



Bowdun Offshore Wind Farm, Offshore EIA Report

Non-Technical Summary

TWP-BOW-RPS-OFE-RPT-00048 | April 2026

Preface

This document is the Non-Technical Summary (NTS) of the Offshore Environmental Impact Assessment (EIA) Report which has been prepared for the Offshore Infrastructure of the Bowdun Offshore Wind Farm (the 'Project').

- Copies of the Environmental Impact Assessment are available to view during normal working hours at the following locations:
 - Stonehaven Library, Evan Street, Stonehaven, AB39 2ET

The Offshore EIA (including NTS), which presents the findings of the EIA work and supporting studies undertaken can be viewed online at: **www.twp.scot/bowdun**

Any person wishing to express an opinion on the Offshore EIA can write to the above address FAO Bowdun Offshore Wind Farm Limited. Anyone wishing to make a formal representation should contact the Marine Directorate – Licensing Operations Team (MD-LOT):

<https://marine.gov.scot/?q=content/contact-marine-directorate>

Alternatively, contact can be made to the Communications Manager for Bowdun Offshore Wind Farm: **k.gove@twp.scot**

Background

A Special-Purpose Vehicle (SPV) was formed, under the name Bowdun Offshore Wind Farm Limited (BOWFL) for the purpose of developing the offshore and onshore elements of Bowdun Offshore Wind Farm, collectively known as the Project. BOWFL (hereafter referred to as the ‘Applicant’) has applied to the Marine Directorate - Licensing Operations Team (MD-LOT), acting on behalf of Scottish Ministers, for the offshore elements of the Project (hereafter referred to as the ‘Proposed Development’). This application is supported by an Offshore EIA Report. The regulations under which the Offshore EIA Report has been prepared are The Electricity Works (EIA) (Scotland) Regulations 2017, The Marine Works (EIA) (Scotland) Regulations 2017 and The Marine Works (EIA) Regulations 2007 which, hereafter, will be collectively referred to as the EIA Regulations. This NTS has been written in non-technical language and is intended to act as a stand-alone document that provides an overview of the Proposed Development, the EIA process and its likely significant environmental effects.

The Applicant is seeking the following consent and licences as part of this application:

- Section 36 consent under the Electricity Act 1989 for an offshore generating station in the Scottish offshore region (12 nm to 200 nm);
- Marine Licence covering the Offshore Generation Assets; and
- Marine Licence covering the Offshore Transmission Assets.

Thistle Wind Partners

TWP is an offshore wind developer founded in 2020 by a Joint Venture (JV) of three companies - DEME Concessions, Qair Marine and Aspiravi International. Together, the founding companies and the TWP team have a strong background in offshore renewable energy development and delivery, and associated port developments. TWP is the development company for the Project on behalf of the Applicant.

Nature and Need for the Project

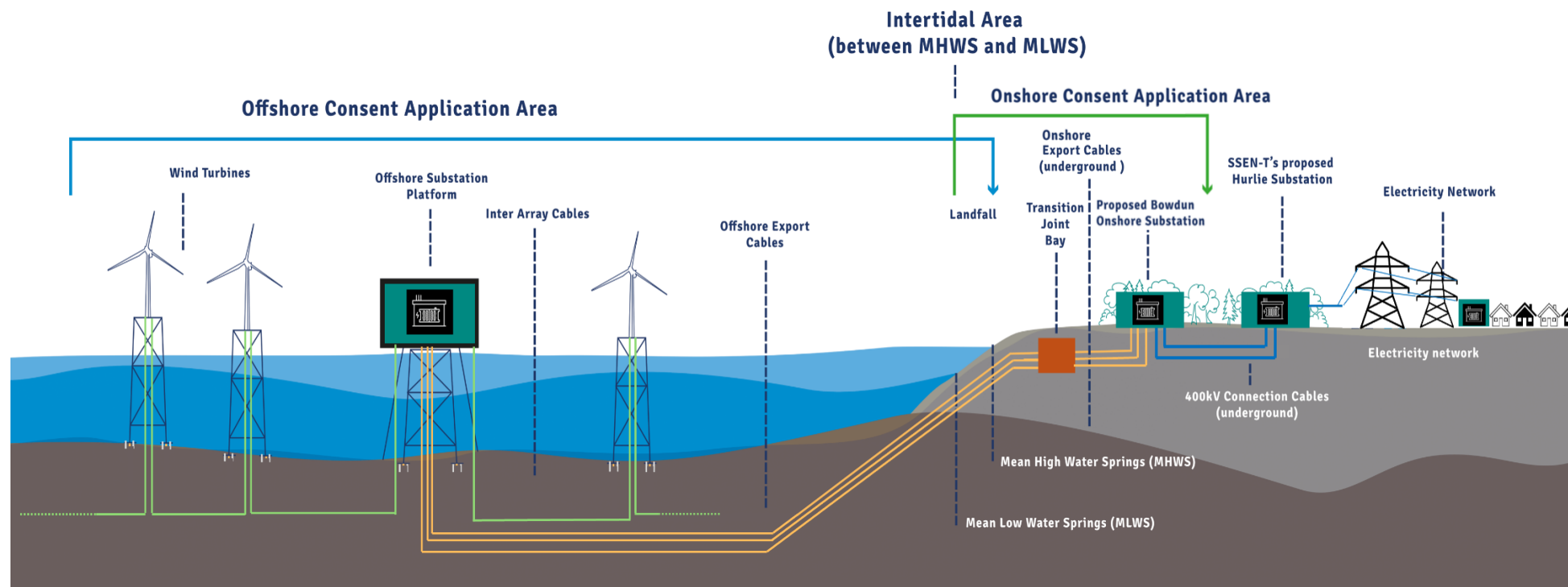
Offshore wind plays a central role in Scotland’s net-zero journey and is key to realising the economic opportunity for Scotland in the global energy transition. The Scottish Government has ambitious targets for offshore wind, as an established and a proven part of the mix of technologies that power our energy systems. Offshore wind is key to decarbonising the national grid by 2035 and also to supporting the UK Governments goal to achieve net-zero by 2050.

The Bowdun Offshore Wind Farm will play a significant role in meeting energy targets by supplying 1 GW of renewable electricity, enough to power 1.2 million homes. Scotland has a proven track record in offshore wind and the skills to deploy it are abundant, with several wind farms already operational, decades of offshore oil and gas experience, and leading research hubs. By harnessing renewable energy, we can improve energy security in Scotland and beyond, reducing reliance on fluctuating international markets and price increases.

A full assessment against relevant policies and plans has been undertaken and reported in a Planning Statement that accompanies the offshore application.

The Project: Bowdun Offshore Wind Farm

The Project is the overarching term for the Bowdun Offshore Wind Farm comprising the Offshore and Onshore Infrastructure required to generate and transmit electricity from the Array Area, the area in which the Wind Turbines are located, to the onshore grid connection point, Hurlie substation. The Project includes the Offshore Generation Assets, the Offshore Transmission Assets and the Onshore Transmission Assets.



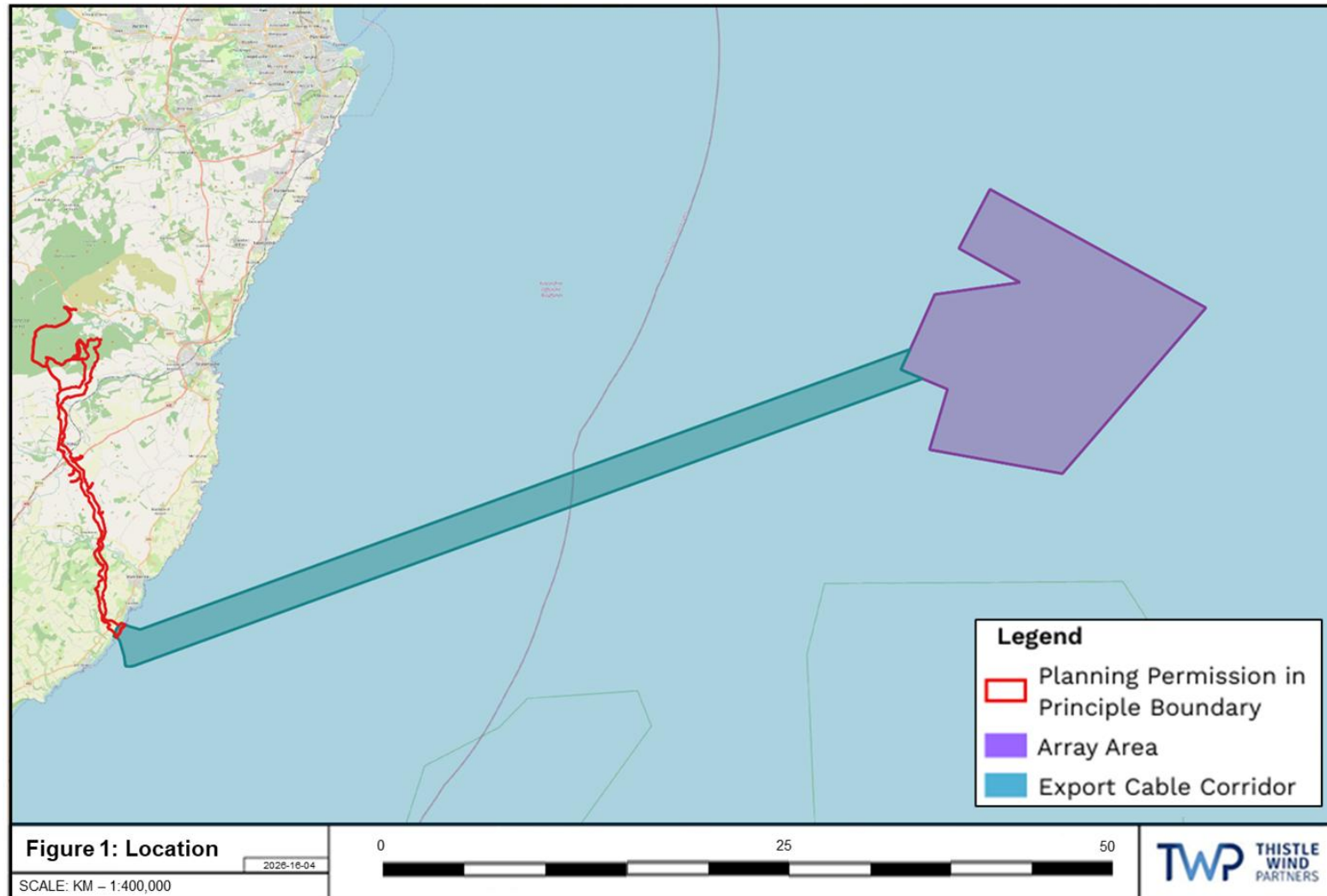
Offshore Generation Assets – the infrastructure of the Proposed Development required to generate electricity comprising of the Wind Turbines, fixed Wind Turbine foundations, Inter-Array Cables (IAC), Interconnector Cables and associated infrastructure.

Offshore Transmission Assets – the infrastructure of the Proposed Development required to transmit generated electricity comprising of the Offshore Substation Platforms (OSP), Offshore Export Cables and associated infrastructure.

Onshore Transmission Assets – includes the Landfall, Transition Joint Bays, Substation, Onshore Export Cables (220/275 kV connect the offshore generation assets to the Substation) and 400 kV Cables (connect the Substation to the national grid via Hurlie substation).

The Proposed Development

The location of the Proposed Development is shown here (Figure 1) in relation to the Onshore Infrastructure, including the Array Area and Export Cable Corridor which reaches Landfall at Benholm. A separate application for the Onshore Infrastructure was submitted to Aberdeenshire Council in November 2025, and the red line boundary for the Planning Permission in Principle application is shown.



Project Development and Site-Selection

The offshore site was awarded in the Crown Estate Scotland's ScotWind leasing round. The ScotWind sites were identified in the Scottish Government's Sectoral Marine Plan (SMP) for Offshore Wind Energy, based on number of factors including wind resource, minimising of environmental impact, proximity to other infrastructure and cognisance of other marine users.

Post award of the Array Area, where the Offshore Generation Assets will be located, a rigorous site selection process was then undertaken to route the Offshore and Onshore Transmission Assets to our Grid Connection Point – which was determined by the National Energy System Operator. The site selection process was informed by environmental and engineering assessments and identified a suitable location for the Landfall, Onshore and Offshore Export Cable Corridors and onshore substation, as explained in Volume 1, Chapter 6: Site Selection and Consideration of Reasonable Alternatives.

This Offshore EIA Report has utilised a Project Design Envelope (PDE) whereby a range of possible parameters have been presented as different design options are still being considered. Maximum Design Scenarios have been determined from the PDE so that the EIA assesses the worst-case or maximum-impact scenario for each receptor or impact pathway. These methods allow for flexibility within the design, especially at the early stages of development.

Through the acquisition of new data and information we were able to refine the design. The PDE has been refined based upon:

- increased understanding of site conditions (e.g. seabed/ground conditions) from data collected during surveys;

- further design and engineering studies;
- feedback from stakeholders including during scoping; and
- mitigation to reduce potential environmental impacts from the Proposed Development (e.g. increased gap between the sea surface and the bottom of the wind turbine blade tip to reduce bird collision risk).

When refining and finalising the PDE, consideration has been given to decommissioning at the end of life, and all design options included in the PDE are considered to be feasible for decommissioning.

The PDE approach which considers a realistic range of Proposed Development design parameters, is described in Volume 1, Chapter 3: Project Description of the Offshore EIA Report.



Offshore wind farm

Project Description

The main components of the Proposed Development are outlined below:

Offshore Generation Assets:

- up to 67 Wind Turbines (each comprised of three rotor blades, a nacelle housing the generating unit, hub and tower section) on fixed foundations;
- a network of up to 167 km of static IACs;
- up to 36 km of Interconnector Cables; and
- scour and cable protection (as required).

Offshore Transmission Assets:

- up to three Offshore Substation Platforms with fixed foundations and supporting infrastructure including scour protection (as required);
- up to three Offshore Export Cables totalling approximately 210 km in length; and
- cable protection and utility crossings where required.

Landfall

The Offshore Export Cables will make Landfall in Benholm, Aberdeenshire. The Offshore Export Cables will be brought under the intertidal area using trenchless installation where they will be connected to the Onshore Export Cables in a transition joint bay. The transition joint bay will be located within a temporary construction compound accessed from the A92. There will be permanent access to this area via an operational track for the lifetime of the Proposed Development. Using a trenchless

installation method means that the beach and intertidal area will not be affected.

Site Preparation

A range of seabed preparation activities will be undertaken to ensure safe and effective installation of infrastructure. These works may occur at any time during the construction phase and include clearing debris, levelling the seabed, and installing protective materials where necessary. Surveys will be carried out beforehand to understand seabed conditions and identify any potential hazards. Site preparation activities include:

- Pre-construction surveys will assess seabed features, soil properties, and potential obstructions using sonar and sampling tools.
- Unexploded Ordnance (UXO), such as old military explosives, may be present and will be carefully managed.
- Sandwaves, which are underwater sand formations, may need to be removed to allow cables to be buried securely and remain protected over the operational life of the Proposed Development.
- Boulder clearance will be carried out to prevent damage to cables and improve burial success. Boulders will be relocated within the site using robotic tools or ploughs.
- A variety of vessels will be used for surveys and clearance activities, with up to 18 vessels operating at peak times and around 140 trips expected during site preparation.

Table 1.1: Key Parameters of the Proposed Development

Parameter	Design
Estimated construction period	Up to 5 years
Array Area (km ²)	187
Distance of Array Area from the shore at closest point (km)	38
Maximum number of Wind Turbines	67
Wind Turbine maximum rotor diameter (m)	326
Wind Turbine maximum tip height from Lowest Astronomical Tide (m)	360
Maximum number of Offshore Substation Platforms	3
Maximum number of Offshore Export Cables	3
Export transmission system	High Voltage Alternating Current

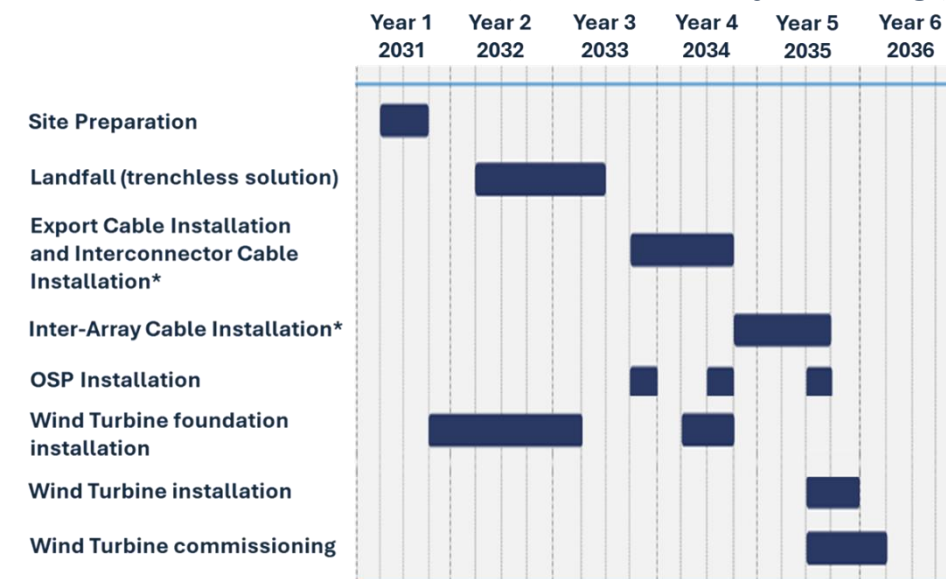
Construction

Programme

Construction and commissioning of the Proposed Development will be timed to meet the grid connection date of 2036. Subject to the Project being consented, the earliest date that construction will start is anticipated to be in 2031, with the commencement of site preparation works.

Consistent with the build-out and commissioning of the generation and transmission assets offshore, together with the Connection Agreement date, the Proposed Development is anticipated to be constructed in a single phase.

Outline of the Construction Timeline (estimated and subject to change)



(*including cable burial and/or protection where required)

Operation and Maintenance

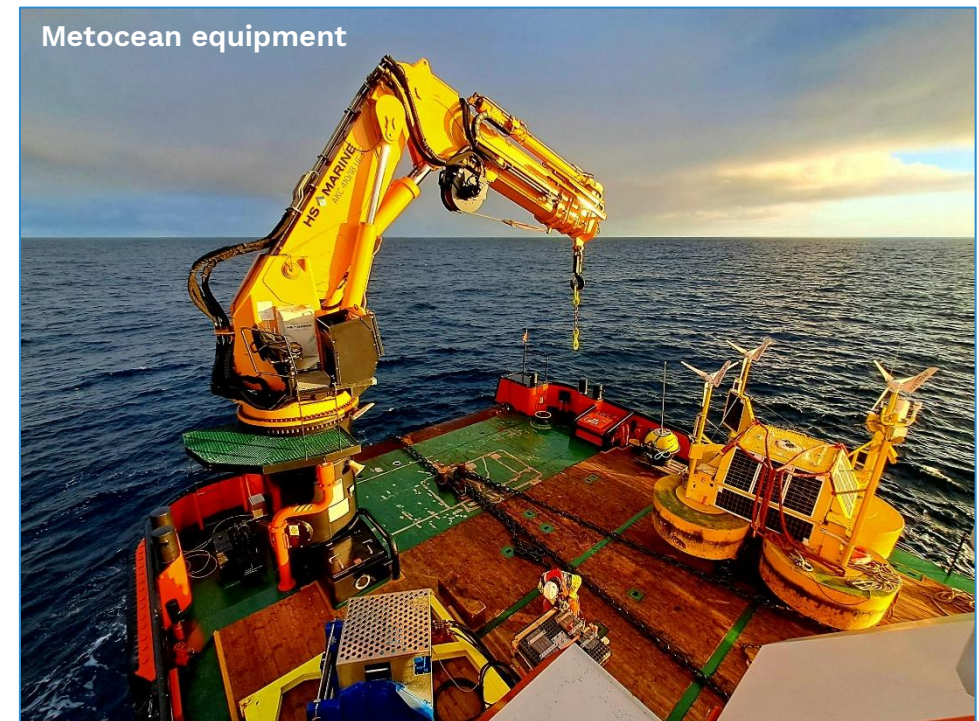
The Proposed Development is expected to operate for up to 30 years, with a range of scheduled and unscheduled maintenance activities carried out to ensure safe and efficient performance. The final Operation and Maintenance (O&M) strategy will depend on the chosen turbine type, electrical systems, and layout, but the following activities are reasonably foreseeable:

- Routine inspections and maintenance will be carried out using service vessels, remotely operated vehicles, and uncrewed surface vessels. Divers may be used if necessary, although diverless operations are preferred.

- Foundations will be inspected and maintained, including removal of marine growth, replacement of corrosion protection, and repairs to ancillary structures like ladders and boat landings.
- Wind Turbines will undergo regular inspections, minor repairs, blade maintenance, and statutory checks. Major component replacements will be carried out as needed, using specialist vessels and equipment.
- Offshore Substation Platforms will be maintained through inspections, cleaning, and replacement of components as required.
- IACs and Interconnector Cables will be inspected and repaired as needed. This may include reburial, installation of cable protection, and removal of fishing debris or marine growth.
- A variety of vessels will be used during the O&M phase, including cable repair vessels, heavy lift vessels, and helicopters.

Decommissioning

The Applicant will prepare a Decommissioning Programme for approval by the Scottish Ministers which will include anticipated costs and financial securities, and consider good industry practice, guidance and legislation relating to decommissioning at the time. A draft of the Decommissioning Programme will be submitted to MD-LOT prior to construction of the Proposed Development. The Decommissioning Programme will be updated during the Proposed Development's lifetime to take account of changing good practice, new technologies and any changes to legislation.



Environmental Impact Assessment

This section outlines the methodology used to assess the environmental impacts of the Offshore Infrastructure within the Proposed Development. It ensures a comprehensive evaluation of potential effects on physical, biological, and human receptors, including inter-related, cumulative, and transboundary effects.

Legislative and Policy Context

The EIA is grounded in European Union Directives and Scottish regulations for projects requiring Section 36 consent under the Electricity Act 1989 and Marine Licences under the Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010. Its methodology draws on guidance from NatureScot, the Institute of Sustainability and Environmental Professionals (ISEP), the British Standards Institution, Collaborative Offshore Wind Research into the Environment, and the Marine Directorate; where Scottish guidance is unavailable, UK-wide or international standards are applied.

Scope of the EIA

EIA requires the reporting of likely significant environmental effects that may result from the Proposed Development, not all effects. Scoping is the process of identifying likely significant environmental effects to consider within the EIA process, and the methodology for the assessment of those effects thereby establishing the scope of the assessment. Scoping is therefore an important preliminary procedure, which sets the context for the EIA process. The Offshore Scoping Report (BOWFL, 2024) set out the proposed scope and methodology of the EIA and was subsequently agreed by MD-LOT through the provision of a Scoping Opinion and additional consultation (MD-LOT, 2024) as explained in Volume 1, Chapter 4: Environmental Impact Assessment

Methodology off the Offshore EIA Report. The following section illustrates the topics scoped in that form the basis of the EIA.

Topics Scoped into the Bowdun Offshore EIA

Below is a list of all topics that are included within the Offshore EIA Report:



Assessment Principles

Each topic chapter follows a consistent structure:

- Study area, legislation, consultation, data sources, baseline, methodology, mitigation, and significance.

The assessment uses the maximum design scenario to evaluate worst-case impacts and incorporates existing data and stakeholder feedback.

Mitigation Measures

Mitigation is categorised as:

- Primary (Embedded): built into project design;
- Secondary (Additional): proposed where embedded measures are insufficient; and
- Tertiary (Embedded): standard practices used to manage environmental effects.

All mitigation commitments are summarised in Volume 3, Technical Appendix 4.6: Schedule of Mitigation and Commitments of the Offshore EIA Report.

Environmental Baseline

A comprehensive evaluation of the existing environment in which the Proposed Development would be located, has been undertaken to facilitate a robust assessment of the potential impacts on receptors from the Proposed Development.

Consideration has also been given to the likely evolution of baseline conditions in the absence of the Proposed Development. Where relevant, consideration is given as to how potential climatic changes may affect topic-specific future baselines.

Identification of Impact and Significance of Effect

EIA is a means of identifying and collating information to inform an assessment of the likely significant environmental effects of a development. For each environmental topic in the Offshore EIA Report, the following have been addressed:

- assessment methodology;
- description of the existing environmental (baseline) conditions;
- identification and assessment of the significance of likely effects arising from the Proposed Development;
- identification of any Additional Mitigation measures, in addition to the Embedded Mitigation measures, proposed to avoid, reduce and if possible, remedy adverse effects; and
- assessment of cumulative effects with other projects in the area, as well as inter-related effects between environmental topics.

The Proposed Development has the potential to create a range of ‘impacts’ and consequent ‘effects’ with regard to the environment. For the purposes of EIA, the term ‘impact’ is used to define a change that is caused by an action during a project’s lifetime. The term ‘effect’ has been used in the Offshore EIA Report to express the consequence of an impact on specific environmental resources or receptor.

This NTS sets out the significant effects identified during the EIA process at this stage.

Inter-related Effects

Inter-relationships between topics may lead to a greater environmental effect on a receptor in combination with each other than they otherwise would when considered in isolation. This can take the form of different impacts within the same topic through the lifetime of the Proposed Development (construction, O&M, and decommissioning) and the effects on receptors between different topics. It is not anticipated that any inter-related effects will be produced that are of greater significance than the assessments presented for each individual impact assessed.

Assessment of Cumulative Effects

Cumulative effects are assessed as there may be a potential for an increased impact when developments in the same area are considered in combination with the Proposed Development, compared to the assessment of the Proposed Development in isolation. A Zone of Influence is applied to enable the identification of other foreseeable major developments in the area that need to be considered in the assessment of cumulative effects.

Transboundary Effects

Transboundary effects are assessed where impacts may affect other European Economic Area (EEA) states. The assessment follows Scottish and UK guidance and is detailed in Volume 3, Technical Appendix 4.5: Transboundary Effects Screening of the Offshore EIA Report. Each topic chapter includes consideration of transboundary effects where relevant.

Consultation Activities

Throughout the pre-application stage significant stakeholder and public engagement has taken place, including formal, informal, statutory and non-statutory platforms and mechanisms facilitating this engagement. Details of this engagement are set out in the Pre-Application Consultation (PAC) Report accompanying the application.

Consultation has been through a wide variety of approaches, including online virtual exhibition hall, fixed venue events, keynote addresses, round tables, informational sessions at festivals, and business breakfasts for supply chain.



Consultation event

Physical Processes

The term physical processes encompasses water levels, currents, waves and winds, stratification in the water column in relation to aspects such as temperature, frontal systems, sediments and geology (including seabed sediment distribution and transport), seabed geomorphology, and coastal geomorphology.

To assess potential impacts of the Proposed Development on the marine physical environment, a combination of analytical methods was employed. These included project-specific numerical modelling of waves, tides, and sediment transport; empirical equations to evaluate changes in turbulent kinetic energy and stratification; evidence from other offshore wind farm developments; and analytical assessments of site-specific data.

Baseline conditions were characterised using geophysical and benthic habitat surveys, supplemented by publicly available data from sources such as the British Geological Survey and Copernicus Marine Service. The study area lies in a semi-diurnal tidal regime with moderate-energy wave conditions. Tidal ranges in the Array Area reach up to 3 m, with peak spring currents below 0.7 m/s, while stronger currents (up to 0.8 m/s) occur to the north of the Landfall. Seasonal stratification varies, with well-mixed waters in winter and weak stratification from April to September.

Seabed sediments are mainly coarse-grained material, with sands and gravels encountered in most areas, muddy sand is also present in places. . Nearshore sediment transport is driven by tidal flows, however areas along the coastline have little loose beach material so movement is generally low. In the Array Area, sediment movement is limited and associated with storm events. At Benholm Landfall, the beach comprises a rocky foreshore with exposed bedrock, rocks, boulders and cobbles.

Potential impacts assessed include:

- changes to suspended sediment concentrations;
- bed levels;
- sediment type;
- seabed and coastal morphology;
- tidal and wave regimes;
- sediment transport;
- stratification; and
- scour.

These were found to be not significant under EIA Regulations, with Embedded Mitigation deemed sufficient. No Additional Mitigation is proposed.

Cumulative impacts with other projects were also assessed and found to be **Negligible**, which is not significant in EIA terms. Transboundary screening concluded no significant effects on EEA states.



Geophysical survey equipment

Benthic Ecology

Benthic ecology encompasses the communities of organisms living on or within the seabed and their interactions with each other and the surrounding environment. The seabed is divided into two zones: the intertidal zone, which is exposed during low tides, and the subtidal zone, which remains submerged.



Site-specific surveys were conducted to characterise benthic ecology within the Site Boundary. These included grab sampling and underwater video in the subtidal zone and walk-over surveys in the intertidal zone. Results showed a range of typical plant and animal communities.

Subtidal habitats consisted mainly of sand to coarse sediments, supporting species such as annelid worms, sea urchins, and bivalves. Overlying assemblages were sparse, primarily featuring colonial jellyfish, and crustaceans such as hermit crabs. The intertidal zone at Benholm Beach was mostly rocky shore, where 17 distinct biotopes were recorded.

Potential impacts on benthic communities from the Proposed Development were assessed across its construction, O&M, and decommissioning phases. These include:

- temporary and long-term habitat loss/disturbance;
- introduction of artificial structures and colonisation;
- changes in sediment characteristics and physical processes;
- risk of invasive non-native species;
- removal of hard structures; and
- Electromagnetic Field (EMF) effects.

All assessed impacts were found to be of **Negligible** or **Minor** adverse significance, meaning they are not significant in EIA terms. For example, habitat loss was considered **Minor** due to the small affected area and the widespread availability of similar habitats regionally.

No Additional Mitigation or monitoring is proposed beyond Embedded Mitigation measures. Cumulative impacts from other marine activities (e.g. aggregate extraction, oil and gas decommissioning, offshore renewables) were also assessed and deemed to have **Minor** adverse effects on subtidal communities within a 50 km buffer.

Transboundary screening concluded that there are no likely significant environmental effects on benthic ecology for other EEA states.

Fish and Shellfish Ecology

Fish and shellfish ecology includes a diverse range of species such as marine fish (teleosts and elasmobranchs), diadromous fish (which migrate between freshwater and seawater), and commercial shellfish (crustaceans and molluscs).

The Fish and Shellfish Ecology Study Area covers a 100 km buffer around the Array Area and Export Cable Corridor, including the Firth of Forth and Firth of Tay. This broad area was used to establish a comprehensive baseline, informed by desktop reviews and site-specific surveys from the Proposed Development and nearby offshore wind farm projects.

The species assemblage is typical of the northern North Sea. Teleosts include cod, herring, and sandeel. Elasmobranchs recorded include basking shark and the common skate complex. Diadromous species include salmonids, lampreys, shads, and European eel, with freshwater pearl mussel considered as a proxy due to its reliance on salmonids. Shellfish include lobsters, crabs, scallops, and cephalopods.

Spawning and nursery grounds were identified for several species, notably herring and sandeel. The baseline environment is dynamic and subject to natural changes over time due to ecological cycles such as spawning and food web fluctuations.

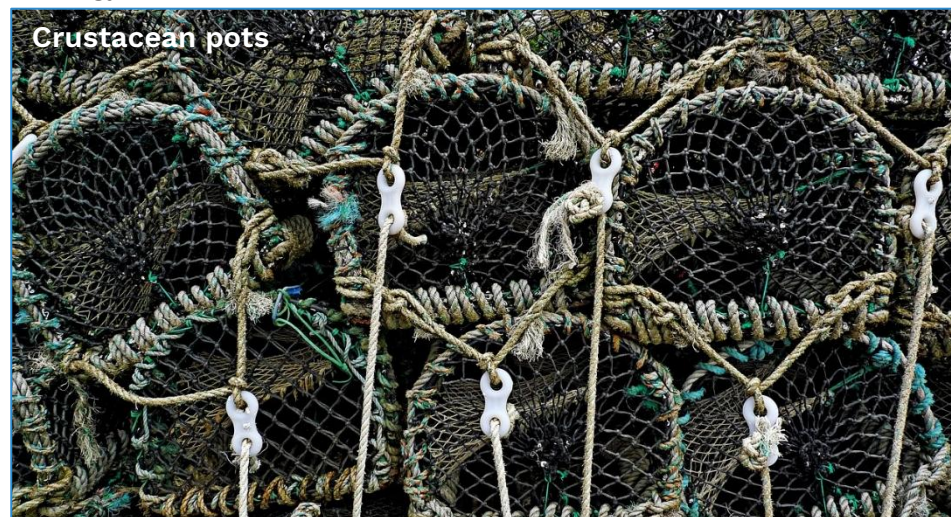
Potential impacts from the Proposed Development were assessed across its construction, O&M, and decommissioning phases. These include:

- habitat loss/disturbance (temporary and long-term);
- colonisation of artificial structures;
- increased suspended sediment concentrations;

- subsea noise; and
- EMF.

Most impacts were assessed as **Negligible** or **Minor** adverse, which are not significant in EIA terms, due to Embedded Mitigation measures. However, a potential **Moderate** adverse significant effect was identified for herring during piling in the construction phase due to noise contours overlapping with spawning grounds, if driven piling is selected as the required installation technique. Additional Mitigation will be finalised and agreed with stakeholders through the development of a Piling Strategy. Following the adoption of Additional Mitigation through the Piling Strategy impacts are expected to reduce to **Minor** adverse and therefore not significant.

Cumulative impacts with other projects were also assessed and found to be not significant, provided the Additional Mitigation for herring is implemented. Transboundary screening concluded no likely significant environmental effects on fish and shellfish ecology for other EEA states.



Marine Mammals

The marine mammal baseline was established using a comprehensive desktop review and 24 months of digital aerial surveys. The northern North Sea supports several marine mammal species, some with internationally important populations near the Proposed Development. Species with robust density data for quantitative assessment included: harbour porpoise; bottlenose dolphin; white-beaked dolphin; minke whale; grey seal; and harbour seal.

Other species such as Risso's dolphin, humpback whales, and fin whale were assessed qualitatively due to limited data.

Marine mammals rely heavily on sound for survival, making them vulnerable to noise-related impacts from all phases of the Proposed Development. Noise modelling was conducted for activities including:

- UXO clearance;
- geophysical/geotechnical surveys;
- impact piling;
- vessel operations; and
- Wind Turbine operation

Potential impacts assessed includes:

- injury/disturbance from subsea noise;
- vessel collision; and
- changes in prey availability.

Indirect effects of EMF on marine mammals were also considered within the assessment of impacts due to changes in prey availability.

All assessed impacts were found to be of **Negligible** or **Minor** adverse significance, which is not significant in EIA terms. Additional Mitigation may be required for harbour porpoise in the event of high order UXO clearance. These measures will be finalised and agreed with stakeholders through the Marine Mammal Mitigation Protocol for UXO clearance.

Cumulative impacts were considered and cumulative modelling for harbour porpoise indicated potential population-level effects from aggregated piling activities across a number of projects, (with recovery predicted from 2038) resulting in **Moderate** adverse effects which are significant in EIA terms. However, the Proposed Development was not a key contributor, so no project-level mitigation was required. All other species and impact pathways were assessed as **Negligible** or **Minor** adverse, and not significant in EIA terms.



Offshore Ornithology

Offshore ornithology refers to seabirds and other bird species that may interact with the Proposed Development, including those migrating through or near the site. The baseline was characterised through a desk-based review and site-specific digital aerial surveys using cameras mounted on aircraft. Birds were identified and counted from still images. Light Detection and Ranging (LiDAR) surveys were used to assess flight heights for collision risk, and intertidal non-breeding surveys to count wader and water birds at Landfall were conducted.

The Offshore Ornithology Study Area includes:

- Array Area Study Area: E3 POA plus a 12 km buffer, exceeding NatureScot's minimum to ensure robust baseline data.
- Export Cable Corridor Study Area: from the Array Area to the coast, up to Mean High Water Springs, with a 10 km buffer.

The Array Area Study Area is the area over which Digital Aerial Surveys (DAS) were undertaken. During the summer months (April to August inclusive) the Array Area Study Area was extended (Extended DAS Area) westwards to give greater coverage towards the Aberdeenshire coast, where breeding colonies are located.

Key bird species identified include:

- Divers: Great northern, red-throated
- Seabirds: Fulmar, shearwaters, storm petrel, gannet
- Skuas and gulls: Kittiwake, herring gull, black-headed gull, common gull, great black-backed gull
- Terns: Arctic

- Auks: Guillemot, razorbill, puffin
- Waders: Oystercatcher, lapwing, curlew.

Potential impacts across construction, O&M, and decommissioning phases include:

- collision risk with Wind Turbine blades;
- displacement and barrier effects from infrastructure;
- disturbance from vessel movements;
- habitat loss or disturbance;
- light attraction; and
- direct impacts from UXO clearance and prey disturbance.



With Embedded Mitigation in place, all impacts for the Proposed Development alone were assessed as **Negligible** or **Minor** adverse, meaning not significant in EIA terms for all key species.

The cumulative effects assessment concluded significant cumulative effects for great black-backed gull and herring gull in relation to collision, for guillemot and razorbill in relation to displacement and for kittiwake for the inter-related effect of displacement and collision. Therefore, a robust monitoring plan is proposed.

Transboundary screening concluded that there are no likely significant environmental effects on offshore ornithology for other EEA states.

Offshore Bats

Offshore bats refer to populations of bats that migrate across the offshore marine environment, predominantly for their seasonal migrations. The status of offshore bats is not definitively known within the region, however evidence suggests there are established Nathusius' pipistrelle species migration pathways between Scotland and Denmark. A desk-based analysis of Nathusius' pipistrelle revealed records throughout Orkney, Shetland, the Highlands and Aberdeenshire. The closest breeding population to the Proposed Development is located in the north of England.

The potential impact of collision risk with Wind Turbine blades was assessed during the O&M phase.

With Embedded Mitigation in place, the impact was assessed as **Minor** adverse, meaning not significant in EIA terms.

Cumulative impacts with other offshore wind farms were also assessed and deemed to have **Minor** effects on offshore Nathusius' pipistrelle within the migration corridor.

Transboundary screening concluded that there are no likely significant environmental effects on Nathusius' pipistrelle for other EEA states.

Commercial Fisheries

Commercial fisheries refer to legally conducted fishing activities undertaken for taxable profit. The baseline for the Proposed Development was established through a desktop study and industry consultation. The Local Commercial Fisheries Study Area generates an average of £6.5 million annually, while the Regional Study Area yields £31 million, based on data from 2020 to 2024.

Fishing fleets operating in the area include:

- UK demersal otter trawlers and seine vessels targeting haddock, nephrops and squid;
- UK and non-UK pelagic trawlers targeting herring;
- UK scallop dredgers targeting king scallop;
- UK potting vessels targeting brown crab, lobster, and velvet crab; and
- UK vessels undertaking handline ("jigging") targeting mackerel.

Key species landed locally include brown crab, lobster, king scallop, haddock and nephrops.

Potential impacts from the Proposed Development across construction, O&M, and decommissioning phases include:

- reduced access or exclusion from established fishing grounds;
- displacement, leading to gear conflict and increased pressure on adjacent grounds;
- disturbance of fish and shellfish resources;
- increased vessel traffic, interfering with fishing activity;
- additional steaming to alternative grounds; and
- snagging risk, potentially damaging gear.

With Embedded Mitigation in place, including commitment to Disruption Agreements, where appropriate, impacts were assessed as **Negligible** or **Minor** adverse, which are not significant in EIA terms.

Mitigation measures are outlined in the Fisheries Mitigation Monitoring and Communication Plan (FMMCP). These include:

- disruption agreements for construction phase; and
- contribution to the development of a strategic, regionally coordinated approach to commercial fisheries monitoring to support understanding of cumulative effects.

Cumulative impacts were assessed and found to be **Minor** adverse for most fleets, but **Moderate** adverse for UK demersal seine and otter trawl, and scallop dredge fisheries. These cumulative effects are unmitigable at the project level. The Applicant is open to exploring strategic regional mitigation in collaboration with the Scottish Government, the fishing industry, and other offshore wind developers.

No significant transboundary impacts were predicted for commercial fisheries affecting other EEA states.



Shipping and Navigation

Shipping and navigation refers to vessel-based activities at sea and in ports, and their interaction with the environment. The baseline for the Proposed Development was established through desktop research and dedicated vessel traffic surveys.

Key navigational features include the ports of Aberdeen, Montrose and Peterhead. The nearest offshore renewable project is Kincardine Offshore Wind Farm, 0.8 nm (1.5 km) north-west of the study area. The nearest UK Military Practice and Exercise Areas is D604, 22 km south-west of the study area.

Vessel traffic surveys were conducted in line with Marine Guidance Note (MGN) 654 requirements. Surveys in summer 2023 and 2025 recorded higher traffic from cargo, cruise, ferry, fishing, recreational vessels, and tanker and tug/service vessels. Cruise and recreational traffic ceased in winter (2024 and 2025), while ferry movements were observed but were for maintenance, trials and training uses.

Potential impacts assessed across construction, O&M, and decommissioning phases includes:

- deviation of commercial vessels and impacts on ports and harbours;
- collision risk;
- allision risk (vessel striking stationary object);
- interference with Search and Rescue activities, communications and radar; and
- grounding and snagging risk.

Collision modelling showed a 53.1% increase in frequency during O&M, but the overall risk remains low - one collision every 412 years. Allision modelling showed the highest risk for support/other vessels at 1 in 220 years, with a total probability of 1 in 180 years, still considered low.

Snagging risks were assessed, with the most likely outcome being gear loss or minor damage. Severe outcomes, such as vessel loss or fatalities, are considered very unlikely due to Embedded Mitigation measures like Safety Zones and an Emergency Response Cooperation Plan (ERCoP). A hazard workshop informed additional risk controls, and the Navigation Risk Assessment (NRA) concluded that all medium-risk hazards were As Low As Reasonably Practicable (ALARP) and tolerable. No Additional Mitigation was deemed necessary.

Cumulative impacts with other projects within a 50 nm (92.6 km) buffer were assessed and found to be not significant in EIA terms. Similarly, no significant transboundary impacts were predicted for shipping and navigation.



Ships at Kincardine Offshore Wind Farm

Aviation and Radar

Wind Turbines can affect aviation and radar receptors in three key ways:

- physical obstruction to aircraft;
- radar clutter, making it difficult for air traffic controllers to distinguish aircraft from Wind Turbine returns; and
- interference with Communications, Navigation and Surveillance equipment within safeguarding zones.

The baseline was established through a desktop review of aviation documentation and charts, alongside consultation with stakeholders including the Ministry of Defence (MoD), National Air Traffic Services, and Aberdeen Airport.

Potential impacts identified include:

- effects on Instrument Flight Procedures (IFPs) at Aberdeen Airport;
- interference with NATS Allanshill, Perwinnes Primary Surveillance Radars (PSRs) and the MoD Buchan Air Defence PSR; and
- disruption to military low flying and UK Search and Rescue (SAR) operations.

Following adoption of Additional Mitigation, all impacts were assessed as **Negligible**, and not significant in EIA terms.

Military and SAR operations will be managed via a Lighting and Marking Plan, Wind Turbine location notifications, and an ERCoP agreed with the MCA.



An IFP assessment confirmed Aberdeen Airport's procedures would be affected. Mitigation involves raising the lowest altitudes of affected procedures, which is expected to be acceptable to Aberdeen Airport. Once implemented, the impact is predicted to be **Negligible** and not significant.

Cumulative impacts are assessed on a case-by-case basis. With mitigation in place, no cumulative effects are expected from interactions with other developments.

No significant transboundary impacts were predicted for aviation and radar receptors affecting other EEA states.

Infrastructure and Other Users

This topic covers existing and potential infrastructure and general activities near the Proposed Development. A desktop study, qualitative assessment, and stakeholder consultation established the baseline, identifying recreational activities such as:

- boating (sailing, cruising, fishing); and
- surfing, kayaking, coastering, paddleboarding, shore angling.
- Potential impacts across construction, O&M, and decommissioning phases include:
- displacement of recreational activities; and
- impacts to early-stage or existing cables/pipelines.

With Embedded Mitigation, all impacts were assessed as **Minor** adverse, and not significant in EIA terms. Recreational vessels can re-route safely due to adequate sea room, Safety Zones, and advisory passing distances.

Cable and pipeline operators will be informed via Notices to Mariners and Kingfisher Bulletins, allowing for minimal disruption and rerouting.

Cumulative impacts from other offshore developments and infrastructure within a 100 km buffer were also assessed and found to be **Minor** adverse. No significant transboundary impacts were predicted.

Major Accidents and Disasters

Major Accidents and Disasters (MADs) refer to events or hazards that could cause serious harm to human health, welfare, or the environment, requiring resources beyond those of the developer or its contractors to manage. These include incidents resulting in fatalities, permanent injury, or widespread irreversible damage.

The assessment followed The Institute of Sustainability and Environmental Professionals (previously known as IEMA) guidance and considered both man-made and natural hazards, drawing on baseline data from multiple technical chapters of the Offshore EIA Report, including commercial fisheries, shipping and navigation, aviation and radar, infrastructure and other users, and UXO data.

The legislative framework includes the Marine Works (EIA) (Scotland) Regulations 2017, the Health and Safety at Work Act 1974, and the Construction (Design and Management) Regulations 2015, which require risks to be mitigated to ALARP. The Offshore EIA Report addresses these requirements through Embedded Mitigation measures.

The assessment considered the vulnerability of the Proposed Development to existing hazards, including:

- shipping and aviation collisions;
- snagging risks from fishing gear;
- accidents involving cables, pipelines;
- extreme weather and storm surge;
- marine pollution from structures; and
- sabotage or terrorism.

It also assessed the potential for the Proposed Development to cause accidents or disasters, such as:

- physical impacts (collision, allision);
- UXO detonation;
- marine pollution from vessels;
- fire at Wind Turbines or Offshore Substation Platforms;
- snagging risks; and
- aviation collision risks.

Following the application of Embedded Mitigation, the assessment concluded that the Proposed Development is not expected to result in MADs. Risks are effectively managed through industry standards, risk assessments, and operational plans.

As the risk of MADs has been mitigated, no cumulative effects assessment specific to MADs was undertaken. Similarly, no transboundary impacts were assessed, as the likelihood of MADs occurring is considered **Negligible**.

Socio-economics, Tourism and Recreation

This topic considers how the Project (both onshore and offshore parts) may affect economic activity, labour markets, housing and service demand, community wellbeing, and tourism and recreation. The baseline was established through a desk-based data review.

The Regional Socio-Economics Study Area (Aberdeenshire, Aberdeen City and Angus) currently performs strongly compared to Scotland and the UK in terms of employment, income level and skills. The region has a skilled workforce, established ports and supply chains, and growing opportunities linked to the transition

from oil and gas to offshore wind. While parts of the region face housing pressures and constraints on health services, capacity within education and other local services is broadly comparable to national averages.

Tourism and recreation in the Tourism and Recreation Study Area (Aberdeenshire and Aberdeen City) are well established and closely linked to coastal landscapes, heritage and marine activities. Walking, sailing, boating and wildlife watching are key recreational uses

Potential impacts across construction, O&M, and decommissioning phases include:

- increases in employment, skills development and Gross Value Added;
- demographic changes;
- shifts in demand for housing and local services;
- changes to tourism and recreation receptors;
- socio-cultural changes.

The assessment found significant positive effects on economic activity during construction and O&M phases. However, there may be significant effects on demographics, housing and services, depending on the location of the O&M port.

Following Embedded Mitigation, no significant residual effects were identified for tourism, recreation or socio-cultural receptors across any phase.

Cumulatively, the Project and other developments are expected to boost economic activity across Scotland and the UK. This may lead to resource competition and growth in the offshore wind supply

chain, but these are expected to be manageable and not significant at national levels. Cumulative effects on housing and infrastructure will depend on whether rural or urban ports are selected. Rural ports are more likely to experience significant impacts due to limited capacity.

No significant transboundary impacts were predicted for socio-economics, tourism, or recreation affecting other EEA states.

Marine Archaeology

Marine archaeology receptors refer to traces of human activity in the marine environment, including shipwrecks, aircraft, and submerged prehistoric landscapes. The baseline for the Proposed Development was established through site-specific geophysical surveys and a desk-based assessment.

The surveys identified:

- four geophysical anomalies of high archaeological potential;
- nine anomalies of medium potential;
- numerous low-potential anomalies and magnetic anomalies;
- known wrecks and obstructions;
- recorded losses of wrecks and aircraft;
- intertidal heritage receptors;
- potential for unknown archaeological features; and
- submerged landscapes with archaeological interest.

Potential impacts assessed across construction, O&M, and decommissioning phases include:

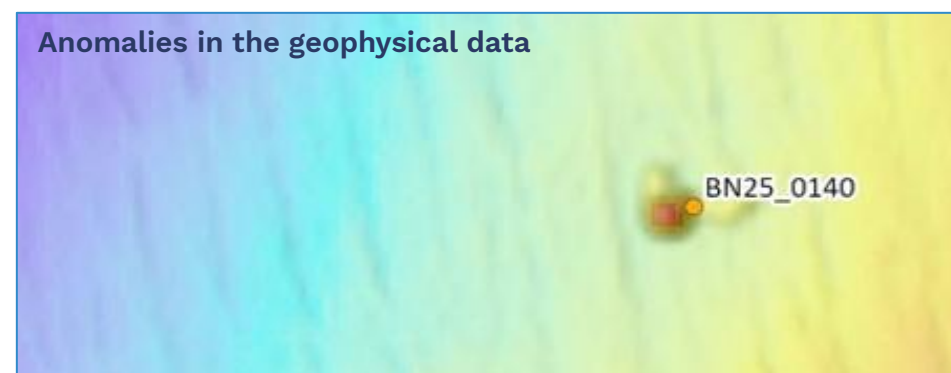
- increased suspended sediment concentrations and sediment deposition;
- direct physical damage; and
- alteration of sediment transport regimes.

With proposed mitigation measures in place, all impacts were assessed as not significant in EIA terms.

Cumulative impacts from other offshore infrastructure (e.g. cables and pipelines) were also assessed and found to result in **Minor** adverse effects, which are not significant in EIA terms.

No significant transboundary impacts were predicted for marine archaeology affecting other EEA states.

A Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) has been prepared for the Proposed Development and details the principles to be implemented to ensure the protection of marine archaeological receptors through all phases of the Proposed Development (construction, O&M, and decommissioning).



Seascape and Landscape Visual Impact Assessment

This assessment considers the potential effects of the Proposed Development on seascape, landscape, and visual receptors within a 60 km Study Area, following relevant legislation, policy, and guidance. The scope and methodology were agreed through consultation with MD-LOT, NatureScot, Aberdeenshire Council and Angus Council.

The baseline was established through desk study, fieldwork, and analysis, identifying two National Seascape Character Types and 25 Landscape Character Types within the Study Area, based on NatureScot's National Character Maps.

The Proposed Development is located over 38 km from mainland Scotland, and potential impacts across construction, O&M, and decommissioning phases include:

- short-term indirect effects on seascape and landscape character during construction and decommissioning;
- short-term localised direct effects on landscape character; and
- long-term visual impacts during the O&M phase.

With Embedded Mitigation in place, the predicted short-term indirect and direct effects upon landscape and seascape character are assessed as not significant in EIA terms.

The level of visual impact depends on viewer sensitivity, viewing opportunity, and weather conditions. Significant visual effects are likely at open coastal locations closer to the Proposed Development.

Cumulative impacts were assessed, considering existing and under-construction offshore wind farms. The addition of the Proposed Development was found to result in no significant cumulative effects on views or landscape/seascape receptors, due to limited and distant visibility of Wind Turbines.

No significant transboundary impacts were predicted for seascape, landscape, or visual receptors affecting other EEA states.

Cultural Heritage

Cultural heritage, in the context of the offshore assessment, refers to historic monuments, buildings and sites that are valued for their architectural, historic or archaeological interest, together referred to as cultural heritage assets. The cultural significance of such assets draws to varying degrees upon their setting.

There are a large number of heritage assets within the Cultural Heritage Study Area. These range in date from early Prehistory to the 20th century, and include burial cairns, settlements, ecclesiastical sites, lighthouses, castles and fortifications. Many of these have visual relationships with the sea but very few are sensitive to distant change.

This assessment has identified cultural heritage assets as receptors where the Proposed Development might conceivably result in change that would substantively affect their cultural significance. This has been done through desk-based research, consultation and the use of a Zone of Theoretical Visibility. The receptors include three coastal castles, a coastal battery and two lighthouses.

The assessment, informed by appropriate visualisations, concluded that the Proposed Development will result in visual change in the setting of the cultural heritage receptors, but that in

all cases this will result in effects of **Minor** significance and is not significant in EIA terms. These conclusions have been reached owing to the Array Area being in excess of 40 km from the receptors. At such distances the proposed Wind Turbines will appear as part of the distant seascape. While the receptors' cultural significance draws upon visual relationships with the sea and relatively long range views, such distant change in the seascape does not have the potential to result in likely significant environmental effects in EIA terms.



The potential for cumulative effects to arise from the Proposed Development in combination with other offshore wind farms within 60 km was assessed. It is considered that there is no potential for cumulative effects to occur.

No likely significant transboundary effects with regard to cultural heritage from the Proposed Development on the interests of other EEAs were predicted.

Climatic Change

Climate change refers to long-term shifts in temperature and weather patterns, primarily driven by human activities. The assessment considered two aspects:

- Greenhouse Gas (GHG) emissions from the Project; and
- effects of future climate on the Proposed Development.

It is important to note that the offshore and onshore elements do not operate alone, therefore GHG emissions have been calculated based on both the onshore and offshore elements of the Project. GHG emissions and climate risks were assessed using desk-based studies and published data. The current baseline for GHG emissions relates to seabed areas occupied by the Proposed Development, primarily sandy sediments with low levels of Blue Carbon. These sediments were assessed for potential carbon disturbance. The future baseline is expected to remain similar.

Climate risks were assessed using current climate observations and future projections over the Project's 30 year lifetime, including changes in temperature, precipitation, and wave height.

Potential impacts assessed across construction, O&M, and decommissioning phases include:

- GHG emissions from Blue Carbon disturbance;
- emissions from manufacturing and installation;
- emissions from O&M activities and National Grid abatement;

- emissions from decommissioning;
- climate change effects on the Proposed Development; and
- net GHG impact.

With Embedded Mitigation, most impacts were assessed as **Negligible** or **Minor** adverse, which are not significant in EIA terms. However:

- manufacturing and installation emissions were initially assessed as **Moderate** adverse (significant); and
- O&M emissions and net GHG impact were assessed as **beneficial** (significant).

With Additional Mitigation, manufacturing and installation emissions were reduced to **Minor** adverse, making them not significant in EIA terms.

Cumulative effects from the Proposed Development and proposed Onshore Transmission Assets were assessed as beneficial (significant) due to their contribution to UK and Scotland's net zero goals and the high sensitivity of climate as a receptor. Overall, the Project would have a carbon payback period of two years (at the earliest) when accounting for construction, O&M and decommissioning phase emissions. The carbon payback period is the time it takes for a renewable energy project to offset the GHGs emitted during its construction and begin displacing grid-based electricity generated from non-renewable sources.

Inter-Related Effects

The inter-related effects assessment explores how different environmental impacts from the Proposed Development may combine or interact across its construction, O&M and decommissioning phases. It considers both individual effects on specific receptors and ecosystem-level interactions.

The assessment follows a two-part methodology:

- Part 1: Examines how multiple impacts may affect a single receptor group (e.g. fish, seabirds) either simultaneously or over time.
- Part 2: An Ecosystem-Based Effects Assessment, which evaluates broader impacts on food webs and ecosystem functioning.

Physical processes (e.g. sediment movement, water levels, currents) were found to be localised and temporary, mainly during construction and decommissioning. No long-term or cumulative impacts were identified.

Benthic ecology impacts, including habitat disturbance and artificial structure colonisation, were deemed **Minor** and recoverable. Risks from invasive species are managed through a dedicated plan.

Fish and shellfish may be affected by noise and EMF. The only significant effect identified was underwater noise from piling, which could affect herring spawning. This is mitigated through the agreement of appropriate Addition Mitigation in the Piling Strategy that will be approved prior to construction, reducing the impact to **Minor**.

Marine mammals face risks from noise, vessel collisions, and prey changes. These effects are local, temporary, and reversible, with no population-level impacts expected.

Seabirds may be affected by a range of impacts including collision risk, disturbance and displacement, and light attraction. However, both project-led and receptor-led inter-related effects are considered to be not significant, as the effects are temporary and localised, with birds expected to adapt or recover.

Bats were found to have no roosts in or around the Proposed Development. There are no inter-related effects that are predicted to arise during any phase of the Proposed Development.

Commercial fisheries may face access restrictions, gear conflict, and vessel interference. These impacts are mitigated and not expected to combine in a way that increases significance.

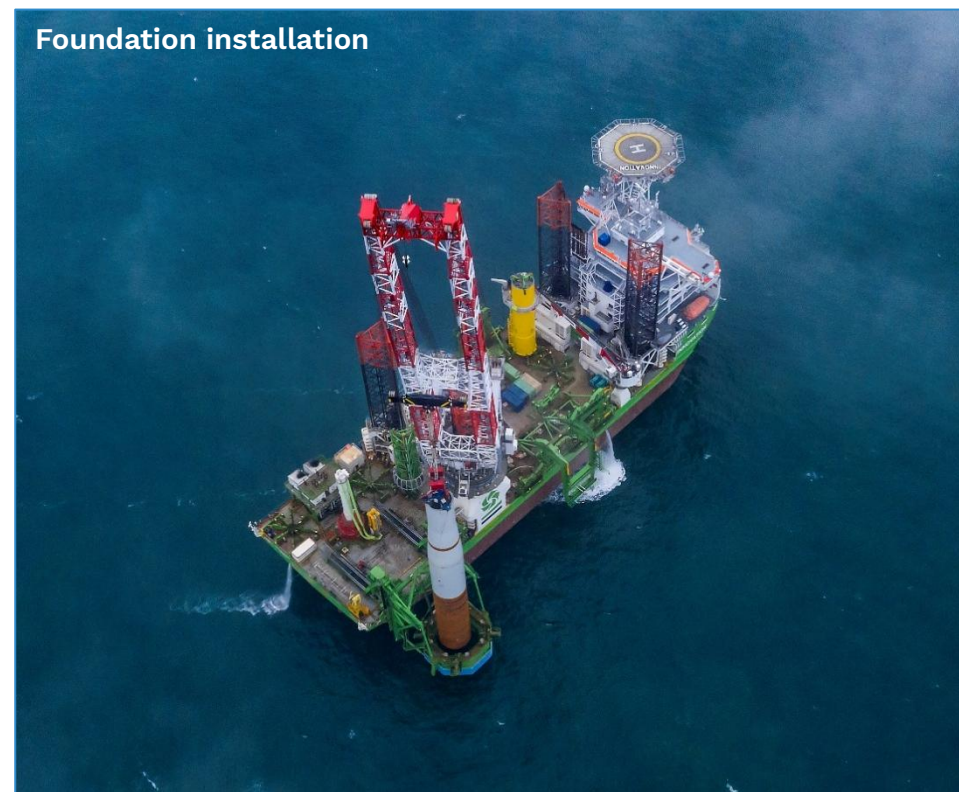
Shipping, navigation, aviation, and infrastructure risks (e.g. snagging, collision, radar interference) are managed through standard safety protocols, with no significant inter-related effects predicted.

Socio-economics, tourism, recreation, and marine archaeology impacts are mostly indirect or Minor. Tourism effects are linked to other environmental changes. Socio-economic impacts are positive, and archaeological effects may be beneficial due to sediment burial.

Seascape, landscape and visual impacts, as well as cultural heritage impacts, people will only perceive the effect one way (visually) at one point in time, and will not experience the construction, O&M and decommissioning phases simultaneously, or across multiple pathways.

The ecosystem-based assessment highlights the role of species like sandeel and herring in food web stability. While vulnerable to external pressures, the Proposed Development is not expected to cause significant disruption. Artificial structures may enhance biodiversity, and the shift to renewable energy supports climate resilience.

In conclusion, the Proposed Development is unlikely to result in significant adverse inter-related or ecosystem-level effects, with most impacts being local, temporary, and reversible (i.e. limited to the immediate area, short-lived, and able to recover over time).



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