions of odour from construction. Emissions of air pollutants from construction equipment on site.
	Operation and Maintenance	Emissions of odour during operational phase. Emissions of air pollutants during operational phase. Emissions of dust during operational phase.
	Decommissioning	Emissions of dust from decommissioning. Emissions of air pollutants from decommissioning equipment on site. Emissions of air pollutants from decommissioning traffic on roads. Emissions of odour from decommissioning.
Water resources and flood risk	Construction	Landfall(s) - cable and associated earthworks resulting in potential impacts on groundwater levels / quality.
	Operation and Maintenance	Operation and maintenance activities resulting in a potential impact on groundwater levels.

Aspect	Phase	Activities and impacts scoped out
	Decommissioning	Decommissioning activities resulting in a potential impact on groundwater levels.
Land use	-	None at this stage.
Terrestrial ecology and ornithology	Construction, Operation and Maintenance, and Decommissioning	<p>Land take / land cover change in all European sites, SSSIs, Local Nature Conservation Site (LNCS) and Local Nature Reserves (LNRs) outside of the Scoping Boundary.</p> <p>Fragmentation on the Ythan Estuary and Sands of Forvie and Meikle Loch SPA and its qualifying interest species including sandwich tern, common tern, little tern, common eider, lapwing, redshank and the non-breeding waterbird assemblage; and all SSSIs identified, with the exception of Loch of Strathbeg SSSI and Rosehearty to Fraserburgh Coast SSSI.</p> <p>Hydrological or pollution impact pathways to Turclossie Moss SAC and its qualifying interest features (active raised bog and degraded raised bogs) and Buchan Ness to Collieston Coast SAC and its qualifying features (vegetated sea cliffs); and all SSSIs, LNCs and LNRs outside the zone of influence of the Scoping Boundary.</p> <p>Disturbance from increased human presence, noise and vibration on all SSSIs with solely habitats or vegetation interest features.</p> <p>Emissions events in all SSSIs outside of the zone of influence of the Scoping Boundary.</p> <p>Increased light levels to SSSIs with bat as an interest feature.</p> <p>Introduction of invasive non-native species in all SSSIs, LNCs and LNRs outside of the zone of influence of the Scoping Boundary.</p> <p>Increased light levels in all SSSIs, LNCs and LNRs outside the zone of influence of the Scoping Boundary.</p>
Onshore archaeology and cultural heritage	Operation and Maintenance	<p>Potential change to setting of onshore heritage assets arising from visibility of offshore infrastructure (wind turbines and offshore substations).</p> <p>Disturbance or change to setting following reinstatement of onshore landfall and onshore export cable corridor.</p>

Aspect	Phase	Activities and impacts scoped out
	Decommissioning	Disturbance of archaeological remains or built heritage assets during decommissioning of onshore export cabling, landfall and substation.
Onshore noise and vibration	Construction	Structural damage, disturbance and annoyance due to construction traffic vibration. Disturbance and annoyance at onshore receptors due to offshore site construction noise.
	Operation and Maintenance	Disturbance and annoyance at onshore receptors due to operational noise from the offshore wind farm. Disturbance and annoyance due to operational traffic noise. Structural damage, disturbance and annoyance due to operational site vibration. Structural damage, disturbance and annoyance due to operational traffic vibration.
	Decommissioning	Disturbance and annoyance due to decommissioning site noise. Disturbance and annoyance due to decommissioning traffic noise. Structural damage, disturbance and annoyance due to decommissioning site vibration. Structural damage, disturbance and annoyance due to decommissioning traffic vibration.
Traffic and transport	Construction	Hazardous Loads on the local and strategic highways network related to any phase of the Project on and offshore.
	Operation and Maintenance	Operation and maintenance activities associated with onshore infrastructure resulting in potential impact on roads, Core Paths and users of these routes. Offshore operation and maintenance phase activities (staff) resulting in potential impact on roads around proposed port. Hazardous Loads on the local and strategic highways network related to any phase of the Project on and offshore.
	Decommissioning	Decommissioning activities associated with onshore infrastructure resulting in a potential impact on local roads, and PRow and the users of these routes.

Aspect	Phase	Activities and impacts scoped out
		Decommissioning activities (staff and materials) associated with offshore infrastructure resulting in a potential impact on local roads. Hazardous Loads on the local and strategic highways network related to any phase of the Project on and offshore.
Landscape and visual	Operation and Maintenance	All receptors within the Scoping Boundary that are outwith the Zone of Theoretical Visibility will have no view of the onshore elements of the Project and are scoped out. Impact of the landfall and onshore export cable corridor on landscape character and designations. Impact of the landfall and onshore export cable corridor on visual receptors (residents / settlements, transport and recreational routes and tourist / visitor attractions) have the potential to be scoped out as the design matures.
	Decommissioning	Impact of the landfall and onshore export cable corridor on landscape character and designations. Impact of the landfall and onshore export cable corridor on visual receptors (residents / settlements, transport and recreational routes and tourist / visitor attractions).
Environmental Aspects Whole Project		
Climate resilience	Construction	Onshore and offshore - restriction of certain construction activities during hot weather due to Increased annual mean temperatures, especially in the summer months, and an increase in the frequency and intensity of hot spells. Onshore - the impact of increased dust creation from construction activities and the effect on the health of construction workers and the failure of machinery and equipment from increased annual mean temperatures and frequency and intensity of hot spells, coupled with decreased summer precipitation. Onshore - risk of wildfires affecting the construction workforce from increased annual mean temperatures and frequency and intensity of hot spells, coupled with decreased summer precipitation.

Aspect	Phase	Activities and impacts scoped out
		Onshore - drought conditions due to a decrease in summer precipitation impacting water available for use during construction, e.g. for dust suppression.
		Onshore - wet weather leading to increased possibility of slips, trips and falls.
	Operation and Maintenance	Onshore - drought conditions undermining tree roots leading to damage to infrastructure due to falling trees.
		Onshore - extended growing season leading to encroachment of vegetation in substations.
Greenhouse gases	Construction	GHG emissions related to pre-construction stage.
	Operation and Maintenance	GHG emissions related to installed products and materials emitted directly from the fabric of products and materials once they have been installed as part of infrastructure and it is in normal use
		GHG emissions resulting from the energy used by the Project to enable it to deliver its service during operation.
		GHG emissions resulting from the consumption of water required by the Project to operate.
		GHG emissions arising from the Project to enable it to operate including management of operational waste.
		GHG emissions as a result of activities associated with user's utilisation of the Project during the operational phase.
Socio-economics	Construction, Operation and Maintenance and Decommissioning	Potential effects on local society arising from the characteristics of new workforces and the distribution of project impacts between groups in society.
Military and civil aviation and telecommunications	Construction	Impacts on military aviation and creation of an aviation obstacle.
		Impacts on telecommunications and power cables.

Aspect	Phase	Activities and impacts scoped out
	Operation and Maintenance	Impacts on military activities and creation of an aviation obstacle such as WTGs. Impacts on telecommunications and power cables.
	Decommissioning	Impacts on military aviation and creation of an aviation obstacle. Impacts on telecommunications and power cables.

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