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Caledonia Offshore Wind Farm

Environmental Impact Assessment Report Non-Technical Summary

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Table of Contents

List of Figures

List of Tables

Acronyms and Abbreviations

ALARP	As Low As Reasonably Possible
CCR	Climate Change Resilience
CEMP	Construction Environmental Management Plan
CO2	Carbon Dioxide
CTMP	Construction Traffic Management Plan
DAS	Digital Aerial Survey
DE	Design Envelope
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMF	Electromagnetic Frequency
EMP	Environmental Management Plan
GHG	Greenhouse Gas Emissions
GW	Gigawatts

HDD	Horizontal Directional Drilling
HND	Holistic Network Design
ICCI	In-Combination Climate Change Impact
IEMA	Institute of Environmental Management and Assessment
IFP	Instrument Flight Procedure
INNS	Invasive Non-native Species
km	Kilometre
kV	Kilovolts
LAT	Lowest Astronomical Tide
LCT	Landscape Character Type
MHWS	Mean High Water Spring
MLWS	Mean Low Water Spring
NATS	National Air Traffic Service

NETS	National Electricity Transmission System
NMU	Non-Motorised Users
NSRs	Noise Sensitive Receptors
NTS	Non-Technical Summary
OCT	Open Cut Trench
OECC	Offshore Export Cable Corridor
ONEC	Onshore Export Cable Corridor
OnTI	Onshore Transmission Infrastructure
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
PPP	Planning Permission in Principle
PSR	Primary Surveillance Radar
RAF	Royal Air Force
RLB	Red Line Boundary

RRH	Remote Radar Head
SAR	Search and Rescue
SEZ	Structure Exclusion Zone
SSC	Suspended Sediment Concentration
SSEN-T	Scottish and Southern Electricity Networks – Transmission
T&T	Traffic and Transport
tCO2e	tonnes of carbon dioxide equivalent
TJB	Transition Joint Bays
UK	United Kingdom
VER	Valued Ecological Receptor
WCS	Worst-case Scenario
WTG	Wind Turbine Generator
WFD	Water Framework Directive

1 Introduction

Caledonia Offshore Wind Farm Limited (the Applicant) is proposing the development of the Caledonia Offshore Wind Farm (OWF) (the Proposed Development), an OWF within the outer Moray Firth, off the north-east coast of Scotland. The Proposed Development consists of both the Proposed Development (Onshore) and the Proposed Development (Offshore) components to generate and transmit the power from the OWF area to new Onshore Substations in the New Deer area, Aberdeenshire. An overview of the key Proposed Development components is shown in Figure 1 overleaf.

The Applicant is seeking to deliver electricity to the grid from 2030. Due to the volume of national grid reinforcement works required to connect offshore wind projects and commercial drivers, the Applicant is expecting the Proposed Development to be developed in phases. To support with the deliverability of these phases, the Applicant is submitting two offshore consent applications (each covering Section 36 and associated Marine Licences) for the Proposed Development (Offshore). The two consent applications for each of the phases of the Caledonia OWF are referred to as:

- Caledonia North; and
- Caledonia South.

To provide flexibility, the assessment considers up to 77 Wind Turbine Generators (WTGs) in Caledonia North and up to 78 WTGs in Caledonia South, however the total WTGs of the Proposed Development (Offshore) will not exceed 140 WTGs.

An Environmental Impact Assessment Report (EIAR) covering the Caledonia North and Caledonia South application areas and the Proposed Development (Onshore) has been prepared to fully assess the potential environmental effects of the Caledonia OWF across all likely delivery scenarios.

The EIAR supports the Section 36 Consents, Marine Licences and Planning Permission in Principle (PPP) being sought for the Proposed Development.

The purpose of this Non-Technical Summary (NTS) is to provide a simplified description of the Proposed Development and a summary of the main findings of the EIAR in accessible, non-technical language to ensure that the outcomes of the EIAR are clearly communicated and understood by the public, stakeholders and decision makers.

The NTS is structured as follows:

- 1. Introduction
- 2. Need for the Proposed Development
- 3. The Proposed Development
- 4. Construction, Operation and Decommissioning
- 5. The Environmental Impact Assessment Process
- 6. Offshore Environmental Effects
- 7. Onshore Environmental Effects
- 8. Intertidal and Combined Effects

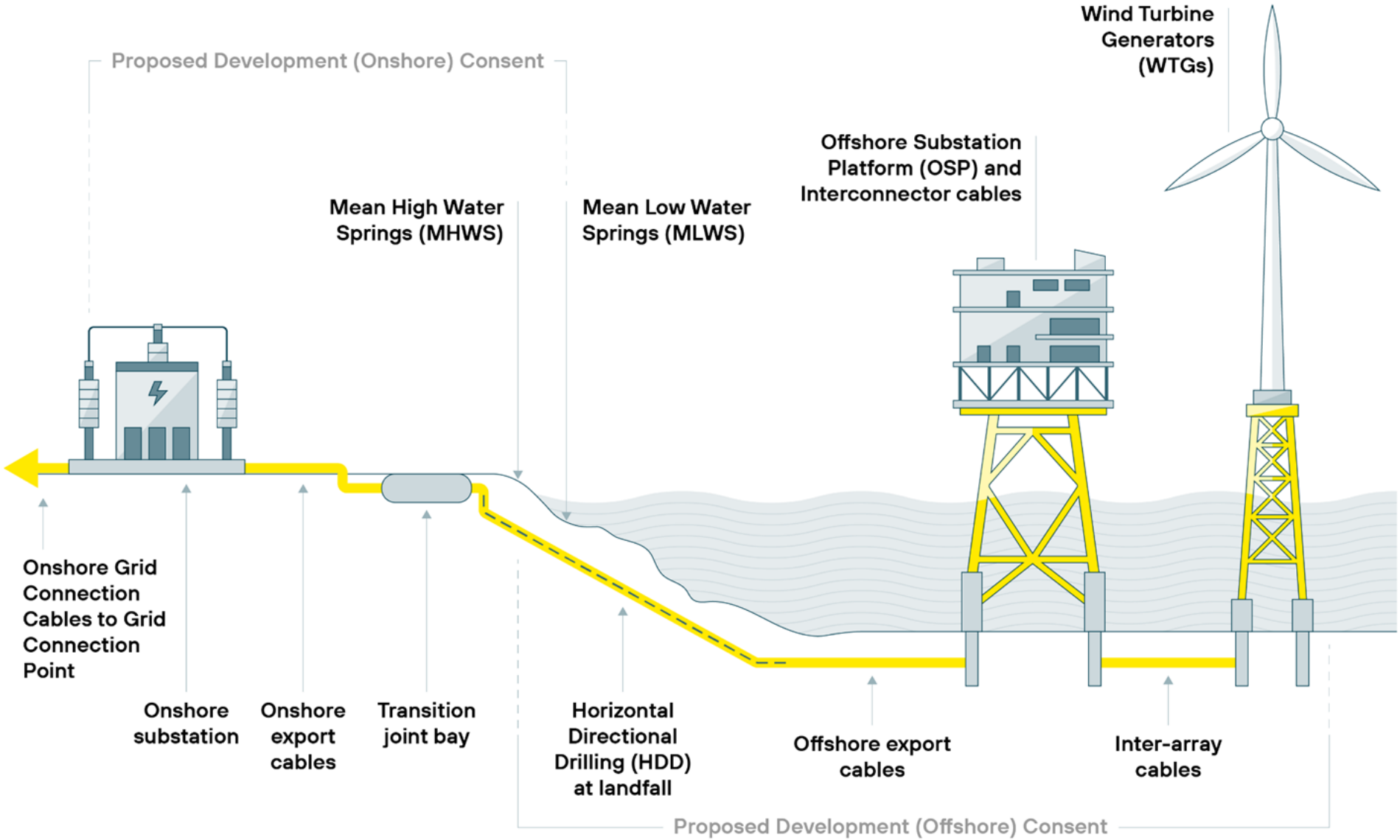


Figure 1: The Proposed Development overview indicative schematic

2 Need for the Proposed Development

The following key considerations, which relate to Scottish and United Kingdom (UK) energy policies, demonstrate the need for the Proposed Development:

- **Delivery of Scottish Government Energy Policy:** Scotwind is a primary component of the Scottish Government's Energy & Net Zero policy:

  > *"Today, I would like to update Parliament on the outcome of the ScotWind Offshore Wind Leasing Round, a major milestone in our journey to Net Zero; ScotWind will provide us with enough power for every home in Scotland, place Scotland at the forefront of the green hydrogen revolution and allow us to become a major exporter of clean energy."* (Michael Matheson, Cab Sec for Net Zero & Energy, Scottish Government Press Release 18 January 2022).

- **Deliverability:** As one of the few ScotWind sites capable of early delivery using proven technology (fixed bottom foundations), the proposed development is a vital contributor to the Scottish and UK Government's energy policy targets.
- **Climate Change, Net Zero and Decarbonisation:** Both the Scottish Government and UK government have ambitious targets relating to climate change and net zero to mitigate the impacts of global climate change. The Proposed Development will contribute substantially to these targets through the generation of low-carbon renewable energy.
- **Security of Supply:** Energy security has become a greater concern in recent years following Covid, and Russia's invasion of Ukraine. These events highlighted the importance of energy independence from imported sources. Offshore wind is considered to be a key step in reducing Scotland's reliance on imported sources given the industry's maturity in Scotland.
- **Affordability of Supply:** Ensuring the energy is available to consumers at the lowest possible cost to ensure the highest quality of life. The Offshore Wind Policy (Scottish Government, 2020a[1]) statement states "Offshore wind is one of the lowest cost forms of electricity generation at scale, offering cheap, green electricity for consumers, with latest projects capable of generating power at below wholesale electricity prices". It is therefore considered the expansion of offshore wind will improve the affordability of supply for the UKs citizens.

The Proposed Development, in generating and exporting low-carbon renewable energy, will make an important contribution in helping to achieve the climate change policy aims and legislative requirements.

The Proposed Development will also contribute to Scotland and UK net zero targets as well as offshore wind overall delivery targets.

3 The Proposed Development

3.1 Caledonia North

Caledonia North is located within the NE4 Plan Option identified in the Scottish Government's Sectoral Marine Plan (SMP) for Offshore Wind Energy (Scottish Government, 2020[2]). The Caledonia North Array Area is approximately 218.5km^2 in size with the northern limit approximately 28km from Wick and the southern limit of the site being approximately 48km from Banff.

A summary of the infrastructure proposed within Caledonia North is provided below:

- Up to 77 WTGs with a maximum blade tip height of 355m to be installed across Caledonia North using fixed foundations;
- Up to two Offshore Substation Platform(s) (OSPs) which transform electricity generated by the WTGs to a higher voltage allowing more efficient transmission to shore;
- Inter-array cables which connect the WTGs together;
- An interconnector cable which connects the Caledonia North OSPs to each other; and
- 2 x Offshore Export Cable (OEC) circuits with a maximum combined length of 180km within an Offshore Export Cable Corridor (OECC) which will be laid between the OSPs and Landfall Site.

3.2 Caledonia South

Caledonia South is located within the NE4 Plan Option identified in the Scottish Government's SMP for Offshore Wind Energy (Scottish Government, 2020[2]). The Caledonia South Array Area is approximately 204.5km^2 in size with the northern limit being approximately 45km from Wick and the southern limit being approximately 35km from Banff.

A summary of the infrastructure within Caledonia South is provided below:

- Up to 78 WTGs with a maximum blade tip height of 355m to be installed across Caledonia South using fixed and floating foundations (with floating foundations, if installed, restricted to the deeper southern part of the site);
- Up to two OSP which transform electricity generated by the WTGs to a higher voltage allowing more efficient transmission to shore;
- Inter-array cables which connect the WTGs together;
- An interconnector cable which connects OSPs to each other; and
- 2 x OEC circuits with a maximum combined length of 150km within an OECC which will be laid between the OSPs and Landfall Site.

3.3 Proposed Development (Offshore)

Caledonia North and Caledonia South as well as all associated Offshore Transmission Infrastructure (OfTI) are collectively

defined as the Proposed Development (Offshore). Flexibility is needed to retain which phase (North or South) is constructed first and connected to the grid. Therefore, while the Environmental Impact Assessment (EIA) considers up to 77 WTG in Caledonia North and up to 78 WTG in Caledonia South, the total WTGs of the Proposed Development (Offshore) will not exceed 140 WTGs. There would be up to two export cable installation phases, aligned with the Caledonia North and Caledonia South construction phases.

3.4 Proposed Development (Onshore)

The purpose of the Onshore Transmission Infrastructure (OnTI) will be to supply power generated by the Caledonia OWF to the National Electricity Transmission System (NETS) onshore. The power will be transmitted as a High Voltage Alternating Current (HVAC). To enable this, the following infrastructure, collectively referred to as the Proposed Development (Onshore), is proposed:

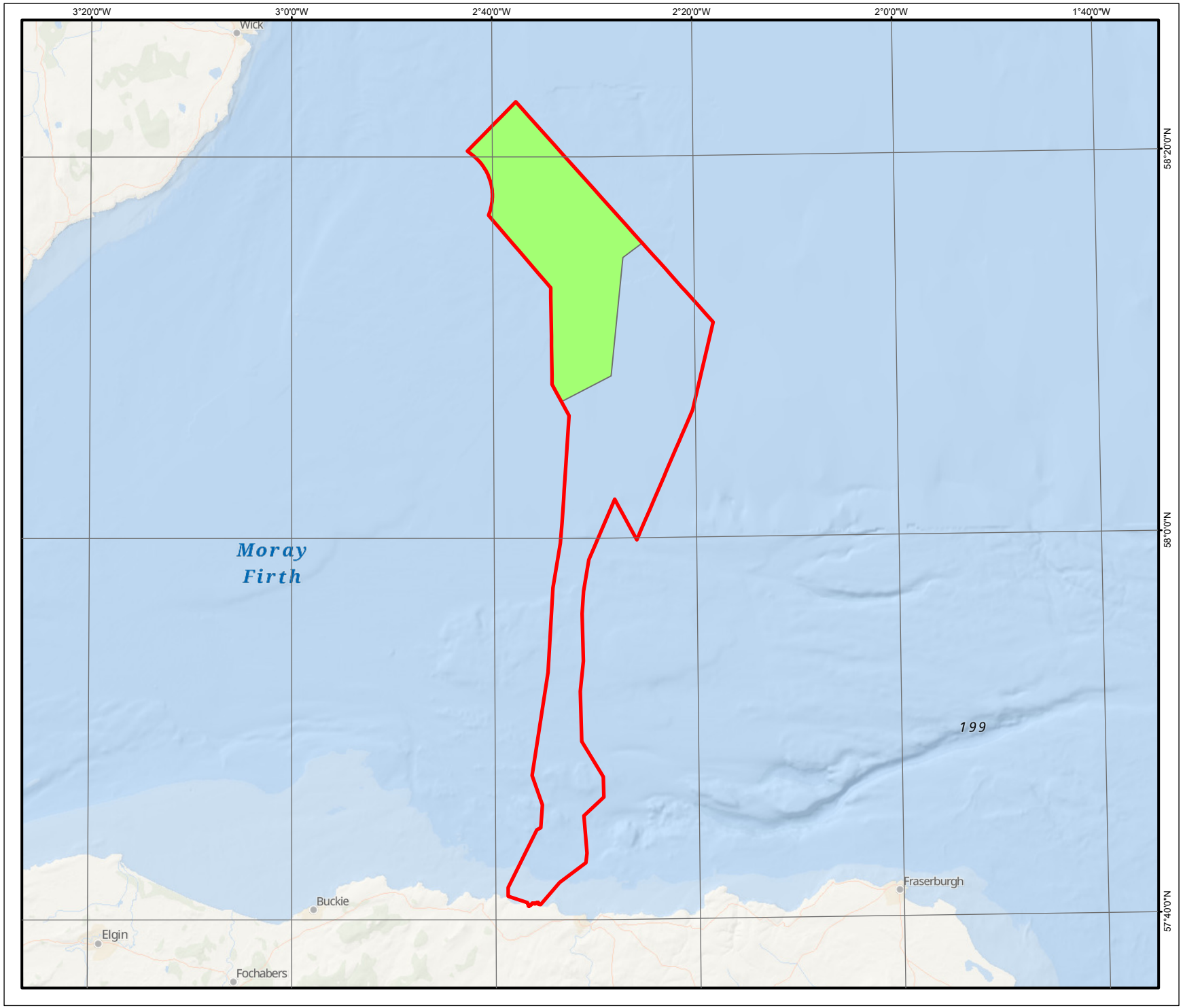
- A Landfall Site which will comprise up to 4 x Horizontal Directional Drilling (HDD) ducts and Transition Joint Bays (TJBs) to connect Offshore Export Cable Circuits to Onshore Export Cable Circuits.
- An Onshore Export Cable Corridor (ONEC) with a minimum width of 100m within which up to 4 x Onshore Export Cable Circuits will be located. At this stage, an ONEC has been defined to allow for micro siting of the Onshore Export Cable Circuits at the detailed design stage and to allow for differing cable installation activities such as HDD.
- Two Onshore Substations will be co-located within an Onshore Substation Site within the OnTI Red Line Boundary (RLB) adjacent to the existing New Deer Substation. Figure 5 outlines the Onshore Substation Site Location and provides an indicative concept design of the Onshore Substations; however, it should be noted that the layout of the Onshore Substation Site will be refined through further technical studies at the detailed design stage.
- An Onshore Grid Connection Cable Corridor which will contain up to 2 x Onshore Grid Connection Cable Circuits and connect the Onshore Substations to the Grid Connection Point at New Deer for Phase 1.

3.5 Proposed Development Phasing

The Applicant has proposed a potential phased approach to offshore construction to manage uncertainties around investment decisions, supply chain and grid connection constraints. Phasing has been designed to address uncertainties around precise timings of the delivery of Caledonia North and Caledonia South.

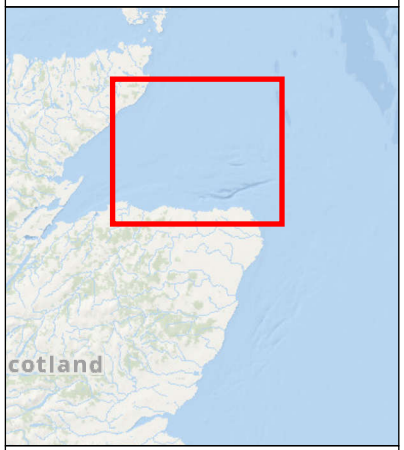
The approach to the consenting of the Proposed Development (Onshore) aligns with the phased offshore application strategy, and therefore considers up to two onshore construction phases to align with the delivery of the Caledonia North and Caledonia South offshore phases.

Given the potential for phased delivery, a range of assessment scenarios have been considered by the EIAR. These include delivering both phases sequentially or concurrently and the potential for completion of some enabling works during the first phase of onshore construction.



Proposed Development (Offshore) Application Area

Extent of Caledonia North Array Area Section 36 and Generation Marine Licence



0 5 10 15 20 km

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01	07/10/2024	Approved	CW	AC	EC

CALEDONIA Offshore Wind Farm

ARUP

CONTRACTOR DRAWING NO: UKCAL1_ARP_WNF_ENV_MAP_00607	CONTRACTOR REV: 01
GEODETIC PARAMETERS: WGS 84 / UTM Zone 30N (EPSG:32630)	

DRAWING TITLE

Figure 2: Caledonia North Application Area

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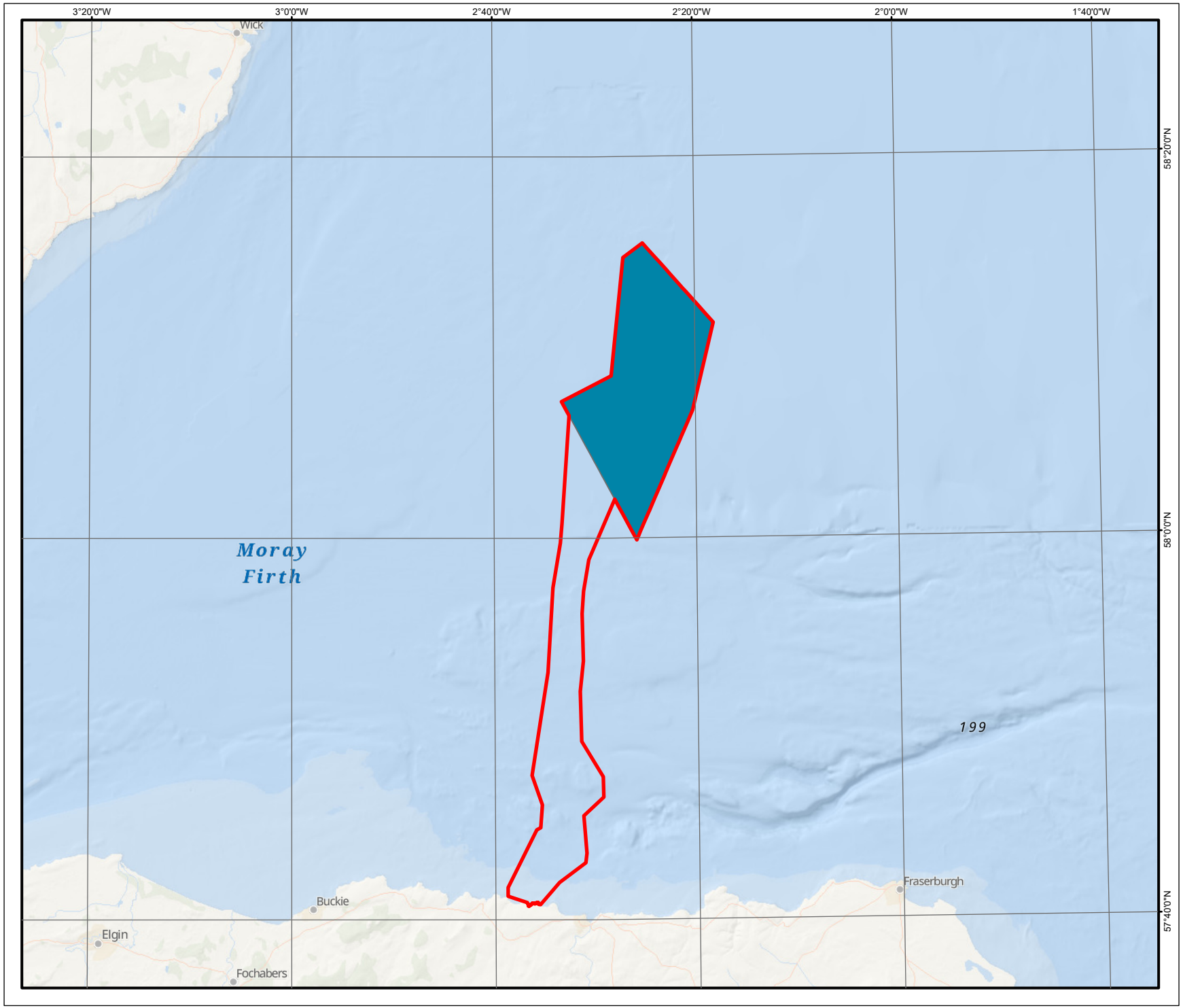
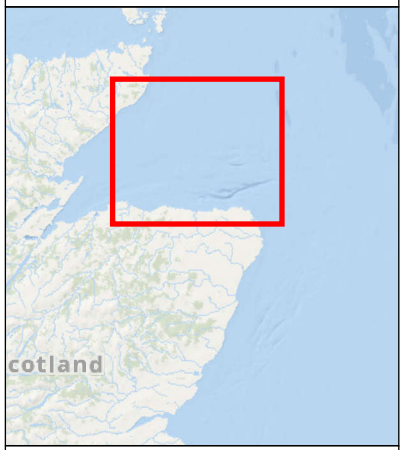


Extent of Caledonia South Offshore Transmission Infrastructure Marine License

Extent of Caledonia South Array Area Section 36 and Generation Marine Licence



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CALEDONIA Offshore Wind Farm

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Figure 3: Caledonia South Application Area

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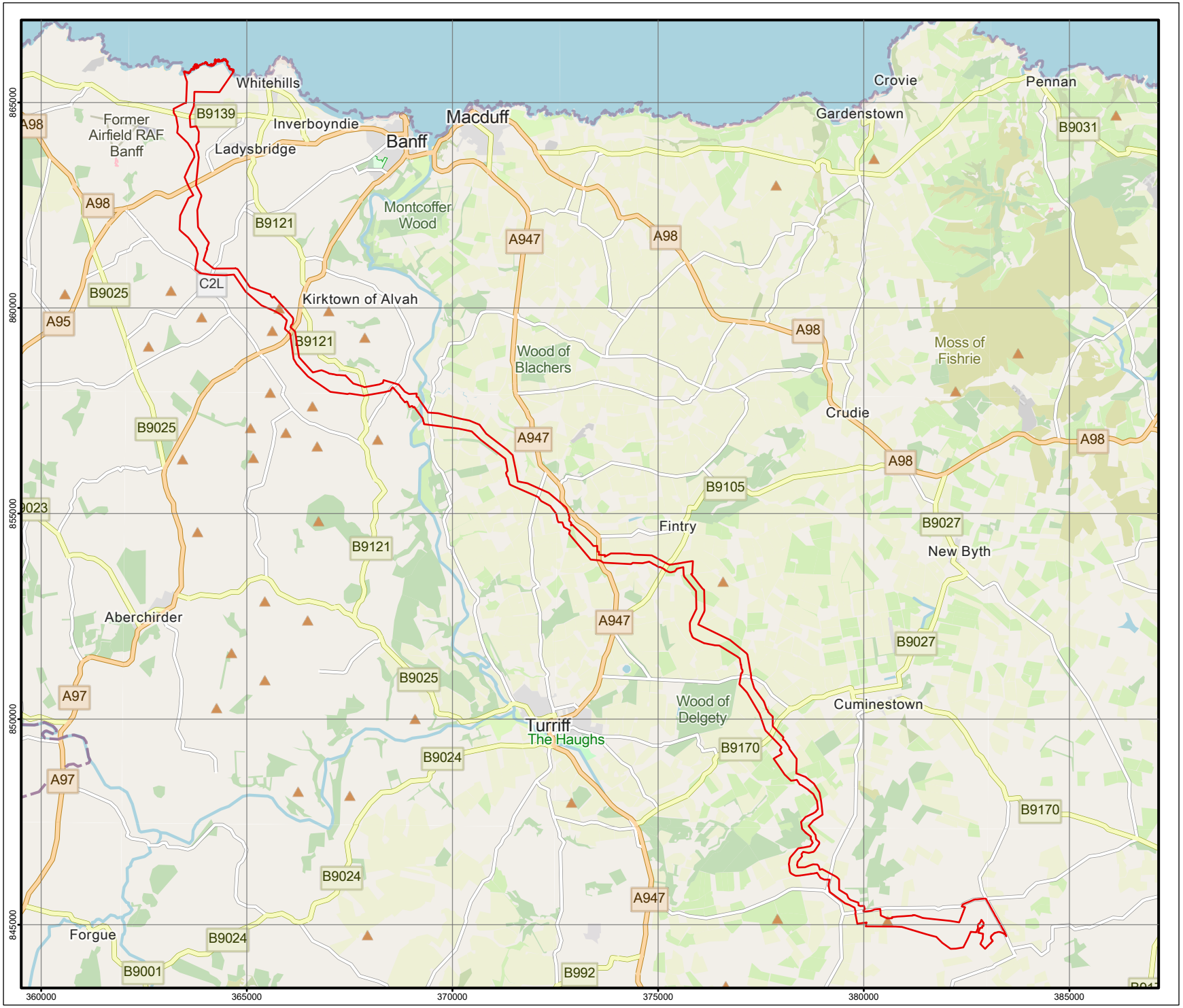

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CALEDONIA Offshore Wind Farm

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CONTRACTOR DRAWING NO: UKCAL1_ARP_WNF_ENV_MAP_00609	CONTRACTOR REV: 01
GEODETIC PARAMETERS: OSGB36 / British National Grid (EPSG:27700)	

DRAWING TITLE

Figure 4: Proposed Development (Onshore) Red Line Boundary

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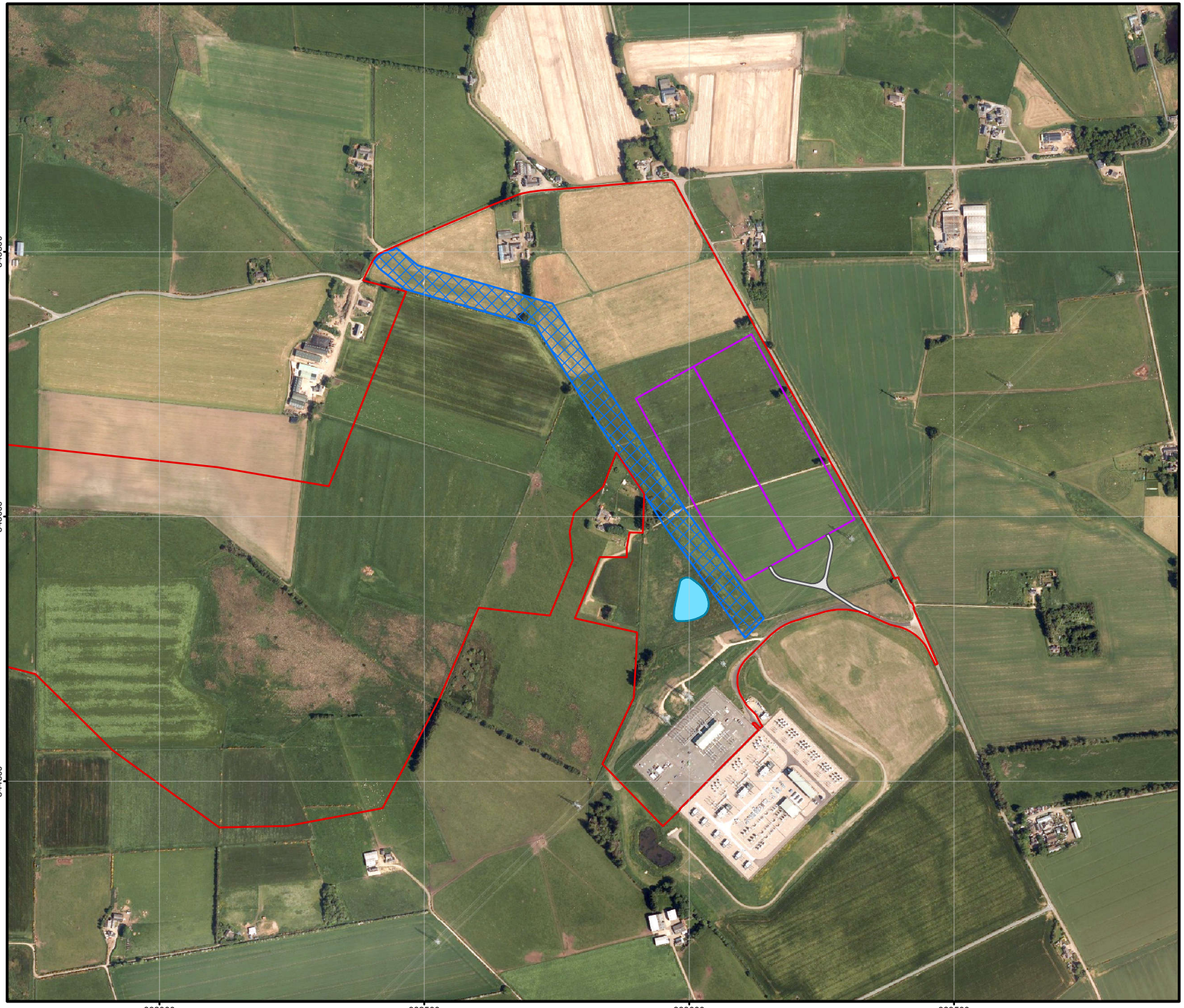
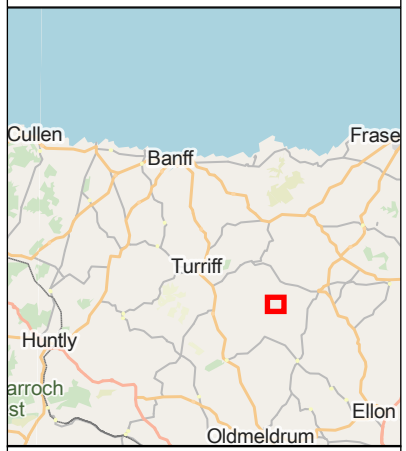


- Onshore Transmission Infrastructure Red Line Boundary
- Indicative Onshore Substations
- Indicative Permanent Onshore Substations Access
- Sustainable Drainage System Area
- Moray East Onshore Cable Route



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REV	DATE	DOC STATUS	ORIGIN	REVIEW	APP
01	07/10/2024	Approved	CW	AC	EC

CALEDONIA Offshore Wind Farm

ARUP

CONTRACTOR DRAWING NO: UKCAL1_ARP_WNF_ENV_MAP_00610	CONTRACTOR REV: 01
GEODETIC PARAMETERS: OSGB36 / British National Grid (EPSG:27700)	

DRAWING TITLE

Figure 5: Onshore Substation Site

STATUS: Approved	SCALE: 1:10,000	
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3.6 Design Envelope Approach

The Proposed Development design will not be finalised until after planning consent has been granted following detailed design. Therefore, a Design Envelope (DE) approach has been used for the EIA. The DE approach enables a range of parameters to be presented for each offshore and onshore aspect which provides the flexibility to allow for further refinement of the design post-consent. In all cases the EIA has assessed the maximum impact option(s) that could be constructed and operated to ensure that all potential environmental impacts have been assessed appropriately.

3.7 Consent and Regulatory Requirements

The Proposed Development (Offshore) is located within the Scottish Territorial Waters (extending to 12 nautical miles (nm) from shore) and the UK Exclusive Economic Zone (EEZ) (between 12 and 200 nm). The Scottish Ministers are the Regulatory Authority in respect of the necessary consents and licences required for the construction and operation of an OWF project.

A PPP is required (from Mean Low Water Spring (MLWS)) for the Proposed Development (Onshore) under the Town and Country Planning (Scotland) Act 1997 (as amended).

The consents will be required by the Proposed Development are outlined in Table 1.

Table 1: Required consents for the Proposed Development

Component of the Proposed Development		Consents
Proposed Development (Offshore)	Caledonia North	A Section 36 consent for Caledonia North under the Electricity Act 1989, submitted to the Marine Directorate - Licensing Operations Team (MD-LOT). These consents will allow the Applicant to build and operate the OWF generating stations. A Generation Marine Licence for Caledonia North submitted to MD-LOT to allow the deposition of WTG and associated infrastructure on the seabed. A Transmission Marine Licence, submitted to MD-LOT, for the OfTI for Caledonia North.
	Caledonia South	A Section 36 consent for Caledonia South under the Electricity Act 1989, submitted to the MD-LOT. These consents will allow the Applicant to build and operate the OWF generating stations. A Generation Marine Licence for Caledonia South submitted to MD-LOT to allow the deposition of WTG and associated infrastructure on the seabed. A Transmission Marine Licence, submitted to MD-LOT, for the OfTI for Caledonia South.
Proposed Development (Onshore)		A PPP for the OnTI, submitted to Aberdeenshire Council (ADC).

4 Construction, Operation and Decommissioning

4.1 Proposed Development (Offshore)

Construction

Pre-construction activities will be required post-consent for the Proposed Development (Offshore). This will include a survey campaign comprising detailed geophysical and geotechnical surveying. The site will then be prepared for construction and the installation of WTGs, OSPs and cables. Site preparation activities will include boulder clearance, dredging and seabed levelling, Unexploded Ordnance (UXO) survey and clearance, and pre-lay grapnel run to remove out cabling and fishing nets etc.

Construction activities will involve the following:

- Installation of WTG foundation substructures/anchors (Figure 7 a, b);
- Installation of OSP foundations and topside (Figure 7 c, d);
- Inter-array and interconnector cable installation, termination and testing;
- Laying of offshore export cable from landfall to the OWF (Figure 7 e); and
- WTG installation and commissioning (Figure 7 f).

The assessment DE approach considered a number of different potential WTG foundation designs (these are shown in Figure 6).

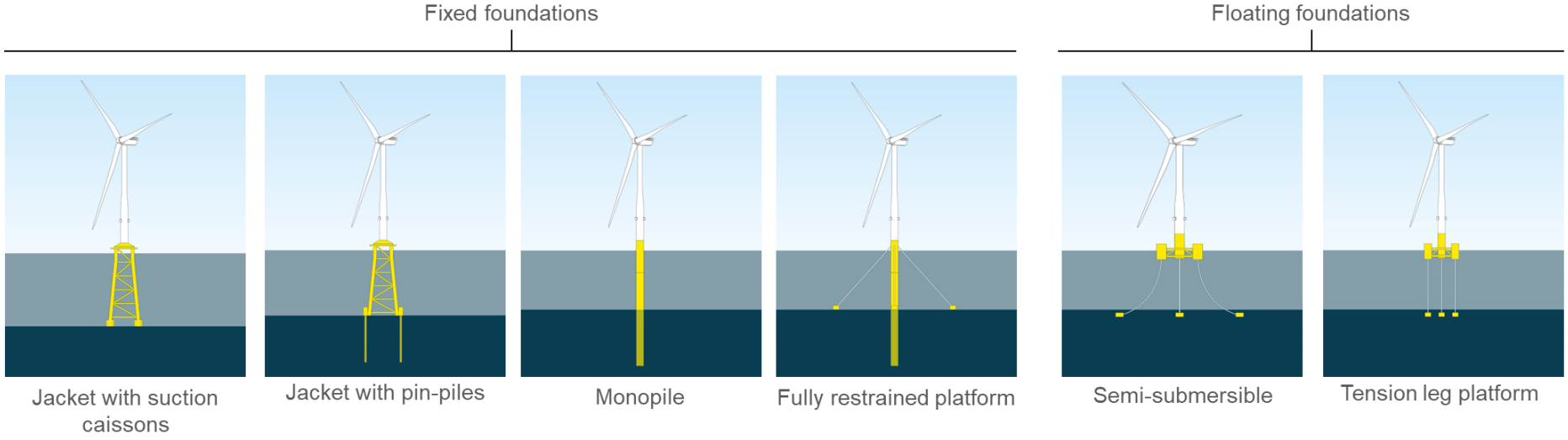

Figure 6: Wind turbine generator foundation types considered in the assessment of construction, operation and decommissioning

a) Moray West monopile loadout by Orion

b) Moray West monopile installation by Bokalift 2

c) Moray West transition piece installation by Apollo

d) Moray West OSP 1 and JUV Leviathan

e) Moray West export cable lay by Skagerak (not pictured)

f) Moray West blade installation by Wind Orca

Figure 7: Illustrative construction phase photos from Moray West

Caledonia South is likely to include floating WTGs in deeper areas. These would be wet-towed to the installation location either from the assembly port or a wet storage location and then connected to mooring lines already attached to the installed piles/anchors.

It is anticipated that construction works associated with Proposed Development (Offshore) will take approximately 3-4 years to complete per application area. There is likely to be an overlap of construction of the phases or a potential gap of up to 5 years between phases.

Operation & Maintenance and Decommissioning

The Proposed Development (Offshore) has an anticipated operational lifespan of 35 years. It is anticipated that throughout this lifespan the Proposed Development (Offshore) will operate with minimum day-to-day operation and maintenance interventions.

The final Operation and Maintenance (O&M) strategy will be finalised post-consent and will be informed by the location of the O&M base(s) and final design parameters. Potential O&M activities is likely to include:

- WTG: routine servicing, blade inspections, scheduled maintenance, fault rectification, major overhauls and major component replacement.
- OSP: preventative maintenance approximately every 3 months and corrective maintenance as required.
- Foundations: preventative maintenance approximately every year and corrective maintenance as required.
- Cables (interconnector, inter-array and offshore export): preventative maintenance approximately every year and corrective maintenance as required.

At the end of the operational lifetime of Proposed Development (Offshore), it is anticipated that all structures above the seabed level will be completely removed. The decommissioning of Caledonia North and Caledonia South may or may not be carried out at the same time. The decommissioning sequence and method is anticipated to generally be the reverse of the construction sequence and involve similar types and numbers of vessels and equipment. Closer to the time of decommissioning, it is likely to be decided that removal would lead to greater environmental impacts than leaving components in situ, in which case certain components may be cut at or below the seabed (e.g., piles) or left buried (e.g., inter-array, interconnector and offshore export cables).

4.2 The Proposed Development (Onshore)

Construction

Pre-construction activities will be required post-consent for the Proposed Development (Onshore) including surveys, ground investigation works and ecological surveys. The requirement for additional surveys will be established at the detailed design stage and secured through planning conditions. Construction activities will broadly involve:

- Landfall: HDD drilling of four ducts from the onshore drilling pit out to the seabed beyond MLWS. Installation of TJBs to connect offshore export cables to onshore export cables at the landfall site onshore. A primary construction compound of approximately 20,000m^2 will be required throughout construction at the landfall site.
- ONEC: installation of the Onshore Export Cable Circuits using predominantly Open Cut Trench (OCT) techniques to bury the cables in trenches. Crossing of linear features such as watercourses, road and existing cables will range from OCT to trenchless techniques such as HDD. Installation of cables will progress in sections from one section to the next, where the sections will connect via Cable Jointing Bays. Primary construction compounds and smaller satellite compounds will be required along the ONEC.
- Onshore Substations: construction will involve pre-construction surveys (requirement for which will be established at detailed design), site establishment, civil enabling works, civil construction works, construction of the onshore substations, installation and commissioning of the substation equipment and landscaping and remediation works.
- Onshore Grid Connection Cable Corridor: An approximately 300m long Onshore Grid Connection Cable Corridor to connect the Onshore Substations to the Grid Connection Point at the existing New Deer Substation (for Phase 1).

Operation & Maintenance and Decommissioning

The anticipated operational lifespan of the Onshore Substations is 35 years. It is anticipated that the Onshore Substations will be unmanned and operate 24 hours a day, 7 days a week. There will be regular inspection and maintenance activities requiring weekly operational vehicle movements, with more frequent movements during planned repair works. Although minor items of equipment will be replaced as and when required, no major refurbishment works at the Onshore Substations are currently envisaged during the design life. If a major equipment failure occurs it is likely to be necessary to replace the faulty major equipment.

Regular inspections and routine maintenance of onshore export cable circuits and grid connection circuits will be undertaken with access agreements in place with any landowners.

At the time of decommissioning, it is likely that all underground equipment and the Onshore Substations foundations will remain in-situ. Above ground equipment at the Onshore Substation Site will be cleared and the site reinstated.

It is considered that the environmental effects of this approach to decommissioning will be less than those arising from the breakup and removal of all infrastructure. The operational lifespan of each phase is likely to differ depending on when they are constructed, therefore the decommissioning of the OnTI could happen independently for each phase. This information will be included in the decommissioning plan when submitted to the relevant authorities.

5 Site Selection and Alternatives Considered

A number of alternatives have been considered throughout the development of the Proposed Development, both in terms of site selection and design elements. The site selection process is illustrated in Figure 8.

The site selection process has followed a robust process of the utilisation of desk based assessments to identify the initial potential Proposed Development component options. The Applicant has then sought to verify desk based information obtained to inform these assessments though the undertaking of surveys and additional assessments to 'ground truth' desktop information. Information provided by stakeholders as part of the consultation process has also been considered.

5.1 Proposed Development (Offshore)

The site selection process of the Array Area was primarily driven by the ScotWind Leasing process where the NE4 Plan Option was formally identified (Scottish Government, 2020[2]).

The Applicant, on choosing to bid for the NE4 Plan Option, undertook extensive desktop reviews of known existing constraints (such as existing infrastructure (subsea cables, wells), known (charted) wrecks, shipping lanes, exclusion zones), and geology, among other factors and engaged with National

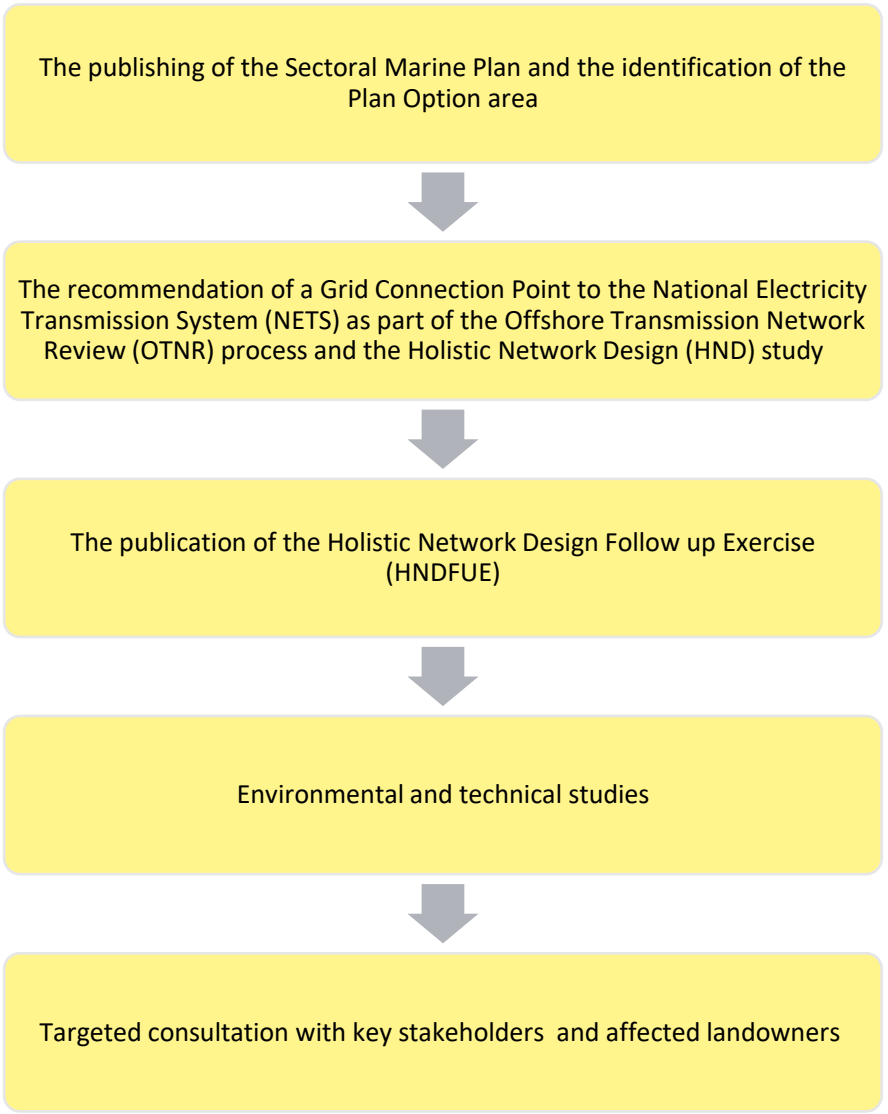

Figure 8: Site selection process

Grid Electricity System Operator (NGESO) to discuss timescales and design for connection to the NETS.

The offshore EIA process identified key constraints associated with the Caledonia North and Caledonia South array areas that have either been embedded into the design at this stage or that have provided parameters for detailed design. This has included removal of a south east section of the Caledonia South array area to reduce impacts on certain fisheries and the identification of a structural exclusion zone to reduce impacts on shipping and navigation.

Site selection of the OECC which was presented in the Scoping Report was informed primarily by the recommendation in the Holistic Network Design (HND) that the Proposed Development would connect into the New Deer substation. 20 potential landfall locations were identified along a stretch of Aberdeenshire coastline and a feasibility and screening assessment was undertaken to confirm their suitability for inclusion as potential landfall locations for consideration in the EIA Scoping corridor. Each landfall location was then subject to a desk-based constraints mapping exercise which informed a Red Amber Green (RAG) assessment. Targeted site inspections were also undertaken to ground truth the desk based information. Following this appraisal 10 short listed landfall locations were identified for inclusion in the Offshore and Onshore Scoping Reports.

The wide OECC presented within the Scoping Report was refined ahead of planned geophysical and environmental survey works in 2023. The refinement process involved further constraints analysis and extensive engagement with the commercial fishing industry. A further technical and environmental study to review the 10 shortlisted landfall locations was conducted in parallel with an Export Cable Routeing study to establish three preferred landfall locations.

The three remaining landfall locations were subject to an additional technical and commercial appraisal with the preferred Landfall Site for the Proposed Development identified as Stake Ness. On confirmation of the preferred Landfall Site, the OECC was refined to focus the final approaches to shore at Stake Ness.

5.2 Proposed Development (Onshore)

The ONEC is the area within which the high voltage buried cable circuits are located between the Landfall Site to the Onshore Substations.

The ONEC was identified using a four-stage process which has progressively refined and narrowed the corridor:

- Stage 1 – Identification of an Onshore Scoping Area between potential landfall locations and the Onshore Substation Scoping Area in the vicinity of the New Deer Substation;
- Stage 2 - Identification of a preferred 2km wide ONEC within the Onshore Scoping Area;
- Stage 3 - Identification of a preferred 500m wide ONEC within the 2km wide corridor; and
- Stage 4 - Identification of the OnTI RLB.

Refinement and progressive narrowing of the ONEC has considered a range of environmental and engineering studies and consultation with landowners and stakeholders.

The preferred location for any OWF substation is adjacent, or as near as possible, to the Grid Connection Point where it will connect to the NETS. Upon commencing the site selection process in summer 2022, the location of the Grid Connection Point was understood to be the existing New Deer substation, as recommended in the HND. The Applicant was also aware that a new substation was also to be constructed in the vicinity of the existing New Deer substation by Scottish and Southern Electricity Networks – Transmission (SSEN-T), originally referred to as New Deer 2 but now known as Greens substation, to facilitate the connection of new renewable generation onto the NETS.

In order to ensure that the substation site selected would be suitable for either a connection to New Deer or Greens, or a split between both, a 6km diameter search area around the existing New Deer substation was defined.

A robust appraisal in line with the National Grid Horlock Rules (National Grid, 2009[3]) was applied to identify potential substation sites within the Onshore Substation Scoping Area.

A search for substation sites was based on a number of objectives including minimising the need for cut and fill; limiting the visibility of substation by considering wider landscape and landform; the location of residential properties; and consideration of technical constraints. Based on these objectives substation sites were identified and shortlisted sites were considered using a RAG assessment.

Three substation sites were short listed for further detailed consideration which included a range of environmental and technical factors such as Phase 1 ecology surveys, Phase 1 peatland surveys, engineering feasibility assessment and engineering concept design. Following these more detailed assessments the preferred Onshore Substation Site was identified.

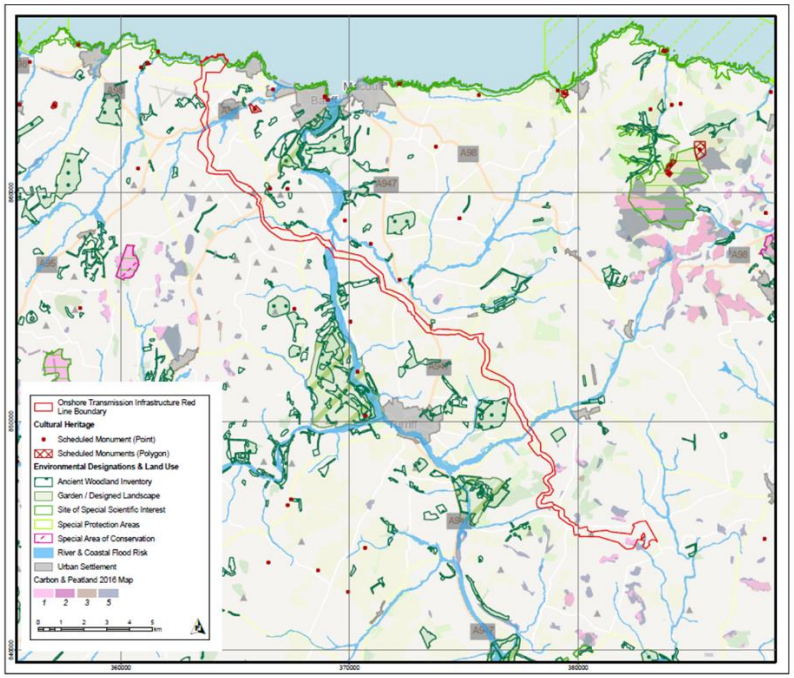

Figure 9: Onshore environmental constraints mapping

6 The Environmental Impact Assessment Process

6.1 Consultation

Stakeholder engagement and consultation has been undertaken by the Applicant in relation to the Proposed Development during the pre-application stage. The Applicant has sought to engage with a broad range of stakeholders through a range of methods including formal consultation events (both in person and online, Figure 10) as well as technical meetings.

The scope of the Onshore and Offshore EIAR has been informed by the formal Scoping exercise. EIA scoping is part of the EIA process in which the applicant identifies the key issues to be assessed in detail as part of the EIA and aspects of the assessment methodology that will be used. Scoping Reports were submitted to MD-LOT and Aberdeenshire Council in 2022 and Scoping Opinions were received in early 2023.

To support the development of the EIA, the Applicant has sought to engage with relevant statutory and non-statutory bodies on a range of topics.

The Applicant has also undertaken formal Pre-Application Consultation events as well as wider public and community engagement.

Stakeholder engagement and consultation has informed the scope of this offshore and onshore EIAR and the development of the design.

Figure 10: Virtual engage room (top) and public exhibition setup (bottom)

A summary of stakeholder engagement activities are presented in Figure 11 overleaf.

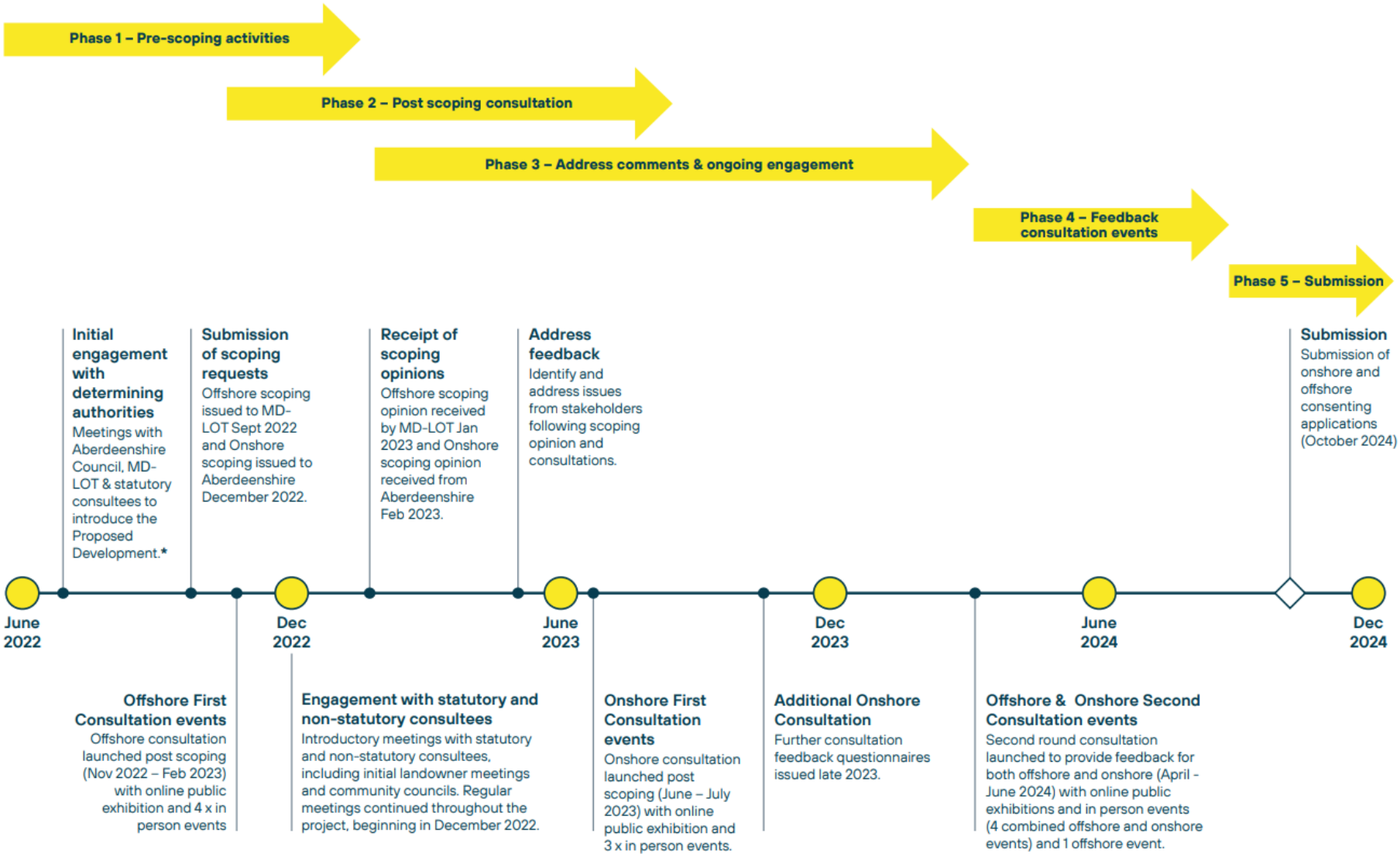

Figure 11: Summary of stakeholder engagement and consultation

6.2 Approach to EIA

EIA is a systematic evidence-based approach that must be undertaken for certain categories of development before they can be given consent. The purpose of an EIA is to assess a development's potential significant environmental effects (positive or negative) and determine how these can be reduced or enhanced depending upon their nature. This enables the predicted effects of a development to be understood by statutory consultees, and other interested parties such as members of the public, and the relevant determining authorities before a consenting decision is made.

EIA Process

EIA is an iterative process and is used to inform the development of the final design. Where initial assessments of the development, informed by the baseline environment and stakeholder engagement, identify unacceptable likely significant effects, alterations to the Proposed Development are made to reduce the significance of negative environmental effects. Figure 12 outlines the EIA and design process and how they are intrinsically linked to ensure a Proposed Development iteratively considers the potential environmental effects it might have on the receiving environment. Efforts are first made to avoid or reduce potential significant environmental effects through iterative design alterations, known as embedded mitigation.

Broadly, the key steps of the EIA process include:

- **Baseline characterisation:** of the existing environment to determine the baseline conditions in the area covered by the Proposed Development. For Proposed Development (Offshore) assessments this includes the area covered by the Array Area, the OECC, Landfall Site and the relevant surrounding technical study areas beyond these areas. Onshore, the baseline environment includes the OnTI RLB (see Figure 4) and any relevant technical study areas beyond this area.
- **Establish the Design Envelope:** to detail the range of design parameters used to determine the worst case scenario for each impact / topic receptor being assessed.
- **Assessment of potential significant effects:** identifies and assesses potentially significant effects that could arise from the Proposed Development (Offshore) and the Proposed Development (Onshore). The assessment of potential effects is based on the relevant worst case scenario for the receptor in question, the baseline environment and feedback gained through consultation. Assessment of potential effects takes account of embedded mitigation before determining significance. Embedded mitigation are measures that have already been incorporated into the design of the project to avoid or reduce environmental effects. Cumulative effects are also assessed for each EIA topics (both offshore and onshore) where other plans and developments have the potential to affect the same receptors in combination with each other.
- **Identification of secondary mitigation:** where there are significant effects identified which cannot be mitigated through embedded mitigation, secondary mitigation has been identified to further avoid and/or reduce the adverse effects. Through consultation and agreement with stakeholders, the need for monitoring may also be required to validate the assessment and the efficacy of the applied mitigation.

- **Assessment of residual effects:** determines any remaining effects once all proposed mitigation measures are considered.

Determining Significance

Determining significance of effects is an inherently subjective process. However, a defined methodology has been followed to reduce the subjectivity of assessment. For each impact, its magnitude is considered and in combination with the sensitivity of the receiving receptor to determine effect significance. The process followed is outlined on Figure 12 and broadly includes:

- Identify impact and receptor;
- Determine magnitude of impact by considering its spatial extent, duration, frequency and reversibility;
- Assess the sensitivity of receptor in the context of its ability to tolerate, adapt to and recover from impacts; and
- Evaluate significance of effect by considering the magnitude of a potential impact and the sensitivity of the receptor to determine an expression for the overall significance of the effect.

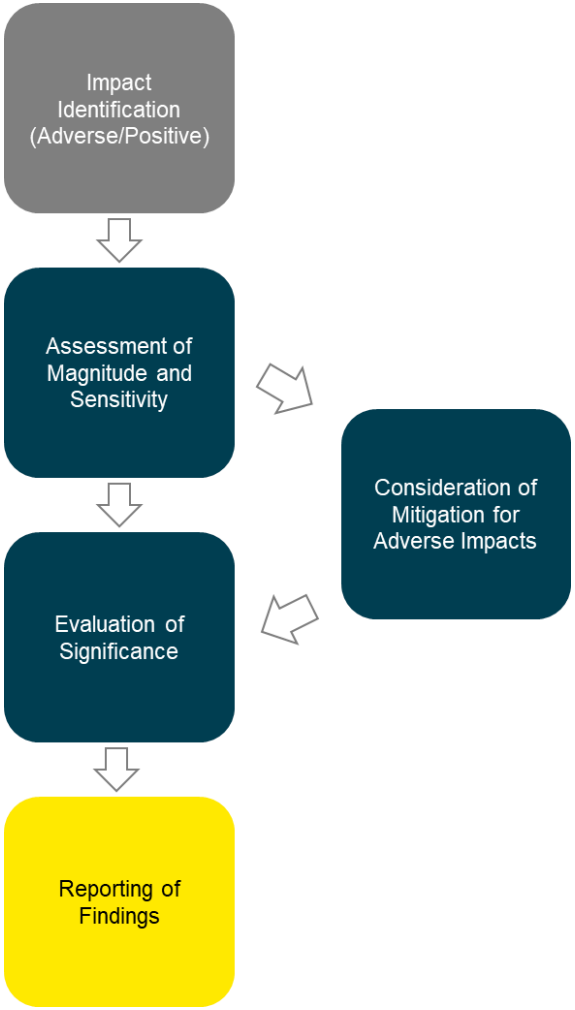

Figure 12: EIA Process and Determining Significance

Sensitivities and magnitudes are categorised as high, medium, low or negligible based on standard EIA method and topic specific assessment criteria. Table 2 sets out how impact magnitude and receptor sensitivity interact to facilitate a judgement of significance of effect. Generally, moderate and major effects are considered to be significant in standard EIA terms.

Table 2: Relationship Between Impact Magnitude and Receptor Sensitivity to Assign Significance of Effect

Significance of Effect		Sensitivity of Receptor			
		Negligible	Low	Medium	High
Impact Magnitude	Negligible	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Negligible	Minor	Minor
	Medium	Negligible	Minor	Moderate	Moderate
	High	Negligible	Minor	Moderate	Major

The following sections of this NTS present the results of the topic specific assessments that have been undertaken as part of the EIA.

7 Offshore Environmental Effects

7.1 Marine and Coastal Processes

The Proposed Development (Offshore)

The Marine and Coastal Processes chapter of Volume 2 of the EIAR (Volume 2, Chapter 2) considers the effects of the Proposed Development (Offshore) on marine and coastal processes. The assessment of marine and coastal processes effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Marine and Coastal Processes chapter was agreed through the scoping process with MD-LOT and through further consultation with NatureScot.

The Marine and Coastal Processes chapter presents an overview of the existing marine environmental baseline, up to Mean High Water Springs (MHWS), including:

- Hydrodynamics, including tidal and non-tidal influences, and waves;
- Morphology, including bathymetry, geology, surficial sediments and seabed form; and
- Sediment transport, including bedload, littoral and suspended sediment transport.

The study area has been determined based upon the Proposed Development (Offshore) location and proposed infrastructure, alongside spring tidal excursions and expert judgement. The Caledonia OWF, located in water depths up to 88m below Lowest Astronomical Tide (LAT) within the Moray Firth, is primarily under the control of the wave regime, with tidal currents that are relatively benign and unable to transport material larger than fine-grained sediments. Surficial sediments are primarily composed of sands, and the presence of mobile bedforms in discreet locations indicates an active sediment transport regime.

Receptors identified include both designated sites with qualifying coastal and marine features and non-designated sites, such as seabed morphological features.

The impacts that have been considered include:

- Increases in Suspended Sediment Concentrations (SSCs) and change to seabed levels;
- Potential impacts to seabed morphology (sandbanks and notable bathymetric depressions);
- Modifications to littoral transport, coastal behaviour (erosion), including at the Landfall Site.
- Potential impacts to seabed morphology;
- Seabed scouring; and
- Modifications to the wave and tidal regimes and associated impacts to morphological features.

Cumulative impacts include increases in SSC and change to seabed levels during construction and cumulative modifications to the wave and tidal regime and associated potential impacts to the sediment transport regime during operation.

The assessment has taken account of embedded mitigation, including the development of a number of plans and statements (e.g., Cable Plan, Development Specification and Layout Plan and

Construction Method Statement) in addition to a number of design commitments (e.g., use of HDD) which will be secured as part of the generation asset and transmission asset marine licences.

The results of this impact assessment demonstrate that the Proposed Development (Offshore) is likely to have a negligible to minor impact upon the identified receptors, which is considered not significant in EIA terms.

Caledonia North

The Marine and Coastal Processes Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the marine environmental baseline was presented, which was similar to that of the Proposed Development (Offshore).

Multiple potential impacts on marine and coastal processes receptors were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being minor. All residual impacts were concluded to be minor and not significant in EIA terms when embedded mitigation measures are considered.

Caledonia South

The Marine and Coastal Processes Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the marine environmental baseline was presented, which was similar to that of the Proposed Development (Offshore).

Multiple potential impacts on marine and coastal processes receptors were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being minor. All residual impacts were concluded to be minor and not significant in EIA terms when embedded mitigation measures are considered.

7.2 Marine Water and Sediment Quality

The Proposed Development (Offshore)

The Marine Water and Sediment Quality chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on marine water and sediment quality receptors. The assessment of marine water and sediment quality effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Marine Water and Sediment Quality Chapter was agreed through the scoping process with MD-LOT and through further consultation with NatureScot.

The Marine Water and Sediment Quality chapter presents an overview of the existing marine environmental characteristics, up to MHWS, for:

- Water quality (including physical parameters), Water Framework Directive (WFD) Legislation Protected Areas, Bathing Waters (BWs), Shellfish Water Protected Areas (SWPAs), Nutrient Sensitive Areas;
- Sediment quality (including Particle Size Analysis (PSA) and Total Organic Carbon (TOC)); and

- Sediment contamination (including Total Hydrocarbons (THC), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCB), Polybrominated Diphenyl Ethers (PBDEs), Organochloropesticides (OCPs), organotins and metals).

The study area has been determined based upon the location of the Proposed Development (Offshore) and proposed infrastructure, alongside spring tidal excursions and expert judgement. The Caledonia OWF is located in water depths up to 88m below LAT within the Moray Firth on a seabed comprised of sands with mobile bedforms present in discreet locations, indicating an active sediment transport regime. The salinity, temperature, dissolved oxygen, turbidity and pH profiles of the water column were all typical for the region. Sediment contaminants are below relevant guideline levels and toxic effects to fauna are not anticipated.

Receptors identified include both non-designated sites (e.g. wider marine environment and designated sites (e.g. coastal and transitional waterbodies).

The impacts that have been considered include:

- Deterioration in water quality due to suspension of sediments;
- Release of sediment-bound contaminants from disturbed sediments; and
- Deterioration in water clarity due to the release of drilling mud.

Cumulative impacts include the deterioration in water quality from the suspension of sediments and the release of sediment-bound contaminants from disturbed sediments during construction and decommissioning and the deterioration in water quality from the suspension of sediments during operation.

The assessment has taken account of embedded mitigation, including the development of a number of plans, statements and programmes (e.g., Cable Plan, Construction Method Statement, Environmental Management Plan, Marine Pollution Contingency Plan, Decommissioning Programme, Project Environmental Monitoring Programme and Vessel Management Plan) in addition to a number of design commitments (e.g., use of HDD) which will be secured as part of the generation asset and transmission asset marine licences.

The results of this impact assessment demonstrate that the Proposed Development (Offshore) is likely to have a negligible to minor impact upon the identified receptors, which is considered not significant in EIA terms.

Caledonia North

The Marine Water and Sediment Quality Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the marine environmental baseline was presented, which was similar to that of the Proposed Development (Offshore).

Multiple potential impacts on marine water and sediment quality receptors were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being negligible to minor. All residual impacts were

concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

Caledonia South

The Marine Water and Sediment Quality Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the marine environmental baseline was presented, which was similar to that of the Proposed Development (Offshore).

Multiple potential impacts on marine water and sediment quality receptors were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being negligible to minor. All residual impacts were concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

7.3 Benthic Subtidal and Intertidal Ecology

The Proposed Development (Offshore)

The Benthic Subtidal and Intertidal Ecology chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on benthic subtidal and intertidal ecology receptors. The assessment of benthic subtidal and intertidal ecology effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Benthic Subtidal and Intertidal chapter was agreed through the scoping process with MD-LOT and through further consultation with NatureScot.

The Benthic Subtidal and Intertidal Ecology chapter presents an overview of the existing benthic ecology characteristics and identifies the potential effects on these receptors associated with the construction, operation and maintenance and decommissioning of the of the Proposed Development (Offshore) seaward of MHWS.

The study area has been determined based upon the Proposed Development (Offshore) boundary, alongside spring tidal excursion data.

Site specific surveys were undertaken to provide an up-to-date characterisation of the habitats and species occurring within the area of the Proposed Development (Offshore). The subtidal surveys were conducted between 19 March and 12 June 2023 by Gardline Limited. In August 2023, Precision Marine Survey Limited carried out the intertidal survey that was primarily focused on Phase I intertidal biotope mapping following the UK Marine Habitat Classification.

The Caledonia OWF is comprised of sands, and the presence of mobile bedforms in discreet locations indicating an active sediment transport regime. The rocky habitats in the vicinity of the Stake Ness Landfall Site are characterised by a structurally complex combination of bedrock, boulder and angular bedrock ridges and gullies.

The following Valued Ecological Receptors (VERs) were recorded across the Caledonia OWF and Caledonia OECC:

- Coarse and mixed sediments with moderate to high infaunal diversity and epibenthic communities;
- Sandy sediments with low infaunal diversity and sparse epibenthic communities;
- Mixed sediments with polychaete and epifaunal communities;
- Burrowed mud communities;
- Kelp and red seaweeds communities;
- Rockpools communities;
- Fucoids on sheltered marine shore communities;
- Barnacles and fucoids on moderately exposed shore communities;
- Lichens or small green algae on supralittoral and littoral fringe rock communities;
- Mussel and/or barnacle communities;
- Robust fucoid and/or red seaweed communities;
- Littoral coarse sediment communities;
- Ocean Quahog; and
- *Devonia perrieri*.

Receptors identified include both designated sites with qualifying benthic ecology features and non-designated sites.

The impacts that have been considered include:

- Temporary habitat disturbance;
- Temporary increases in SSCs and changes to seabed levels;
- Direct and indirect seabed disturbance leading to release of sediment contaminants;
- Long-term habitat loss/alteration due to the addition of infrastructure to the area;
- Colonisation of hard substrates;
- Increased risk of introduction and/or spread of Invasive Non-Native Species (INNS);
- Changes in physical processes resulting from the presence of the OWF subsea; infrastructure (e.g., scour effects, changes in wave/tidal current regimes and resulting effects on sediment transport);
- Electromagnetic Field (EMF) effects generated by inter-array, interconnector and export cables;
- Seabed sediment heating from subsea cables; and
- Long-term habitat loss/alteration due to the removal of infrastructure.

Cumulative impacts include the cumulative temporary increase in SSC and sediment deposition during construction.

The assessment has taken account of embedded mitigation, including the development of a number of plans, statements and programmes (e.g., Cable Plan, Environmental Management Plan, Marine Pollution Contingency Plan, Decommissioning Programme) in addition to a number of design commitments (e.g., use of HDD) which will be secured as part of the generation asset and transmission asset marine licences.

The results of this impact assessment demonstrate that the Proposed Development (Offshore) is likely to have a negligible to minor significance, which is considered not significant in EIA terms.

Caledonia North

The Benthic Subtidal and Intertidal Ecology Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the VERs recorded in the Caledonia North Site and Caledonia North OECC was presented, with the majority of the assemblage being the same as presented for the Proposed Development (Offshore) (no mixed sediments with polychaete and epifaunal communities were identified in Caledonia North).

Multiple potential impacts on benthic subtidal and intertidal ecology receptors were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being negligible to minor. All residual impacts were concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

Caledonia South

The Benthic Subtidal and Intertidal Ecology Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the VERs recorded in the Caledonia South Site and Caledonia South OECC was presented, with the majority of the assemblage being the same as presented for the Proposed Development (Offshore).

Multiple potential impacts on benthic subtidal and intertidal ecology receptors were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being negligible to minor. All residual impacts were concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

7.4 Fish and Shellfish Ecology

The Proposed Development (Offshore)

The Fish and Shellfish Ecology chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on fish and shellfish ecology receptors. The assessment of fish and shellfish ecology effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Fish and Shellfish Ecology chapter was agreed through the scoping process with MD-LOT and through further consultation with NatureScot and the University of Aberdeen Lighthouse Field Station (relating to basking sharks).

The Fish and Shellfish Ecology chapter presents an overview of the existing fish and shellfish ecology characteristics and identifies the potential effects on these receptors associated with the construction, operation and maintenance and decommissioning phases of the Proposed Development (Offshore) seaward of MHWS.

The fish and shellfish ecology study area has been determined based upon the Proposed Development (Offshore) location and proposed infrastructure, alongside spring tidal excursion data and underwater noise modelling. While for basking sharks, a site-

specific study area encompassing Caledonia OWF, Caledonia OECC and 4km buffer, and a broader regional study area covering the Convention for the Protection of the Marine Environment of the North East Atlantic, (OSPAR) Region II: Greater North Sea have been defined for basking sharks.

Site specific surveys were undertaken to provide an up-to-date characterisation of the habitats and species occurring within the area of the Proposed Development (Offshore) with sampling conducted between 14 and 22 April 2023 by Gardline Limited. A site-specific Digital Aeiral Survey (DAS) campaign was conducted from May 2021 to April 2023 within the Caledonia OWF plus a 4km buffer, by APEM to characterise basking shark baseline.

Receptors identified include both designated sites with qualifying fish and shellfish ecology features and non-designated sites.

The impacts that have been considered include Mortality, injury, behavioural impacts and auditory masking arising from noise and vibration, temporary increases in SSCs, Temporary Habitat Loss and Disturbance, Direct and indirect seabed disturbance leading to release of sediment contaminants, Increased risk of introduction and/or spread of INNS from Vessel traffic, Long-term Habitat Loss, Colonisation of hard substrate, Increased risk of introduction and/or spread of INNS due to Operation and Maintenance vessel traffic, EMF effects arising from cables during operational phase, Impacts arising from operational underwater noise and Mortality, injury, behavioural impacts and auditory masking arising from noise and vibration.

Impacts relevant to basking sharks include Underwater noise from pile driving, Underwater noise from unexploded ordnance clearance, Underwater noise from other construction activities, Vessel collisions, Vessel disturbance, Indirect impacts on prey, EMF, Operational noise, Entanglement, Long term displacement/habitat loss/barrier effects and Underwater noise from other decommissioning activities.

Cumulative impacts on fish and shellfish receptors include Cumulative mortality, injury and behavioural changes resulting from underwater noise arising from construction activity, Cumulative temporary increase in suspended sediment and sediment deposition, Cumulative temporary habitat loss and disturbance, Cumulative long-term habitat loss and Cumulative impacts from EMF. Cumulative impacts on basking sharks include Cumulative disturbance resulting from underwater noise from operational noise, Risk of secondary entanglement, and Cumulative impacts from EMF.

The assessment has taken account of embedded mitigation, including the development of a number of plans, statements and programmes (e.g., Cable Plan, Construction Method Statement, Environmental Management Plan, Marine Pollution Contingency Plan, Decommissioning Programme, Piling Strategy, Project Environmental Monitoring Plan, Vessel Management Plan, Decommissioning Programme, Marine Mammal Mitigation Protocol and Entanglement Management Plan) in addition to a number of design commitments (e.g., use of HDD) which will be secured as part of the generation asset and transmission asset marine licences.

The results of this impact assessment demonstrate that the Proposed Development (Offshore) is likely to have impacts of negligible to minor significance on fish, shellfish and basking sharks, which is considered not significant in EIA terms.

Caledonia North

The Fish and Shellfish Ecology Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the Fish and Shellfish Ecology baseline was presented, with the fish and shellfish assemblage being similar to that presented for the Proposed Development (Offshore).

Multiple potential impacts on fish and shellfish ecology receptors were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being minor. All residual impacts were concluded to be minor and not significant in EIA terms when embedded mitigation measures are considered.

Caledonia South

The Fish and Shellfish Ecology Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the Fish and Shellfish Ecology baseline was presented, with the fish and shellfish assemblage being similar to that presented for the Proposed Development (Offshore).

Multiple potential impacts on fish and shellfish ecology receptors were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being minor. All residual impacts were concluded to be minor and not significant in EIA terms when embedded mitigation measures are considered.

7.5 Offshore Ornithology

The Proposed Development (Offshore)

The Offshore Ornithology chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on offshore ornithology receptors. The assessment of offshore ornithology effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Offshore Ornithology chapter was agreed through the scoping process with MD-LOT and through further consultation with NatureScot and the Royal Society for the Protection of Birds.

The Offshore Ornithology Chapter presents an overview of the existing offshore and intertidal ornithology environment and identifies the potential effects on these receptors associated with the construction, operation, and decommissioning of the Proposed Development (Offshore).

The study area has been determined based upon the Proposed Development (Offshore) location and proposed infrastructure.

Site-specific DAS were undertaken to provide an up-to-date survey of species occurring within the Array Area of the Proposed Development (Offshore). A programme of 24 DAS took place monthly between May 2021 and April 2023 inclusive.

The following key ornithological receptors were recorded within the Array Area of the Proposed Development (Offshore) during the 24 months of DAS:

- Kittiwake;
- Great black-backed gull;
- Herring gull;
- Great skua;
- Common guillemot;
- Razorbill;
- Puffin;
- Red-throated diver;
- Fulmar; and
- Gannet;

Receptors identified include both designated sites with qualifying ornithological features and non-designated sites.

The impacts that have been considered include:

- Distributional Responses (including Barrier Effects): Array Area;
- Distributional Responses: OECC and Landfall Site;
- Distributional Responses: Vessel Transit (Moray Firth Special Protection Area (SPA));
- Collision Risk;
- Indirect Impacts on Prey Species; and
- Artificial Light.

Cumulative impacts include Disturbance and displacement during operation, Collision risk during operation and Combined disturbance/displacement and collision risk during operation.

The assessment has taken account of embedded mitigation, including the development of a number of plans, statements and programmes (e.g., Construction Method Statement, Environmental Management Plan, Piling Strategy, Project Environmental Monitoring Plan, Vessel Management Plan and Lighting and Marking Plan) in addition to a number of design commitments, including a 35m air gap and the use of HDD which will be secured as part of the generation asset and transmission asset marine licences.

The results of this impact assessment demonstrate that the Proposed Development (Offshore) is likely to have impacts of negligible to minor significance, which is considered not significant in EIA terms. The Cumulative impact assessment also demonstrates that the impact of the Proposed Development (Offshore) is likely to have a negligible to minor significance when considering the wider cumulative impact of other projects, which is considered not significant in EIA terms

Caledonia North

The Offshore Ornithology Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the offshore ornithology baseline was presented, with the offshore

ornithology assemblage being similar to that presented for the Proposed Development (Offshore).

Multiple potential impacts on offshore ornithology receptors were identified, as described for the Proposed Development (Offshore). No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being negligible to minor. All residual impacts (including cumulative impacts) were concluded to be minor and not significant in EIA terms when embedded mitigation measures are considered.

Caledonia South

The Offshore Ornithology Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the offshore ornithology baseline was presented, with the offshore ornithology assemblage being similar to that presented for the Proposed Development (Offshore).

Multiple potential impacts on offshore ornithology receptors were identified, as described for the Proposed Development (Offshore). No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being negligible to minor. All residual impacts (including cumulative impacts) were concluded to be minor and not significant in EIA terms when embedded mitigation measures are considered.

7.6 Marine Mammals

The Marine Mammals chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on marine mammal receptors. The assessment of marine mammal effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Offshore Ornithology chapter was agreed through the scoping process with MD-LOT and through further consultation with NatureScot.

The Marine Mammals chapter presents an overview of the existing marine mammal baseline and identifies the potential effects on these receptors associated with the construction, operation and maintenance and decommissioning phases of the Proposed Development (Offshore) seaward of MHWS.

The marine mammal study area has been defined at two spatial scales; the local study area and a regional scale study area using species-specific Management Units. For all marine mammal species, the local scale study area covers the Caledonia OWF (i.e. Caledonia North Site and Caledonia South Site) plus a 4 km buffer. The local study area informed by monthly DASs conducted by APEM Ltd. from May 2021 to April 2023. The following marine mammal species were screened into the assessment:

- Harbour porpoise;
- Bottlenose dolphin;
- White-beaked dolphin;
- Short-beaked common dolphin;
- Risso’s dolphin;
- Minke whale;
- Humpback whales;
- Harbour seal; and

- Grey seal.

The impacts that have been considered include Auditory injury and disturbance from UXO, Auditory injury and disturbance from piling, Auditory injury and disturbance from other construction activities, Auditory injury and disturbance from geophysical surveys, Vessel collisions and disturbance from vessels, Disturbance to seal haul-out sites, Indirect impacts on marine mammals via changes in prey availability, Changes in water quality, Operational noise, Entanglement with floating WTGs and Long term displacement/habitat loss/barrier effects.

Cumulative impacts include Disturbance from underwater noise from piling during construction of other OWFs and the construction of other projects and developments, Disturbance from vessel activity during construction, operation and decommissioning of projects and developments, Disturbance to seal haul-outs, Disturbance from operational noise and Secondary entanglement.

The assessment has taken account of embedded mitigation, including the development of a number of plans, statements and programmes (e.g., Cable Plan, Environmental Management Plan, Martine Pollution Contingency Plan, Decommissioning Programme, Piling Strategy, Project Environmental Monitoring Plan, Vessel Management Plan, Marine Mammal Mitigation Plan and Entanglement Management Plan) in addition to a number of design commitments which will be secured as part of the generation asset and transmission asset marine licences.

The results of this impact assessment demonstrate that, given the commitment to embedded mitigation measures, the Proposed Development (Offshore) is likely to have impacts to marine mammals of negligible to minor significance, which is considered not significant in EIA terms.

Caledonia North

The Marine Mammals Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the marine mammals baseline was presented, with the marine mammal assemblage being the same as presented for the Proposed Development (Offshore).

Multiple potential impacts on marine mammal receptors were identified. The Caledonia North assessment did not consider the impact of Entanglement (as included for the Proposed Development (Offshore) and Caledonia South) as floating WTG will not be installed in this site. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being minor. All residual impacts were concluded to be minor and not significant in EIA terms when embedded mitigation measures are considered.

Caledonia South

The Marine Mammals Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the marine mammals baseline was presented, with the marine mammal assemblage being the same as presented for the Proposed Development (Offshore).

Multiple potential impacts on marine mammal receptors were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being minor. All residual impacts were concluded to be minor and not significant in EIA terms when embedded mitigation measures are considered.

7.7 Commercial Fisheries

The Proposed Development (Offshore)

The Commercial Fisheries chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on commercial fisheries receptors. The assessment of commercial fisheries effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Commercial Fisheries chapter was agreed through the scoping process with MD-LOT and through further consultation with the Scottish Fishermen's Federation and the Scottish White Fish Producers Association.

The Commercial Fisheries Chapter presents an overview of the existing commercial fisheries environment and identifies the potential effects on these receptors associated with the construction, operation, and decommissioning of the Proposed Development (Offshore).

Commercial fisheries refers to any form of fishing activity legally undertaken and sold for taxable profit. The commercial fisheries active across the Proposed Development (Offshore) and wider regional area was characterised via analysis of landing statistics and mapping of fishing grounds, including vessel monitoring system data, aerial surveillance, vessel plotter data and consultation with the industry.

The commercial fishing fleets operating across the wider regional area include:

- UK demersal otter trawlers targeting nephrops and mixed demersal species;
- UK demersal otter trawlers targeting squid;
- UK demersal otter trawlers targeting haddock and mixed demersal species;
- UK demersal seine targeting haddock and mixed demersal species;
- UK scallop dredgers targeting king scallop;
- UK potting vessels targeting brown crab and lobster;
- UK vessels deploying lines targeting mackerel; and
- UK, Norwegian, Irish, Danish, Dutch and German pelagic trawlers and purse seiners targeting mackerel.

The characterisation of commercial fisheries found that a range of fisheries are active across the Proposed Development (Offshore), including scallop dredge and demersal trawl and seine fisheries within the Caledonia OWF and OECC; as well as vessels operating pots and seasonal line fishery across the OECC.

A number of potential impacts on commercial fisheries, associated with the construction, operation and maintenance, and decommissioning of the Proposed Development (Offshore) were identified.

These included Interference with fishing activity during construction, Increased snagging risk, which could result in loss or damage to fishing gear, Increased steaming/vessel transit times and Impacts to commercial exploited species populations. For reduced access or loss of fishing grounds during the operational phase it was assumed that fishing would resume within areas of fixed foundations (with exception of demersal seine and pelagic trawl / purse seine gear) and that fishing is unlikely to resume within the areas of floating WTG dependant on the type and configuration of the moorings and anchoring systems.

There were a number of significant impacts identified, including Reduction in access to, or exclusion from established fishing grounds within the Caledonia OWF and OECC and Displacement of fishing activity into other area during construction, operation and decommissioning.

Cumulative impacts of the Caledonia OWF together with other ScotWind floating OWF developments and fisheries management measures implemented as part of the UK's Marine Protected Area network were assessed and predicted as likely to result in effects of moderate significance (significant in EIA terms) upon commercial fisheries. The Applicant is committed to continued discussion and development of appropriate cumulative mitigation with other OWF developers, including continued participation on regional and national commercial fisheries working groups and forums.

The Applicant has developed embedded mitigation measures of relevance to the commercial fisheries including advance warning and accurate location details of construction operations via Notices to Mariners (NtMs), and associated Safety Zones, advisory safe passing distances and on-going liaison with all fishing fleets. In addition, the southern site boundary was reduced by 6.1km^2 to reduce potential effects on established fishing grounds.

In addition to the embedded mitigation, a suite of robust secondary mitigation and monitoring measures have been developed to be implemented through the Outline Fisheries Management and Mitigation Strategy (FMMS), including cable protection surveys, monitoring of fisheries activity pre, during and post construction and during the operational phase. In addition, the Applicant has also committed to investigating whether defined fishing areas are feasible within the floating portion of Caledonia South based on final location and type of infrastructure and a research package to explore fisheries and floating wind farm infrastructure coexistence.

With the proposed embedded and additional mitigation measures in place, the impacts on commercial fisheries resulted in effects of minor adverse significance and not significant in EIA terms. No likely significant transboundary effects with regard to commercial fisheries from the Proposed Development (Offshore) on the interests of European Economic Area (EEA) States were predicted.

Caledonia North

The Commercial Fisheries Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the commercial fisheries baseline was presented, with the Caledonia

North commercial fisheries receptors being the same as presented for the Proposed Development (Offshore).

Multiple potential impacts on commercial fisheries receptors were identified. Significant impacts identified include a potential Reduction in access to, or exclusion from established fishing grounds within the Caledonia North Site and Caledonia North OECC and Displacement of fishing activity into other area during construction and decommissioning. It is assumed that fishing will resume within Caledonia North during operation. All residual impacts were concluded to be minor and not significant in EIA terms when embedded mitigation and secondary mitigation measures are considered.

Secondary mitigation measures proposed include the implementation of the Outline Fisheries Management and Mitigation Strategy (FMMS).

Caledonia South

The Commercial Fisheries Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the commercial fisheries baseline was presented, with the Caledonia South commercial fisheries receptors being the same as presented for the Proposed Development (Offshore).

Multiple potential impacts on commercial fisheries receptors were identified. Significant impacts identified include a potential Reduction in access to, or exclusion from established fishing grounds within the Caledonia South Site and Displacement of fishing activity into other areas during construction, operation and decommissioning. It is assumed that fishing will resume within the fixed WTG area of Caledonia South during operation however fishing may not resume in the floating area of Caledonia South. Significant impacts have also been identified with a reduction in access to, or exclusion from established fishing grounds within the Caledonia South OECC during construction and decommissioning. All residual impacts were concluded to be minor and not significant in EIA terms when embedded mitigation and secondary mitigation measures are considered.

Secondary mitigation measures proposed include the implementation of the Outline Fisheries Management and Mitigation Strategy (FMMS), investigating defined fishing areas (if feasible) within the floating WTG area of Caledonia South, and a research package to explore fisheries and floating wind farm infrastructure coexistence.

7.8 Shipping and Navigation

The Proposed Development (Offshore)

The Shipping and Navigation chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on shipping and navigation receptors. The assessment of shipping and navigation effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the shipping and navigation chapter was agreed through the scoping process with MD-LOT and through further consultation with the Maritime and Coastguard Agency, Northern Lighthouse Board and a number of other relevant stakeholders.

The Shipping and Navigation chapter presents an overview of the existing shipping and navigation environment and identifies the potential effects on these receptors associated with the construction, operation, and decommissioning of Proposed Development (Offshore).

Various datasets were analysed in order to evaluate the shipping and navigation baseline associated with the Proposed Development (Offshore). These included key navigational features as shown on Admiralty Charts, seasonally-weighted vessel traffic data in alignment with Marine Guidance Note (MGN) 654, as well as marine incident data provided by the Marine Accident Investigation Branch (MAIB) and the Royal National Lifeboat Institution (RNLI). A future baseline associated with the Proposed Development (Offshore) was also evaluated, including the consideration of external vessel re-routeing, as well as cumulative effects in conjunction with other planned offshore wind projects.

Following this, an impact assessment for shipping and navigation receptors was undertaken as per the Formal Safety Assessment (FSA) methodology. This assessment considered the baseline and future environments as well as relevant consultation output, project parameters, and embedded mitigation within the Design Envelope associated with the Proposed Development (Offshore).

Multiple potential impacts on shipping and navigation receptors due to the Proposed Development (Offshore) were identified. These included Increased vessel to vessel collision risk resulting from displacement (third party to third party), Vessel to vessel collision risk (third party vessel and a Caledonia OWF vessel), Vessel to structure allision risk, Reduced access to local ports, harbours and marinas, Reduction of under keel clearance as a result of wet stored subsea infrastructure, Reduction of under keel clearance as a result of subsea infrastructure, Anchor interaction with subsea cables/mooring lines, Loss of station, Reduction of search and rescue capability and Adverse weather routeing.

Cumulative impacts include Vessel displacement and Increased third party vessel to vessel collision risk, Increased third party vessel to project vessel collision risk, Vessel to structure allision risk, Reduced access to local ports, and Reduced search and rescue capabilities.

No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being tolerable with mitigation. The majority of impacts were concluded to be As Low As Reasonably Practicable (ALARP) and not significant in EIA terms when embedded mitigation measures are considered. Several impacts were concluded to be ALARP and not significant in EIA terms when additional secondary mitigation measures are considered.

Secondary mitigation measures proposed include liaison with Whitehills, Banff, and Macduff harbour authorities to mitigate the impact of reduced access to local ports during the construction and decommissioning phases of the Proposed Development (Offshore), and the implementation of a Structure Exclusion Zone (SEZ) to manage impacts to adverse weather routeing.

Caledonia North

The Shipping and Navigation Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter.

Multiple potential impacts on shipping and navigation receptors due to Caledonia North were identified. Impacts identified for Caledonia North were generally similar to the Proposed Development (Offshore), however impacts associated with the Reduction of underkeel clearance from wet stored components and loss of station were not scoped in as there are no WTG within Caledonia North design. No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being tolerable with mitigation. The majority of residual impacts were concluded to be ALARP and not significant in EIA terms when embedded mitigation measures are considered. Several impacts were concluded to be ALARP and not significant in EIA terms when additional secondary mitigation measures are considered.

Secondary mitigation measures proposed include liaison with Whitehills, Banff, and Macduff harbour authorities to mitigate the impact of reduced access to local ports during the construction and decommissioning phases of Caledonia North.

Caledonia South

The Shipping and Navigation Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter.

Multiple potential impacts on shipping and navigation receptors due to Caledonia South were identified, as described for the Proposed Development (Offshore). No impact was assessed as an unacceptable significance of risk, with the highest significance of risk assessed being tolerable with mitigation. The majority of residual impacts were concluded to be ALARP and not significant in EIA terms when embedded mitigation measures are considered. Several impacts were concluded to be ALARP and not significant in EIA terms when additional secondary mitigation measures are considered.

Secondary mitigation measures proposed include liaison with Whitehills, Banff, and Macduff harbour authorities to mitigate the impact of reduced access to local ports during the construction and decommissioning phases of the Caledonia South, and the implementation of a SEZ to manage impacts to adverse weather routeing.

7.9 Marine Archaeology and Cultural Heritage

The Proposed Development (Offshore)

The Marine Archaeology and Cultural Heritage chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on marine archaeology and cultural heritage receptors. The assessment of marine archaeology and cultural heritage effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Marine Archaeology and Cultural Heritage chapter was agreed through the scoping process with MD-LOT.

The Marine Archaeology and Cultural Heritage Chapter presents an overview of the existing marine environmental characteristics, up to MHWS, for:

- Known and potential palaeogeographic features related to submerged prehistoric landscapes;
- Known and potential maritime and aviation archaeology receptors identified as seabed features, inclusive of designated/protected sites; and
- Known and potential intertidal archaeology receptors.

The marine study area has been determined as the whole of the Caledonia OWF and OECC to MHWS with an additional 1km buffer to provide context for maritime and aviation archaeology receptors from documentary sources which may have poor positional accuracy within the non-site-specific datasets used. Within this, the geophysical study area comprises the coverage of datasets for sidescan sonar, multibeam echosounder, marine magnetometer and sub-bottom profiler data sets. These were used to assess the presence of seabed and sub-seabed (palaeogeographic) features of archaeological potential within the study area.

The baseline palaeolandscape assessment resulted in the identification of a total of four shallow geological units, none of which are considered to be of archaeological potential. No individual palaeogeographic features of archaeological potential were identified within the marine study area. The area considered of highest potential for palaeogeographic features is between landfall and the -20m bathymetric contour.

The documentary sources for maritime and aviation archaeology identified 22 recorded wreck and obstruction sites within the marine study area for the Proposed Development (Offshore), including two designated sites. Eight recorded wreck or aircraft crash sites were identified within the OECC, one of which may be designated if aircraft material is identified at its location in the future. Assessment of the site-specific geophysical surveys integrated with the documentary sources identified a total of 716 features listed as being of possible archaeological potential within the geophysical survey extents, discriminated as follows:

- 21 A1 anomalies (anthropogenic origin of archaeological interest);
- 104 A2_h anomalies (anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest of a modern feature);
- 570 A2_l anomalies (anomaly of possible anthropogenic origin but interpretation is uncertain; may be anthropogenic or a natural feature);
- 17 A3 records (historic record of possible archaeological interest with no corresponding geophysical anomaly); and
- 4 U2 anomalies (known non-archaeological feature / feature of non-archaeological interest).

Both direct and indirect impacts on the receptors have been identified, and where necessary review of other EIAR chapters with relevant information has been completed. The following impacts have been identified:

- Loss or damage to known and unknown marine and intertidal historic environment and submerged prehistoric landscapes from direct impacts during pre-construction seabed preparation, and construction activities;
- Indirect disturbance to marine historic environment assets caused by seabed preparation for seabed foundations, cable burial methods and/or cable protection due to changes in seabed levels from suspended sediment concentrations and/or scour;
- Loss or damage to known and unknown marine and intertidal historic environment and submerged prehistoric landscapes from direct impacts during O&M activities;
- Indirect disturbance to marine historic environment assets during O&M caused by installed seabed foundations, cables and/or cable protection due to changes in seabed levels from suspended sediment concentrations and/or scour; and
- Loss or damage to known and unknown marine and intertidal historic environment and submerged prehistoric landscapes from direct impacts during decommissioning activities.

Cumulative impacts include loss or damage to known and unknown marine historic environment and submerged prehistoric landscapes from direct impacts, indirect disturbance to marine historic environment assets caused by seabed preparation, foundations, cable burial methods and/or cable protection

The assessment has taken account of embedded mitigation, including the development of a number of plans, statements and programmes (e.g., Cable Plan, Development Specification and Layout Plan, Decommissioning Programme, Written Scheme of Investigation and Protocol for Archaeological Discoveries) in addition to a number of design commitments which will be secured as part of the generation asset and transmission asset marine licences.

These measures mean that the results of this impact assessment are that the Proposed Development (Offshore) is likely to have a negligible to minor impact upon the identified receptors, which is not considered significant in EIA terms.

Caledonia North

The Marine Archaeology and Cultural Heritage Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the marine archaeology and cultural heritage baseline was presented, with 716 features listed as being of possible archaeological potential.

Multiple potential impacts on marine archaeological receptors due to Caledonia North were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance assessed being negligible to minor. All residual impacts were concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

Caledonia South

The Marine Archaeology and Cultural Heritage Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the marine archaeology and cultural heritage baseline was

presented, with 537 features listed as being of possible archaeological potential.

Multiple potential impacts on marine archaeological receptors due to Caledonia South were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance assessed being negligible to minor. All residual impacts were concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

7.10 Military and Civil Aviation

The Proposed Development (Offshore)

The Military and Civil Aviation chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on military and civil aviation receptors. The assessment of military and civil aviation effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Military and Civil Aviation chapter was agreed through the scoping process with MD-LOT and through further consultation with the Ministry of Defence (MoD) and Highlands and Islands Airports Limited.

Potentially affected aviation stakeholders include civil and military aerodromes and radar facilities, and offshore fixed-wing and helicopter flights such as military low flying activities, Search and Rescue (SAR) operations, and helicopter support for the oil and gas industry.

The Military and Civil Aviation chapter has considered effects with respect to impacts on radar and UK airspace predicted due to the physical presence of the Proposed Development (Offshore) during the construction, operation and decommissioning phases. Potential impacts are Physical obstruction to aircraft and Interference on radars caused by rotating WTG blades. Significant effects include the Creation of an aviation obstacle environment associated with Wick airport Instrument Flight Procedures during construction and operation, and Impacts on the NATS Allanshill, RAF Lossiemouth and RRH Buchan Primary Surveillance Radar (PSR) systems during operation.

A range of mitigation measures related to military and civil aviation have been embedded in the design envelope to reduce potential aviation effects. These include notification to aviation stakeholders during construction (and decommissioning) of the OWF, an aviation obstacle lighting scheme agreed with the relevant authorities, and the development of an Emergency Response Cooperation Plan to mitigate the effect on SAR operations.

There are a number of secondary mitigation measures relevant to military and civil aviation. Consultation has been advanced with aviation stakeholders to detail additional appropriate mitigations to safeguard airport operations. Adverse impact on Wick Airport’s Instrument Flight Procedures (IFPs) can be mitigated by amendment of the IFPs, and it is anticipated that agreement with the stakeholder can be reached to put in place the required mitigation. Technical mitigation solutions are available for radar interference and such solutions are being further discussed with affected radar operators, NATS and the MoD.

No residual significant effects on military and civil aviation have been identified.

Caledonia North

The Military and Civil Aviation Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the military and civil aviation baseline was presented, which is similar to the baseline for the Proposed Development (Offshore).

Multiple potential impacts on aviation receptors due to Caledonia North were identified. Significant effects identified include the Creation of an aviation obstacle environment relevant to Wick Airport IFPs during construction and operation, and the Creation of an aviation obstacle environment relevant to the NATS Allanshill, RAF Lossiemouth and RRH Buchan PSR systems during operation, with the highest significance being major. All residual impacts were concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

Secondary mitigation measures include the advancement of consultation to agree appropriate measures to safeguard airport operations and further discussion with NATS and the MoD on potential technical mitigation solutions.

Caledonia South

The Military and Civil Aviation Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the military and civil aviation baseline was presented, which is similar to the baseline for the Proposed Development (Offshore).

Multiple potential impacts on aviation receptors due to Caledonia South were identified. Significant effects identified include the Creation of an aviation obstacle environment relevant to Wick Airport IFPs during construction and operation, and the Creation of an aviation obstacle environment relevant to the NATS Allanshill, RAF Lossiemouth and RRH Buchan PSR systems during operation, with the highest significance being major. All residual impacts were concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

Secondary mitigation measures include the advancement of consultation to agree appropriate measures to safeguard airport operations and further discussion with NATS and the MoD on potential technical mitigation solutions.

7.11 Seascape, Landscape and Visual

The Proposed Development (Offshore)

The Seascape, Landscape and Visual Impact Assessment chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on seascape, landscape and visual impact assessment receptors. The assessment of seascape, landscape and visual impact assessment effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the seascape, landscape and visual impact assessment chapter was agreed through the scoping process with MD-LOT and through further consultation with

NatureScot, The Highland Council and Aberdeenshire Council. A combination of bottom-fixed and floating WTG foundations were considered within the assessment.

The Seascape, Landscape and Visual Impact Assessment identifies and assesses the significance of changes resulting from the construction, operation and decommissioning of the Caledonia OWF. This is carried out in relation to both the seascape (coastal) character and landscape character as environmental resources in their own right, and on people's views and visual amenity. The construction, operation and decommissioning of the OECC has been scoped out of the seascape, landscape and visual impact assessment.

The significant visual effects identified occur along the coastal area of Caithness in the Highlands, in the western part of the study area, between approximately Keiss and Whaligoe Steps and along a short section of the Aberdeenshire coast between approximately Portsoy and Gardenstown, where the effects are assessed as Significant (borderline). These locations, which represent views from settlements and routes, represent the outer limits of significant visual effects on the Highlands and Aberdeenshire coastlines.

Further north along the Highlands coast and from the Orkney Isles the effects have found to be not significant. This is largely due to increasing distance, the scale of the Caledonia OWF as a proportion of the wider seascape and the fact that it appears to be an addition to existing OWF development seen in the same part of the view.

The night-time effects have been assessed as not significant. This is largely due to the long distance and low intensity of the lights when viewed from the coast as well as the lit context within which the lights would be seen. The Applicant has committed to install sensors so that when visibility of the WTG lights from all sensors is greater than 5km in the hours of darkness the aviation lighting is reduced from 2000 candela to 200 candela. The addition of the Caledonia OWF to baseline OWF (operational and under construction) is considered throughout the assessment.

It has been assessed that there would be Moderate significant cumulative effect on the settlement of Keiss and localised sections of the A882, the B784, the B78 and the rail line through the addition of the Caledonia OWF to a cumulative context that includes operational, under construction onshore and offshore wind farms when Cogle Moss onshore wind farm is added to the cumulative context. Across the southern part of the study area in Moray and Aberdeenshire it has been assessed that there would be no significant cumulative effect on viewpoints or receptors through the addition of Caledonia OWF to a cumulative context that includes operational, under construction onshore and offshore wind farms.

There will be a short term, Moderate, Significant in-combination effect of the Caledonia OWF and the Proposed Development (Onshore), which has been assessed as Significant. This will affect residential receptors and users of NCR1 and the core path in the localised area between Whitehills and Easter Whyntie during the OnTI construction period.

The assessment has taken account of embedded mitigation, including the development of a Lighting and Marking Plan in

addition to a number of design commitments which will be secured as part of the generation asset and transmission asset marine licences.

Caledonia North

The Seascape, Landscape and Visual Impact Assessment Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. Only fixed-bottom WTG foundations were considered within the assessment. An overview of the seascape, landscape and visual impact assessment baseline was presented.

The significant visual effects identified occur along the coastal area of Caithness in the Highlands, in the western part of the study area between approximately the Hill of Harley (approximately 5km north of Keiss) and Whaligoe Steps. These locations, which represent views from sensitive receptors such as residents in settlements and recreational users (walkers along core paths, dog walkers, beach goers etc) represent the outer limits of significant visual effects on the Highlands coastline.

The night-time effects have been assessed as not significant, as described for the Proposed Development (Offshore).

A 17km extent of the coast to the north between Wick and Hill of Harley (approximately 5km north of Keiss) would also be significantly affected by OWF development views through the further addition of Caledonia North Site to this context.

The addition of the Caledonia South Site to baseline OWF (operational and under construction) is considered throughout the seascape, landscape and visual impact assessment. It has been assessed that there would be Moderate significant cumulative effect on the settlement of Keiss and localised sections of the A882, the B784, the B78 and the rail line through the addition of the Caledonia North Site to a cumulative context that includes operational, under construction onshore and offshore wind farms when Coggle Moss onshore wind farm is added to the cumulative context.

The assessment has taken account of embedded mitigation, including the development of a Lighting and Marking Plan in addition to a number of design commitments which will be secured as part of the generation asset and transmission asset marine licences.

Caledonia South

The Seascape, Landscape and Visual Impact Assessment Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. A combination of fixed-bottom and floating WTG foundations were considered within the assessment. An overview of the seascape, landscape and visual impact assessment baseline was presented.

The significant visual effects identified occur along the coastal area along a short section of the Aberdeenshire coast between approximately Portsoy and Gardenstown where the effects are assessed as Significant (Borderline). These locations, which represent views from settlements and routes represent the outer limits of significant visual effects on the Aberdeenshire coastline.

The night-time effects have been assessed as not significant, as described for the Proposed Development (Offshore).

The addition of the Caledonia South Site to baseline OWF (operational and under construction) is considered throughout the seascape, landscape and visual impact assessment. It has been assessed that there would be no significant cumulative effect on viewpoints or receptors through the addition of Caledonia South Site to a cumulative context that includes operational, under construction onshore and OWFs.

The assessment has taken account of embedded mitigation, including the development of a Lighting and Marking Plan in addition to a number of design commitments which will be secured as part of the generation asset and transmission asset marine licences.

7.12 Other Human Activities

The Proposed Development (Offshore)

The Other Human Activities chapter of Volume 2 of the EIAR considers the effects of the Proposed Development (Offshore) on other human activities receptors. The assessment of other human activities effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Other Human Activities chapter was agreed through the scoping process with MD-LOT and through further consultation with the relevant developments and stakeholders.

The Proposed Development (Offshore) is within the vicinity of multiple OWF, wave and tidal energy developments, utilities developments, oil and gas infrastructure and a number of other marine infrastructure sites.

The Other Human Activities Chapter assesses the potential environmental effects from the Proposed Development (Offshore) on other human activities receptors. These impacts include:

- Temporary obstruction to other OWFs;
- Temporary obstruction to utilities developments and associated activities; and
- Temporary obstruction to licenced marine disposal sites and associated activities.

Cumulative impacts include temporary obstruction to other OWFs, temporary obstruction to utilities developments and associated activities and temporary obstruction to licenced marine disposal sites and associated activities.

The assessment has taken account of embedded mitigation, including the development of a number of plans, statements and programmes (e.g., Cable Plan, Construction Method Statement, Environmental Management Plan, Marine Pollution Contingency Plan, Lighting and Marking Plan, Navigational Safety Plan and Emergency Response Cooperation Plan) in addition to a number of design commitments which will be secured as part of the generation asset and transmission asset marine licences.

Consultation has been advanced with relevant stakeholders to detail additional appropriate mitigations to safeguard other developments and projects.

No significant effects were identified for OHA receptors. This is both in terms of the Proposed Development (Offshore) and cumulatively with other developments. As a result, no additional mitigation has been proposed above and beyond the embedded mitigation outlined. Overall, no significant residual effects to any of the identified receptors are identified.

Caledonia North

The Other Human Activities Chapter of Volume 3 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the Other Human Activities baseline was presented, with a similar baseline as presented for the Proposed Development (Offshore).

Multiple potential impacts on other human activity receptors due to Caledonia North were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance assessed being minor. All residual impacts were concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

Caledonia South

The Other Human Activities Chapter of Volume 4 of the EIAR followed the same approach as the overall Proposed Development (Offshore) EIAR Chapter. An overview of the Other Human Activities baseline was presented, with a similar baseline as presented for the Proposed Development (Offshore), with the exception of the Shetland HVDC Link power cable, which does not cross the other human activities ZoI, unlike for the Proposed Development (Offshore).

Multiple potential impacts on other human activity receptors due to Caledonia South were identified. No impact was assessed as an unacceptable significance of risk, with the highest significance assessed being minor. All residual impacts were concluded to be negligible to minor and not significant in EIA terms when embedded mitigation measures are considered.

8 Onshore Environmental Effects

8.1 Land Use

The Land Use chapter of the Onshore EIAR considers the effects of the Proposed Development on land use within the Proposed Development (Onshore) OnTI RLB (the study area). The assessment of land use effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Land Use Chapter was agreed through the scoping process with Aberdeenshire Council and through further consultation with Aberdeenshire Council and local landowners.

The baseline for the land use assessment considers the land use of the study area. The study area and surrounding area is rural in nature, with little to no densely populated residential areas. The predominant land use within the study area is agriculture, including both arable and grazed farmland. The study area is largely unforested apart from localised areas of plantation woodland, private woodland around properties and native/semi-natural amenity woodland.

The Land Use Chapter assesses the potential environmental effects from the Proposed Development (Onshore) on land use receptors. This includes direct impacts to agricultural land and soils, and forestry and woodland as well as cumulative and inter-related effects and inter-relationships with other technical disciplines.

The chapter considers temporary, construction impacts only as land will be reinstated following construction, with operational effects deemed negligible. Decommissioning impacts have been scoped out of the assessment, given buried infrastructure will remain in-situ.

The following potential impacts to land use receptors were identified:

- Direct and temporary loss of agricultural land and soils;
- Direct and temporary loss or removal of forestry and woodland; and
- Potential cumulative temporary losses of agricultural land and soils with other developments.

The assessment has taken account of embedded mitigation measures including:

- Reinstatement of agricultural land following construction to existing agricultural use;
- Engagement with landowners throughout the EIA process as part of the evolution of the design process and ongoing;
- Avoidance of high value agricultural and forestry land as far as practicable as part of the design of the ONEC. Notable forested areas in the study area will also be avoided by using trenchless crossing methodologies or through micro siting of infrastructure at detailed design;
- Field drains will be protected as far as practicable and impacts to field drains as a result of construction activities will be remedied as part of the reinstatement process. Livestock water supplies will also be protected and alternative supplies provided where access could be compromised by work; and

- Prevention of soil borne pests and diseases through adoption of precautions as recommended by Scotland's Environment and Rural Services.

No significant effects were identified for forestry and woodland and as a result, no additional mitigation has been proposed above and beyond the embedded mitigation outlined in the chapter.

Significant effects were identified for the temporary loss of agricultural land on the basis that certain infrastructure required for construction across the worst-case of two sequential phases of works such as haul roads may be present for extended durations. As a result, secondary mitigation has been proposed in the form of bespoke and targeted landowner consultation to minimise effects at any one location. Following the application of secondary mitigation, no significant residual effects are anticipated. Overall, no significant residual effects to any of the identified receptors are identified.

8.2 Terrestrial Ecology and Biodiversity

The Terrestrial Ecology and Biodiversity chapter of the EIAR considers the effects of the Proposed Development (Onshore)on terrestrial ecology and biodiversity within the OnTI RLB and Zone of Influence (ZoI) for relevant ecological features. The assessment of terrestrial ecology and biodiversity effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the assessment was agreed through the scoping process with Aberdeenshire Council and through further consultation with relevant stakeholders such as NatureScot.

The baseline for the terrestrial ecology assessment was developed through a desk study and a range of site-specific surveys undertaken between October 2022 and August 2024. These surveys followed relevant guidance and were undertaken across varying study areas dependent on the target species.

The terrestrial ecology and biodiversity assessment identifies the potential effects on terrestrial ecology and biodiversity associated with the construction, operation and decommissioning of the Proposed Development (Onshore). This includes the direct, indirect, cumulative and in-combination effects.

Ecological features considered include designated sites, notable habitats including ancient woodland, invasive non-native species, amphibians, aquatic and terrestrial invertebrates, badger, breeding birds, fish, freshwater pearl mussel, otter, pine marten, red squirrel, reptiles, water vole, wildcat and wintering birds.

For the construction phase of the Proposed Development (Onshore) potential impacts identified include disturbance and displacement of protected or notable species, increase in species mortality, and temporary or permanent habitat loss, degradation and fragmentation.

For the operational phase of the Proposed Development (Onshore), potential impacts identified include disturbance and displacement of protected or notable species and permanent habitat loss, degradation and fragmentation. These impacts are primarily constrained to the Onshore Substation Site.

The impacts associated with decommissioning of the Proposed Development (Onshore) are assumed to be equal to or lesser than those identified for the construction stage.

The assessment has considered embedded mitigation measures for the assessment of potential effects. This includes a Construction Environmental Management Plan (CEMP) and related pollution avoidance measures, a Construction Traffic Management Plan (CTMP), avoidance of notable habitats through micro-siting and use of trenchless technology. This embedded mitigation in most cases will avoid permanent or temporary habitat loss, fragmentation or degradation to ecological receptors.

Following the implementation of embedded mitigation measures, secondary mitigation measures were proposed to avoid likely significant effects on several ecology features. This includes, but is not limited to, the appointment of an Ecological Clerk of Works (ECoW), a detailed Lighting Management Plan (LMP) and further consultation with the relevant District Salmon Fisheries Boards regarding mitigation for fish species.

Following the implementation of embedded and secondary measures, only minor residual effects remain for fish species. Following consultation, confirmation of the HDD design and implementation of methods provided in the detailed CEMP, noise and vibration impacts during the construction phase for fish are expected to be not significant in EIA terms.

The chapter also outlines potential, Proposed Development (Onshore) ecological enhancements which could include landscape planting to connect ecological corridors and to provide additional foraging and commuting resources in and adjacent to the Onshore Substation Site. It is also recommended that additional enhancements are explored such as the provision of bird and bat boxes, daylighting of culverts and removal of barriers to fish passage.

8.3 Landscape and Visual

The Landscape and Visual chapter of the Onshore EIAR considers the effects of the Proposed Development on landscape and visual receptors within a 1km buffer of the OnTI RLB; and 3km of the Onshore Substation. The assessment of landscape and visual effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Landscape and Visual chapter was agreed through the scoping process with Aberdeenshire Council and through further consultation with the council.

The Landscape and Visual assessment assesses the potential effects from the Proposed Development (Onshore) on landscape and visual amenity.

The baseline for the assessment was developed through a desk based study and site specific surveys. The principal visual receptors within the study area include people within settlements, local residents, people driving on roads, visiting tourist facilities or historic environment assets, or engaged in recreational activity such as walking and cycling.

Onshore receptors most sensitive to the effects of the Proposed Development (Onshore) include landscape elements within the OECC and visual receptors (people) within 1km of the ONEC.

Onshore receptors most sensitive to the effects of the Onshore Substations include landscape elements within the Onshore Substation Site, landscape character within 3km of the Onshore Substation Site and visual receptors within 3km of the Onshore Substation Site.

The assessment has taken account of embedded mitigation measures for the assessment of potential effects, including advanced mitigation planting of mixed native hedgerow, blocks of mixed native woodland, mixed native woodland/shrub mix woodland, mixed native woodland/shrub mix woodland and deciduous native woodland/shrub.

Potential significant adverse effects were identified on visual amenity at some viewpoints and local visual amenity during construction and operation of the Proposed Development and in the cumulative assessment for the proposed Onshore Substations before mitigation planting has established.

Potential significant adverse, medium term effects during construction were identified on the perceived landscape character of the Undulating Agricultural Heartland Landscape Character Type (LCT 20) within 600m of the Onshore Substations. Such potential adverse significant effects would also arise cumulatively during construction and operation when they would be long term.

Embedded mitigation includes planting around the Onshore Substations including native hedgerows, and native deciduous and mixed native woodland planting for screening. Some planting will be implemented in advance of the start of construction activity and some at the end of construction of Phases 1 and 2. The post Phase 1 planting will establish and provide more effective screening earlier in views from the north. For all viewpoints, the mitigation planting will be sufficient to reduce the effect of the Proposed Development (Onshore) to non-significant levels after 15 years of operation of both Onshore Substations.

As mitigation of the landscape and visual effects of the Proposed Development (Onshore) is limited to embedded mitigation measures and precludes any requirement for secondary mitigation, the residual effects of the Proposed Development (Onshore) will be of the same level and nature as those assessed during the construction and operation phases.

Potentially, mounding of soil around the Onshore Substations would provide additional mitigation of its landscape and visual effects. At this stage, there is insufficient detail to consider what mounding may be feasible and for this reason this assessment has not considered mounding. This will be considered at the detailed design stage subject to further detail becoming available.

8.4 Terrestrial Archaeology and Cultural Heritage

The Terrestrial Archaeology and Cultural Heritage Chapter considers the effects of the Proposed Development (Onshore) on receptors within a 500m buffer of the OnTI RLB; and 5km of the Onshore Substation Site. The assessment of terrestrial archaeological and cultural heritage effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Terrestrial Archaeology and Cultural Heritage chapter was agreed through the scoping process with

Aberdeenshire Council, Aberdeenshire Council Archaeology and Built Heritage Advisors.

The baseline for the terrestrial archaeology and cultural heritage assessment was developed through a desk based study and a site walkover survey. There are no designated heritage assets within the OnTI RLB. Within the 500m study area, there are two Scheduled Monuments, 15 Listed Buildings, one Conservation Area, and one Inventory Garden and Designed Landscape. Within the 5km study area, there is one Scheduled Monument, two Listed Buildings and one Inventory Garden and Designed Landscape.

The Terrestrial Archaeology and Cultural Heritage assessment assesses the potential effects from the Proposed Development (Onshore) on terrestrial archaeology and cultural heritage. This includes direct, indirect, whole project assessment, cumulative, inter-related effects, inter-relationships and transboundary effects.

Onshore receptors sensitive to the effects of the OnTI include known and potential archaeological resource within 500m of the OnTI and heritage assets within 5km of the Onshore Substation Site.

The following impacts were identified as requiring assessment:

- Physical impact to the known and unknown archaeological resource due to construction activities (including any enabling works etc.); and
- Impact to the cultural significance of a designated heritage asset through settings impacts or alteration of the setting of a heritage asset during operation.

The assessment has taken account of embedded mitigation measures for the assessment of potential effects, including advanced mitigation planting of mixed native hedgerow, blocks of mixed native woodland, to be planted prior to the start of construction; mitigation planting comprising mixed native woodland/shrub mix woodland.

Significant effects were identified as a result of indirect physical impacts to Category C Listed Millbrex Church. Following implementation of the Construction Traffic Management Plan and mitigation measures contained therein no significant residual effects remain.

Whilst no significant residual effects are identified; it is proposed to mitigate effects arising from the construction of the Proposed Development (Onshore) to terrestrial archaeology by the implementation of an appropriate programme of archaeological investigation and recording. Following the implementation of the proposed mitigation measures, it is anticipated that effects to terrestrial archaeology could be further reduced. For example, where an adverse minor effect was previously identified, it is anticipated that this could be reduced to a negligible effect. Overall, no significant residual effects to any of the identified receptors are identified.

8.5 Hydrology and Hydrogeology

The Hydrology and Hydrogeology Chapter considers the effects of the Proposed Development on hydrology and hydrogeology receptors within up to a 1km radius of the Proposed Development (Onshore). The assessment of hydrology and hydrogeology effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Hydrology and Hydrogeology Chapter was agreed through the scoping process with Aberdeenshire Council and through further consultation with the council and the Scottish Environmental Protection Agency (SEPA).

Within the study area, there are no internationally important designated sites that have hydrological or hydrogeological qualifying features. The study area is within the North East WFD basin district with a number of large river and coastal waterbodies located in the study area. The north of the study area interacts with the intertidal coastal zone of the North Sea.

The Hydrology and Hydrogeology assessment assesses the potential effects from the Proposed Development (Onshore) on hydrology and hydrogeology. This includes the direct, indirect, whole project assessment, cumulative and in-combination effects.

The onshore receptors most sensitive to hydrology and hydrogeology impacts include surface watercourses and waterbodies, groundwater bodies that underlie the study area, potable water supplies that directly depend on water resources, and other waterbodies or water dependent features, such as groundwater-dependent terrestrial ecosystem (GWDTE) areas.

Examples of sensitive receptors throughout the study area include springs, wells and Private Water Supplies (PWS); the Inverboyndie designated bathing water catchment; surface and groundwater Drinking Water Protected Areas (DWPAs), and WFD classified watercourses such as River Deveron.

For the construction phase of the Proposed Development (Onshore) potential impacts include changes to surface water and groundwater quality due to an increased chance of pollution, increased sediment mobilisation and an alteration of drainage patterns. Construction may also cause changes to surface water and groundwater quantity and hydromorphology characteristics due to changes in water catchment dynamics and pathways. These have the ability to impact sensitive receptors in the study area.

For the operational phase of the Proposed Development (Onshore), potential impacts include increased flood risk to people and property due to an increase in hardstanding areas associated with the Onshore Substations. Operational impacts to surface water and groundwater quantity may occur due to permanent changes in water catchments and pathways and the introduction of barriers to natural overland flow. Permanent changes to watercourses to facilitate the OECC or any upgrades to watercourse crossings may result in permanent impacts on hydromorphological quality of the water features within the study area.

The impacts associated with decommissioning of the Proposed Development (Onshore) are assumed to be equal to or lesser than those identified for the construction stage.

The assessment has taken into account of embedded mitigation measures for the assessment of potential effects, including the measures included in the Outline CEMP. These include pollution prevention mitigation and surface water management plans (including temporary cutoff drains or bunds to be placed upslope side of the working area to minimise water runoff interacting with exposed soil and reroute surface water away from the construction area), a suitable floodplain compensation strategy for works impacting the floodplain, avoidance of placement of construction compounds and stockpiles in flood zones and the use of trenchless techniques, such as Horizontal Directional Drilling HDD, for all WFD and salmonid watercourses.

Following the assessment, no significant effects on any hydrological or hydrogeological receptors are predicted. As such, no secondary mitigation measures are considered to be required.

Overall, no significant residual effects to identified receptors are predicted, either for the Proposed Development (Onshore) alone or cumulatively with other plans or developments.

8.6 Geology Soils and Contaminated Land

The Geology, Soils and Contaminated Land Chapter of the Onshore EIAR considers the effects of the Proposed Development (Onshore) on receptors within the OnTI RLB plus a buffer zone of 100m. The assessment of geology, soils and contaminated land effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Geology, Soils and Contaminated Land Chapter was agreed through the scoping process with Aberdeenshire Council.

The study area is underlain by a range of metamorphic, sedimentary and igneous bedrock lithologies. The study area comprises a lowland glaciated and periglaciated terrain, with associated landforms and superficial deposits such as till, glaciofluvial and glaciolacustrine deposits. There are two sites within the study area which are designated for their geodiversity. The study area lies within an area of generally low topography with elevations ranging from sea level at the Landfall Site, to a maximum elevation of 175 metres above Ordnance Datum (mAOD) within the ONEC.

The Geology, Soils and Contaminated Land assessment assesses assessment considers the effects to designated geological sites, designated mineral resources, peat and carbon-rich soils and contaminated land. Human health is also considered as a receptor to contaminated land that may be disturbed as a result of the Proposed Development (Onshore).

The following impacts were identified as requiring assessment:

- Loss or damage to designated geological sites during construction;
- Sterilisation of mineral resources during construction;
- Potential for disturbance of contaminated land during construction, operation and decommissioning, with consequential impacts on human health; and
- Loss of peat and carbon-rich soils during construction.

The potential impacts on groundwater and surface water as a result of the disturbance of contaminated land are assessed in Volume 5, Chapter 6: Hydrology and Hydrogeology.

The assessment has taken account of embedded mitigation measures for the assessment of potential effects, including:

- the implementation of a CEMP which will prevent pollution during construction and ensure the appropriate management of waste;
- the design of the ONEC to avoid all Class 1 and 2 peatland and the selection of the Onshore Substation Site to avoid potential peatland;
- the implementation of a groundwater and surface water quality monitoring plan;
- the design of the ONEC and Onshore Substation Site to avoid PWS;
- the identification and management of contaminated land in accordance with current guidance;
- development of a Materials Management Plan (MMP) if soils are required to be re-used; and
- implementation of a Peat Management Plan.

No significant effects were identified and overall, no significant residual effects to any of the identified receptors are predicted, either for the Proposed Development (Onshore) alone or cumulatively with other plans or developments.

8.7 Airborne Noise and Vibration

The Airborne Noise and Vibration chapter of the Onshore EIAR considers the effects of the Proposed Development (Onshore) on receptors within the OnTI RLB plus a buffer zone of 100m. The assessment of airborne noise and vibration effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the airborne noise and vibration chapter was agreed through the scoping process and through further consultation with Aberdeenshire Council Environmental Health Officer.

The baseline for the noise and vibration assessment was developed through desk based study and a baseline survey to characterise the prevailing noise environment at Noise sensitive receptors (NSRs).

The Airborne Noise and Vibration assessment assesses the potential noise and vibration effects from the Proposed Development (Onshore) on NSRs.

NSRs considered comprise the closest residential properties to construction activities and the Onshore Substation Site. For construction activities along the ONEC and at the Landfall Site, the assessment has not considered specific NSRs, instead stand-off distances have been determined at which appropriate criteria would be exceeded, and therefore where potential significant effects may occur.

Potential noise impacts considered in the chapter comprise construction activities at the Landfall Site, along the ONEC and at the Onshore Substation Site and operational activities at the

Onshore Substation Site. Noise impacts from road traffic during construction have also been considered. Detailed consideration of vibration impacts from construction was scoped out of the assessment, on the basis that vibration can be limited to within appropriate threshold values at NSRs by the implementation of appropriate mitigation.

The assessment has taken account of embedded mitigation measures for the assessment of potential noise effects, specifically; attenuation of electrical plant within the Onshore Substation Site and the implementation of a CTMP and CEMP.

Potentially significant noise effects have been identified at a range of separation distances from proposed construction activities at the Landfall Site and ONEC. Noise impacts during the construction of the Onshore Substation Site have been determined to be not significant during weekday daytimes. Noise impacts associated with road traffic during construction have been determined to be not significant for most links in the study area. Potential significant effects have been identified on three links, however, these are expected to prove not significant once further clarity is available on actual construction traffic movements to access points along the ONEC. Noise impacts due to operation of the Onshore Substation Site have been determined to be not significant at the closest NSRs.

Mitigation has been specified, comprising the production of a CEMP and CTMP to address potential noise and vibration impacts during construction and the optimisation of the Onshore Substation Site during detailed design stage to minimise noise from electrical plant.

No significant residual effects have been identified.

8.8 Traffic and Transport

The Traffic and Transport Chapter of the Onshore EIAR considers the effects of the Proposed Development (Onshore) within the survey area defined for the Traffic and Transport assessment.

The assessment of traffic and transport effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Traffic and Transport Chapter was agreed through the scoping process with Aberdeenshire Council.

The Traffic and Transport assessment assesses the potential effects from the Proposed Development (Onshore) on Traffic and Transportation (T&T) receptors during construction, operation and decommissioning.

A full baseline review of all transport network types, including Non-Motorised Users (NMU), public transport, and road networks, was undertaken to identify any key issues that may impact on their current operation.

Throughout the area covered by the T&T receptor points the local road network is largely rural, comprising of rural 'A' roads, 'B' roads and numerous unclassified roads. There are currently no known issues with regards to heavily trafficked roads, particularly in terms of journey delays and / or congestion, although there may be some localised delays during peak weekday periods within the surrounding towns such as Banff.

Pedestrian, cycle networks and public transport services are subject to relatively limited provision, partly due to low levels of demand and the wide spread of trip origins and destinations.

The most likely significant effect on the local road network will result from vehicle movements during the construction phase. Of the 28 onshore receptors that were considered as part of a series of traffic surveys, 12 were identified as exceeding the traffic flow thresholds set by the Institute of Environmental Management and Assessment (IEMA). These 12 onshore receptors are identified as most susceptible to potential effects resulting from the addition of construction traffic.

The assessment has taken into account of embedded mitigation measures for evaluating potential effects. The primary mitigation measure, the Outline CTMP, serves as a framework to manage construction vehicle movements safely throughout the area covered by the T&T receptor points. It outlines the basic principles and actions to address potential traffic impacts, based upon a WCS. A more detailed CTMP will be developed at the detailed design stage. This will consider specific activities, route assessments, plans for Abnormal Indivisible Loads and internal road management. A CEMP will accompany the CTMP and will act as a supporting mitigation measure, reinforcing the vehicle management processes as outlined by the Outline CTMP / CTMP.

Potential significant effects, prior to the implementation of mitigation, have been identified for receptors at site 9 (the east-west running B9139, located to the west of Banff) and site 21 (an east-west running unclassified road, located approximately 3.5km to the west of Birkenhills). This assessment was based on the worst-case of a concurrent construction scenario. Overall traffic numbers would be lower for the sequential or enabling scenario.

Importantly, these significant effects relate solely to the point-based receptors and not the full length of the road which the receptor is located on. Furthermore, these effects are temporary in nature and will be mitigated through the embedded mitigation measures above, no secondary mitigation is proposed.

No significant residual impacts are predicted, either for the Proposed Development (Onshore) or cumulatively with other plans or developments.

9 Intertidal and Combined Effects

9.1 Socioeconomics, Tourism and Recreation

The Socioeconomics, Tourism and Recreation chapter of the EIAR considers the effects of the Proposed Development on both socio-economic receptors and tourism and recreation receptors. The socio-economic impacts are assessed at the following areas:

- Aberdeenshire (for the OnTI elements only);
- North Scotland, defined as the local authorities of Aberdeen City, Aberdeenshire, Highland, and Moray;
- Scotland; and
- the UK.

For tourism and recreation, the assessment focuses on the local administrative areas that contain the OnTI and areas experiencing significant visual impacts as identified within the Proposed Development (Offshore) Seascape and Landscape and Visual Impact Assessment.

The assessment of socioeconomics, tourism and recreation effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the chapter was agreed through the scoping process with Aberdeenshire Council.

The assessment considers direct, indirect, cumulative, and transboundary effects. The assessment also discusses appropriate mitigation and monitoring as required to address any significant effects. The assessment looks at both the construction, operational and decommissioning of the Proposed Development, and is a combined assessment for both onshore and offshore.

The receptors that are most sensitive to economic changes are the supply chains and economies of Aberdeenshire, the North of Scotland, Scotland and the UK. Tourism and recreation assets within the Aberdeenshire Tourism and Recreation Study Area (TRSA) and Caithness TRSA have also been identified as potential receptors.

The following impacts were identified as requiring assessment during the construction, operational and decommissioning phase of the Proposed Development:

- Economic Impacts, which include the employment and Gross Value Added (GVA) which is supported by the Proposed Development;
- Tourism Asset Impacts, which includes the secondary impacts on tourism and recreation receptors; and
- Social and Community Assets.

No embedded mitigation measures that are specific to socio-economics, tourism and recreation have been considered. However, the assessment has multiple inter-related impacts, and the embedded mitigation measures relative to these chapters are also considered in the assessment. This includes the development and adherence to a Vessel Management Plan, Lighting and Marking Plan, Navigational Safety Plan and planting around the Onshore Substations. In addition, the Proposed Development has also embedded enhancement measures to

maximise the beneficial effects identified. This includes staff dedicated to managing supply chain and community interactions to maximise benefits.

No significant effects have been identified on economic, social or tourism and recreation receptors. On balance, the economic impacts of the Proposed Development are expected to be positive, with peak employment supported across Scotland of up to 3,795 jobs during construction and 455 jobs during the operational phase. Caledonia North or Caledonia South on their own with a single onshore phase would generate approximately half of these jobs. The Proposed Development will also contribute to the just transition to net zero.

The residual effects of the Proposed Development will be the same as assessed due to embedded mitigation which precludes any requirement for secondary mitigation.

9.2 Greenhouse Gases

The Greenhouse Gases Chapter of the EIAR assess the impacts of the Proposed Development against a baseline scenario, i.e. the climate if the Proposed Development does not exist. The study area for the assessment covers the construction footprint of the Proposed Development. The assessment of greenhouse gas effects has been carried out in accordance with all appropriate legislation, policy and guidance. The content of the Greenhouse Gases Chapter was agreed through the scoping process with Aberdeenshire Council.

The assessment considers the potential effects on Greenhouse Gas (GHG) emissions from the construction, operation and decommissioning of the Proposed Development. The Proposed Development comprises, Caledonia North and Caledonia South, collectively referred to as the Proposed Development (Offshore) and the OnTI required to transfer the power from the Proposed Development (Offshore) to a connection to the NETS, referred to as the Proposed Development (Onshore). The assessment approach captures both direct and indirect GHG emissions arising as a result of the Proposed Development (Offshore) and Proposed Development (Onshore) combined.

The impact assessment takes into account the embedded mitigation of the Proposed Development including:

- Development of and adherence to a Construction Method Statement;
- Development of and adherence to an Offshore EMP; and
- Development of a CEMP.

Aligning with IEMA guidance the emissions attributable to the Proposed Development have been calculated against the UK National Carbon Budgets. For the Proposed Development (Onshore) and Proposed Development (Offshore).

The GHG emissions assessment considered the construction materials, construction processes, the operational use stage, the decommissioning stage, and any benefits and loads beyond the boundary of the Proposed Development such as land use and blue (marine) carbon sequestration.

The GHG emissions assessment results for the Proposed Development (Onshore) and Proposed Development (Offshore) combined were between 4,685,282 – 4,987,854 tCO_2e for

construction, 343,100 – 365,573 tCO_2e for operational maintenance and 954,761 – 1,013,953 tCO_2e for decommissioning. There are also GHG emissions impacts associated with land use and blue carbon change as a result of the Proposed Development (Onshore) and Proposed Development (Offshore).

The GHG emissions for Caledonia North and single phase of the Proposed Development (Onshore) were 2,049,718 tCO_2e for construction, 150,517 tCO_2e for operation and 423,107 tCO_2e for decommissioning.

The GHG emissions for Caledonia South and single phase of the Proposed Development (Onshore) were 2,939,574 tCO_2e for construction, 215,423 tCO_2e for operation and 590,247 tCO_2e for decommissioning.

The significance conclusion for the construction and decommissioning phases of the Proposed Development is minor adverse (not significant) due to the increase in emissions associated with construction/decommissioning materials and processes. The conclusion for the operation of either the Proposed Development (Offshore) or Caledonia North and Caledonia South alone is significant beneficial due to the generation of low carbon electricity, aligning with IEMA guidance (IEMA, 2022[4]). Calculated avoided emissions per year are 617,650 – 692,651 tCO2e for the Proposed Development's 35 year operational phase. Overall, for the Proposed Development (Onshore) and the Proposed Development (Offshore) combined the assessment conclusions are significant beneficial, when considering the needs case for helping the UK and Scotland achieve national carbon targets of net zero by 2050 and 2045 respectively.

In line with best practice, the whole life GHG emissions associated with construction, maintenance and decommissioning of the Proposed Development, would seek to be reduced as far as practicable.

No potential in-combination effects for GHG emissions were identified.

Considering additional mitigation measures, minimising GHG emissions through design is a core principle of the UK Government's Infrastructure Carbon Review and the PAS 2080:2023 specification of infrastructure carbon management. The PAS 2080 carbon management hierarchy should also be used by the Applicant design team when developing the design of the Proposed Development including considering opportunities to "Build nothing, Build less, Build clever, Build efficiently".

Given the nature and scale of the Proposed Development it is expected that there will be residual construction and decommissioning-related emissions associated with the Proposed Development. However, the Proposed Development is, by design, reducing national emissions and Scotland's and the UK's reliance on fossil fuels within the national electricity generation and transmission system.

9.3 Climate Change Resilience

The content of the Climate Change Resilience chapter was agreed through the scoping process with Aberdeenshire Council. The

assessment considers the Climate Change Resilience (CCR) of the Proposed Development. This CCR assessment identifies the potential effects of future changes to climate hazards (driven by climate change) on receptors within the Proposed Development, assessing how resilient the development is to such future climate hazards. The assessment looks at both the construction, operational and decommissioning periods of the Proposed Development, and is a combined assessment for both onshore and offshore.

This chapter also assesses the impact of climate change on other environmental topics within the ICCI assessment. This assessment investigates whether climate change will exacerbate any potential effects of the Proposed Development on all other environmental receptors identified within in the EIAR.

For both assessments, weather hazards which are projected to change in future were used to identify risks and potential effects. These include:

- Increased frequency and intensity of extreme heat events;
- Increased risk of drought;
- Increased heavy rainfall events and resultant flooding;
- Increased frequency of storm events;
- Sea level rise; and
- Increased ocean temperatures.

Climate Change Resilience

Within the CCR assessment, receptors include various physical assets (e.g. WTG, cables, Onshore Substations) within the Proposed Development and staff operations; receptors were grouped by whether these were located onshore or offshore. Receptors included lower value assets such as landscaping and car parks as well as higher value receptors such as electrical equipment and staff.

For the CCR assessment, the potential risks caused by these climate hazards included:

- Risk of damage to assets (built and partially built) both direct and indirect;
- Risk of physical loss or damage to materials or equipment and plant (construction phase);
- Risk of disruption and delay to construction or dismantling processes (construction and decommissioning phase;
- Risk of disruption or delay of checks and maintenance (operational phase); and
- Health and safety risks to staff.

Embedded mitigation considered within the assessment includes:

- The following of best practice health and safety procedures, these are expected to evolve as the climate changes into the future;
- The design of assets to withstand different weather thresholds higher than currently expected and within what is

likely within the operational life of the Proposed Development; and

- The pausing of construction during extreme weather events.

No significant effects were identified. As a result, no additional mitigation has been proposed beyond the embedded mitigation outlined. There are also no significant residual effects identified.

In-Combination Climate Change Impacts

For the ICCI assessment, receptors identified were those included within each individual topic chapter within the EIAR. Embedded mitigation identified as part of the ICCI assessment is contained within each individual topic chapter within the EIAR. No significant effects were identified. As a result, no additional mitigation has been proposed beyond the embedded mitigation outlined. There are also no significant residual effects identified.

9.4 Intertidal

The Intertidal Assessment provides an assessment of the potential Proposed Development effects where there is an overlap between MHWS and MLWS (referred to as the 'intertidal zone') for the Proposed Development (Offshore) and the Proposed Development (Onshore). The intertidal assessment has been conducted to ensure that neither the Proposed Development (Offshore) nor the Proposed Development (Onshore) is considered in isolation and that the 'whole Proposed Development' effects are understood.

The Proposed Development (Offshore) and potential combined effects with the Proposed Development (Onshore) were identified and discussed for the following topics:

- Marine and Coastal Processes;
- Marine Water and Sediment Quality;
- Benthic, Subtidal and Intertidal Ecology;
- Fish and Shellfish Ecology;
- Offshore Ornithology;
- Marine Mammals;
- Marine Archaeology and Cultural Heritage;
- Seascape, Landscape and Visual Impact;

The following topics have no impact pathway for potential whole Proposed Development effects and were therefore not considered as part of the intertidal assessment:

- Commercial fisheries;
- Shipping and navigation;
- Military and aviation;
- Other human activities;
- Land use; and
- Traffic and transport.

The only assessments that identified receptors where there may be significant effects as a result of both the Proposed Development (Onshore) and the Proposed Development (Offshore) was the SLVIA and LVIA during construction.

There is the potential for effects along the coast in the vicinity of the Proposed Development (Onshore) Landfall Site where it will be visible at close range during construction whilst there are also views out to sea where Caledonia South will also be visible during construction. Effects during construction on receptors on NCR1, B9139, the NE250 which follows the B9139 and then the same minor road as the NCR1 and coastal core path are assessed as not significant. Effects on residents at Whitehills are assessed as being of medium-high sensitivity to the construction of the Proposed Development (Onshore). The effect during construction is assessed as significant, adverse, short-term and reversible. The effect will extend across the western edges of the village, where there is potential visibility of the Proposed Development (Onshore) during construction, while no effect will occur within the village where buildings screen it from view from more distant parts of the village to the east. Effects on residents at Whitehills is assessed in as being of Medium-High sensitivity in regards the construction of the Proposed Development (Offshore). The effect during construction is assessed Significant (Borderline) due to size and scale of the WTG particularly in comparison to existing OWF visible along the horizon. Effects are identified as adverse, short to medium term and temporary. The indicative programme shows that the Proposed Development (Onshore) construction works (which may include the Landfall Site HDD) and the installation of the WTGs for the Proposed Development (Offshore), may occur during a period of six months of the overall construction period.

It is assessed that the magnitude of change on the residential receptors and users of NCR1 and the core path between Whitehills and Easter Whyntie would increase only slightly from the Medium magnitude of change assessed locally in relation to the Proposed Development (Onshore) construction alone and would remain at a Medium magnitude as a result of the effects of the Proposed Development. The effect is assessed as Moderate and Significant, adverse, short-term and temporary. No further significant effects are assessed as a result of the short-term effects of the Proposed Development at this location.

10 References

[1] Scottish Government (2020a)'Offshore Wind Policy Statement'. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2020/10/offshore-wind-policy-statement/documents/offshore-wind-policy-statement/offshore-wind-policy-statement/govscot%3Adocument/offshore-wind-policy-statement.pdf (Accessed 01/05/2024).

[2] Scottish Government (2020) 'Sectoral Marine Plan for Offshore Wind Energy'. Available at: https://www.gov.scot/publications/sectoral-marine-plan-offshore-wind-energy/ (Accessed 01/10/2024).

[3] National Grid (2009) The Horlock Rules – guidelines for the design and siting of substations. Available at https://www.nationalgrid.com/electricity-transmission/document/82846/download (Accessed 01/10/2024).

[4] Institute of Environmental Management and Assessment (IEMA) (2022) Institute of Environmental Management & Assessment (IEMA) Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available at: https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions (Accessed 01/10/2024).

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