Cenos Offshore Windfarm Limited

Cenos EIA

Chapter 4 – Site Selection and Consideration of Alternatives

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CONTENTS

ACRONYMS

ACRONYM	DEFINITION
AC	Alternating Current
BEIS	Department for Business, Energy and Industrial Strategy
CaP	Cable Plan
CES	Crown Estate Scotland
CNS	Central North Sea
COP	Cease of Production
DC	Direct Current
DSLP	Development Specification and Layout Plan
DSV	Diving Support Vessel
EICC	Export/Import Cable Corridor
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
FTU	Floating Turbine Unit
GHG	Greenhouse Gas
GREG	Government Regulatory Electrification Group
GW	Gigawatts
HES	Historic Environment Scotland
HND	Holistic Network Design
HNDFUE	Holistic Network Design Follow Up Exercise
HRA	Habitats Regulations Appraisal
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAC	Inter-Array Cable
IEMA	Institute of Environmental Management and Assessment
IN	Innovation
INTOG	Innovation and Targeted Oil & Gas
JNCC	Joint Nature Conservation Committee
IPF	Initial Plan Framework
km	Kilometre
M	Metre

ACRONYM	DEFINITION
MD-LOT	Marine Directorate – Licensing Operations Team
MHWS	Mean High Water Springs
MLA	Marine Licence Applications
MPA	Marine Protected Area
MW	Megawatt
NCMPA	Nature Conservation Marine Protected Area
NESO	National Energy System Operator
NGESO	National Grid Electricity System Operator [now the 'National Energy System Operator', or NESO]
NM	Nautical Mile
NSTA	North Sea Transition Authority
NSTD	North Sea Transition Deal
OASD	Options Appraisal Summary Document
OSCPs	Offshore Substation Converter Platforms
OTNR	Offshore Transmission Network Review
PAC	Pre-Application Consultation
PDE	Project Design Envelope
RLB	Red Line Boundary
RSPB	Royal Society for the Protection of Birds
s.36	Section 36
SAC	Special Areas of Conservation
SFF	Scottish Fishermen's Federation
SNH	Scottish Natural Heritage (now NatureScot)
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Areas
SSSI	Sites of Special Scientific Interest
TOG	Targeted Oil and Gas
ToR	Terms of Reference
UK	United Kingdom
WTG	Wind Turbine Generator

GLOSSARY

TERM	DEFINITION
2023 Scoping Opinion	Scoping Opinion received in June 2023, superseded by the 2024 Scoping Opinion.
2023 Scoping Report	Environmental Impact Assessment (EIA) Scoping Report submitted in 2023, superseded by the 2024 Scoping Report.
2024 Scoping Opinion	Scoping Opinion received in September 2024, superseding the 2023 Scoping Opinion.
2024 Scoping Report	EIA Scoping Report submitted in April 2024, superseding the 2023 Scoping Report.
Area of Opportunity	The area in which the limits of electricity transmission via High Voltage Alternating Current (HVAC) cables can reach oil and gas assets for decarbonisation. This area is based on assets within a 100 kilometre (km) radius of the Array Area.
Array Area	The area within which the Wind Turbine Generators (WTGs), floating substructures, moorings and anchors, Offshore Substation Converter Platforms (OSCPs) and Inter-Array Cables (IAC) will be present.
Cenos Offshore Windfarm ('the Project')	'The Project' is the term used to describe Cenos Offshore Windfarm. The Project is a floating offshore windfarm located in the North Sea, with a generating capacity of up to 1,350 Megawatts (MW). The Project which defines the Red Line Boundary (RLB) for the Section 36 Consent and Marine Licence Applications (MLA), includes all offshore components seaward of Mean High Water Springs (MHWS) (WTGs, OSCPs, cables, floating substructures moorings and anchors and all other associated infrastructure). The Project is the focus of this Environmental Impact Assessment Report (EIAR).
Cenos Offshore Windfarm Ltd. (The Applicant)	The Applicant for the Section 36 Consent and associated Marine Licences.
Cumulative Assessment	The consideration of potential impacts that could occur cumulatively with other relevant projects, plans, and activities that could result in a cumulative effect on receptors.

TERM	DEFINITION
Developer	Cenos Offshore Windfarm Ltd., a Joint Venture between Flotation Energy and Vårgrønn As (Vårgrønn).
Environmental Impact Assessment (EIA)	The statutory process of evaluating the likely significant environmental effects of a proposed project or development. Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation and maintenance and decommissioning.
Environmental Impact Assessment Regulations	This term is used to refer to the Environmental Impact Assessment Regulations which are of relevance to the Project. This includes the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended); and the Marine Works (Environmental Impact Assessment) Regulations 2007.
Environmental Impact Assessment Report	A report documenting the findings of the EIA for the Project in accordance with relevant EIA Regulations.
Export/Import Cable	High voltage cable used to export/import power between the OSCPs and Landfall.
Export/Import Cable Bundle (EICB)	Comprising two Export/Import Cables and one fibre-optic cable bundled in a single trench.
Export/Import Cable Corridor (EICC)	The area within which the Export/Import Cable Route will be planned and the Export/Import Cable will be laid, from the perimeter of the Array Area to MHWS.
Export/Import Cable Route	The area within the Export/Import Export Corridor (EICC) within which the Export/Import Cable Bundle (EICB) is laid, from the perimeter of the Array Area to MHWS.
Floating Turbine Unit (FTU)	The equipment associated with electricity generation comprising the WTG, the floating substructure which supports the WTG, mooring system and the dynamic section of the IAC.
Flotation Energy	Joint venture partner in Cenos Offshore Windfarm Ltd.

TERM	DEFINITION
Habitats Regulations	The Habitats Directive (Directive 92/43/ECC) and the Wild Birds Directive (Directive 2009/147/EC) were transposed into Scottish Law by the Conservation (Natural Habitats &c) Regulations 1994 ('Habitats Regulations') (up to 12 NM); by the Conservation of Offshore Marine Habitats and Species Regulations 2017 ('Offshore Marine Regulations') (beyond 12 NM); the Conservation of Habitats and Species Regulations 2017 (of relevance to consents under Section 36 of the Electricity Act 1989); the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001; and the Wildlife and Countryside Act 1981. The Habitats Regulations set out the stages of the Habitats Regulations Appraisal (HRA) process required to assess the potential impacts of a proposed project on European Sites (Special Areas of Conservation, Special Protection Areas, candidate SACs and SPAs and Ramsar Sites).
Habitats Regulations Appraisal	The assessment of the impacts of implementing a plan or policy on a European Site, the purpose being to consider the impacts of a project against conservation objectives of the site and to ascertain whether it would adversely affect the integrity of the site.
High Voltage Alternating Current (HVAC)	Refers to high voltage electricity in Alternating Current (AC) form which is produced by the WTGs and flows through the IAC system to the OSCPs. HVAC may also be used for onward power transmission from the OSCPs to assets or to shore over shorter distances.
High Voltage Direct Current (HVDC)	Refers to high voltage electricity in Direct Current (DC) form which is converted from HVAC to HVDC at the OSCPs and transmitted to shore over longer distances.
Horizontal Directional Drilling (HDD)	An engineering technique for laying cables that avoids open trenches by drilling between two locations beneath the ground's surface.
Innovation and Targeted Oil & Gas (INTOG)	In November 2022, the Crown Estate Scotland (CES) announced the Innovation and Targeted Oil & Gas (INTOG) Leasing Round, to help enable this sector-wide commitment to decarbonisation. INTOG allowed developers to apply for seabed rights to develop offshore windfarms for the purpose of providing low carbon electricity to power oil and gas installations and help to decarbonise the sector. Cenos is an INTOG project and in November 2023 secured an Exclusivity Agreement as part of the INTOG leasing round.
Inter-Array Cable (IAC)	The cables which connect the WTGs to the OSCPs. WTGs may be connected with IACs into a hub or in series as a 'string' or a 'loop' such that

TERM	DEFINITION
	power from the connected WTGs is gathered to the OSCPs via a single cable.
Joint Venture	The commercial partnership between Flotation Energy and Vårgrønn, the shareholders which hold the Exclusivity Agreement with CES to develop the Cenos site as an INTOG project.
Landfall	The area where the Export/Import Cable from the Array Area will be brought ashore. The interface between the offshore and onshore environments.
Marine Licence	Licence required for certain activities in the marine environment and granted under the Marine and Coastal Access Act 2009 and/or the Marine (Scotland) Act 2010.
Marine Protected Area (MPA)	Marine sites protected at the national level under the Marine (Scotland) Act 2010 out to 12 NM, and the Marine and Coastal Access Act 2009 between 12-200 NM. In Scotland MPAs are areas of sea and seabed defined so as to protect habitats, wildlife, geology, underseas landforms, historic shipwrecks and to demonstrate sustainable management of the sea.
Marine Protected Area (MPA) Assessment	A three-step process for determining whether there is a significant risk that a proposed development could hinder the achievement of the conservation objectives of an MPA.
Mean High Water Springs (MHWS)	The height of Mean High Water Springs is the average throughout the year, of two successive high waters, during a 24-hour period in each month when the range of the tide is at its greatest.
Mean Low Water Springs (MLWS)	The height of Mean Low Water Springs is the average throughout a year of the heights of two successive low waters during periods of 24 hours (approximately once a fortnight).
Mitigation Measures	Measures considered within the topic-specific chapters in order to avoid impacts or reduce them to acceptable levels. • Primary mitigation - measures that are an inherent part of the design of the Project which reduce or avoid the likelihood or magnitude of an adverse environmental effect, including location or design; • Secondary mitigation – additional measures implemented to further reduce environmental effects to 'not significant' levels (where

TERM	DEFINITION
	appropriate) and do not form part of the fundamental design of the Project; and • Tertiary mitigation – measures that are implemented in accordance with industry standard practice or to meet legislative requirements and are independent of the EIA (i.e. they would be implemented regardless of the findings of the EIA). Primary and tertiary mitigation are referred to as embedded mitigation. Secondary mitigation is referred to as additional mitigation.
Mooring System	Comprising the mooring lines and anchors, the mooring system connects the floating substructure to the seabed, provides station-keeping capability for the floating substructure and contributes to the stability of the floating substructure and WTG.
Nature Conservation Marine Protected Area (NCMPA)	NCMPA designated by Scottish Ministers in the interests of nature conservation under the Marine (Scotland) Act 2010.
Offshore Substation Converter Platforms (OSCPs)	An offshore platform on a fixed jacket substructure, containing electrical equipment to aggregate the power from the WTGs and convert power between HVAC and HVDC for export/import via the Export/Import Cable to/from the shore. The OSCPs will also act as power distribution stations for the Oil & Gas platforms.
Onward Development	Transmission projects which are anticipated to be brought forward for development by 3rd party oil and gas operators to enable electrification of assets via electricity generated by the Project. All Onward Development will subject to separate marine licensing and permitting requirements.
Onward Development Area	The area within which oil and gas assets would have the potential to be electrified by the Project.
Onward Development Connections	Oil and gas assets located in the waters surrounding the Array Area will be electrified via transmission infrastructure which will connect to the Project's OSCPs. These transmission cables are referred to as Onward Development Connections.
Project Area	The area that encompasses both the Array Area and EICC.
Project Design Envelope	A description of the range of possible elements that make up the Project design options under consideration and that are assessed as part of the EIA for the Project.

TERM	DEFINITION
Study Area	Receptor specific area where potential impacts from the Project could occur.
Transboundary Assessment	The consideration of impacts from the Project which have the potential to have a significant effect on another European Economic Area (EEA) state's environment. Where there is a potential for a transboundary effect, as a result of the Project, these are assessed within the relevant EIA chapter.
Transmission Infrastructure	The infrastructure responsible for moving electricity from generating stations to substations, load areas, assets and the electrical grid, comprising the OSCPs, and associated substructure, and the Export/Import Cable.
Vårgrønn As (Vårgrønn)	Joint venture partner in Cenos Offshore Windfarm Ltd.
Wind Turbine Generator (WTG)	The equipment associated with electricity generation from available wind resource, comprising the surface components located above the supporting substructure (e.g., tower, nacelle, hub, blades, and any necessary power transformation equipment, generators, and switchgears).
Worst-Case Scenario	The worst-case scenario based on the Project Design Envelope which varies by receptor and/or impact pathway identified.

4 SITE SELECTION AND CONSIDERATION OF ALTERNATIVES

4.1 Introduction

This Chapter provides a description of the site selection and route appraisal process that has been undertaken by Cenos Offshore Windfarm Ltd. (the Applicant) when defining the Cenos Offshore Windfarm ('the Project'), in terms of the Array Area and Export/Import Cable Corridor (EICC) and all infrastructure therein, since the initial project concept selection process in September 2020.

Additionally, this Chapter sets out the alternatives considered for the Project in terms of the design options considered throughout the development process, within the context of government marine spatial planning and Crown Estate Scotland (CES) leasing processes, as well as consideration of not developing the Project (the 'Do-Nothing' option).

Site selection, route appraisal and the consideration of alternatives is an iterative process undertaken as part of a Project's development and maturation and forms an integral part of the Environmental Impact Assessment (EIA) process.

This Chapter provides a full description of the site selection process and alternatives considered, including any refinements made as a result of the EIA process and/or in response to statutory consultation, advice and stakeholder feedback received within the Scoping Opinion. However, by necessity, individual elements of the Project do require topic-specific consideration – for example, the EICC may require specific detailed consideration in relation to cable route selection whilst site selection is specific to the Array Area.

4.1.1 Structure of the Assessment

Table 4-1 below provides a summary of the chapter structure.

Table 4-1 Structure of the Assessment

SECTION	SUPPORTING NOTES
Introduction	
Project Summary	This provides a brief summary of the Project – for further information, please see Environmental Impact Assessment Report (EIAR) Vol. 2, Chapter 5: Project Description.
Objectives and Need	Sets out the reasons for the Project – for further information, please see EIAR Vol. 2, Chapter 2: Need for the Project.
Policy and Legislation	The legislative requirement for the consideration of alternatives is codified within the EIA Regulations, discussed within Section 4.1.4. The EIA Regulations provide a brief explanation of what is formally required. This has been fulfilled by the Applicant, however, best-practice and relevant industry guidance has also been considered to ensure a robust process. For further information, please see EIAR Vol. 2, Chapter 3: Policy and Legislative Context.

SECTION	SUPPORTING NOTES
Best-Practice and Relevant Guidance	Section 4.1.5 presents a range of best-practice and industry guidance which has been considered by the Applicant during the development of the assessment.
Consultation and Engagement	The Applicant has engaged with a range of relevant stakeholders to inform the evolution of the Project – a brief summary is provided within Section 4.1.6. For further details, please refer to EIAR Vol. 2, Chapter 6: Stakeholder Engagement.
Site Selection, Route Appraisal and Assessment of Alternatives	
Context - Sectoral Marine Plan and Innovation and Targeted Oil & Gas (INTOG)	Section 4.2.1 provides background to the Project, focused on the Sectoral Marine Plan and INTOG, an offshore wind leasing round which focused specifically on innovation ('IN') and targeted oil and gas decarbonisation (TOG). The Project is a 'TOG' development. Breakout boxes are provided within this Section to provide a clear, concise summary of topic-specific conclusions.
Site Selection	Section 4.2.2 provides an overview of the process followed to select the location for the Project. This Section is focused on the location where the Floating Turbine Units (FTUs) will be located (i.e., the Array Area). Breakout boxes are provided within this Section to provide a clear, concise summary of topic-specific conclusions.
Route Appraisal	Section 4.2.3 describes the process for selecting the EICC – it is split into two sub-sections which consider the route inshore (0 - 12 Nautical Mile (NM)) (Section 4.2.3.1) and offshore (12 - 200 NM) (Section 4.2.3.2). Breakout boxes are provided within this Section to provide a clear, concise summary of topic-specific conclusions.
Assessment of Alternatives	Section 4.2.4 provides a summary of the alternative development solutions considered by the Applicant. Breakout boxes are provided within this Section to provide a clear, concise summary of topic-specific conclusions.
Remainder of Assessment	
The 'Do-Nothing' Option	Under the EIA Regulations, the Applicant is required to provide a description of what would happen if the Project did not proceed – this is commonly referred to as the 'Do-Nothing' scenario.
Onward Development	Provides an overview of how the project has defined the Onward Development Area for Onward Development Connections. Please refer to EIAR Vol. 3, Chapter 22: Statement of Combined Effects for further details.

SECTION	SUPPORTING NOTES
Red Line Boundary	Provides an overview of the evolution of the boundary for the Project. For further information, see EIAR Vol. 2, Chapter 5: Project Description.
Project Design Alternatives	Provides an overview of how the design of the Project has evolved, and how it will further evolve to the point of construction commencing. For further information, see EIAR Vol. 2, Chapter 5: Project Description.

4.1.2 Project Summary

The Project is located in the Central North Sea (CNS), located approximately 200 kilometres (km) offshore east of Aberdeen and comprises both the Array Area and the EICC.

A brief summary of the Project is provided below (for further information, see EIAR Vol. 2, Chapter 5: Project Description):

- Up to 95 FTUs, each with a WTG and floating substructure, which will be anchored to the seabed to maintain station keeping within an allowable radius for each FTU within the Array Area;
- Up to two Offshore Substation and Convertor Platforms (OSCPs) within the Array Area, connected to the WTGs using dynamic subsea Alternating Current (AC) power cables (the Inter-Array Cables (IACs)). OSCP topsides will be located on bottom-fixed jacket foundations with 50 metre (m) spacing between jackets. OSCP topsides will be linked via bridge-link;
- Up to 350 km of IACs (including 280 km of buried, static cabling, and 70 km of dynamic cabling); and
- A cable bundle comprising two Direct Current (DC) Export/Import Cables and a fibre optic cable, each with a maximum length of 230 km from the OSCPs to Landfall at Longhaven.

For the purposes of the site selection and assessment of alternatives, the Project is broadly summarised by Array Area, EICC and landfall (the landfall itself being a component of the EICC).

Figure 4-1 below provides a cross-sectional summary of the Project.

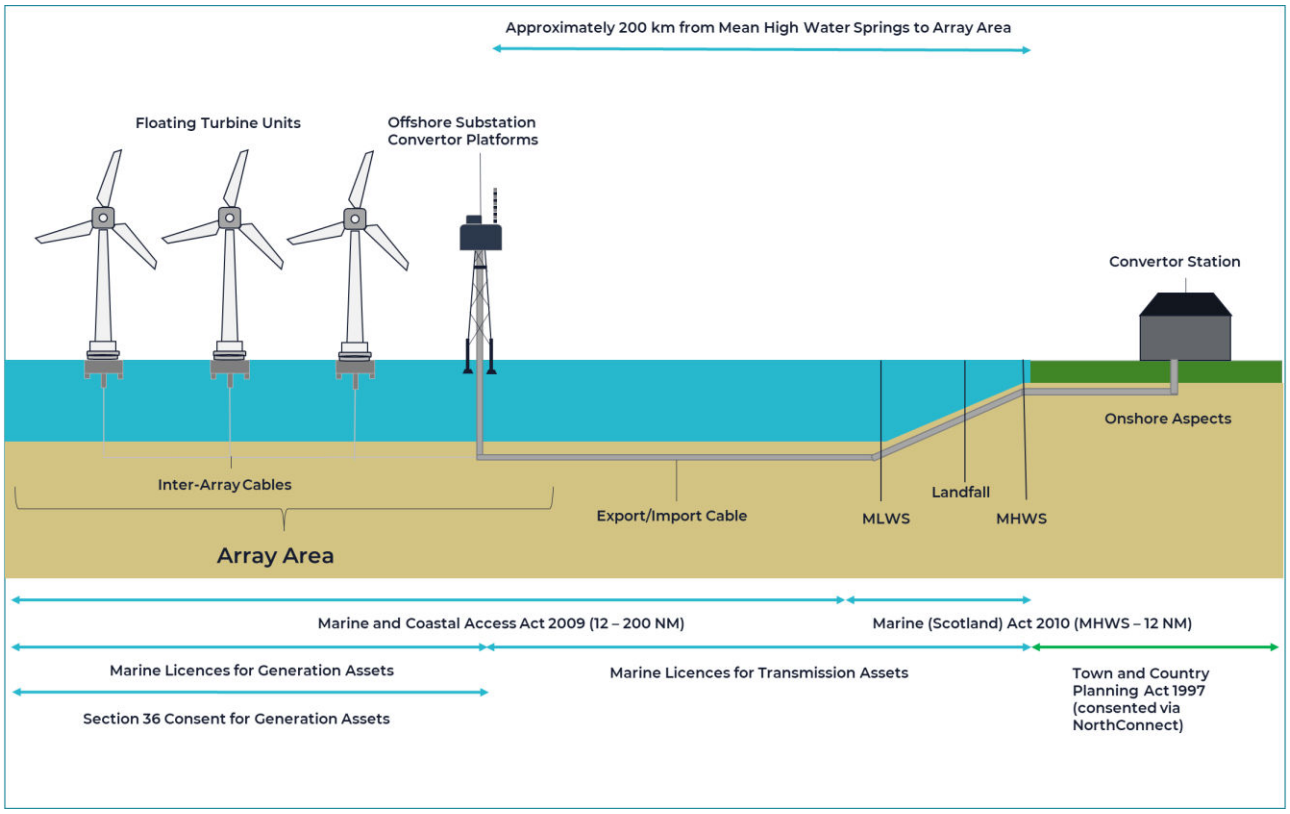


Figure 4-1 Project overview (note onshore aspects are shown for context only)

4.1.3 Objectives and Need

The key components of the Project are summarised in Section 4.1.2 above.

The objectives of the Project include generating low carbon, renewable energy and supporting the decarbonisation of the oil and gas industry through electrification of surrounding assets and reduction or elimination of the emissions directly associated with fossil fuel production activities.

The location of the Project (including FTUs) is defined by the location of the plethora of adjacent relevant oil and gas platforms which crucially have some of the longest Cease of Production (COP) dates in this area of the North Sea. Platforms with long COPs are vital to the Project – a high number of platforms operating over a long period presents maximisation of a long-term decarbonisation opportunity. The Project aims to maximise the *number* of platforms that can be decarbonised. Critically the Project has been located in close proximity to platforms that have the longest potential operational life, likely to be measured in decades. Therefore, the benefit of decarbonisation is likely to be extended beyond that of other projects.

The decarbonisation aims of the Project will support legislative commitments and polices discussed in EIAR Vol. 2, Chapter 2: Need for the Project and further detailed in EIAR Vol. 2, Chapter 3: Policy and Legislative Context.

The Project will act to offset Greenhouse Gas (GHG) emissions that might otherwise be produced by other means of electricity generation (e.g. diesel generators) and will also increase the security of electricity supply. Additionally, the Project will contribute to the delivery of United Kingdom (UK) and Scottish Government energy and climate change policies, the meeting of renewable energy commitments, and net zero targets.

The need for the Project is centred around four key topics: (1) Climate change and the decarbonisation of a carbon-intensive industry, (2) New energy infrastructure, (3) Energy security and (4) Economic benefit; this is explained in-detail within EIAR Vol. 2, Chapter 2: Need for the Project.

4.1.4 Policy and Legislation

The Marine Works (Environmental Impact Assessment) Regulations 2007, the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (hereafter 'the EIA Regulations') set out the requirements of an EIAR in relation to site selection.

Based on Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007, Schedule 4 of the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017, and Section 5(2)(d) of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, the EIAR must include:

- An outline of the main alternatives studied by the Applicant;
- A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the Applicant, which are relevant to the proposed works and its specific characteristics; and
- An indication of the main reasons for selecting the chosen option, taking into account the effects of the development on the environment.

Schedule 4 (part 3) of the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 also states that the EIA must include "*A description of the relevant aspects of the current state of the environment (the 'baseline scenario') and an outline of the likely evolution thereof without implementation of the project [...]*". This is also commonly referred to as the 'Do-Nothing' scenario.

Scotland's National Marine Plan (Scottish Government, 2015) does not include explicit or prescriptive guidance on site selection, route appraisal or assessment of alternatives. Notwithstanding, it does include some elements of relevance to this assessment, specifically:

- Chapter 9: Oil and Gas, Part 1 sets out within objective 1 the need to "*maximise the recovery of [oil and gas] reserves through a focus on industry-led innovation* [...]" and also the need for "*continued technical development of enhanced oil recovery and exploration* [...]";
- Chapter 9: Oil and Gas, Part 2 recognises the need for a 'mixed energy portfolio, including hydrocarbons, to provide secure and affordable heat and electricity'; and
- Chapter 11: Offshore Wind and Marine Renewable Energy – "*RENEWABLES 1: proposals for commercial scale offshore wind [...] should be sited in the Plan Option areas identified through the Sectoral Marine Plan process* [...]".

4.1.5 Best-Practice and Relevant Guidance

Marine Scotland Consenting and Licensing Manual for Offshore Wind, Wave and Tidal Energy Applications (Marine Scotland, 2018)

The Marine Scotland Consenting and Licensing Manual for Offshore Wind, Wave and Tidal Energy Applications provides guidance to prospective Marine Licence applicants to help them develop successful marine licence and Section 36 (s.36) applications ('the Marine Scotland manual') (Marine Scotland, 2018). The Marine Scotland manual contains a range of best-practice and guidance, focused on marine renewables.

The 'general' topic of alternatives is considered within the Marine Scotland manual. Section 2.5 of the Marine Scotland manual explains that applicants "*may find EIA a useful tool for considering alternative approaches to a development*", noting that " [...] *this can result in a final proposal that is more environmentally acceptable, and can form the basis for a more robust application for consent*" (Marine Scotland, 2018).

Section 4.1.1 of the Marine Scotland manual reiterates the need for assessment of alternatives, largely aligning with the Marine Works EIA Regulations 2007; it states that the EIAR "*must contain [...] a description of the reasonable alternatives studied by the developer, which are relevant to the development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment*".

Section 4.1.2 provides more prescriptive detail on the requirements associated with alternatives within the EIAR, setting out that the assessment of alternatives "*should include a full assessment of the alternatives that were considered for the proposed project. This could include alternative sites, technologies and preliminary designs. The main reasons for selecting the chosen option should be provided. If no alternatives were considered, then this should be stated*".

There is limited guidance regarding site selection or route appraisal in the Marine Scotland manual. However, section 1.5.4 details the value of 'Regional Locational Guidance', noting that "*there is no sectoral marine plan or no sectoral marine plan requirement to aid developers in terms of the best environment and economic advice to aid developers with site selection and other development considerations*" (Marine Scotland, 2018).

Considering Alternatives during the EIA Process (IEMA, 2012)

The Institute of Environmental Management and Assessment (IEMA) provide non-statutory guidance to supplement the "*core*" regulatory requirements of the EIA Regulations. The guidance includes good practice which encourages developers to consider a more detailed range of factors as part of the site selection and appraisal of alternatives process (locations and scales of development, layout and access, different approaches to design and alternative phasing, for instance). The guidance encourages developers to consider a range of aspects – these should be considered on a case-by-case basis proportionate to the development, and include:

- Outline how the scheme has evolved since project inception;
- Explain why alternative options have not been selected;
- Assess the "Do-Nothing" option (i.e. the possibility of not carrying out the proposed development at all); and

- Identify the main reasons (including environmental) for the final choice of the preferred alternative, which should involve a comparison of the magnitude and significance of the effects of all the alternatives considered.

The guidance also recognises the need for "*clarity and transparency*" when presenting site selection and alternatives assessments to help justify the proposed development.

IEMA Guidance: Reasonable Alternatives (IEMA, 2014)

The IEMA 2014 guidance "*looks beyond*" the 'base' requirement for appraisal of alternatives, as driven by the EIA process. The guidance cites the need for robust consideration of alternatives and the relevance of this to both EIA and SEA, as well as Habitats Regulations Appraisal (HRA). The guidance emphasises the need for consideration of "*reasonable, realistic and relevant alternatives*".

IEMA Impact Assessment Guidance (2015)

There is no single methodology for site selection, route appraisal or assessment of alternatives. IEMA publishes a suite of guidance associated with impact assessment. The IEMA impact assessment guide to shaping quality development (IEMA, 2015) states that: "[…] *it is important that the ES describes the influence that the environment and consultation responses have had on design evolution, and how that led to the specific development proposal, thus meeting the EIA regulation requirements in respect of alternatives. One way of achieving this is via a chapter dedicated to the topic of the design evolution, which then can be referenced by other chapters*"' […].

IEMA Guidance: EIA As a Design Tool and Consideration of Alternatives (IEMA, 2023)

Provides a range of guidance associated with the finer details of the appraisal of alternatives. This includes various advice associated with a staged process of assessment. The guidance also reiterates that "*The principles of interdisciplinary project interaction should be embedded into the design and EIA process. Early design insights and operational characteristics combined with robust present and future environmental knowledge steers better decision-making*".

EIA Handbook (Scottish Natural Heritage (SNH) / Historic Environment Scotland (HES), 2018)

The EIA handbook provides some guidance on the process for alternatives assessment, recommending that " *[…] the EIAR should contain an outline of the main alternatives studied by the applicant and an indication of the main reasons for their choice, taking into account the environmental effect (see Box B.6.Info.3 above)* […]". The EIA handbook continues to explain that the "*EIA does not absolutely constrain the selection of the submitted project in preference to alternatives studied, but it is reasonable to expect that a rational explanation would be included in the EIAR as to why a more, or less, environmentally harmful project was chosen for submission*".

INTOG Leasing – Guidance Notes (CES, 2022)

Whilst the INTOG leasing guidance does not provide any explicit guidance associated with site selection or route appraisal of assessment of alternatives, it does include some guidance regarding design refinement. D1 (Project Concept) sets out the need for robust consideration of technical / project identification.

The Crown Estate – Cable Route and Development Guidance (2024)

The Crown Estate has developed guidance associated with the identification of cable route options and onward refinement ahead of application for seabed lease. The guidance sets out a range of overarching principles which provide best-practice guidance on the way in which cable route planning should be undertaken to ensure *"good management of land and seabed, and to minimise environmental impacts"* (The Crown Estate, 2024). Whilst focused on the development of cable route options specifically and therefore has principle relevance to the EICC, the wider principles contained within the guidance provide useful context to the overall development process for marine infrastructure projects.

4.1.6 Consultation and Engagement

Consultation and stakeholder engagement has helped to inform the development of the Project, the selection of the Array Area and the EICC. Relevant pre-application stakeholder engagement is reported within Table 4-2 (for further details, see EIAR Vol. 2, Chapter 6: Stakeholder Engagement.

Stakeholder consultation has been ongoing throughout the EIA and has played an important role in ensuring the scope of the baseline characterisation and impact assessment are appropriate with respect to the Project and the requirements of the regulators and their advisors.

4.1.6.1 Pre-Award Agreement

Prior to CES awarding the Applicant an Exclusivity Agreement to develop the Project, a stakeholder mapping exercise was undertaken by the Applicant to support and inform early stakeholder engagement. Stakeholders were identified who could contribute to the site selection process, inform supply chain planning, and help shape project concept development.

4.1.6.2 Consultation with Statutory and Non-Statutory Consultees

The Applicant has aimed to consult with all stakeholders that may have an interest in the Project, including organisations, individuals, and communities. Stakeholder experience and expertise plays an important role in the project development process and any concerns or feedback received can be used to shape the Project.

4.1.6.3 Pre-Application Consultation (PAC)

Section 7 of the Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013 requires that the Applicant must host at least one PAC event prior to the submission of the Marine Licence Application (MLA) to allow members of the public to provide any feedback or comments regarding the Project to the prospective Applicant on a proposed licensable marine activity. Two PAC sessions took place at Peterhead Football Club on Tuesday 1st October 2024 from 12:00 – 15:00 and 16:00 – 19:00. For further details, see EIAR Vol. 2, Chapter 6: Stakeholder Engagement and the Pre-Application Consultation (PAC) Report.

4.1.6.4 EIA Scoping

The 2024 Scoping Report was submitted to Marine Directorate – Licensing Operations Team (MD-LOT) in April 2024, relevant stakeholders were consulted. The Scoping Opinion was received in September 2024.

Relevant comments from the Scoping Opinion and other consultation specific to the site selection and assessment of alternatives are provided in Table 4-2 below, which provides a high-level response on how these comments have been addressed within the EIAR (further information can be found within EIAR Vol. 2, Chapter 6: Stakeholder Engagement).

Table 4-2 Comments from the Scoping Opinion and wider pre-application engagement relevant to Site Selection and Consideration of Alternatives

REGULATOR/CONSULTEE	SUMMARY / COMMENTS	RESPONSE
Pre-application engagement		
Government Regulator Electrification Group (GREG) – NSTD Workshop (2022)	Technical workshop with GREG held where an overview of the Project was provided and drivers for the Project were discussed. Some of the challenges associated with development of the Project were discussed, and GREG provided feedback / recommendations to the Applicant.	The site selection and consideration of alternatives chapter provides a clear description of objectives and need for the Project in Section 4.1.3.
Joint Nature Conservation Committee (JNCC) – Introductory Meeting (2022)	An introductory workshop was held with the JNCC where the derivers for the Project were discussed, as well as the timeline for the Project. The Applicant provided a summary of key site sensitivities and requested further guidance from the JNCC regarding the East of Gannet and Montrose Fields Nature Conservation Marine Protected Area (NCMPA). The Applicant provided further information regarding future engagement.	Advice from the JNCC has been used to help inform the site selection and consideration of alternatives chapter. In relation to the East of Gannet and Montrose Fields NCMPA, Section 4.2 provides further information regarding the site selection, route appraisal and assessment of alternatives process; Section 4.2.2.6 provides specific consideration of features within the NCMPA. For additional information, see Marine Protected Area (MPA) Assessment.
JNCC – MPA-Specific Meeting (2022)	A further technical workshop was held with the JNCC where the East of Gannet and Montrose Fields NCMPA was discussed in further detail. Further information regarding the Project was shared with the JNCC, alongside details regarding the NCMPA. Clarifications regarding the JNCC data associated with the NCMPA were raised, and the Applicant presented key details regarding refinement of the Project location, site selection and survey strategy.	
JNCC and MD-LOT – Post-Scoping Workshop (One of Two) (2024)	A technical workshop was held with both JNCC and MD-LOT where a number of themes were discussed, including the need for the Project, site selection, project design refinement and onward development. The Applicant presented the specific details of the	Feedback from the JNCC and MD-LOT has helped inform the site selection and consideration of alternatives chapter.

REGULATOR/CONSULTEE	SUMMARY / COMMENTS	RESPONSE
	approach to the assessment of NCMPAs and an open discussion was held regarding the approach to the assessment of the East of Gannet and Montrose Fields NCMPA.	The approach to consideration of onward development was generally supported, and this has gone on to inform the development of a Statement of Combined Effect; for further details, see EIAR Vol. 3., Chapter 22: Statement of Combined Effects. The positive feedback regarding the approach to the assessment of the East of Gannet and Montrose Fields NCMPA is welcome – this has served to support the structure of the MPA Assessment, reported within the MPA Assessment. For the purposes of this chapter and in relation to the East of Gannet and Montrose Fields NCMPA, Section 4.2 provides further information regarding the site selection, route appraisal and assessment of alternatives process; Section 4.2.2.6 provides specific consideration of features within the NCMPA.
JNCC and MD-LOT – Post-Scoping Workshop (Two of Two) (2024)	A further post-Scoping workshop was held with the JNCC and MD-LOT, which focused on the assessment approach associated with the Habitats Regulations, and with regards to the MPA Assessment. The Applicant presented a range of data which has been considered during the site selection process, including with relation to the East of Gannet and Montrose Fields NCMPA. The Applicant highlighted some of the variations in habitat characterisation and classification between 2012 predictive and 1990-2000 field-specific habitat data, and 2015 predictive and site-specific habitat data. The Applicant explained some of the key evidence gaps, and also the work undertaken by the Project to help address them (i.e., contemporaneous site-specific environmental surveys, for instance). Pressures associated with NCMPA were discussed, and the	The feedback received has help to inform the approach to the MPA Assessment – see the MPA Assessment for further information. For the purposes of this chapter and in relation to the East of Gannet and Montrose Fields NCMPA, Section 4.2 provides further information regarding the site selection, route appraisal and assessment of alternatives process. Section 4.2.2.6 provides specific consideration of features within the NCMPA – this includes specific details of how the siting of the Array Area has been refined based on the identified features within the NCMPA. The nature of the Project (i.e., FTUs) means seabed interactions are limited, as reported within the MPA Assessment. Beyond this, the clear

REGULATOR/CONSULTEE	SUMMARY / COMMENTS	RESPONSE
	Applicant requested clarity on the topic of 'recovery' (noting the recently updated conservation advice for the NCMPA). The Applicant presented some opportunities associated with co-location between the array area and the NCMPA.	conclusions of the MPA Assessment are that the conservation objectives of the East of Gannet and Montrose Fields NCMPA will not be hindered by the Project. However, in order to help support Scottish Ministers with their determination process, the Applicant has also prepared a Marine Protected Area (MPA) Assessment – Shadow Without Prejudice Derogation Case and a Marine Protected Area (MPA) Assessment – Measures of Equivalent Environmental Benefit and Implementation Strategy which provides further details on the Applicant's proposals associated with the NCMPA.
EIA Scoping Opinion		
Scottish Ministers (Scoping Opinion)	The EIA Regulations require that the EIA Report include 'a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the Developer, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects'.	In accordance with the EIA Regulations, the Applicant has provided information to fulfil the requirement for consideration of alternatives. This is the basic or 'core' legislative requirement under the EIA Regulations. In order to provide further details to Scottish Ministers and stakeholders, the Applicant has provided further substantive detail to help explain and justify the Project in relation to site selection and alternatives.
Scottish Ministers (Scoping Opinion)	The Scottish Ministers acknowledge chapter 4 of the Developer's Scoping Report setting out the consideration of alternatives to date together with the planned activities that are proposed to inform the EIA Report further. The Scottish Ministers advise however that these considerations must include how decommissioning has been taken into account within the design options. The Scottish Ministers advise that this must be based on the presumption of as close to full removal as possible of all infrastructure and assets and should consider the methods and processes of doing so.	In accordance with the EIA Regulations, this assessment provides a consideration of the reasonable alternatives considered by the Applicant, and the key reasons for selection of the chosen design and approach. The nature of the Project, being focused on floating wind to aid oil and gas decarbonisation, means that the future decommissioning (or indeed repowering) is typically not significantly impacted by decisions made during site selection and assessment of alternative solutions. For instance, whilst the specific location of FTUs may add a degree of time or complexity to decommissioning or repowering, this is considered a material issue. This is unlike, for example, fixed-bottom wind where

REGULATOR/CONSULTEE	SUMMARY / COMMENTS	RESPONSE
		decisions on site selection and alternatives can significantly impact future decommissioning and/or repowering. For the purposes of the EIAR, the following decommissioning principles have been assumed: • FTU substructure components will be removed and towed to port; • Mooring lines will be removed and where possible, piles will be removed or cut to a suitable distance below the mudline such that the upper portion is removed; • Cables no longer required will be removed where safe to do so. Where they cross live third-party assets, they may be cut and left in-situ to prevent damage to third-party operations; and • The OSCPs will be decommissioned, and the jacket and topside(s) will be towed to shore. The piles will be cut to a suitable distance below the mudline. Section 4.6.1.2 has been included to ensure this comment is fully addressed.
Scottish Ministers (Scoping Opinion)	For the avoidance of doubt, the Scottish Ministers advise that the EIA Report must include an up to date consideration of the reasonable alternatives studied as the parameters of the Proposed Development have been refined. This includes but is not limited to the identification of the potential wind turbine layouts within the array area, the parameters of the export cables, the cable corridor options and the landfall location or locations. The Scottish Ministers expect this to comprise a discrete section in the EIA Report that provides details of the reasonable alternatives studied across all	Section 4.2.4 provides a detailed assessment of alternatives. The Project is a 'TOG' project under the INTOG leasing round. It is important to recognise that the purpose of the Project (and indeed the very substance of the leasing round which it is a part of) is specifically defined. The targeted decarbonisation of oil and gas assets is a specific aim, and one which can only be fulfilled with a limited number of solutions (noting also the bounds of the INTOG leasing round (Crown Estate Scotland, 2018). For this reason, the assessment of alternatives is limited

REGULATOR/CONSULTEE	SUMMARY / COMMENTS	RESPONSE
	aspects of the Proposed Development and the reasoning for the selection of the chosen option(s), including a comparison of the environmental effects. The Developer may wish to consider including further narrative within the EIA Report regarding the site selection process relative to the decision to situate the Proposed Development within the East of Gannet and Montrose Fields NCMPA.	to infrastructure and activity which could fulfil this defined aim whilst adhering to the clear bounds of the leasing process, as dictated by Crown Estate Scotland. Section 4.5 and Section 4.6 provide further details regarding the evolution of the design for the Project; for further detailed technical information, including the FTU layouts for the Array Area and information pertaining to the EICC and OSCPs, see **EIAR Vol. 2, Chapter 5: Project Description**. In relation to the East of Gannet and Montrose Fields NCMPA, this has been considered in-detail within this assessment. See Section 4.2.2 where this is considered in further detail. For additional information specific to the NCMPA, please see the **MPA Assessment.**

4.2 Site Selection, Route Appraisal and Assessment of Alternatives

4.2.1 Context

4.2.1.1 2020

In 2020 the Scottish Government indicated, in the Sectoral Marine Plan (SMP) for Offshore Wind Energy, that it would explore the demand for projects "*aimed at the decarbonisation of the oil and gas sector in Scotland*." The Scottish Government then undertook a planning process to identify areas where offshore wind could be located in order to help decarbonise oil and gas production in Scottish waters.

4.2.1.2 2021

In August 2021, the Scottish Government consulted on the SMP for Innovation and Targeted Oil & Gas Decarbonisation Planning Specification and Context Report (INTOG Context Report) (Scottish Government, 2021a). This planning process specifically considered spatial options for floating offshore wind both at the smaller innovation scale and larger projects aimed at oil and gas decarbonisation. The SMP INTOG Context Report describes the spatial data used to refine the selection of options that would then be brought forward for seabed leasing. In alignment with the previous offshore wind planning process, the INTOG process considered designated sites around Scotland. Due to the perceived potential impact to seabirds, Special Protection Areas (SPAs) were classified as a high constraint whilst Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSI) and Marine Protected Areas (MPAs) were assessed as a low-level constraint. As all projects to progress under the INTOG plan would be using floating technology, the perceived impact on seabed/benthic features was considered to be minimal[1].

The consultation on the INTOG Context Report was also accompanied by a statutory consultation on Strategic Environmental Assessment screening and scoping work. Statutory Nature Conservation Bodies (SNCBs) were consulted as part of both steps. Responses were published online by the Scottish Government (Scottish Government, 2021b).

4.2.1.3 2022

Following these consultations, the planning process was updated in 2022, with the publication of the INTOG Initial Plan Framework (IPF), which finalised the Areas of Search and permitted CES to begin the leasing process. The East of Gannet and Montrose Fields NCMPA is contained within the wider 'E-a' Area of Search identified by the Scottish Government for future leasing activity. As such, both the Scottish Government's process and the internal site selection process carried out by the Project identified the Array Area as suitable for floating offshore wind activity.

Accompanying this planning process, CES announced the world's first leasing round designed to enable offshore wind energy to directly supply offshore oil and gas platforms, INTOG, in 2022. The INTOG leasing round was designed in response to the demand from government and industry to help achieve the net zero ambitions set out in the North Sea Transition Deal (NSTD) (BEIS, 2021). INTOG offered developers the ability to apply for seabed rights for developments under two different categories:

[1] *Section 5 of the INTOG context report provides an introduction to some of the benefits of floating offshore wind in the context of INTOG; section 10 of the INTOG context report goes on to provide more substantive detail on geospatial data and constraints analysis, and the reasons for this focus (building upon the SMP consultation discussed above).*

- IN – Small scale, innovative projects, of less than 100 Megawatts (MW); or
- TOG – Projects connected directly to oil and gas infrastructure, to provide electricity and reduce the carbon emissions associated with production.

The spatial component of the leasing round was based upon the Scottish Government's INTOG Initial Plan Framework (IPF) (2022). The IPF defined the final areas of search in which leasing would be permitted.

Amongst the information considered by the Scottish Government in developing the INTOG IPF was seabird usage distribution data produced by the Royal Society for the Protection of Birds (RSPB). These data align with the RSPB's own Indicative Area of Opportunity for floating wind (per The RSPB's 2050 Energy Vision report) (RSPB, 2016).

In November 2022, Cenos undertook engagement with the JNCC to provide an update on the Project, and to discuss the approach to the location for the Project. The approach to refinement of the Project location was discussed, including with respect to the features of the East of Gannet and Montrose Fields NCMPA (Cenos, 2022).

Figure 4-2 below provides an extract from the IPF, indicating the 'E-a' area within which the Project is located.

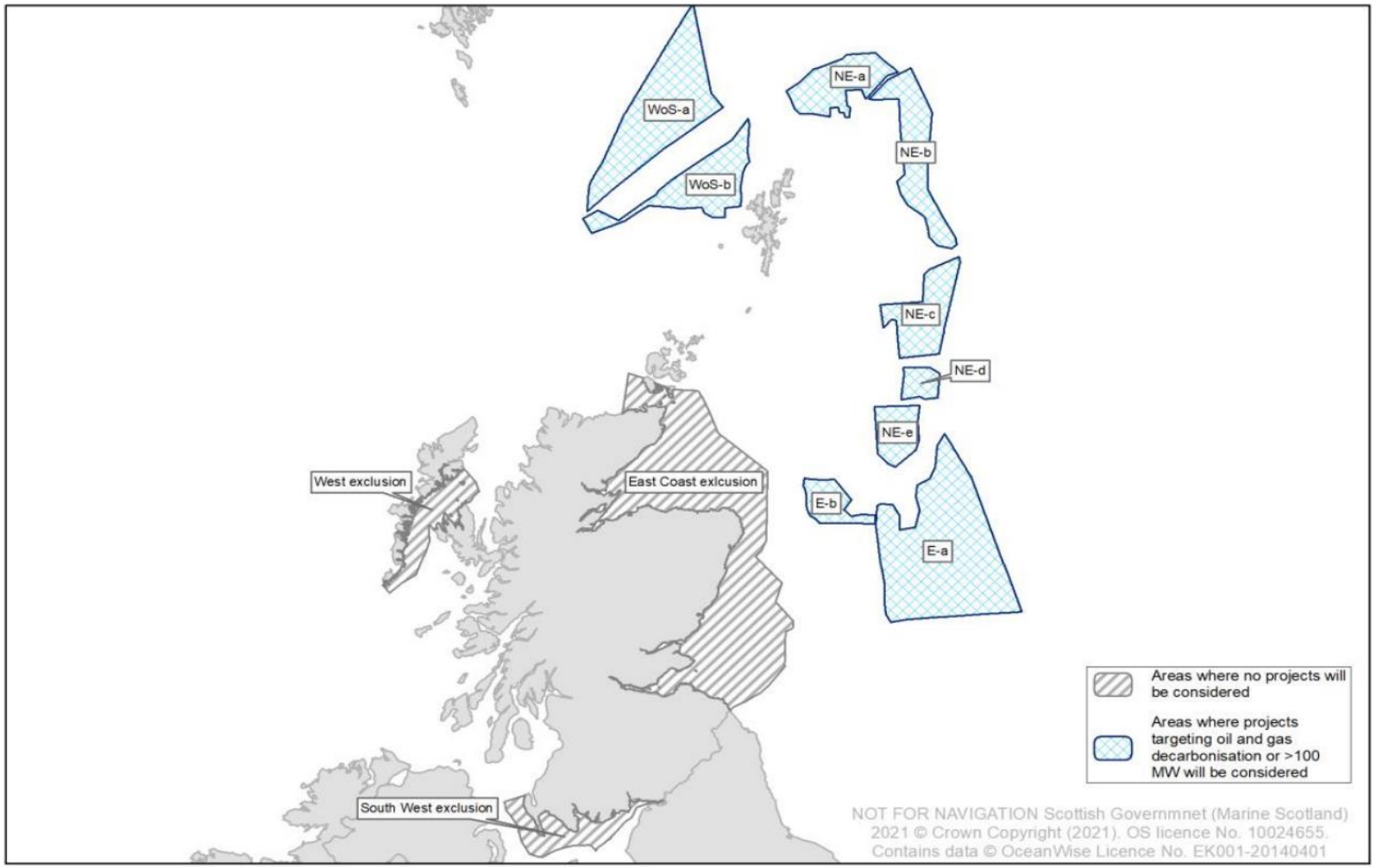


Figure 4-2 INTOG areas of search and exclusions as described in the Plan Specification and Context Report (CES, 2022)

4.2.1.4 2023

In March 2023, CES awarded Exclusivity Agreements to successful applicants, including the Project. The Exclusivity Agreement grants the Applicant the option to lease an area of seabed for a period of 50 years to generate renewable energy by means of a floating offshore windfarm. The Project is considered a Targeted Oil and Gas Development under the INTOG leasing process, as a key aim of the Project is to contribute to the NSTD target of decarbonisation by 2030 through electrification of oil and gas facilities in the CNS. Having an Exclusivity Agreement in place enables successful applicants to progress project development and consenting whilst the final SMP for INTOG is prepared by the Scottish Government. Applicants will be able to progress towards an Option Agreement following the completion of the SMP for Offshore Wind Energy for Innovation and Targeted Oil & Gas Decarbonisation. However, due to delays with the strategic planning process, CES have indicated that INTOG projects may transfer to an Option Agreement based on other relevant criteria, such as securing a marine licence and consent under Section 36 of the Electricity Act 1989.

The Offshore Transmission Network Review (OTNR), which was launched by the UK Government in 2020, concluded in May 2023. One of the key outcomes of this review was the Holistic Network Design (HND), which aims to integrate 23 Gigawatts (GW) of offshore wind-generated electricity with the National Grid via coordinated offshore and onshore transmission infrastructure.

In the last quarter of 2023, the National Grid Electricity System Operator (NGESO), now called the National Energy System Operator (NESO), introduced a HND Follow Up Exercise (HNDFUE) specifically for coordination of transmission infrastructure for the electricity being generated by INTOG projects. This exercise considered connection to the National Grid via new radial and non-radial offshore transmission infrastructure and through the reinforcement of onshore transmission infrastructure. The Applicant has met regularly with NGESO throughout 2022 and 2023 to introduce the concept of Cenos collaborating with the NorthConnect Interconnector project to share transmission infrastructure and a common grid connection location for both projects.

The Applicant has entered into a binding agreement to acquire Northconnect Limited (the "Acquisition"). Completion of the Acquisition is subject to receipt of customary regulatory approvals. Once this acquisition is complete, the Project will hold the benefit of the Marine Licences granted in respect of the NorthConnect project as well as the planning permissions that have been granted for the onshore substation and cable infrastructure. Discussions remain ongoing as to whether the Applicant will utilise the full NorthConnect route to develop a multi-purpose interconnector that connects the Project (as well as future oil and gas Onward Development Connections) to Scotland and Norway. The Applicant intends to utilise the shoreward part of the NorthConnect cable corridor for its offshore transmission infrastructure, although it is applying for new marine licences to reflect the fact that its transmission infrastructure would not be part of an exempt interconnector cable and instead connected to an offshore generating station. For the avoidance of doubt, only one set of infrastructure will be placed within the consented cable corridor.

4.2.1.5 2024

In March 2024, NGESO published their report, Beyond 2030: A national blueprint for a decarbonised electricity system in Great Britain, which incorporated their recommendations for the HNDFUE with their annual network options assessment (NGESO, 2024). The HND in this report, however, did not consider INTOG projects, as these were to be subject to a separate HNDFUE.

Following publication of this report, the Applicant continued its consultation with the NGESO, as a development being subject to the HNDFUE process, but which had previously identified a route to grid via coordination with the NorthConnect Interconnector project. NGESO then held a forum specifically for TOG projects on the 2nd September 2024 to ensure the draft recommended design reflected development timelines and requirements, prior to submission to the Transmission Network Board on Monday 9th September 2024.

With subsequent board approval, the Terms of Reference (ToR) for the HNDFUE design were signed, making 12U-NC the confirmed design for Targeted Oil and Gas (TOG). Subsequently, NESO produced an Options Appraisal Summary Document (OASD) which provides detail on the analysis of each of the shortlisted designs and confirmation of the recommended design.

The Applicant received the OASD on 14th October 2024, confirming the Project's route to grid via NorthConnect's onshore transmission infrastructure which will connect to the existing Peterhead substation. The Applicant continues to work with NESO and SSEN Transmission to update relevant grid connection contracts, which are anticipated to be finalised in 2025.

In summary:

- The Scottish Government committed to the exploration of projects aimed at the decarbonisation of oil and gas;
- The Scottish Government completed an exercise looking at areas where offshore wind activity could be located to achieve decarbonisation of oil and gas assets;
- A new leasing round, INTOG, was launched providing opportunity to secure Exclusivity Agreements for specific zones of the seabed to support decarbonisation of oil and gas;
- The Applicant were awarded an Exclusivity Agreement in 2023 within a spatially-defined zone (i.e. within the INTOG leasing area 'E-a', discussed further below); and
- The Applicant has received recommendation of connection to grid at Peterhead, via NorthConnect onshore transmission infrastructure, from NESO.

Section 4.2.2 below considers how the location for the Project was determined within this wider leasing zone.

4.2.2 Site Selection

Overall initial selection of the Array Area was driven by Seabed leasing for offshore renewable energy generation which is managed through a plan-led process[2]. The INTOG IPF provided the final Areas of Search. "E-a", the Area of Search in which the Project is located was not altered during the refinement process, as set out above.

The site selection process for the Project has been guided and informed by key events in the Project's development timeline, including:

- The target of decarbonisation by 2030 within the NSTD (BEIS, 2021);
- The aim to maximise decarbonisation opportunities for oil and gas production in the CNS;

[2] *As per the INTOG planning and leasing programme, a plan level SEA and HRA is now in progress by Scottish Government.*

- The development of the IPF for the Sectoral Marine Plan for Offshore Wind Energy for Innovation and Targeted Oil & Gas Decarbonisation (Scottish Government, 2022);
- The selection and award of an Exclusivity Agreement (March 2023), signed by the Project in October 2023, and through the INTOG Leasing Round that took place in 2022;
- Facilitation of the NorthConnect interconnector project, which will bring new renewable energy resources to the grid in both Scotland and Norway, via the NorthConnect onshore infrastructure and grid connection at Peterhead 1 and through the use of the Project as a multi-point interconnector; and
- Consultation, as well as environmental and technical investigations, which have enabled refinements to be made to the Project design and areas within which Project infrastructure will be located.

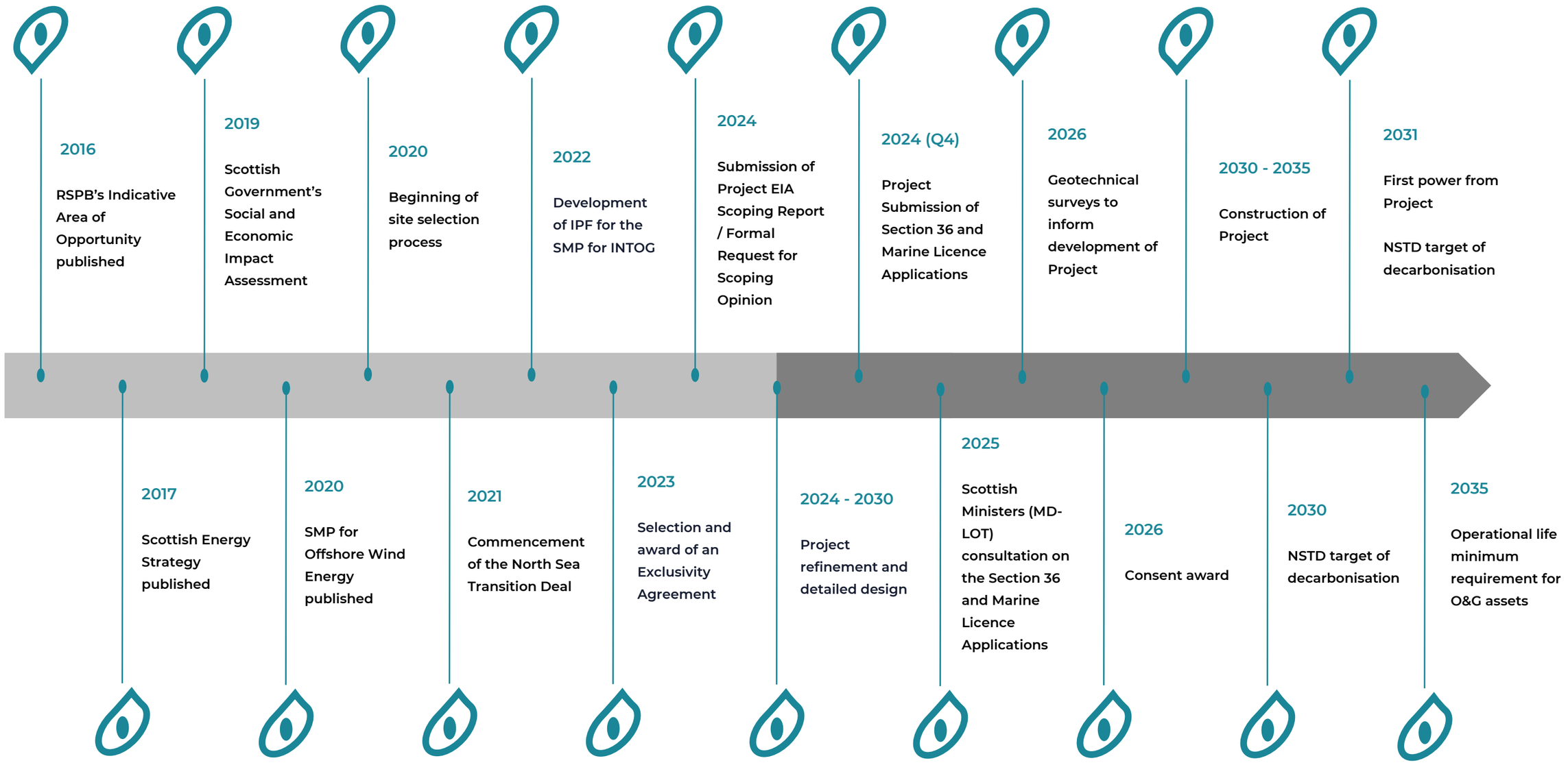


Figure 4-3 Evolution of the Project – Project Site Selection Process and Timeline

The INTOG plan and leasing process was set up to facilitate the formation of commercial relationships and to aid identification of feasible development locations to ensure delivery as outlined below.

The Project site selection process began in 2020 and was focused on the new concept of using commercial scale offshore wind to decarbonise oil and gas production activity in Scottish waters. The SMP for Offshore Wind Energy (October 2020) had indicated that the Scottish Government was exploring options for further offshore wind development that could deliver this decarbonisation goal.

Since the aim of the Project is to decarbonise offshore oil and gas extraction, proximity to existing oil and gas infrastructure is a crucial factor in dictating the location of the Project.

The site selection process examined the project objectives, environmental, physical and technical constraints and narrowed down the available options based on these considerations. In addition to the constraints discussed below (which are typical of most marine infrastructure projects), the unique decarbonisation objective was a key consideration.

4.2.2.1 Technical Factors and Project Fundamentals

The proximity to oil and gas infrastructure which critically have a long period of time before COP occurs (such as Buzzard for the Green Volt project) was a necessary prerequisite in the Array Area selection, to enable as significant a reduction in carbon emissions as possible. Locating the Project near to these long-term COP platforms is also vital in the economic evaluation of the Project and in relation to economic viability for oil and gas operators.

Given the estimated timeline for the Project, oil and gas assets were initially considered only if they had an operational lifetime beyond 2035. This five year minimum lifetime became a CES requirement in the later leasing process.

The Array Area must also be based within a reasonable distance of the oil and gas assets where electricity transmission via High Voltage Alternating Current (HVAC) cables remains possible. HVAC transmission is limited to around 100 km unless additional infrastructure such as booster stations are used. Therefore a 100 km radius was used to identify potential oil and gas assets that could be served by the single offshore wind farm without the need for additional infrastructure beyond a single transmission cable (referred to as the 'Onward Development Area'). This was set alongside the need for locations where the presence of offshore wind turbines would not present any negative impact on helicopter access to the installations nor to safety measures such as search and rescue operations.

The CNS area contains a number of large brownfield oil and gas operations within the required HVAC distance limitation and with a suitable operational lifetime. Targeting these operations allowed the Project to maximise the decarbonisation opportunity in line with the NSTD and Scottish and UK Net Zero commitments. The Project therefore prioritised this decarbonisation opportunity. Figure 4-4 below shows the CNS oil and gas facilities with expected life beyond 2032 and have a case for electrification through the Cenos Project. Figure 4-4 shows 100 km and 50 km radius rings which capture the maximum number of facilities. The centre of this ring is just east of the Madoes subsea oil field. Consequently, the area of search shown in Figure 4-4 maximises the potential for decarbonisation of oil and gas facilities in the CNS area. This is the primary purpose and focus of the Project

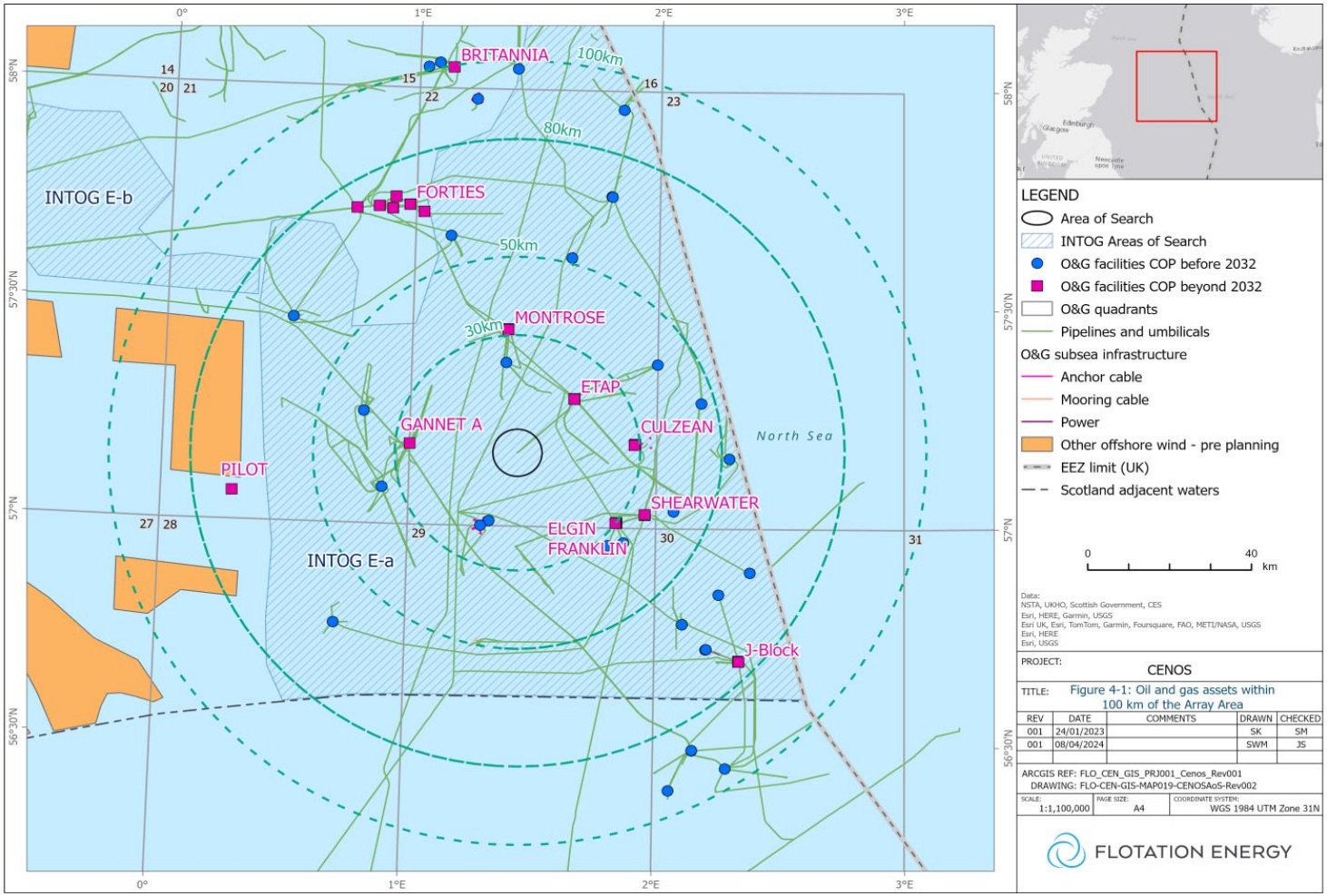


Figure 4-4 Oil and gas assets within 100 km of the Array Area

4.2.2.2 Overview of Constraints Mapping

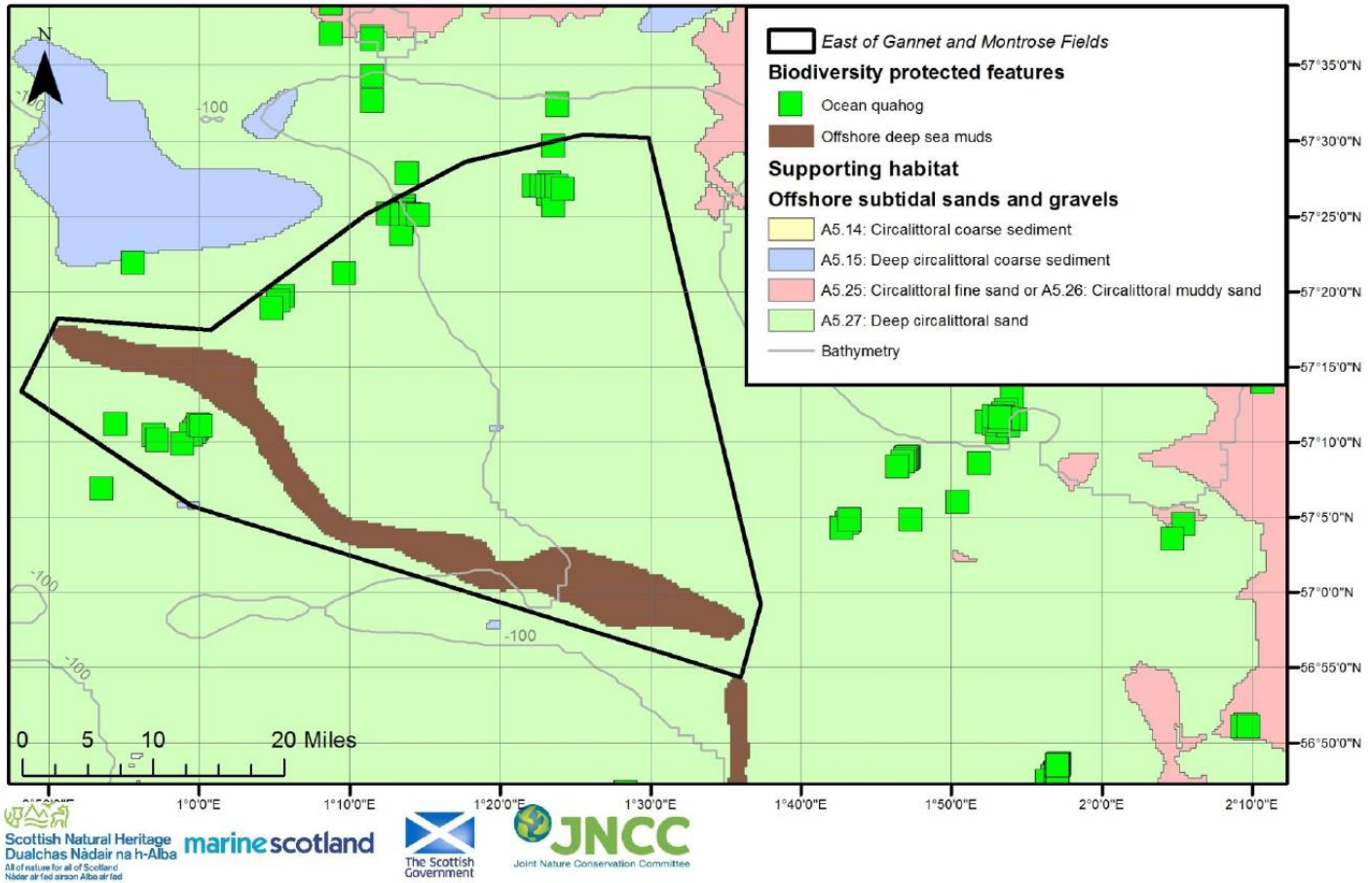
A further constraint mapping process was undertaken to identify the Array Area locations. This step considered various constraints such as:

- A minimum of a 500 m buffer around oil and gas assets and associated infrastructure (e.g. pipelines, manifolds, etc.) to remove risk of overlapping infrastructure;
- Potential for significant environmental impact;
- Maximising oil and gas decarbonisation opportunities;
- Helicopter safety zones (6 Nautical Mile (NM) radius from oil and gas assets) which allows all weather and night time operations to be undertaken safely as per the required consultation zone requirements. There is a statutory Air Navigation Order of 1.5 NM radius around each platform from the surface to 2000' and additional approach procedures for individual platforms that can extend out to over 6 NM.
- A minimum buffer of 1,250 m around the Madoes field to allow for drilling rig, workover vessel, and Diving Support Vessel (DSV) access;
- Oil and gas licenced blocks, as well as those likely to be auctioned;
- Areas of high shipping activity, including specific oil and gas vessel use;
- Marine obstructions (e.g. wrecks); and
- Commercial fisheries activities.

In addition, technical criteria such as water depth, sediment type and significant wave height contributed to the site selection processes. This site selection process identified the Project location as the preferred location based on the above criteria and to maximise the decarbonisation opportunity.

As per the 2014 JNCC East of Gannet and Montrose Fields NCMPA management options paper (JNCC, 2014) potential oil and gas activity and/or developments are allowed within the NCMPA zone, and protected features within the NCMPA will be assessed through the existing EIA process on a case-by-case basis.

It should be noted that this assessment identified the southern area of the NCMPA as the location of the offshore deep sea mud features. Figure 4-6 below provides the known distribution of protected features within the NCMPA based on JNCC East of Gannet and Montrose Fields NCMPA management options paper (2014). Figure 4-6 presents the NCMPA features with relation to survey activity commissioned by the Applicant (the sublittoral mud was understood to be principally in the southwest of the NCMPA – as-per JNCC East of Gannet and Montrose Fields NCMPA management options paper (2014) and hence this was avoided as far as practicable by the survey area for the Project).



Map displayed in geographic coordinates WGS84.The exact limits of the UK Continental Shelf are set out in the Continental Shelf (Designation of Areas) Order 2013, Statutory Instrument 2013/3162 (© Crown Copyright).Landmass Ordnance Survey © Crown Copyright and database right 2011. All rights reserved. Scotland (Adjacent waters) Updated by the Law of the Sea Division, United Kingdom Hydrographic Office October 2005. Bathymetry © GEBCO, 2011. Biological data from Geodatabase of Marine features in Scotland (GeMS v4) © Crown copyright. MPA and geodiversity features © JNCC and SNH 2014. All rights reserved.

Figure 4-5 Distribution of protected features within the East of Gannet and Montrose Fields NCMPA (JNCC, 2014)

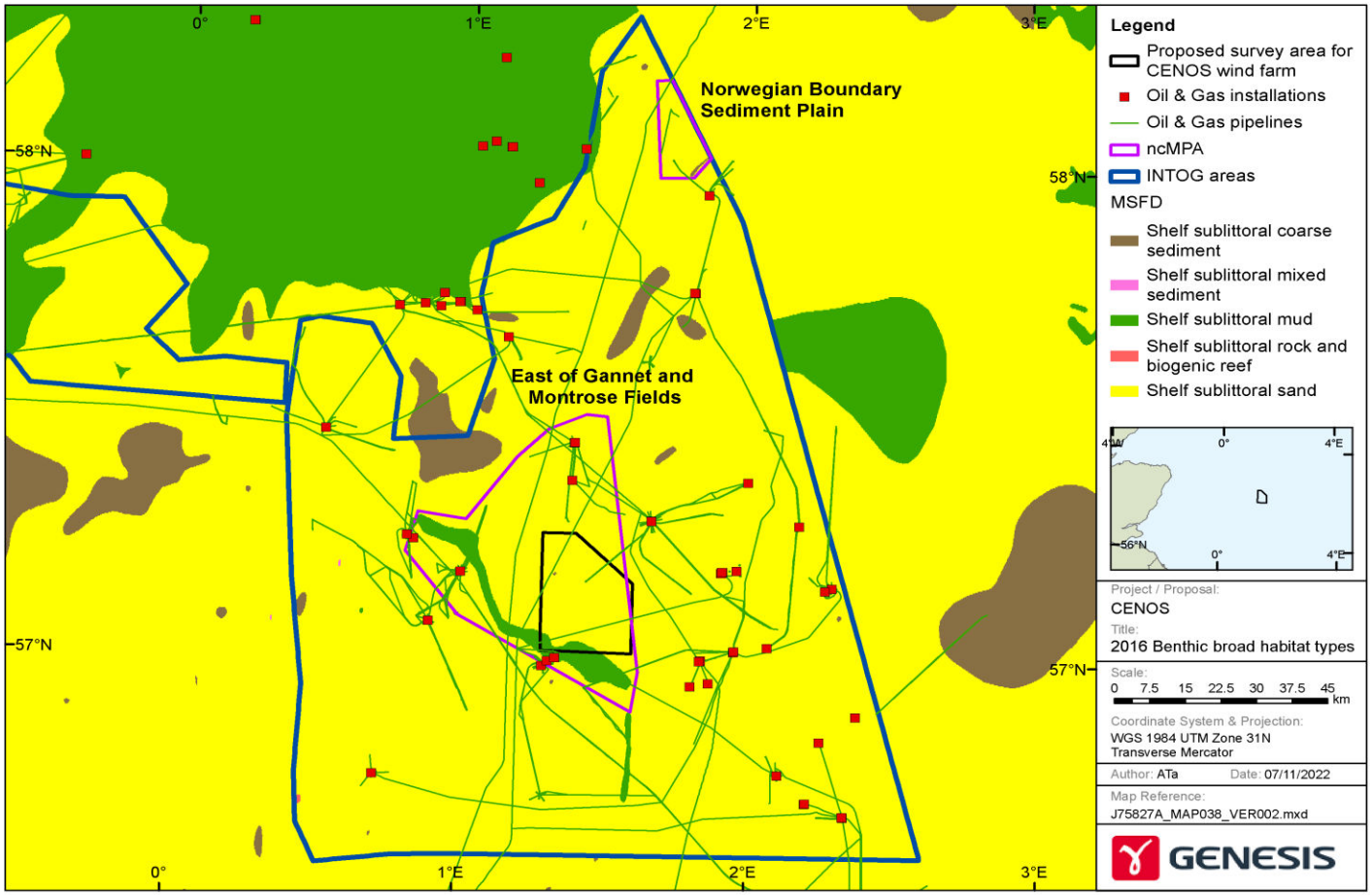


Figure 4-6 Benthic Broad Habitat Types (2022)

These constraints align with the established Sectoral Marine Planning process developed by the Scottish Government (Scottish Government 2018 and 2020) and many of the same data sources were used.

Data relating to environmental constraints, such as seabirds, marine mammals and priority marine features were also considered. Due to the distance offshore and in alignment with the SMP for Offshore Wind Energy and the requirement for regional surveys, the risk to seabirds was deemed to be low, with the primary areas for concern being located closer to shore.

Potential negative impact to seabirds also played a role in the initial sites selection, noting also that the RSPB produced seabird utilisation data that was used in the Scottish Government's planning process. Additionally, the Array Area aligns with the RSPB's own "*Indicative Area of Opportunity*" for floating wind outlined in the 2050 Energy Vision report (RSPB, 2016)

Marine mammals and other sensitive features are likely to be present but are less well presented in available data as well as being considered to be less sensitive to floating offshore wind.

An area of interest was identified to the west of the majority of the oil and gas assets that would allow for the Project to connect to relevant oil and gas operations and minimise impact on a number of receptors. This location is within the East of Gannet and Montrose Fields NCMPA.

As can be seen in Figure 4-7, the remaining area where a windfarm can feasibly be constructed that meets the objectives of decarbonisation whilst avoiding key constraints has resulted in a site within the East of Gannet and Montrose Field NCMPA.

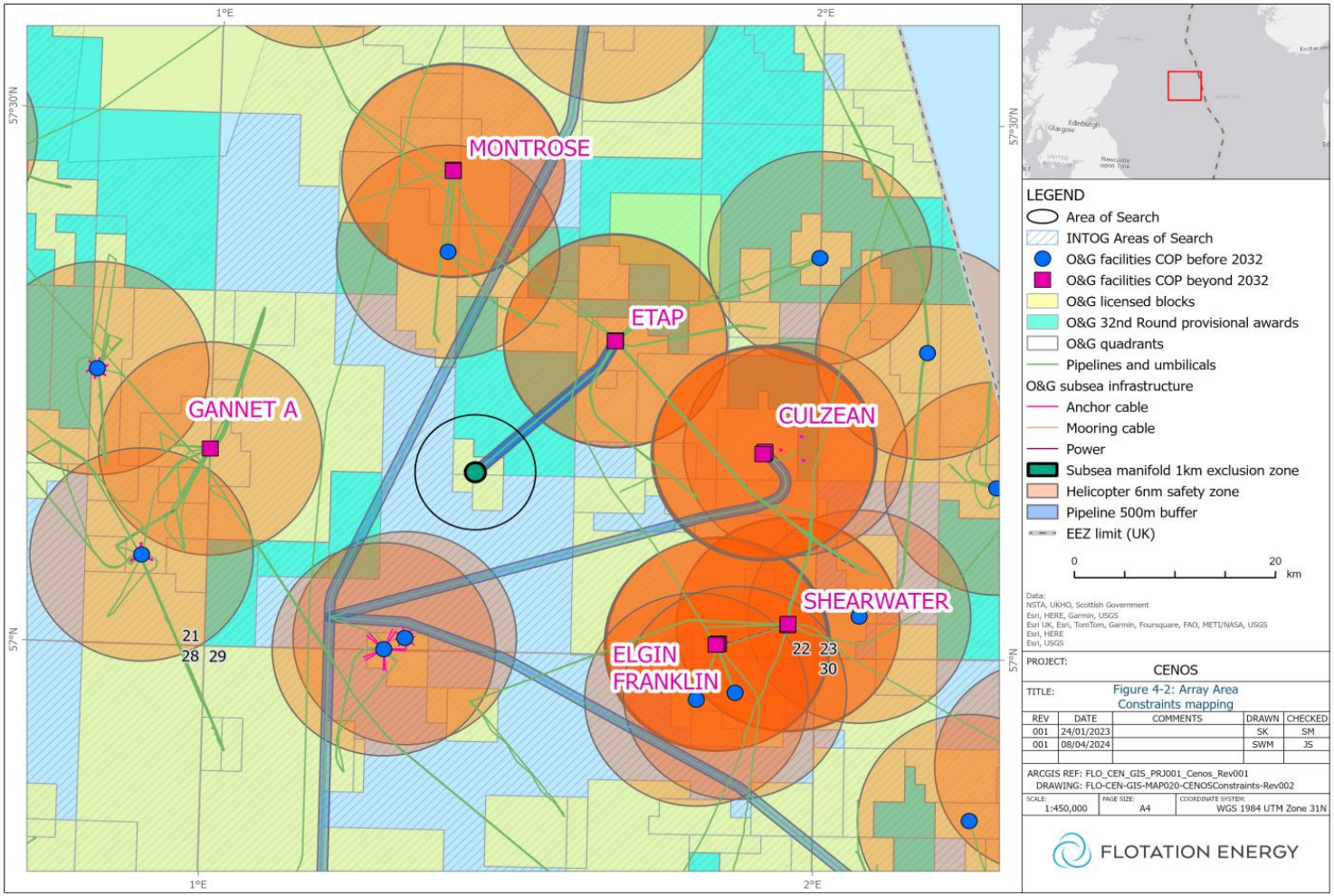


Figure 4-7 Array Area Constraints Mapping

4.2.2.3 Identification of Initial Survey Area

The search resulted in the identification of a ~440 km^2 area which was taken forward for initial survey works.

The maximum area available to lease through INTOG is limited to 333 km^2 (CES, 2022). Hence, prior to lease application submission the survey area had to be refined to identify an area to meet the INTOG requirements. The survey area included the Madoes field which cannot be built upon and hence that area was removed, optimisation was then carried out for wind energy yield, to minimise IAC length and distances to oil and gas assets.

This INTOG IPF process, combined with the work on Oil and Gas proximity and platform suitability along with a review of more specific environmental constraints (discussed further below) has led to the identification of the current Array Area to be taken forward for more detailed assessment in the final EIAR, presented in Figure 4-8 within the wider INTOG areas of search.

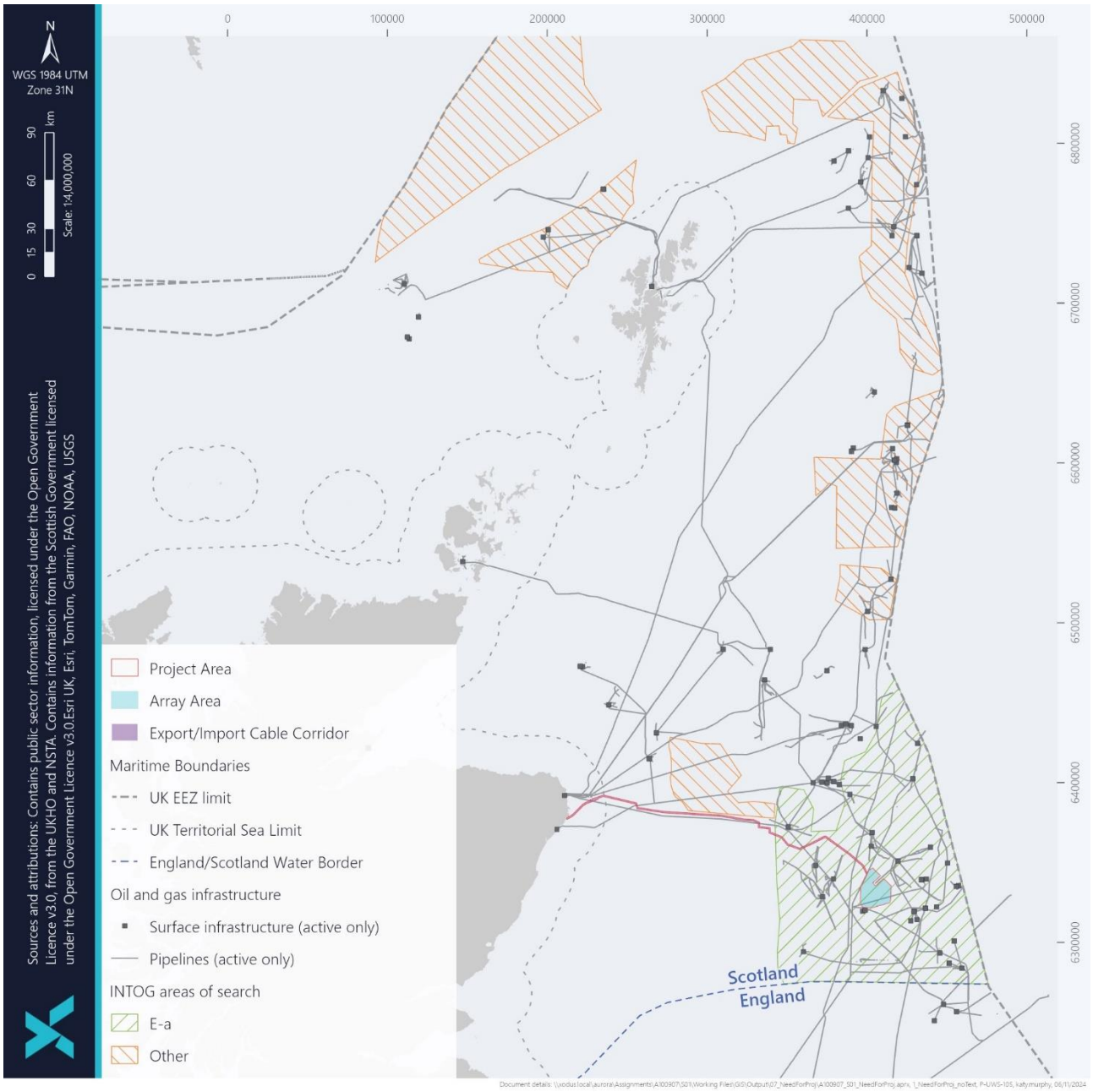


Figure 4-8 Overview of Array Area within wider INTOG areas of search

4.2.2.4 Site Selection – Further Refinement

The area of interest within the East of Gannet and Montrose Fields NCMPA meets the technical criteria as described above to enable the maximum level of decarbonisation of the oil and gas production sector. However, whilst other offshore wind projects in Scotland and the UK have overlapped with NCMPA and other designated sites, the Project also explored alternatives due to noted sensitivities around the NCMPA.

The primary site selection requirement, as noted above, is locating the windfarm sufficiently close enough to existing oil and gas platforms that have sufficient operational life to support the significant cost and time impact of installing the required electrical infrastructure connections. Maximising the number of potential platforms with this profile is key to maximising decarbonisation in the North Sea and will heavily support the implementation of the NSTD.

The secondary issue that influences the location selected is helicopter safety around the identified oil and gas platforms in the CNS and distance to oil and gas assets. A 6 NM buffer around oil and gas platforms is required to ensure helicopters are not hindered by the wind farm (there is a statutory Air Navigation Order of 1.5 NM radius around each platform from the surface to 2000m) and additional approach procedures for individual platforms that can extend out to over 6 NM).

The Project utilised The Crown Estate Round Four constraints receptor assessment approach of 0-3 NM and beyond 6 NM metric to help assess this impact at the time of site selection for the windfarm location (The Crown Estate, 2019). Figure 4-8 shows that, ignoring other constraints, the Project could be located southwest or northeast of the current location, but this would put platforms at greater distance.

The Project could still deliver to a high number of the CNS platforms by being located much further east of the Shearwater platform, but this region falls outside of Scottish waters and outside of the plan limits. The locations to the northeast and east are also assigned as part of the 32nd oil and gas permitting process.

4.2.2.5 Commercial Fishing

A great deal of consideration has been given to the potential for negative impact on the commercial fishing sector. Data representing fishing activity and the sector's own recent publications on the need for co-existence and better marine management has influenced the final Array Area location.

The INTOG IPF designated a final selection of areas that would be taken forward for leasing. Those areas largely avoid areas where commercial fishing takes place. However, some overlap does remain. Fishing effort can be seen within the southern section of the East of Gannet and Montrose Fields NCMPA. The Scottish Government's Social and Economic Impact Assessment (2019) to support development of the SMP for Offshore Wind Energy assumes a complete cessation of fishing activity within a windfarm area. Whilst this was originally considered likely to be an overly cautious assessment of impact, the Array Area was refined to reduce overlap with fishing activity whilst still avoiding other sensitivities.

However, the remaining overlap with fishing effort can be described as temporary. The East of Gannet and Montrose Fields NCMPA protects two features that are especially sensitive to bottom trawling fishing activity. Both Ocean Quahog and Offshore Deep Sea muds will be damaged by trawling activity. The Scottish Government has yet to put in place management measures for the offshore MPAs but proposed measures were presented in 2019 which describe fishing restriction throughout the NCMPA. In August 2024, the Scottish Government published a series of

proposals for 'Fisheries Management Measures within Scottish Offshore Marine Protected Areas (MPAs)' (Scottish Government, 2024a; Scottish Government, 2024b). These include measures to remove fishing activity in the East of Gannet and Montrose Fields NCMPA. If these measures are implemented, certain types of fishing activity will likely be restricted. This is likely to result in displacement of fishing activity into the surrounding areas.

If the measures are implemented, the Project and the management measures will not create a cumulative negative impact on fishers. It is currently unknown as to what management measures will ultimately be implemented, but siting the Project within the NCMPA will affect fishers less than if placed outside the NCMPA.

This Project location is thus reducing potential impact on fishers and delivering Scotland's National Marine Plan policy to encourage co-existence (Scottish Government 2015 General Policy 4). The Scottish Government is seeking to deliver up to 11 GW of offshore wind by 2030. By overlapping the Project with the NCMPA, the Scottish Government's offshore wind targets can be met, alongside it's NCMPA protection targets without additional impact. It is also specifically aligned with the future fishing scenarios published by Scottish Fishermen's Federation (SFF) in 2022 (Scottish Fishermen's Federation, 2022), which as its "Future 1 scenario for 2030 assumes a loss of access to 80% of the East of Gannet and Montrose Fields NCMPA."

4.2.2.6 NCMPA Protected Features

As described above, the East of Gannet and Montrose Fields NCMPA does not currently have any management measures in place to protect the sensitive features from bottom trawling fishing activity. A consultation regarding potential measures is currently underway.

Ocean quahog and offshore deep-sea mud are sensitive to commercial trawling pressures (since designation, the site has allowed commercial trawling activities to continue). They may also be sensitive to offshore wind development, but the negative impact pathway would primarily be through habitat loss and disturbance from physical interaction with the seabed.

However, because the Project will utilise floating technology the pathway for impacts to the seabed is reduced. Notwithstanding, the Array Area has been specifically refined to minimise impact on features considered to be more representative of those designated within the East of Gannet and Montrose Fields NCMPA. The Array Area was reduced significantly from the initial area of interest and was relocated to avoid the sands and gravel which are the preferred habitat of the ocean quahog. Similarly, the location of the Array Area generally avoids the areas considered to better represent deep-sea mud features (for further information, see EIAR. Vol. 3, Chapter 10: Benthic Ecology and EIAR. Vol. 3, Chapter 8: Marine Geology, Oceanography and Coastal Processes.

This INTOG IPF process, combined with the work on oil and gas proximity and platform suitability along with a review of more specific environmental constraints has led to the identification of the Array Area taken forward for detailed assessment in this EIAR.

In summary:

- The location for the Project was, to a large degree, dictated by the INTOG leasing area (and specially, area 'E-a' area of search which it is within);
- A central aim of the Project is to maximise the number of oil and gas assets which could be supported in decarbonisation from the Project – this has also informed the location for the Project and specifically, the Array Area;
- The more 'refined' location for the Project, including the Array Area, was informed by a systematic consideration of a number of environmental, technical and commercial factors, as described above;
- Based on information available at the time (2020), site selection was also refined to reduce potential interactions identified features within the East of Gannet and Montrose Fields NCMPA which were considered to be of specific additional potential value / sensitivity, as described above; and
- Whilst the overall Project location and boundary has been selected and forms the basis of the s.36 Consent application and MLA for the Project, it is crucial to recognise that there will be significant opportunity for onward refinement through the detailed design process (as is typical for an offshore wind infrastructure project).

Section 4.2.3 below provides a summary of the route selection process, considering how the Applicant selected the route for the EICC from the Array Area to the landfall at Longhaven.

4.2.3 Route Appraisal

The EICC extends for 230 km from Mean High Water Springs (MHWS) to the centre of the Array Area, wherein the OSCPs will be located. This Section of the Chapter is split into two clear sections to aid the reader – those elements of the EICC between 0 - 12 NM and those elements of the EICC between 12 - 200 NM.

In 2018, NorthConnect Limited submitted a marine licence application to develop a 1.4 GW High Voltage Direct Current (HVDC) interconnector between Peterhead, Scotland and Simadalen, Norway ('NorthConnect'). NorthConnect Limited were granted a Marine Licence in 2020 (Licence ID: 06771/20/0 and 06870/20/0) for the aspects of the project within Scottish and UK waters; however, the Ministry of Petroleum Energy in Norway determined there was insufficient information to reach a consenting decision and NorthConnect has since been on hold.

4.2.3.1 EICC – Inshore (0 - 12 NM)

The portion of the EICC extending from MHWS to the 12 NM limit for Scottish territorial waters follows the consented NorthConnect cable route emanating from the Aberdeenshire coastline.

As described in Section 4.2.1.4 The Applicant has entered into a binding agreement to acquire Northconnect Limited

This provides a strategic approach to electricity transmission to the UK power grid. Moreover, the use of a single set of cabling infrastructure minimises the potential for adverse effects on the inshore marine environment, including potential impacts to sensitive seabed and geomorphological features and species which utilise these waters (e.g. seabirds).

As outlined above, the section of the EICC from MHWS to 12 NM encompasses the consented NorthConnect cable route. A brief summary of the landfall and route selection process for NorthConnect is provided below[3]:

- A preliminary study was undertaken by NorthConnect to identify potential landfall options within the UK, and from these, a preferred option was selected. Options were assessed against a range of themes, such as:
  - Subsea and overland route requirements;
  - Environmental and permitting considerations;
  - Technical factors (grid connection and system configurations, for instance);
  - Commercial factors;
  - Risk appraisal; and
  - Programme considerations
- This process identified the preferred landfall 'zones' adjacent to a suitable grid connection point. From this point, an initial list of 25 options was established;
- A screening exercise was undertaken by NorthConnect, leading to the selection of five leading options. A detailed assessment of these five options then ensued, leading (ultimately) to the down-selection of the Peterhead area as the preferred landfall option;
- A detailed desktop study was undertaken by NorthConnect in 2012 to identify a preferred cable route between Scotland and Norway, including those elements of the cable route between 0 - 12 NM. The following aspects were considered in the analysis:
  - Physical characteristics of the cable;
  - Existing infrastructure including pipelines, cables, and offshore installations;
  - Bathymetry;
  - Seabed geology and sediment characteristics;
  - Commercial fisheries, shipping and navigation;
  - Cultural heritage and marine archaeology;
  - Benthic ecology and habitat types; and
  - Designated sites and protected habitats.
- The overall objective of the 2012 study was to identify the most efficient cable route between the UK and Norwegian landfalls, considering the physical limitations and whilst minimising socio-economic, cultural and environmental impacts;
- Following this process, it was confirmed the Longhaven cliffs would be the entry point for the NorthConnect landfall (subsequently termed 'Longhaven' to distinguish from the adjacent village);
- A broad corridor was selected, and subsequently refined through a further detailed analysis of various technical, environmental and commercial criteria. This process led to the selection of a survey corridor; and
- Comprehensive geophysical, geotechnical, benthic and archaeological subsea surveys were carried out by NorthConnect to further inform the cable routeing during late 2016 to late 2017. After the survey, the results were utilised to refine the corridor to form the consenting corridor.

[3] *For further information, please review the MD-LOT public register and specifically Marine Licence reference numbers 06771 & 06870.*

The process by which the landfall and cable route, including beyond 12 NM, was selected is considered robust and indeed underpinned a successful MLA (MD-LOT, 2020), as demonstrated by Marine Licence reference numbers 06771 & 06870.

Building upon this context, it is important to note that a wider corridor for the EICC has been provided by the Applicant within the 2024 Scoping Report and so the sensitivities identified and assessed by the NorthConnect project (Marine Licence reference numbers 06771 & 06870) can be re-assessed by MD-LOT, as required, informed by this EIAR.

4.2.3.2 EICC – Offshore (12 - 200 NM)

The proposed Cenos offshore EICC extends for approximately 230 km, from MHWS to the centre of the offshore Array Area, wherein the OSCPs are anticipated to be located. It was determined that an HVDC transmission system would be required for the Export/Import Cable, rather than HVAC cabling, due to the limitations of HVAC systems (i.e. not practical for transmission requirements exceeding 100 km). The use of HVDC cables will significantly reduce potential transmission loss of electricity transmitted to/from the OSCPs and the onshore substation.

A comprehensive cable route optioneering exercise was conducted to identify the potential offshore EICC based on technical, commercial and environmental constraints as well as known hazards. The optioneering resulted in two EICC routes from the OSCPs which would lead into the inshore section of the NorthConnect cable route: 'Cable Route A' and 'Cable Route B'. Both routes retained the option for future development of the NorthConnect interconnector which would then continue from the Cenos OSCPs.

All routes considered known seabed conditions and environmental sensitivities (including protected sites), and wrecks and hazards, alongside existing offshore infrastructure (e.g. oil and gas platforms, oil pipelines, gas pipelines, cables and all associated subsea assets) and planned infrastructure associated with offshore wind. This review resulted in two routes being taken forward for further consideration.

Overall, the offshore corridors were designed taking account of available data to:

- Minimise the cable route length;
- Minimise the number of crossings with third-party assets (e.g. oil and gas pipelines and lease areas);
- Avoid oil and gas assets including a safety exclusion zone;
- Avoid offshore wind energy lease areas;
- Avoid known wreck locations;
- Avoid designated sites as far as possible, excluding the East of Montrose and Gannet Fields Nature Conservation NCMPA for which the windfarm is located within and the Southern Trench NCMPA which the EICC intersects;
- Maximise the benefits of coordinated transmission within 12 NM by utilising the NorthConnect cable corridor route, and landfall location which connects to NorthConnect onshore infrastructure; and
- To provide synergy with a conceptual future interconnector to Norway.

Cable Route A had a total length of 254 km whereas Cable Route B had an initial length of 227 km. Cable Route A had crossings with seven oil and gas assets while Cable Route B had six crossings.

Cable Route A had a total length of 254 km and included seven asset (i.e. pipeline or cable) crossings, whereas Cable Route B had a total length of 227 km and included six asset crossings. Cable Route A was designed with the intention of minimising the need for new marine licences and route engineering by utilising the consented NorthConnect cable corridor out to roughly 100 km offshore. However, the Project was advised that Cenos would be required to apply for separate marine licences (both offshore and inshore – see Section 1.3) for the proposed EICC irrespective of existing concurrent consents. For this reason, Route A became much less attractive due to the compounding impacts to costs associated with manufacture, installation and maintenance associated with a 12% longer cable.

Cable Route B was therefore selected as the best on-balance option.

The resultant EICC has been further informed by the Applicant's offshore environmental and geophysical survey campaign which supported the identification of the Project boundaries, as presented in the Scoping Report (Cenos, 2024). Consequently, the original Cable Route B has been varied slightly to account for additional sensitivities identified during the offshore geophysical survey campaign. This has increased the route length by 3 km to 230 km.

Figure 4-9 provides an overview of the route optioneering, focusing on Cable Route Option A and Cable Route Option B. Figure 4-10 presents designated sites in the vicinity of the physical environment Study Area, emphasising the Applicant's avoidance of designated sites for the offshore EICC.

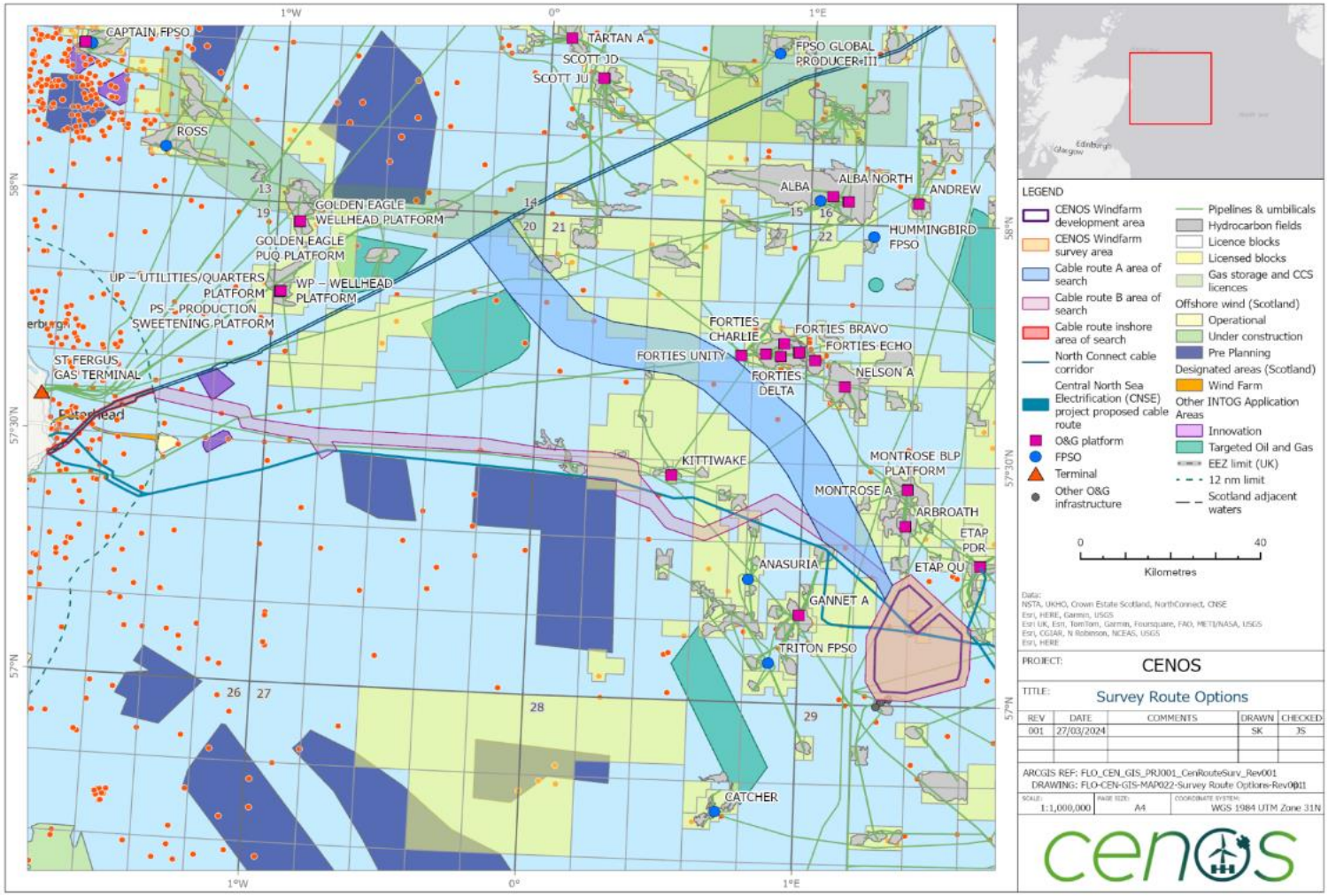


Figure 4-9 Offshore Export/Import Cable Corridor (EICC) route optioneering

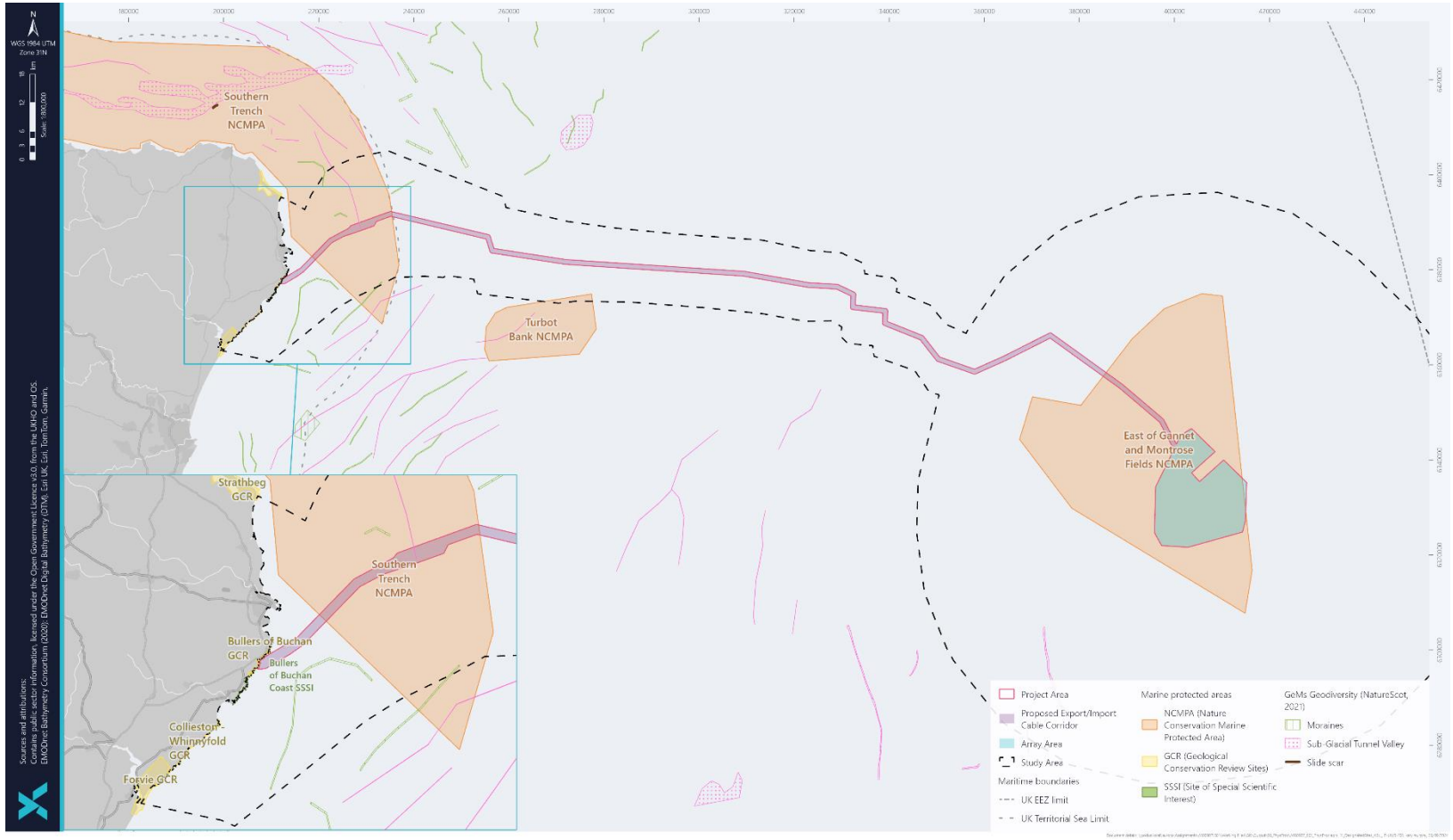


Figure 4-10 Designated Sites in the vicinity of the Physical Environment Study Area

In summary:

- Within the inshore area (0 - 12 NM), the Applicant has entered into a binding agreement to acquire NorthConnect Limited and the route for the EICC shares the same route as NorthConnect;
- Within this inshore area, the cable route was established following a systematic consideration of various technical, commercial and environmental criteria – this resulted in the selection of the NorthConnect consented corridor (now the EICC, which forms part of this s.36 Consent Application and MLA for the Project);
- Offshore (12 - 200 NM), the EICC has been selected based on a robust consideration of various technical, commercial and environmental criteria. Following this process, the best on-balance solution was selected (Cable Route B, as surmised above and depicted in Figure 4-9);
- Together, the inshore extent of the EICC (including landfall) and the offshore extent form the basis of the s.36 Consent Application and MLA for the Project; and
- It is important to note that whilst the EICC route has been selected, further refinement of the exact location of infrastructure (i.e. cable(s)) within the corridor will be undertaken post-consent, as is typical for this type of marine infrastructure project.

Section 4.2.4 below provides further details regarding the assessment of alternatives.

4.2.4 Assessment of Alternatives

INTOG is a leasing round for offshore wind projects targeted at directly reducing emissions from offshore oil and gas production and boosting innovation to help achieve the targets of the NSTD (see EIAR Vol. 2, Chapter 3: Policy and Legislative Context for further details).

The Project is a TOG project under the INTOG leasing round, as explained in Section 4.2 above. It is important to recognise that the purpose of the Project (and indeed the very substance of the leasing round which it is a part of) is specifically defined. The targeted decarbonisation of oil and gas assets is a specific aim, and one which can only be fulfilled with a limited number of solutions (noting also the bounds of the INTOG leasing round (CES, 2018; CES, 2022). For this reason, the assessment of alternatives is limited to infrastructure and activity which could fulfil this defined aim whilst adhering to the clear bounds of the leasing process, as dictated by CES.

As part of the assessment of alternatives for the electrification and decarbonisation of the large oil and gas platforms in this section of the North Sea, a number of potential options have been explored over the last ten years to comply with the NSTD target by 2030. Alternatives considered during this process of North Sea electrification (not all project alternatives) have included the following:

1. Cable from Norway utilising HVDC technology to provide renewable energy to support the electrification of one or more oil and gas platforms. This type of project had occurred in the last 25 years (at a now decommissioned oil and gas platform located approximately 100 km to the southeast of the Cenos area), but due to changes in Norwegian governmental policy this alternative has not been taken forward by the oil and gas operators;
2. Cable from UK utilising HVDC technology to provide grid energy (note that grid supplied electricity is a significant component of gas power production included) to support the electrification of one or more oil and gas platforms has been significantly developed as part of the CNSE joint platform operator group (Marine Directorate Scoping Request – https://marine.gov.scot/node/24007). This project has proposed to run a HVDC cable along a very

similar route to the Cenos EICC (including through the East of Gannet and Montrose Fields MPA) and locating an offshore converter station approximately equidistant from the oil and gas platforms as noted within their scoping document. This would form the hub for several Onward Connection's electrical cables routes. The Export/Import Cable Route and some of the additional cables would have been located within the NCMPA zone. This proposed project (run by Harbour Energy) has not submitted any applications to MD-LOT since their scoping submission; and

3. Creation of an off grid floating offshore wind farm in the same area of the Cenos development area, similar but larger to the Hywind Tampen demonstrator project in Norway which produced approximately 30% of the electrical load for the platforms at peak renewable power output. This option would have provided full electrification to the connected platforms during periods of wind generation, but importantly full platform back up power generation would still be required as part of the project, as back up grid power would not be available to the platforms and would undermine the purpose of the electrification of oil and gas platforms. This is not economically feasible for the Cenos area and does not provide the required level of decarbonisation to the oil and gas platforms that is contained within the NSTD.

In summary:

- The specific nature of the Project means that there are a limited number of alternative solutions to delivering the key aims;
- The nature of the INTOG leasing round means there are specific criteria which the Project must comply with – this also, to a large extent, dictates the fundamental approach to the Project;
- Notwithstanding, the Applicant has considered a number of options for delivering the aims of the Project, as set out above; and

Looking forward, whilst the fundamental solution to deliver the aims of the Project has been determined, there is significant potential for onward refinement as the Project progresses – this is discussed in section 4.5 and 4.6 below.

Section 4.3 below considers the 'Do-Nothing' option (I.e., a scenario where the Project does not proceed).

4.3 The 'Do-Nothing' Option

The 'Do-Nothing' option is a consideration of what would happen if the Project did not go ahead. As presented in EIAR Vol. 2, Chapter 2: Need for the Project, the Project aims to achieve the following benefits:

- Contribute to Government commitments to address climate change;
- New energy infrastructure;
- Energy security;
- Deliver low carbon economic growth and support net zero; and
- Contribute to the UK target to deliver 5 GW of floating offshore wind projects by 2030.

A 'Do-Nothing' scenario would not meet any of the above Project aims. The 'Do-Nothing' option would result in a loss of offshore wind capacity and reduced development within the 'E-a' area of the INTOG leasing process, subsequently resulting in a reduction in long-term energy security within the UK.

The Project contributes to important aspects of energy security by supporting the continuation of indigenous oil and gas production and through the growth of renewable electricity generation in the UK. This is accomplished by the Project through its contributions to Scottish electricity requirement and through the electrification of oil and gas platforms and the subsequent reduction in greenhouse gases this engenders.

The location of the windfarm is defined by the location of the oil and gas platforms, which aims to maximise the number of platforms that can be decarbonised and also crititically next to the platforms that have the longest potential operational life, with COP likely to be measured in decades therefore extending the benefit of decarbonisation. Other windfarm locations would not provide this level of decarbonisation and would still need to utilise the East of Gannet NCMPA to provide a route for the Export/Import Cable.

4.3.1 Conclusions of the 'Do-Nothing' Option

In the 'Do-Nothing' scenario the opportunity for decarbonisation of oil and gas platforms associated with the Onward Development of the Project would cease to occur, delaying the achievement of the net zero ambitions set out in the NSTD (Department for Business, Energy and Industrial Strategy (BEIS), 2021). Additionally, this scenario would be in contravention of the objectives of the Draft Energy Security and Just Transition Plan (Scottish Government, 2023), as well as the overarching objectives of the INTOG IPF. Finally, in the 'Do-Nothing' scenario the economic benefits associated with the Project, including job opportunities, supply chain development and a community benefit fund (EIAR Vol. 3, Chapter 19: Socio-economics, Tourism and Recreation), would cease to materialise.

Having considered the factors above associated with the 'Do-Nothing' scenario, proceeding with the Project is by far the most advantageous scenario. Proceeding with the Project will help to support net zero ambitions, as set out by Government and the NSTD (noting also the extensive policy support underpinning the Project).

4.4 Onward Development

As described in Section 4.1.3 above, oil and gas installations as candidates for decarbonisation were narrowed to those within a 100 km radius, as this is the operational limit for HVAC cables.

A central aim of the Project is to provide the opportunity for oil and gas assets located in the waters surrounding the Array Area to electrify via transmission infrastructure connecting to the Project's electricity hub (i.e. OSCPs). These future projects form part of the anticipated future Onward Development which will be originated by Cenos, referred to as Onward Development Connections.

The Onward Development Connections for oil and gas electrification will be finalised and brought forward by 3rd party oil and gas operators, subject to separate marine licensing and permitting requirements (including separate EIA, as appropriate). At this very early stage in the process, the information available about these connections is limited and cannot be confirmed by the Project. In accordance with standard practice and relevant industry guidance, the level of information available means there is insufficient detail to enable full inclusion within a cumulative effects assessment. However, recognising industry feedback and a keen interest in this topic from stakeholders, the Applicant has voluntarily provided a qualitative assessment of the combined impact of the Project and Onward Development

Connections, to the extent it can with the limited details on possible Onward Development. Please refer to EIAR Vol. 3, Chapter 22: Statement of Combined Effects for further details.

4.5 Red Line Boundary

The Red Line Boundary (RLB) definition for the EIAR is based on the offshore Array Area, offshore EICC and landfall. Further refinement of the layout and offshore cable route is currently underway and will continue as further geotechnical and geophysical survey data is collected. These will inform post consent requirements, including the production of post-consent documentation and management plans such as the Development Specification and Layout Plan (DSLP) and Cable Plans (CaP).

4.6 Project Design Alternatives

The Project has utilised a Project Design Envelope (PDE) approach to inform this EIAR. The PDE approach enables a range of values to be presented for each Project aspect, providing the flexibility to allow for further refinement of the Project design. The first version of the PDE was presented within the 2023 Scoping Report, submitted to MD-LOT in 2023, and thereafter refined for the 2024 Scoping Report submitted to MD-LOT in April 2024. The PDE has been further refined based on the results of environmental surveys, technical and engineering studies and discussions with stakeholders and the community, as part of the EIA process.

4.6.1.1 Design Evolution

At the time of production of the Scoping Report (April 2024), the Project had retained a number of options associated with different aspects of the Project design, including drag embedment anchors, chain catenary moorings, and use of rock protection for the IAC and Export/Import Cable within the East of Gannet and Montrose Fields NCMPA.

Since the submission of the 2024 Scoping Report, a number of key decisions have been taken which have removed certain design concepts from the PDE these being:

- Removal of Drag Embedment Anchors;
- Focus principally on driven piles and suction piles with a prioritisation of suction piles to limit noise impacts;
- Reduce the maximum anticipated length of chain required for mooring systems that will come into contact the seabed for a semi-taut mooring system, eliminate consideration of a chain only catenary system, and prioritise study of TLP's and Taut mooring systems with a view to designing out the use of chain (and chain interaction with the seabed); and
- Reduce the need for rock placement within the East of Gannet and Montrose Fields NCMPA to pipeline crossings and the base of the OSCPs only and prioritise the use of recoverable alternatives such as rock bags or recoverable mattresses.

This represents a degree of initial design refinement however it is important to recognise that the Project is at an early stage in the lifecycle of the development (i.e., pre-detailed design, and in the absence of appointment of an engineering, procurement and construction (EPCI) contractor, for example). As the lifecycle of the development progresses, there will be further opportunity for refinement of the Project across a range of different areas (i.e., design, layout, lighting, technology choice etc.).

Alongside design refinement undertaken by the Applicant in order to deliver the Project effectively, it is anticipated that MD-LOT will set post-consent requirements on any future s.36 Consent and assocciated Marine Licences for the Project, placing legally binding requirements on the Project. It is anticipated that this will include provision of additional information regarding details of the design and/or refinement before commencement of construction (a typical process for marine infrastructure projects in Scottish waters).

4.6.1.2 Decommissioning

As reported within section 4.1.6 above, during the EIA Scoping Process, Scottish Ministers asked the Applicant to provide further details regarding how decommissioning had been considered by the Project.

The Energy Act 2004, as amended by the Scotland Act 2016 contains statutory requirements in relation to the decommissioning of Offshore Renewable Energy Installations and requires the Project to provide a Decommissioning Programme, supported by details of the type and timing of appropriate financial security proposed. The Decommissioning Programme will follow the guidance found in the Scottish Government's Decommissioning of Offshore Renewable Energy Installations in Scottish Waters (Scottish Government, 2022b). Decommissioning activities will comply with all relevant legislation at that time and best practice at the time of decommissioning will be followed.

Throughout the Project lifespan, the Decommissioning Programme will be reviewed and updated every five years. It is anticipated that the final revision process will commence two years prior to the initiation of decommissioning activities. Best practice will be followed when developing a Decommissioning Programme.

For the purposes of the EIAR, the following decommissioning principles have been assumed:

- FTU substructure components will be removed and towed to port;
- Mooring lines will be removed and where possible, piles will be removed or cut to a suitable distance below the mudline such that the upper portion is removed;
- Cables no longer required will be removed where safe to do so. Where they cross live third-party assets, they may be cut and left in-situ to prevent damage to third-party operations; and
- The OSCPs will be decommissioned, and the jacket and topsides will be towed to shore. The piles will be cut to a suitable distance below the mudline.

The nature of the Project, being focused on floating wind to aid oil and gas decarbonisation, means that the future decommissioning (or indeed repowering) is typically not significantly impacted by decisions made during site selection and assessment of alternative solutions. For instance, whilst the specific location of FTUs may add a degree of time or complexity to decommissioning or repowering, this is not considered a material issue. This is unlike, for example, fixed-bottom wind where decisions on site selection and alternatives can significantly impact future decommissioning and/or repowering.

Consistent with other recent Scottish marine licensing for offshore wind development, and indeed the typical lease requirements of CES, there is anticipated to be a number of post-consent requirements associated with decommissioning – this is discussed further in EIAR Vol. 3, Chapter 23: Summary of Mitigation and Monitoring.

4.7 Summary

Based on the EIA Regulations, this chapter provides an outline of the main alternatives studied by the Applicant, a description of the reasonable alternatives considered and an indication of the main reasons for selecting the chosen option. With relation to Schedule 4 (part 3) of the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017, the chapter also includes 'A description of the relevant aspects of the current state of the environment (the "baseline scenario") and an outline of the likely evolution thereof without implementation of the project […]' (i.e., the 'Do-Nothing' scenario).

The Project is a TOG project under the INTOG leasing round. It is important to recognise that the purpose of the Project (and indeed the very substance of the leasing round which it is a part of) is specifically defined. The targeted decarbonisation of oil and gas assets is a specific aim, and one which can only be fulfilled with a limited number of solutions (noting also the bounds of the INTOG leasing round (CES, 2018; CES, 2022)). For this reason, the assessment of alternatives presented in this chapter is limited to infrastructure and activity which could fulfil this defined aim whilst adhering to the clear bounds of the leasing process, as dictated by CES.

The Applicant has undertaken engagement with a range of relevant stakeholders to help inform the development of the Project, both with relation to the Array Area and also the EICC. This has helped to inform the refinement of the outline design for the Project, and to form the basis of the s.36 consent application and MLAs. Engagement with stakeholders, including through the EIA Scoping process, has also helped to shape the final content of this chapter.

Overall, during the evolution of the Project, the Applicant's aim has been to deliver the best on-balance solution for achieving the objectives of the Project whilst also adhering to the clearly defined bounds of the INTOG leasing round, as set out above. To-date, this includes:

- Refining the PDE following the EIA Scoping process to reduce (downward) the maximum parameters for the Project;
- Refining the Array Area within the East of Gannet and Montrose Fields NCMPA in order to avoid greater areas of sublittoral muds, based on environmental data available during site selection;
- Refining the PDE to reduce the potential for impacts on the East of Gannet and Montrose Fields NCMPA, and to reduce the likelihood of conservation objectives being hindered;
- Avoiding all designated sites along the offshore (12-200 NM) EICC; and
- Increasing the overall length of the EICC to avoid sensitivities.

It is important to note that refinement of the Project will continue throughout the post-consent / pre-construction process, as informed by the output from further engineering and technical studies, Project evolution, technical engagement and regulatory requirements.

4.8 References

Cenos, 2022. JNCC Technical Workshop dated 9th November 2022.

Crown Estate Scotland, 2018. INTOG Leasing – Guidance Notes. Available online at: https://www.crownestatescotland.com/sites/default/files/2024-09/INTOG%20Leasing%20Guidance%20Notes.pdf [Accessed on 29/10/2024]

Crown Estate, 2019. Offshore Wind Leasing Round 4. Available online at: https://www.thecrownestate.co.uk/our-business/marine/Round4 [Accessed on 29/10/2024]

Crown Estate, 2024. Cable Route Identification & Leasing Guidelines. Available online at: https://www.datocms-assets.com/136653/1723817449-cable-route-guidance_2024_v5-0_final-for-publication.pdf [Accessed on 29/10/2024]

Crown Estate Scotland, 2022. INTOG Leasing – Offer Document. Available online at: www.crownestatescotland.com/sites/default/files/2024-09/INTOG%20Leasing%20Offer%20Document.pdf [Accessed on 29/10/2024].

IEMA, 2014. EIA Quality Mark Article: Reasonable Alternatives - when is an alternative not an alternative? [Arup]. Available online at: https://iema-stage.wearewattle.com/media/a4yjyh2o/arup_article_reasonable_alternatives_-_when_is_an_alternative_not_an_alternative.pdf [Accessed on 29/10/2024].

JNCC, 2014. East of Gannet and Montrose Fields MPA - Management Options Paper v4.0 July 2014

Marine Scotland, 2018. Marine Scotland Consenting and Licensing Guidance For Offshore Wind, Wave and Tidal Energy Applications. Available online at: https://www.gov.scot/binaries/content/documents/govscot/publications/consultation-paper/2018/10/marine-scotland-consenting-licensing-manual-offshore-wind-wave-tidal-energy-applications/documents/00542001-pdf/00542001-pdf/govscot%3Adocument/00542001.pdf [Accessed on 29/10/2024].

National Grid ESO, 2024. Beyond 2030: A national blueprint for a decarbonised electricity system in Great Britain. Available online at: https://www.neso.energy/document/315516/download [Accessed on 29/10/2024].

Royal Society for the Protection of Birds (RSPB) (2016). The RSPB's 2050 energy vision: Meeting the UK's climate targets in harmony with nature. Technical Report. Available online at: https://www.researchgate.net/publication/303459162_The_RSPB's_2050_energy_vision_Meeting_the_UK's_climate_targets_in_harmony_with_nature [Accessed on 16/07/24].

Scottish Government (2021a). Sectoral Marine Plan for Offshore Wind for Innovation and Targeted Oil & Gas Decarbonisation (INTOG) Planning Specification and Context Report. Available online at: https://marine.gov.scot/sites/default/files/sectoral_marine_plan_for_offshore_wind_for_intog_-_project_spec-context_report_-_confidential_-_25_august_2021.pdf [Accessed on 16/07/24].

Scottish Government (2021b). Sectoral Marine Plan - innovation and targeted oil and gas decarbonisation, offshore wind: Published Consultation Responses. Available online at: https://consult.gov.scot/marine-scotland/smp-innovation-and-targeted-oil-and-gas/consultation/published_select_respondent [Accessed on 29/10/2024].

Scottish Government (2022). Initial Plan Framework for the Sectoral Marine Plan for Offshore Wind Energy for Innovation and Targeted Oil & Gas Decarbonisation (INTOG). Available online at: https://www.gov.scot/publications/initial-plan-framework-sectoral-marine-plan-offshore-wind-innovation-targeted-oil-gas-decarbonisation-intog/documents/ [Accessed on 04/06/24].

Scottish Government (2023). Draft Energy Strategy and Just Transition Plan – delivering a fair and secure zero carbon energy system for Scotland. January 2023. ISBN 9781804358054. Available online at: https://www.gov.scot/publications/draft-energy-strategy-transition-plan/documents/ [Accessed on 19/07/2024].

Scottish Government (2024a). Draft Fisheries Assessment – Turbot Bank NCMPA: Fisheries management measures within Scottish Offshore Marine Protected Areas (MPAs). Available online at: https://www.gov.scot/publications/draft-fisheries-assessment-turbot-bank-ncmpa-fisheries-management-measures-within-scottish-offshore-marine-protected-areas-mpas/pages/5/ [Accessed on 29/10/2024].

Scottish Government (2024b). Draft Fisheries Assessment – East of Gannet and Montrose Fields NCMPA: Fisheries management measures within Scottish Offshore Marine Protected Areas (MPAs). Available online at: https://www.gov.scot/publications/draft-fisheries-assessment-east-gannet-montrose-fields-ncmpa-fisheries-management-measures-within-scottish-offshore-marine-protected-areas-mpas/ [Accessed on October 2024).

SNH; HES, 2018. Environmental Impact Assessment Handbook Environmental Impact Assessment Handbook Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.

The Crown Estate (TCE) (2019). Resource and Constraints Assessment for Offshore Wind: Methodology Report (Reort Ref. 38255-TCE-REP-024). Available online at: https://www.thecrownestate.co.uk/media/3331/tce-r4-resource-and-constraints-assessment-methodology-report.pdf [Accessed on 29/10/2024].

The Crown Estate (TCE) (2021). Cable Route Identification and Leasing Guidelines. Available online at: https://www.marinedataexchange.co.uk/details/3522/summary [Accessed on 29/10/2024].

Department for Business, Energy and Industrial Strategy (BEIS) (2021). North Sea Transition Deal. Available online at: https://www.gov.uk/government/publications/north-sea-transition-deal [Accessed on 04/06/24].