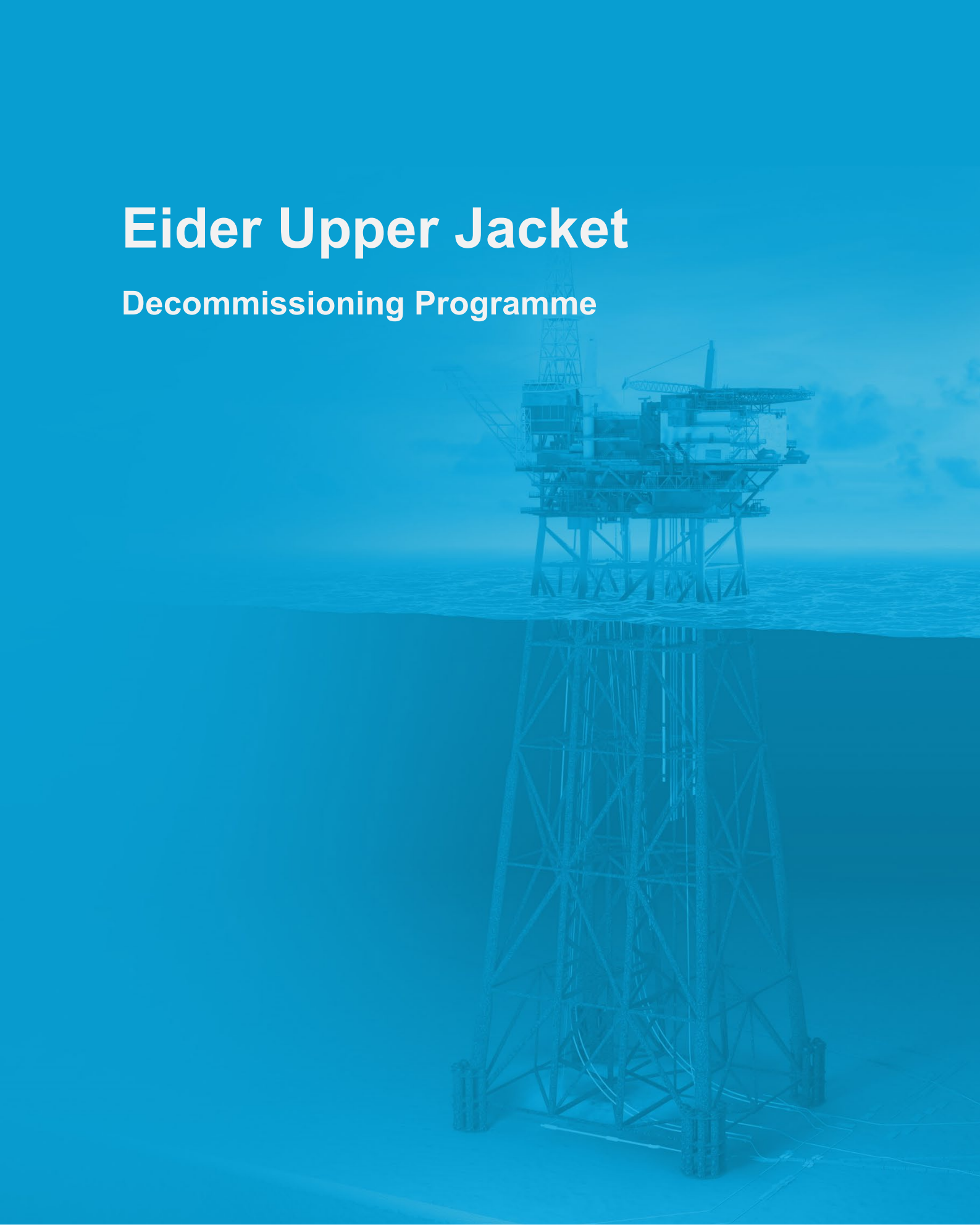
Eider Upper Jacket

Decommissioning Programme



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ABBREVIATIONS

Abbreviation	Explanation
AWMP	Active Waste Management Plan
BEIS	Department of Business, Energy & Industrial Strategy (now the Department for Energy Security and Net Zero)
CoP	Cessation of Production
DP	Decommissioning Programme
EA	Environmental Appraisal
ES	Environmental Statement
FPAL	First Point Assessment Limited
HLV	Heavy Lift Vessel
IPR	Interim Pipeline Regime
JLS	Jacket Lift System
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
MARPOL	International Convention for the Prevention of Pollution from Ships
NNS	Northern North Sea
NORM	Naturally Occurring Radioactive Material
NSTA	North Sea Transition Authority (Previously the OGA)
OGA	Oil and Gas Authority (Now the NSTA)
OPEP	Oil Pollution Emergency Plan
OPEX	Operational Expense
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo Paris Convention
SLV	Single Lift Vessel
SOPEP	Shipboard Oil Pollution Emergency Plan
TAQA	TAQA Bratani Limited
Te	Tonnes
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
WBS	Work Breakdown Structure

1 EXECUTIVE SUMMARY

1.1 Decommissioning Programme

This document contains six Decommissioning Programmes (DP), one for the Eider Upper Jacket, and five for the associated pipelines, etc.

The Upper Jacket consists of the platform's sub-structure from the topside cut height, 11 to 15 m above Lowest Astronomical Tide (LAT) to approximately 127 m below LAT, which is circa 30m above the seabed. See Figure 1-1. This section of the sub-structure is referred to as the "Upper Jacket" throughout this document. The lower section of the sub-structure is referred to as the "Footings". The Footings will be covered by a separate DP and supporting documents to be submitted to Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) in due course. The platform topsides are covered by a separate DP which was approved in May 2020 [1].

The Eider platform is located in Block 211/16a in the UK Northern North Sea. The field was discovered in May 1976. The platform was installed in June 1988 and production started in November 1988.

A CoP (Cessation of Production) application for Eider was accepted by the Oil and Gas Authority (OGA now the NSTA) in 2017 and production at Eider ceased in January 2018.

This Eider Upper Jacket Decommissioning Programme is supported by an Environmental Appraisal see Section 4, and technical assessments [2][3]. Early decommissioning planning commenced in 2020. Decommissioning will take place starting in 2025 at the earliest. TAQA expects completion of decommissioning by 2030.

1.2 Requirement for Decommissioning Programme

In accordance with the Petroleum Act 1998, the Eider installation Section 29 notice holders listed in Table 1.2 are applying to OPRED for approval to decommission the Eider Upper Jacket detailed in Section 2.1 and 3.1 of this document. Appendix 2 presents Section 29 Holders' Letters of Support for the proposed Decommissioning Programme.

In conjunction with stakeholder and regulatory consultation, this Decommissioning Programme is submitted in compliance with national regulations, international obligations and OPRED guidelines. This Decommissioning Programme is for a ~10-year schedule, which began in 2020.

1.3 Introduction

The Eider platform was designed as a fixed Installation serving as an attended production facility for the Eider Field, which lies within the East Shetland Basin of the UKCS in licence block 211/16a. Since 2018 the installation has been in 'Utility Mode' after native production ceased and production from the Otter subsea field was rerouted from the Eider platform to North Cormorant.

The Eider platform is located in 157.5m water depth and comprises an eight-legged steel sub-structure supporting modular topsides. The sub-structure is a 'K' braced frame with extensive horizontal and diagonal bracings throughout the water column. It is secured to the seabed by twenty four piles, six at each corner leg. The piles are 2.13m diameter steel tubes that are 69.5m long and driven to an average depth of 50m. The corner legs (A1, B1, A4, B4) measure 4.8m in diameter at the base. The Footings footprint at seabed level is 80m by 70m. The plan area at the top of the sub-structure is 53m by 23m, see Figure 1-1. The sub-structure was originally barge launched, upended, and sunk to the seabed in a controlled fashion. It was then anchored using the piles at the corner legs. Each pile is grouted into a pile sleeve. The pile sleeves are integral parts of the sub-structure secured to the legs by shear plates. Eider was installed in 1988, the overall installed weight of the entire sub-structure, consisting of the Upper Jacket and Footings, is estimated as 18,650 Te, excluding marine growth, piles, and grout. The sub-structure is therefore a candidate for derogation under OSPAR decision 98/3.

The Upper Jacket covered by this Decommissioning Programme (DP) has an estimated lift weight of ≈14,000 Te including marine growth. The Upper Jacket extends from the topside cut height to a cut depth of approximately 127 m below LAT. The exact cut depth will be determined following detailed engineering considering technical constraints such as: sub-structure design, in particular the 'K' bracing and cutting technology and safety impacts. Once the exact planned cut depth is known, OPRED will be advised. The cut depths of individual members achieved in practice may vary from the planned depth by one or two meters. OPRED will be advised of the precise cut depths achieved following Upper Jacket removal.

Production on Eider ceased in 2018. The platform was retained as a support facility to provide subsea controls / utilities for the Otter field and back-up power generation to the North Cormorant platform. Otter is a subsea field that originally produced via Eider. Due to technical issues, and to maximise the life of the field and avoid reserves becoming stranded, Otter production was rerouted to North Cormorant bypassing Eider. This was achieved by the installation of a water injection line from Tern to Otter and an oil export line from Otter to North Cormorant. Otter reservoir fluids are processed on North Cormorant and exported via the Brent System to the Sullom Voe Terminal. It is projected that Otter production will continue until North Cormorant reaches CoP when it will not be able to process Otter produced fluids. At this time, the requirement for the Eider platform will end and the facility will be decommissioned.

The pipeline riser sections that are attached to the Upper Jacket will be removed with the Upper Jacket.

TAQA has carried out an assessment [3] that confirms that removal of the Upper Jacket will not preclude subsequent decommissioning of the sub-structure Footings since, following removal of the Upper Jacket the Footings have sufficient inherent structural integrity to allow a variety of decommissioning options utilising a range of decommissioning vessels and methodologies to be considered.

The Eider Topsides will be removed under a separate DP [1], which was approved in 2020. During the period after Topsides removal, but before Upper Jacket removal, aids to navigation will be maintained on the sub-structure to mitigate risk to other sea users.

Separate Decommissioning Programmes covering the Eider Footings and associated pipelines, power cables and umbilicals will be submitted at a later stage, in line with TAQA's wider northern North Sea

decommissioning plans. Section 3.1 describes the boundaries of the Decommissioning Programme contained in this document in detail.

Two of the jacket legs, B2 and B3, are used for storage of base oil and diesel, respectively. The tanks will be cut through during Upper Jacket removal. The tanks will be flushed prior to Upper Jacket removal, and TAQA will also apply for an oil discharge permit prior to Upper Jacket removal.

There is a drill cuttings pile at the base of the Eider sub-structure as shown in Figure 1-1. The cuttings pile is outside the scope of this Decommissioning Programme. The Eider Footings Decommissioning Programme will address the cuttings pile.

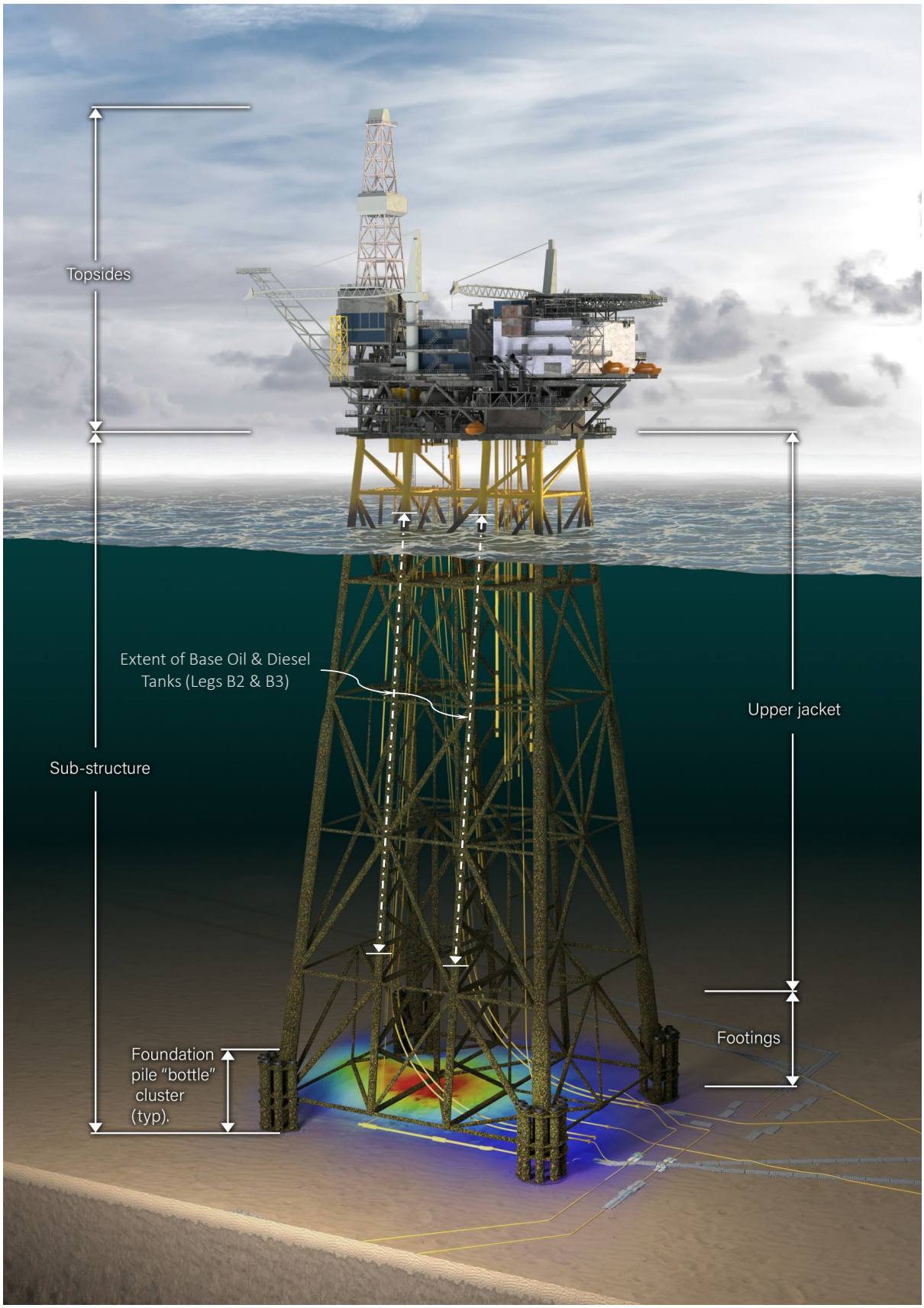


Figure 1-1: Eider Overview

1.4 Overview of Installation Being Decommissioned

1.4.1 Installation

Table 1.1: Installation to be Decommissioned			
Field:	**Eider**	**Production Type** (Oil/Gas/Condensate):	**Oil/Gas/Condensate**
Water Depth:	**157.5m**	**UKCS Block**:	**211/16a**
Distance to Median (km):	**32 km**	**Distance from Nearest UK Coastline** (km):	**120 km**
Surface Installation			
Number:	**Type:**	**Total Upper Jacket Weight (Te):**	
1	Fixed Large Steel Jacket	≈14,000 Te*	

*Including marine growth

Table 1.2: Installation Section 29 Notice Holders Details		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)**
TAQA Bratani Limited	05975475	100%
Shell U.K. Limited	00140141	0%
Esso Exploration and Production UK Limited	00207426	0%

1.4.2 Pipeline Risers / J tubes

The pipeline, umbilical and power cable riser / J tube sections listed below will be removed as part of the Upper Jacket. TAQA is the Operator of all of these pipelines, umbilicals, and power cables. TAQA will consult the S29 notice holders for these facilities and keep them informed of decommissioning plans and progress. The various Section 29 Notice Holders for these risers are listed in Table 1.3, Table 1.4, Table 1.5, Table 1.6, and Table 1.7.

- Rigid Risers:
  - PL6184. (This riser previously connected to PL475, the Eider to North Cormorant 12" production export pipeline).
  - PL6185. (This riser previously connected to PL1317, the Tern to Eider Water Injection Import 12" pipeline).
- Flexible Risers in J tubes
  - PL1868B in a 16" J tube. (This riser previously connected to PL1868, the Otter to Eider 10" multiphase production pipeline riser).
  - PL4310 in a 16" J tube.
- Umbilicals / Power Cables in J tubes
  - PLU1870 Eider to Otter control umbilical in a 16" J tube.
  - PL4438, PL 4439, PL 4440, three 11kV electric submersible pump power cables from Eider to Otter contained in one 16" J tube.
  - PL3815, 33 kV import/export power cable linking North Cormorant and Eider in a 16" J tube.

The Eider Platform is hydrocarbon free and subsea production has been bypassed. All pipelines and risers have been drained, flushed, purged, and vented. The risers and J tubes will be severed at the Upper Jacket cut depth approximately 127 m below LAT. The upper sections of the rigid risers and J tubes will be removed with the Upper Jacket. There are riser guides below the proposed Upper Jacket cut depth, which will continue to stabilise the risers after the Upper Jacket removal.

The Pipeline Works Authorisations for the pipelines, umbilical and power cables will be amended as necessary to reflect the as left status. The subsea sections of the pipelines, umbilical, and power cables will be covered by further Decommissioning Programmes.

Table 1.3: Riser S29 Notice Holders; PL6184, PL6185		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)**
TAQA Bratani Limited	05975475	100
Shell U.K. Limited	00140141	0
Esso Exploration and Production UK Limited	00207426	0

Table 1.4: Riser S29 Notice Holders; PL1868B		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)**
TAQA Bratani Limited	05975475	100
TAQA Bratani LNS Limited	06230540	0
Dana Petroleum (BVUK) Limited	03337437	0
Fina Exploration Limited	00808167	0
Fina Petroleum Development Limited	00740632	0

Table 1.5: Riser S29 Notice Holders; PLU1870		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)**
TAQA Bratani Limited	05975475	80.996
TAQA Bratani LNS Limited	06230540	19.004
Dana Petroleum (BVUK) Limited	03337437	0
Fina Exploration Limited	00808167	0
Fina Petroleum Development Limited	00740632	0

Table 1.6: Riser S29 Notice Holders; PL4310, PL4438, PL4439, PL4440,		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)**
TAQA Bratani Limited	05975475	80.996
TAQA Bratani LNS Limited	06230540	19.004

Table 1.7: Riser S29 Notice Holders; PL3815,		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)**
TAQA Bratani Limited	05975475	100

1.5 Summary of Proposed Decommissioning Programme

Table 1.8: Summary of Decommissioning Programme	
Proposed Decommissioning Solution	**Reason for Selection**
Upper Jacket	
Removal of the Eider Upper Jacket to approximately 127 m below LAT. Recovered material will be returned to shore for recycling or disposal. (Well conductors were cut at a depth of ≈143 m below LAT with the exception of EA10 which was cut at 141.8 m below LAT, as outlined in the topsides DP [1] and removed as part of the well P&A campaign).	Removal of the Eider Upper Jacket to approximately 127 m below LAT complies with OSPAR Decision 98/3 and Regulatory requirements.
Rigid Riser Sections	
The rigid risers were installed with the Eider sub-structure and the upper sections of these risers will be removed as part of the Upper Jacket. The cut elevation of the risers will be aligned with the cut depth of the Upper Jacket at 127 m below LAT or deeper.	Removal of the Eider rigid risers with the Upper Jacket to approximately 127 m below LAT complies with OSPAR Decision 98/3 and Regulatory requirements.
Flexible Riser, Umbilical & Power Cable Sections	
There are two flexible risers, one umbilical and four power cables installed in J tubes, which are part of the Eider sub-structure. The upper sections of the J Tubes, flexible risers, umbilical and power cables will be removed with the Upper Jacket. The cut depth of the J tubes will be aligned with the cut depth of the Upper Jacket at 127 m below LAT or deeper.	Removal of the Eider J tubes flexible risers umbilical, and power cables with the Upper Jacket to approximately 127 m below LAT complies with OSPAR Decision 98/3 and Regulatory requirements.

Table 1.8: Summary of Decommissioning Programme
Interdependencies
Decommissioning the Eider Upper Jacket will not impact any pipelines or installations as there will be no operational facilities connected to the Eider Upper Jacket following topsides decommissioning. Otter will no longer be in production when the Eider Upper Jacket is removed. TAQA will liaise with the relevant riser S29 notice holders regarding the riser sections that will be removed with the Upper Jacket. The Upper Jacket decommissioning solution will not preclude any feasible future proposals for decommissioning the Footings.

1.6 Field Location Including Field Layout and Adjacent Facilities

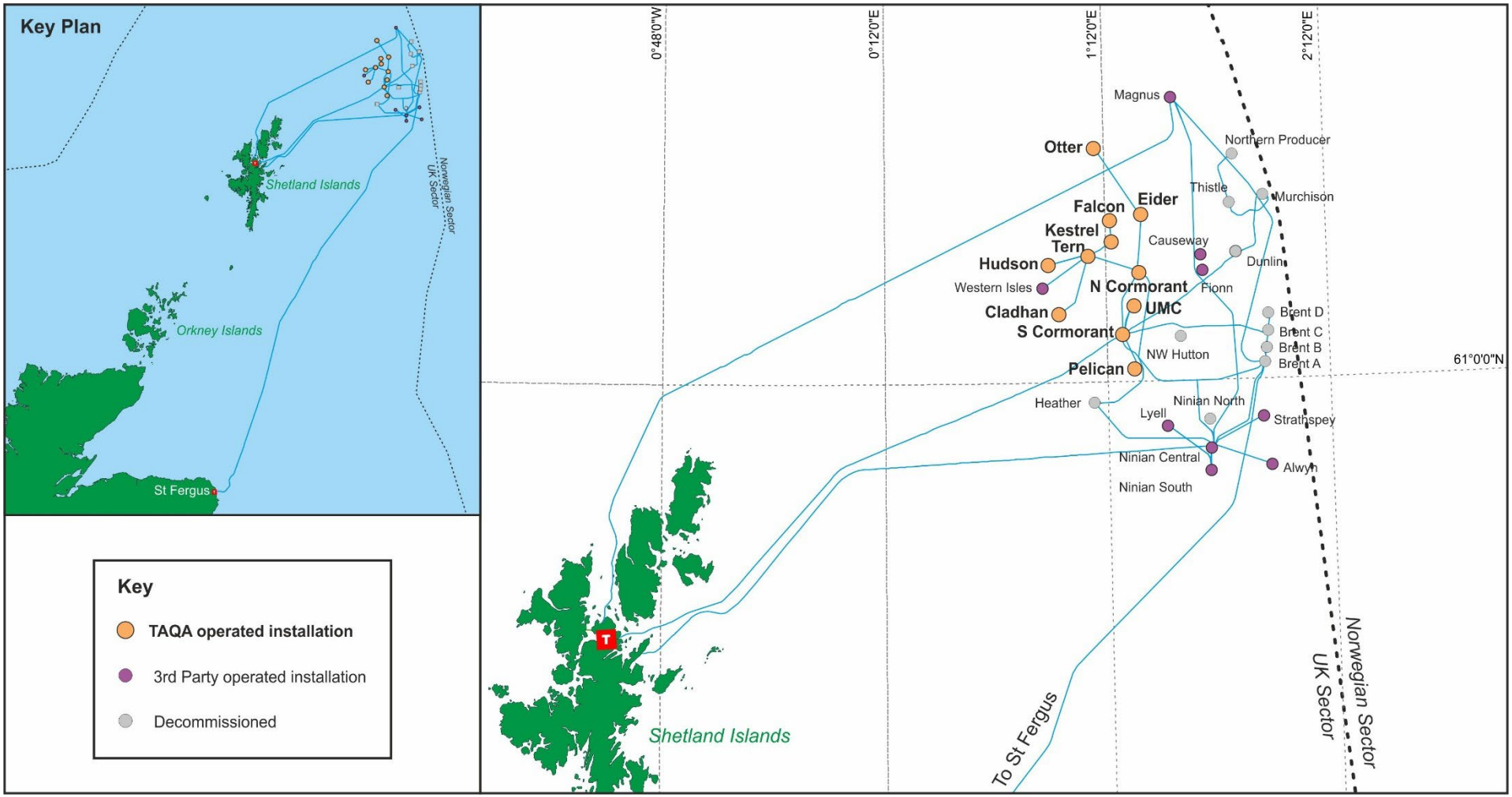


Figure 1-2: Eider Field Location in UKCS

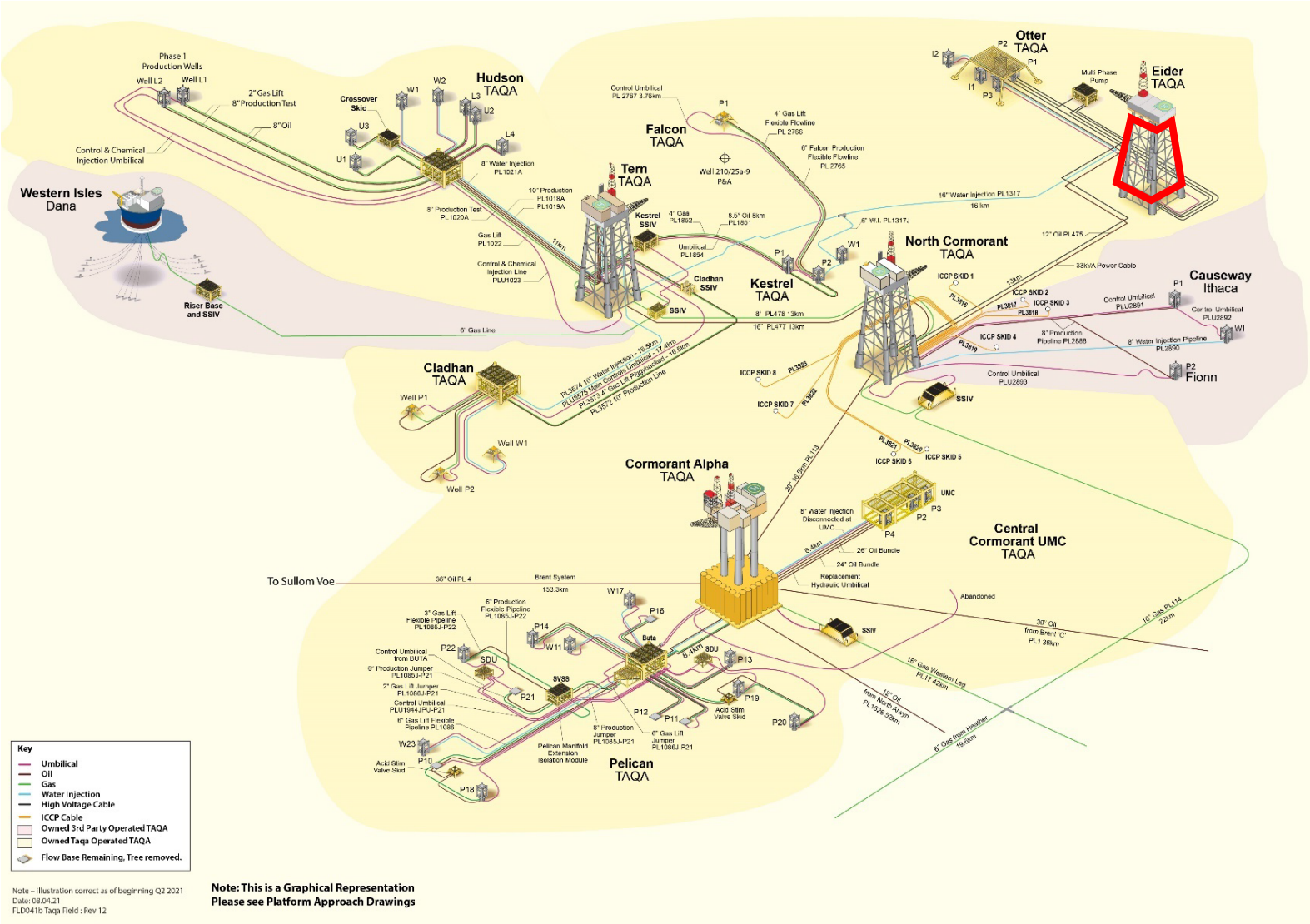


Figure 1-3: TAQA NNS Field Layout (Scope of this DP highlighted in red)

Table 1.9: Adjacent Facilities					
Owner	**Name**	**Type**	**Distance / Direction**	**Information**	**Status**
TAQA Bratani Limited	Otter	Subsea Wells (Template)	21 km north west of Eider	Water Injection / Production Wells	Operational
TAQA Bratani Limited	Otter	Subsea Structure	21 km north west of Eider	Multiphase Pump	Operational
TAQA Bratani Limited	Eider / Cormorant North Production Pipeline	13” Pipeline PL475	From PL1868 at Eider to Cormorant North	Multiphase Oil Production Line (Former Eider to Cormorant North Oil Export Pipeline)	Disused
TAQA Bratani Limited	Otter Production Pipeline	15” Pipeline PL1868	Otter Host Manifold to PL475 at Eider	Multiphase Oil Production Pipeline	Operational
TAQA Bratani Limited	Otter Production Pipeline	10” Pipeline PL1868B	Riser Blind Flange to Eider	Multiphase Oil Production Pipeline	Disused / IPR
TAQA Bratani Limited	Otter Power Cable	Power Cable P1 PL4438	Eider to Otter	Power Supply Cable to Otter	Operational
TAQA Bratani Limited	Otter Power Cable	Power Cable P2 PL4439	Eider to Otter	Power Supply Cable to Otter	Operational
TAQA Bratani Limited	Otter Power Cable	Power Cable P3 PL4440	Eider to Otter	Power Supply Cable to Otter	Operational
TAQA Bratani Limited	Otter Umbilical	Umbilical PLU1870	Eider to Otter	Control Umbilical	Operational
TAQA Bratani Limited	North Cormorant / Eider Power Cable	Power Cable PL3815	North Cormorant to Eider	Power Cable	Operational
TAQA Bratani Limited	Otter Water Injection Pipeline	16” Pipeline PL1317	Tern Topsides to PL3132 at Eider	Water Injection Pipeline	Operational
TAQA Bratani Limited	Otter Water Injection Pipeline	10” Pipeline PL3132	From PL1317 at Eider to Otter	Water Injection Pipeline	Operational
TAQA Bratani Limited	Falcon	Subsea Wells	9.5 km south west of Eider	Production Wells	Operational

Table 1.9: Adjacent Facilities					
Owner	**Name**	**Type**	**Distance / Direction**	**Information**	**Status**
TAQA Bratani Limited	Falcon Production Pipeline	8” Pipeline PL2765	8.3 km south south west of Eider	Falcon Production Pipeline to Kestrel	Operational
TAQA Bratani Limited	Falcon Gas Lift Pipeline	4” Pipeline PL2766	8.3 km south south west of Eider	Falcon Gas Lift Pipeline from Kestrel	Disused / IPR
TAQA Bratani Limited	Falcon	Umbilical PLU2767	8.3 km south south west of Eider	Falcon Control Umbilical from Kestrel	Operational
TAQA Bratani Limited	Kestrel	Subsea Wells	8.3 km south south west of Eider	Water Injection / Production Wells	Operational
TAQA Bratani Limited	Kestrel Production Pipeline	8” Pipeline PL1851	8.3 km south south west of Eider	Kestrel Production Pipeline to Tern	Operational
TAQA Bratani Limited	Kestrel Gas Lift Pipeline	4” Pipeline PL1852	8.3 km south south west of Eider	Kestrel Gas Lift Pipeline from Tern	Disused / IPR
TAQA Bratani Limited	Kestrel Control Umbilical	Umbilical PLU1854	8.3 km south south west of Eider	Kestrel Control Umbilical from Tern	Operational
TAQA Bratani Limited	Kestrel Water Injection Flowline	8” Pipeline PL1317JKEU-W1	8.3 km south south west of Eider	Kestrel Water Injection Flowline from Tern	Operational
TAQA Bratani Limited	Tern	Pipeline PL476	Tern to Eider	Water Injection	Disused / IPR
TAQA Bratani Limited	Otter	Pipeline PL1868A	Otter to Eider	Oil Export Line: Managed via the Interim Pipeline Regime	Disused / IPR
TAQA Bratani Limited	Otter	Pipeline PL1869	Eider to Otter	Water Injection Line: Managed via the IPR	Disused / IPR

Table 1.9 Adjacent Facilities
Impacts of Decommissioning
This Decommissioning Programme covers the Eider Upper Jacket. Removing the facilities in the scope of this Decommissioning Programme will have no impact on the operation TAQA's other facilities in the area. Similarly, there are a number of third party installations in the area, none of these are physically connected to the Eider platform, nor are they reliant in any way on the continuous presence of the Eider platform. The decommissioning proposal in this document will have no impact on any third-party infrastructure.

1.7 Industrial Implications

TAQA developed the Eider Upper Jacket decommissioning contract and procurement strategy, on behalf of the Section 29 Notice Holders. TAQA has, and will continue to:

- Publish Eider Upper Jacket decommissioning project information, including the high level project schedule, on the TAQA decommissioning website: https://eu.taqa.com/decommissioning-consultations-and-projects/
- In the event of further contract awards for Eider Upper Jacket decommissioning, TAQA will publish project information and contact details on the NSTA (North Sea Transition Authority) Pathfinder website.
- Engage with the NSTA and the decommissioning supply chain on any future issues relating to the Eider Upper Jacket Decommissioning Programme and schedule.
- Use the FPAL database as the primary source for establishing tender lists for any future Eider Upper Jacket decommissioning contracts and purchases with a value of £250,000 or more.

2 DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Installation: Upper Jacket

Table 2.1: Jacket Information					
Name	**Facility Type**	**Location**		**Upper Jacket**	
				Total Estimated Recovered Weight (Te)	**No. of Legs**
Eider (Upper Jacket)	Large Fixed Steel	WGS84	61º 21’ 26.292” N 01º 09’ 41.019” E	≈14,000*	8
		WGS84 Decimal Minute	61°-21.438’N 01°-09.684’E		

* Including marine growth

See Figure 2-1 below.

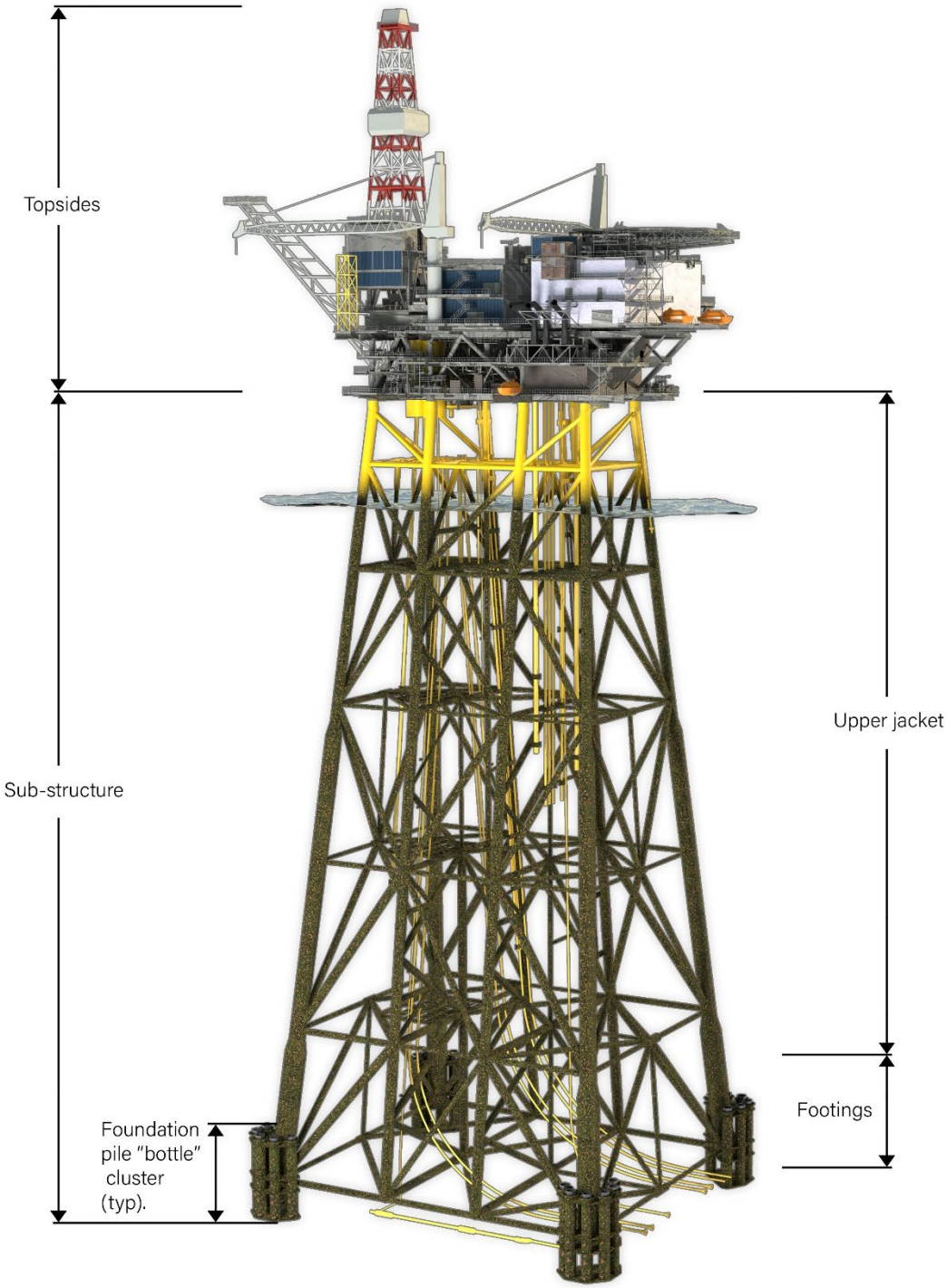


Figure 2-1: Eider Platform

2.2 Wells

There are no wells in the scope of this Decommissioning Programme. The Eider wells are described in the Eider Topsides Decommissioning Programmes [1].

2.3 Drill Cuttings

There are no drill cuttings in the scope of this Decommissioning Programme. The Eider Footings Decommissioning Programme will address the drill cuttings.

2.4 Inventory Estimates

The approximate amounts of materials that make-up the Eider Upper Jacket have been evaluated. These estimates will be refined during detailed engineering and the quantities of materials coming ashore will be tracked through the dismantling phase of the project to confirm overall quantities and the proportions that go to reuse, recycle and disposal.

A summary of the material inventories for the Eider Upper Jacket is presented in Table 2.2 and in Figure 2-2.

Table 2.2: Material Inventory

Material	Weight Te	% Of Total
Ferrous Metal	≈ 10,594	≈ 75.6%
Hazardous Material / NORM	≈ 15	≈ 0.1%
Other Non-Hazardous (Including 702 Te of Marine Growth)	≈ 2,100	≈ 15%
Concrete	≈ 1,295	≈ 9.3%
Total	≈ 14,000	100%

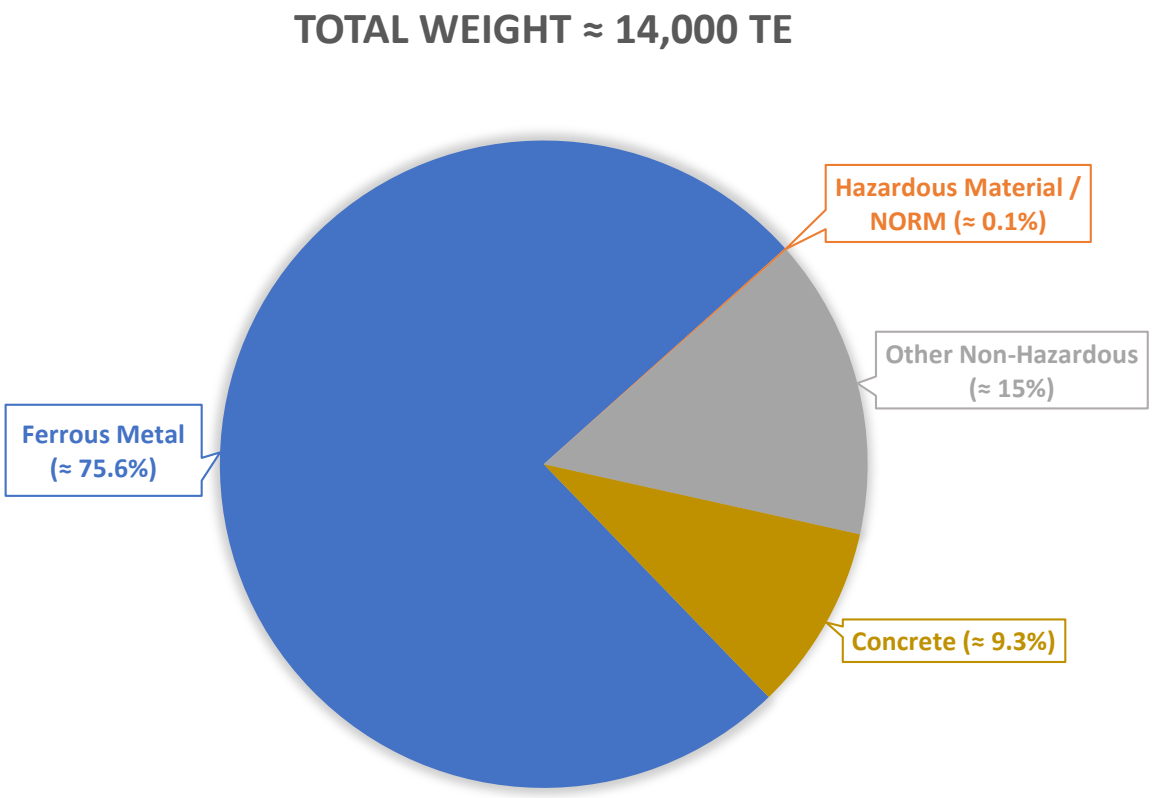


Figure 2-2: Material Inventory

This estimate includes the total weight of all material present, including allowances for marine growth and additional material added since the original installation of the platform. The quantity of marine growth is estimated to be approximately 700 Te. This is accounted for as part of the "Other Non-Hazardous" category. The Upper Jacket weight is inclusive of an estimated 15 Te of hazardous materials. This is limited to paint at the top of the Upper Jacket, and its presence only extends to an elevation of approximately -8 m through the splash zone.

3 REMOVAL AND DISPOSAL METHODS

The reuse of an installation or its constituent parts is the preferred decommissioning option. TAQA carried out a review of options for reusing the Eider platform, including the Upper Jacket [4], and concluded there are no technically viable reuse options.

The majority of the Eider Upper Jacket is steel, which will be recovered and recycled. The small proportion of materials remaining after recycling will be disposed of appropriately in accordance with TAQA policies and the relevant regulatory requirements.

3.1 Upper Jacket Decommissioning Overview

The Eider sub-structure is located in 157.5m of water and its full height is 180m. The Eider Upper Jacket will be removed to a cut depth of approximately 127 m below LAT which is c. 30 m above the seabed, see Figure 1-1 and Figure 3-1 . TAQA will inform OPRED when the exact cut depth is determined.

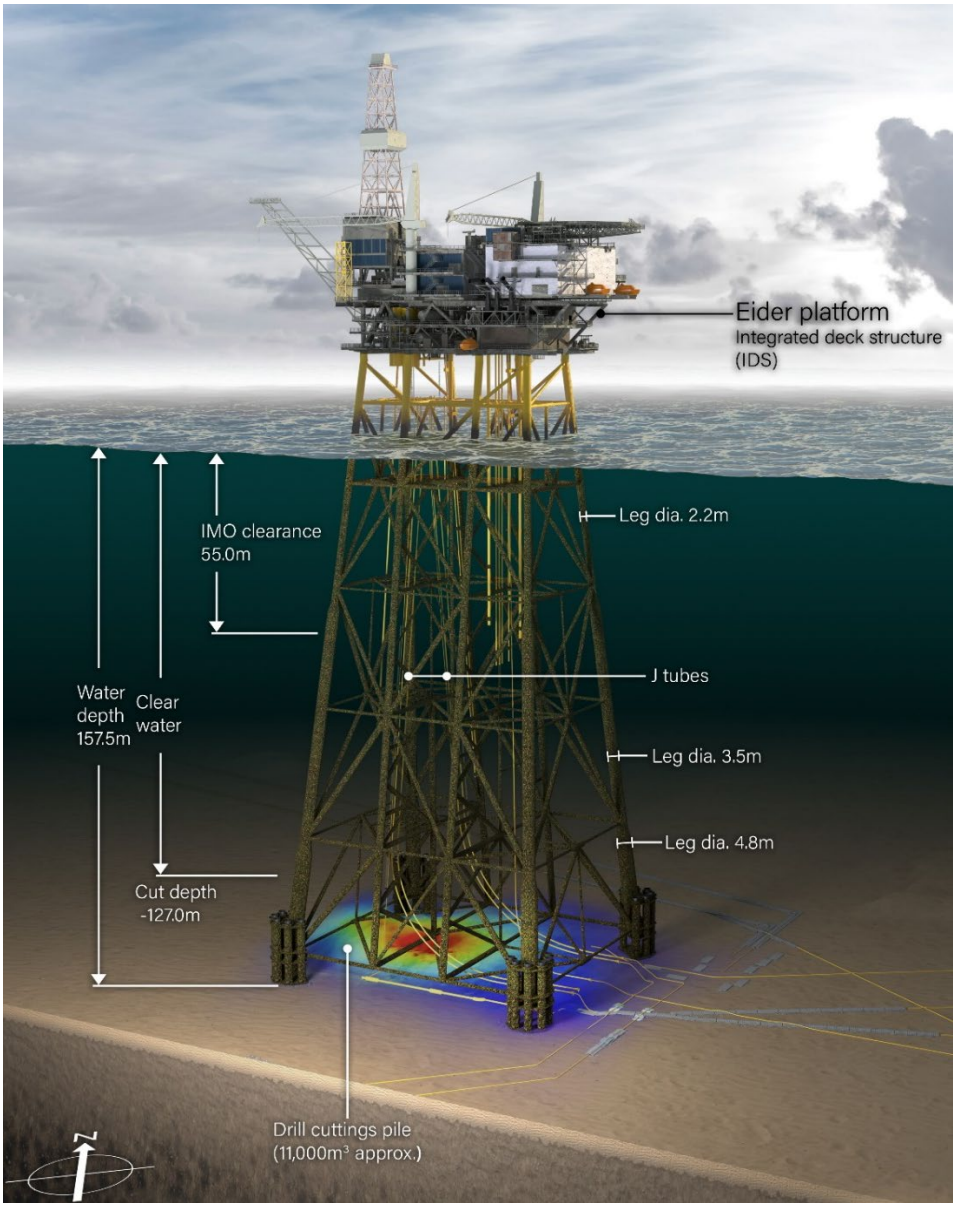


Figure 3-1: Eider Sub-structure

Two of the jacket legs, B2 and B3, form base oil and diesel storage tanks. These tanks extend from approximately 14 m above LAT to 108 m below LAT. The overall height of the Upper Jacket is around 140 m. It is therefore unlikely that the Upper Jacket will be removed as a single piece, and consequently the tanks in legs B2 and B3 will potentially be cut through during Upper Jacket removal. The volume of the tanks is approximately 370 m^3. The tanks will be emptied of oil and flushed prior to Upper Jacket removal, notwithstanding TAQA will apply for an oil discharge permit prior to Upper Jacket removal and comply with all regulatory requirements.

The cut depth at 127 m below LAT was determined following detailed engineering considering technical constraints including structural design, cross bracing configuration and cutting technology.

1. The structural design influences the cut depth as the Upper Jacket must retain sufficient structural integrity to allow it to be lifted and handled safely. Additionally there are risers and J tubes within the Upper Jacket that must be supported during removal. Therefore, the locations of the supports also influence the selected cut depth. Finally the available lift system's load limit and hook height influence the Upper Jacket lift.
2. The cross bracing configuration is part of the structural design, but also influences cut depth as only locations where there is sufficient room between bracings to allow Remotely Operated Vehicle (ROV) and cutting tool access are suitable for cuts.
3. The influence of cutting technology is related to cross bracing configuration, in that the size of the tools required to make the cuts in the sub-structure members dictates locations where cuts may be made.

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. The weight of the Upper Jacket is approximately 14,000 Te. This weight includes an allowance for the weight of the risers, which will be partly removed with the Upper Jacket.

TAQA conducted various studies on removal techniques for the Eider Upper Jacket and Footings in accordance with OSPAR 98/3. These studies considered various options for removal of the Upper Jacket and Footings. These options included removing the Upper Jacket and Footings as a single structure and removing the Upper Jacket and Footings separately. Removing the Upper Jacket and Footings as a single structure presents a number of technical constraints and challenges;

1. The Upper Jacket and Footings are so tall that if they were lifted as one piece it would not be possible to lift them clear of the water and onto a barge in an upright orientation.
2. Transporting the Upper Jacket and Footings in one piece on its side on a barge or other vessel is not possible as the structure cannot support its self-weight in this orientation and there is a risk of the structure collapsing during transportation or unloading.
3. Transporting the Upper Jacket and Footings in one piece hanging on a crane vessel's hooks is approaches the limit of the largest available crane vessel's capacity.
4. The Upper Jacket and Footings cannot be lifted onto a quayside in one piece due to the height of the structure and limits on crane vessel lift heights. Therefore the jacket would have to be set down in inshore waters and dismantled in pieces using a crane vessel.

Therefore, TAQA concluded that in all conceptual scenarios for removal of the Upper Jacket and decommissioning the Footings, the separation of the Upper Jacket from the Footings would be a pre-requisite for any potential Footings decommissioning methodology [2]. TAQA conducted a further study to determine if removal of the Upper Jacket would preclude potential Footings decommissioning options [3]. The study concluded that removal of the Upper Jacket will not prejudice Footings decommissioning, and that a delay of the order of years or decades between the removal of the Upper Jacket and decommissioning of the Footings would not impact the Footings' mechanical strength to an

extent that would preclude decommissioning options. The removal of the Upper Jacket will be carried out such that it does not preclude the future decommissioning of the Footings, since following removal of the Upper Jacket the Footings have sufficient inherent structural integrity to allow a variety of decommissioning options utilising a range of decommissioning vessels and methodologies to be considered.

Following Upper Jacket removal, TAQA will conduct an as left survey of the Footings, to confirm that Upper Jacket removal is in accordance with the DP. TAQA will notify the presence of the Footings to other sea users through the FishSAFE mapping and bulletin system and via inclusion on Admiralty charts. Following complete field decommissioning, a post removal monitoring scheme will be agreed with OPRED by TAQA. This will typically include an independent verification of the seabed, two environmental baseline surveys, at least two pipeline surveys, and two surveys of the Eider platform location.

The Footings and drill cuttings pile are shown in Figure 3-2. The Footings will be the subject of a separate Decommissioning Programme that will also address the fate of the cuttings pile. The Eider substructure is a candidate for derogation under OSPAR 98/3. If derogation is granted, the Footings and cuttings pile may be left in situ.

The recovered Upper Jacket will be returned to shore for recycling or disposal. TAQA will select a recycling and disposal facility considering safety, environmental, socio-economic, and cost factors. TAQA will inform OPRED which yard has been selected.

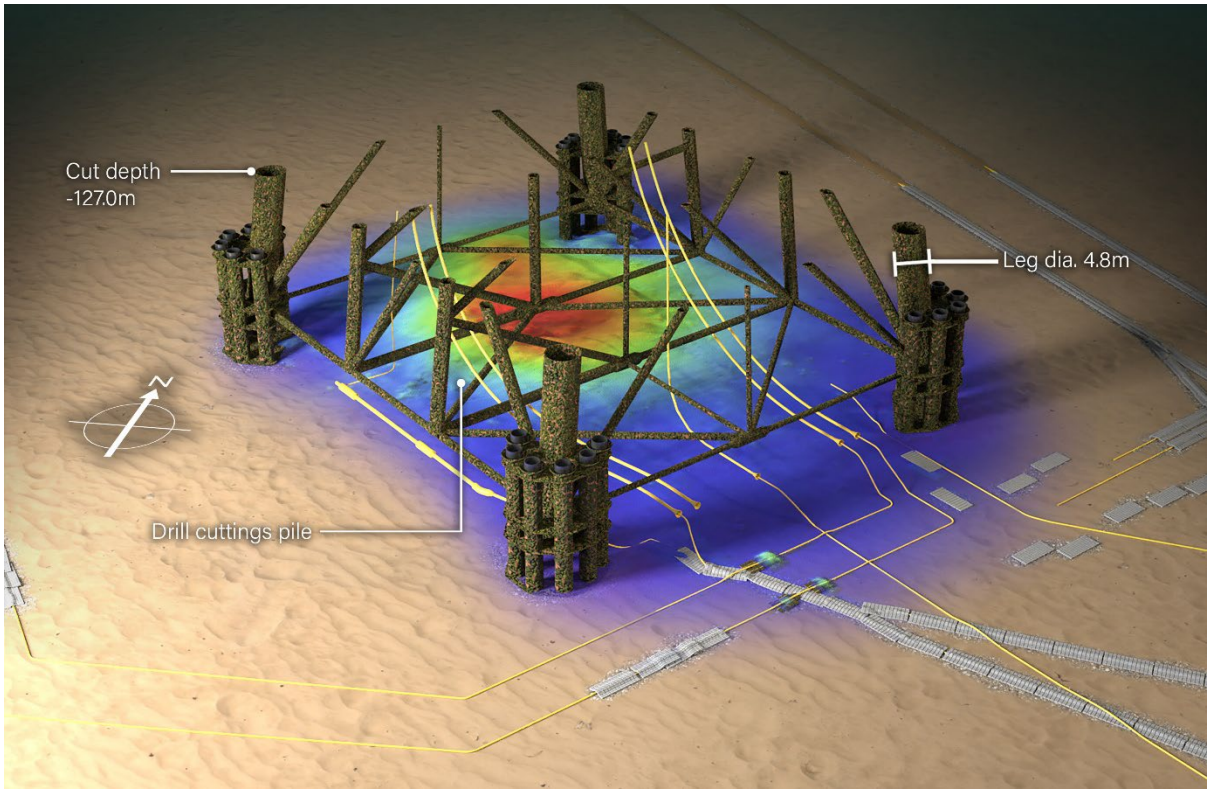


Figure 3-2: Eider Footings

3.2 Upper Jacket Removal Methods

TAQA has conducted various studies on removal techniques for the complete removal of the Eider Upper Jacket and Footings in accordance with OSPAR 98/3. Due to the complexities of the Footings, all current proven technologies require removal of the Upper Jacket separately from the Footings. The removal of the Upper Jacket will be carried out such that it does not preclude the possible future removal of the Footings.

The removal methods considered by TAQA for the Eider Upper Jacket are listed in Table 3.1 below:

Table 3.1: Upper Jacket Proposed Removal Methods

1) HLV (Semi-submersible Heavy Lift Vessel) ☒
2) SLV ☒
3) Other ☒ (Dual HLV)

Method	Description
Removal by SLV	Removal of the Eider Upper Jacket could be achieved by cutting at approximately 127 m below LAT and utilising the SLV Pioneering Spirit's JLS (Jacket Lift System). The JLS would lift and potentially rotate the jacket and transport it to shore. The vessel's size prevents it entering most ports. Therefore, the vessel would transit to a nearshore location and offload the Upper Jacket onto a barge. The barge would then transport the Upper Jacket to shore for recycling and disposal.
Removal by HLV	Removal of the Eider Upper Jacket to a depth of 127 m below LAT could be achieved by an HLV cutting the Upper Jacket into two sections. Each section height would be determined by the HLV's ability to transfer the lift to the quayside directly, avoiding the requirement for a transfer barge. The HLV would transport each section to shore for recycling and disposal
Removal by dual HLVs	Removal of the Eider Upper Jacket could be achieved by cutting at approximately 127 m below LAT and recovering the Upper Jacket in sections, each by twin HLV's working in tandem to conduct a 'quad lift' and transfer to barge. The barge will be towed to an onshore facility for recycling and disposal of the recovered jacket.
Proposed removal method and disposal route	**The recovered section of the Upper Jacket will be taken ashore for recycling and disposal.** **TAQA has selected a removal contractor following a tender evaluation process that considered safety, environmental, technical, and socio-economic factors. TAQA will select removal methods and disposal routes in collaboration with the removal contractor.** **OPRED will be informed once the removal method and recycling and disposal routes have been selected.**

3.3 Waste Streams

Table 3.2: Waste Streams Management Methods	
Waste Stream	Removal and Disposal Method
Carbon Steel	Carbon steel will be recycled
Hazardous Material / NORM	Hazardous material will be recovered to shore and disposed of under appropriate permits and in accordance with relevant regulations and guidance.
Other Non-hazardous (Including Marine Growth)	Non-ferrous metals – principally material from sacrificial anodes will be recycled. Marine Growth – some marine growth may be removed offshore to allow cutting and lifting activities; the remainder will be taken ashore for recycling/disposal under appropriate permits.
Concrete	The eight Upper Jacket legs are concrete filled between approximately +13 m and -10 m with respect to LAT. The total weight of this concrete is estimated to be 1295 Te. This concrete will be recovered to shore and recycled or disposed of under appropriate permits and in accordance with relevant regulations and guidance.
Onshore Dismantling Sites	Appropriate licenced sites will be selected for onshore dismantling, recycling, and disposal. TAQA will ensure that the removal contractor has a proven track record and waste stream management throughout the deconstruction process. TAQA will carry out audits on disposal yards to provide assurance that they are compliant with legislation. Once an onshore dismantling site has been selected OPRED will be advised.

Table 3.3: Inventory Disposition			
Waste Stream	**Total Inventory Tonnage**	**Planned Tonnage to Shore**	**Planned Left *in situ***
Upper Jacket	≈ 14,000 Te	≈ 14,000 Te	0 Te

Recovered material will be landed ashore between 2025 and 2028. It is not possible to fully define the available recycling and waste disposal sites and treatment options, which will be determined through a competitive tendering process. Therefore, the following is a summary of the general waste disposal strategy. Percentages shown relate to the weight of material which is expected to be recovered to shore.

On removal and where practical, TAQA will ensure the principles of the waste hierarchy will be met in the handling of materials from the Eider Upper Jacket decommissioning to maximize the quantities of reused and recycled material.

Preventing waste is the most preferred option. This will be achieved through reducing consumption and using resources efficiently. 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 project will follow industry good practice at all stages of reuse, recycling, and disposal.

The project will target options at the top of the waste hierarchy. Based on the current materials breakdown, TAQA aims to recycle up to 95 % of the waste generated from this programme. The high proportion of concrete in the overall estimated recovered Upper Jacket weight and the possibility for the recovered material to be contaminated by marine growth, hydrocarbons, paints etc may limit the recovered material that can be successfully recycled.

Waste management activities will be conducted in full compliance with all relevant legislation and regulatory controls. Disposal to landfill will be the option of last resort when there are no other options and the environmental disadvantages of alternatives to landfill outweigh any benefits. For example, alternatives to landfill may involve additional transportation mileage or additional waste treatment emissions and discharge impacts.

TAQA recognises that there will be large quantities of material returned to shore for recycling or disposal. Regardless of the ultimate destination there will be sufficient notice provided to ensure that there is suitable capacity for processing landed material, taking cognisance of destination handling capacity and availability, and to allow all applicable regulatory bodies, stakeholders, and contractors to be engaged appropriately.

4 ENVIRONMENTAL APPRAISAL OVERVIEW

The Environmental Appraisal (EA) considered the potential for significant environmental effects as a result of interactions between the proposed decommissioning activities and sensitive environmental receptors. It has been prepared in accordance with BEIS Decommissioning Guidelines [5], and Decom North Sea EA Guidelines [6].

The environmental sensitivities around the Eider platform are summarised in Table 4.1. The environmental assessment has not identified any significant environmental effects as a result of activities described within this Decommissioning Programme. The rationale behind the assessments that there are no significant impacts are presented in Table 4.2. However, TAQA is committed to the schedule of environmental management measures set out in the ES to further reduce the potential for environmental effects. These management measures are summarised in Table 4.3.

4.1 Environmental Sensitivities (Summary)

Table 4.1: Environmental Sensitivities

Environmental Receptor	Main Features
Conservation interests	There are no Nature Conservation Marine Protected Areas, Special Protection Areas, Special Areas of Conservation or Demonstration and Research Marine Protected Areas within 40 km of the Eider platform. The closest designated site is the Pobie Bank Reef, located approximately 87 km to the south west. Sea-pens and other burrowing megafauna have been recorded in this region. The OSPAR Habitat and Priority Marine Feature 'seapens and burrowing megafauna communities' is typically found in plain or fine muds. The sediments close to the Eider platform, are classified as muddy sand. Therefore, this habitat is unlikely to occur at Eider.
Seabed	The Eider platform is located at a water depth of 157.5 m. The combined energy at the seabed from wave and tide action is low. Survey work shows that the seabed sediments present are muddy sand. This is consistent with mapped information which classifies this region of the North Sea as the European Nature Information System (EUNIS) broadscale habitat A5.27 deep circalittoral sand. Invertebrate communities living within the sediments are dominated by polychaete and mollusc species characteristic of background conditions in this part of the NNS. Although, species richness appears to be unaffected by the influence of drilling related activity with stations close to the platform displaying levels similar to stations to the northwest, the organically enriched sediment close to the platform showed a reduced species diversity.

Table 4.1: Environmental Sensitivities	
Environmental Receptor	**Main Features**
Fish and Shellfish	The Eider platform lies within known spawning grounds for haddock, saithe, Norway pout and cod. Cod is recorded as using the Eider area as high intensity spawning ground. Blue whiting is the only species with a high intensity nursery ground around the Eider platform. The area is also a potential low intensity nursery ground for mackerel, haddock, Norway pout, spurdog, herring, hake and ling. The probability of aggregations of juvenile anglerfish, haddock, horse mackerel, mackerel, plaice, sprat, whiting, Norway pout, blue whiting and hake occurring in the offshore decommissioning project area is low.
Fisheries	Fishing effort in the area around the Eider platform is dominated by bottom-towed demersal fishing gears. Fishing effort generally peaks in the summer months.
Marine Mammals	Harbour porpoise, white-beaked dolphin, minke whale and white-sided dolphin are the most abundant species recorded around the Eider platform. The harbour porpoise is the most frequently recorded cetacean in the vicinity of Eider, which is reflective of these being the most abundant and widely distributed cetaceans in the North Sea. Both grey and harbour seal densities are low around the Eider platform, densities are predicted to be between 0 and 1 individuals per 25 km^2 for both species.
Birds	Offshore in the NNS, the most numerous species present are likely to be northern fulmar, black-legged kittiwake, and common guillemot. The Eider platform is located close to hotspots for northern fulmar, northern gannet, and Atlantic puffin 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 *Fratercula arctica*) disperse from their coastal colonies and into the offshore waters. At this time, these birds are particularly vulnerable to oil pollution.
Onshore Communities	Onshore communities are potentially sensitive to disturbance from cleaning, dismantling and disposal activities. TAQA will select onshore decommissioning facilities that comply with all regulatory requirements to ensure that potential impacts are appropriately controlled.
Other Users of the Sea	Shipping density in the NNS in the vicinity of the Eider platform is very low. Between 100 and 200 vessels transit through Block 211/16 annually. The proposed decommissioning operations are located in a well-developed area for oil and gas extraction. However, there is little activity from other sea users recorded in the area. Apart from pipelines and cables associated with the Eider platform, there are no other cables or pipelines in the vicinity, no designated military practice and exercise areas, no offshore renewable or wind farm activity and no designated or protected wrecks nearby.
Atmosphere	The primary source of atmospheric emissions will be from vessel activity during decommissioning activities.

4.2 Potential Environmental Impacts and their Management

A review of potentially significant environmental and social interactions has been completed and, considering the mitigation measures that will be built into the project activities, there is expected to be no significant impact on receptors from Eider Upper Jacket decommissioning.

Given the remote offshore location of the Eider field, there is no potential for Eider Upper Jacket decommissioning to impact any European or nationally designated protected sites. The Environmental Appraisal 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 the Marine Plan's objectives and policies.

Based on the findings of the Environmental Appraisal including the identification and subsequent application of appropriate mitigation measures, and project management according to TAQA's Health, Safety, Security and Environment Policy, and Environmental Management System, it is considered that the proposed Eider Upper Jacket decommissioning activities do not pose any significant threat of impact to environmental or societal receptors within the UKCS. Summaries of the bases for this determination are given in Table 4.2.

Notwithstanding, TAQA is committed will apply the management measures set out in Table 4.3 to ensure that decommissioning activities at Eider represent good practice and reduce further any potential environmental impacts.

Table 4.2: Environmental Impact Screening Summary

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 to be generated by the decommissioning activities is 22,305 Te. This equates to less than 0.13 % of the total UKCS emissions in 2020. Considering the above, atmospheric emissions do not warrant further assessment.
Disturbance to the Seabed	No	• Planned use of dynamically positioned vessels therefore no direct seabed interaction associated with the decommissioning. • The decommissioning activities associated with the cutting of the Eider Upper Jacket are not expected to impact the seabed and, where relevant, Marine Licences will be requested. On this basis, no further assessment need be undertaken.

Table 4.2: Environmental Impact Screening Summary		
Impact	**Further Assessment**	**Rationale**
Physical Presence of Vessels in Relation to Other Users of the Sea	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 Eider 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 any material left in situ. • The presence of the material on the seabed following removal of the Upper Jacket will be communicated to other sea users via the FishSAFE system and Admiralty charts.
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 storage tanks for base oil and diesel located in legs B2 and B3 will probably be cut through during removal activities. However, there is expected to be negligible discharge from these tanks which will have been emptied and flushed as part of preparation activities, and fully assessed in the relevant environmental permit applications. • Any marine growth present on the Upper Jacket will be removed prior to cutting but will be limited to the cut location 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, discharges to sea resulting from any vessel and Upper Jacket removal activity should not be assessed further.

Table 4.2: Environmental Impact Screening Summary		
Impact	**Further Assessment**	**Rationale**
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. On this basis, underwater noise assessment does not need assessed further.
Resource Use	No	• Limited raw materials required (largely restricted to fuel use). • The estimated total energy usage for the decommissioning activities is 229,893 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 and volume of such material is not expected to result in substantial landfill use. Considering the above, resource use does not warrant further assessment.
Waste	No	• The waste to be brought to shore 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. On this basis, no further assessment of waste is necessary.
Unplanned Events	No	• The OPEP in place for the Eider platform will be revised as necessary to cover decommissioning. • SOPEPs will be in place for vessels used in decommissioning operations. • Emergency response procedures will be in place for the Eider installation and decommissioning vessels during decommissioning operations. Considering the above, the potential of unplanned during decommissioning activities do not warrant further assessment.

Table 4.2: Environmental Impact Screening Summary		
Impact	**Further Assessment**	**Rationale**
Wild Birds	No	Management of wild birds in the vicinity of the Upper Jacket is achieved through the TAQA wild birds' management strategy.

Table 4.3: Environmental Impact Management	
Impact	**Management**
Emissions to Air	Vessel management in accordance with TAQA's marine procedures. Minimal vessel use/movement. Engine maintenance.
Disturbance to the Seabed	Dynamically positioned vessels will be used. Therefore, no anchoring will take place. A post-decommissioning seabed verification will be conducted using non-intrusive methods.
Physical Presence of Vessels in Relation to Other Users of the Sea	Minimal vessel use. Notification to Mariners.
Physical presence of infrastructure decommissioned in situ in relation to other sea users	None of the equipment within scope of this Decommissioning Programme will be left in situ. The sub-structure Footings that remain after decommissioning will be included in the FishSAFE mapping and bulletin systems and marked on admiralty charts.
Discharges to Sea	MARPOL compliance. Bilge management procedures. Vessel audit procedures. Contractor management procedures. Emptying and flushing of B2 and B3 base oil and diesel tanks prior to cut, compliance with regulatory requirements including discharge permit.
Underwater Noise Emissions	The only noise generating activities will be vessel use and underwater cutting. Notwithstanding, vessel use and cutting durations will be minimised where possible. Currently, there are no plans to use explosives. However, should the use of explosives be necessary TAQA will complete appropriate evaluations and consultations prior to their use.
Waste	Adherence to the Waste Hierarchy. Waste Management Strategy and Active Waste Management Plan.
Unplanned Events	OPEP in place for operations. SOPEP on all vessels. Navigational warnings in place. Contractor management and communication. Lifting operations procedures Dropped object risk assessments
Wild Birds	Management of wild birds in the vicinity of the Upper Jacket is achieved through the TAQA wild birds' management strategy.

5 INTERESTED PARTY CONSULTATIONS

TAQA consulted a wide range of interested parties during the decommissioning planning stages and compilation of the Decommissioning Programme. These are summarised as:

Table 5.1: Summary of Stakeholder Comments		
Who	**Comment**	**Response**
Statutory Consultees		
Scottish Fisherman's Federation (SFF)		
National Federation of Fisherman's Organisations (NFFO)		
Northern Irish Fish Producers Organisation (NIFPO)		
Global Marine Services (GMS)		
Other Interested Parties		
Health and Safety Executive (HSE)		
North Sea Transition Authority (NSTA)		
Joint Nature Conservation Committee (JNCC)		
Marine Scotland		
Public		

6 PROGRAMME MANAGEMENT

6.1 Project Management and Verification

A TAQA Project Management team will be appointed to manage the selected Eider Upper Jacket removal contractor. TAQA health, environment and safety management principals will govern hazard identification, risk management and operational controls. Where possible the work will be coordinated with due regard to interfaces with other operator's oil and gas assets in the NNS and with other users of the sea. The TAQA Project Management team will control and manage the progress all permits, licences, authorisations, notices, consents, and consultations required as part of this process. Any changes in detail to the offshore removal programme will be discussed and agreed with OPRED.

6.2 Post Decommissioning as Left Status

Following the removal of the Eider Upper Jacket TAQA will conduct an as left survey of the Footings, to confirm that Upper Jacket removal is in accordance with the approved DP. The presence of the Footings that remain after the removal of the Upper Jacket will be included in the FishSAFE mapping and bulletin systems and marked on Admiralty Charts and notices to mariners as required.

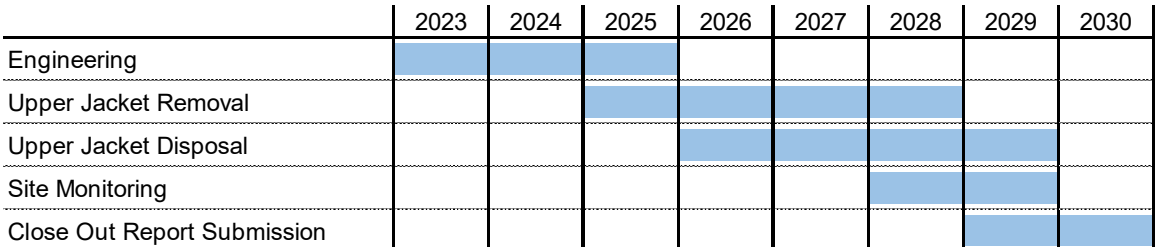
Following complete field decommissioning, an independent verification of the seabed will be performed, and TAQA will conduct two environmental baseline surveys, at least two pipeline surveys, and two surveys of the seabed at the Eider platform location.

6.3 Schedule

The main milestones in the Eider Upper Jacket decommissioning process were, or are anticipated to be:

- Eider cessation of production: 2018
- Eider platform topsides removal: 2025-2028
- Eider Upper Jacket removal: 2025-2028 (Following Topsides removal)
- Eider Upper Jacket removal as left survey: 2028
- Post removal survey: Post 2028

This schedule may change to maximise economic recovery, or to exploit opportunities to minimise decommissioning impacts by combining activities into campaigns, or by combining Eider decommissioning operations with third-party decommissioning. The Eider Upper Jacket decommissioning schedule is shown below in Figure 6-1,



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

Figure 6-1: Eider Decommissioning Schedule

6.4 Long Term Facilities Management

The planned decommissioning of the Eider field will take place over an extended period. Throughout this period the asset and the seabed will be in various stages of decommissioning and remediation. At all times, the facilities will be maintained to a standard that enables completion of the programme safely and in compliance with regulations and TAQA's corporate standards.

TAQA will communicate the presence of the Eider Footings through the FishSAFE mapping and bulletin systems and by providing details of the facilities to the UK Hydrographic Office for inclusion on Admiralty charts as appropriate.

Following complete field decommissioning, an independent verification of the seabed will be performed, and TAQA will conduct two environmental baseline surveys, at least two pipeline surveys, and two surveys of the seabed at the Eider platform location.

6.5 Costs

Table 6.1: Provisional Decommissioning Programme Costs

Item	Estimated Cost (£m)
WBS 1 – Operator Project Management	Provided to OPRED in confidence
WBS 2 – Post CoP OPEX	
WBS 3 – Well Abandonment	
WBS 4 – Facilities & Pipelines Permanent Isolation & Cleaning	
WBS 5 – Topsides Preparation	
WBS 6 – Topsides Removal	
WBS 7 – Substructure Removal	
WBS 8 – Onshore Recycling	
WBS 9 – Subsea Infrastructure	
WBS 10 – Site Remediation	
WBS 11 – Monitoring	

6.6 Close Out

In accordance with the OPRED guidelines, a close out report will be submitted to OPRED within twelve months of the completion of the offshore decommissioning scope and disposal. Any variances from the approved Decommissioning Programme will be described and explained in the close out report.

6.7 Post Decommissioning Monitoring and Evaluation

Following the full decommissioning of the Eider field, TAQA will carry out two post decommissioning baseline environmental surveys. The surveys will focus on chemical and physical disturbances of the decommissioned area and be compared with pre decommissioning surveys.
TAQA will also commission an independent verification of the seabed. In addition, TAQA will also conduct at least two pipeline surveys, and two surveys of the Eider platform location.
A copy of all the survey results will be forwarded to OPRED. After the survey results have been sent to OPRED and reviewed, a post monitoring survey schedule will be agreed by both parties taking account of ongoing liability, and the status and findings of previous surveys. The schedule will apply a risk-based approach to the frequency and scope of further surveys.

6.8 Management of Residual Liability

The Footings that are left in place following the completion of the Upper Jacket Decommissioning Programme will remain the property and responsibility of the Eider S29 notice holders and will be subject to a separate Decommissioning Programme.

The Eider Operator recognises that the parties to the Decommissioning Programme will continue, post completion of the programme, to retain ownership of, and residual liability for any infrastructure left in place.

The presence of the Eider sub-structure Footings will be communicated and published through the FishSAFE electronic hazard charting system and associated bulletins and by marking the structures on Admiralty charts as appropriate.

TAQA will engage with OPRED on all future legacy and liability matters and relating to the Eider facilities.

7 SUPPORTING DOCUMENTS

[1] TAQA, Eider Topside Decommissioning Programme, 77-AEIA0288-X-AD-0001-000

[2] TAQA, Eider Sub-structure Removal Options Structural Assessment, 77-AEIA0288-S-RE-0001-000

[3] Xodus, Impact of Upper Jacket Removal on Subsequent Footings Removal, A-302504-S00-TECH-002

[4] TAQA, Eider Alpha Asset Reuse Study, 77-AEIA0288-X-SU-0001-000

[5] Department for Business Energy & Industrial Strategy, Guidance Notes: Decommissioning of Offshore Oil & Gas Installations and Pipelines, November 2018

[6] Decom North Sea, Environmental Appraisal Guidelines, 2017

8 APPENDICES

Appendix 1 Public Notice

Appendix 2 Section 29 Holders' Letter of Support

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