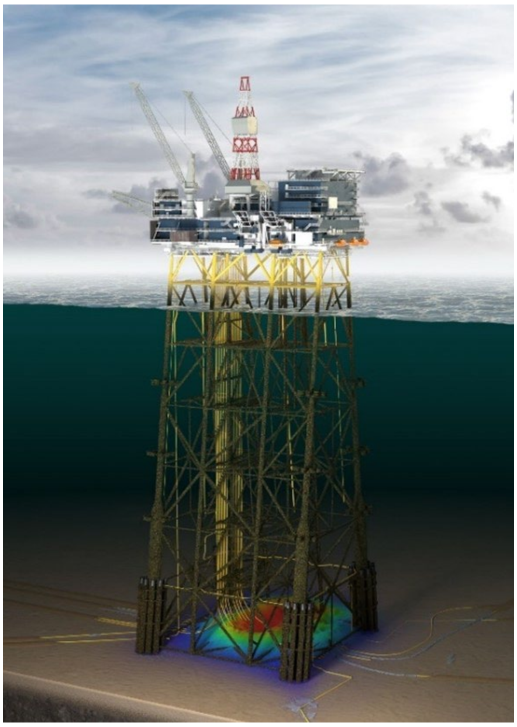
NORTH CORMORANT DECOMMISSIONING

North Cormorant Upper Jacket and Associated Riser Sections

Decommissioning Environmental Appraisal



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ABBREVIATIONS

Abbreviation	Meaning
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
AWMP	Active Waste Management Plan
BEIS	Department for Business, Energy and Industrial Strategy
CA	Comparative Assessment
CoP	Cessation of Production
CSV	Construction Support Vessel
DECC	Department for Energy and Climate Change
DESNZ	Department for Energy Security and Net Zero
DP	Decommissioning Programme
EA	Environmental Appraisal
EL	Elevation
EMS	Environmental Management System
EPS	European Protected Species
ERL	Effects Range Low
EU	European Union
EUNIS	European Nature Information System
EWC	European Waste Catalogue Codes
FLAGS	Far north Liquids and Associated Gas System
FOCI	Feature of Conservation Interest
GHG	Greenhouse Gas
GJ	Gigajoules
HLV	Heavy Lift Vessel
HSE	Health, Safety and Environment
HSSE	Health, Safety, Security and Environment
ICES	International Council for the Exploration of the Sea
INTOG	Innovation and Targeted Oil and Gas
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee

Abbreviation	Meaning
LAT	Lowest Astronomical Tide
MARPOL	International Convention for the Prevention of Pollution from Ships
MSF	Module Support Frame
NCMPA	Nature Conservation Marine Protected Area
NMP	National Marine Plan
NMPI	National Marine Plan Interactive
NNS	Northern North Sea
NORM	Naturally Occurring Radioactive Materials
NRC	National Research Council
NSTA	North Sea Transition Authority
OEUK	Offshore Energy UK
OGA	Oil and Gas Authority
OMR	Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2017
OPEP	Oil Pollution Emergency Plan
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	The Oslo Paris Convention
PETS	Portal Environmental Tracking System
PMF	Priority Marine Feature
ROV	Remotely Operated Vehicle
SAC	Special Areas of Conservation
SACFOR	Super abundant, Abundant, Common, Frequent, Occasional, Rare
SAHFOS	Sir Alister Hardy Foundation for Ocean Science
SCOS	Special Committee on Seals
SEEMP	Shipboard Energy Efficiency Management Plan
SFF	Scottish Fishermen’s Federation
SMRU	Sea Mammal Research Unit
SNH	Scottish National Heritage
SOPEP	Shipboard Oil Pollution Emergency Plan
SOSI	Seabird Oil Sensitivity Index
SPA	Special Protection Area
Te	Tonnes

Abbreviation	Meaning
THC	Total Hydrocarbon Content
UK	United Kingdom
UK BAP	United Kingdom Biodiversity Action Plan
UKCS	United Kingdom Continental Shelf

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APPENDICES

EXECUTIVE SUMMARY

Introduction and Background

This non-technical summary provides an outline of the findings of the Environmental Appraisal (EA) conducted by TAQA Bratani Limited (TAQA) for the proposed decommissioning of the North Cormorant Platform Upper Jacket and associated pipeline, umbilical and power cable riser sections. This consists of the structure from the topsides cut height to approximately EL -116 m, or approximately 45 m above the seabed. This structure is referred to as the "Upper Jacket" throughout this document. The Upper Jacket estimated gross weight (inclusive of marine growth), is ≈12,500 Te. The purpose of the EA is to understand and communicate the potential significant environmental impacts associated with the proposed Upper Jacket decommissioning activities.

The North Cormorant platform within the United Kingdom Continental Shelf (UKCS) Block 211/21a of the northern North Sea (NNS), approximately 113 km northeast of Shetland and 35 km west of the UK/Norway median line (Figure 1-1). The platform is a fixed installation which consists of an 8-legged steel jacket sub-structure, secured by piles to the seabed, supporting a module support frame (MSF) and two levels of modules including accommodation and drilling facilities that incorporate a well bay, process bay and utilities bay. The platform was installed in 1981 and production started in 1982. A Cessation of Production (CoP) application for North Cormorant was submitted to the Oil & Gas Authority (OGA) – now the North Sea Transition Authority (NSTA) – in January 2022 and was approved the following month. The anticipated CoP date for North Cormorant is Q4 2024. The North Cormorant platform facilitates production from Cormorant North, Cormorant East and Otter Fields. Oil and gas are separated out and processed via the North Cormorant process facilities. The oil is then routed to Cormorant Alpha for onward transmission through the Brent Oil Pipeline System to Sullom Voe in the Shetland Islands. Associated gas, and gas imported from Tern Alpha, is exported through the Western Leg and the Far north Liquids and Associated Gas System (FLAGS) Pipeline to the St. Fergus terminal in Aberdeenshire.

Over the lifetime of the North Cormorant platform, drill cuttings have been discharged to sea resulting in a drill cuttings pile with an approximate volume of 22,980 m^3. The majority of these cuttings are located directly beneath the North Cormorant platform with a maximum height of 9.0 m (Fugro, 2019). The cuttings will not be affected by the Upper Jacket decommissioning operations and are outside the scope of this EA.

Separate Decommissioning Programmes (DPs) and supporting EAs covering the North Cormorant Footings and associated drill cuttings pile and subsea infrastructure adjacent to the platform will be submitted at a later stage, in line with TAQA's wider NNS Field plans.

Regulatory Context

The decommissioning of offshore oil and gas infrastructure in the United Kingdom Continental Shelf (UKCS) is principally governed by the Petroleum Act 1998, as amended by the Energy Act 2008, which sets out the requirements for a formal DP and the approval process. Under the Department for Business, Energy and Industrial Strategy (BEIS), Guidance Notes on Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998 (BEIS, 2018), the DP must be supported by an EA.

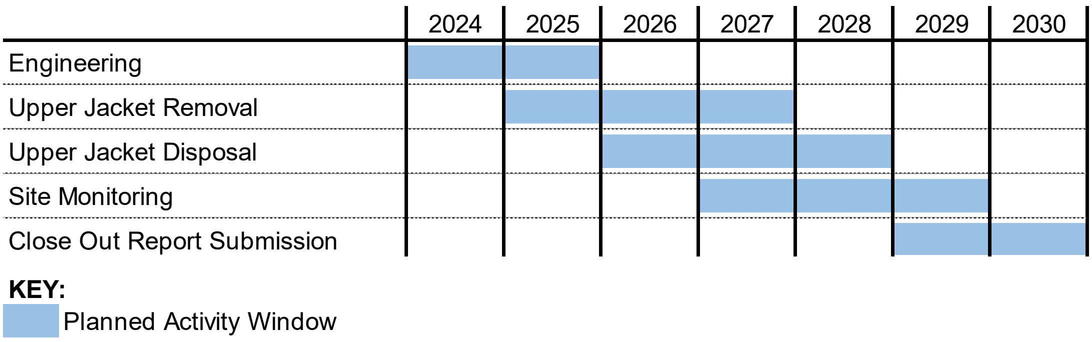
As part of the planning for decommissioning the North Cormorant facilities, four DPs are in preparation, each supported by an EA:

- Topsides DP (TAQA, 2020a), covered by a previous EA (TAQA, 2020b) (Approved by the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) November 2020);
- Upper Jacket and Associated Riser Sections Decommissioning Programmes (TAQA, 2024), covered by this EA;
- A future Footings DP, covering the sub-structure that will remain after Upper Jacket removal. The Footings will be covered by a separate EA;
- A future Subsea infrastructure DP. The subsea facilities will be covered by a separate EA.

Due to the complexities of the Footings decommissioning, all current, proven technologies indicate the requirement to remove and transport the Upper Jacket as a separate entity from the Footings. Removal of the Upper Jacket will be carried out such that it does not preclude the possible future decommissioning of the Footings. Therefore, separate DPs and EAs will be submitted for each. As TAQA intends to fully remove the North Cormorant Upper Jacket, no Comparative Assessment (CA) submission is required in support of the North Cormorant Upper Jacket DP. The Steel Piled Jackets Technical Assessment (TAQA, 2022a) demonstrates removal of the Upper Jacket does not preclude subsequent decommissioning of the Footings.

Proposed Schedule

The North Cormorant Upper Jacket decommissioning schedule is shown in Figure 0-1. This schedule may change to maximise economic recovery, or to exploit other opportunities to minimise greenhouse gas (GHG) emissions or other decommissioning impacts by combining activities into campaigns.



Note: Actual execution windows will be subject to contractor portfolio and market capacity, and removal may be accelerated.

Figure 0-1 North Cormorant Decommissioning Schedule

Options for Decommissioning

A study was conducted to assess options for reuse of the North Cormorant installation (TAQA, 2018). It concluded there were no credible reuse options principally due to the limited remaining life of the jacket structure due to fatigue and obsolescence issues, and economic factors associated with converting the installations for any intended reuse purpose. Components from the installation may be reused if a suitable use can be found.

Environmental and Socio-Economic Baseline

The key environmental and social sensitivities in the North Cormorant area are summarised in Table 0-1.

Table 0-1 Key Environmental and Social Sensitivities for the North Cormorant Field

Sediment type and seabed features
The North Cormorant platform is located at a water depth of 161 m. The annual mean wave height within the North Cormorant Field ranges from 2.71 m – 3.00 m, and current speeds are low (0.11 – 0.25 m/s). The combined energy at the seabed from wave and tide action is also low. Recent survey work indicates that the seabed sediments range from fine silt to fine sands, with patches of coarse material. This is consistent with mapped information which classifies this region of the North Sea as the European Nature Information System (EUNIS) broadscale habitats 'Offshore Circalittoral Sand', 'Deep Circalittoral Coarse Sediment' and '*Capitella capitata, Thyasira spp*. in organically – enriched Offshore Circalittoral Mud and Sandy Mud'.
Sediment chemical composition
Hydrocarbon concentrations in the wider area are generally within expected background levels for the NNS. Hydrocarbon levels within 250 m of the North Cormorant platform are elevated with significant hydrocarbon enrichment occurring close to the installation itself. Metal concentrations within 500 m of the platform and within the drill cuttings pile generally exceeded the OSPAR Effect Range Low Levels.
Seabed habitats and species
Invertebrate communities living within the sediments are dominated by annelid species characteristic of background conditions in this part of the NNS, and evident in baseline surveys. The North Cormorant area has a high abundance of polychaetes, however, a high abundance of the taxa Nematoda is present closer to the North Cormorant platform, potentially as a result of the high barium concentrations associated with the drill cuttings here. Four individual ocean quahog (bivalves) were observed in a recent survey. No OSPAR threatened and/or declining species/habit, or other species/habitat of conservation concern were found to be present in the offshore decommissioning project area.
Fish and shellfish
The North Cormorant platform sits within known spawning grounds for haddock (*Melanogrammus aeglefinus),* Norway pout (*Trisopterus esmarkii*), saithe (*Pollachius virens*), whiting (*Merlangius merlangus*), and cod (*Gadus morhua*). The area is known to be an area of high intensity spawning for cod. The area is also a potential nursery ground for haddock, Norway pout, whiting, blue whiting (*Micromesistius poutassou*), hake (*Merluccius merluccius*), herring (*Clupea harengus*), ling (*Molva molva*)., mackerel (*Scomber scombrus),* and spurdog (*Squalus acanthias*). The area is known to be a high intensity nursery ground for blue whiting. However, published sensitivity maps indicate that the probability of aggregations of juvenile cod, common sole (*Solea solea)*, haddock, herring, horse mackerel (*Trachurus mediterraneus*), mackerel, plaice (*Pleuronectes platessa*), sprat (*Sprattus sprattus*), whiting and Norway pout occurring in the offshore decommissioning project area is low, and blue whiting and hake are medium.
Seabirds
Offshore in the NNS, the most numerous species present are likely to be northern fulmar (*Fulmarus glacialis*), black-legged kittiwake (*Rissa tridactyla*) and common guillemot (*Uria aalge*). The North Cormorant decommissioning area is located within or close to hotspots for northern fulmar, northern gannet (*Morus bassanus*) and Atlantic puffin (*Fratercula arctica*) during their breeding season, when adults of these species can be seen foraging far from their coastal breeding colonies. In addition, after the

breeding season ends in June, large numbers of moulting auks (common guillemot, razorbill (*Alca torda*) and Atlantic puffin) disperse from their coastal colonies and into the offshore waters from July onwards. At this time these high numbers of birds are particularly vulnerable to oil pollution. However, overall seabird sensitivity to oil pollution in the region of the offshore decommissioning project area is considered low throughout the year as shown in Table 3-3.
Marine mammals
Harbour porpoise (*Phocoena phocoena*), Atlantic white-sided dolphin (*Lagenorhynchus obliquidens*) and minke whale (*Balaenoptera acutorostrata*) were the most abundant species recorded in the survey block covering the North Cormorant Decommissioning area. These species are Scottish Priority Marine Features (PMFs) and European Protected Species (EPS). The harbour porpoise is also protected under Annex II of the EU Habitats Directive (92/43/EEC as amended by 97/62/EC). Around the North Cormorant platform, both grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) densities are predicted to be between 0 and 1 seals per 25 km^2, which is considered to be low.
Conservation
There are no Nature Conservation Marine Protected Areas (NCMPAs), Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Demonstration and Research Marine Protected Areas (DRMPAs) within 40 km of the North Cormorant platform. The closest designated site is the Pobie Bank Reef SAC, located approximately 77 km southwest of the North Cormorant Decommissioning area.
Fisheries and shipping
The North Cormorant platform is located in International Council for the Exploration of the Sea (ICES) rectangle 51F1. This region is primarily targeted for demersal species, with some minor shellfish and pelagic fishing occurring therein. Annual fishery landings by live weight and value are considered low for shellfish and pelagic fisheries and moderate for demersal fisheries in comparison to other areas of the North Sea. Fishing effort has remained relatively low within this region for the last five fishing years and is dominated by bottom-towed demersal fishing gears. Fishing effort generally peaks in the summer months within ICES Rectangle 51F1. Shipping density in the NNS in the vicinity of the proposed decommissioning activities is low. Between 200 - 300 vessels transit through Block 211/21a annually.
Other sea users
The proposed decommissioning operations are located in a well-developed area for oil and gas extraction. There are no operational offshore wind farms in the vicinity of the project area. However, the project area is close to areas identified under the Innovation and Targeted Oil and Gas (INTOG) scheme. INTOG area NE-b lies approximately 2.9 km southeast of North Cormorant and INTOG area NE-a lies approximately 38 km northwest of North Cormorant. In addition to the INTOG areas, the NE1 ScotWind area lies approximately 99 km south-southwest of North Cormorant. Apart from pipelines and cables associated with the North Cormorant platform, there are no other cables or pipelines in the vicinity, no designated military practice and exercise areas and no designated or protected wrecks nearby

Impact Assessment Process

This EA Report has been prepared in line with the BEIS Decommissioning Guidelines and with Decom North Sea's EA Guidelines for Offshore Oil and Gas Decommissioning. The BEIS Decommissioning Guidelines state that an EA in support of a DP should be focused on the key issues related to the specific activities proposed; and that the impact assessment write-up should be proportionate to the scale of the project and to the environmental sensitivities of the project area.

The Environmental Impact Assessment (EIA) within this EA has been informed by several different processes, including identification of potential environmental issues through project engineer and marine environmental specialist review in a screening workshop, and consultation with key stakeholders (Marine Scotland, Joint Nature Conservation Committee (JNCC) and Scottish Fisherman's Federation (SFF)).

The impact assessment considered the proposed decommissioning activities and any potential impacts these may pose. This discussion identified thirteen potential impact areas based on the three proposed removal methods. All thirteen potential impacts were screened out of further assessment based on the low level of severity, or likelihood of significant impact occurring. The thirteen potential impacts are tabulated in Table 0-2, together with justification statements for the screening decisions.

Table 0-2 Environmental Impact Screening Summary for North Cormorant Upper Jacket Removal

Impact	Further assessment	Rationale
Emissions to air	No	• Majority of emissions relate to vessel time, or the recycling of material returned to shore which will be limited in duration. • The estimated CO_2 emissions generated by the decommissioning activities are 22,137 Te. This equates to less than 15% of the operational emissions emitted by the asset during 2022 and less than 0.16% of the total oil and gas UKCS emissions in 2022. Considering the above, atmospheric emissions do not warrant further assessment.
Disturbance to the seabed	No	• Planned use of dynamically positioned vessels. Therefore, there will be no direct seabed interaction associated with the decommissioning. • Cutting will be carried out using abrasive water jet or diamond wire. Both techniques will generate swarf, and abrasive water jet will release spent abrasive media. Any swarf, abrasive media, marine growth, etc. that falls to the seabed will fall within a footprint that extends some 15 m from the base of the Jacket. Any such discharges are unlikely to cause significant disturbance to the seabed or cuttings pile. Following award of contract and selection of cutting methodology, any such disturbances will be quantified and assessed in the Marine Licence application submitted in support of the execution of Upper Jacket removal. On this basis, no further assessment needs to be undertaken.
Physical presence of vessels in relation to other sea users	No	• Limited in duration • Similar vessels to those currently deployed for oil and gas installation, operation and decommissioning activities. • Vessel activity focussed within the existing 500 m safety zone and will not occupy 'new' areas. • Other sea users will be notified in advance of and subsequent to operations. • The decommissioning of the North Cormorant Upper Jacket is estimated to require up to four vessels, however these would not all be on location at the same time (max of three at any one time). Considering the above, temporary presence of vessels does not need further assessment.
Physical presence of infrastructure decommissioned *in situ* in relation to other sea users	No	• The decommissioning of the Upper Jacket will not result in infrastructure decommissioned *in situ* considered within this scope. However, the Jacket Footings will remain *in situ*. The Footings and associated riser sections will be the subject of a subsequent Decommissioning Programme. On this basis, no further assessment needs to be undertaken.

Impact	Further assessment	Rationale
Physical presence of Footings following removal of the 500 m safety zone but prior to the Footings DP approval in relation to other sea users	No	• Once the Upper Jacket is removed, there will be no aids to navigation in place to alert other sea users to the presence of the Jacket Footings. This potentially leads to an increase in the risk to other sea users. This issue will be addressed in a variation to the Consent to Locate for the installation. • TAQA will also advise the relevant bodies of changes to the installation to facilitate updates to Admiralty charts and the FishSAFE system to notify other sea users of the presence of the Jacket Footings. On this basis, no further assessment needs to be undertaken.
Discharges to sea	No	• Discharges from vessels are typically well-controlled activities regulated through vessel and machinery design, management and operation procedures. • The potable water storage tanks located in the legs will be cut through during removal activities. Given the benign nature of potable water, these discharges will not have any adverse environmental impact. • The diesel storage tanks located in the legs will not be cut through during removal activities. However, small residual quantities of diesel may remain in the tanks that could be discharged during Upper Jacket removal. Prior to Upper Jacket removal operations commencing TAQA will apply for an oil discharge permit under the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations (OPPC) to cover potential residual diesel discharges. • Any marine growth present on the Upper Jacket will be removed prior to cutting but removal will be limited to the cut locations and lift points. This will be fully assessed in the relevant environmental permit applications. Marine growth remaining on the Upper Jacket will be removed onshore. Considering the above, this does not warrant further assessment
Underwater noise emissions	No	• Aside from vessel noise and Upper Jacket cutting activities, there will be no other noise generating activities. • Vessel presence and cutting activities will be limited in duration. • The project is not located within an area protected for marine mammals. • With industry-standard mitigation measures and JNCC guidance, EAs for offshore oil and gas decommissioning projects typically show no injury, or significant disturbance associated with these projects. • The cutting technique is likely to be diamond wire, or possibly abrasive water jet. Recently published Department for Energy Security and Net Zero (DESNZ) (2023) guidance states that "*Sound radiated from the diamond wire cutting of a conductor or abrasive water jets is not easily discernible above the background noise*."

Impact	Further assessment	Rationale
		Considering the above, this does not warrant further assessment
Resource use	No	• Limited raw materials required (largely restricted to fuel use). • The estimated total energy usage for the decommissioning activities is 264,826 GJ. • Material will be returned to shore as a result of project activities, expectation is to reuse or recycle c.95% of this returned material. There may be instances where infrastructure returned to shore is contaminated and cannot be recycled, but the weight / volume of such material is not expected to result in substantial landfill use. Considering the above, this does not warrant further assessment.
Onshore activities	No	The BEIS Guidance states that onshore activities are not in scope of Decommissioning EAs, and this topic does not require further assessment.
Waste	No	• The majority of the waste to be brought to shore will be non-hazardous, including structural steel which will likely be recycled. The waste and materials present will be managed in line with TAQA's Waste Management Strategy and the Waste Hierarchy, as part of the project Active Waste Management Plan (AWMP), using approved waste contractors and in liaison with the relevant Regulators. On this basis, no further assessment of waste is necessary.
Employment	No	TAQA will communicate regularly with all crew members throughout. Following the above measures and continued communications further environmental assessment is not warranted for this aspect.
Unplanned events	No	• The loss of diesel from one or all, of the diesel tanks onboard the North Cormorant platform is extremely unlikely and would only be expected to occur if a major incident caused the integrity of the platform itself to be compromised. The diesel inventories onboard the North Cormorant platform are split between several storage tanks and it is extremely unlikely that the complete diesel inventory stored would be spilled instantaneously during a single event. • Vessel fuel inventories are split between a number of separate fuel tanks, significantly reducing the likelihood of an instantaneous release of a full inventory. • Shipboard Oil Pollution Emergency Plans (SOPEPs) in place. • Dropped object procedures industry-standard. • Any dropped objects will be addressed during the debris survey and clearance activities at the conclusion of decommissioning operations in the North Cormorant area.

Impact	Further assessment	Rationale
		Considering the above, the potential impacts from accidental chemical/hydrocarbon releases or dropped objects during decommissioning activities do not warrant further assessment.
Disturbance or destruction of seabird nests	No	All nesting birds and nesting activities are protected from damage by conservation legislation. Under the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2017 – (OMR 17), it is an offence to: • take, damage or destroy the nest of any wild bird while that nest is in use or being built, or • take or destroy an egg of any wild bird. TAQA has in place a proactive Seabird Management Strategy, which is managed continuously. This includes a suite of remedial strategies that can be used, if required, to prevent birds from nesting. Part of the strategy includes conducting independent annual nesting bird surveys on each of TAQA's offshore platforms. Since 2022 there has been no evidence of nesting birds on the North Cormorant Platform. In addition, monthly surveys are conducted on the platform by trained personnel to provide a summary of bird activity and presence throughout the year. Again, these surveys have not identified any nesting birds. Prior to disembarkation, an asset specific survey will be undertaken to identify those areas of higher risk of nesting birds and appropriate deterrent measures will be put in place. In addition to the ongoing annual surveys, a dedicated survey will be conducted prior to the arrival of the HLV in the field to re-confirm that no nesting birds or nests are present. In the event nesting birds or nests are encountered, TAQA will engage with OPRED to agree any necessary licensing obligations at that time. This may include application for a disturbance licence. Considering the above, the potential impacts on seabirds and seabird nests do not warrant further assessment in this EA.

Environmental Management

The project has limited activity associated with it beyond the main period of decommissioning. The focus of environmental performance management for the project is therefore to ensure that the activities that will take place during the limited period of decommissioning happen in a safe, compliant and acceptable manner. The primary mechanisms by which this will occur are TAQA's certified Environmental Management System (EMS), Health, Safety, Security and Environment (HSSE) Policy and the TAQA Management System.

To support this, a project Health, Safety and Environment (HSE) Plan will be developed which outlines how HSE issues will be managed and how the policy will be implemented effectively. The plan will apply to all work carried out, both onshore and offshore. Performance will be measured to satisfy both regulatory requirements, compliance with environmental consents and to identify progress on fulfilment of project objectives and commitments.

TAQA also operates a Waste Management Strategy and will develop an AWMP for the project to identify and describe the types of materials identified as decommissioning waste and to outline the processes and procedures necessary to support the DPs for the North Cormorant facilities. The AWMP will detail the measures in place to ensure that the principles of the waste management hierarchy are followed during decommissioning.

TAQA is committed to working towards the government policy of Net Zero in line with NSTA Stewardship Expectation 11. This commitment includes decommissioning activities and is intended to drive increased energy efficiencies and minimise emissions. TAQA seeks to influence its joint venture partners and suppliers to ensure that everyone is striving to reduce and manage the emissions associated with the North Cormorant facilities decommissioning.

In terms of activities in the NNS, the National Marine Plan (NMP) has been adopted by the Scottish Government to help ensure sustainable development of the marine area. This Plan has been developed in line with UK, European Union (EU) and OSPAR legislation, directives, conventions and guidance. With regards to decommissioning, the NMP states that 'where re-use of oil and gas infrastructure is not practicable, either as part of oil and gas activity, or by other sectors such as Carbon Capture and Storage (CCS), decommissioning must take place in line with standard practice, and as allowed by international obligations. As part of the conclusions to this assessment (Section 5.1.1), TAQA has given due consideration to the Scottish NMP during project decision making.

Conclusions

The North Cormorant Upper Jacket is located well offshore in the NNS, remote from coastal sensitivities and from any designated sites. Therefore, no significant impact to any protected sites is expected. The marine environment where the North Cormorant Upper Jacket is located is typical of the NNS. Whilst recognising there are certain times of the year when populations of seabirds, fish spawning and commercial fisheries are vulnerable to oil pollution, the area is not considered particularly sensitive to the proposed decommissioning activities.

Following detailed review of the project activities, the environmental sensitivities of the project area and industry experience with decommissioning activities, it was determined that there are no potential risks which are required to be considered further. Removal of the Upper Jacket will be carried out such that it does not preclude the possible future decommissioning of the Footings.

This EA has considered the Scottish National Marine Plan, adopted by the Scottish Government to help ensure sustainable development of the marine area. TAQA considers that the proposed decommissioning activities are in alignment with its objectives and policies.

Based on the findings of this EA including the identification and subsequent application of appropriate mitigation measures, and project management according to TAQA's HSSE Policy and EMS, it is considered that the proposed North Cormorant Upper Jacket decommissioning activities do not pose any significant threat of impact to environmental or societal receptors within the UKCS.

1.0 INTRODUCTION

In accordance with the Petroleum Act 1998, TAQA Bratani Limited (TAQA), as North Cormorant operator and on behalf of the Section 29 notice holders, is applying to the to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the North Cormorant Upper Jacket (Figure 2-1).

This Environmental Appraisal (EA) has been conducted to assess the potential environmental impacts that may result from undertaking the Upper Jacket decommissioning activities as part of a staged decommissioning of the North Cormorant facilities. It covers the decommissioning of the North Cormorant Upper Jacket from the topside cut height to approximately EL -116 m, which is approximately 45 m above the seabed (TAQA, 2024). This structure is referred to as the Upper Jacket throughout this document.

OSPAR Decision 98/3 recognises that there may be difficulty in removing large steel substructures weighing more than 10,000 tonnes (Te) that were installed before 1999. As a result, there is a provision for derogation from the presumption of total removal for such substructures. The North Cormorant sub-structure, i.e. the Upper Jacket and Footings combined, weighs 20,052 Te and was installed in 1988 and is therefore a potential derogation candidate.

1.1 Project Overview

The North Cormorant platform is a drilling/production unit located in Block 211/21a of the Northern North Sea (NNS), approximately 113 km northeast of Shetland and 35 km west of the UK/Norway median line (Figure 1-1). The platform stands in 161 m of water at lowest astronomical tide (LAT).

The North Cormorant platform is a fixed installation which consists of an 8-legged steel jacket sub-structure, secured by piles to the seabed, supporting a module support frame (MSF) and two levels of modules including accommodation and drilling facilities that incorporate a wellbay, process bay and utilities bay. The platform was installed in 1981 and production started in 1982. A Cessation of Production (CoP) application for North Cormorant was submitted to the Oil and Gas Authority (OGA) - now the North Sea Transition Authority (NSTA) – in January 2022. This was approved in February 2022. The anticipated CoP date for North Cormorant is Q4 2024.

The North Cormorant platform facilitates production from the Cormorant North, Cormorant East and Otter Fields. The oil is then routed to Cormorant Alpha for onward transmission through the Brent Oil Pipeline System to Sullom Voe on the Shetland Islands. Associated gas, and gas imported from Tern Alpha, is exported through the Western Leg and the Far north Liquids and Associated Gas System (FLAGS) Pipeline to the St. Fergus terminal in Aberdeenshire.

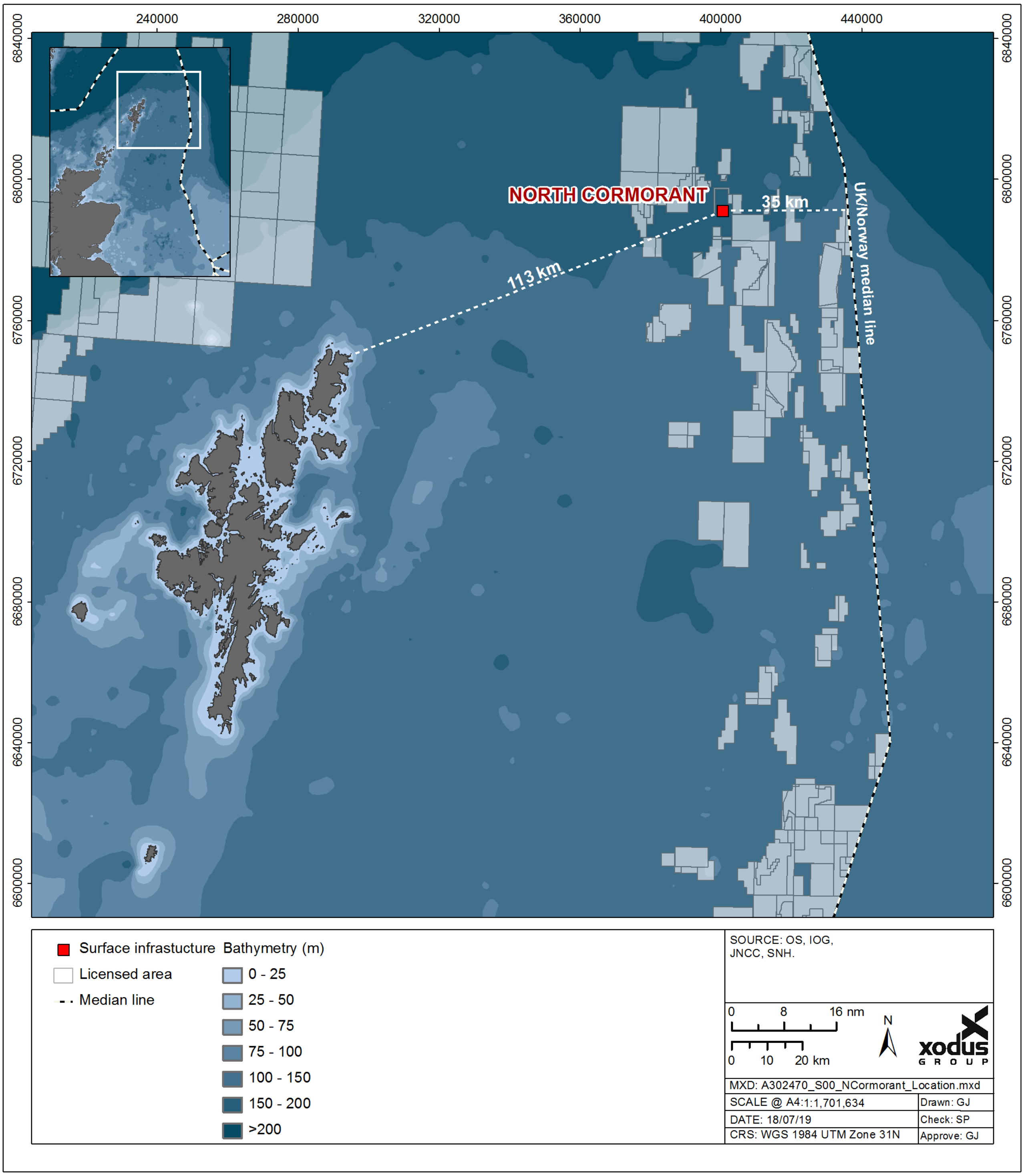


Figure 1-1 Location of the North Cormorant Upper Jacket

A schematic illustrating the North Cormorant platform and the other installations in the vicinity, together with connecting infrastructure including pipelines, umbilicals and power cables, is shown in Figure 1-2.

1.2 Purpose of the Environmental Appraisal

This EA assesses the potential environmental impacts associated with the proposed North Cormorant Upper Jacket decommissioning activities. The impact identification and assessment process accounts for stakeholder engagement, comparison of similar decommissioning projects undertaken in the UKCS, expert judgement, and the results of supporting studies which aim to refine the scope of the DP. This EA Report documents this process and details, in proportionate terms, the extent of any potential impacts and any necessary mitigation/control measures proposed.

1.3 Regulatory Context

The decommissioning of offshore oil and gas installations and pipelines on the UKCS is controlled through the Petroleum Act 1998 (as amended). Decommissioning is also regulated under the Marine and Coastal Act 2009 and Marine (Scotland) Act 2010. The UK's international obligations on decommissioning are primarily governed by the 1992 Convention for the Protection of the Marine Environment of the Northeast Atlantic (the Oslo Paris (OSPAR) Convention). The responsibility for ensuring compliance with the Petroleum Act 1998 rests with OPRED.

In terms of activities in the NNS, the Scottish National Marine Plan has been adopted by the Scottish Government to help ensure sustainable development of the marine area. This Plan has been developed in line with UK, European Union (EU) and OSPAR legislation, directives and guidance. With regards to decommissioning the Plan states that ‘where re-use of oil and gas infrastructure is not practicable, either as part of oil and gas activity or by other sectors such as carbon capture and storage, decommissioning must take place in line with standard practice, and as allowed by international obligations. Re-use or removal of decommissioned assets will be fully supported where practicable and adhering to relevant regulatory process. As part of the conclusions to this assessment (Section 5.1.1), TAQA has given due consideration to the National Marine Plan during Project decision making and the interactions between the Project and Plan.

1.4 Scope and Structure of this Environmental Appraisal Report

This EA report sets out to describe, in a proportionate manner, the potential environmental impacts of the proposed activities associated with decommissioning of the North Cormorant Upper Jacket and to demonstrate the extent to which these can be mitigated and controlled to an acceptable level. This is achieved in the following sections, which cover:

- The process by which TAQA has arrived at the selected decommissioning strategy (Section 2.0
- A description of the proposed decommissioning activities (Section 2.0);
- A summary of the baseline sensitivities and receptors relevant to the assessment area that support this EA (Section 3.0);
- A review of the potential impacts from the proposed decommissioning activities and justification for the assessments that support this EA (Section 5.0);
- Assessment of key issues (Section 5.1); and
- Conclusions (Section 6.0).

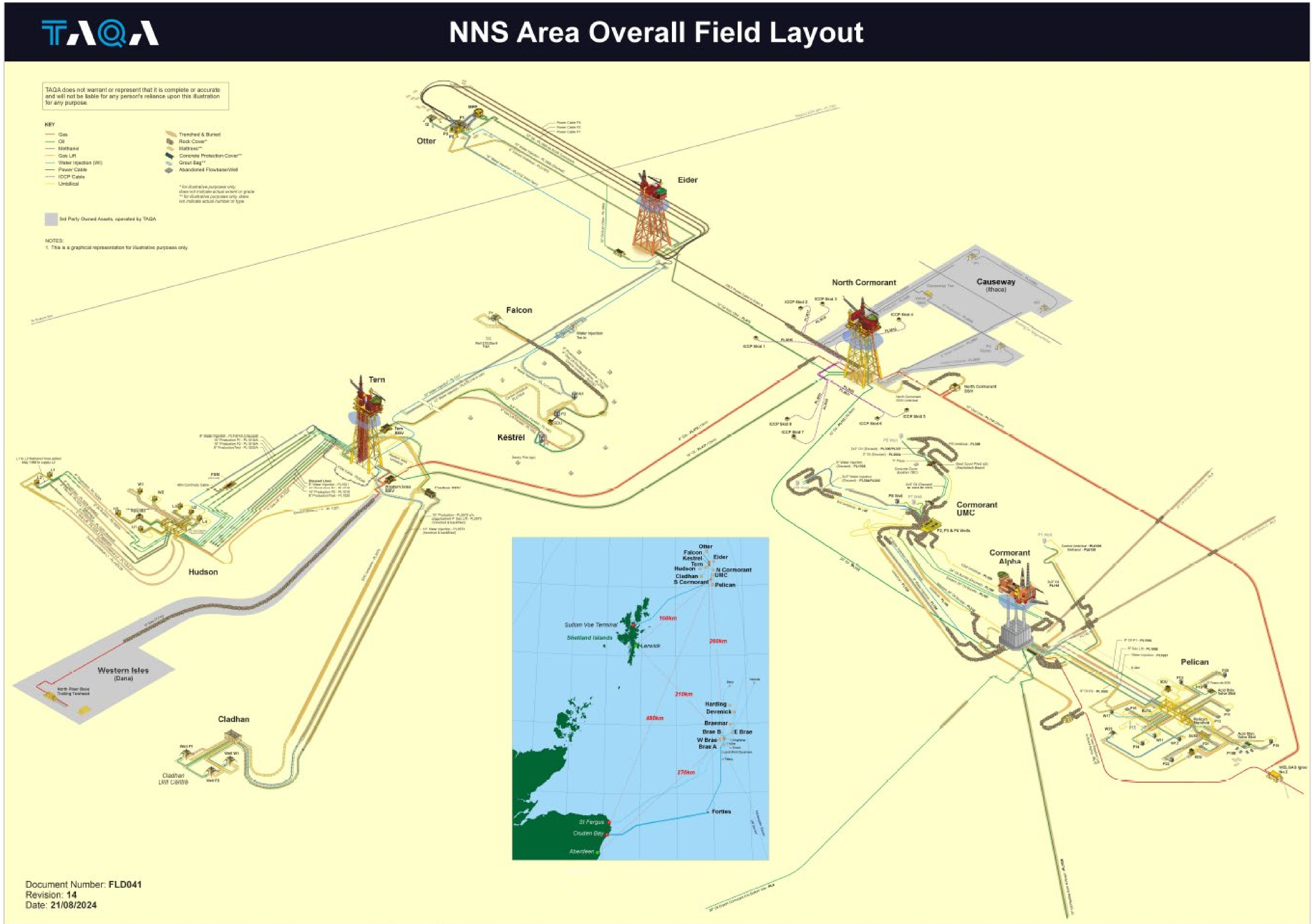


Figure 1-2 Location of the North Cormorant Platform in Relation to Other Installations

2.0 PROJECT SCOPE

2.1 Description of the Infrastructure Being Decommissioned

The North Cormorant sub-structure consists of an eight leg, steel 'K' braced frame with extensive horizontal and diagonal bracings throughout the water column. It is secured to the seabed by thirty-two piles, eight at each corner leg. The corner legs (B2, F2, B4 and F4) measure 6 m in diameter at the base reducing to 2 m at the top of the sub-structure. The Footings footprint at seabed level is 75 m by 77 m. The plan area at the top of the sub-structure is 31 m by 77 m. The height of the sub-structure is 172 m LAT (Figure 2-1). It is proposed that the Upper Jacket will be cut at approximately EL -116 m LAT, which is approximately 45 m above the seabed.

The Upper Jacket incorporates bulk storage tanks for diesel in Leg B2 and Leg B4. These tanks will be drained of diesel and appropriately flushed as part of the platform de-energisation process and well in advance of the Upper Jacket removal. The Upper Jacket cut depth of -116 m LAT is well below the bottom of the Leg B2 and Leg B4 diesel bulk tanks at -90 m LAT. The exact cut depth will be determined following detailed engineering.

Legs, C2, C4, E2 and E4 incorporate tanks for potable water storage which extend below the Upper Jacket cut height. Consequently, the top portion of these tanks will be recovered with the Upper Jacket whereas the lower portions are out with the scope of this project and will be subject to a future DP. Some potable water still within these storage tanks will be discharged to sea during Upper Jacket cutting operations.

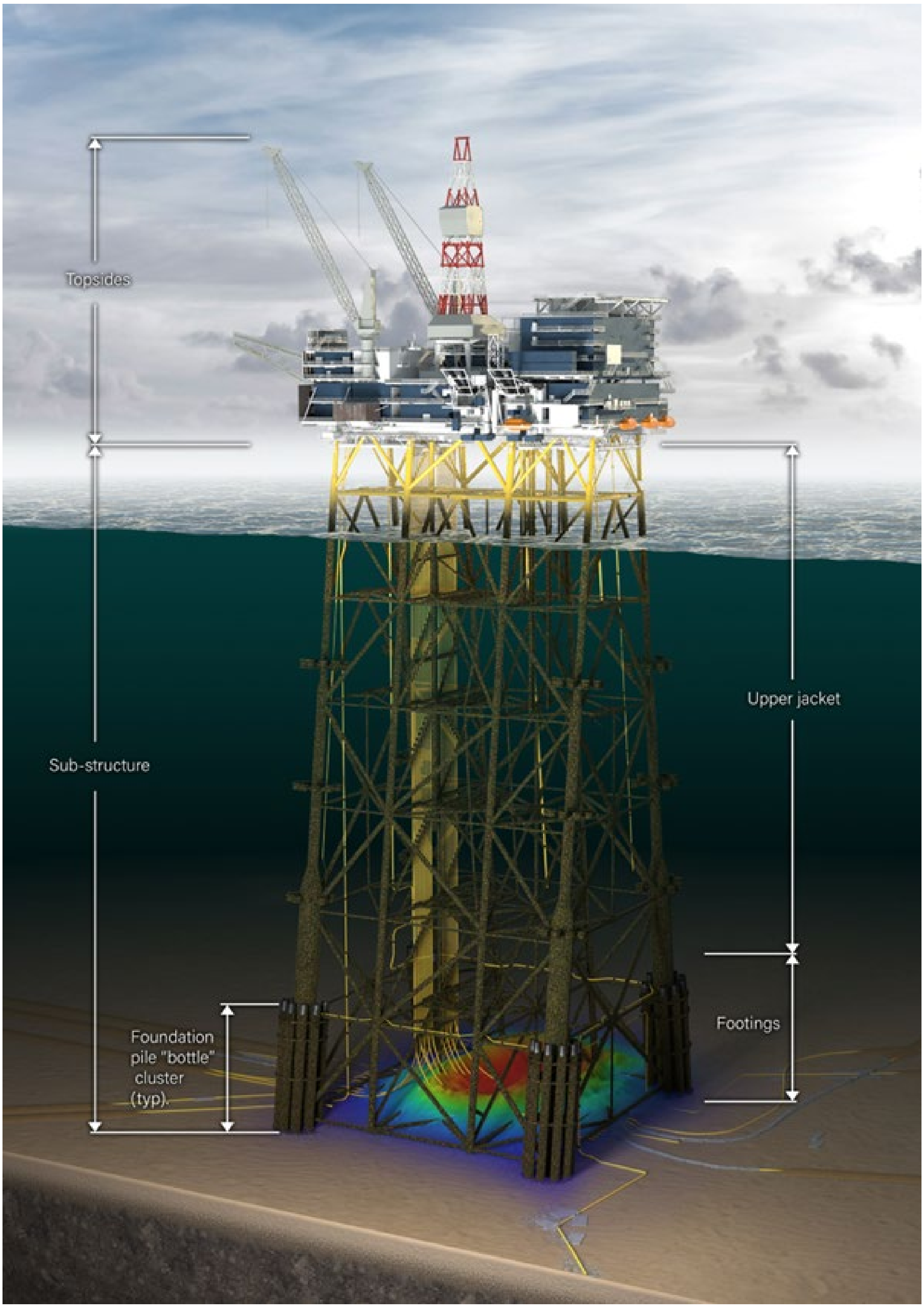


Figure 2-1 North Cormorant Platform

2.2 Description of Proposed Decommissioning Activities

Upon completion of topside decommissioning activities, the sub-structure will remain in place for a period prior to its removal. During this period, a temporary ‘Aid to Navigation’ unit will be installed to ensure that the installation meets all operational and regulatory requirements. It is envisaged that the system will be developed in consultation with the relevant bodies including the Maritime and Coastguard Agency (MCA), the Ministry of Defence (MoD), the Northern Lighthouse Board (NLB), etc. The existing 500 m safety zone will remain in operation until the Upper Jacket is removed and the installation no longer projects above the sea surface.

TAQA will continue to maintain an Oil Pollution Emergency Plan (OPEP) for the installation and a Dismantling Safety Case will be in place to cover all activities required to complete the Upper Jacket removal operations. It is assumed that prior to Upper Jacket decommissioning:

- Conductors shall be removed at cut heights of approximately 116 m below LAT;
- Caissons will be removed or pinned to the Upper Jacket; and
- The MSF will be fully removed, and access platforms will be installed to support Upper Jacket removals post-topsides removal.

TAQA has in place a proactive Seabird Management Strategy, which will incorporate removal of the North Cormorant Upper Jacket, including the access platforms installed following removal of the MSF. This includes a suite of remedial strategies that can be used, if required, to prevent birds from nesting.

Due to the complexities associated with the Footings decommissioning, all current, proven technologies indicate the requirement to remove and transport the Upper Jacket as a separate entity from the Footings. The Upper Jacket will be cut at approximately EL -116 m LAT, which is circa 45 m above the seabed. The exact cut depth will be determined following detailed engineering considering technical constraints including structural design, cross bracing configuration and cutting technology. The configuration of the cross bracings and the access requirements for cuttings tools were the main drivers for the selected cut depth. The selection also considered safety and environmental constraints. Removal of the Upper Jacket will be carried out such that it does not preclude the possible future Footings decommissioning.

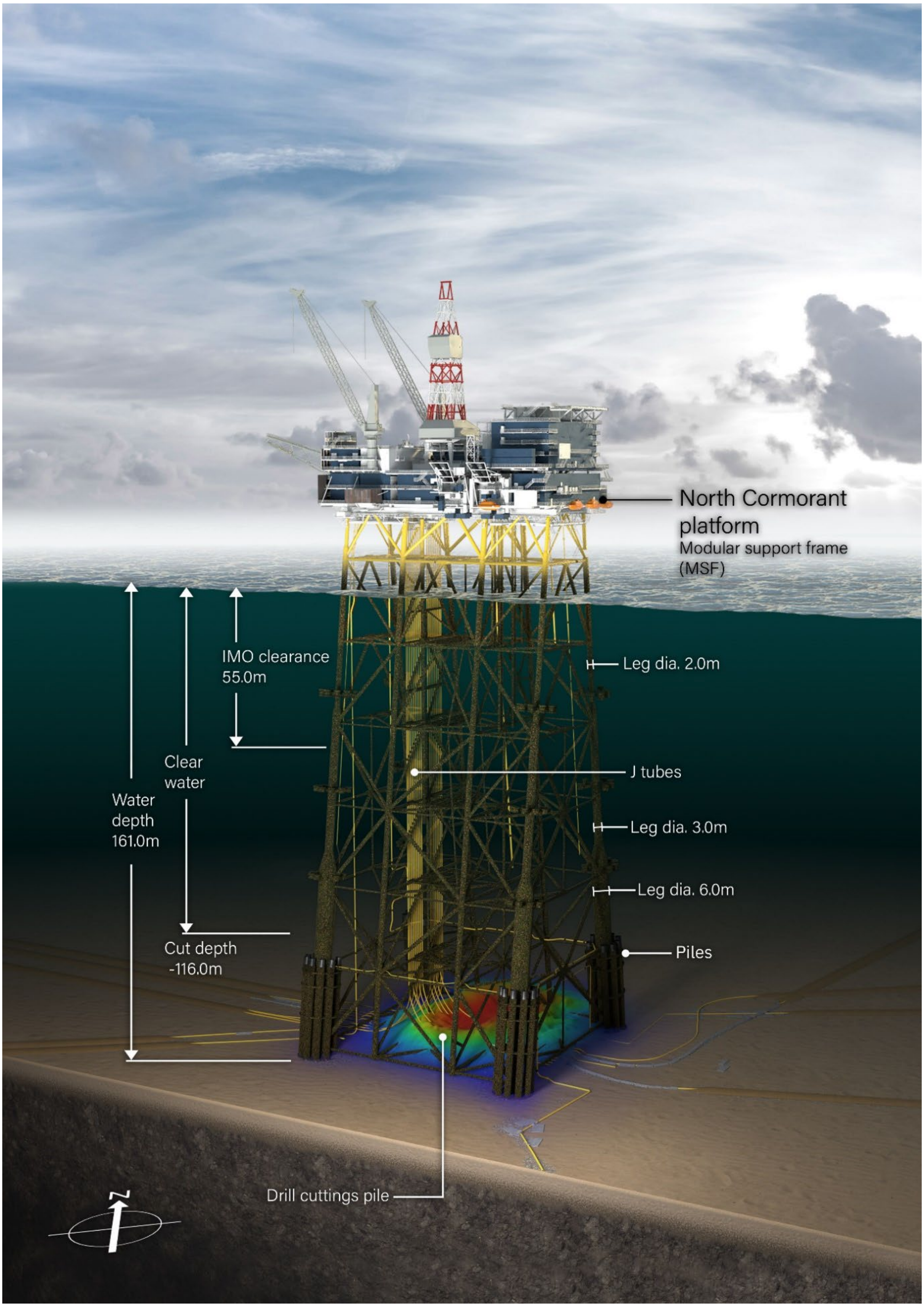
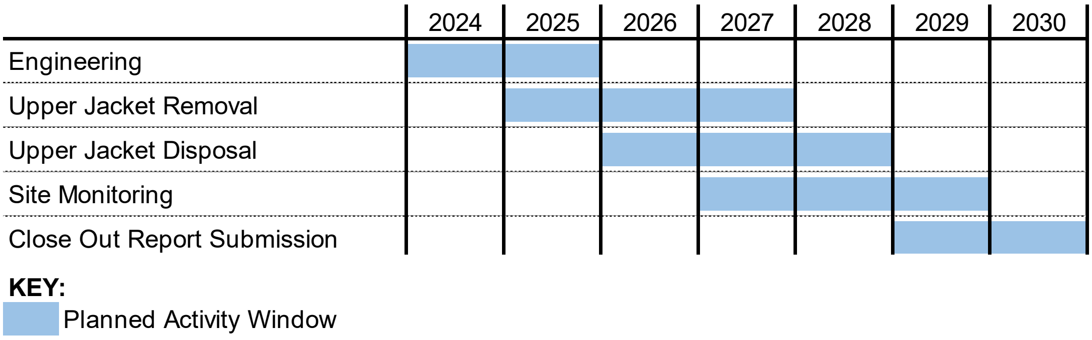


Figure 2-2 North Cormorant Decommissioning Schematic

2.3 Proposed Schedule

The North Cormorant Upper Jacket decommissioning schedule is shown below in Figure 2-3. This schedule may change to maximise economic recovery, or to exploit other opportunities to minimise greenhouse gas (GHG) emissions or other decommissioning impacts by combining activities into campaigns, or by combining North Cormorant decommissioning operations with third-party decommissioning.



Note: Actual execution windows will be subject to contractor portfolio and market capacity, and removal may be accelerated.

Figure 2-3 North Cormorant Upper Jacket Decommissioning Schedule

2.4 Summary of Materials Inventory

The North Cormorant Upper Jacket comprises a predominantly steel structure between the topsides cut height and approximately EL - 116 m LAT. The Upper Jacket estimated gross weight is ≈12,500 Te. Table 2-1 and Figure 2-4 provide a summary of the quantities of materials that would be recovered to shore following removal of the Upper Jacket. Table 2-1 also indicates the proposed fate of these materials.

Table 2-1 Summary of Proposed Fate of the Materials from the North Cormorant Upper Jacket

Material	Estimated weight to be recovered to shore (Te)	Proposed fate			Total weight (Te)
		Reuse (Te)	Recycling (Te)	Disposal (Te)	
Ferrous Metal	11,090		11,090		11,090
Hazardous Material / NORM	15			15	15
Other Non-Hazardous Material (Includes Marine Growth)	1,395		680	715	1,395
Total	**12,500**		**11,770**	**730**	**12,500**

The Upper Jacket approximate cut height of -116 m LAT is well below the bottom of the diesel leg tanks. It is proposed that the Upper Jacket will be removed as a single piece. The diesel tanks will have been appropriately drained as part of the platform de-energisation process well in advance of the Upper Jacket removal. The diesel tanks will not be cut through during Upper Jacket removal. However, small residual quantities of diesel may remain in the tanks that could be discharged during Upper Jacket removal. Any potential impact associated with the discharge of any remaining residual diesel / hydrocarbons be fully assessed in the relevant environmental permit applications and in compliance with all regulatory requirements. Similarly, the potable water leg tanks will likely be cut through during Upper Jacket Removal.

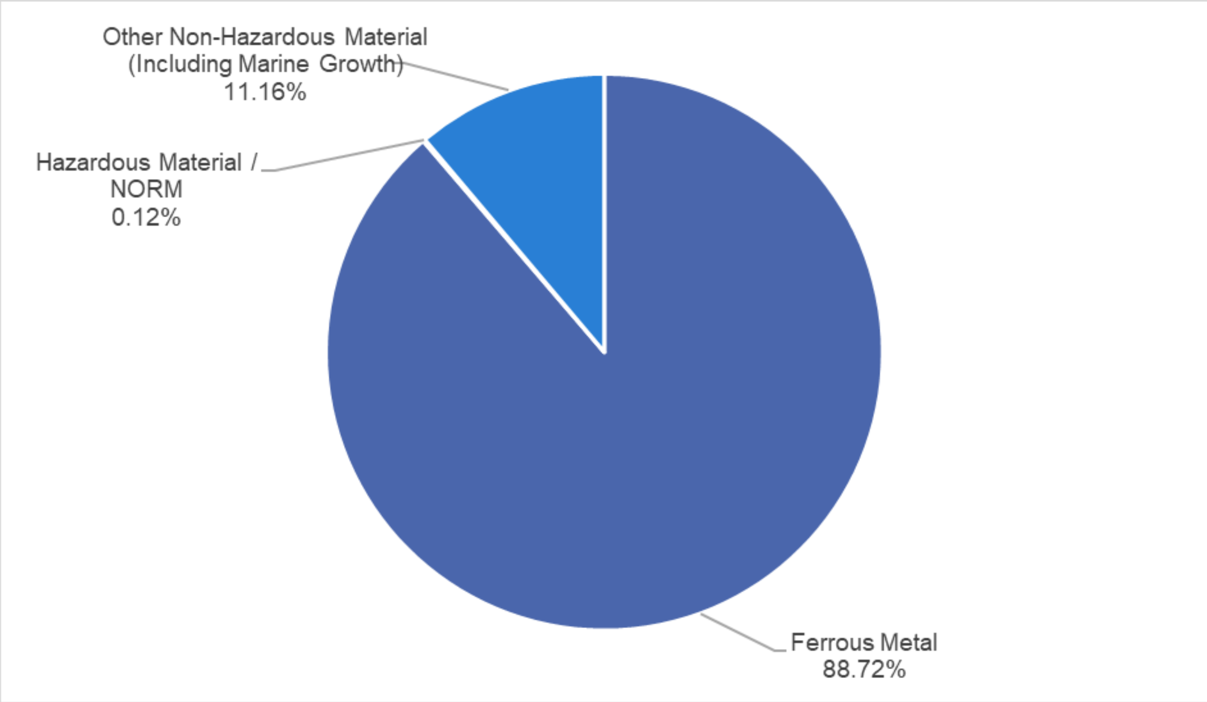


Figure 2-4 Bulk Materials from the North Cormorant Upper Jacket

2.5 Waste Management

TAQA will comply with the Duty of Care requirements under the UK Waste Regulations and The Environmental Protection (Duty of Care) (Scotland) Regulations 2014. The waste hierarchy (see Figure 2-5) will be followed and industry best practice will be applied (Decom North Sea, 2018). Driving waste management up the waste hierarchy is central to the development of sustainable waste management and the ambition of a zero-waste society in Scotland.

All waste will be managed in compliance with relevant waste legislation by a licenced and/or permitted waste management contractor. The contractor(s) to be used will be assessed for competence through due diligence prior to removal. During dismantling and disposal, duty of care assurance activities will be planned to monitor onshore activities.

Most of the material recovered during the North Cormorant Upper Jacket decommissioning activities will be non-hazardous, predominately non-ferrous metals, as outlined in Section 2.4.

Preventing waste is ultimately the best option, achieved through reducing consumption and using resources more efficiently. However, this is followed by re-use and recycling of goods (Figure 2-5). If all re-use opportunities have been taken by TAQA, the next preferable option is for recycling of materials and specifically, closed loop recycling of materials. Evidence shows that there are greater environmental benefits to closed loop recycling, where a product is used, discarded, captured, and then the component materials recycled into a new product of similar functionality. Which can then again travel through this cycle, continuously moving the material through the supply chain.

Figure 2-5 Waste Hierarchy Model

The Material Inventory has also classified each material according to the European Waste Catalogue Codes (EWC) as required for disposal of wastes within the EU and a further categorisation of hazardous/special or non-hazardous/non-special wastes. The EWC is a standardised way of describing waste and was established by the European Commission. The use of EWC codes to describe waste is a legal requirement of the Duty of Care for waste which requires the holder of waste to take all reasonable steps to ensure that waste is described in a way that permits its safe handling and management.

Until a waste management contractor has been selected and disposal routes identified, the final disposal options for waste materials are unknown. The project aspiration is that all ferrous and non-ferrous metals and concrete will be recycled. Approximately 95% of material will be reused or recycled, and the remaining material will be sent for disposal. There may be instances where infrastructure returned to shore is contaminated (marine growth, hydrocarbons, paints etc) and cannot be recycled, but the weight/volume of such material is not expected to result in substantial landfill use.

As part of TAQA's standard processes, all sites and waste carriers will have appropriate environmental and operating licences and/or permits to carry out this work and will be closely managed within TAQA's contractor and HSSEQ assurance processes.

Should NORM be encountered, TAQA will ensure that it is appropriately managed and that any disposal sites are suitably licenced to accept the waste arising from the decommissioning of the Upper Jacket.

An Active Waste Management Plan (AWMP) including an inventory of hazardous waste will be compiled to aid the segregation and recycling of waste.

2.6 Environmental Management Strategy

TAQA Bratani has an established and independently verified Environmental Management System (EMS) which operates in accordance with the requirements of ISO14001:2015. The scope of the TAQA EMS is defined to include all activities, onshore and offshore, in relation to the exploration for and production of hydrocarbons in defined license areas of the UK sector of the North Sea. This scope encompasses the North Cormorant platform plus associated infrastructure, all under the control of the TAQA Aberdeen headquarters. The EMS meets the requirements of OSPAR

Recommendation 2003/5 which promotes the use and implementation of EMSs by the offshore industry.

TAQA is committed to managing all environmental impacts associated with its activities. Continuous improvement in environmental performance is sought through effective project planning and implementation, emissions reduction, waste minimisation and waste management. This mindset has fed into the development of the mitigation measures developed for the Project. These measures include both industry-standard and project-specific mitigations. A copy of TAQA's HSSE Policy is presented in Appendix A.

The project has limited activity associated with it beyond the main period of preparation for decommissioning and removal of the North Cormorant Upper Jacket. The focus of environmental performance management for the project is therefore to ensure that the activities that will take place during the limited period of decommissioning happen in a safe, compliant and acceptable manner. The primary mechanisms by which this will occur are TAQA's certified EMS and HSSE Policy implemented through the TAQA Management System.

To support this, a project Health, Safety and Environment (HSE) Plan will be developed which outlines how HSE issues will be managed and how the policies will be implemented effectively throughout the project. The plan will apply to all work carried out, whether onshore or offshore. Performance will be measured to satisfy both regulatory requirements including compliance with environmental consents, as well as to identify progress on fulfilment of project objectives and commitments.

TAQA also operates a Waste Management Strategy and will develop an AWMP for the project to identify and describe the types of materials identified as decommissioning waste and to outline the processes and procedures necessary to support the Decommissioning Programme for the North Cormorant Upper Jacket. The AWMP will detail the measures in place to ensure that the principles of the waste management hierarchy are followed during decommissioning.

TAQA's Emissions Management Strategy (TAQA, 2022b) supports a commitment to Net Zero and NSTA Stewardship Expectation 11. This strategy catalogues the asset portfolio and associated future decommissioning activities. TAQA plans several initiatives under the Emissions Reduction Strategy including working with the supply chain, collating emission/energy savings initiatives across the business and reviewing emissions sources.

The National Marine Plan (NMP) has been adopted by the Scottish Government to help ensure sustainable development of the marine area. This Plan has been developed in line with UK, EU and OSPAR legislation, directives, conventions and guidance. With regards to decommissioning, the Plan states that 'where re-use of oil and gas infrastructure is not practicable, either as part of oil and gas activity or by other sectors such as Carbon Capture and Storage (CCS), decommissioning must take place in line with standard practice, and as allowed by international obligations. TAQA has given due consideration to the Scottish NMP during project planning and decision making.

3.0 ENVIRONMENTAL AND SOCIETAL BASELINE

The North Cormorant platform is located in UKCS Block 211/21a, in the NNS, approximately 113 km northeast of the Shetland coastline and 35 km west of the UK/Norway median line (see Figure 1-1). The water depth at the installation is 161 m LAT.

As part of the EA process, it is important that the main physical, biological and societal sensitivities of the receiving environment are well understood. This environmental baseline describes the main characteristics of the offshore environment in and around the North Cormorant platform and highlights the key sensitivities. This section draws on several information sources including published papers, relevant Strategic Environmental Assessments (SEA) and site-specific investigations.

A survey gap analysis study commissioned by TAQA, mapped and assessed all available survey reports covering TAQA assets across the wider NNS area including North Cormorant (Xodus, 2018). The full coverage of this study, sampling station locations and listings of the survey reports consulted, are shown in Figure 3-1. These surveys have all indicated similar species and sediment compositions which provide evidence of the relatively uniform nature of the seabed habitats and communities within the vicinity and the wider region.

Four environmental survey reports have been used to inform the seabed and benthos sections of this environment baseline description for the immediate area adjacent to the North Cormorant platform:

- *North Cormorant Baseline Environmental Survey (ERT, 1992):*

  This report provides the results of an environmental baseline survey which was conducted around the North Cormorant platform by Environment and Resource Technology Limited in 1991. Twenty-two stations were sampled within 10 km of the platform. The main objectives of this survey were to establish the current gradients of physical, chemical and biological indices around the platform.

- *Post- Drilling Environmental Survey of the Benthic Sediments at North Cormorant (ERT 1995):*

  This seabed environmental survey was carried out as part of a wider North Sea study to collect and analyse seabed sediments following the cessation of the permitted discharge of oil-based mud during offshore drilling operations.

- *North Cormorant – Combined Environmental Baseline and Habitat Assessment Survey Report (Benthic Solutions, 2019):*

  This report provides the results of a pre-decommissioning environmental baseline and habitat assessment survey that was conducted around the North Cormorant platform by Benthic Solutions in April 2019, including visual scrutiny of the seabed at 10 stations within 500 m of the platform. The main objectives of this survey were to establish the current gradients of physical, chemical and biological indices around the platform and to identify and quantify any species or features of conservation importance near to the structure.

- *North Cormorant Cuttings Pile UKCS Block 211/21a (Fugro, 2019):*

  The survey associated with this report included remotely operated vehicle (ROV) core sampling for physicochemical analyses and ROV grab sampling for biological analysis of the sediments within the North Cormorant cuttings pile. Twelve cores and five ROV grab samples were collected from corresponding locations so that biological data could be related to physicochemical sample results.

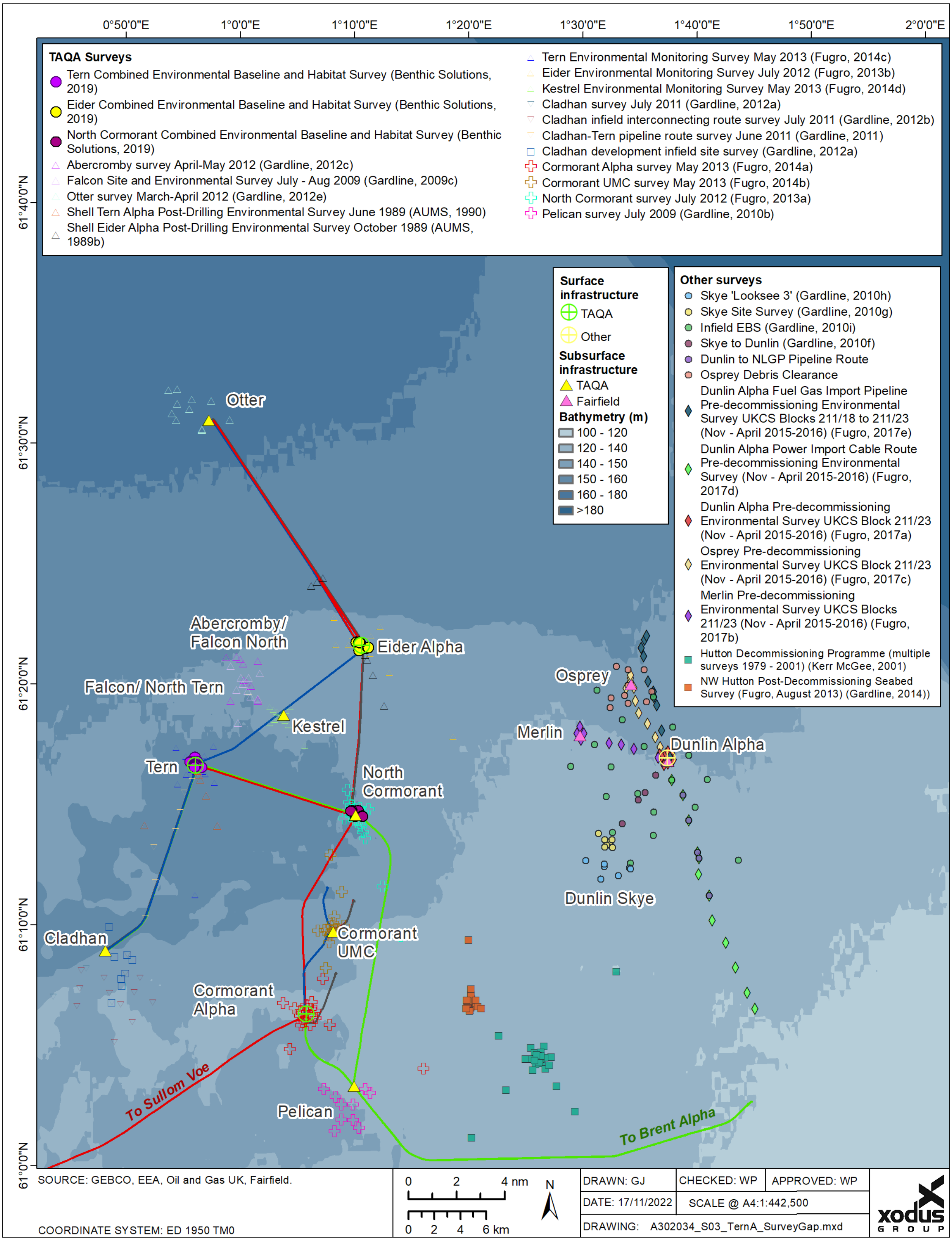


Figure 3-1 Location of Surveys Around the TAQA NNS Infrastructure

3.1 Physical Environment

3.1.1 Bathymetry

The North Cormorant platform is located at a water depth of 161 m LAT. The North Cormorant platform is not located on any large-scale features of functional significance such as shelf deeps, shelf banks and mounds, seamounts, or continental slopes (NMPI, 2023).

3.1.2 Currents, waves and tides

The annual mean wave height in the NNS region follows a gradient increasing from the southern point in the Fladen/Witch Ground to the northern area of the East Shetland Basin. In the south, the mean wave height ranges from 2.71 – 2.30 m whilst in the north it ranges from 2.41 – 3.00 m (NMPI, 2023). McBreen *et al.* (2011) shows wave energy at the seabed is 'low' (less than 0.21 N/m^2) within the Cormorant North Field. The annual mean wave height at the North Cormorant platform ranges from 2.71 m – 3.00 m and the annual mean wave power ranges from 36.1 – 42.0 kW/m (NMPI, 2023).

The anti-clockwise movement of water through the North Sea and around the NNS region originates from the influx of Atlantic water, via the Fair Isle Channel and around the north of Shetland (as shown on Figure 3-2), and the main outflow northwards along the Norwegian coast (DECC, 2016). Against this background of tidal flow, the direction of residual water movement in the NNS is generally to the south or east (DTI, 2001; DECC, 2016). The peak flow for mean spring tide ranges between low velocities of 0.11 to 0.25 m/s (DECC, 2016). The mean residual current through the Cormorant North Field is approximately 0.05 to 0.1 m/s (Wolf *et al.*, 2016).

The NNS is seasonally stratified, and the strength of the thermocline is determined by solar energy, tidal and wave forces (DECC, 2016). Distinct density stratification occurs in the NNS region in summer at a depth of around 50 m and the thermocline becomes increasingly distinct towards deeper water in the north of the region (DECC, 2016). This stratification breaks down in September as the frequency and severity of storms increases causing mixing in the water column (DECC, 2009).

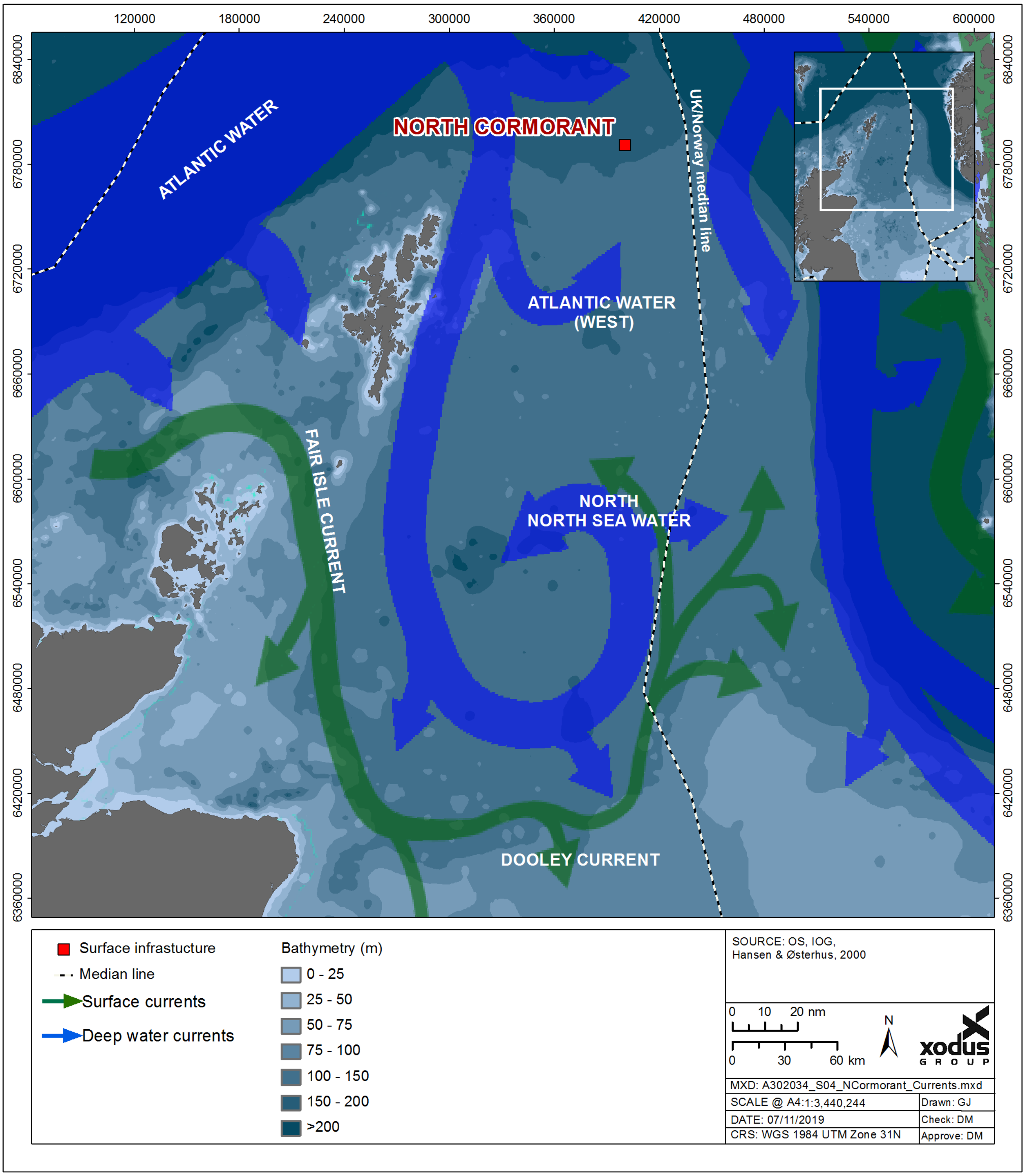


Figure 3-2 Sea Currents Around the North Cormorant Upper Jacket

3.1.3 Meteorology

The prevailing winds in the NNS are from the southwest and north-northeast. Wind strengths in winter are typically in the range of Beaufort scale force 4-6 (6-11 m/s) with higher winds of force 8-12 (17-32 m/s) being much less frequent. Winds of force 5 (8 m/s) and greater are recorded 60-65% of the time in winter and 22 to 27% of the time during the summer months. In April and July, winds in the open, central to NNS, are highly variable and there is a greater incidence of north westerly winds (DECC, 2016).

3.1.4 Seabed sediments

The North Sea is a large shallow sea with a surface area of around 750,000 km^2. Water depths gradually deepen from south to north (DTI, 2001; DECC, 2016). In the NNS region depths range from 100 m at the southern point in the Fladen/Witch Ground to as deep as 1,500 m in the Faroe-Shetland Channel.

In the NNS, sediments generally comprise a veneer of unconsolidated terrigenous and biogenous deposits, generally much less than 1 m thick. Areas of outcropping rock occur in coastal waters around and between Shetland, Orkney and the Scottish mainland. Sediments in the area are predominantly sand and muddy sand, although the deeper areas within the Fladen Ground consist of mud or sandy mud off the edge of the continental shelf to the north of the region, the slope is characterised by areas of mixed and coarse sediments, while the floor of the Faroe-Shetland Channel is classified as mud (JNCC, 2017; DECC, 2016).

Under the European Nature Information System (EUNIS) habitat classification, three habitat types were identified in the North Cormorant survey area:

- ‘Circalittoral Muddy Sand’ (A5.26);
- ‘Deep Circalittoral Coarse Sediment’ (A5.15); and
- ‘*Capitella capitata*, *Thyasira* spp. In organically-enriched Offshore Circalittoral Mud and Sandy Mud’ (A5.374).

Figure 3-3 shows the predicted seabed habitat surrounding the North Cormorant Upper Jacket (JNCC, 2017).

Table 3-1 provides the percentage of gravel and fines found in sediments around the North Cormorant platform during the most recent surveys (Benthic Solutions, 2019; Fugro, 2019), and the sediment types. The samples collected in the Benthic Solutions (2019) survey (between 90 and 590 m away from the North Cormorant platform) exhibited wider variability, representing five Folk (1954) classifications ranging from muddy sand to gravelly muddy sand, with most stations conforming to slightly gravelly muddy sand (40% of stations). The sediment type throughout the North Cormorant cuttings pile (directly below the platform) showed moderate variability and ranged from fine silt to fine sand. Coarser material was typically noted in the top core sections in comparison to their respective middle and bottom core sections. The cuttings pile sediment can be described as highly modified compared to the wider area covered by Benthic Solutions (2019).

Table 3-1 Seabed Characteristics for the North Cormorant Platform

Survey	Gravel (mean %)	Fines (mean %)	Sediment classification (Folk, 1954)
Benthic Solutions, 2019	6.3	31.5	Muddy to gravelly muddy gravelly sand
Fugro, 2019 (Cuttings pile)	5.17	52.5	Fine silt to fine sand

One station 100 m northwest of the North Cormorant platform exhibited high levels of organic enrichment and chemical contamination (Benthic Solutions, 2019). This station could not be assigned a EUNIS habitat type due to the low species diversity and abundance of taxa and was instead identified as an area of 'Organically Enriched Gravelly Muddy Sand' by Benthic Solutions. A gradient of Total Hydrocarbon (THC) levels decreasing with distance from North Cormorant platform was evident, suggesting a point source of hydrocarbons most likely related to drilling discharges. An ellipsoidal distribution of THC was also observed around the North Cormorant platform. This pattern is common surrounding platforms with a typically higher concentration of hydrocarbons along the axis of the most persistent current (Davies *et al.*, 1984).

Drilling-related discharges can contain substantial amounts of barium sulphate (barites) as a weighting agent (NRC, 1983). The presence of barium is therefore frequently used as an indicator of the deposition of drilling fluids around offshore installations (Chow and Snyder, 1980; Gettleson and Laird, 1980; Tricine and Trefry, 1983; Muniz *et al.*, 2004). Solid barites discharged during drilling also contain measurable concentrations of heavy metals as impurities, including cadmium, chromium, copper, lead, mercury, and zinc (NRC, 1983; McLeese *et al.*, 1987). Metal levels analysed in sediments around North Cormorant showed a pattern of higher levels at central stations, decreasing with distance from the platform (Benthic Solutions, 2019). Within the cuttings pile (Fugro, 2019) some measured metals, including cadmium, chromium, copper, mercury, lead, and zinc showed elevation above their respective OSPAR Effects Range Low (ERL) thresholds, above which a significant environmental impact might be expected.

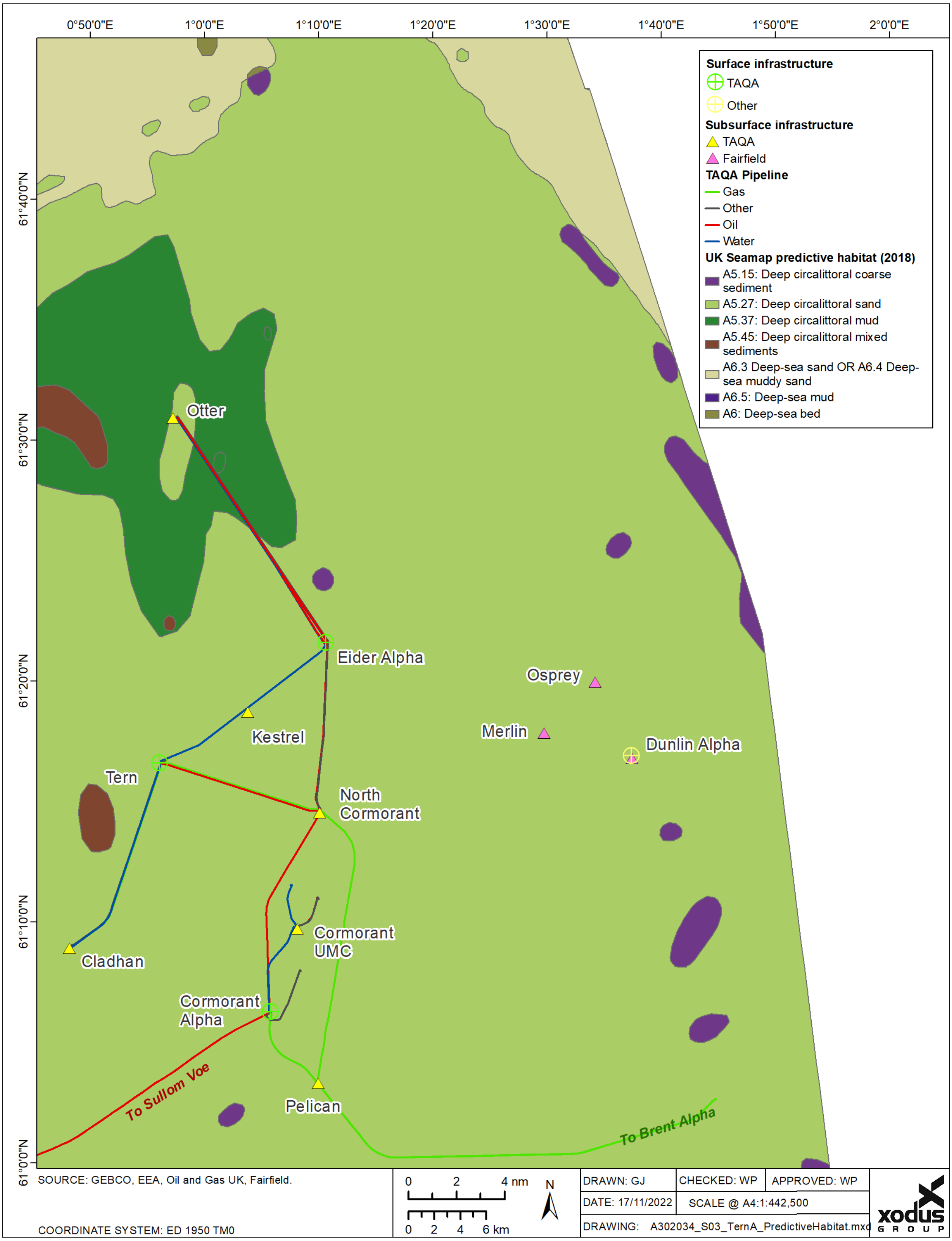


Figure 3-3 Broad-Scale Predicted Habitat Around the North Cormorant Upper Jacket (JNCC, 2017)

3.2 Biological Environment

3.2.1 Plankton

Planktonic assemblages exist in large water bodies and are transported with tides and currents as they flow around the North Sea. Plankton forms the basis of marine ecosystem food webs and therefore directly influences the movement and distribution of other marine species.

In both the northern and central areas of the North Sea, the phytoplankton community is dominated by dinoflagellates of the genus *Ceratium* and diatoms such as *Thalassiosira spp*. and *Chaetoceros spp*. In recent years, the dinoflagellate *Alexandrium tamarense* and the diatom *Pseudo-nitzschia* (known to cause amnesic shellfish poisoning) have been observed in the area (DECC, 2016). Densities of phytoplankton fluctuate during the year, with sunlight intensity and nutrient availability driving its abundance and productivity together with water column stratification (Johns & Reid, 2001; DECC, 2016). In the 10-year period between 1997 and 2007, two main blooms were seen to occur in the NNS: one in May, and a second in August before levels decreased through the winter months when light and temperature are less abundant (SAHFOS, 2015).

Zooplankton species richness is greater in the northern and central areas of the North Sea, than in the south and displays greater seasonality. Zooplankton in this area is dominated by calanoid copepods, in particular, *Calanus* and *Acartia spp*. and *Euphausiids* and decapod larvae are also important to the zooplankton community in this region (DECC, 2016).

Calanus finmarchicus has historically dominated the zooplankton of the North Sea and is used as an indicator of zooplankton abundance. Analysis of data provided by the Continuous Plankton Reader surveys in the 10-year period between 1997 and 2007 shows a sharper spring increase in *C. finmarchicus* biomass in May in the NNS compared to more southerly areas. This peak in numbers is 70% greater than seen in the central North Sea and 88% greater than the southern North Sea over the same period (SAHFOS, 2015). The increase is likely a reflection of the increased availability of nutrients and food (including phytoplankton) in spring. Overall, abundance of *C. finmarchicus* has declined dramatically over the last 60 years, which has been attributed to changes in seawater temperature and salinity (Beare *et al.*, 2002; FRS, 2004). *C. finmarchicus* has largely been replaced by boreal and temperate Atlantic and neritic (coastal water) species, and a relative increase in the populations of *Calanus helgolandicus* has occurred (DECC, 2009; Edwards *et al.*, 2010; Baxter *et al.*, 2011).

3.2.2 Benthos

The biota living near, on or in the seabed is collectively termed benthos. The diversity and biomass of the benthos is dependent on several factors including substrata (i.e. sediment or rock), water depth, salinity, the local hydrodynamics and degree of organic enrichment (DECC, 2016). The species composition and diversity of the benthos or macrofauna found within sediments is commonly used as a biological indicator of sediment disturbance or contamination.

3.2.2.1 **Macrofauna**

During the environmental survey around the North Cormorant platform conducted by Benthic Solutions (2019), the macrobenthos was analysed from 20 grab samples at ten baseline stations around the platform. The sediment was relatively consistent throughout the survey area conforming to a muddy sand or slightly gravelly muddy sand. Coarser sediment in the form of *Mytilus eduli*s shells was observed within samples close to the platform.

Epifaunal species have been separated into two categories: solitary epifauna and colonial epifauna. Solitary epifauna are less ecologically important benthic components and in this survey, they solely consisted of solitary Ascidiacea and Cnidaria individuals. Colonial epifauna are inclusive of encrusting epifauna which are generally recorded in high counts or as presence/absence. For this survey they include colonial Cnidaria and Bryozoans. Within these analyses solitary epifauna have been included with infaunal species, however colonial epifauna have been omitted.

Subsequent macrofaunal taxonomy of all recovered fauna identified a total of 15,638 individuals (infauna and solitary fauna). Of the 295 taxa recorded, 6 were solitary epifauna, 288 were infaunal, consisting of 140 annelid species accounting for 45.4% of the total individuals. The arthropods were represented by 63 species (just 2.7% of total individuals) and the molluscs by 55 species (8.8% of total individuals). In contrast, only 14 species of echinoderms were recorded, accounting for just 1.3% of the total individuals. Solitary epifauna was represented by two Ascidiacea taxa and four cnidarians (*Edwardsiidae, Actiniaria, Cerianthus lloydii, Caryophyllia (Caryophyllia) smithii*), where only one individual of *Edwardsiidae* and one *Cerianthus lloydii* individual in total was noted. All other groups (*Nemertea, Nematoda, Sipuncula, Turbellaria, Phoronida, Chaetognatha*, etc.) were represented by just 10 species, but accounted for 41.3% of the total individuals.

3.2.2.2 **Infaunal trends**

The macrofauna within the North Cormorant survey area was variable with different species dominating at the sediment close to the platform compared to the sediment sampled further afield. For example, the annelid species, *Glycera lapidum, Prionospio cirrifera, Spiophanes kroyeri* and *Spiophanes wigleyi* (polychaete worms) were found uniformly distributed throughout the survey area corresponding to the generally muddy sand/slightly gravelly muddy sand habitat. Polychaetes have frequently been found to account for ca. 50% of the species encountered in offshore sediments in the North Sea and the taxa identified across the North Cormorant survey area are broadly similar to those encountered previously in the NNS (Eleftheriou and Basford, 1989; Kunitzer *et al.*, 1992). In contrast, a high abundance of the taxa Nematoda, *Capitella*, *Nereimyra punctata*, *Cirratulus cirratus, Raricirrus beryli* and *Thyasira sarsii* was found in the areas closer to the North Cormorant platform (up to 122 m) where barium-rich drill cuttings have had an influence. This indicates that peak barium concentrations are suppressing the dominance of opportunistic species. Both species richness and abundance were affected by the influence of drilling related activity with stations close to the platform showing a reduced species diversity and increase in the abundance of opportunistic species (Benthic Solutions, 2019).

3.2.3 Potential Sensitive Habitats and Species

A review of the visual survey data from the area surrounding the North Cormorant platform indicated the presence of several potentially sensitive habitats and species, including:

- ‘Submarine structures made by leaking gases’ - Annex I Habitat
- ‘Sea-pen and Burrowing megafauna communities’ – United Kingdom Biodiversity Action Plan (UK BAP) habitat and OSPAR list of threatened and/or declining species and habitats (Region II - Greater North Sea)
- Ocean quahog *Arctica islandica* - OSPAR list of threatened and/or declining species and habitats (Region II - Greater North Sea)

These habitats are listed by one or more International Conventions, European Directives or UK Legislation (including devolved UK administrations).

‘Submarine structures made by leaking gases’ encompass hard substrates which support a unique community of organisms that are able to survive on the methane and hydrogen sulphide gasses associated with these ecosystems. They are defined as Annex I habitats, which are protected within Special Areas of Conservation (SACs) under the EU Habitats Directive. There are two main types of submarine structures known to occur in the UK: bubbling reefs and submarine structures associated with pockmarks (JNCC, 2018). Pockmarks are generally connected to the release of methane, which reacts with the surrounding seawater forming carbonate blocks. The closest SAC with evidence of the Annex I habitat 'Submarine structures made by leaking gases' is the Braemar Pockmarks SAC, which is situated approximately 250 km south of the North Cormorant platform. Depressions resembling unit pockmarks were recorded throughout the survey area on side scan sonar and bathymetry data (Benthic Solutions, 2019). The observed depressions were confirmed by visual survey, revealing a high density of relic mussel shells and depressions filled with gravel and cobbles.

'Sea-pen and burrowing megafauna communities' are classified as a UK Habitat Feature of Conservation Importance (FOCI) and are also an OSPAR-listed habitat. OSPAR defines of 'Sea-pen and burrowing megafauna communities' as follows:

"Plains of fine mud, at water depths ranging from 15–200 m or more, which are heavily bioturbated by burrowing megafauna; burrows and mounds may form a prominent feature of the sediment surface with conspicuous populations of sea-pens, typically *Virgularia mirabilis* and *Pennatula phosphorea.* The burrowing crustaceans present may include *Nephrops norvegicus*, *Calocaris macandreae* or *Callianassa subterranea*. In the deeper fjordic lochs which are protected by an entrance sill, the tall sea-pen *Funiculina quadrangularis* may also be present. The burrowing activity of megafauna creates a complex habitat, providing deep oxygen penetration. This habitat occurs extensively in sheltered basins of fjords, sea lochs, voes and in deeper offshore waters such as the North Sea and Irish Sea basins and the Bay of Biscay" (OSPAR, 2010).

According to JNCC (2015) data, the key determinant for classification of 'Sea-pen and burrowing megafauna communities' is the presence of burrowing species or burrows at a Super abundant, Abundant, Common, Frequent, Occasional, Rare (SACFOR) density of at least 'frequent'. Of the ten EBS sampling stations, sea-pens were identified at six (the closest of these being 250 m out from the North Cormorant Platform). Benthic Solutions (2019) estimated the density of burrow openings at the seabed using representative video transects from each sampling station and found that the density of small and large burrows across the transects were recorded as 'occasional' on the SACFOR scale and therefore not considered to be a high enough density to be classified as a FOCI or as an OSPAR Habitat.

There were four recorded examples of the ocean quahog *Arctica islandica* (a type of clam). Three were found at a station approximately 500 m southwest of the platform and a further individual was found 250 m northeast (Benthic Solutions, 2019). This species is listed as a Priority Marine Feature (PMF) in Scottish waters (Tyler-Walters, 2016) and is on the OSPAR List of Threatened and/or Declining Species (OSPAR, 2008).

There was no evidence of distinct *A. islandica* siphons at the seabed on any of the video footage or still photographs. The North Cormorant platform is located on the edge of a number of UKCS Blocks where this species has been recorded (Figure 3-4) and the distribution of *A. islandica* is relatively wide in the North Sea (OSPAR, 2009a).

No other benthic habitat or species features of conservation interest have been noted within the scope of the most recent (Benthic Solutions, 2019) surveys within 500 m of the North Cormorant platform. This includes those listed on the Annex I of the EU Habitats Directive, the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, the OSPAR list of threatened and/or declining species, or the Scottish PMF list (IUCN, 2022).

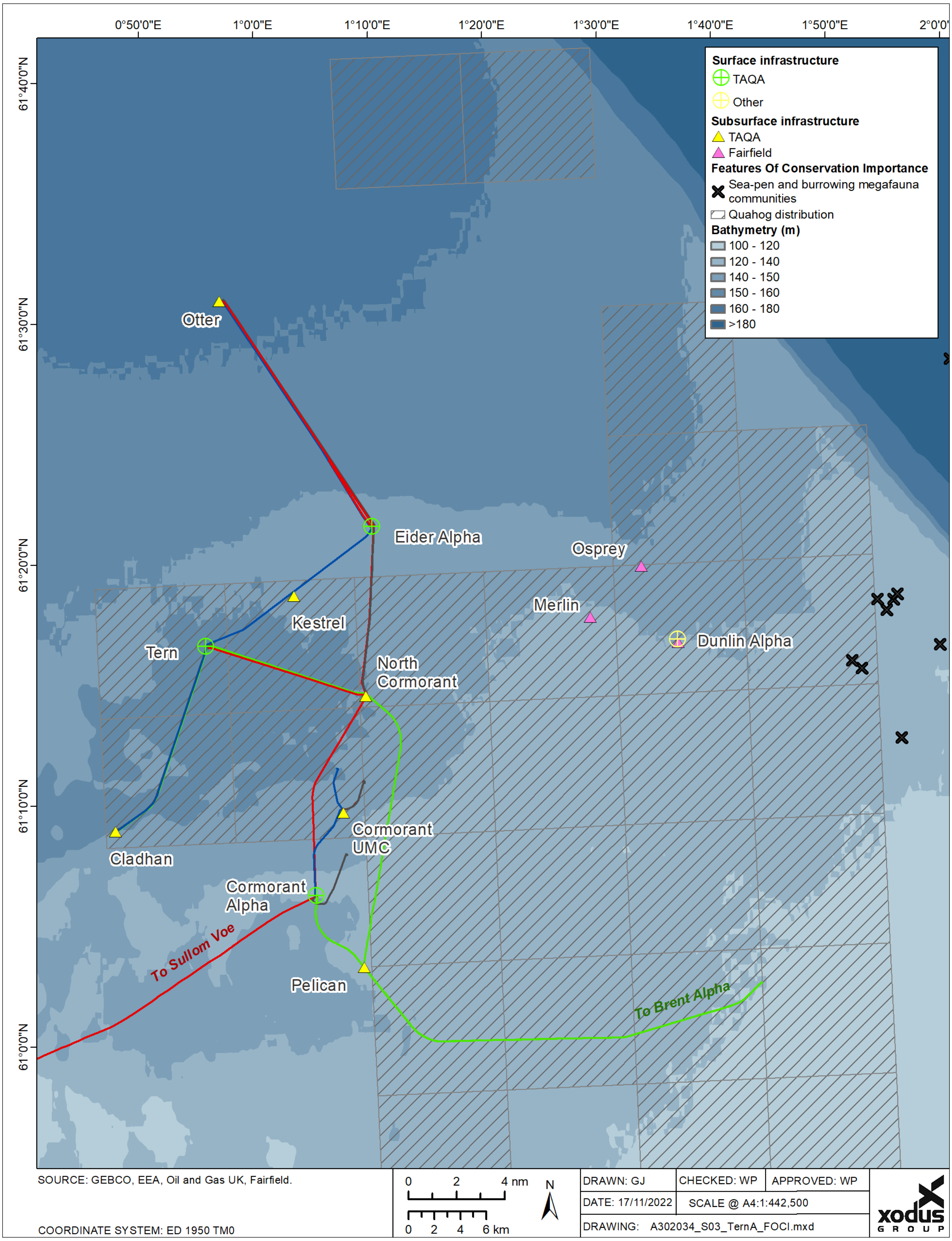


Figure 3-4 Features of Conservation Importance in the Vicinity of the North Cormorant Platform

3.2.4 Fish and Shellfish

A number of commercially important fish and shellfish species occur in the vicinity of the proposed decommissioning operations. Fish and shellfish populations may be vulnerable to impacts from offshore installations such as hydrocarbon pollution and exposure to aqueous effluents, especially during the egg and juvenile stages of their lifecycles (Bakke *et al.*, 2013).

The North Cormorant platform is located in International Council for the Exploration of the Sea (ICES) rectangle 51F1, in an area of spawning and nursery grounds for several commercially important species. Information on spawning and nursery periods for these different species, including peak spawning times is detailed in Table 3-2.

Table 3-2 Fisheries Sensitivities within ICES Rectangle 51F1 (Coull *et al.*, 1998 and Ellis *et al.*, 2012)

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cod	S	S*	S*	S								
Haddock	N	S*N	S*N	S*N	N	N	N	N	N	N	N	N
Norway pout	SN	S*N	S*N	SN	N	N	N	N	N	N	N	N
Saithe	S*	S*	S	S								
Whiting	N	SN	SN	SN	SN	SN	N	N	N	N	N	N
Blue whiting	N	N	N	N	N	N	N	N	N	N	N	N
Hake	N	N	N	N	N	N	N	N	N	N	N	N
Herring	N	N	N	N	N	N	N	N	N	N	N	N
Ling	N	N	N	N	N	N	N	N	N	N	N	N
Mackerel	N	N	N	N	N	N	N	N	N	N	N	N
Spurdog	N	N	N	N	N	N	N	N	N	N	N	N

S = Spawning, N = Nursery, SN = Spawning and Nursery; * = peak spawning; Species = High nursery intensity as per Ellis *et al*, 2012; Species = High intensity spawning as per Ellis *et al* (2012); Species = High concentration spawning as per Coull *et al.*, 1998;

Spawning areas for most species are not rigidly fixed and fish may spawn either earlier or later from year to year. In addition, the mapped spawning areas represent the widest known distribution given current knowledge and should not be seen as rigid unchanging descriptions of presence or absence (Coull *et al*, 1998). Whilst most species spawn into the water column of moving water masses over extensive areas, benthic spawners (e.g. sandeel; *Ammodytidae sp*) have very specific habitat requirements, and therefore their spawning grounds are relatively limited and potentially vulnerable to seabed disturbance and change.

The North Cormorant platform is within an area of spawning ground for of cod (*Gadus morhua*); January – April [peak spawning February – March], haddock (*Melanogrammus aeglefinus*; February to May [peak spawning February – April]), Norway pout (*Trisopterus esmarkii;* January to April [peak spawning February – March]), saithe (*Pollachius virens;* January to April [peak spawning January – February]) and whiting (*Merlangius merlangus*; February to June) (Coull *et al.*, 1998; Ellis *et al.*, 2012). Also, a high intensity spawning area for Norway pout has previously been reported approximately 30 km south of the North Cormorant platform by Coull *et al*. (1998) (Figure 3-5).

The North Cormorant Decommissioning area is also a potential nursery ground for haddock, Norway pout, whiting, blue whiting (*Micromesistius poutassou)*, European hake (*Merluccius merluccius)*, herring (*Clupea harengus)*, ling (*Molva molva*), mackerel (*Scomber scombrus)* and spurdog (*Squalus acanthias)*. Blue whiting is the only species with a high nursery intensity ground in the North Cormorant area while other species have a lower nursery intensity (Ellis *et al.*, 2012).

Fisheries sensitivity maps produced by Aires *et al*. (2014)[1] , for Marine Scotland Science detail the likelihood of aggregations of fish species in the first year of their life (i.e. 0 group or juvenile fish) occurring around the UKCS, as shown on Figure 3-6 and Figure 3-7. Maps from Aires *et al*. (2014), which show the probability of the presence of aggregations of 0 group blue whiting, haddock, European hake, herring, mackerel, Norway pout, whiting, ling and nephrops are available on the NMPI (2023) (note, for European hake the maps show probability of presence of 0 group fish as opposed to presence of aggregations). The modelling indicates the presence, in medium densities, of juvenile fish (less than one years old) for four species within the North Cormorant area: blue whiting, haddock, European hake and Norway pout. All other species densities were low.

Most fish are known to produce pelagic eggs with the exception of herring and sandeels, which are both benthic spawners. Neither are reported to spawn within Block 211/21a where the North Cormorant platform is located (Coull *et al*, 1998; Ellis *et al.*, 2012).

The following species listed above are also listed as Scottish PMF and are considered of natural heritage importance: blue whiting, ling, mackerel, Norway pout, spurdog, herring, saithe, whiting and cod (NatureScot, 2022a).

Herring, mackerel and hake are also on the IUCN Red List, as species of global status of 'least concern', as well as spurdog, listed with a global status of “vulnerable” and European status of “least concern”. Norway pout and whiting are listed as species of 'least concern', both global and European status, and saithe and blue whiting are listed as species of 'least concern' (European status; IUCN, 2022). Cod and haddock are listed as a global status of 'vulnerable' global status (IUCN, 2022).

Cod, mackerel, ling, Norway pout, spurdog, herring, sole, whiting, blue whiting and hake are also on the Scottish Biodiversity List which identifies species of most importance for biodiversity conservation in Scotland (NatureScot, 2022b).

[1] The probability maps show information detailing the performance of the Random Forest model used to classify the data sets, this ranked probability of the presence of aggregations each species from low to high. In all instances, the probability was checked on the NMPI (2020) and considered to be at the low end of the probability scale.

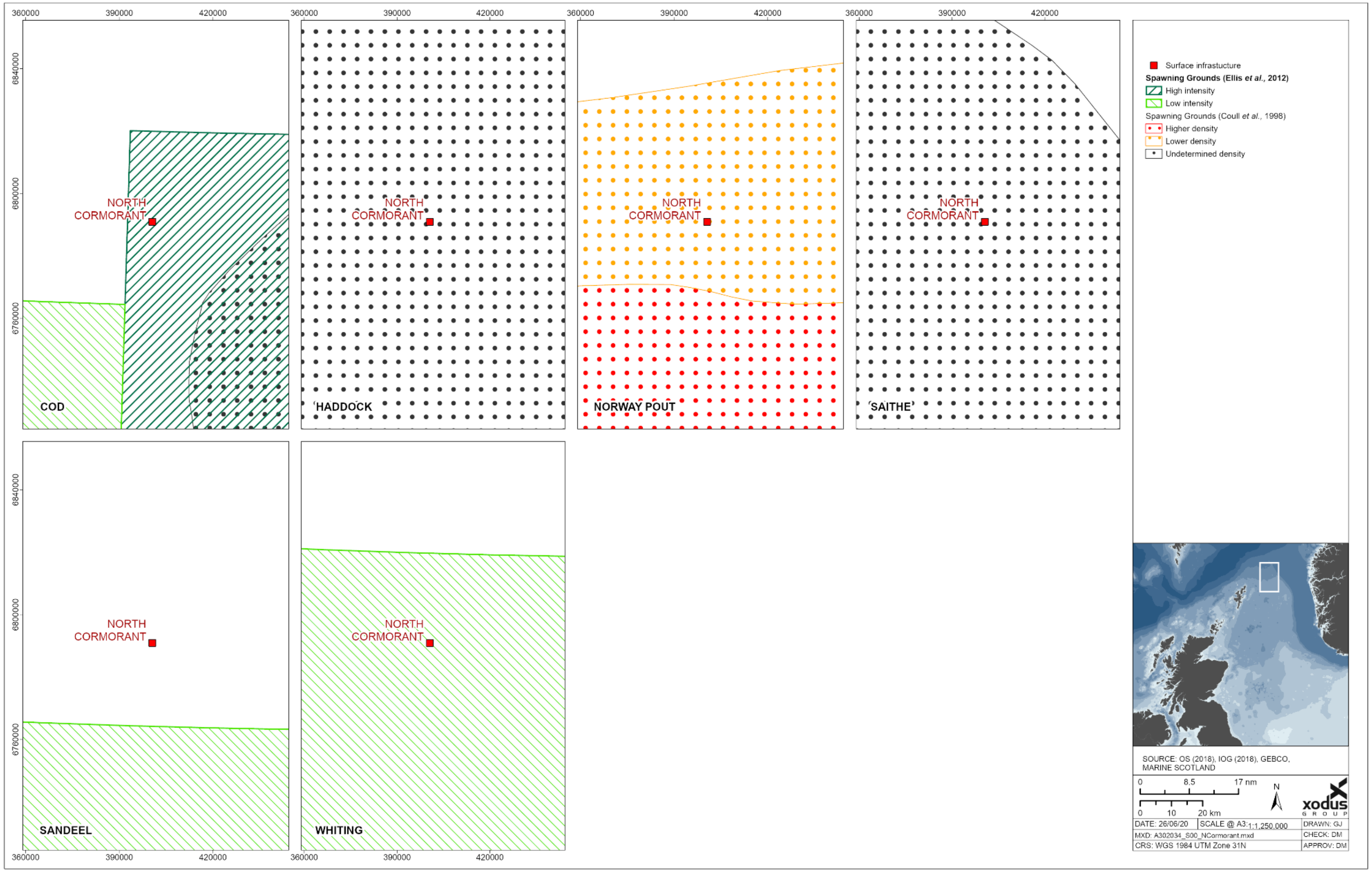


Figure 3-5 Potential Fish Spawning Grounds

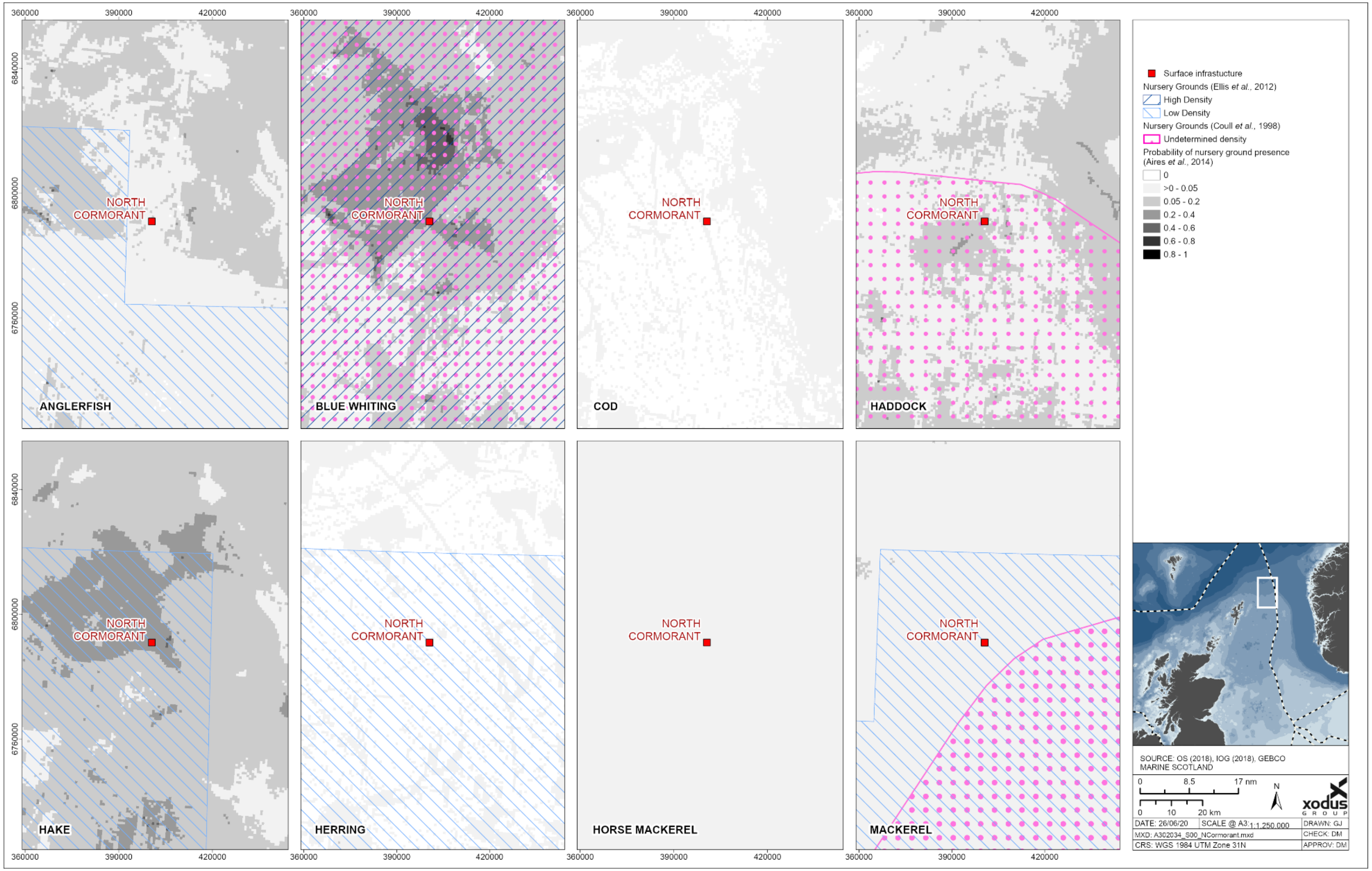


Figure 3-6 Potential Fish Nursery Habitats and 0 Group Aggregations adapted from Aires *et al.* (2014) (1 of 2)

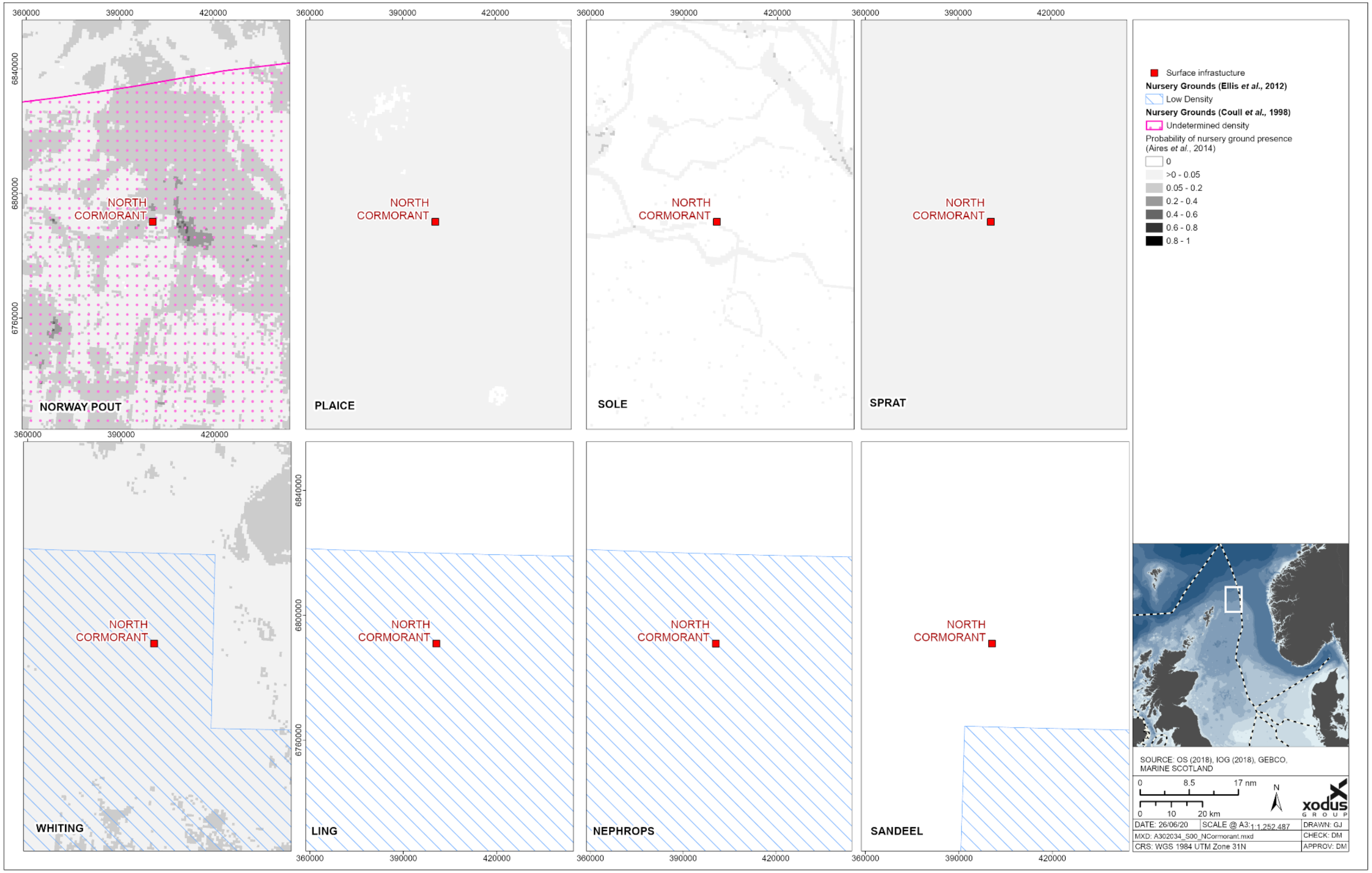


Figure 3-7 Potential Fish Nursery Habitats and 0 Group Aggregations adapted from Aires *et al.* (2014) (2 of 2)

3.2.5 Seabirds

Much of the North Sea and its surrounding coastline is an internationally important breeding and feeding habitat for seabirds. In the NNS, the most numerous species present are likely to be northern fulmar (*Fulmarus glacialis)*, black-legged kittiwake (*Rissa tridactyla)* and common guillemot (*Uria aalge*) (DECC, 2009; DECC, 2016). Seabirds are not normally affected by routine offshore oil and gas operations. In the unlikely event of an oil release, however, birds are vulnerable to oiling from surface pollution, which could cause direct toxicity through ingestion, and hypothermia as a result the birds' inability to waterproof their feathers. Birds are most vulnerable in the moulting season when they become flightless and spend a large amount of time on the water surface.

After the breeding season ends in June, large numbers of moulting auks (common guillemot, razorbill (*Alca torda)* and Atlantic puffin (*Fratercula arctica*)) disperse from their coastal colonies and into the offshore waters from July onwards. At this time these high numbers of birds are particularly vulnerable to oil pollution. In addition to auks, black-legged kittiwake, northern gannet (*Morus bassanus)*, and northern fulmar, are present in sizable numbers during the post breeding season.

Kober *et al.* (2010) have identified hotspots for a number of breeding seabirds in UK waters. The North Cormorant platform is located within or in the vicinity of a wider area of aggregation (or hotspots) for northern fulmar, northern gannet and Atlantic puffin during their breeding season. The offshore presence of these species during the breeding season is confirmed by the maximum foraging distances from colonies reported by Thaxter *et al.* (2012). The northern fulmar has been recorded up to 580 km from colonies, the northern gannet up to 590 km, and the Atlantic puffin up to 200 km (Thaxter *et al.*, 2012).

The Seabird Oil Sensitivity Index (SOSI) (Webb *et al.*, 2016) identifies sea areas where seabirds are likely to be most sensitive to oil pollution. Overall, seabird sensitivity to oil pollution in the region of the North Cormorant platform is considered low (score of 5) from January to April and June to December (Table 3-3). No data was available for May, but based on surrounding blocks and adjacent months, is also likely to be low.

Table 3-3 Seabird Oil Sensitivity in Block 211/21 and Surrounding Blocks (Webb *et al.*, 2016)

Block	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
210/20	3	5	5	5*	N	5*	5	5	5	5*	4*	4
211/16	4*	5	5	5*	N	5*	5	5	5	5*	4*	4
211/17	3*	5	5	5*	N	5*	5	5	5*	N	3*	3
210/25	5	5	5	5*	N	5*	5	5	5	5*	5*	5
211/21	**5**	**5**	**5**	**5***	**N**	**5***	**5**	**5**	**5**	**5***	**5***	**5**
211/22	5	5	5	5*	N	5*	5	5	4	4*	4*	4
210/30	5	5	5	5*	5*	5	5	5	5	5*	5*	5
211/26	5	5	5	5*	5*	5	5	5	5	5*	5*	5
211/27	5	5	5	5*	5*	5	5	5	4	4*	5*	5
Key	Extremely high	Very high	High	Medium	Low	No data						
* in light of coverage gaps, an indirect assessment of SOSI has been made.												

3.2.6 Marine mammals

3.2.6.1 Cetaceans

The NNS has a moderate to high diversity and density of cetaceans, with a general trend of increasing diversity and abundance with increasing latitude. Harbour porpoise (*Phocoena phocoena)* and white-beaked dolphin (*Lagenorhynchus albirostris*) are the most widespread and frequently encountered species, occurring regularly throughout most of the year. Minke whales (*Balaenoptera acutorostrata)* are regularly recorded as frequent seasonal visitors. Coastal waters of the Moray Firth and east coast of Scotland support an important population of bottlenose dolphins (*Tursiops truncates)*, while killer whales (*Orcinus orca)* are sighted with increasing frequency towards the north of the area. Atlantic white-sided dolphin (*Lagenorhynchus acutus)*, Risso's dolphin (*Grampus griseus)* and long-finned pilot whale (*Globicephala melas)* can be considered occasional visitors, particularly in the north of the area (DECC, 2016).

Harbour porpoise, white-beaked dolphin, white-beaked dolphin and minke whale have been recorded in the vicinity of the North Cormorant platform (Reid *et al*, 2003). Minke whale was also recorded at medium densities in May and white-sided dolphins and white-beaked dolphins are both recorded at relatively medium densities in July (Reid *et al.*, 2003).

In 2022, the fourth series of Small Cetaceans in European Atlantic waters and the North Sea (SCANS-IV) survey was conducted in European Atlantic waters. This involved a large-scale ship and aerial survey to study the distribution and abundance of cetaceans. Harbour porpoise white-sided dolphin and minke whale were the most abundant species recorded in the survey block covering the North Cormorant Decommissioning area, with specific densities listed in Table 3-4 (Gilles *et al.*, 2023). This does not discount other species from occurring within the area, however, there is insufficient data for these species to provide abundance estimates (Gilles *et al.*, 2023). Other species recorded within this survey block were also sighted including Risso's dolphin, fin whale (*Balaenoptera physalus*) and Gervais's beaked whale (*Mesoplodon europaeus*), however, there was not sufficient data for these species to provide abundance estimates (Gilles *et al.*, 2023).

Table 3-4 Densities of Cetaceans in the North Cormorant Decommissioning Area (Gilles *et al.*, 2023)

Species	Density of cetaceans in the survey Block NS-F (animals per km^2)
Harbour porpoise	0.439
White-sided dolphin	0.306
Minke whale	0.027

3.2.6.2 Seals

Two species of seal live and breed in the UK, namely the grey seal (*Halichoerus grypus)* and harbour seal (*Phoca vitulina)*, both of which are protected under Annex II of the EU Habitats Directive and are listed as Scottish PMFs (NatureScot, 2022a; Jones *et al.*, 2015; DECC, 2016).

Approximately 35% of the world's grey seals breed in the UK with 80% of these breeding at colonies in Scotland with the main concentrations in the Outer Hebrides and in Orkney. Birth rates have grown since the 1960s, although according to data from the Special Committee on Seals (SCOS) population growth is levelling off (SCOS, 2022). In the case of harbour seals, approximately 32% of the world's population are found in the UK. Following significant population declines due to disease in 1988 and 2002, harbour seal numbers on the English east coast increased rapidly between 2006 to 2012 from which point they remained relatively constant until a decline began in 2019 (SCOS, 2022). Harbour seals are widespread around the west coast of Scotland and throughout the Hebrides and Northern Isles (SCOS, 2022).

Grey and harbour seals will feed both in inshore and offshore waters depending on the distribution of their prey, which changes both seasonally and yearly. Both species tend to be concentrated close to shore, particularly during the pupping and moulting season. Seal tracking studies have indicated that the foraging movements of grey seals are generally restricted to within 100 km range of their haul-out sites although they can feed several hundred kilometres offshore (SCOS, 2022). The foraging ranges of harbour seals vary substantially with some journeying over 100 km from their nearest haul-out sites while others remain very close inshore within only a few kilometres of haul-out sites (SCOS, 2022).

Since the North Cormorant platform is located approximately 113 km offshore, grey and harbour seals are unlikely to encountered routinely. This is confirmed by the grey and harbour seal density maps published by the Sea Mammal Research Unit (SMRU), which are provided in the National Marine Plan Interactive (NMPI), (2023). The maps report the presence of grey and harbour seals in UKCS Block 211/21a as between 0 - 1 per 25 km^2 (Figure 3-8).

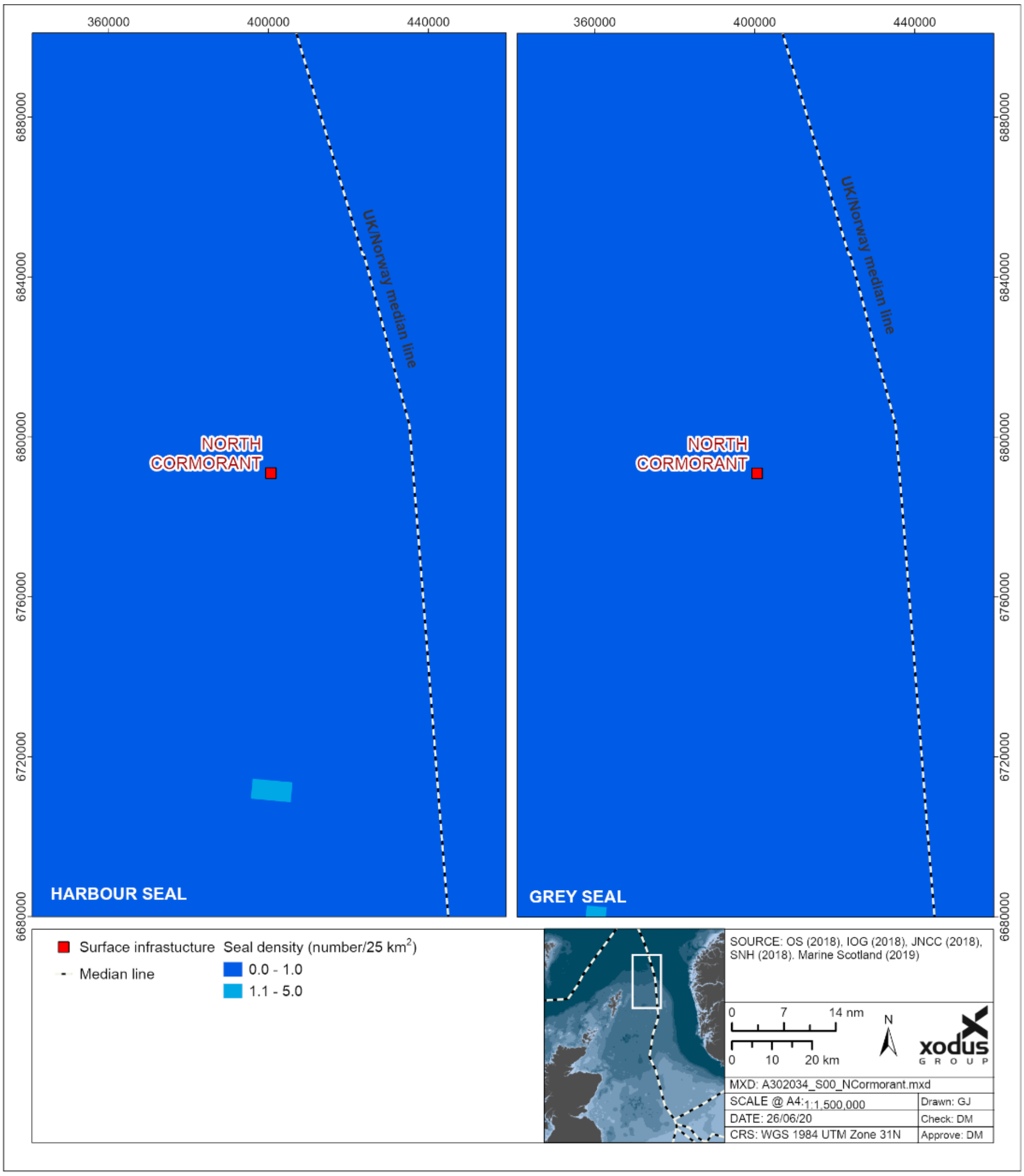


Figure 3-8 Seal Densities round the North Cormorant Upper Jacket (per 25 km^2)

3.3 Conservation

3.3.1 Offshore conservation

There are no Nature Conservation Marine Protected areas (NCMPAs), Special Protection areas (SPAs), SAC, or Demonstration and Research Marine Protected Areas within 40 km of the North Cormorant platform (NMPI, 2023). The closest SAC is the Pobie Bank Reef, located approximately 77 km southwest of the North Cormorant Decommissioning area (Figure 3-9).

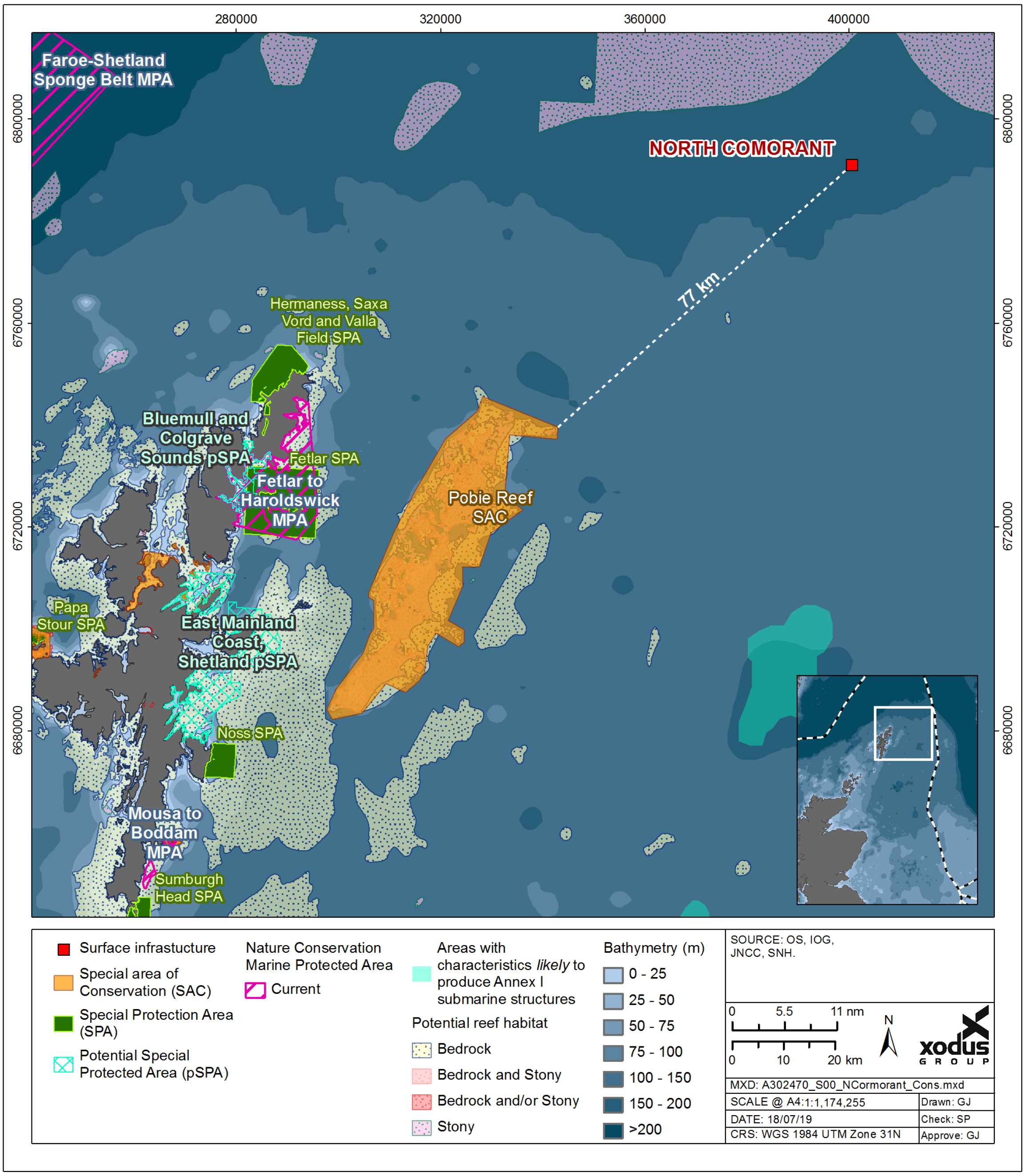


Figure 3-9 Location of the North Cormorant Platform in Relation to Protected Areas

The seabed in UKCS Block 211/21a is within a wider area of 'subtidal sand and gravels' (NMPI, 2019), a seabed type designated as a PMF in Scottish waters (Tyler-Walters, 2016). 'Subtidal sands and gravels' also support internationally important commercial fisheries e.g. scallops, flatfish, sandeels, and are important nursery grounds for juvenile commercial fish species such as sandeels, flatfish, bass, skates, rays and sharks (NatureScot, 2022b). However, the distribution of this feature is relatively wide in the North Sea (NMPI, 2023).

Lophelia pertusa (or *Desmophyllum pertusum*, WoRMS, 2022), is known to be present on some of the North Cormorant Upper Jacket (Benthic Solutions, 2019). *Lophelia pertusa* is a reef-building cold water coral that provides habitats for other epifaunal and fish species, and is a UK habitat of principal importance and a Scottish Priority Marine Feature; it is also highlighted in Annex I of the European Habitats Directive, and is on the OSPAR List of Threatened and/or Declining Species and Habitats. This species is normally restricted to water in depths of between 200 and 2,000 m on the continental slope and the extent of Lophelia pertusa reefs is undergoing an overall decline due to mechanical damage by demersal fishing gear in all OSPAR areas (OSPAR, 2009b). However, the species has also been recognised in the scientific literature as one which grows opportunistically on oil and gas subsea infrastructure (e.g. Gass & Roberts, 2006) and which has been recorded from many offshore installations in the NNS at depths between 59 m and 132 m. In line with the BEIS Guidance Notes (BEIS, 2018) and TAQA's Waste Management Strategy, as the coral is present and the installation is to be returned to shore, it will be necessary to discuss the requirements for a Convention on International Trade in Endangered Species (CITES) certificate with the Department of Environment, Food and Rural Affairs (Defra).

3.3.2 Protected Species

Four species listed under Annex II of the EU Habitats Directive are found in UK waters: harbour porpoise, minke whale, grey seal and harbour seal. Grey and harbour seals are unlikely to be observed near the North Cormorant project with any regularity as both species have very low densities. The harbour porpoise and minke whale are the two Annex II species which could be present near the North Cormorant decommissioning project. However, due to their mobile nature, the species are likely to move away and not be adversely affected by the proposed North Cormorant platform decommissioning activities.

All species of cetacean recorded within the proposed operations area are listed as European Protected Species (EPSs). Other marine species listed as EPSs include turtles and sturgeon (*Acipenser sturio*), which are not likely to be present within this area of the North Sea.

Ocean quahog *A. islandica* is listed as PMF in Scottish waters (Tyler-Walters, 2016) and is on the OSPAR List of Threatened and/or Declining Species (OSPAR, 2008). The presence of four individuals near the North Cormorant platform is discussed in Section 3.2.3.

3.3.3 Onshore Conservation

The closest onshore conservation area is the Hermaness, Saxa Vord and Valla Field SPA, located in Unst, Shetland approximately 113 km to the southwest (Figure 3-9). Due to this distance, no impacts to onshore conservation sites are expected from decommissioning activities in UKCS Block 211/21a.

3.3.4 National Marine Plan

The NMP covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). The aim of the NMP is to help ensure the sustainable development of the marine area through informing and guiding regulation, management, use and protection of the NMP areas. The proposed operations as described in this permit have been assessed against the Marine Plan Objectives and policies, specifically GEN 1, 4, 5, 9, 12, 13, 14 and 21 (Section 3.3.4.1 to Section 3.3.4.8) and Oil and Gas sector policies and objectives 2, 3 and 6 (Section 3.3.4.9 to Section 3.3.4.11).

Assessment of compliance against relevant policies has been achieved through the impact assessment in Section 5.0, in support of this EA Justification. The proposed operations do not contradict any of the marine plan objectives and policies. TAQA will ensure compliance with all the policies that have been introduced; with particular attention being made to the following policies:

3.3.4.1 GEN 1 – General Planning and Principle

Development and use of the marine area should be consistent with the Marine Plan, ensuring activities are undertaken in a sustainable manner that protects and enhances Scotland's natural and historic marine environment.

Decommissioning of the North Cormorant Upper Jacket will result in the removal of around 12,500 Te of infrastructure, from the local marine environment, of which approximately 95% will be recycled.

3.3.4.2 GEN 4 – Co-existence

Where conflict over space or resource exists or arises, marine planning should encourage initiatives between sectors to resolve conflict and take account of agreements where this is applicable.

Potential impacts to other users of the sea during execution will be managed through existing safety zones, UK Hydrographic Office (UKHO) standard communication channels (including Kingfisher, Notice to Mariners and radio navigation warnings) and the use of Automatic Identification System (AIS) as well as other navigational controls.

3.3.4.3 GEN 5 – Climate Change

Marine planners and decision makers should seek to facilitate a transition to a low carbon economy. They should consider ways to reduce emissions of carbon and other greenhouse gasses.

TAQA has developed a draft Emissions Reduction Strategy which supports their commitment to Net Zero and the NSTA Stewardship Expectation 11. This strategy defines TAQA's asset portfolio, including decommissioning activities, and is intended to drive increased energy efficiencies and reduced emissions. TAQA plans several improvements under the Emissions Reduction Strategy including working with the supply chain, collating emission/energy savings initiatives across the business and reviewing emissions sources.

TAQA will ensure that the minimal number of vessels will be deployed and the streamlining of activities through planning to reduce the time required for vessels to undertake these activities and, in doing so, will support the drive to reduce emissions. Each vessel will have a Shipboard Energy Efficiency Management Plan (SEEMP) which contains information on minimising fuel consumptions.

3.3.4.4 GEN 9 – Natural Heritage

Development and use of the marine environment must:

- *Comply with legal requirements for protected areas and protected species.*
- *Not result in significant impact on the national status of PMF.*
- *Protect and, where appropriate, enhance the health of the marine area.*

Legal requirements will be adhered to throughout the duration of the project, including those relating to the protected species which may be present within the project area. There are no protected areas within 40 km of the project area. There a number of PMFs expected within the project area however the proposed operations will not result in significant impact on their national status.

3.3.4.5 GEN 12 – Water Quality and Resource

Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives that apply.

The diesel tanks will have been drained as part of the platform de-energisation process well in advance of Upper Jacket removal. These tanks will not be cut through during Upper Jacket removal. However, small residual quantities of diesel may remain in the tanks that could be discharged during Upper Jacket removal. Any such potential discharges will be assessed and managed under an OPPC permit.

Discharges from vessels are typically well-controlled activities that are regulated through vessel and machinery design, management and operation procedures. Controls will be in place, as required, through compliance with MARPOL.

3.3.4.6 GEN 13 – Noise

Development and use in the marine environment should avoid significant adverse effects of anthropogenic noise and vibration, especially on species sensitive to such effects.

TAQA will ensure that any potential impacts via underwater noise associated with North Cormorant Upper Jacket decommissioning operations will be kept to a minimum. Vessel noise and cutting activities will be the only noise generating activities during the Upper Jacket removal. Vessel presence will be limited in duration and will mask any noise generated by cutting (Pangerc *et al.*, 2016). The recently published DESNZ (2023) guidance on "The Use and Environmental Impact of Explosives in the Decommissioning of Offshore Wells and Facilities" states that "*Sound radiated from the diamond wire cutting of a conductor or abrasive water jets is not easily discernible above the background noise.*"

3.3.4.7 GEN 14 – Air Quality

Development and use of the marine environment should not result in the deterioration of air quality and should not breach any statutory air quality limits. Some development and use may result in increased emissions to air, including particulate matter and gasses. Impacts on relevant statutory air quality limits must be taken into account and mitigation measures adopted, if necessary, to allow an activity to proceed within these limits.

TAQA will ensure that the minimal number of vessels will be deployed and the streamlining of activities through planning to reduce the time required for vessels to undertake these activities and, in doing so, will support the drive to reduce emissions. Each vessel will have a SEEMP which contains information on minimising fuel consumptions.

3.3.4.8 GEN 21 – Cumulative Impacts

Cumulative impacts affecting the ecosystem of the marine plan area should be addressed in decision making and plan implementation.

In terms of air and water quality, TAQA's approach and project-specific mitigation measures will minimise the potential negative aspects contributing towards cumulative impacts as detailed in the responses to GEN 12 and GEN 14. In terms of seabed disturbance, it is reasonable to presume that the proposed decommissioning activities associated with the cutting of the North Cormorant Upper Jacket are not expected to impact the seabed and therefore are not expected to have any discernible contribution to cumulative impacts in the broader context, although this presumption is qualified in Section 5.1.1.

3.3.4.9 OIL AND GAS 2 – Decommissioning End-Points

Where re-use of oil and gas infrastructure is not practicable, either as part of oil and gas activity or by other sectors such as carbon capture and storage, decommissioning must take place in line with standard practice, and as allowed by international obligations. Re-use or removal of decommissioned assets from the seabed will be fully supported where practicable and adhering to relevant regulatory process.

TAQA is committed to establishing and maintaining environmentally acceptable methods for managing wastes in line with the Waste Framework Directive and principles of the Waste Hierarchy. In accordance with the Waste Hierarchy, TAQA will continue review reuse options for elements of the North Cormorant Upper Jacket.

3.3.4.10 OIL AND GAS 3 – Minimising Environmental and Socio-Economic Impacts

Supporting marine and coastal infrastructure for oil and gas developments, including for storage, should utilise the minimum space needed for activity and should consider environmental and socio-economic constraints.

TAQA will carry out assurance and audit on the selected onshore disposal yard(s) prior to removal and transportation onshore. This process will ensure that the yards are appropriately authorised and fit for purpose. During execution works at the onshore yards, on-going audit, assurance and site representation is planned to monitor the deconstruction process, and the ability to deliver innovative reuse / recycling options, and thus minimising the space required to process recovered items.

3.3.4.11 OIL AND GAS 6 – Risk Reduction

Consenting and licensing authorities should be satisfied that adequate risk reduction measures are in place, and that operators should have sufficient emergency response and contingency strategies in place that are compatible with the National Contingency Plan and the Offshore Safety Directive.

TAQA has the relevant risk reduction measures in place for the proposed decommissioning activities and will demonstrate this appropriately through this DP/EA process, through stakeholder engagement and ultimately through the submission of the Decommissioning Safety Case and of the notifications and applications for the authorisations, permits, licences and consents required to execute the work.

3.4 Socio-Economic Environment

3.4.1 Commercial Fisheries

To provide the fullest picture of fisheries within the area, and the associated landings and effort trends, data from 2018 to 2022 are considered (see Table 3-5 and Table 3-6). The North Cormorant platform is located in ICES rectangle 51F1, which in recent years has been targeted primarily for demersal species in terms of both landed weights and value (Marine Directorate, 2023).

Since 2018, demersal catch has contributed over 84% of the annual catch weight and over 92% of the catch value. In 2018, 2020 and 2022 demersal catch was 100% of the catch landings and value. In these same years shellfish has always contributed <1% of the catch landings and value. In 2021, the contribution of pelagic catch was the highest it had been compared to preceding years; however, this is still comparatively low; pelagic catch was 15% of the live weight and 7% of the value of catch in ICES rectangle 51F1 (Marine Directorate, 2023).

In 2022, the live weight of demersal fish in ICES rectangle 51F1 was less (1,327 Te) compared to surrounding ICES blocks such as rectangle 50F0 and 50F1, where demersal live weight reached 1,882 Te and 1,489 Te respectively (Marine Directorate, 2023).

To put the landings into context, catches amounting to 481,398 Te with a value of £685 million were landed across the UKCS in 2022. Therefore, ICES rectangle 51F1 presents a relatively low contribution to the UK total, comprising 0.28% weight landed and providing a 0.35% contribution to the total value of the UK commercial fisheries in 2022 for the above ICES rectangle (Marine Directorate, 2023).

Table 3-6 presents the fishing effort in ICES rectangle 51F1 between 2018 and 2022. Fishing effort in ICES rectangle 51F1 is dominated by demersal (trawl) activities and, as with fishing intensity, is relatively low in comparison to areas to the south and east. Fishing effort amounted to 197 days in ICES rectangle 51F1 in 2022, as detailed in Table 3-6. This represents a considerable decrease in effort compared to 2021 however still higher that effort recorded between 2018 and 2020. Fishing effort in ICES rectangle 51F1 was recorded in every month of the year except for February and July when effort was disclosive[2]. Fishing effort is generally highest between March and May and September and November.

Trawls were the dominant gear types used in ICES rectangle 51F1 in 2022 (accounting for approximately 185 days in 2022). Seine nets were also operated between 2019 and 2022 in ICES 51F1 however recorded as disclosive effort (Marine Directorate, 2023).

Trawls were the main gear type used in the ICES rectangle 51F1 across all years, with some disclosive effort attributed to seine nets also present in more recent years (since 2019) (Marine Directorate, 2023). Figure 3-11 shows fishing intensity in the NNS according to gear type based on vessel monitoring system data. Between 2010 and 2020, ICES rectangle 51F1 only has vessels fishing with bottom trawls. Although this dataset differs in certain respects from that issued by Marine Directorate (2023), it broadly corroborates the overall picture that the fishing effort in UKCS Block 211/21 and in the surrounding blocks is low compared to other area of the North Sea.

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2 The term 'disclosive' is used when fewer than five vessels have been recorded fishing in an area, meaning that detailed data cannot be shown in order to preserve data privacy. It therefore indicates very low levels of effort within the area.

Table 3-5 Live Weight and Value of Fish and Shellfish from ICES Rectangle 51F1 from 2018-2022 (Marine Directorate, 2023)

Species type	2022		2021		2020		2019		2018	
	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)
Demersal	2,398,088	1,327	2,914,127	1,702	1,301,666	877	2,136,673	1,204	1,381,095	846
Pelagic	-	-	236,261	324	199	0	59,457	175	637	1
Shellfish	9,137	2	11,430	3	5,734	2	12,507	3	3,272	1
Total	**2,407,225**	**1,329**	**3,161,818**	**2,029**	**1,307,599**	**879**	**2,208,637**	**1,382**	**1,385,005**	**848**

Table 3-6 Number of Fishing Days per Month (all gears) in ICES Rectangle 51F1 from 2018-2022 (Marine Directorate, 2023)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2022	10	D	37	23	25	14	D	9	21	24	20	14	**197**
2021	9	D	13	46	68	31	35	10	18	D	15	6	**277**
2020	D	9	11	16	D	11	24	14	7	12	11	D	**128**
2019	11	18	14	32	9	D	D	18	38	21	6	D	**191**
2018	D	10	D	27	14	D	7	17	18	19	D	N/A	**131**

Note: Monthly fishing effort by UK vessels landing into Scotland: N/A = no data, D = Disclosive data (indicating very low effort), green = 0 – 100 days fished, yellow = 101 – 200, orange =201-300, red = ≥301

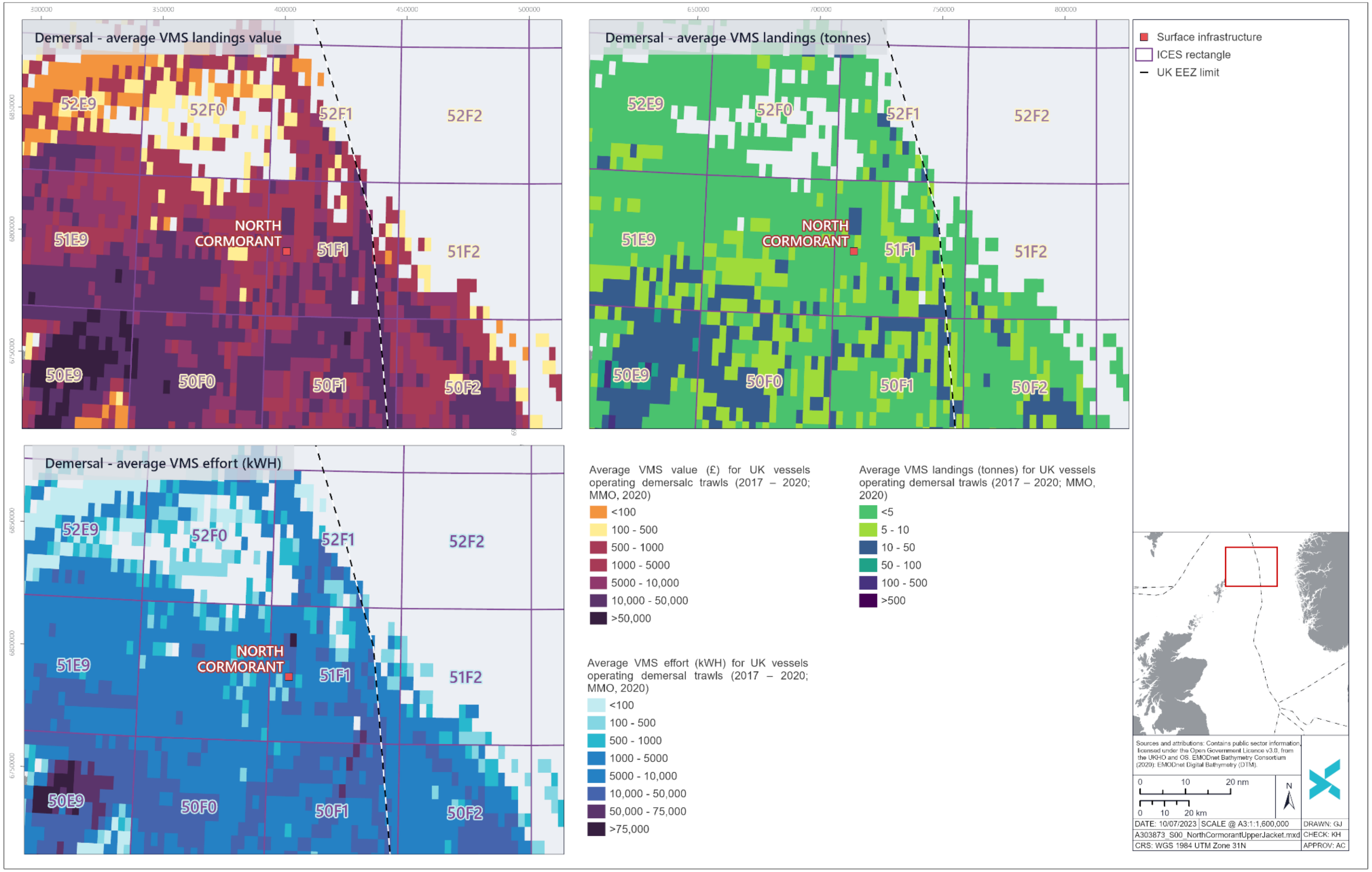

Figure 3-10 Average Landings (tonnes), Value (£) and Effort (kWh) of Demersal Fisheries by ICES Rectangle (2017-2020)

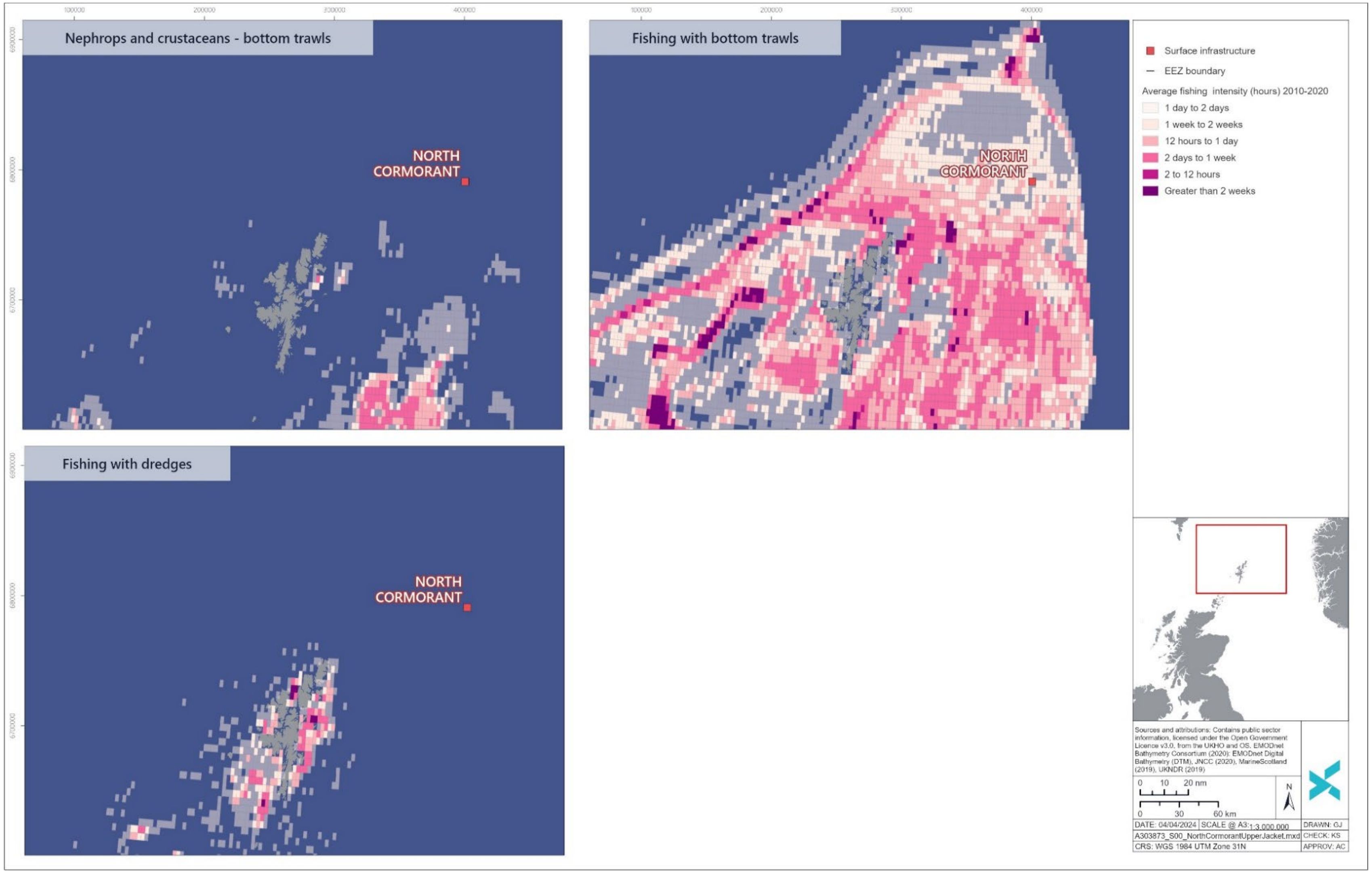

Figure 3-11 Average Fishing Intensity (hours) in the Region of North Cormorant Between 2010 – 2020 Grouped by Fishing Methods

3.4.2 Shipping

The North Sea contains some of the world's busiest shipping routes, with significant traffic generated by vessels trading between ports at either side of the North Sea and the Baltic. North Sea oil and gas fields generate moderate vessel traffic in the form of support vessels, principally operating from Peterhead, Aberdeen, Montrose and Dundee in the north and Great Yarmouth and Lowestoft in the south (DECC, 2016).

The level of shipping activity is considered very low in Block 211/21 (OGA, 2016). The average weekly density of vessels (all combined) using AIS data between 2012 and 2017 is five transits or less in UKCS Block 211/21, which is low compared to other areas in the North Sea (NMPI, 2023). Satellite data based on the AIS dataset from 2019, plotted in Figure 3-12, show that between 200 – 500 vessels transit through Block 211/21 annually (UKHO, 2019) and are most likely related to ongoing platform activity.

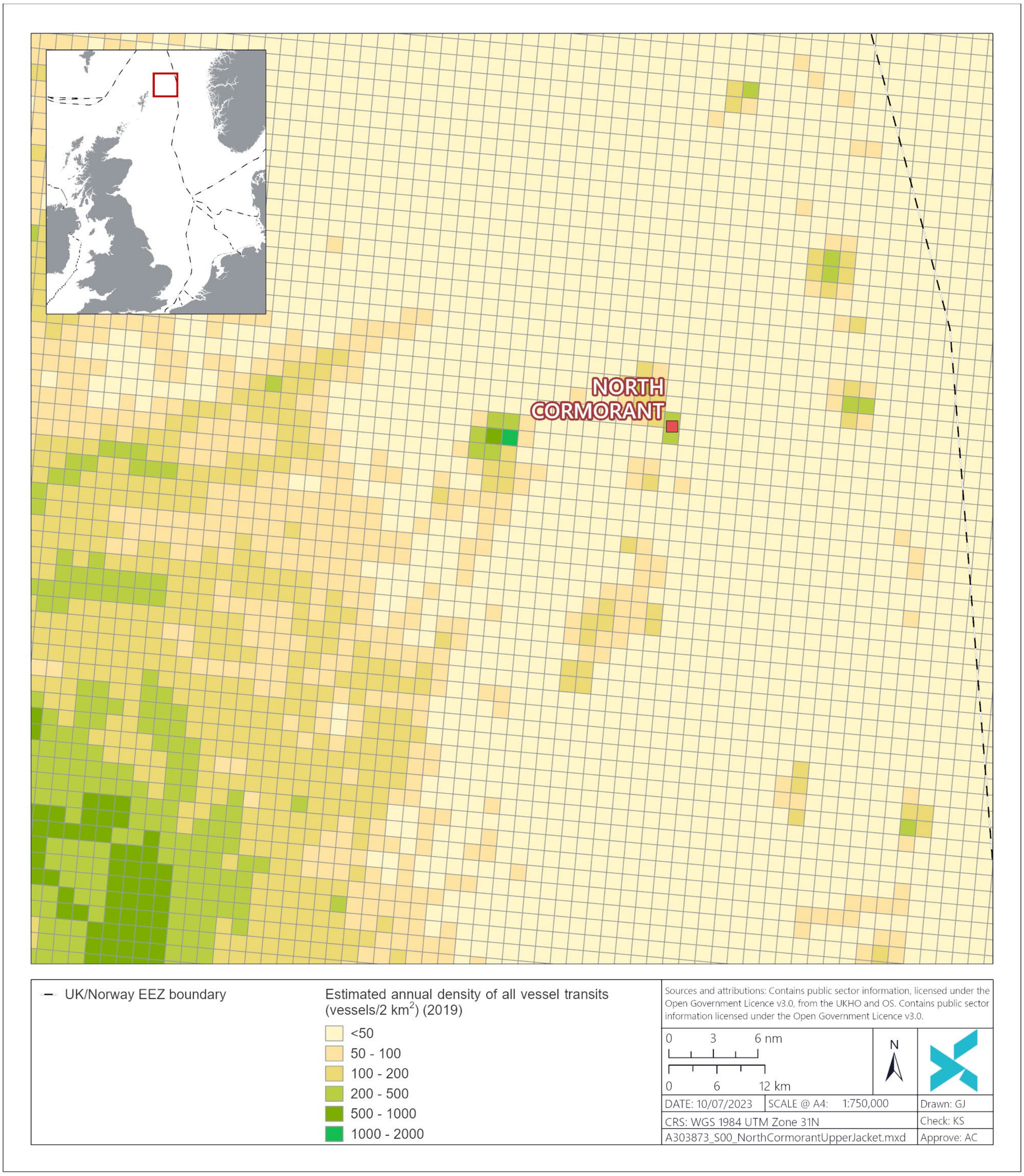

Figure 3-12 Annual Density of Vessel Transits Around the North Cormorant Platform in 2019

3.4.3 Oil and Gas Activity

There are several oil and gas installations in the vicinity of the North Cormorant platform, as shown in Figure 3-13. Table 3-7 provides the distances to installations less than 40 km from the North Cormorant platform.

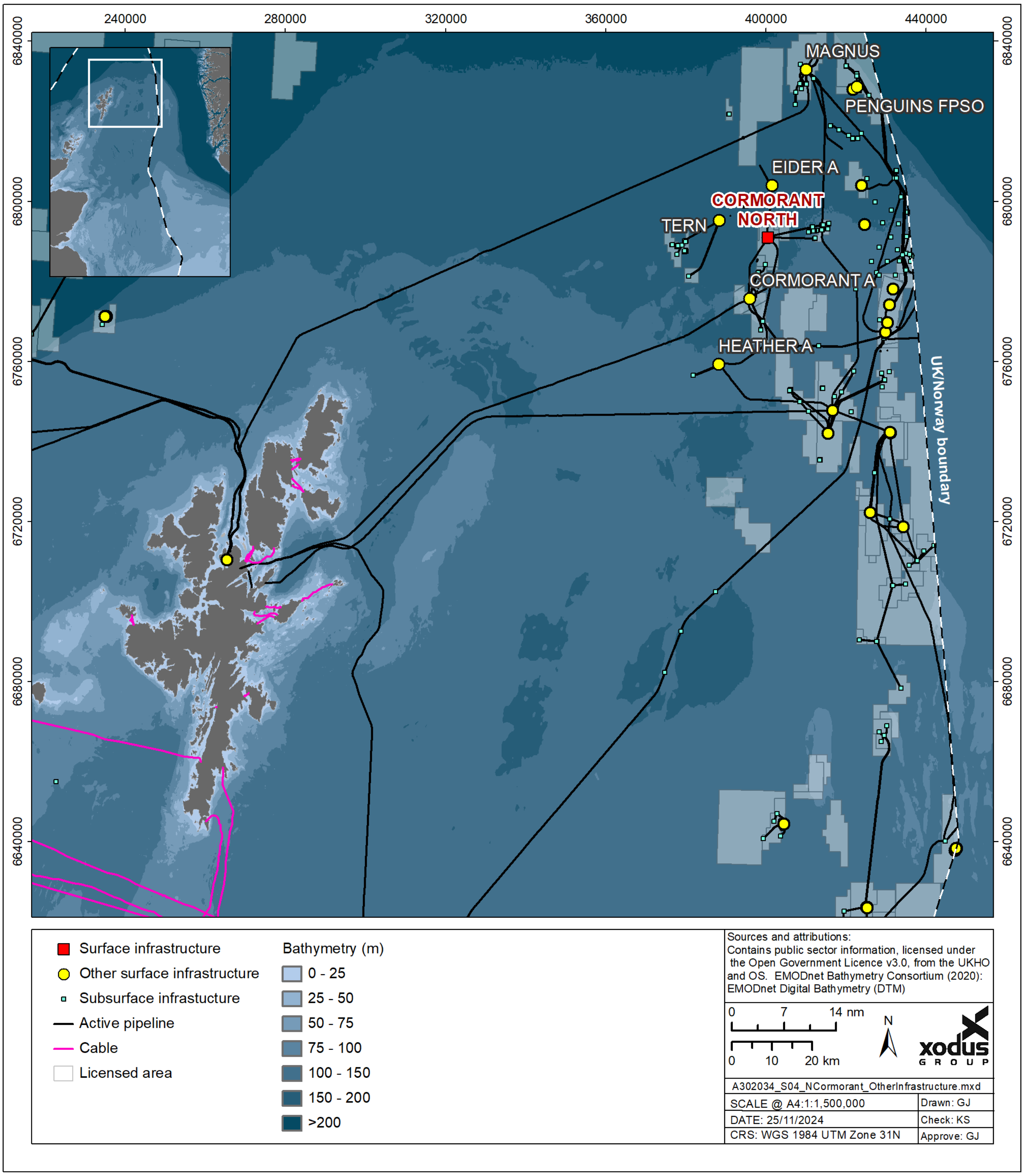

Figure 3-13 Installations in the Vicinity of the North Cormorant platform

Table 3-7 Installations Located within 40 km of the North Cormorant platform

Installation	Distance (km)	Direction from North Cormorant	Status
Tern Alpha	13.0	West	Under preparation for decommissioning
Eider Alpha	13.0	North	Under preparation for decommissioning
Cormorant Alpha	16.0	South	Active
Western Isles FPSO	21.0	West	Under preparation for decommissioning
Dunlin Alpha	24.0	East	Topsides removed
Thistle Alpha	27.0	Northeast	Under preparation for decommissioning

3.4.4 Military Activities

There are no charted Military Practice and Exercise Areas (PEXAs) the vicinity of the North Cormorant Upper Jacket (BEIS, 2022).

3.4.5 Renewable Energy

There are no operational offshore wind farms in the vicinity of the project area. However, the project area is close to areas identified under the Innovation for Targeted Oil and Gas (INTOG) scheme (Crown Estate, 2023a). INTOG area NE-b lies approximately 2.9 km southeast of North Cormorant and INTOG area NE-a lies approximately 38 km northwest of North Cormorant (Crown Estate 2023a, NMPI, 2023).

In addition to the INTOG areas, the NE1 ScotWind area lies approximately 99 km south-southwest of North Cormorant (Crown Estate, 2023b, NMPI, 2023).

There are no other renewables developments, proposed or active, within 100 km of the project area.

3.4.6 Telecommunication Cables

There are no telecommunication cables within or in the vicinity of Block 211/21 (NMPI, 2023).

3.4.7 Wrecks

There is one wreck site in Block 211/21. Transcend (a motor fishing vessel) is located 2 km to the west-southwest of the North Cormorant Upper Jacket (NMPI, 2023). This wreck site is not protected or dangerous.

4.0 EA METHODOLOGY

The Environmental Appraisal is designed to:

- Identify potential impacts to environmental and societal receptors from the proposed decommissioning activities;
- Evaluate the potential significance of any identified impacts in terms of the threat that they pose to these receptors; and
- Assign measures to manage the risks in line with industry best practice; and address concerns or issues raised by stakeholders through consolation.

The environmental appraisal was undertaken using the following approach:

- The potential environmental issues arising from the North Cormorant Upper Jacket decommissioning activities were identified through a combination of the expert judgement of project engineers and marine environmental specialists in a screening workshop, and consultation with key stakeholders (Section 4.1). The potential environmental issues were grouped under the following key receptor risk groups:
    - Emissions to air;
    - Disturbance to the seabed;
    - Physical presence of vessels in relation to other sea users;
    - Physical presence of infrastructure decommissioned *in situ* in relation to other sea users;
    - Physical presence of Footings following removal of the 500 m safety zone but prior to the Footings DP approval in relation to other sea users;
    - Discharges to sea;
    - Underwater noise emissions;
    - Resource use;
    - Onshore activities;
    - Waste;
    - Employment;
    - Unplanned events; and
    - Disturbance or destruction of seabird nests.
- Undertake initial screening based on a high-level consideration of these aspects against the evaluation criteria. Screening aspects in or out of further detailed assessment. Compile justification statements detailing the rationale for screening out any aspects from further assessment (Section 5.1).
- For aspects which are considered potentially significant, evaluate significance of potential impacts against impact criteria definitions (Section 4.2.3 to Section 4.2.5)
- For any potentially significant impact, capture potential mitigation and/or control measures to be used to further reduce any impact to ‘as low as reasonably practicable’ (ALARP).

4.1 Stakeholder Engagement

Consultation for the North Cormorant Upper Jacket decommissioning has been largely based on sharing project expectations, approach and specific considerations with key stakeholders including the Health and Safety Executive, Marine Scotland, JNCC and SFF. Any specific stakeholder consultation and comments will be provided in this section following public consultation.

4.2 EA Methodology

4.2.1 Overview

The North Cormorant Upper Jacket EA methodology was developed by reference to the Institute of Ecology and Environmental Management (IEEM) guidelines for marine impact assessment (IEEM, 2010), the Marine Life Information Network (MarLIN) species and ecosystem sensitivities guidelines (Tyler-Walters *et al*., 2004) and guidance provided by Scottish National Heritage (SNH) in its handbook on environmental impact assessment (SNH, 2018) and by The Institute of Environmental Management and Assessment (IEMA) in its guidelines for environmental impact assessment (IEMA, 2015, 2016).

Environmental impact assessment provides an assessment of the environmental and societal effects that may result from a project's impact on the receiving environment. The terms impact and effect have different definitions in environmental impact assessment, and one drives the other. Impacts are defined as the changes resulting from an action, and effects are defined as the consequences of those impacts.

In general, impacts are specific, measurable changes in the receiving environment (volume, time and/or area); for example, were a number of marine mammals to be disturbed following exposure to vessel noise emissions. Effects (the consequences of those impacts) consider the response of a receptor to an impact; for example, the effect of the marine mammal/noise impact example given above might be exclusion from an area caused by disturbance, leading to a population decline. The relationship between impacts and effects is not always so straightforward; for example, a secondary effect may result in both a direct and indirect impact on a single receptor. There may also be circumstances where a receptor is not sensitive to a particular impact and thus there will be no significant effects/consequences.

For each impact, the assessment identifies a receptor's sensitivity and vulnerability to that effect and implements a systematic approach to understand the level of impact. The process considers the following:

- Identification of receptor and impact (including duration, timing and nature of impact);
- Definition of sensitivity, vulnerability and value of receptor;
- Definition of magnitude and likelihood of impact; and
- Assessment of consequence of the impact on the receptor, considering the probability that it will occur, the spatial and temporal extent and the importance of the impact. If the assessment of consequence of impact is determined as moderate or major, it is considered a significant effect.

Once the consequence of a potential impact has been assessed it is possible to identify measures that can be taken to mitigate impacts through engineering decisions or execution of the project. This process also identifies aspects of the project that may require monitoring, such as a post-decommissioning survey at the completion of the works to inform inspection reports.

For some impacts, significance criteria are standard or numerically based. For others, for which no applicable limits, standards or guideline values exist, a more qualitative approach is required. This involves assessing significance using professional judgement.

Despite the assessment of impact significance being a subjective process, a defined methodology has been used to make the assessment as objective as possible and consistent across different topics. The assessment process is summarised below. The terms and criteria associated with the impact assessment process are described and defined; details on how these are combined to assess consequence and impact significance are then provided.

4.2.2 Baseline characterisation and receptors

To assess potential impacts on the environment it was necessary to firstly characterise the different aspects of the environment that could potentially be affected (the baseline environment). The baseline environment is described in Section 3.0 and is based on desk studies combined with additional site-specific studies such as surveys and modelling where required. Information obtained through consultation with key stakeholders was also used to help characterise specific aspects of the environment in more detail.

The EA process requires identification of the potential receptors that could be affected by the North Cormorant Upper Jacket Decommissioning Project (e.g. other users of the sea, water quality). High level receptors are identified and described in Section 3.0.

4.2.3 Impact definition

4.2.3.1 Impact magnitude

Determination of impact magnitude requires consideration of a range of key impact criteria including:

- Nature of impact, whether it be beneficial or adverse;
- Type of impact, be it direct or indirect;
- Size and scale of impact, i.e. the geographical area;
- Duration over which the impact is likely to occur e.g. days, weeks;
- Seasonality of impact, i.e. expected to occur all year or during specific times; and
- Frequency of impact, i.e. how often the impact is expected to occur.

Each of these variables is expanded upon in Table 4-1 to Table 4-5 to provide consistent definitions across all EA topics. In each impact assessment, these terms are used in the assessment summary table to summarise the impact and are enlarged upon as necessary in any supporting text. With respect to the nature of the impact (Table 4-1), it should be noted that all impacts discussed in this EA report are adverse unless explicitly stated otherwise.

Table 4-1 Nature of Impact

Nature of impact	Definition
Beneficial	Advantageous or positive effect to a receptor (i.e. an improvement).
Adverse	Detrimental or negative effect to a receptor.

Table 4-2 Type of Impact

Type of impact	Definition
Direct	Impacts that result from a direct interaction between the North Cormorant Upper Jacket Decommissioning Project and the receptor. Impacts that are caused by the activities.
Indirect	Reasonably foreseeable impacts that are caused by the interactions of the North Cormorant Upper Jacket Decommissioning Project, but which occur later in time than the original, or at a further distance. Indirect impacts include impacts that may be referred to as 'secondary', 'related' or 'induced'.
Cumulative	Impacts that act together with other impacts (including those from any concurrent or planned future third-party activities) to affect the same receptors as the North Cormorant Upper Jacket Decommissioning Project. Definition encompasses "in-combination" impacts.

Table 4-3 Duration of Impact

Duration	Definition
Short-term	Impacts that are predicted to last for a short duration (e.g. less than one year).
Temporary	Impacts that are predicted to last a limited period (e.g. a few years). For example, impacts that occur during the decommissioning activities and which do not extend beyond the main activity period for the works or which, due to the timescale for mitigation, reinstatement, or natural recovery, continue for only a limited time beyond completion of the anticipated activity
Prolonged	Impacts that may, although not necessarily, commence during the main phase of the decommissioning activity and which continue through the monitoring and maintenance, but which will eventually cease.
Permanent	Impacts that are predicted to cause a permanent, irreversible change.

Table 4-4 Geographical Extent of Impact

Geographical extent	Description
Local	Impacts that are limited to the area surrounding the North Cormorant Upper Jacket Decommissioning Project footprint and associated working areas. Alternatively, where appropriate, impacts that are restricted to a single habitat or biotope or community.
Regional	Impacts that are experienced beyond the local area to the wider region, as determined by habitat/ecosystem extent.
National	Impacts that affect nationally important receptors or protected areas, or which have consequences at a national level. This extent may refer to either Scotland or the UK depending on the context.
Transboundary	Impacts that could be experienced by neighbouring national administrative areas.
International	Impacts that affect areas protected by international conventions, European and internationally designated areas or internationally important populations of key receptors (e.g. birds, marine mammals).

Table 4-5 Frequency of Impact

Frequency	Description
Continuous	Impacts that occur continuously or frequently.
Intermittent	Impacts that are occasional or occur only under a specific set of circumstances that occurs several times during the North Cormorant Upper Jacket Decommissioning project. This definition also covers such impacts that occur on a planned or unplanned basis and those that may be described as 'periodic' impacts.

4.2.3.2 Impact magnitude criteria

Overall impact magnitude requires consideration of all impact parameters described above. Based on these parameters, magnitude can be assigned following the criteria outlined in Table 4-6. The resulting effect on the receptor is considered under vulnerability and is an evaluation based on scientific judgement.

Table 4-6 Impact Magnitude Criteria

Magnitude	Criteria
Major	Extent of change: Impact occurs over a large scale or spatial geographical extent and/or is long term or permanent in nature. Frequency/intensity of impact: high frequency (occurring repeatedly or continuously for a long period of time) and/or at high intensity.
Moderate	Extent of change: Impact occurs over a local to medium scale/spatial extent and/or has a prolonged duration. Frequency/intensity of impact: medium to high frequency (occurring repeatedly or continuously for a moderate length of time) and/or at moderate intensity or occurring occasionally/intermittently for short periods of time but at a moderate to high intensity.
Minor	Extent of change: Impact occurs on-site or is localised in scale/spatial extent and is of a temporary or short-term duration. Frequency/intensity of impact: low frequency (occurring occasionally/intermittently for short periods of time) and/or at low intensity.
Negligible	Extent of change: Impact is highly localised and very short term in nature (e.g. days/few weeks only).
Positive	An enhancement of some ecosystem or population parameter.
Notes: Magnitude of an impact is based on a variety of parameters. Definitions provided above are for guidance only and may not be appropriate for all impacts. For example, an impact may occur in a very localised area (minor to moderate) but at very high frequency/intensity for a long period of time (major). In such cases informed judgement is used to determine the most appropriate magnitude ranking and this is explained through the narrative of the assessment.	

4.2.3.3 Impact likelihood for unplanned and accidental events

The likelihood of an impact occurring for unplanned/accidental events is another factor that is considered in this impact assessment. This captures the probability that the impact will occur and also the probability that the receptor will be present and is based on knowledge of the receptor and experienced professional judgement. Consideration of likelihood is described in the impact characterisation text and used to provide context to the specific impact being assessed in topic specific chapters as required.

4.2.4 Receptor definition

As part of the assessment of impact significance it is necessary to differentiate between receptor sensitivity, vulnerability and value. Receptor sensitivity is defined as 'the degree to which a receptor is affected by an impact'.

Overall, receptor sensitivity is determined by considering a combination of value, adaptability, tolerance and recoverability. This is achieved by applying known research and information on the status and sensitivity of the receptor under consideration, coupled with professional judgment and experience.

The ability of a receptor to adapt, change, tolerate, and/or recover and the timing for recovery from potential impacts is key in assessing its vulnerability to the impact under consideration.

4.2.4.1 Receptor sensitivity

These range from negligible to very high and definitions for assessing the sensitivity of a receptor are provided in Table 4-7.

Table 4-7 Sensitivity of Receptor

Receptor Sensitivity	Definition
Very high	Receptor with no capacity to accommodate a particular effect and no ability to recover or adapt.
High	Receptor with very low capacity to accommodate a particular effect with low ability to recover or adapt.
Medium	Receptor with low capacity to accommodate a particular effect with low ability to recover or adapt.
Low	Receptor has some tolerance to accommodate a particular effect or will be able to recover or adapt.
Negligible	Receptor is generally tolerant and can accommodate a particular effect without the need to recover or adapt.

4.2.4.2 Receptor vulnerability

Information on both receptor sensitivity and impact magnitude is required to be able to determine receptor vulnerability. These criteria, described in Table 4-6 and Table 4-7 are used to define receptor vulnerability as per Table 4-8.

Table 4-8 Vulnerability of Receptor

Receptor Sensitivity	Definition
Very high	The impact will have a permanent effect on the behaviour or condition on a receptor such that the character, composition or attributes of the baseline, receptor population or functioning of a system will be permanently changed.
High	The impact will have a prolonged or extensive temporary effect on the behaviour or condition on a receptor resulting in long term or prolonged alteration in the character, composition or attributes of the baseline, receptor population or functioning of a system.

Receptor Sensitivity	Definition
Medium	The impact will have a short-term effect on the behaviour or condition on a receptor such that the character, composition, or attributes of the baseline, receptor population or functioning of a system will either be partially changed post development or experience extensive temporary change.
Low	Impact is not likely to affect long term function of system or status of population. There will be no noticeable long-term effects above the level of natural variation experience in the area.
Negligible	Changes to baseline conditions, receptor population of functioning of a system will be imperceptible.

It is important to note that the above approach to assessing sensitivity/vulnerability is not appropriate in all circumstances and in some instances professional judgement has been used in determining sensitivity. In some instances, it has also been necessary to take a precautionary approach where stakeholder concern exists with regard to a particular receptor. Where this is the case, this is detailed in the relevant impact assessment in Section 5.0.

4.2.4.3 Receptor value

The value or importance of a receptor is based on a pre-defined judgement based on legislative requirements, guidance or policy. Where these may be absent, it is necessary to make an informed judgement on receptor value based on perceived views of key stakeholders and specialists. Examples of receptor value definitions are provided in Table 4-9.

Table 4-9 Value of Receptor

Receptor Sensitivity	Definition
Very high	Receptor of international importance (e.g. United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site). Receptor of very high importance or rarity, such as those designated under international legislation (e.g. EU Habitats Directive) or those that are internationally recognised as globally threatened (e.g. IUCN red list). Receptor has little flexibility or capability to utilise alternative area. Best known or only example and/or significant potential to contribute to knowledge and understanding and/or outreach.
High	Receptor of national importance (e.g. NCMPA, Marine Conservation Zone (MCZ)). Receptor of high importance or rarity, such as those which are designated under national legislation, and/or ecological receptors such as UK BAP priority species with nationally important populations in the study area, and species that are near-threatened or vulnerable on the IUCN red list. Receptor provides the majority of income from the North Cormorant installation area. Above average example and/or high potential to contribute to knowledge and understanding and/or outreach.

Receptor Sensitivity	Definition
Medium	Receptor of regional importance. Receptor of moderate value or regional importance, and/or ecological receptors listed as of least concern on the IUCN red list, but which form qualifying interests on internationally designated sites, or which are present in internationally important numbers. Any receptor which is active in the North Cormorant installation area and utilises it for up to half of its annual income/activities. Average example and/or moderate potential to contribute to knowledge and understanding and/or outreach.
Low	Receptor of local importance. Receptor of low local importance and/or ecological receptors such as species which contribute to a national site, are present in regionally. Any receptor which is active in the North Cormorant installation area and reliant upon it for some income/activities. Below average example and/or low potential to contribute to knowledge and understanding and/or outreach.
Negligible	Receptor of very low importance, no specific value or concern. Receptor of very low importance, such as those which are generally abundant around the UK with no specific value or conservation concern. Receptor of very low importance and activity generally abundant in other areas/ not typically present in the North Cormorant installation area. Poor example and/or little or no potential to contribute to knowledge and understanding and/or outreach.

4.2.5 Consequence and significance of potential impact

Having determined impact magnitude and the sensitivity, vulnerability and value of the receptor, it is then necessary to evaluate impact significance. This involves:

- Determination of impact consequence based on a consideration of sensitivity, vulnerability and value of the receptor and impact magnitude;
- Assessment of impact significance based on assessment consequence;
- Mitigation; and
- Residual impacts.

4.2.5.1 Assessment of consequences and impact significance

The sensitivity, vulnerability and value of receptor are combined with magnitude (and likelihood, where appropriate) of impact using informed judgement to arrive at a consequence for each impact, as shown in Table 4-10. The significance of impact is derived directly from the assigned consequence ranking. The assessment of consequence considers mitigation measures that are embedded within the proposed activities.

Table 4-10 Assessment of Consequence

Assessment consequence	Description (consideration of receptor sensitivity and value and impact magnitude)	Impact significance
Major consequence	Impacts are likely to be highly noticeable and have long term effects, or permanently alter the character of the baseline and are likely to disrupt the function and status/value of the receptor population. They may have broader systemic consequences (e.g. to the wider ecosystem or industry). These impacts are a priority for mitigation in order to avoid or reduce the anticipated effects of the impact.	Significant
Moderate consequence	Impacts are likely to be noticeable and result in prolonged changes to the character of the baseline and may cause hardship to, or degradation of, the receptor population, although the overall function and value of the baseline/ receptor population is not disrupted. Such impacts are a priority for mitigation in order to avoid or reduce the anticipated effects of the impact.	Significant
Low consequence	Impacts are expected to comprise noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause long term degradation, hardship, or impair the function and value of the receptor. However, such impacts may be of interest to stakeholders and/or represent a contentious issue during the decision-making process and should therefore be avoided or mitigated as far as reasonably practicable.	Not significant
Negligible	Impacts are expected to be either indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not anticipated to be a stakeholder concern and/or a potentially contentious issue in the decision-making process.	Not significant
Positive	Impacts are expected to have a positive benefit or enhancement. These impacts do not require mitigation and are not anticipated to be a stakeholder concern and/or a potentially contentious issue in the decision-making process.	Not significant

4.2.6 Cumulative Impact Assessment

While the scope of this impact assessment is restricted to the decommissioning of the North Cormorant Upper Jacket as outlined in Section 2.0, there will be other marine activities which have the potential to interact with the activities completed under the decommissioning work scope. The impact assessments presented in the following sections consider the potential for significant cumulative impacts to occur as a result of overlapping activities. Those with the potential for significant contribution towards cumulative impacts are discussed further in Section 5.1.1.

4.2.7 Transboundary Impact Assessment

For most potential impacts from decommissioning, the likelihood of transboundary impact is low. However, where impacts on mobile receptors are of concern, the likelihood of a transboundary impact is higher. The impact assessments presented in the following sections have identified the potential for transboundary impacts and the potential for transboundary impact is considered within the definition of significance. Those with the potential for significant contribution towards transboundary impacts are discussed further in Section 5.1.1.

4.2.8 Mitigation

Where potentially significant impacts (i.e. those ranked as being of moderate consequence level or higher in Table 4-1) are identified, mitigation measures must be considered. The intention is that such measures should remove, reduce or manage the impacts to a point where the resulting residual significance is at an acceptable or insignificant level. Mitigation is also proposed in some instances to ensure impacts that are predicted to be not significant remain so.

5.0 IMPACT ASSESSMENT AND JUSTIFICATION

An impact assessment screening workshop was undertaken to discuss the proposed decommissioning activities and any potential impacts these may pose. This discussion identified thirteen potential impact areas based on the proposed removal methods. Of the thirteen potential impacts, all were screened out of further assessment based on the low level of severity, or likelihood of significant impact occurring. The potential impacts of the Upper Jacket decommissioning activities are assessed in Table 5-1, together with rationale for the screening decisions and proposed mitigations.

5.1 Assessment of potential impacts

Table 5-1 Assessment of Potential Impact Areas

Impact	Further assessment	Rationale	Proposed Mitigation
Emissions to air	No	TAQA has developed a draft Emissions Reduction Strategy which supports their commitment to Net Zero and the NSTA Stewardship Expectation 11. This strategy defines TAQA's asset portfolio, including decommissioning activities, and is intended to drive increased energy efficiencies and reduced emissions. TAQA plans several improvements under the Emissions Reduction Strategy including working with the supply chain, collating emission/energy savings initiatives across the business and reviewing emissions sources. The methodology that will be used to remove the Upper Jacket will not be known until detailed engineering is completed but it will include the number and sequence of cuts. Therefore, it will not be possible to prepare a detailed estimate of emissions until detailed engineering has been carried out. The emissions presented are the best estimate available at this time and present the bounding case for the worst-case emissions for the full scope. This assumes one vessel mobilisation for Upper Jacket removal. Notwithstanding, the North Cormorant Topsides will be removed before the Upper Jacket. In this case, TAQA may take the opportunity to perform some of the Upper Jacket removal works in parallel with the Topsides removal works. While ostensibly this will split the Upper Jacket removal works into two campaigns, it will not involve an additional mobilisation, as vessels will already be present at the North Cormorant Platform to perform the topsides removal works. If Upper jacket removal "pre-cuts" on the jacket are carried out during topsides removal, there is a potential associated saving in overall emissions. Upper Jacket removal operations may be interrupted by weather. In the extreme this may necessitate vessels seeking shelter. However, TAQA and its contractors will plan to carry out work in forecast clear weather windows to avoid this eventuality. It is not reasonable to factor additional mobilisations due to weather into the worst-case emissions estimate.	• Adherence to TAQA Emissions Reduction Strategy • Vessel management in accordance with TAQA's marine procedures. • Minimal vessel use/movement. • Vessel sharing where possible. • Engine maintenance.

Impact	Further assessment	Rationale	Proposed Mitigation
		TAQA will ensure that the minimal number of vessels will be deployed and streamline activities to reduce the time required to undertake activities, thereby supporting emissions reduction. Each vessel will have a SEEMP which contains information on minimising fuel consumptions. Reviewing historical EU Emissions Trading Scheme data and comparison with the likely emissions from the proposed workscope suggests that emissions relating to decommissioning will be small relative to those generated during production which, obviously, will cease as a result of decommissioning operations. Most emissions arising from North Cormorant Upper Jacket decommissioning relate to the vessel time or are associated with the recycling of material returned to shore. The estimated CO_2 emissions to be generated by the recommended decommissioning options is 22,137 Te (Appendix C: Energy and Emissions). This is based on four vessels working offshore for a total of approximately 87 vessel days, onshore deconstruction, onshore recycling, and onshore transport of materials. The total CO_2 emissions equates to marginally less than 15% of the operational emissions emitted by the North Cormorant asset during 2022 (148,173 Te) and less than 0.16% of the total UKCS oil and gas emissions in 2022 (14,300,000 Te; OEUK, 2023). Considering the above, atmospheric emissions do not warrant further assessment.	

Impact	Further assessment	Rationale	Proposed Mitigation
Disturbance to the seabed	No	The water depth at North Cormorant effectively precludes any vessel anchoring activities. Currently it is envisaged that all vessels undertaking the decommissioning and removal works would be dynamically positioned vessels. As a result, there will be no direct seabed interaction associated with the decommissioning of the Upper Jacket. Dynamically Positioned vessels may use taut wire systems as position references. These involve placing clump weights on the seabed. Any clump weights lowered to the seabed as Dynamic Positioning references will be placed to avoid disturbance of the cuttings pile. Similar clump weights were placed during the Brae Bravo topsides, flare jacket and Upper Jacket removal operations. In those operations, a total area of less than 2 m^2 of seabed was occupied during seven clump weight deployments. If clump weights are used during North Cormorant Upper Jacket removal, the number of placements is anticipated to be fewer and the area of impacted seabed therefore less than 2 m^2. Marine growth will be removed from the jacket to facilitate cutting operations. Cutting will be carried out using abrasive water jet or diamond wire. Both techniques will generate swarf, and abrasive water jet will release spent abrasive media. Any swarf, abrasive media, marine growth, etc. that falls to the seabed will fall within a footprint that extends some 15 m from the base of the jacket. Any such discharges are unlikely to cause significant disturbance to the seabed or cuttings pile. Brae Bravo removal operations resulted in the discharge of approximately 10 Te of marine growth, c 8 Te of spent abrasive and c 15 Te of swarf. Discharges of marine growth, spent abrasive, and swarf resulting from North Cormorant Upper Jacket removal are expected to be of a similar order of magnitude to those from Brae Bravo. Once the removal methodology is finalised, potential seabed impacts will be quantified, assessed and captured in the appropriate Consent to Locate / Marine Licence application and its supporting EA justification within the Portal Environmental Tracking System (PETS). On this basis, no further assessment need be undertaken.	• Dropped objects procedure will be followed according to industry standard. • A post-decommissioning seabed verification will be conducted using non-intrusive methods.

Physical presence of vessels in relation to other sea users	No	The presence of a small number of vessels for Upper Jacket decommissioning activities will be relatively short-term in the context of the life of the North Cormorant platform. Decommissioning will involve similar vessels to those currently deployed for operation of the platform. the exception of this is the HLV, which is larger than the vessels routinely used for operations. The small number of vessels required will be in use within the existing 500 m safety zone and will not occupy 'new' areas. Other sea users will be notified in advance of activities occurring meaning those stakeholders will have time to make any necessary alternative arrangements for the very limited period of operations. The decommissioning of the North Cormorant Upper Jacket is estimated to require up to four vessels, however these would not all be on location at the same time (a maximum of three vessels at any one time). A review of previously submitted decommissioning EAs show that some projects indicate a greater potential issue with short-term vessel presence, but those largely relate to project-specific sensitive locations, which is not the case for this decommissioning project. Therefore, the rationale for screening out impact on commercial fishing and other sea users is as follows; • The North Cormorant Upper Jacket Decommissioning Operations are restricted to the North Cormorant 500 m safety zone, with the exception of decommissioning vessels transiting to and from the worksite. • The 500 m safety zone is closed to fishing vessels and gear and other sea users. Therefore, the decommissioning operations in the 500 m zone will not impact fishing. • Decommissioning vessels transiting to and from the worksite may encounter fishing vessels that are fishing and other sea users. In such instances, normal rules of the sea will apply, to minimise inconvenience to fishing and other operations. Considering the above, temporary presence of vessels does not need further assessment.	• Minimal vessel use/movement. • Notification to Mariners. • Opening up of 500 m safety exclusion zone following close-out.

Impact	Further assessment	Rationale	Proposed Mitigation
Physical presence of infrastructure decommissioned *in situ* in relation to other sea users	No	As previously detailed, this documents scope is focused on the North Cormorant Upper Jacket. As such, the activities associated with the decommissioning of the Upper Jacket will not result in infrastructure decommissioned *in situ* considered within this scope. However, the Jacket Footings will remain *in situ*. The Footings will be the subject of a subsequent Decommissioning Programme. The Safety Case and associated regulations will continue to apply to the North Cormorant Jacket until it no longer projects above the sea surface at any state of the tide. TAQA will continue to manage operations to ensure that major accident risks to personnel, and the risk of a major environmental incident are managed to levels that are ALARP. Therefore, irrespective of whether Upper Jacket removal cuts take place over one, two or more campaigns spread over one or more seasons, TAQA will ensure that the jacket's integrity is appropriately managed and maintained. If pre-cuts are undertaken, a variation to the Consent to Locate will be submitted to reflect this. Considering the above, the physical presence of infrastructure decommissioned in situ in relation to other sea users (mainly commercial fishing vessels), does not need further assessment.	• A post-decommissioning seabed verification will be conducted using non-intrusive methods.
Physical presence of Footings following removal of the 500 m safety zone but prior to the Footings DP approval in relation to other sea users	No	Once the Upper Jacket is removed, there will be no aids to navigation in place to alert other sea users to the presence of the Jacket Footings. This potentially leads to an increase in the risk to other sea users. This issue will be addressed in a variation to the Consent to Locate for the installation. TAQA will also advise the relevant bodies of changes to the installation to facilitate updates to Admiralty charts and the FishSAFE system to notify other sea users of the presence of the Jacket Footings. Considering the above, the physical presence of Footings following removal of the 500 m safety zone but prior to the Footings DP approval in relation to other sea users (mainly commercial fishing vessels), does not need further assessment.	• A monitoring schedule for the Footings will be agreed with OPRED.

Impact	Further assessment	Rationale	Proposed Mitigation
Discharges to sea	No	Discharges from vessels are typically well-controlled activities that are regulated through vessel and machinery design, management and operation procedures. The diesel tanks will have been drained as part of the platform de-energisation process well in advance of Upper Jacket removal. The diesel tanks will not be cut through during Upper Jacket removal. However, small residual quantities of diesel may remain in the tanks that could be discharged during Upper Jacket removal. Prior to Upper Jacket removal operations commencing TAQA will apply for an oil discharge permit under the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations (OPPC) to cover potential residual diesel discharges. The potable water tanks in the jacket legs C2, E2 and E4 extend down to 159 m below LAT, while the tank in leg C4 extends down to 50 m below LAT. The legs will be cut at 116 m below LAT. Therefore, the C2, E2 and E4 tanks will be cut through during Upper Jacket removal. The C4 tank is unlikely to be cut. The volume of the larger water tanks, C2, E2 and E4, is approximately 500 m^3, and the volume of the smaller, C4, water tank is approximately 160 m^3. Given the benign nature of potable water, these discharges will not have any adverse environmental impact. Considering the above, discharges to sea resulting from any vessel and upper jacket removal activity should not be assessed further in this EA.	• International Convention for the Prevention of Pollution from Ships (MARPOL) compliance. • Compliance with Offshore Petroleum Activities (OPPC) Regulations 2005. • Bilge management procedures. • Vessel audit procedures. • Contractor management procedures.
Underwater noise emissions	No	Aside from vessel noise and upper jacket cutting activities, there will be no other noise generating activities. Vessel presence associated with the cutting process will be limited in duration and will mask the cutting noise generated (Pangerc *et al.*, 2016). The project is not located within an area protected for marine mammals. The cutting method will be determined during detailed engineering, and appropriate Marine Licence applications and a supporting environmental assessment will be submitted at that stage.	• Vessel management. • Minimal vessel use/movement. • Vessel sharing where possible.

Impact	Further assessment	Rationale	Proposed Mitigation
		With industry-standard mitigation measures and JNCC guidance, EAs for offshore oil and gas decommissioning projects typically show no injury, or significant disturbance associated with these projects (Shell, 2017; CNRI, 2013; CNRI, 2017; and Marathon, 2017). Notwithstanding, the cutting technique is likely to be diamond wire, or possibly abrasive water jet. The recently published DESNZ (2023) guidance on "The Use and Environmental Impact of Explosives in the Decommissioning of Offshore Wells and Facilities" states that "*Sound radiated from the diamond wire cutting of a conductor or abrasive water jets is not easily discernible above the background noise.*" Similarly, the detailed modelling carried out in support of East Brae Upper Jacket removal demonstrated that noise is not a significant issue. It is therefore appropriate to screen out jacket cutting noise from detailed consideration. On this basis, underwater noise does not warrant further assessment.	• Cutting activities will be minimised and carried out in isolation where possible.
Resource use	No	Generally, resource use from the proposed activities will require limited raw materials and be largely restricted to fuel use. The estimated total energy usage for the decommissioning activities is 264,826 GJ. Material will be returned to shore as a result of project activities, expectation is to reuse or recycle up to 95% of this returned material. There may be instances where infrastructure returned to shore is contaminated and cannot be recycled, but the weight/volume of such material is not expected to result in substantial landfill use. Considering the above, resource use does not warrant further assessment.	• Adherence to the Waste Hierarchy. • Vessel management. • Minimal vessel use/movement. • Vessel sharing where possible. • Engine maintenance.

Impact	Further assessment	Rationale	Proposed Mitigation
Onshore activities	No	The BEIS Guidance (BEIS, 2018) states that onshore activities are not in scope of Decommissioning EAs, and this topic does not require further assessment. It should be noted that, through TAQA's Waste Management Strategy, only licenced contractors will be considered who can demonstrate they are capable of handling and processing the material to be brought ashore. This will form part of the commercial tendering process.	• Overall 'Duty of Care'. • Selection of suitably licenced site (if applicable). • Communication with relevant Regulator(s) e.g., Scottish Environmental Protection Agency (SEPA) established.
Waste	No	It is waste management, not generation, that is the issue across DPs, often cited as a stakeholder concern. The majority of the waste to be brought to shore will be non-hazardous, including structural steel which will likely be recycled. The waste and materials present will be managed in line with TAQA's Waste Management Strategy and the Waste Hierarchy, as part of the project AWMP, using approved waste contractors and in liaison with the relevant Regulators (Section 2.5). On this basis, no further assessment of waste is necessary.	• Waste Hierarchy. • Waste Management Strategy and Active waste tracking. • Environmental and Emissions Monitoring System (EEMS) tracking and close-out reporting.
Employment	No	TAQA will communicate regularly with all crew members throughout. Following the above measures and continued communications further environmental assessment is not warranted for this aspect.	• Regular communication. • Contractor management.

Impact	Further assessment	Rationale	Proposed Mitigation
Unplanned events	No	Although the risk of oil spill is remote, an OPEP will be in place for the North Cormorant Decommissioning activities. Any spills from vessels in transit and outside the 500 m zone are covered by a separate SOPEP. Up to four vessels will be deployed during decommissioning activities at any one time, including an HLV, Construction Support Vessel (CSV), a support vessel and a survey vessel. The loss of diesel from one or all, of the diesel tanks onboard the North Cormorant platform is extremely unlikely and would only be expected to occur if a major incident caused the integrity of the platform itself to be compromised. In order to prevent a collision occurring, a 500m exclusion zone for general shipping is enforced around the platform, and the Emergency Response and Rescue Vessel (ERRV) patrols this zone. The North Cormorant platform is fitted with appropriate navigation aids to warn vessels of its presence, and the ERRV is equipped with radar and communication equipment so that any vessel in the area can be detected and contacted, if required. Dropped object procedures are industry-standard and there is only a very remote probability of any interaction with any live infrastructure. Any dropped objects of significant size will be removed. Any dropped objects will be addressed during the debris survey and clearance activities at the conclusion of decommissioning operations in the North Cormorant Area. Considering the above, the potential impacts from accidental chemical/hydrocarbon releases or dropped objects during decommissioning activities do not warrant further assessment in this EA.	• OPEP in place for operations. • SOPEP on all vessels. • Navigational warnings in place. • Spill response procedures. • Contractor management and communication. • Lifting operations management of risk. • Debris survey and clearance activities. • PON1/ PON2 submissions. • Careful planning, selection of equipment, subsequent management and implementation of activities.

Disturbance or destruction of seabird nests	No	In recent years, there has been an increase in the number of seabirds nesting on offshore installations. Opportunistic species such as kittiwake and herring gull use artificial nest locations and successfully rear chicks. In some instances, colonies of several hundred birds have established and return each year. Although for most offshore platforms, the number of breeding birds remains very low. All nesting birds and nesting activities are protected from damage by conservation legislation. Under the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2017 – (OMR 17), it is an offence to: • Take, damage or destroy the nest of any wild bird while that nest is in use or being built, or • Take or destroy an egg of any wild bird. This legislation is relevant to installations more than 12 nautical miles from the coast, applies to all species of bird and applies irrespective of the number of nests found. i.e. there is no *de minimis*. TAQA has in place a proactive Seabird Management Strategy, which will incorporate removal of the North Cormorant Upper Jacket, including the access platforms installed following removal of the MSF. This includes a suite of remedial strategies that can be used, if required, to prevent birds from nesting. Part of the strategy includes conducting independent annual nesting bird surveys on each of the platforms. Since 2022 there has been no evidence of nesting birds on North Cormorant. In addition, monthly surveys are conducted on the platform by trained personnel to provide a summary of bird activity and presence throughout the year. Again, these surveys have not identified any nesting birds. Prior to disembarkation, an asset specific survey will be undertaken to identify those areas of higher risk of nesting birds and appropriate deterrent measures will be put in place.	• TAQA Seabird Management Strategy. • Non-lethal deterrent methods. • Ornithologist support if required. • Disturbance licence in discussion with OPRED if required.

Impact	Further assessment	Rationale	Proposed Mitigation
		In addition to the ongoing annual surveys, a dedicated survey will be conducted prior to the arrival of the HLV in the field to re-confirm that no nesting birds or nests are present. In the event nesting birds or nests are encountered, TAQA will engage with OPRED to agree any necessary licensing obligations at that time. This may include application for a disturbance licence. Considering the above, the potential impacts on seabirds and seabird nests do not warrant further assessment in this EA.	

5.1.1 Cumulative and Transboundary Impacts

5.1.1.1 Marine Discharges

It is not anticipated that any chemicals within the remit of the Offshore Chemical Regulations 2002 (as amended) will be operationally used / discharged during the cutting of the North Cormorant Upper Jacket.

Discharges from vessels are typically well-controlled activities that are regulated through vessel and machinery design, management and operation procedures.

The diesel tanks will have been drained as part of the platform de-energisation process well in advance of Upper Jacket removal. These tanks will not be cut through during Upper Jacket removal. However, small residual quantities of diesel may remain in the tanks that could be discharged during Upper Jacket removal. Any such potential discharges will be identified, assessed, mitigated and controlled under an OPPC permit.

Despite the low wave energy at the seabed within the North Cormorant Field (McBreen *et al.* 2011), the annual mean wave height within the North Cormorant Field ranges from 2.71 m – 3.00 m and the annual mean wave power ranges from 36.1 – 42.0 kW/m (NMPI, 2023) and so these discharges would still be expected to disperse rapidly in the environment, long term or chronic effects are therefore highly unlikely. Due to the low levels of contaminants and the temporary nature of their discharge, such discharges are not of significant magnitude to have any discernible contribution to cumulative or transboundary impacts, particularly when contextualised with discharges associated with the ceased production operations.

5.1.1.2 Atmospheric Emissions

The potential cumulative effects associated with the atmospheric emissions produced by the vessels includes global warming (greenhouse gases), acidification (acid rain) and local air pollution. Localised impacts may include elevated levels of atmospheric emissions in the immediate area of the vessels. As discussed in Table 5-1 above, the contribution of atmospheric emissions from the proposed operations amounts to less than 15% of the operational emissions emitted by the asset during 2022 and less than 0.16% of the total atmospheric emissions associated with UKCS oil and gas activities in a year (note that the latter figure does not factor in atmospheric emissions associated with general shipping in the UK in a year, which would further reduce that percentage). It can therefore be concluded that the projected emissions do not represent a significant proportion of the UK offshore emissions, and therefore are not considered significant in cumulative terms.

In addition, the temporary nature of the emissions along with the remote geographic location and winds within the offshore environment means that the atmospheric emissions would be rapidly dispersed and are not likely to be detectable within a short distance from the source. Given the distance from the UK/ Norway median line (35 km), transboundary impacts are also deemed negligible.

5.1.1.3 Seabed Impacts

Currently it is envisaged that all vessels undertaking the decommissioning and removal works would be dynamically positioned vessels. As a result, there will be no direct seabed interaction associated with the decommissioning of the Upper Jacket. Should this change following the commercial tendering process and, for example, an anchor vessel be required or should the cutting methodology result in swarf or abrasive media falling to the seabed, any potential impact would be quantified, assessed and captured in the appropriate Consent to Locate / Marine Licence application and its supporting EIA justification within PETS.

Even in the event that such disturbance was to take place, it would be highly localised and of insufficient magnitude to contribute any discernible contribution towards cumulative or transboundary impacts. For example, swarf / abrasive media falling to the seabed would do so within the confines of the ~0.01 km^2 footprint of the installation Footings. There are six surrounding oil and gas assets within a 40 km radius of North Cormorant, all subject to decommissioning in the coming years, and the anticipated seabed footprint of these activities cannot be known at present. However, the ~0.01 km^2 seabed footprint which could potentially be subject to some form of disturbance resulting from the North Cormorant Upper Jacket decommissioning amounts to less than 0.0002% of the 5,027 km^2 of seabed available within that 40 km radius, which is a well-established area of oil and gas development. It is therefore reasonable to presume that any potential seabed disturbance associated with the proposed operations cannot be of significant magnitude to have any discernible contribution to cumulative impacts.

6.0 CONCLUSIONS

The North Cormorant Upper Jacket is located 113 km from Shetland in the NNS, remote from coastal sensitivities and from any designated sites. Therefore, no impact to any protected or sensitive habitats or species is expected. The marine environment where the North Cormorant Upper Jacket is located is typical of the NNS. Whilst recognising there are certain times of the year when populations of seabirds, spawning fish and commercial fisheries are vulnerable to oil pollution, the area is not considered to be particularly sensitive to the proposed decommissioning activities.

This EA presents a detailed review of the project activities, the environmental sensitivities of the project area and stakeholder concerns, informed by industry experience of decommissioning activities and their interaction with various aspects of the environment. It has also considered the objectives and marine planning policies of the NMP across the range of policy topics including biodiversity, natural heritage, cumulative impacts and the oil and gas sector. TAQA considers that the proposed decommissioning activities are in alignment with such objectives and policies.

Based on the findings of this EA, the identification and subsequent application of appropriate mitigation measures, and project management according to TAQA's HSSE Policy and EMS, it is considered that the proposed North Cormorant Upper Jacket decommissioning activities do not pose any significant threat of impact to environmental or societal receptors within the UKCS.

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APPENDIX A: TAQA HSSE POLICY

TAQA UK Health, Safety, Security and Environment Policy

The health, safety and security of our employees, contractors and the public is our highest priority; it is more important than any operational priority.

We must also:

- Ensure that our assets are operated safely
- Assure the integrity of our assets
- Respect, protect and understand the natural environment

HSSE = Health, Personal Safety, Major Accident Prevention, Security and Environment

We strongly believe that excellent business performance requires excellent HSSE performance – we recognise this as a core value.

Employees and contractors are required to focus on the four areas below:

Leadership

- Everyone within TAQA demonstrates commitment and accountability to implement this policy and to work in accordance with the TAQA Management System Elements and Expectations
- Everyone within TAQA understands their accountabilities for the management of HSSE
- The structure and resources necessary to achieve and measure HSSE accountabilities are provided
- Requirements of applicable legislation and standards are identified, understood and complied with
- Personnel have the required competencies and are fit for work
- Our workforce is aligned, involved and empowered in the identification and management of HSSE hazards and the achievement of our HSSE goals
- Key stakeholder groups are identified and a good working relationship is maintained with them (understanding and addressing their issues and concerns)

Operational Risk Identification and Assessment

- Risks are identified, assessed and appropriately managed
- Information required to support safe operation is identified, accurate, available and up to date

Operational Risk Management

- The standards, procedures and operating manuals required to support project, maintenance and operational activities are identified, developed, understood and consistently applied
- Process and operational status monitoring and handover requirements are defined, understood and carried out
- Operational interfaces with third parties are identified, assessed and appropriately managed

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TAQA UK Health, Safety, Security and Environment Policy

- Risks arising from any form of change are systematically identified, assessed and managed
- A systematic process is in place to verify the safe condition of plant and equipment and to ensure that personnel are appropriately prepared (before start-up or return to normal operations)
- We are appropriately prepared for all necessary actions which may be required for the protection of the public, personnel (including contractors), the environment, plant equipment and reputation in the event of an incident
- We aim to prevent pollution and protect the environment from the impact of our operations

Review and Improvement

- We routinely monitor our activities through internal/external audits and produce key performance indicators – we review these indicators and intervene as necessary
- Compliance with our expectations is routinely reviewed and audited to determine whether this policy remains appropriate and is being implemented effectively
- The management system is routinely reviewed for continual improvement and to enhance HSSE performance
- All incidents, near misses and opportunities for improvement are consistently reported and investigated, and that identified actions and learnings are implemented on a timely basis

We all have a personal responsibility to work safely and protect the environment. We are all safety leaders, irrespective of our role or location. Everyone is empowered to challenge and stop work if they are in any doubt regarding a job they are involved in or observing.

Donald Taylor, Managing Director

John Mulvany, HSSEQ Director

Jeremy Kibble, Finance Director

Sandy Hutchison, Legal, Commercial and Business Services Director

Calum Riddell, Operations Director

David Wilson, Decommissioning and Projects Director

Corrine Kelt, Human Resources Director

Gary Tootill, Technical Director

APPENDIX B: SEABED PHYSICAL AND CHEMICAL COMPOSITION

Table B-1 Summary of surface particle characteristics from the wider area (Benthic Solutions, 2019)

Station	Direction from platform	Depth (m)	Distance from Platform (m)	Mean Sediment Size (mm)	Fines (%)	Sands (%)	Gravel (%)
NC_EBS_01	SE	164	122	0.06	46.8	52.4	0.9
NC_EBS_02	SW	164	100	1.97	3.6	53.9	42.6
NC_EBS_03	NW	164	100	0.06	45.8	45.9	8.3
NC_EBS_04	NE	164	100	0.05	57.2	42.6	0.2
NC_EBS_05	SE	164	250	0.12	24.3	73.9	1.5
NC_EBS_06	SW	164	250	0.09	28.3	70.9	0.8
NC_EBS_07	NW	164	250	0.11	25.5	71.4	3.1
NC_EBS_08	NE	163	250	0.09	29.4	67.0	3.6
NC_EBS_09	SE	164	500	0.10	26.1	72.5	1.3
NC_EBS_10	NW	164	500	0.09	27.6	71.5	0.8
Mean				0.27	31.5	62.2	6.3
Standard Deviation				0.60	15.0	12.2	13.0

Table B-2 Summary of Total Hydrocarbons Content (THC), Total Organic Carbon (TOC) and Total Organic Matter (TOM) from the wider area (Benthic Solutions, 2019)

Station	Direction from platform	Depth (m)	Distance from Platform (m)	THC ($mg.kg^{-1}$)	TOC (%M/M)	TOM (%)
NC_EBS_01	SE	164	122	4,530	1.2	4.5
NC_EBS_02	SW	164	100	390	1.1	3.6
NC_EBS_03	NW	164	100	1,850	1.0	4.2
NC_EBS_04	NE	164	100	967	0.92	3.7

Station	Direction from platform	Depth (m)	Distance from Platform (m)	THC ($mg.kg^{-1}$)	TOC (%M/M)	TOM (%)
NC_EBS_05	SE	164	250	35	0.47	1.8
NC_EBS_06	SW	164	250	176	0.47	2.1
NC_EBS_07	NW	164	250	93	0.55	2.2
NC_EBS_08	NE	163	250	133	0.56	2.4
NC_EBS_09	SE	164	500	56	0.51	2.2
NC_EBS_10	NW	164	500	47	0.52	2.3
Mean				**828**	**0.72**	**2.9**
Standard Deviation				**1,424**	**0.28**	**1.0**
Reference value:						
UKOOA 95th Percentile (UKOOA, 2001)				**20.32**		**2.04**

Table B-3 Total Heavy and Trace Metal Concentrations (µg/g^{-1} or ppm) from the Wider Area (Benthic Solutions, 2019)

Station	Depth (m)	Distance from Platform (m)	Arsenic (HF-MS)	Cadmium (HF-MS)	Chromium (HF-MS)	Copper (HF-MS)	Lead (HF-MS)	Mercury (Tot.MS)	Nickel (HF-MS)	Vanadium (HF-MS)	Zinc (HF-MS)	Aluminium (Sediments HF-OES)	Iron (HF-OES)	Barium (Sediments HF-OES)	Barium (By Fusion)	Strontium (Sediments	Lithium (HF-OES)
NC_EBS_01	164	122	23.7	2.00	45.6	79.4	468.0	0.79	27.8	46.2	1,572.0	16,000	34,800	119	2,430	438	28.7
NC_EBS_02	164	100	23.0	2.06	48.7	99.4	404.0	0.71	25.6	41.0	2,107.0	10,900	37,100	135	2,540	447	25.6
NC_EBS_03	164	100	18.5	1.08	52.0	101.0	237.0	0.38	20.0	34.1	1,071.0	10,300	26,300	146	3,310	420	26.7
NC_EBS_04	164	100	37.2	3.48	43.1	90.7	751.0	0.92	31.4	43.2	2,674.0	11,400	39,400	91	2,800	613	25.1
NC_EBS_05	164	250	3.3	0.29	9.9	12.0	42.0	0.08	7.0	8.9	188.0	2,230	5,710	2,460	3,980	460	5.8
NC_EBS_06	164	250	3.2	0.24	13.1	15.8	34.7	0.12	6.7	10.5	117.0	2,760	6,670	2,930	12,000	521	6.6
NC_EBS_07	164	250	3.1	0.23	11.5	19.8	30.4	0.10	7.1	10.8	114.0	3,120	6,840	3,030	16,700	565	7.3
NC_EBS_08	163	250	6.1	0.29	17.9	16.9	59.8	0.18	9.6	17.0	113.0	3,860	8,640	1,210	22,600	490	9.1
NC_EBS_09	164	500	1.9	0.14	11.0	8.1	15.7	0.13	7.4	10.3	37.7	2,910	5,420	2,860	4,930	595	7.3
NC_EBS_10	164	500	1.6	0.14	8.6	10.8	11.8	<0.015	6.9	8.7	36.6	2,480	4,730	2,650	3,400	546	6.7
Mean			12.2	1.00	26.1	45.4	205.4	0.38	15.0	23.1	803.0	6,596	17,561	1,563	7,469	510	14.9
Standard Deviation			12.5	1.15	18.5	41.2	255.6	0.34	10.1	16.0	990.9	5,029	14,899	1,338	7,139	69	10.1
Reference Values																	
UKOAA 95th Percentile (UKOOA, 2001; µg/g^{-1})			**-**	**0.81**	**11.48**	**4**	**11.03**	**0.10**	**7**	**19.66**	**17.10**	**-**	**8,039.80**	**577.25**	**-**	**-**	
Cefas (2001) mean levels of metals within 500 m of North Sea oil and gas platforms (µg/g^{-1})			**-**	**0.85**	**34.68**	**17.45**	**57.52**	**0.36**	**17.79**	**32.61**	**129.74**	**-**	**14,096.14**	**-**	**33,562.12**	**-**	**-**

Source: Benthic Solutions (2019). Light orange cell = above ERL/TEL or TRV (whichever is lowest). Dark orange cell = above ERM/PEL (whichever is lowest

APPENDIX C: ENERGY AND EMISSIONS

Table C-1 Energy and Emissions by Project Activity for Decommissioning of Upper Jacket

Planned activity	Operations energy (GJ)	Operations CO_2 (Te)
Onshore transportation of materials	14	1
Onshore deconstruction	14,950	N/a
Onshore recycling of materials	110,565	11,794
Offshore transport	139,297	10,342
Total	264,826	22,137

Table C-2 Offshore Transport Energy and Emissions for Decommissioning of Upper Jacket

Vessel type	Total Duration (days)					Operations energy (GJ)	Operations CO_2 (Te)
	Mob/ Demob	Transit	Working	Wait on Weather	Total		
HLV	0.75	4.83	16.8	0	22.38	139,297	10,342
CSV	2	2	18.9	0	22.9		
Supply vessel	4	7	14.7	0	25.7		
Survey vessel[1]	6	6	1.5	2.025	15.525		
Total	12.75	19.83	51.9	2.025	86.505		

[1] "Survey Vessel" is collective term to cover Dive and / or ROV Support Vessels (DSVs / ROVs)

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