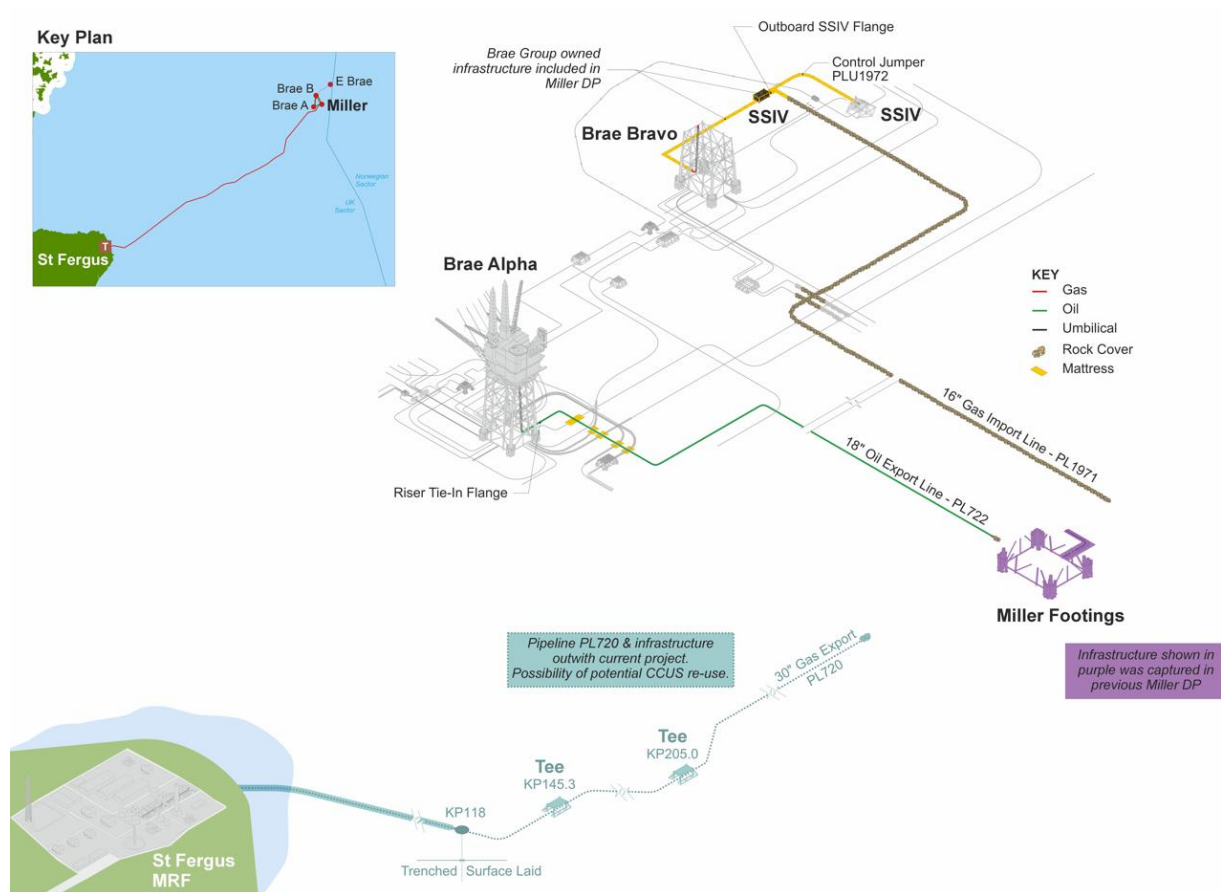




MILLER INFIELD PIPELINES DECOMMISSIONING PROJECT

ENVIRONMENTAL APPRAISAL

Document Number: DC109-EN-REP-000-5018

Consultation Draft

January 2026



Document Control

Approvals

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SUMMARY INFORMATION SHEET

Project Name	Miller Infield Pipelines Decommissioning Project
Block Numbers	16/7b and 16/8b.
Type of Project	Decommissioning
Undertaker	BPEAL (BP Exploration (Alpha) Limited) Chertsey Road, Sunbury on Thames, Middlesex, TW16 7BP
Licensees/Owners	The Miller field was originally discovered by BPEAL and Conoco in 1982.
Short Description	This document considers the environmental and socio-economic impact of the activities associated with the decommissioning of the Miller infield pipelines (out with the Miller 500m zone) in the Central North Sea. Decommissioning of the Miller platform was completed in 2018. Decommissioning of the oil export pipeline to St Fergus is out with the scope of this DP submission given the potential for reuse in support of future carbon capture and storage projects. The Miller Infield Pipeline System transported oil from the Miller platform to the Brae Alpha platform (PL722) and gas for reservoir support was provided to the Miller from the Brae Bravo platform (PL1971). In line with the results of a Comparative Assessment, BPEAL propose that the surface laid PL722 will be trenched and buried, whilst the exposed end of the rock covered PL1971 will be cut and removed. Any exposed mattresses, a Subsea Isolation Valve and its associated umbilical (PLU1972) a spool crossing frame and several pipeline spools will be recovered. Existing rock-cover will also be left in situ as will a small number of mattresses and short lengths of spools covered in cutting at Brae will be decommissioned <i>in situ</i>. Note activities to be carried out with the Brae A and B 500 m exclusion zones will be completed by the Brae owners on behalf of BPEAL, however the impacts are captured within the EA. The impact assessment presented in this Environmental Appraisal determined that there are no significant environmental or socio-economic impacts associated with the proposed decommissioning activities.
Company Document Number	DC109-EN-REP-000-5018
EIA Prepared By	BPEAL and Genesis Energies.

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EXECUTIVE SUMMARY

Purpose

As operator, BPEAL has prepared this Environmental Appraisal (EA) under the Petroleum Act 1998, in support of the draft Decommissioning Programme (DP) that is being submitted to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED), to seek approval for the decommissioning of the Miller Infield Pipelines system. Decommissioning of the Miller field has been captured over two Decommissioning Programme (DP) submissions:

The *first* Miller DP submission covered the Miller platform (topsides and jacket) and the subsea infrastructure within the Miller platform 500 m exclusion zone, and was approved in 2013 (BPEAL, 2011). This was based on an approved derogation from the requirements of OSPAR Decision 98/3 for the jacket footings. The execution of the activities associated with the decommissioning of the platform was completed in 2018 whilst those activities associated with decommissioning of the remaining infrastructure within the platform's 500 m zone was completed in 2024.

The *second* DP submission (referred to as the Miller Infield Pipelines DP) is supported by this Environmental Appraisal (EA) and focuses on the oil export pipeline (PL722), the gas import pipeline (PL1971), the SSIV control umbilical (PLU1972) and associated structures and protection/stabilisation material.

The pipelines covered by this DP submission are currently subject to an approved Disused Pipeline Notification (DPN). A Comparative Assessment (CA) was carried out to determine the optimal approach to decommissioning the pipelines.

Background Information

The Miller field is located in UK Continental Shelf (UKCS) Blocks 16/7b and 16/8b in the Central North Sea and was discovered by BPEAL and Conoco in 1982.

The platform at Miller was an integrated oil and gas drilling, production, processing, and accommodation platform installed in 1991. It was located c. 230 km north-east of St Fergus, the nearest point of United Kingdom (UK) coast, and c. 9.2 km from the UK/Norway median line, in water depths of around 103 m.

The Miller Pipeline System incorporated crude oil and natural gas transportation facilities between the Brae offshore installations as well as gas exporting facilities to shore at St Fergus. Production from the Miller reservoir ceased in 2007 and as mentioned above, the Miller platform and infrastructure within the platform's 500 m exclusion zone has been decommissioned.

Figure 1 identifies the infrastructure associated with the Miller Infield Pipelines DP, the Miller Pipeline Comparative Assessment (CA) and this supporting Environmental Appraisal (EA).

BPEAL has prepared this EA under the Petroleum Act 1998, in support of the Miller Infield Pipelines DP submission. The DP captures the decommissioning of

- An 18" oil export pipeline (PL722) from Miller platform to the Brae Alpha (A) platform;
- A 16" Brae-Miller Link-line (PL1971) between the Brae Bravo (B) and Miller platform (here after referred to as the gas import pipeline);
- A Subsea Isolation Valve (SSIV) on PL1971 and referred to as the Brae B SSIV and an associated umbilical (PLU1972);

- A spool crossing frame supporting a crossing over PL722 located within the Brae A 500 m exclusion zone; and
- Stabilisation material (mattresses and rock cover).

Note: The main export pipeline from Miller Platform to St Fergus (PL720) does not form part of the DP or this EA as it is subject to possible reuse considerations for carbon capture and storage (CCS) by third parties.

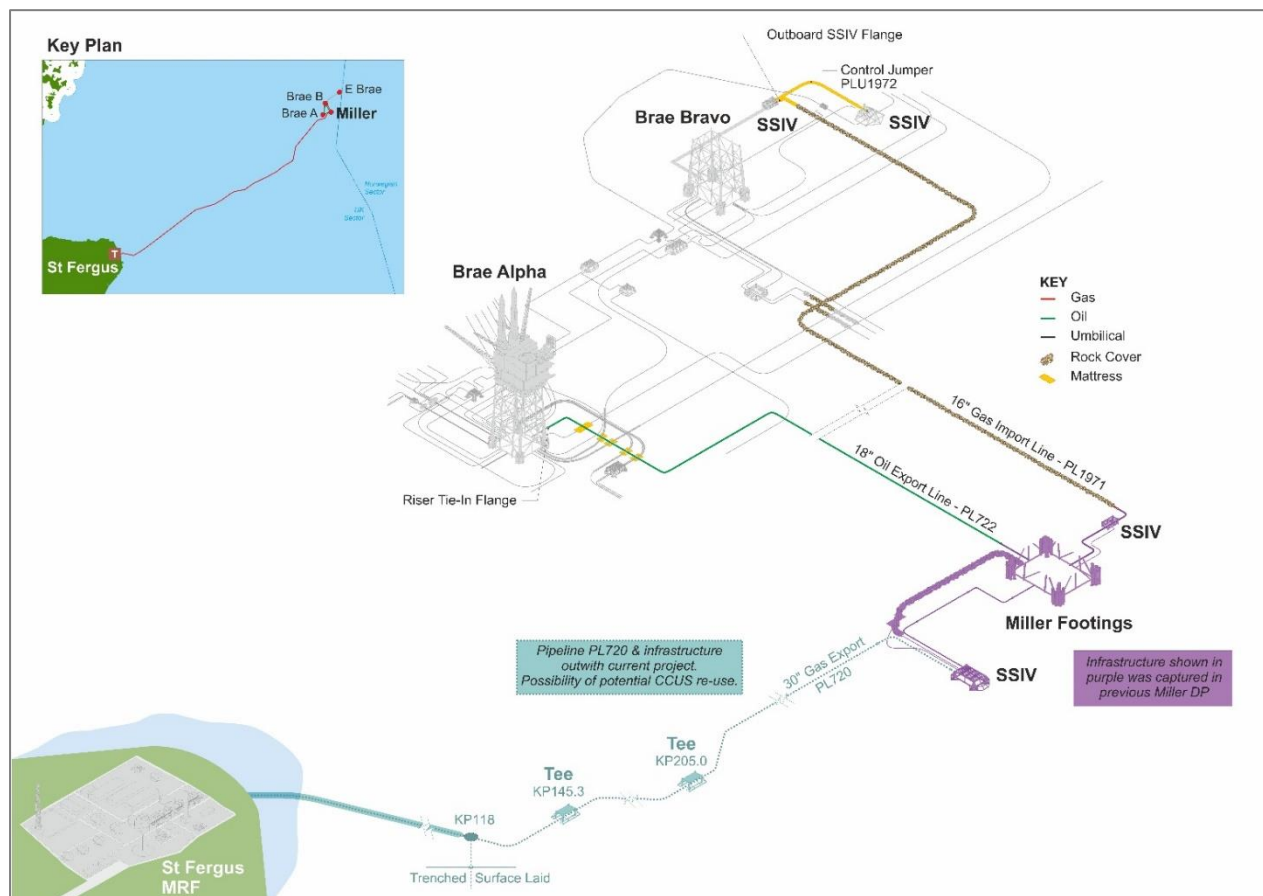


Figure 1: Representative schematic of the Miller infrastructure and pipelines included in the DP.

Stakeholder Engagement

In July 2022, as part of the informal stakeholder engagement process, BPEAL issued a Scoping Report (BPEAL, 2022) to a number of stakeholders. The Scoping Report provided an overview of the Miller field and pipelines, the proposed decommissioning activities and an overview of the impacts to be assessed in this EA. Stakeholders were invited to comment on the Scoping Report with respect to any concerns they may have, and comments received have been addressed in this report.

In addition to issuing the Scoping Report, BPEAL held a Stakeholder Engagement Workshop (September 2022). Comments received on the Scoping Report and issues raised during the workshop have been addressed in this report.

Planned Decommissioning Activities

A CA was carried out to determine the best method of decommissioning the infield pipelines associated with Miller.

In line with the results of the CA, PL722 (which is currently surface laid) will be trenched and buried and the rock covered PL1971 (Miller to Brae B) will be decommissioned *in situ*. The exposed end of PL1971 will be cut and removed and if required c. 10 te of rock will be added to mitigate any remaining snagging risk.

The SSIV associated with PL1971, the spool crossing frame associated with PL722, and most of the spools associated with PL722 and PL1971 will be recovered to shore. In addition for the most part the SSIV umbilical (PLU1972) will be recovered. This umbilical is 169 m in length, of which 161 m will be recovered with 8 m remaining *in situ* as it is crossed by a third-party line. Any exposed mattresses will also be recovered to shore. All material returned to shore will be management in line with the waste hierarchy and will be handled by an approved (permitted) yard.

Any concrete mattresses which are rock-covered or covered in drill cuttings at the Brae platforms will remain *in situ*. Existing rock-cover will also be left *in situ*. Finally on approach to the Brae B platform 71 m of spools associated with PL1971 are covered in drill cuttings and these will be decommissioned *in situ*.

Those activities to be carried out within the Brae 500 m exclusion zones will be completed by the Brae owners on behalf of BPEAL at the time of decommissioning of the Brae subsea infrastructure. However the impacts of these activities are captured in this EA. Those activities to be completed by the Brae owners include recovery of the SSIV and the spool crossing frame, decommissioning of PLU1972 and the spools associated with PL722 and 1971 on approach to the Brae platforms, the riser associated with PL722, and the lower riser section associated with PL1971. Note the upper riser section has previously been recovered when the upper jacket of the Brae B platform was recovered.

Following the proposed decommissioning activities, BPEAL will carry out post-decommissioning surveys. Preference will be given to methods not resulting in seabed disturbance e.g. side scan sonar (SSS) /multi beam echo sounder (MBES) surveys, however if deemed necessary over trawl trials will be commissioned.

Environmental and Socio-economic Baseline

PL722 and PL1971 are located at water depths of c. 103 m.

Within the immediate area of Miller, the sediment can be classed as sand and muddy sand. The overlying sand content is thin, moderately sorted, with a mean grain size varying from coarse to fine overlaying the silty clays of the Witch Ground Formation. The existing survey data is summarised with the EA and was used to support the impact assessment. To enhance the existing survey data available for the Miller area BPEAL proposed to carry out an additional environmental baseline survey in Q3 2025. The survey results will be used to inform the required environmental permits prior to any proposed decommissioning activities (e.g. marine licence applications).

The nearest protected area to the proposed activities is the Braemar Pockmarks Special Area of Conservation which is approximately 15.7 km from the Miller field. At this distance the proposed activities will not impact on any designated areas.

Plankton, benthic and fish species in the area are typical of the Central North Sea (CNS). The Miller pipelines are situated within an area which is a spawning ground for spotted ray, Norway Pout, *Nephrops*, mackerel,

haddock, cod and saithe. Of the fish species identified in the Miller area the following are priority marine features (PMFs): blue whiting, spurdog, anglerfish, mackerel, herring, cod, Norway pout and saithe.

The Atlas of Cetacean Distribution in Northwest European Waters has indicated that harbour porpoise, white-beaked dolphin, white-sided dolphin, minke whale, and beaked whale have been sighted in the immediate vicinity of the Miller area. All the cetaceans recorded in the area are PMFs except for beaked whales. Additionally, all cetaceans in UK waters are European Protected Species such that under the Habitats Regulations, it is an offence to deliberately disturb, capture, injure or kill any of these species. Harbour porpoise are also protected under Annex II of the Habitats Directive.

Distribution and abundance of bird species vary seasonally and annually. Seabird densities such as Atlantic puffin are generally higher in the breeding season (April – July), whereas other species such as the Northern fulmar have higher densities in the winter season (August - February). Of the species expected to occur in the area, guillemot (*Uria aalge*) and the European storm petrel (*Hydrobates pelagicus*) are afforded protection by the European Commission (EC) Birds Directive (Annex I).

The Miller infrastructure occurs within ICES rectangle 46F1. Data provided by the Scottish Government demonstrates that trawls and seine nets were used throughout this rectangle in the years 2019 to 2023 (Marine Directorate of Scottish Government, (MDSG) 2024). Species targeted in the area include cod, monk fish, *Nephrops* and haddock.

The data suggests that this ICES rectangle encompasses an area that is of relatively low importance to the UK fishing industry such that fishing activity in the area can be considered low to moderate.

The shipping activity within the vicinity of the Miller area is considered low in Blocks 16/7 and 16/8 and moderate in the adjacent Block 16/12.

Impact Assessment

In order to determine the significance of the impact of the proposed decommissioning activities an ENVironmental Issues IDentification (ENVIID) Workshop was undertaken. Receptors considered in the workshop included: air quality, water quality, sediment quality, plankton, benthic species, fish, marine mammals, seabirds, fisheries, shipping, landfill resources and resource use. The impacts associated with emissions to air, discharges to sea, seabed disturbance, underwater noise, waste production, the physical presence of the vessels during operations and the legacy impacts of the pipelines to be decommissioned *in situ* were considered on each of the receptors.

Applying industry standard mitigation measures (see Table 1), the impact significance of each of the planned activities was considered to be Low. Following scoping of the ENVIID results, a further assessment was carried out on:

- 1) The cumulative impacts of the potential seabed disturbance associated with the proposed activities (recovery of subsea structures, trenching and burying of pipeline to be decommissioned *in-situ*; addition of c. 30 te of rock cover and over trawl sweeps and over trawl trials).
- 2) The legacy impacts associated with decommissioning the pipelines, buried mattresses and existing rock-cover *in situ*.
- 3) Impact of emissions on climate change.

In all cases, the results of this further assessment aligned with the initial results of the ENVIID Workshop and concluded that, with the application of industry standard mitigation measures, the impact significance is Low

with respect to cumulative seabed disturbance, legacy impacts (both environmental and socio-economic) and climate change.

Environmental Management

The Miller Infield Pipelines Decommissioning Project will be aligned to BPEAL's goal to 'minimise the impact to the environment'.

Atmospheric emissions will be managed by inspection of the vessels contracted to carry out the work and by planning vessel schedules to ensure efficient operations.

The inventory of decommissioned items will distinguish equipment that can be reused, materials that can be recycled and waste for appropriate disposal. Waste management activities will be conducted in full compliance with all relevant legislation and regulatory controls. Disposal to landfill will be the waste management option of last resort.

Following the decommissioning activities, independent verification of the seabed state will be obtained, and evidence of clearance will be provided to all relevant governmental and non-governmental organisations. A post-decommissioning environmental survey will be carried out following decommissioning activities to establish the condition in which the seabed is left. An ongoing monitoring survey strategy will be agreed with OPRED, the aim of which will be to verify recovery of the seabed and that the pipelines decommissioned in situ remain buried and do not present a risk of snagging to other users of the sea.

Stringent control measures and operational procedures will be implemented to prevent accidental events involving the release of hydrocarbons or chemicals.

Table 1 lists procedural and technical controls and mitigation measures identified in the ENVIID workshop and during the preparation of this EA to reduce impacts to a level that is 'as low as reasonably practicable'.

Table 1: Miller Infield Pipelines Decommissioning Project Specific Commitments.

Aspect	Commitment
Physical Presence	• Ongoing consultation with Scottish Fishermen's Federation (SFF). • Notice to mariners will be circulated. • Vessel use will be optimised. • A Collision Risk Management Plan will be produced if required. • All vessels engaged in the project operations will have markings and lightings as per the International Regulations for the Prevention of Collisions at Sea (COLREGS) (International Maritime Organisation, 1972). • If rock cover is used, volumes will be minimised. • Location of remaining material will be mark on FishSafe.
Atmospheric Emissions	• As part of the tendering process, vessels will go through a detailed assurance process which will include a review of generator and engine maintenance which leads to better efficiency in line with manufacturer's specifications. • Vessel schedules will be planned to minimise vessel use. • Prior to the contract award, BPEAL will audit the decommissioning yards to ensure suitable permits are in place and that atmospheric emissions are being managed. • Activities will be carried out in line with BPEAL's environmental policy which includes minimising emissions.
Discharges to Sea	• BPEAL will carry out a detailed assurance process on all vessels prior to contract award. • Work procedures will be in place to minimise offshore campaigns. • Only Maritime Pollution (MARPOL) compliant vessels will be used. • Flushing and cleaning of pipelines and umbilicals has been completed in line with Best Available Technique (BAT)/Best Environmental Practice (BEP) requirements. • All contracted vessels will be signed up to the International Maritime Organisation (IMO) and will adhere to their guidelines. • Any associated discharges will be managed to minimise impact.
Seabed Disturbance	• Cutting/jetting/dredging and lifting procedures will be in place. • If rock cover is used, volumes will be minimised, and a fall pipe will be used to lay it on the seabed. • Post-decommissioning surveys, for example side scan sonar surveys will be prioritised over the use of over trawl trials.
Onshore Activities.	• Contract award will be to an established yard with appropriate experience, capability, licences, consents, and community engagement in place.
Waste Generation and Resource Use.	• The Miller Infield Pipelines Decommissioning Project will have in place a Waste Management Plan (WMP) developed to describe and quantify waste arising from decommissioning activities and identify available disposal options for those wastes. • Waste management options will take account of the waste hierarchy. • As part of BPEAL's Duty of Care, contract award will be to an established yard with appropriate experience, capability, licences and consents in place.
Accidental Events.	• Any infrastructure decommissioned <i>in situ</i> will be marked on FishSafe and communicated accordingly. • Work procedures in place. • Vessel assurance inspections. • Pre-hire vessel audits. • Emergency response plans in place.

Conclusion

This EA has assessed the environmental and socio-economic impacts associated with the proposed Miller Infield Pipelines decommissioning activities in the context of the environment within which the pipelines and pipeline structures are situated. With implementation of the proposed mitigation measures, the environmental impact of the decommissioning activities is likely to be minimal, and the proposed decommissioning activities will leave the area in a condition suitable for re-colonisation by local species and which is safe for fishermen.

In addition, the EA has considered the objectives and marine planning policies of the Scottish National Marine Plan (NMP) across the range of policy topics including biodiversity, natural heritage, cumulative impacts and oil and gas. BPEAL considers that the proposed decommissioning activities are in broad alignment with such objectives and policies. Similarly, BPEAL considers that the proposed activities are aligned with the oil and gas specific marine planning policies.

ACRONYMS

%	Percentage
(H)	Height
(L)	Length
(W)	Width
"	Inches
>	More Than
<	Less Than
≤	Less than or equal to
≥	More than or equal to
°C	Degrees Celsius
µm	Micrometres
µg/g	Micrograms per gram
‰	Parts per thousand
%	Percent
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
BAT	Best Available Techniques
BEIS	(the Department of) Business, Energy and Industrial Strategy (now DESNZ)
BEP	Best Environmental Practice
BHQ	Benthic Habitat Quality
BPEAL	BP Exploration (Alpha) Limited
c.	Approximately
CA	Comparative Assessment
CCS	Carbon Capture and Storage
CCC	Committee on Climate Change
cm	Centimetre
CMID	Common Marine Inspection Documents
CNS	Central North Sea
CH ₄	Methane
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO _{2e}	Carbon dioxide equivalent

COLREGS	Collision Regulations
COSHH	Control of Substances Hazardous to Health
CRA	Collision Risk Assessment
DESNZ	Department for Energy Security and Net Zero
DP	Dynamic Positioning
DP	Decommissioning Programme
DPN	Disused Pipeline Notification
DTI	Department of Trade and Industry
EA	Environment Appraisal
EC	European Commission
EIA	Environmental Impact Assessment
EMODnet	European Marine Observation and Data Network
EMS	Environmental Management System
EEMS	Environmental Emissions Monitoring System
ENVIID	Environmental Issue Identification
EPS	European Protected Species
ESAS	European Seabirds at Sea
ESIA	Environmental and Socio-Economic Impact Assessment
ESRA	Environmental and Socio-Economic Risk Assessment
EU	European Union
EUNIS	European Nature Information Service
FeAST	Feature Activity Sensitivity Tool
FuECoMMS	Functionality and Ecological Connectivity of Man-Made Structures
GES	Good Environmental Status
GHG	Greenhouse Gas
GWP	Global Warming Potential
HSE	Health, Safety, and Environmental
ICES	International Council for the Exploration of the Sea
IMO	International Maritime Organisation
INTOG	Innovation and Targeted Oil and Gas
INSITE	INfluence of man-made Structures In The marine Environment
IoP	Institute of Petroleum

IPCC	Intergovernmental Panel on Climate Change	NOx	Nitrogen Oxides
ISO	International Organization for Standardisation	N ₂ O	Nitrous Oxide
IUCN	International Union for Conservation of Nature	NORM	Naturally Occurring Radioactive Material
JNCC	Joint Nature Conservation Committee	NSTA	North Sea Transition Authority
kg	Kilogram	NTF	Not Technically Feasible
km	Kilometre	OBM	Oil Based Mud
km ²	Squared Kilometres	OEUK	Offshore Energies UK
KP	Kilometre Point	OGA	Oil and Gas Authority (now NSTA)
LAT	Lowest Astronomical Tide	OGUK	Oil and Gas UK (now Offshore Energies UK; OEUK)
m	Metre	OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
m/s	Metres per Second	OSPAR	Oslo/ Paris Convention
m ²	Square Metres	PMF	Priority Marine Features
MARPOL	Maritime Pollution	POP	Persistent Organic Pollutants
MAS	Marine Assurance Standards	ppm	Parts per Million
MBES	Multi Beam Echo Sounder	PWA	Pipeline Works Authorisation
MD	Marine Directorate	RAG	Red-Amber-Green
MDSG	Marine Directorate of Scottish Government	SAC	Special Areas of Conservation
mg/kg	Milligram per kilogram	SCANS	Small Cetacean Abundance in the North Sea
mm	Milometers	SDM	Species Distribution Modelling
MPA	Marine Protected Area	SDS	Safety Data Sheets
MRF	Miller Reception Facilities	SEEMP	Ship Energy Efficiency Management Plan
m/s	Metres per second	SEPA	Scottish Environment Protection Agency
MSBL	Mean Seabed Level	SFF	Scottish Fisheries Federation
MSFD	Marine Strategy Framework Directive	SIMOPS	Simultaneous Operations
MU	Management Unit	SMRU	Sea Mammal Research Unit
N/A	Not Applicable	SNH	Scottish Natural Heritage (now NatureScot)
NCMPA	Nature Conservation Marine Protected Area	SO	Screened Out
NCP	National Contingency Plan	SO ₂	Sulphur Dioxide
nm	Nautical Miles	SOx	Sulphur Oxides
NMP	National Marine Plan	SOPEP	Shipboard Oil Pollution Emergency Plan
NMPi	National Marine Plan Interactive	SOSI	Seabird Oil Sensitivity Index
NSTD	North Sea Transition Deal		
NO	Nitrogen Oxide		

SPA	Special Protection Area
SSIV	Subsea Isolation Valve
SSS	Side-scan Sonar
VOC	Volatile Organic Compounds
te	Tonne
TOP	Top of Pipe
UK	United Kingdom
UK BAP	United Kingdom Biodiversity Action Plan
UKCS	United Kingdom Continental Shelf
UNFCCC	United Nations Framework Convention on Climate Change
UKHO	United Kingdom Hydrographic Office
UV	Ultraviolet
VMS	Vessel Monitoring Systems
WMP	Waste Management Plan
yr	Year

1. INTRODUCTION

The Miller field is located in UKCS Blocks 16/7b and 16/8b in the Central North Sea (CNS) and was discovered by BPEAL and Conoco in 1982. The Miller platform was installed in 1991 and was located c. 230 km north-east of St Fergus, the nearest point of UK coast, and c. 9 km from the UK/Norway median line (Figure 1-1). Water depths in the area are around 103 m Lowest Astronomical Tide (LAT). Production at the Miller field ceased in September 2007 and Cessation of Production (CoP) was granted in 2013.

When operational, the Miller pipeline system comprised:

- An oil export pipeline (PL722) from the Miller platform to the Brae Alpha (A) platform;
- A gas import pipeline (PL1971) from Brae Bravo (B) to the Miller platform;
- An SSIV control umbilical (PLU1972) within the Brae B 500 m zone running between the East Brae Gas Transfer Subsea Safety Isolation Valve (SSIV) and the Brae B SSIV (associated with the Miller gas import pipeline); and
- A gas export pipeline (PL720) to St Fergus.

Decommissioning of the Miller field has been captured over two Decommissioning Programme (DP) submissions:

1. The *first* DP submission covered the Miller platform (topsides and jacket) and the subsea infrastructure within the Miller platform 500 m exclusion zone and was approved in 2013 (BPEAL, 2011). This DP was based on an approved derogation from the requirements of OSPAR Decision 98/3 for the jacket footings. The execution of the activities associated with the decommissioning of the platform was completed in 2018 whilst those activities associated with decommissioning of the remaining infrastructure within the platform's 500 m zone was completed in 2024.
2. The *second* DP submission (referred to as the Miller Infield Pipelines DP submission) is supported by this Environmental Appraisal (EA) and focuses on the oil export pipeline (PL722), the gas import pipeline (PL1971), the SSIV control umbilical (PLU1972) and associated structures and protection/stabilisation material (details of which are provided in Section 3). BPEAL has prepared this EA under the Petroleum Act 1998, in support of the Miller Infield Pipelines DP submission that is being submitted to OPRED to seek approval for the decommissioning of the infrastructure identified. The lines and structure covered by this DP are currently subject to an approved Disused Pipeline Notification (DPN). A Comparative Assessment (CA) was carried out to determine the optimal approach to decommissioning the pipelines.

Due to being subject to possible reuse considerations for carbon capture and storage (CCS) by third parties the main export pipeline to St Fergus (PL720) does not form part of the DP submission and therefore is not considered in the CA or this EA.

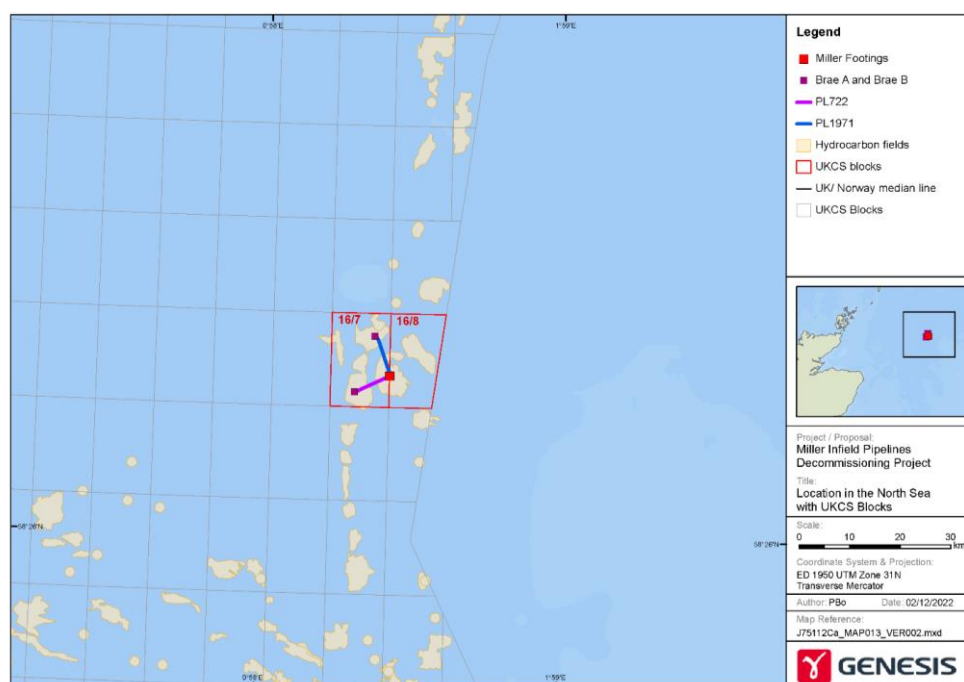


Figure 1-1: Location of the Miller Field Infrastructure.

1.1 Overview of the Miller Infrastructure to be Decommissioned

There are no surface installations included in this DP as the Miller platform has been decommissioned under the first DP submission (BPEAL, 2011). In accordance with the Petroleum Act 1998, the Section 29 Notice holders of the Miller field pipelines are applying to OPRED to obtain approval for the decommissioning of the PL722 (Oil export pipeline including the spool crossing frame structure on the pipeline), PL1971 (gas import pipeline including the SSIV structure on the pipeline), and umbilical PLU1972. The scope of the DP submission also includes the existing mattresses and rock cover.

1.2 Purpose of the Document

The purpose of the EA is to assess and describe, in a proportionate manner, the potential environmental and socio-economic impacts associated with the proposed decommissioning activities, and to identify mitigation measures to reduce the level of these impacts to as low as reasonably practicable.

1.3 Regulatory Context

The UK's international obligations on decommissioning are governed principally by the 1992 Oslo and Paris (OSPAR) Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention). OSPAR Decision 98/3 requires that all installations should be completely removed and recovered to shore for re-use, recycling or final disposal unless a derogation is granted. Pipelines and cables are not included within the Decision, however OPRED's Decommissioning Guidance Notes (BEIS, 2018) requires that operators aim to achieve a clear seabed and robustly assess decommissioning options, based on evidence and data, using the CA process.

The decommissioning of offshore oil and gas infrastructure (including pipelines) on the UKCS is principally governed by the Petroleum Act 1998, as amended by the Energy Act 2008. This Act sets out the requirements for a formal DP, which must be approved by OPRED before the owners of an offshore installation or pipeline may proceed with decommissioning.

There is no statutory requirement to undertake an Environmental Impact Assessment (EIA), but OPRED's decommissioning guidance notes (BEIS, 2018) advise that any DP is supported by an assessment of the environmental impacts of undertaking the decommissioning activities described. This EA has been prepared to meet this requirement.

1.4 Document Layout

Table 1-1 details the structure of the EA report.

Table 1-1: Structure of the EA Report.

Chapter No	Title	Contents
	Non-Technical Summary	A summary of the EA Report
1	Introduction	Introduction to the project and scope of the EA. This chapter also includes a summary of applicable legislation.
2	Stakeholder Engagement	Details of the consultation process to date.
3	Project Description	A description of the infrastructure to be decommissioned, the proposed decommissioning activities and an indicative schedule of activities.
4	Comparative Assessment	Summary of the results of the CA carried out for the pipelines and umbilical.
5	Environmental Baseline	A description of the environmental and socio-economic receptors in the project area.
6	Scoping of Potential Environmental Impacts	Overview of the methodology used to determine the environmental and socio-economic impact significance of the proposed decommissioning activities. Results of the ENVID (ENVironmental impacts IDentification) Workshop and justification for selecting those aspects not requiring further assessment in the EA. Justification is also provided for those aspects that are assessed further.
7	Seabed Disturbance	Assessment of seabed disturbance during decommissioning.
8	Legacy Impacts	Assessment of legacy impacts on other sea users and on the environment.
9	Atmospheric Emissions	Assessment of the impacts from atmospheric emissions from vessels used during the decommissioning.
10	Environmental Management	A description of BPEAL's Environmental Management Procedures and how they apply to the Miller Infield Pipelines Decommissioning Project.
11	Conclusions	Key findings including a register of commitments
12	References	Data sources used to support the EA.
Appendix A	Impact Assessment Methodology.	
Appendix B	Assessment against relevant policies including Scottish National Marine Plan, Marine Strategic Framework Directive, and oil and gas specific policies.	

2. STAKEHOLDER ENGAGEMENT

Consulting with stakeholders is an important part of the decommissioning impact assessment process, as it allows any concerns or issues which stakeholders may have, to be communicated and addressed.

As part of the informal stakeholder engagement process BPEAL issued a Scoping Report in July 2022 to several stakeholders. The Scoping Report provided an overview of the Miller field, the proposed decommissioning activities and an overview of the impacts to be assessed in the EA. Recipients of the Scoping Report were invited to comment on the report with respect to any concerns they may have.

In addition to issuing the Scoping Report, BPEAL held an informal Stakeholder Engagement Workshop in September 2022 to share the proposed decommissioning activities.

The formal statutory and public consultation process will be triggered by the submission of the consultation draft of the DP and supporting documents (including this EA report) to OPRED. As the project progresses, further consultation will be undertaken in line with the Miller Infield Pipeline DP Stakeholder Management Plan, with comments captured in the DP and the EA.

Table 2-1 identifies those stakeholders that received the Scoping Report, and/or attended the Stakeholder Engagement Workshop and summarises the main concerns that these stakeholders identified.

Table 2-1: Summary of Stakeholder Comments.

Stakeholder	Comments Received
OPRED Offshore Decommissioning Unit (ODU)	<u>Scoping Report</u> No response was received from OPRED on the Scoping Report. <u>Stakeholder Engagement Workshop</u> OPRED attended the Stakeholder Engagement Workshop and for the Infield Pipelines, no significant concerns were raised.
OPRED Environmental Management Team (EMT)	<u>Stakeholder Engagement Workshop</u> The EMT requested that BPEAL ensures the current environmental survey data and future surveys cover full decommissioning area and consider how any gaps will be filled. <i>Response: Addressed in EA in Section 5.</i>
Ministry of Defence	<u>Scoping Report</u> Ministry of Defence advised they would comment once the DP is submitted formally.
United Kingdom Hydrographic Office (UKHO)	<u>Scoping Report</u> In response to the Scoping Report, the UKHO advised on required notifications in advance of offshore activities.
Joint Nature Conservation Committee (JNCC)	<u>Scoping Report</u> In Response to the Scoping Report: - JNCC recommends that BPEAL follows the mitigation hierarchy when operating within the vicinity of conservation features. <i>Response: Recommendation has been noted by BPEAL, and applicable mitigation will be applied where relevant.</i> - Request a full justification for why decommissioning outcomes were chosen (incorporating evidence from burial feasibility study) and why full removal not selected.

Stakeholder	Comments Received
	<i>Response: The CA report issued in support of the DP details the process applied to determine the optimal approach to decommissioning the pipelines. The EA identifies relevant legislation / guidance.</i> 3. Expect clear maps to be included within that show where nature conservation features are located in relation to the operations. <i>Response: Chapter 5 provides ArcGIS maps showing the Miller field location in relation to protect areas and sensitive habitats and species in the area are also discussed in Chapter 5.</i> 4. Present the realistic worst-case scenario to enable a meaningful assessment of the environmental impacts of the planned activities. <i>Response: The EA considers worst case impacts throughout.</i> <u>Stakeholder Engagement Meeting with JNCC on 13th September 2022</u> At a separate engagement session, JNCC re-iterated the above points. In addition, 5. JNCC asked for clarification on the recovery of mattresses and grout bags. <i>Response: Mattresses to be recovered are detailed in Chapter 3 and impacts on the seabed are considered in Chapter 7. There are no grout bags associated with this project.</i> 6. JNCC asked if there were any plans to carry out any additional surveys at Miller in advance of the decommissioning activities. <i>Response: Given the existing data, no pre-decommissioning environmental surveys were planned, however a post-decommissioning environmental survey will be carried out. A survey gap analysis was carried out of the existing survey data the results of which are provided in Chapter 5.</i>
Scottish Fishermen's Federation (SFF)	<u>Scoping Report</u> In Response to the Scoping Report: For pipeline PL722 – SFF advised it would be good to know the reasoning behind why removal was scoped out. SFF had no comments relating to PL1971. SFF have concerns about surveys being used to verify an area is safe for fishing. <i>Response: The CA report submitted in support of the DP details the CA process and how the option to recover pipeline PL722 was scoped out. BPEAL are committed to ensuring a safe seabed and over trawl trials are discussed in Section 3.3. The impacts of the over trawl trials are considered in Chapter 7.</i> <u>Stakeholder Engagement Workshop</u> SFF attended the Stakeholder Engagement Workshop, and for the Infield Pipelines, no significant concerns were raised.
Health and Safety Executive (HSE)	<u>Scoping Report</u> No response was received from the HSE on the Scoping Report. <u>Stakeholder Engagement Workshop</u> HSE attended the Stakeholder Engagement Workshop, and for the Infield Pipelines, no significant concerns were raised.
North Sea Transition Authority (NSTA)	<u>Scoping Report</u> No response was received from the NSTA on the Scoping Report. <u>Stakeholder Engagement Workshop</u>

Stakeholder	Comments Received
	NSTA attended the Stakeholder Engagement Workshop and for the Infield Pipelines, no significant concerns were raised.
Scottish Environment Protection Agency (SEPA)	<u>Scoping Report</u> No response was received from SEPA on the Scoping Report. <u>Stakeholder Engagement Workshop</u> SEPA attended the Stakeholder Engagement Workshop and raised no concerns.
The Scoping Report was also issued to: Maritime and Coastguard Agency (MCA), and Global Marine Systems Limited, neither organisation provided a response.	

3. PROJECT DESCRIPTION

This section describes the Miller subsea infrastructure to be decommissioned and outlines the proposed decommissioning activities.

3.1 Miller Subsea Overview

As described in Section 1.1, there are no surface installations covered by the Miller Infield Pipelines DP submission, as the Miller platform was covered in an earlier DP submission (BPEAL, 2011). In addition, in agreement with OPRED, the main export pipeline from the Miller field to St Fergus (PL720) is not captured in this DP submission as it is subject to possible reuse considerations for carbon capture and storage (CCS) by third parties.

Infrastructure captured in this DP submission is therefore limited to the Miller infield infrastructure outside the Miller 500 m exclusion zone and does not include the gas export pipeline to shore. A summary of the pipelines and infrastructure included in the Miller Infield Pipelines DP submission is provided in Figure 3-1 and Figure 3-2.

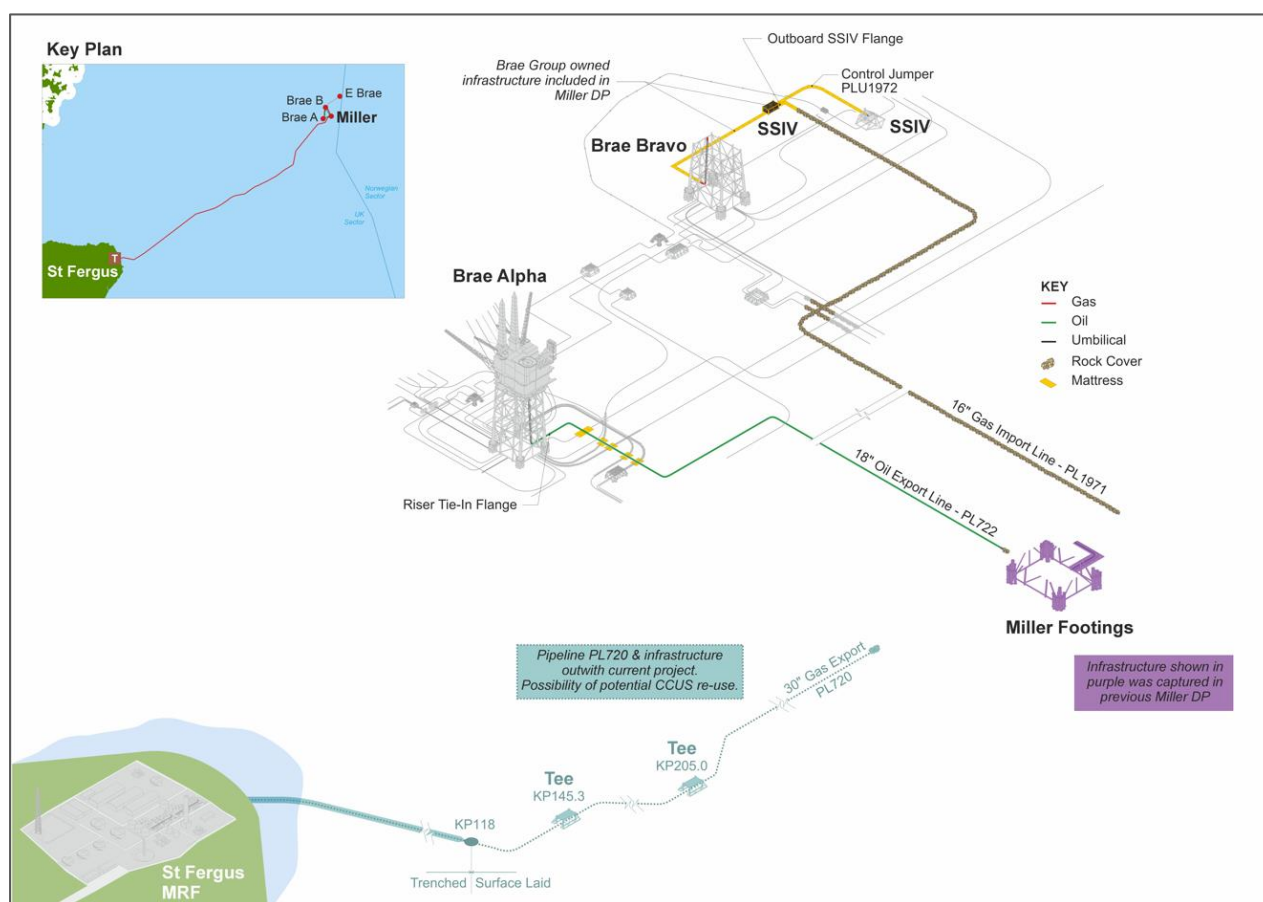


Figure 3-1: Representative Schematic of the Miller Infrastructure and Pipelines Included in the DP Submission.

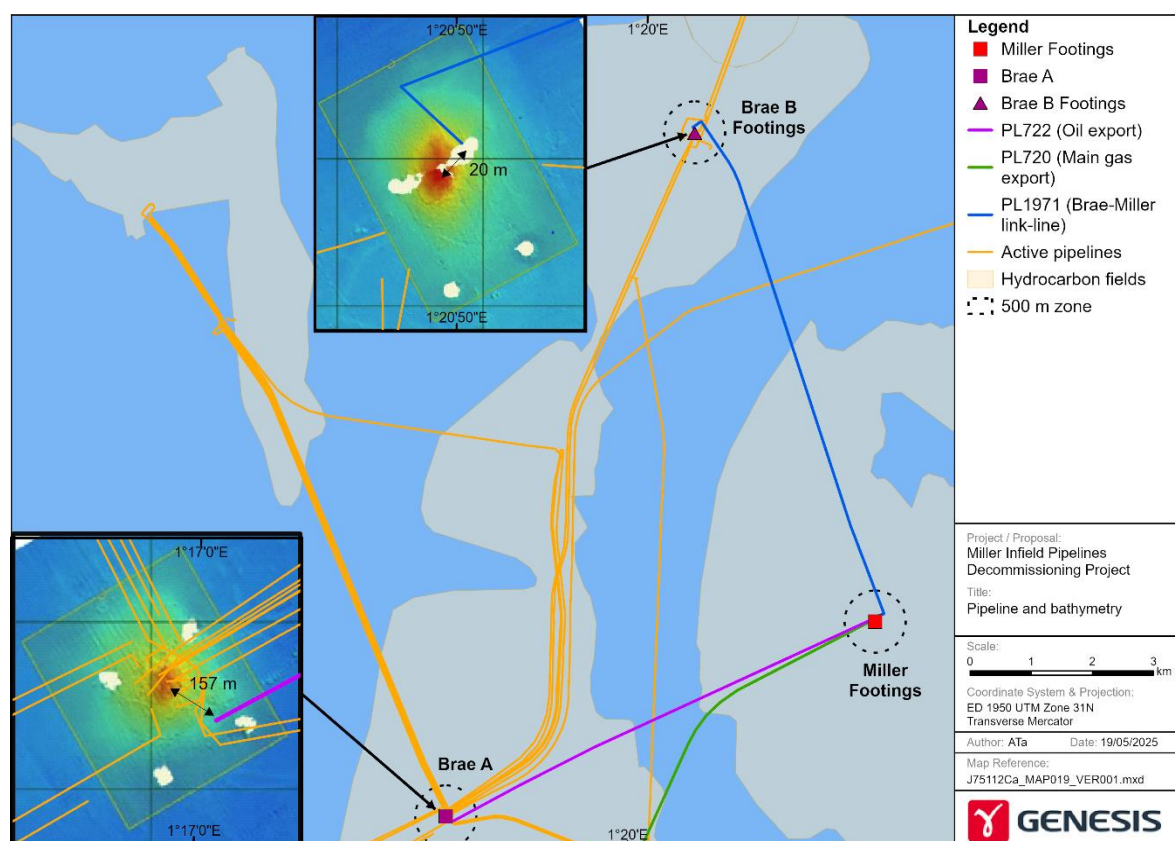


Figure 3-2: Location of Proposed Miller Activities and Images of Existing Cuttings Piles at Brae A and B taken from Marathon Oil (2013).

3.1.1 Pipelines and Umbilical

Table 3-1 summarises the pipelines and umbilical to be decommissioned as part of the proposed decommissioning activities.

PL722 transported processed crude oil from the Miller platform to the Brae A platform. At the Brae A platform, the Miller hydrocarbons were comingled with the Brae and Heimdal hydrocarbons for onward transport to Cruden Bay *via* the Forties Charlie platform.

PL1971 connects the Miller platform to the Brae B platform. This pipeline was used to transport gas from the Brae B platform to the Miller platform for gas injection.

PLU1972 was laid between the East Brae Transfer System SSIV and the SSIV on the PL1971 Miller gas import pipeline line (this SSIV is referred to as the Brae B SSIV).

Table 3-1: Pipelines and Umbilical Associated with the Miller Infield Pipelines DP Submission.

Description	Length (km) or Dimensions	Description of Component Parts	From – To End Points ⁽¹⁾	Burial Status	Current Content
Oil Export Pipeline (PL722)	7.460	Carbon steel/ plastic/ alloy & concrete coatings.	Pipeline Flange (Miller) to Pig Receiver (Brae 'A') ⁽²⁾ .	Surface laid.	Inhibited seawater (treated with the corrosion inhibitor TROS 650@750ppm).
Gas Import Pipeline (PL1971) ⁽³⁾	8.684	Carbon steel/ plastic/ alloy (not concrete coated).	Riser cut location (-61m) to Pipeline Cut Location (Miller) ⁽⁴⁾ .	Trenched with rock cover over entire length. Spools protected by concrete mattresses.	
SSIV Umbilical (PLU1972)	0.169	Plastic/ copper & misc. coatings.	East Brae 18" Gas Transfer SSIV to Brae B 16" SSIV ⁽⁵⁾ .	Surface laid and protected by mattresses.	Hydraulic fluid.

1- Note at the Miller end of each of the pipelines, the end of each line is within the 500 m exclusion zone of the previous Miller platform location.

2- This length includes the pipeline (as far as cut end to Miller) (7.11 km), the spools at Brae A (200 m), and the riser at Brae A (150 m). The length does not include the spools which were covered by the original Miller Platform DP and recovered during the 2023 works in the Miller 500m zone. Brae A riser upper section will be removed as part of the Brae A Upper Jacket DP. The fate of the lower section of the riser will be defined within a future Brae A Jacket DP, the outcome of which will be shared by BPEAL with OPRED.

3- PL1971 length includes riser and spool pieces at Brae B. Does not include riser or 35 m spool at Miller end 35m which was cut and recovered to shore in agreement with OPRED during the 2023 works in the Miller 500m zone. 71m of PL1971 spool pieces at Brae B will be decommissioned *in situ* under drill cuttings at Brae B. Total spool length is 220 m, such that 149 m will be recovered.

4- The upper section of the riser at Brae B was removed as part of the Brae B Upper Jacket DP. The fate of the lower section of the line will be defined within the future Brae B Jacket DP. The outcome of which will be shared by BPEAL with OPRED.

5- Approximately 161 m will be recovered with 8 m associated with a crossing remaining *in situ* (where the TAQA pipeline PL4164 crosses over this umbilical). The umbilical will be cut at either side of the crossing.

Following flushing and cleaning activities (carried out in 2009), the pipelines were suspended under the Disused Pipelines Notification (Interim Pipeline Regime), therefore, providing time to identify re-use options¹. The pipeline end at the Brae A platform (PL722) has been positively isolated and at Brae B (PL1971) severed as part of the completed Brae B topsides and upper jacket removal activities.

3.1.1.1 Crossings

There are a number of third-party crossings associated with the Miller pipelines and umbilical (see Figure 3-1 and Figure 3-3 and Table 3-2). Table 1-6 of the DP submission provides further information on the third-party crossings in terms of specific KP (kilometre point) locations of the crossings whilst Table 3-2 below identifies if the crossings are within or outwith any 500 m exclusion areas.

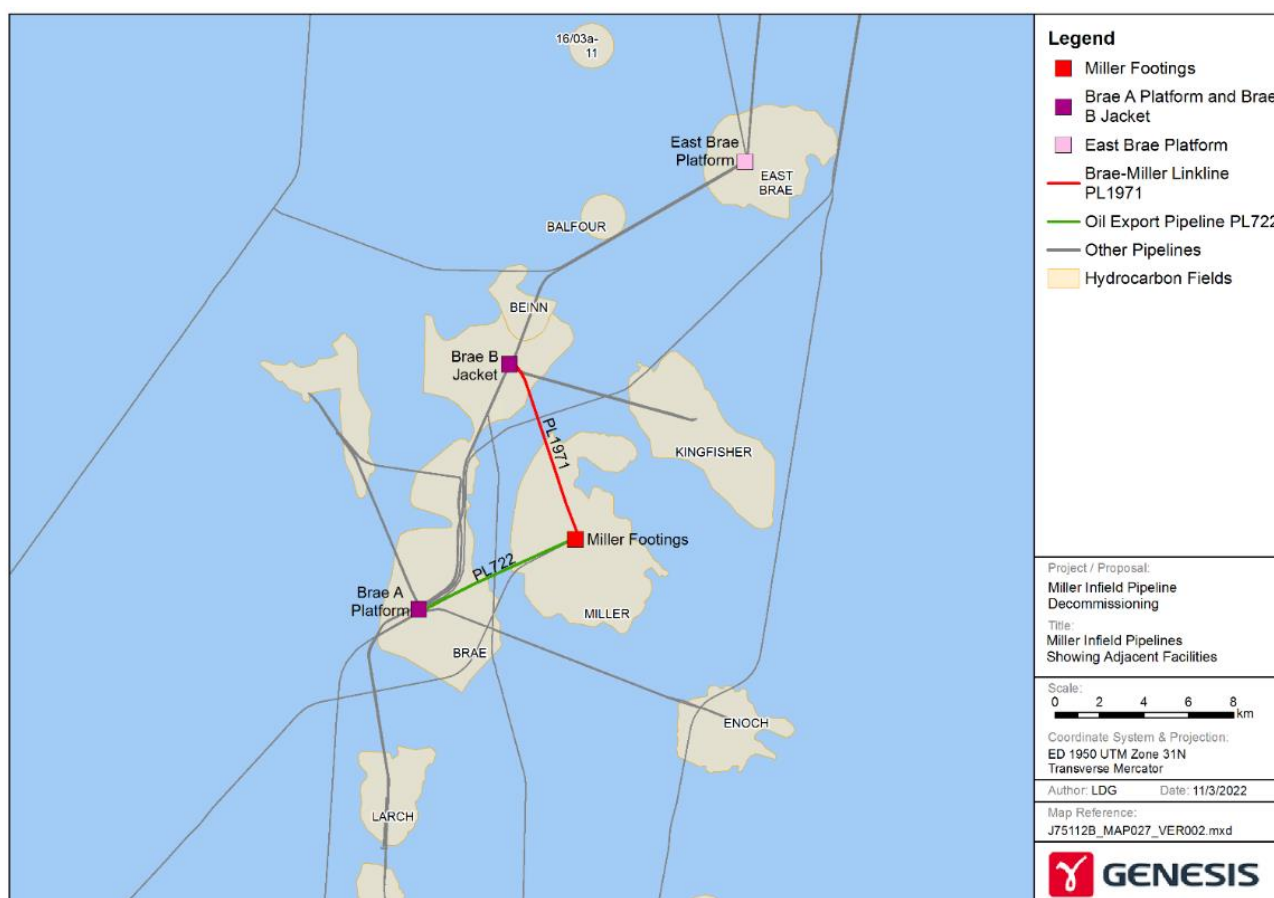


Figure 3-3: Third-party Crossings Associated with Miller Pipelines.

¹ Note: the Interim Pipeline Regime is intended to ensure that out of use pipelines do not pose a risk to other users of the sea, or to the environment. In addition, it ensures that pipelines are covered by an appropriate survey and maintenance regime until a DP for the lines is approved.



Table 3-2: Third-party Crossings on Miller Pipelines.

Operator	Name	Type	Distance/Direction	Third party crosses over/under Miller lines	Status
Crossings associated with PL722 (oil export line)					
CNR ¹	PL872	10" Gas Pipeline	Out with any 500 m exclusion zones	Crosses over PL722	Active
Equinor ²	PL301	8" Condensate Pipeline	Within the Brae A 500 m exclusion zone	Crosses under PL722	Out of Use
Crossings associated with PL1971 (gas import line)					
TAQA ³	PL360	18" Gas Pipeline	Within the Brae B 500 m exclusion zone	Crosses under PL1971	Active
TAQA ³	PLU4188	SSIV Control Umbilical	Within the Brae B 500 m exclusion zone	Crosses under PL1971	Out of Use
TAQA ³	PLU6121	PMS Cable	Within the Brae B 500 m exclusion zone	Crosses under PL1971	Active
TAQA ³	PL894	18" Condensate Pipeline	Within the Brae B 500 m exclusion zone	Crosses under PL1971	Active
Shell ⁴	PLU1490	Control Umbilical	Out with any 500 m exclusion zones	Crosses under PL1971	Active
Shell ⁴	PL1488	10" Production Pipeline	Out with any 500 m exclusion zones	Crosses under PL1971	Out of Use
Shell ⁴	PL1489	10" Production Pipeline	Out with any 500 m exclusion zones	Crosses under PL1971	Out of Use
TAQA ³	PLU4031	Power Cable	Out with any 500 m exclusion zones	Crosses under PL1971	Active
Equinor ²	PL301	8" Condensate Pipeline	Out with any 500 m exclusion zones	Crosses under PL1971	Out of Use
Crossings associated with PLU1972 (umbilical to SSIV)					
TAQA ³	PL4164	18" Gas by-pass Pipeline	Within the Brae B 500 m exclusion zone	Crosses over PLU1972	Active
¹ CNR International (UK) Ltd ² Equinor Energy AS ³ TAQA Bratani Limited ⁴ Shell U.K. Limited					

3.1.2 Pipeline Structures

Table 3-3 details two pipeline structures associated with the Miller infield infrastructure: a spool crossing frame located within the Brae A 500 m zone, and the Brae B SSIV located within the Brae B 500 m zone. Both structures will be recovered as part of the proposed decommissioning activities.

Table 3-3: Summary of Structures Associated with the Proposed Activities.

Item	Dimensions (m)/ Weight (Te)	Location	Comments/Status
1 x spool crossing frame	15.5 m (L) x 6 m (W) x 2.5 m (H) 75 te	Located within the Brae A 500 m zone.	The crossing frame supports the crossing of the PL722 spools over the spools associated with the Heimdal condensate pipeline (PL301). It is a piled structure (four piles) and is exposed on the seabed.
1 x SSIV	13.6 m (L) x 7.7 m (W) x 3.5 m (H) 107.9 te	Located within the Brae B 500 m zone.	The SSIV is a gravity-based structure and is exposed on seabed. SSIV is included here, however, it will be decommissioned at the same time as the Brae B facilities.

3.1.3 Stabilisation Features

Stabilisation features associated with the Miller pipelines include mattresses and rock cover, quantities of which are summarised in Table 3-4. There are no grout bags associated with the infrastructure to be decommissioned.

Table 3-4: Summary of Stabilisation Features Associated with the Miller Infield Infrastructure.

Stabilisation Feature	No	Total weight (te)	Comment
Flexible concrete mattresses 2.66 m (L) x 1.5 m (W) x 0.15 m (H)	12	16.9	Exposed mattresses associated with PL722 will be recovered to shore (12).
Flexible concrete mattresses varying dimensions with largest being 6 m (L) x 3 m (W) x 0.3 m (H)	45	237.8	Rock covered mattresses associated with PL1971 will remain <i>in-situ</i> (12). Exposed mattresses associated with PL1971 and Brae B Spool piece and SSIV Umbilical (PLU1972) will be recovered to shore (33).
Flexible concrete mattresses 6 m (L) x 3 m (W) x 0.15 m (H)	20	83.5	Concrete mattresses protecting PL1971 spool pieces from Brae B SSIV to base of riser at Brae B. Mattresses exposed on seabed will be recovered (12) and mattresses buried under drill cuttings will remain <i>in-situ</i> (8).
Rock cover	N/A	47,310	This volume of rock is associated with PL1971.*

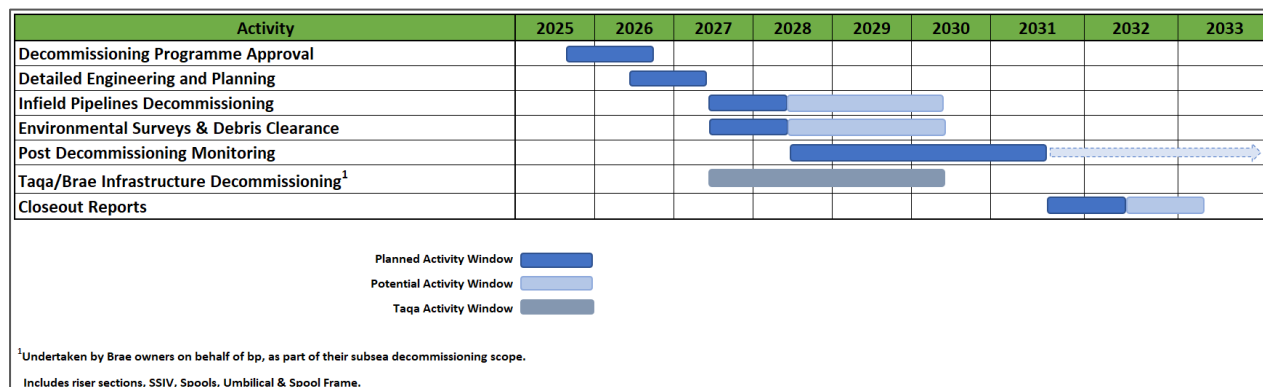
*Note: Rock volume provided relates to rock that has been placed as part of the Miller project. Hence rock associated with the crossings on PL722 and PLU1971 which was laid by the third party over the Miller infrastructure has not been included here.

3.2 Proposed Activities

3.2.1 Schedule

BPEAL propose to progress the decommissioning of the Miller infield infrastructure in line with the indicative schedule shown in Figure 3-4. Note some of the decommissioning activities will be carried out by the Brae owners at the time of decommissioning the Brae A and Brae B subsea infrastructure. Activities to be completed by the Brae owners are identified in Section 3.2.3.

Figure 3-4: Indicative Schedule.



3.2.2 Preparatory Works

Depressurization, cleaning and flushing of the Miller pipelines was completed in 2009. Following CoP, all pipelines were flushed and cleaned to reduce hydrocarbon content to as low as reasonably practicable and left filled with inhibited seawater (treated with the corrosion inhibitor TROS 650@750ppm).

3.2.3 Decommissioning Activities

3.2.3.1 Pipelines, Umbilical and Structures

Table 3-1 and Table 3-3 summarise the pipelines and umbilical and the structures associated with the proposed decommissioning activities.

A CA was carried out to determine the optimal approach to decommissioning the two pipelines. The CA approach and results are detailed in the CA report submitted in support of the DP and summarised in Chapter 4 of this EA.

Table 3-5 summarises how each of the Miller infield elements (pipelines, umbilical and structures) will be decommissioned.

Table 3-5: Proposed Decommissioning Activities.

Element	Comment
Surface laid oil export pipeline (PL722)	In line with the results of the CA, BPEAL propose to trench and bury the full length of the oil export pipeline to a target minimal depth of 0.6 m to Top of Pipe (ToP). The worst-case use of a mechanical plough during trenching has been assumed (as opposed to jet trenching) in the EA as it would have the largest footprint during installation.
Riser associated with PL722	To be decommissioned by Brae A owners on behalf of BPEAL. This riser is contained within the Brae A jacket and will be decommissioned when the Brae jacket is decommissioned. It is expected the upper half will be recovered to shore when the upper jacket is recovered. The fate of the lower section of the riser will be dependent on the selected decommissioning option for the Brae A lower jacket.
Rock covered gas import pipeline (PL1971)	In line with the results of the CA it is proposed to decommission the main length of this pipeline <i>in situ</i> with the exposed end cut and recovered. It is possible that a small quantity of spot rock (c. 10 te) will be added to make the cut end safe.
Riser associated with PL1971	To be decommissioned by Brae B owners on behalf of BPEAL. The upper section of this riser was recovered when the upper section of the Brae B jacket was recovered. The fate of the lower section of the riser will be dependent on the selected decommissioning option for the Brae B lower jacket.
Spools associated with PL722 and PL1971	Spools associated with PL722 (200 m) and PL1971 (149 m) will be recovered by the Brae owners during the decommissioning of the Brae A and Brae B subsea infrastructure respectively.
PLU1972 umbilical located within the Brae B 500 m exclusion zone	To be decommissioned by Brae B owners on behalf of BPEAL. Total length is 169 m. Approximately 161 m will be recovered with 8 m associated with a crossing remaining <i>in situ</i> (where the TAQA pipeline PL4164 crosses over this umbilical). The umbilical will be cut at either side of the crossing and if required up to 10 te of rock may be added to the cut ends (i.e. 10 te at either side) to make safe.
SSIV associated with PL1971 (i.e. the Brae B SSIV)	To be decommissioned by Brae B owners on behalf of BPEAL. SSIV is a gravity-based structure and will be recovered by the operators of the Brae B platform at the time of decommissioning the Brae B subsea infrastructure.
Spool crossing frame	To be decommissioned by Brae A owners on behalf of BPEAL. Piled structure located within the Brae A 500 m zone (supporting the crossing of the spools on the Miller PL722 pipeline over PL301 (Hemindal pipeline)). The four piles will be cut internally at a target depth of -3 m below seabed and the spool crossing frame will be recovered at the time of decommissioning the Brae A subsea infrastructure. As internal cutting of the piles is possible, external excavation is not expected to be required.

The use of a mechanical ploughing during trenching and burying of PL722 may result in the formation of clay berms but this is currently uncertain as the clay layer is below a depth of 1 m to 2 m from the seabed. Care will be taken to minimise the formation of berms during trenching and there will be a survey and monitoring

program to ensure that there is no hazard to towed fishing gear following completion of decommissioning work. The survey and monitoring program is discussed in Section 3.3.

3.2.3.2 Stabilisation Features

Stabilisation features associated with the proposed decommissioning activities are summarised in Table 3-4. As detailed in Table 3-4, there are 77 mattresses associated with the field. Of these, 12 are associated with crossings and are rock covered whilst eight are covered with drill cuttings within the Brae B cuttings pile. These 20 mattresses will be decommissioned *in situ*. All exposed mattresses (57 in total) will be recovered and returned to shore for management, in line with the waste hierarchy.

All existing rock protection will remain *in situ*. Most of the crossings will be decommissioned *in situ*. The one exception is the crossing between PL301 (condensate line from the Equinor Energy AS operated Hemindal field) and the Miller PL722 pipeline. At this crossing, a spool crossing frame was installed to facilitate the lay down of the spools associated with Miller pipeline PL722 over PL301. The PL722 spools and the crossing frame will be recovered as part of the activities covered in the DP submission.

As part of the proposed decommissioning activities it is possible that an additional 30 te of rock may be deposited. This 30 te would be spread across three locations:

- 10 te spot cover on the end of PL1971 after cut and recovery of the exposed end section;
- 10 te at either side of the crossing associated with PLU1972 (i.e. 10 te x 2).

Surveys to monitor the burial status of the pipelines and umbilical and associated protection materials are discussed in Section 3.3.

3.2.4 Vessel Use

A range of specialist and support vessels (Table 3-5) will be required to complete the decommissioning activities. At the time of writing, specific vessels have not yet been identified, however, the types of vessels required are well known and standard performance characteristics for typical vessels have been used for the purposes of estimating energy consumption and emissions to air. By estimating the fuel use based on generic vessel types (Institute of Petroleum (IoP) Guidelines (2000), and industry experience) and the likely duration of the work programme for each vessel, estimates of fuel consumption can be made (Table 3-5). Although the detailed schedules for the different work-scopes are still to be defined, the predicted maximum estimates of vessel use have been presented. The total number of vessel days associated with the decommissioning activities is c. 49.9.

Table 3-5: Vessel Use.

Vessel Type	Duration (days) ¹			Fuel Consumption (te/day) ^{2,3}			Fuel Usage (te)
	Working	Mob/ Demob	In transit	Working	Mob/ Demob	In transit	
Subsea Decommissioning							
Trenching vessel	7.9	6	1	15	2	10	141
Construction support vessel (CSV)	19.1	6.5	2	21.5	1.5	27	475.2
Seabed Clearance and Over Trawlability Surveys							
Survey vessel	1.8	2	1	14	3	21	52.6
Trawler (trawl sweeps and trawl trials)	4.6	0.5	0.5	4	4	4	22.4
Post Decommissioning Survey							
Survey vessel (assumes seabed sampling and visual surveys the full length of the lines). Allowance has been made for two survey trips.	2.3	3	3	14	3	21	104
Maximum Anticipated Fuel Use Across all Operations							795.3
1. Vessel day estimates include a 15% contingency. 2. IoP guidelines do not always have exact equivalent vessel e.g., Multi Support Vessel (MSV) used to represent CSV, Dive Support Vessel (DSV) used to represent survey vessel 3. Industry standards used for the fuel consumption data for the trenching vessel as no analogous vessels available within the IoP guidelines. Note: vessel days provided are worst case estimates and include mobilisation, transit and working days, but exclude waiting on weather allowance. Prior to contract award it is difficult to determine accurately. Final vessel days will be captured in the environmental impact assessment supporting the Marine Licence to be submitted prior to commencement of offshore activities.							

3.3 Survey and Monitoring Programme

Inspections of the pipelines decommissioned *in situ* will be carried out to confirm that no further spans/exposures develop and that existing rock berms have maintained their position. The timeline for inspections will be agreed with OPRED.

A post decommissioning site survey will be carried out on final completion of all decommissioning works. Surveys will be undertaken along the pipeline routes and at the site where the structure has been removed. Any significant debris will be recovered for onshore recycling or disposal. Independent verification of the seabed state will be obtained for the pipeline areas, and evidence of clearance will be provided to all relevant governmental and non-governmental organisations. Preference will be given to an approach not impacting on the seabed, for example, using Side Scan Sonar (SSS) or Multibeam Echo Sounder (MBES) data to show



a clear seabed. However, if deemed necessary by any of the stakeholders, an over-trawl trial may be carried out; this EA assumes the worst case of an over trawl trial being carried out.

A post decommissioning environmental seabed survey (centred on the sites of the subsea structures and those sections of pipelines where remedial activities are required) will be carried out. The objective of the survey is to identify any chemical or physical disturbances to the seabed following decommissioning and to provide a baseline from which future surveys can be compared. The survey reports will be submitted to OPRED, and a post monitoring survey regime will be agreed.

4. COMPARATIVE ASSESSMENT

OPRED's Guidance Notes on the Decommissioning of Offshore Installations and Pipelines (BEIS, 2018) require a case-by-case consideration of pipeline decommissioning alternatives through a CA process. The pipeline CA process is based on the principles and process within OSPAR Decision 98/3.

To determine the optimal approach for decommissioning PL722 and PL1971 a CA was carried out in line with the Oil & Gas UK (now Offshore Energies UK (OEUK)) Guidelines for CA (OGUK, 2015). The CA Report (BPEAL, 2025b), submitted in support of the consultation draft DP submission, provides full details of the assessment carried out for the decommissioning of the Miller infield pipelines. This chapter summarises the process followed and the results of the CA. The CA focused on the main lengths of line and did not include the spools or risers.

4.1 Pre-Screening of Decommissioning Options

Within the CA the two pipelines were evaluated separately:

- PL722 Surface laid concreted coated 18" oil export pipeline; and
- PL1971 rock covered 16" gas import pipeline.

Prior to the CA, a pre-screening of a wide range of the potential decommissioning options for the pipeline groups was carried out. Options considered included:

Option 1A: Total Removal by Reverse Reeling.

Option 1B: Total Removal by Reverse S-Lay.

Option 1C: Total Removal by Cut and Lift.

Option 2A: Remediate *In situ*: Exposed Sections Rock-covered.

Option 2B: Remediate *In situ*: Exposed Sections Trenched and Buried.

Option 2C: Remediate *In situ*: Exposed Sections Cut and Removed.

Option 3: Leave *In situ*: Monitor.

In the pre-screening, each of the groups were assessed against the above options. A qualitative assessment considering safety, environment, technical, societal, and economic impacts was carried out using a Red-Amber-Green (RAG) evaluation method. The pre-screening is detailed in the CA Report. The results of the pre-screening of the decommissioning options are shown in Table 4-1.

Table 4-1: Results of the Decommissioning Options Pre-Screening Assessment.

Group ID	Total Removal			Remediate <i>in situ</i>			Leave <i>in situ</i>
	1A	1B	1C	2A	2B	2C	3
PL722	X NTF	X SO	✓	✓	✓	X NA	✓
PL1971	✓	X SO	X SO	✓	✓	✓	X NA
✓ Selected for assessment in the CA.		X (NTF) Not technically feasible		X (SO) Screened out		X (NA) Not applicable	

4.2 Comparative Assessment Approach and Results

For all options selected for further assessment, scoring in the CA was carried out against safety, environment, technical feasibility, societal impacts, and economics. Within each of these criteria a number of sub-criteria were considered.

The conclusions of the CA are:

- The Oil Export Pipeline PL722 will be decommissioned *in situ* by trenching and burial of the full length, and
- Gas Import Pipeline PL1971 (already rock covered) will be decommissioned *in situ*, with removal of the exposed ends.

Remediate *in situ* with exposed sections cut and remove was identified as the most preferred option for PL1971. It is possible that c. 10 te of rock will be added to make the cut end safe (i.e. to minimise the risk of snagging on fishing gear).

5. ENVIRONMENTAL & SOCIOECONOMIC BASELINE

5.1 Introduction

This section describes the current nature and status of the environment in the vicinity of the Miller infield pipelines that may be affected by the proposed decommissioning activities. An understanding of the baseline environment is required to identify the potential environmental impacts of the proposed decommissioning works and to provide a basis for assessing the potential interactions of the proposed activities with the environment.

5.2 Environmental Baseline Surveys

A number of environmental baseline surveys have been carried out in the vicinity of the Miller field and, where relevant, these have been used to inform this chapter. The survey sampling locations associated with these surveys are provided in Table 5-1. To enhance the existing survey data available for the Miller area, BPEAL proposed to carry out an additional survey in Q3 2025. The survey results will be used to inform the required environmental permits prior to any proposed decommissioning activities (e.g. marine licence applications).

Additionally, as a founding member of the INfluence of man-made Structures In The Ecosystem (INSITE) programme, bp provide access and funding for this independent science programme, aiming to provide stakeholders with the scientific evidence base needed to understand the influence of man-made structures on the ecosystem of the North Sea (INSITE, 2023). As part of the INSITE project 'Functionality and Ecological Connectivity of Man-Made Structures' (FuECoMMS), the University of Essex undertook environmental sampling and subsequent analyses around the decommissioned Miller platform in July 2021. Manuscripts are in preparation, however, summary statistics are presented in this chapter, where relevant (N. Hicks, pers. comm, April 2025).

Table 5-2 presents details of other relevant reports which provide summaries of previous environmental surveys also undertaken in the area and are used to support this chapter, where relevant.

To enhance the existing survey data available for the Miller area BPEAL proposed to carry out an additional environmental baseline survey in Q3 2025. The survey results will be used to inform the required environmental permits prior to any proposed decommissioning activities (e.g. marine licence applications).

Table 5-1: Environmental surveys carried out in the vicinity of the Miller field.

Report Reference	Report	Survey Dates
ERT (2000)	BP Miller (UKCS Blocks 16/7b and 16/8b) Seabed Environmental Survey	July 2000
Gardline (2002)	Pipeline Route Surveys Brae Area Volume IV Environmental Report	August 2001
Fugro (2018)	Environmental Monitoring Report Kingfisher Pre-Decommissioning Survey UKCS Blocks 16/8a and 16/8c	June 2017

Table 5-2: Additional environmental reports which provide summaries of surveys carried out in the vicinity of the Miller field.

Report Reference	Report	Survey Dates
Aurora Environmental Ltd (2005a)	Miller Platform and Gas Export Pipeline Route – Environmental Description	1988-2004
Aurora Environmental Ltd (2005b)	A Review of 1988-2004 Miller seabed surveys Final report	1988-2004
Marathon Oil (2017)	Brae Alpha, Brae Bravo, Central Brae, West Brae and Sedgewick Combined Decommissioning Programmes Environmental Statement: Main Report	1981-2015

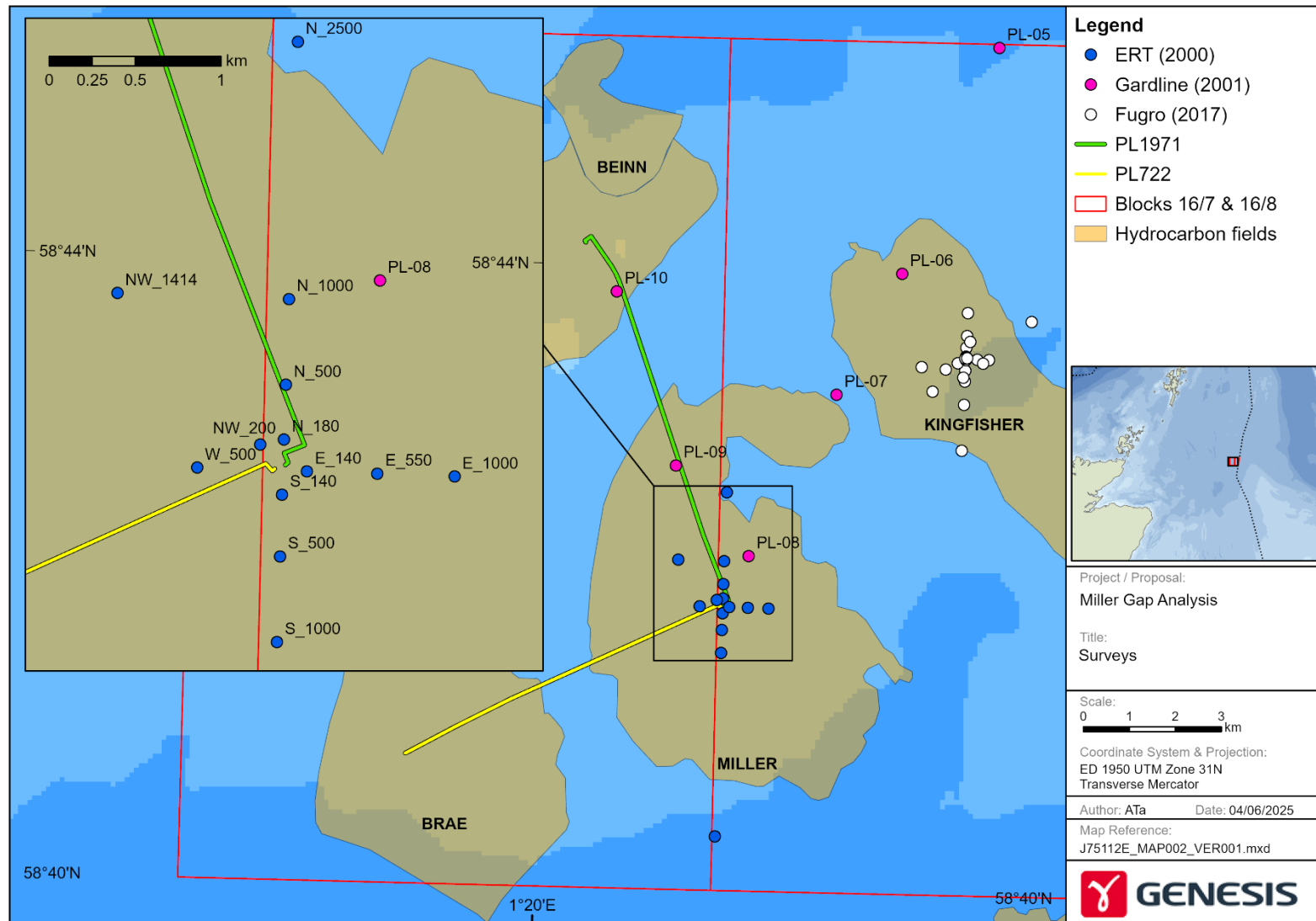


Figure 5-1 Seabed Surveys in the Vicinity of the Miller Infrastructure (See Table 5-1 for details).

5.3 Physical Environment

The type and distribution of marine life is influenced by the physical conditions of the surrounding environment, biological interactions, and anthropogenic activities. These physical factors, which include currents, tides, waves, temperature, salinity, and wind also influence the fate and behaviour of emissions and offshore discharges (planned and unplanned) from vessels and installations, and the risks associated with them.

5.3.1 Bathymetry

Bathymetry plays a significant role in modifying coastal tidal and residual currents, especially in the North Sea (Department for Energy Security and Net Zero (DESNZ), 2022). Knowledge of the bathymetry of the area helps to provide an understanding of the movement of sediments and possible contaminants associated with the sediment. PL722 and PL1971 are located at water depths of c. 103 m LAT.

5.3.2 Water Masses, Currents and Tides

Water masses, local current speeds and direction all influence the transport, dispersion, and fate of marine discharges. The major water masses in the North Sea can be classified as Atlantic water, Scottish coastal water, Northern North Sea (NNS) water, Norwegian water, CNS water, Southern North Sea (SNS) water, Jutland water and Channel water (Turrell, 1999).

The Miller infield pipelines are located in the area influenced by the Atlantic water (West) and the Fair Isle Current. The predominant regional current in the CNS originates from the vertically well-mixed coastal water and Atlantic water inflow of the Fair Isle/ Dooley current, which flows around the north of the Orkney Islands and into the North Sea (Figure 5-2).

Typical current speeds in the CNS are 0.1 m/s and the maximum current speed during mean spring tide is between 0.4 and 0.5 m/s. The mean spring tidal range is between 0.1 - 1.0 m (Scottish Government NMPi).

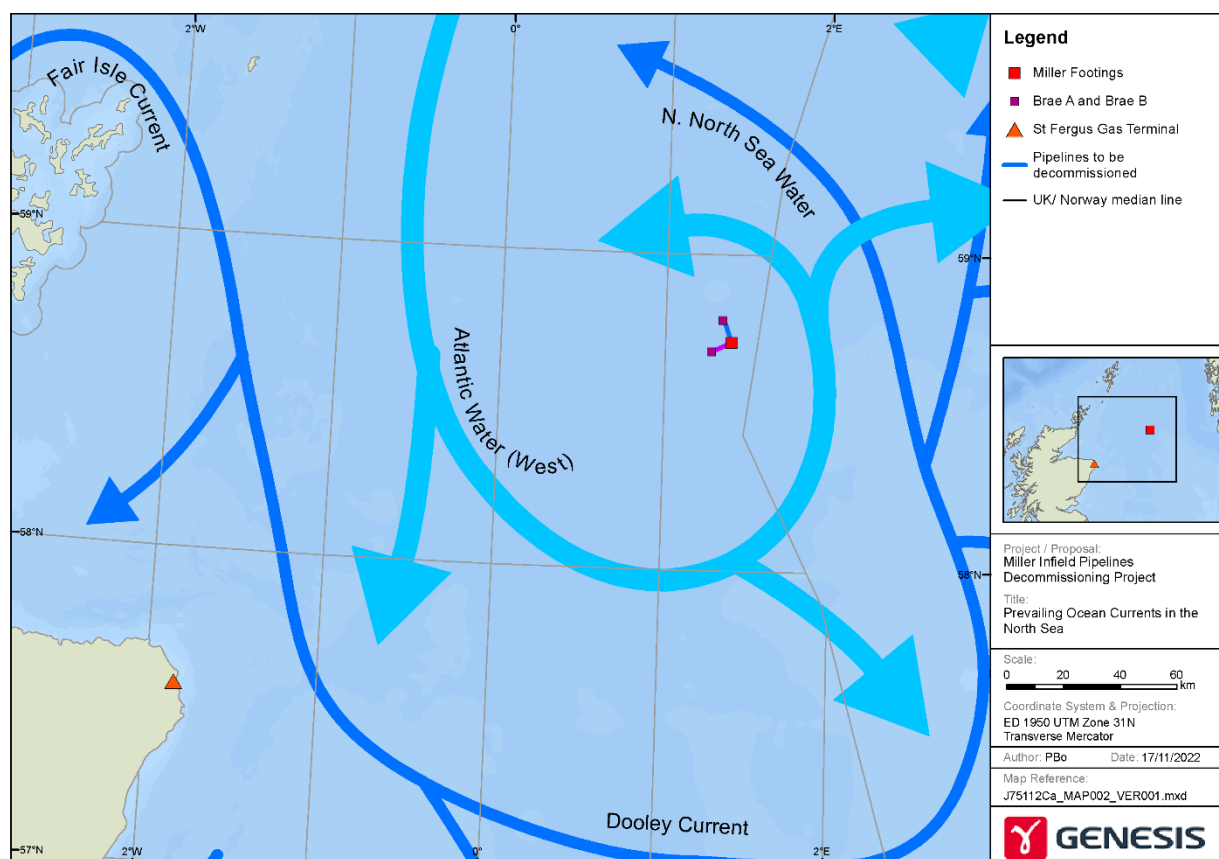


Figure 5-2: Ocean Circulation in the North Sea (Turrell, 1999).

5.3.3 Wind and Waves

Wind direction and speed directly influence the transport and dispersion of atmospheric emissions from an installation. These factors are also important for the dispersion of marine discharges, including oil spills, influencing the movement, direction and break up of substances on the sea surface. The UK is subject to strong maritime influences with coastal areas and island locations (Shetland and Orkney) being strongly impacted.

At the Miller location, wind speed increases in strength and also propagates from the north, northwest and southeast (Figure 5-3 ; Saha *et al.*, 2010).

Rough seas are common in the North Sea, particularly from October to March, waves in the Miller location propagate most frequently from the north (Figure 5-3) (ABPmer, 2013).

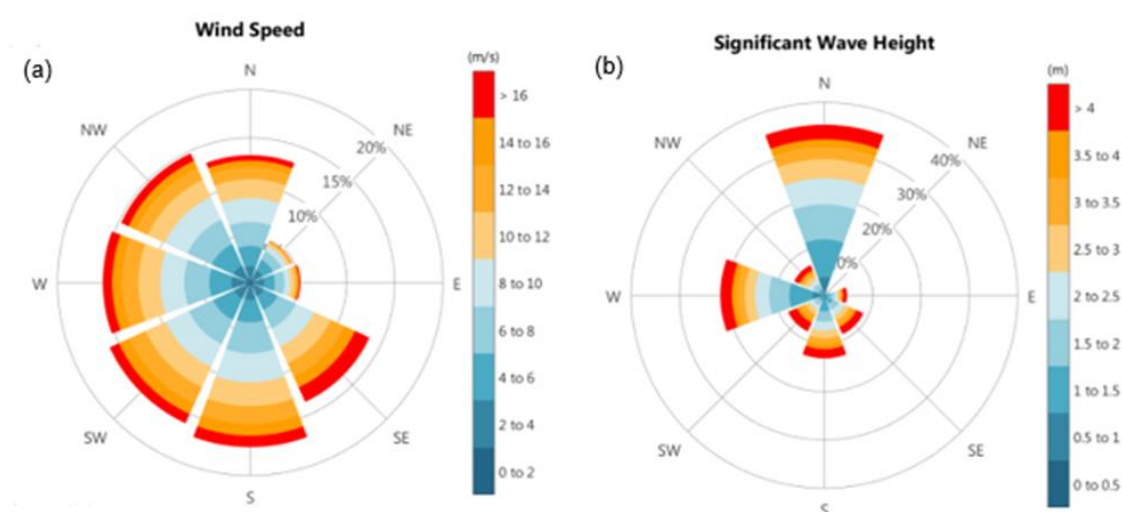


Figure 5-3: Wind Rose (a) (Saha *et al.*, 2010) and Wave Rose (b) (ABPmer, 2013) for the Miller Field.

5.3.4 Temperature

The water column in the CNS is vertically stratified during the summer months with a thermocline in August/September, typically forming at around 50 m water depth. The strong stratification of the water mass in the CNS effectively isolates the bottom water and seabed fauna from the large-scale temperature changes that occur in the upper water column. Water temperatures remain reasonably constant throughout the winter months, with only a marginal seasonal variation in salinity that is typical of the open and western waters of the North Sea (Scottish Government NMPI). The temperature of the sea affects both the properties of the sea water and the fates of discharges and spills to the environment. Seawater temperatures vary with season, depth, and proximity to land.

Annual mean near-seabed water temperatures are 6-7 °C at the Miller field. The average annual surface water temperature in the Miller infrastructure area is 9.5 °C (Scottish Government NMPI).

5.3.5 Salinity

Fluctuations in salinity are largely caused by the addition or removal of freshwater to or from seawater through natural processes such as rainfall and evaporation

In the region of Miller, the salinity is approximately 35 ‰. In these open waters seasonal variability is relatively small and may range between 34.9 - 35.3 ‰ (Aurora Environmental Ltd, 2005a).

5.3.6 Seabed Sediments

The characteristics of local sediments within a project area is an important factor in determining the potential effects of decommissioning activities on the local seabed environment.

The seabed sediment distribution in the vicinity of the Miller Infield Pipelines Project is illustrated in Figure 5-4. The sediment across the Miller area is relatively uniform and typically comprises the Marine Strategy Framework Directive (MSFD) Broad Benthic Habitat Type 'Offshore circalittoral sand' and the European Nature Information Service (EUNIS) biotope complex 'Deep circalittoral sand' (A5.27) (EMODnet, 2023a).

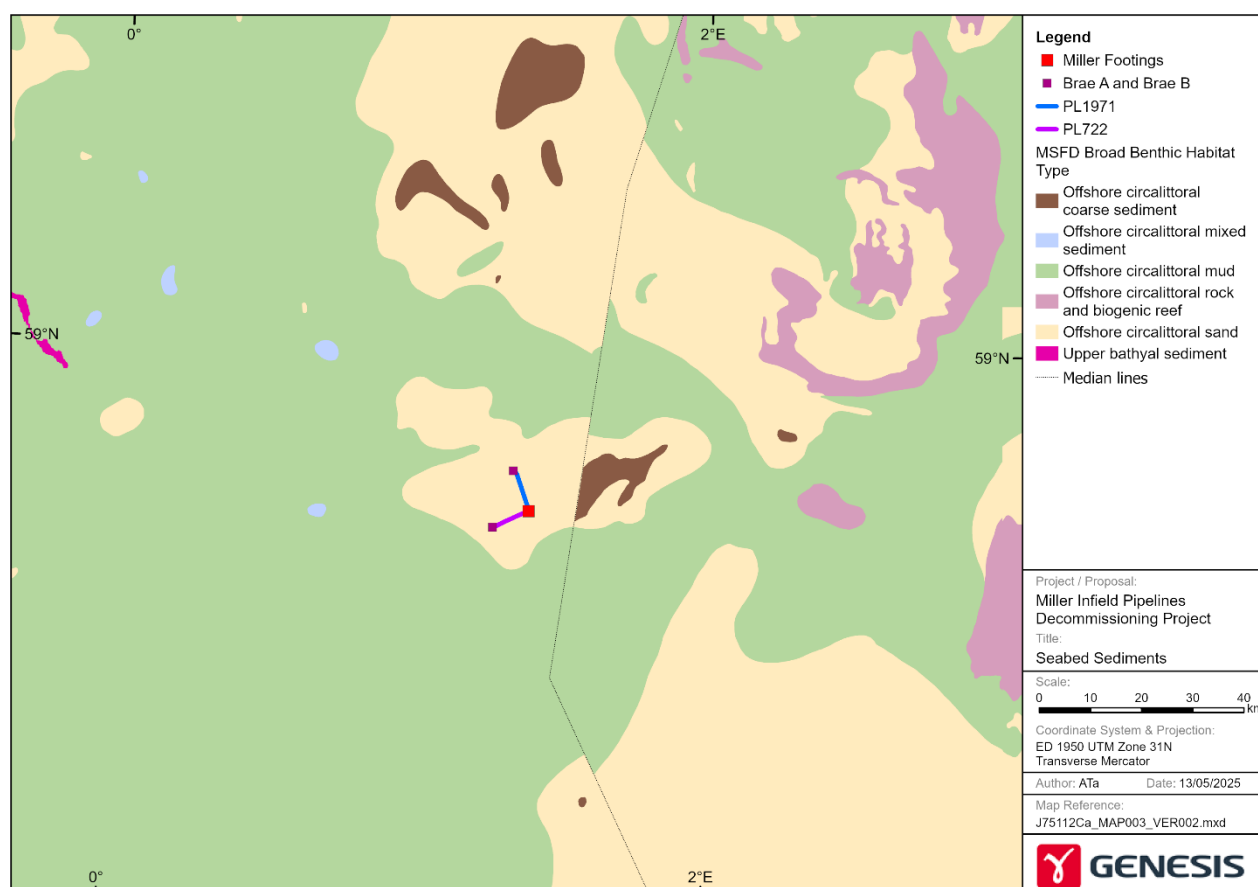


Figure 5-4: Modelled Distribution of Seabed Sediments in the Vicinity of the Miller Infield Pipelines Decommissioning Project (EMODnet, 2023a).

The Miller Infield Pipelines Decommissioning Project is located within the Witch Ground Basin is characterised by numerous pockmarks on the seabed, although they do not intersect with the Project area. The overlying sand content is thin, moderately sorted, with a mean grain size varying from coarse to fine overlaying the silty clays of the Witch Ground Formation.

The University of Essex collected sediment samples around the decommissioned site of the Miller platform in July 2021, from 50 m away and doubling in distance up to 3.2 km away as a reference site. Particle size was similar across all sites (sandy), except for those in close proximity to the platform where, at 50 m away, the mean particle size was 128.54 µm making this sediment muddy and noticeably different from the rest of the sediment. This is possibly linked to the presence of drill cuttings piles and previous operational or production activities (N. Hicks, pers. comm, May 2024).

As noted in Aurora Environmental Ltd, (2005b), Kjeilen-Eilertsen *et al.* (2004) observed similar findings. Sediments in the area of the Miller field ranged from very fine to medium sands, with the majority of sediments being characterised as fine sands and mainly classified as well sorted sediments. ERT (2000) also recorded sediments in the Miller area to be characterised by very fine to medium sands. Finer sediment (very fine sand) was recorded at the most distant (and deepest) stations.

Similar sediments were also observed around the Brae platforms. Sediments at the Brae A platform were described as 'Deep circalittoral mud', consisting of very fine to medium sands, while sediments at the Brae B platform ranged from coarse silt to very fine sand (Marathon Oil, 2017). Data from a pre-decommissioning environmental site survey at the neighbouring Kingfisher field (c. 7.5 km away) also found similar sediment types (Fugro, 2018). Using the Wentworth (1922) sediment description, six stations out with 200 m of the Kingfisher platform were classified as fine sand, with seven classified as very fine sand. Descriptions in core

sections ranged from 'fine silt' to very fine sand. When compared to the wider survey area, mean particle size was generally lower in the cuttings pile. The largest particle sizes were recorded in K06 and K07, which are those stations closest to Miller, however these sediments were still classified as fine sand. The majority of the Kingfisher survey area was identified as the EUNIS biotope complex 'circalittoral muddy sand' (A5.26). Areas of mixed sediments with shell debris were identified as 'circalittoral mixed sediment' (A5.44).

Overall, the seabed sediments in the vicinity are understood to be largely homogeneous, comprising offshore circalittoral sands.

5.3.6.1 Sediment Hydrocarbons

As a result of the permitted historic discharges of oily cuttings, and the resulting formation of a cuttings pile which lies directly below the Miller jacket, a gradient of seabed sediment contamination extends from the platform location. Similarly, historic cuttings piles contaminated with oil based mud (OBM) also exist at both the Brae A and Brae B platform locations (Marathon Oil, 2017).

The Miller cuttings pile is centred on the north-east leg (based on platform north) and extends to the south-east leg. Approximately 80 % of the cuttings lie outside the jacket footprint. The outer slopes of the pile are shallow and have gradients of less than 1:10. The total weight of THC within the pile is estimated to be 1,350 Te (BPEOC, 2011). Aurora Environmental Ltd (2005b) conducted a review of all Miller seabed surveys carried out between 1988 and 2004:

- In 1988, total hydrocarbon (THC) concentrations were generally very low. Where slightly elevated levels were recorded, they were reported to be attributed to shipping or unrecorded exploration wells.
- In 2000, THC concentrations in the sediments ranged from 6.2 µg / g to 11,775 µg / g for all stations; from 193.5 µg / g to 11,775 µg / g in close proximity to the platform (< 200 m); from 15.1 µg / g to 65.2 µg / g out to the 1,000 m; and from 6.2 µg / g to 9.8 µg / g beyond 1,000 m. THC levels primarily associated with OBM fluid were evident above the uniform 'background' concentrations predominantly within 200 m of the platform and decreased to background levels at stations beyond 1,000 m (Aurora Environmental Ltd, 2005b). It was therefore observed that surface sediment THC concentrations exceeded the UKOOA 95th percentile (40.1 mg / kg), for the CNS, up to 1,000 m from the Miller platform.
- There was a wider spread of sediment hydrocarbon concentrations in 2004 than in 2000, with THC values ranging from non-detectable levels (at distances of 1,000 m from the platform location) to 17,000 µg / g (at closer proximity to the cuttings pile). The overall extent of THC contamination did not appear to have changed appreciably on the north-south axis but extended only 200 m to 250 m on the east-west axis (i.e. approximately half the distance recorded in 2000) and could therefore indicate as much as a 60 % reduction in the area contaminated by THC concentrations above 50 µg / g.

The stations at Miller which exceeded the UKOOA 95th percentile THC value in 2000 are presented as red circles in Figure 5-5 (ERT, 2000). More recently, the University of Essex found elevated levels of hydrocarbons (both alkanes and polyaromatic hydrocarbons) at 50 m from the decommissioned Miller platform site, likely due to the proximity to the drill cuttings piles (N. Hicks, pers. comm, May 2024).

Nearby, the cuttings pile at Brae A is located on the north side of the platform and is understood to cover an area of c. 100 m x 75 m (Marathon Oil, 2017). Surveys of the Brae A drill cuttings pile and surrounding area in 2015 concluded that THC concentrations were significantly lower than previously recorded in 1983, 1985 and 1989. The drill cuttings pile at Brae B is between the two northern most legs of the (decommissioned) Brae B platform, covering an area of c. 100 m x 80 m (Marathon Oil, 2017). THC concentrations at the Brae B drill cuttings pile and surrounding area were substantially elevated in 2015, compared to historical survey

data and UKOOA (2001) background data for the North Sea. This may have been due to a disturbance event at the site.

Data from the neighbouring Kingfisher field (platform location c. 7.5 km away from Miller platform location) showed the THC concentration was predominantly below the CNS background mean out with 200 m of the Kingfisher platform and associated cuttings pile (Fugro, 2018). The THC concentration of K07, the closest station to Miller (c. 6 km to the northeast), was $4.3 \mu\text{g/g}$, which is lower than the CNS background mean.

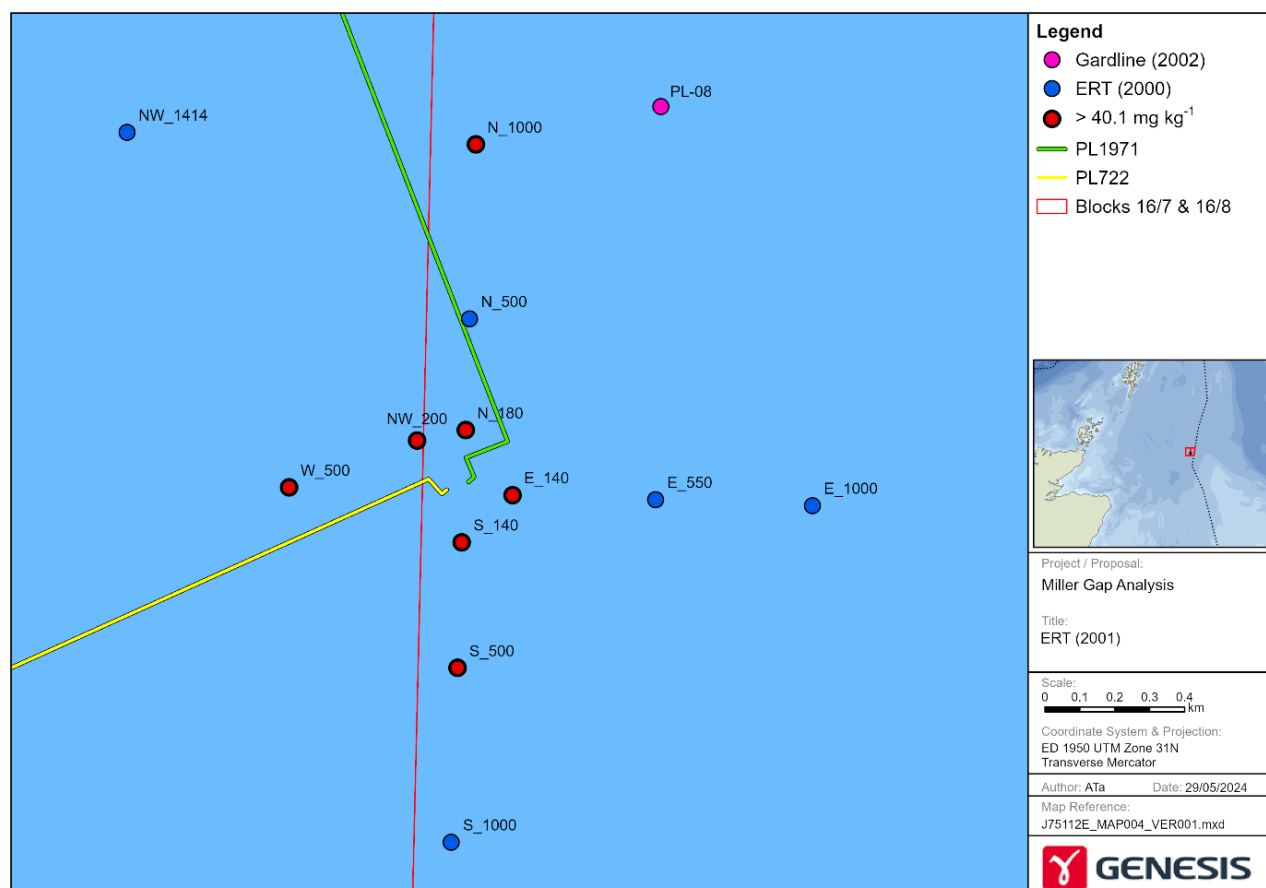


Figure 5-5: ERT (2000) Survey Stations which Exceeded the UKOOA 95th Percentile THC Value for the CNS.

5.4 Biological Environment

5.4.1 Plankton

Plankton are drifting organisms that inhabit the pelagic zone of a body of water and include single celled organisms such as bacteria as well as plants (phytoplankton) and animals (zooplankton). Phytoplankton are the primary producers of organic matter in the marine environment and form the basis of marine ecosystem food chains. They are grazed on by zooplankton and fish, which in turn are eaten by larger species such as other fish, birds and cetaceans. Therefore, the distribution of plankton directly influences the movement and distribution of other marine species. Zooplankton include all life stages of planktonic organisms (holoplankton) and includes the eggs, larvae and spores of non-planktonic species such as fish, benthic invertebrates and algae (meroplankton).

The composition and abundance of plankton communities varies throughout the year; influenced by several factors including depth, tidal mixing, temperature stratification, nutrient availability and the location of oceanographic fronts. Species distribution is directly influenced by temperature, salinity, water inflow and the presence of local benthic communities (Robinson, 1970; Colebrook, 1982). The meroplankton population

may have a very different seasonal cycle depending on the life cycle strategy of the fish species and benthic organisms which inhabit the area.

The phytoplankton assemblage in the area of the Miller field is typical of the CNS. Phytoplankton numbers in the CNS usually peak in the spring with communities dominated by relatively large diatoms, e.g., *Thalassiosira* spp. and *Chaetoceros* spp. There may be an additional, but smaller, peak in phytoplankton numbers during the autumn with smaller dinoflagellate species, e.g., *Tripos* dominating. Calanoid copepods are the principal constituent of the zooplankton community in the CNS, along with *Paracalanus* spp. and *Pseudocalanus* spp. *Calanus* larval stages, euphausiids, *Acartia* spp., and decapod larvae are also important components of the zooplankton assemblage (BEIS, 2022).

5.4.2 Benthos

Bacteria, plants and animals living on or within the seabed sediments are collectively referred to as benthos. Species living on top of the sea floor may be sessile (e.g., seaweeds) or freely moving (e.g., starfish) and collectively are referred to as epibenthic or epifaunal organisms. Animals living within the sediment (e.g., clams, tubeworms and burrowing crabs) are termed infaunal species. Semi-infaunal animals, including sea pens and some bivalves, lie partially buried in the seabed. The majority of marine benthic invertebrates exhibit a life cycle that includes a planktonic larval phase, from which the bottom dwelling juvenile and adult phases recruit.

Benthic animals display a variety of feeding methods. Suspension and filter feeders capture particles which are suspended in the water column (e.g., sea pens) or transported by the current (e.g., mussels). Deposit feeders (e.g., sea cucumbers) ingest sediment and digest the organic material contained within it. Benthic species can be herbivorous (e.g., sea urchins), carnivorous (e.g., crabs) or omnivorous (e.g., nematodes). Benthic communities show a strong correlation with habitat type, with depth mainly influencing epifauna, and sediment characteristics typically influencing the infauna (Basford *et al.*, 1990). Benthic communities in deeper soft sediment habitats tend to be spatially distributed over large scales, with distinctive species assemblages associated with particular substrate types. However, depending on the intensity and spatial extent of sampling, localised community types or subtler variations may be distinguished, often associated with topographic features (BEIS, 2022).

Activities that result in the disruption of the seabed, such as the proposed decommissioning activities, can affect the benthic fauna (Clark, 1996). The recognition that aquatic contaminants may alter benthic fauna, together with the relative ease of obtaining quantitative samples from specific locations, has led to the widespread use of infaunal communities in monitoring the long-term impact of disturbance to the marine environment. The species composition and relative abundance in a particular location provides a reflection of the immediate environment, both current and historic (Clark, 1996). Sessile infaunal species are particularly vulnerable to external influences that may alter the physical, chemical or biological community of the sediment as they are unable to avoid unfavourable conditions. Each species has its own response and degree of adaptability to changes in the physical and chemical environment.

The macrofauna identified by ERT (2000) was heterogenous across the Miller survey area, consisting of an undisturbed “background” community at stations greater than 550 m distance from the platform location, and a disturbed community at stations within 500 m of the platform (excluding one station). The macrofaunal assemblages recorded were relatively homogenous in composition and similar to those previously recorded. Overall, a total of 234 taxa were identified from the 30 samples analysed across the Miller survey area. The phyletic composition of the macrofauna was considered relatively typical of microbenthic communities in offshore sediments in this area of the North Sea, where polychaetes have been found to account for c. 50% of the species encountered (Eleftheriou & Basford, 1989; UKOOA, 2001; ERT, 2000).

Across the Miller area annelids were found to dominate, accounting for 49.3 % of taxa, followed by arthropods accounting for 23.8 % and molluscs with 17.6 % (ERT, 2000). Numerically annelids were also the most

abundant, accounting for 85.1 % of individuals sampled. Common taxa included the polychaetes *P. jeffreysii*, *P. assimilis*, *Aphelochaeta* spp., *Exogone vergura*, *S. kroyeri*, and *J. caudata*. Opisthobranch molluscs belonging to the order Cephalaspidia (including *Cyllichna cylindracea*, *P. quadrata*, *P. scabra* and *Retusa umbilicate*), the bivalve mollusc *Thyasira pygmaea* and Nemertean worms were also found to be consistently common over the Miller survey area. Uniquely, the polychaetes *G. oculata*, *L. gracilis*, *Parafoneis eliasoni*, *Nephtys hystrix*, *Mediomastus fragilis*, *Notomastus latericeus* and the bivalve mollusc *Thyasira croulinensis* were found to be common at stations 5 km and 10 km to the south of Miller. However, these were not considered common at any of the other six stations out with 550 m from the Miller platform location.

A recent study by the University of Essex observed clear changes in macrofaunal biodiversity with increased distance from the Miller platform location (N. Hicks, pers. comm, May 2024). Communities closer to the Miller platform structure (50 m and 100 m) were dominated by polychaete species such as *Cirratulus cirratus*, and low abundance of echinoderms. With increasing distance from the platform, macrofaunal communities become more similar to the communities at a site 3.2 km away, with high abundance of *Echinocardium* with increasing distance. Microbial biodiversity also shows similar trends to the macrofauna, with higher abundance of sulphur cycling microbes closer to the platform compared to further away.

Environmental data from Brae A showed benthic communities were largely dominated by the polychaetes *P. jeffreysii*, *G. oculata*, *Tharyx kilariensis*, *Pholoe assimilis* and the bivalve molluscs *Adontorhina similis* and *Axinulus croulinensis* (Marathon Oil, 2017). Polychaete annelids accounted for c. 50% of the species encountered in the Brae A platform. Gardline (2002) also found the dominant species in all 12 Brae A samples to be the polychaete *P. jeffreysii*, with a mean abundance of 118 individuals per sample. In the Brae B survey area, the same polychaete species were dominant, with the addition of *Spiophanes bombyx* (Marathon Oil, 2017). *P. jeffreysii* accounted for 68% of the polychaetes identified and 55 % of the total individuals found in samples. *A. islandica* accounted for 0.01% of all taxa (three individuals).

The PMF *A. islandica* was also identified in the Brae Area Pipeline Route Survey area (Gardline, 2002) (see Section 5.6).

The general biotopes around the Brae A platform were considered to be variations on SS.SMU.Omu.PjefThyAfil, (*P. jeffreysii*, *Thyasira* spp. and *A. filiformis* in offshore circalittoral sandy mud). *Thysaria* spp. are also a component species of the PMF 'Offshore subtidal sands and gravels' Gardline (2002) (see Section 5.6). The predominant biotope identified across the Brae B drill cuttings pile was broadly similar to SS.SMU.Omu.CapThy (opportunistic species *Capitella* sp. and *Thyasira* spp. in organically enriched offshore circalittoral mud and sandy mud; Connor *et al.*, 2004). The polychaete *P. jeffreysii* is considered to be a hydrocarbon tolerant scavenger species and is often found in high numbers in areas of contamination (Hiscock *et al.*, 2005).

At the nearby Kingfisher field, Fugro (2018) found that the most abundant taxa were similar between stations. The polychaete *P. jeffreysii*, followed by Echinoidea and the phoronid *Phoronis* sp. were ranked both most abundant and most dominant taxa across the survey area. The opportunist polychaete *Chaetozone setosa* was the most abundant taxa at one station 1,000 m north of the Kingfisher platform only, whilst the polychaete *Galathowenia oculata* was present within the top three most abundant taxa at both reference stations. The OSPAR listed threatened and/or declining habitat 'sea pens and burrowing megafauna communities' was also recorded (Fugro, 2018) (see Section 5.6).

5.4.3 Finfish and Shellfish

More than 330 fish species are thought to inhabit the shelf seas of the UKCS (BEIS, 2022). Pelagic species (e.g., herring (*Clupea harengus*), mackerel (*Scomber scombrus*), blue whiting (*Micromesistius poutassou*), and sprat (*Sprattus sprattus*) are found in mid-water and typically make extensive seasonal movements or migrations. Demersal species (e.g., cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), sandeels (*Ammodytes marinus*), sole (*Solea solea*) and whiting (*Merlangius merlangus*) live on or near the seabed

and, similar to pelagic species, many are known to passively move (e.g., drifting eggs and larvae) and / or actively migrate (e.g., juveniles and adults) between areas during their lifecycle.

The most vulnerable stages of the life cycle of fish, to general disturbances such as disruption to sediments and oil pollution, are the egg and larval stages. Hence, recognition of spawning and nursery times and areas within a development area is important when considering potential disturbance caused by decommissioning activities.

The Miller pipelines are situated within International Council for the Exploration of the Sea (ICES) rectangle 46F1. Table 5-3 shows the approximate spawning times of commercial fish species known to exist in the vicinity of the operations.

Figure 5-6 illustrates spawning and nursery grounds of these commercial fish species occurring in the relevant ICES rectangle. It should be noted that spawning and nursery areas tend to be transient and therefore cannot be defined with absolute accuracy (Coull *et al.*, 1998; Ellis *et al.*, 2012).

Table 5-3: Summary of Spawning and Nursery Activity for Some Commercial Fish Species in ICES Rectangle 46F1 (Coull *et al.*, 1998; Ellis *et al.*, 2012).

Species	J	F	M	A	M	J	J	A	S	O	N	D	Nursery
Anglerfish													Yes
Blue whiting													Yes
European Hake													Yes
Ling													Yes
Sandeel													Yes
Spotted ray					*	*	*						Yes
Spurdog													Yes
Whiting													Yes
Norway Pout		*	*										Yes
<i>Nephrops</i>				*	*	*							Yes
Mackerel					*	*	*						Yes
Haddock													Yes
Cod		*	*										Yes
Saithe	*	*											No
Species Present (*Peak Spawning)								Species not recorded					

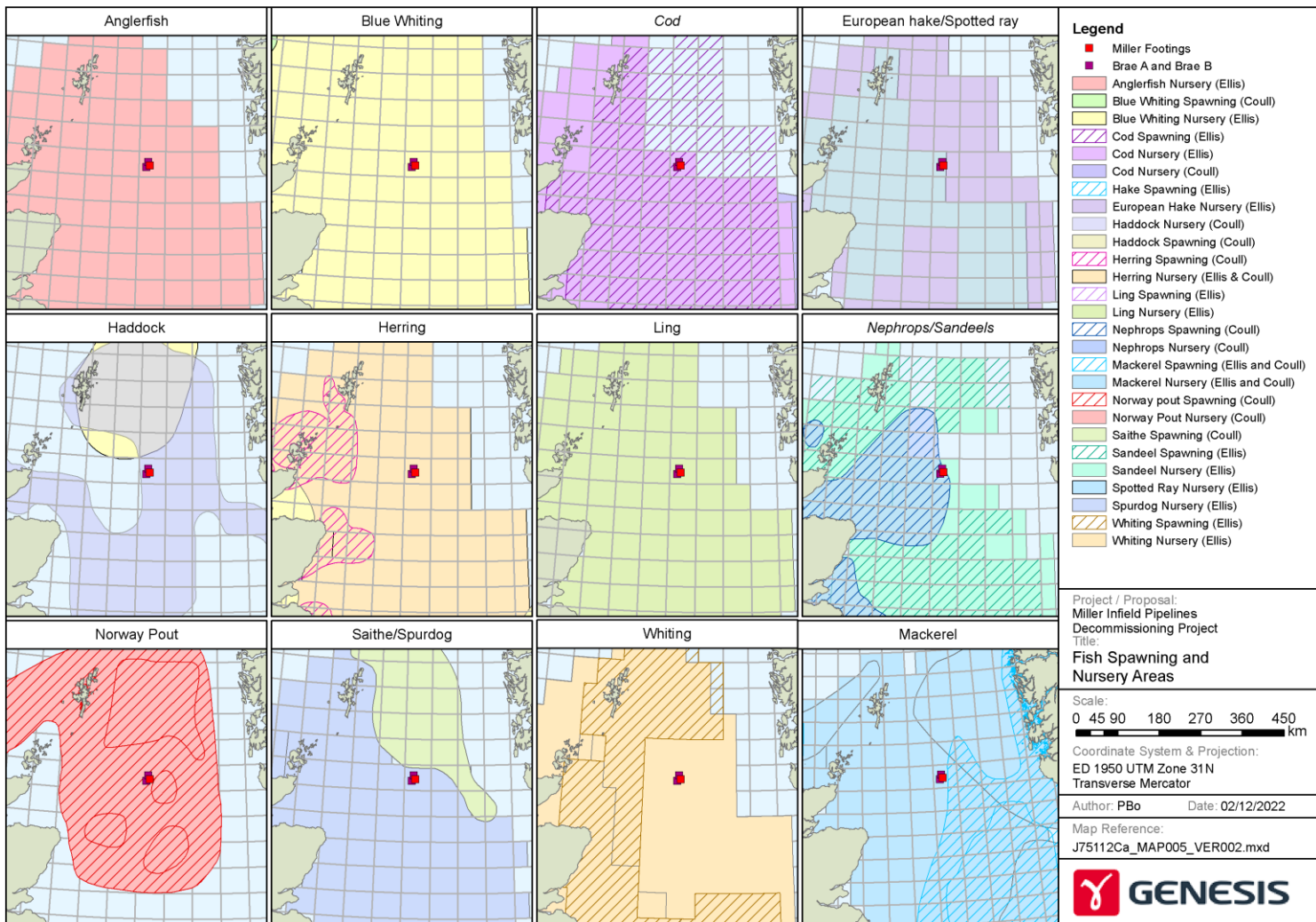


Figure 5-6: Spawning and Nursery Grounds of Some Commercially Important Fish Species in the Area (Coull *et al.*, 1998; Ellis *et al.*, 2012).

Of the fish species identified in the area, a number have been assessed by NatureScot and JNCC as Priority Marine Features (PMFs) in Scotland (NatureScot, 2016); see Section 5.5 for a list of all PMFs in the area. In addition, cod is considered vulnerable on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. Similar to many other species, cod is a benthic spawner and is sensitive to seabed disturbance. They are known to aggregate over specific grounds to spawn and aggregate on a spawning arena where males hold small territories in a lek-like mating system. This aggregative behaviour, together with seasonal site fidelity, can make cod especially vulnerable to anthropogenic impacts. The Miller field is recognised to be located within a cod spawning area (Coull *et al.*, 1998; Ellis *et al.*, 2012).

Data generated by Marine Scotland (Aires *et al.*, 2014) uses Species Distribution Modelling (SDM) to predict where aggregations of 0-group fish (fish in the first year of their life) may be found based on environmental information and catch records. The data indicates that low levels of juveniles are present throughout the area of the Miller field for the majority of commercial fish species. There are a limited number of exceptions to this, including: a medium probability of haddock juveniles in Blocks 16/7 and 16/8, and a medium probability of Norway pout juveniles in Block 16/8.

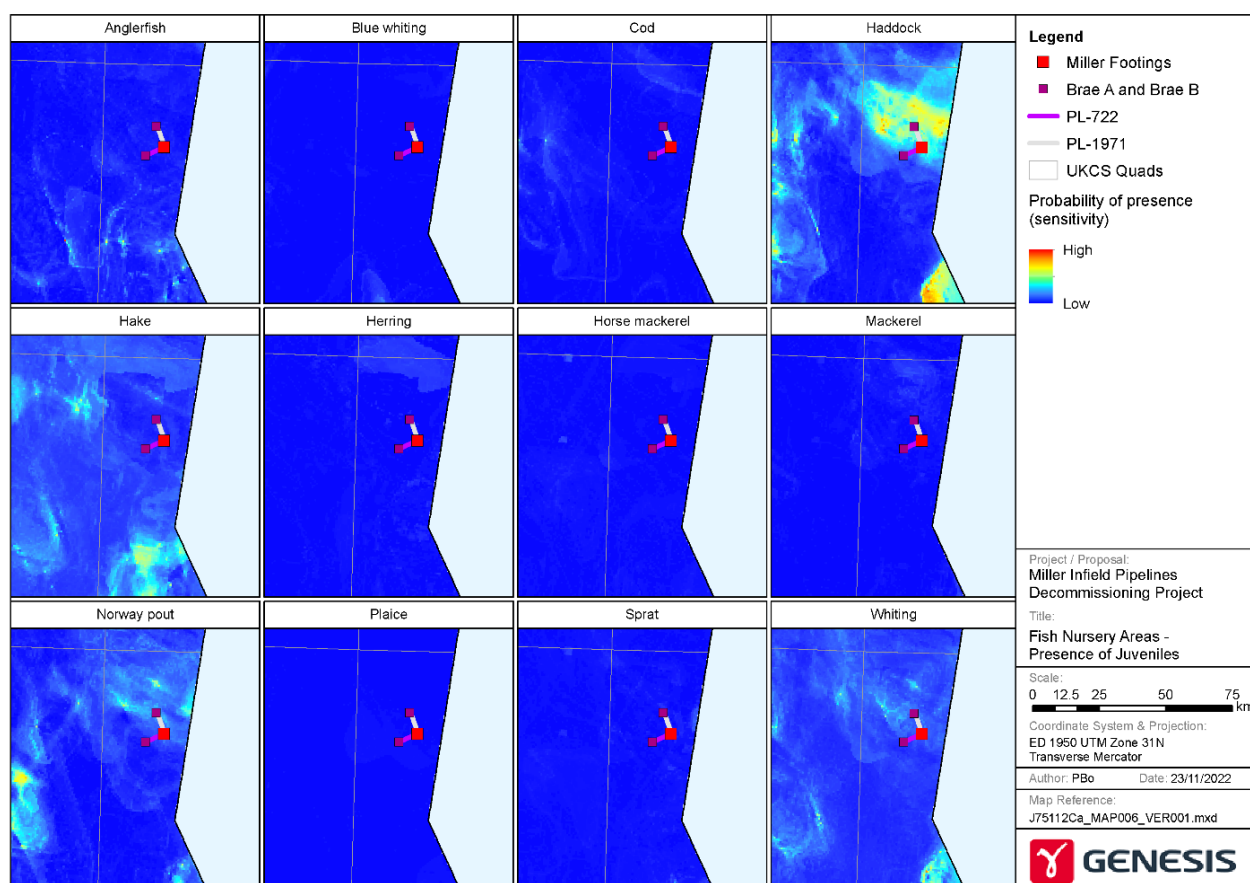


Figure 5-7: Probability of Juvenile Fish Presence Throughout the Project Area (Aires *et al.* 2014)

5.4.4 Seabirds

The UK and its surrounding seas are very important for seabirds. The extensive network of cliffs, sheltered bays, coastal wetlands, and estuarine areas provide breeding and wintering grounds for nationally and internationally important bird species and assemblages (BEIS, 2022). Approximately 26 species of seabird regularly breed in the UK and Ireland as do a number of other water bird and wader species (BEIS, 2022). It is recognised that some of these species may be qualifying features of coastal Special Protection Areas (SPAs) along the UK coastline. For example, fulmar has a foraging range of up to 400 km and is a qualifying

feature for a number of SPAs along the east coast of Scotland e.g., Buchan Ness to Collieston Coast (see Section 5.5 for information on protected areas).

Predicted maximum monthly abundance of seabirds in the Miller Project area is based on an analysis of the European Seabirds at Sea (ESAS) data collected over 30 years (Kober *et al.*, 2010). Continuous seabird density surface maps were generated using the spatial interpolation technique 'Poisson kriging' and fifty-seven seabird density surface maps were created to show particular species distribution in specific areas. Data from the relevant maps has been summarised for the Miller area in Table 5-4.

Distribution and abundance of these bird species vary seasonally and annually. Seabird densities such as Atlantic puffin are generally higher in the breeding season (April – July), whereas other species such as the Northern fulmar have higher densities in the winter season (August - February) (Table 5-4). Of the species expected to occur in the area, guillemot (*Uria aalge*) and the European storm petrel (*Hydrobates pelagicus*) are afforded protection by the European Commission (EC) Birds Directive (Annex I).

Table 5-4: Predicted Monthly Seabird Surface Density at Miller Pipelines Site (Maximum Number of Individuals/km²) (Kober *et al.*, 2010).

Species	Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern Fulmar	Breeding												
	Winter												
European Storm-petrel	Breeding												
Northern Gannet	Winter												
Arctic Skua	Breeding												
	Additional												
Long-tailed Skua	Additional												
	Additional												
Great Skua	Breeding												
	Winter												
Black-legged Kittiwake	Breeding												
	Winter												
Black-headed Gull	Breeding												
Great Black-beaked Gull	Breeding												
	Winter												
Common Gull	Breeding												
	Winter												
Lesser Black-backed Gull	Breeding												
	Winter												
Herring Gull	Breeding												
	Winter												
Arctic Tern	Breeding												
Common Guillemot	Breeding												
	Additional												
	Winter												
Razorbill	Breeding												
	Additional												

Table 5-4: Predicted Monthly Seabird Surface Density at Miller Pipelines Site (Maximum Number of Individuals/km²) (Kober *et al.*, 2010).

Species	Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Winter												
Little Auk	Winter												
Atlantic Puffin	Breeding												
	Winter												
ALL species combined	Breeding												
	Summer												
	Winter												
Key	≤1.0	1.0 – 5.0			5.0 – 10.0			10.0 - 20.0			20.0 ->30.0		

5.4.5 Marine Mammals

Many activities associated with the offshore oil and gas industry have the potential to impact on marine mammals by causing physical injury, disturbance, or changes in behaviour. Activities with the potential to cause disturbance or behavioural effects include drilling, seismic surveys, vessel movements, construction work and decommissioning (JNCC, 2008).

5.4.5.1 Pinnipeds

Two seal species are resident in British waters; the grey seal (*Halichoerus grypus*) and the harbour seal (*Phoca vitulina*). Under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, grey and harbour seals are considered species whose conservation requires the designation of SACs. These seal species are not considered European Protected Species (EPS) under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. However, in UK waters they are protected under the Conservation of Seals Act 1970 such that it is illegal to intentionally or recklessly kill, injure, or take seals. In Scottish waters, both species are considered Scottish PMFs.

Both grey seals and harbour (also called common) seals tend to frequent inshore waters but have been seen offshore from a number of platforms in the North Sea (Cosgrove, 1996).

Telemetry data indicate harbour seals are not likely to be present in the Miller field area whilst grey seals possibly occur in low numbers (Carter *et al.*, 2022; Figure 5-8).

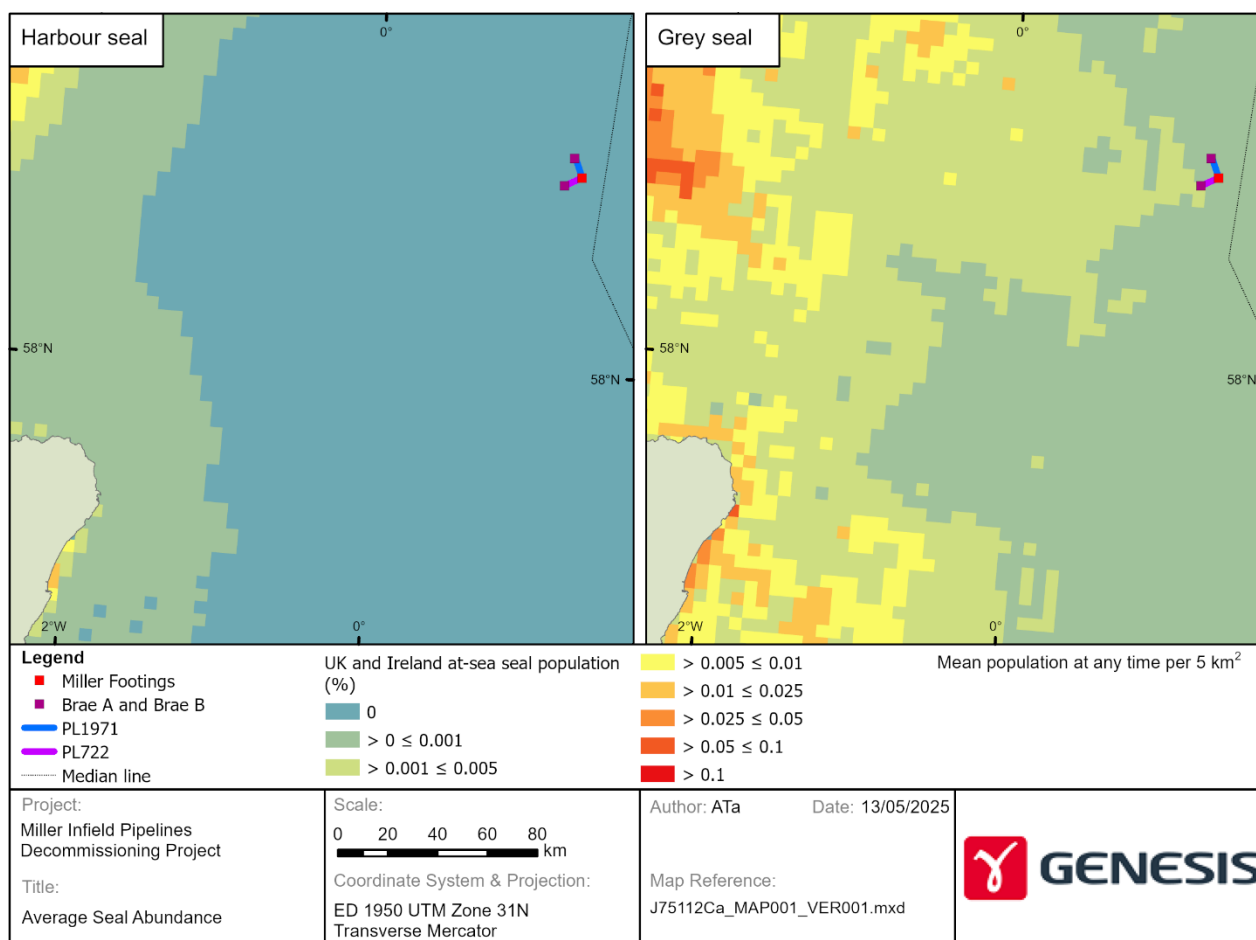


Figure 5-8: Mean UK and Ireland At-Sea Seal Population Distribution in the Vicinity (Carter *et al.*, 2022).

5.4.5.2 Cetaceans

Twenty-seven species of cetacean have been recorded in UK waters and those regularly recorded in the North Sea include harbour porpoise (*Phocoena phocoena*), white-beaked dolphin (*Lagenorhynchus albirostris*), minke whale (*Balaenoptera acutorostrata*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), and killer whale (*Orcinus orca*) (Reid *et al.*, 2003). Risso's dolphin (*Grampus griseus*) and large baleen whale are also occasionally sighted. Spatially and temporally, harbour porpoise, white and minke whale are the most regularly sighted cetacean species in the North Sea (Reid *et al.*, 2003; SMRU, 2012). The JNCC has compiled an Atlas of Cetacean Distribution in Northwest European Waters (Reid *et al.*, 2003) which gives an indication of the annual distribution and abundance of cetacean species in the North Sea. Table 5-5 presents the annual abundance of cetacean species likely to occur in the area. The data suggests that moderate to high densities of white-beaked dolphin, and minke whale have been sighted. White sided dolphin and harbour porpoise have been sighted in low densities, and beaked whale (*Ziphius cavirostris*) have been sighted in the immediate vicinity of the Miller field (Reid *et al.*, 2003).

Table 5-5: Seasonal Cetacean Abundance in the Vicinity of the Miller Field (Reid *et al.*, 2003).

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Harbour Porpoise ^{1,2}	3	3		3			2	3	3	3		2
White-beaked Dolphin ²			3			1	1	1	1	2	2	
Atlantic White-sided Dolphin ²							3					
Minke Whale ²						3	1	2				
Beaked Whale*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Key: 1: High Density, 2: Moderate Density, 3: Low Density, ND: No Data

¹ Annex II species

² Annex IV species

*Note: Beaked whale presence was identified in the area, using Reid *et al* (2003), however monthly density data is not available for this species.

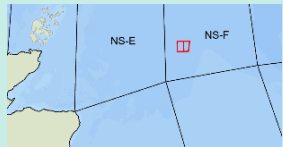
A series of Small Cetacean Abundance in the North Sea (SCANS) surveys have been conducted to obtain an estimate of cetacean abundance in North Sea and adjacent waters, the most recent results are SCANS-IV are presented in Gilles *et al.* (2023). Aerial and shipboard surveys were carried out to collect data on the abundance of harbour porpoise, bottlenose dolphin, Risso's dolphin, white-beaked dolphin, white-sided dolphin, common dolphin, striped dolphin, pilot whale, all beaked whale species combined, sperm whale, minke whale and fin whale.

The JNCC have also published the reviewed 'regional' population estimates for the seven most common species of cetacean occurring in UK waters (Inter-Agency Marine Mammal Working Group (IAMMWG), 2023). Divided into Management Units (MU), these provide an indication of the spatial scale and the relevant populations at which potential impacts should be assessed.

The Miller pipelines are located within SCANS-IV survey area "NS-F". Aerial survey estimates of animal abundance and densities (animals per km²) of species present within each area are provided in Table 5-6 along with relevant MU population estimates.

Of the marine mammals known to occur in the area, the harbour porpoise is an Annex II species and therefore are protected under the Habitats Directive. In addition, all cetaceans in UK waters are Annex IV species i.e., European Protected Species (EPS). Under the Habitats Regulations, it is an offence to deliberately disturb any EPS, or to capture, injure or kill an EPS at any time.

Table 5-6: Cetacean Abundance in SCANS-IV Survey Block NS-F (Gilles *et al.* (2023)¹; Inter-Agency Marine Mammal Working Group (IAMMWG), 2022²).

Location	Species	SCANS-IV Survey Block “NS-F”		Relevant MU
		Animal Abundance ¹	Density (animals/km ²) ¹	Population ²
	Harbour Porpoise	26,383	0.3046	346,601
	White-beaked Dolphin	18,350	0.0311	43,951
	White-sided Dolphin	-	-	18,128
	Minke Whale	0.0271	1,630	20,118

5.5 Marine Protected Areas

A network of MPAs are in place to aid the protection of vulnerable and endangered species and habitats through structured legislation and policies. These sites include Special Areas of Conservation (SACs) and SPAs, which were designated in the UK under the European Union (EU) Nature Directives (prior to January 2021) and are now maintained and designated under the Habitats Regulations for England and Wales, Scotland and Northern Ireland. Amendments to the Habitats Regulations mean that the requirements of the EU Nature Directives continue to apply to how European sites (SACs and SPAs) are designated and protected. The Habitats Regulations also provide a legal framework for species requiring strict protection, e.g. EPS. MPAs are designated under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009.

The protected sites in closest proximity to the Miller field are shown in Figure 5-9. Table 5-7 describes the closest protected areas and their qualifying features.

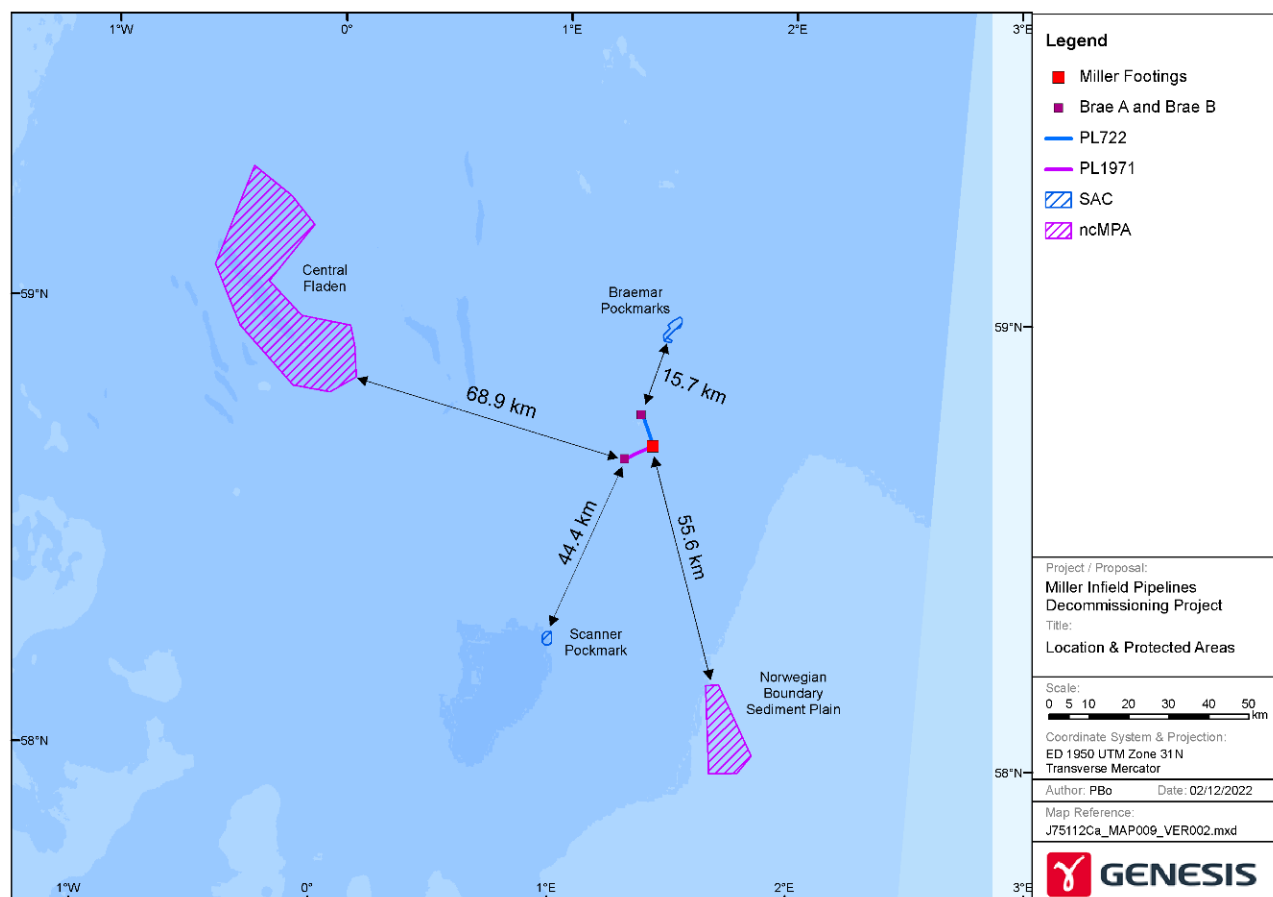


Figure 5-9: Location of the Miller Field in Relation to Protected Areas.

Table 5-7: Protected Areas in Closest Proximity to the Miller Field (JNCC, 2017).

Area	Qualifying Features	Approximate distance from Miller field (km)
Scanner Pockmark SAC	Annex I habitats: Submarine structures made by leaking gases.	44.4
Braemar Pockmarks SAC	Annex I habitats: Submarine structures made by leaking gases.	15.7
Norwegian Boundary Sediment Plain NCMPA	Annex II species: Ocean quahog (<i>Arctica islandica</i>) Annex I habitats: Offshore subtidal sands and gravels representing sediment types suitable for Ocean quahog colonisation.	55.6
Central Fladden NCMPA	Annex I habitats: Burrowed mud, quaternary of Scotland- sub-glacial tunnel valley	68.9

5.6 Sensitive Habitats and Species

As described in Section 5.5, a number of Annex I habitats are known to occur in the vicinity of the Project. There are areas of submarine structures made by leaking gases (known as 'pockmarks') within this area of the North Sea, however the Miller field is located outside the main pockmark area.

The general biotopes around the Brae area were considered to be variations on the habitat '*P. jeffreysii*, *Thyasira* spp. and *A. filiformis* in offshore circalittoral sandy mud (SS.SMU.Omu.PjefThyAfil) which is component of 'Offshore deep sea muds', a PMF habitat and a priority habitat under the UK Biodiversity

Action Plan (UK BAP), however this habitat is understood to be ubiquitous across this region of the North Sea (Marathon Oil, 2017; Nature Scot, 2020).

Gardline (2002) identified the PMF species *A. islandica* in the Brae Area Pipeline Route Survey area, with a mean abundance of 3.83 per sample. *A. islandica* is also a species of conservation importance on the OSPAR (2008) list of threatened and/or declining species. Despite being listed as a species of conservation importance *A. islandica* is a common species found within the North Sea (Tyler-Walters & Sabatini, 2017).

At the nearby Kingfisher Field (c. 7.5 km east) the OSPAR listed threatened and/or declining habitat 'sea pens and burrowing megafauna communities' was recorded (Fugro, 2018); however, no evidence has been found of this habitat in the area of the Miller Infield Decommissioning Project (Aurora Environmental Ltd, 2005a).

As described in Section 5.5.4, a number of cetacean species occur in the area. All cetaceans in UK waters are EPS under Annex IV of the Habitats Regulations and it is an offence to deliberately disturb, capture, injure or kill an EPS at any time. Harbour porpoise and bottlenose dolphin are further protected under Annex II of the Habitats Directive.

In addition to the designation of marine protected areas, PMFs which are considered to be of particular importance in Scotland's seas have been identified.

The following PMF species occur in the area of the Miller field (Tyler-Walters *et al.*, 2016):

- | | |
|---|--|
| • Mackerel (<i>S. scombrus</i>) | • Minke whale (<i>Balaenoptera acutorostrata</i>) |
| • Ling (<i>M. molva</i>) | • White-beaked dolphin (<i>Lagenorhynchus albirostris</i>) |
| • Whiting (<i>M. merlangus</i>) | • Saithe (<i>Pollachius virens</i>) |
| • Cod (<i>G. morhua</i>) | • Sandeels (<i>A. marinus</i>) |
| • Norway pout (<i>Trisopterus esmarkii</i>) | • Blue whiting (<i>Micromesistius poutassou</i>) |
| • Atlantic white-sided dolphin (<i>Lagenorhynchus acutus</i>) | • Spurdog (<i>Squalus acanthias</i>) |
| • Harbour porpoise (<i>Phocoena phocoena</i>) | • Anglerfish (<i>Lophius piscatorius</i>) |

No other evidence of Annex I habitats or PMFs was found in the Project area.

5.7 Socio-Economic Environment

This section describes the socio-economic activities in the vicinity of the Miller platform, which primarily include fishing, shipping and oil and gas operations.

5.7.1 Commercial Fisheries

The Miller field is located within ICES rectangle 46F1. Data provided by the Scottish Government demonstrates that trawls and seine nets were used throughout this rectangle in the years 2019 to 2023 (Marine Directorate of Scottish Government, (MDSG) 2024). Species targeted in the area include cod, monk fish, *Nephrops* and haddock.

The Scottish Government (MDSG, 2024) provide fishing effort (vessel days), and landings data (value and quantity) for UK vessels ≥ 10 m in length. Note that fishing effort is defined as a measure of the fishing activity of vessels, which includes the time spent travelling to fishing grounds as well as the time spent fishing.

The data suggests that this ICES rectangle encompasses an area that is of relatively low importance to the UK fishing industry such that fishing activity in the area can be considered low to moderate (see Table 5-6 and 5-7). In addition, it demonstrates that bottom trawl gear is used, emphasising the importance of ensuring a safe seabed as part of the proposed decommissioning project.

Scotland's seas support diverse commercial fisheries, including both bigger vessels (length ≥ 15 m) and smaller vessels (length < 15 m). The bigger vessels are covered by Vessel Monitoring Systems (VMS). VMS are used in commercial fishing to allow environmental and fisheries regulatory organisations to monitor, minimally, the position, time at a position, and course and speed of fishing vessels.

VMS data for all UK registered commercial fishing vessels (≥ 15 m length) for the period 2009 - 2017 have been combined with landings information to develop spatial data layers depicting fishing intensity/pressure (ICES, 2019a,b,c).

5.7.1.1 Fishing Effort

Fishing effort statistical data for 2019 to 2023 (Table 5-6) shows that UK fishing effort within ICES rectangle 46F1 varies both monthly and annually with fishing occurring at all times of the year. ICES rectangle 46F1 contributed, on average, 0.39 % of the total number of days fished by UK fishing vessels between 2019 and 2023 (MDSG, 2024) suggesting that 46F1 is of relatively low importance to the fishing industry.

Table 5-5-8: Fishing Effort (Days) Taken from ICES Rectangle 46F1 (2019-2023) (MDSG, 2024).

Year	Month												46F1 total (days)	UK total (days)	46F1 as % of UK Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
2019	D	200	36	115	D	D	26	D	D	20	6	D	403	126,386	0.33
2020	14	8	32	12	7	23	49	65	14	34	90	11	358	104,027	0.34
2021	7	20	37	9	6	D	50	194	20	60	25	D	427	105,793	0.41
2022	5	9	13	20	6	165	91	65	75	41	D	D	490	95,211	0.52
2023	D	5	94	17	7	7	15	74	116	0	D	5	339	95,358	0.36
Mean	8	48	42	35	7	65	46	99	56	31	40	8	403	105,355	0.39

Notes:

¹ Monthly effort data are shown where five or more UK vessels over 10 m undertook fishing activity in a given year. Where less than five such vessels undertook fishing activity in a given month, the data are "disclosive" (D) and not shown.

² Includes disclosive days.

³ A measure of the fishing activity of vessels including the time spent travelling to fishing grounds as well as the time spent fishing.

5.7.1.2 Fishing Landings

The weight (te) and value (£) of landings from UK vessels for demersal, pelagic, and shellfish species from ICES rectangle 46F1 are shown in Table 5-7. These landings equate to 0.01 % (by weight) and 0.2% (by value) of total UK reported landings 2023.

Table 5-7: Landings (by Species Type) from ICES Rectangle 46F1 for 2019-2023 (MDSG, 2024).

	2019		2020		2021		2022		2023	
Species	Value (£)	Live weight (te)	Value (£)	Live weight (te)	Value (£)	Live weight (te)	Value (£)	Live weight (te)	Value (£)	Live weight (te)
Demersal	798,554	484	1,345,203	874	878,0934	505	718,529	468	625,010	411
Pelagic	58,249	128	60	0.130	-	-	75	0	28	0
Shellfish	886,090	290	459,090	191	1,184,633	365	1,981,549	387	759,287	178
46F1Total	1,743,024	902	1,804,606	1,065	2,063,605	871	2,700,154	855	1,384,325	589
UK Total	765,871,445	492,972	642,414,795	525,662	686,410,369	538,469	686,612,229	484,839	800,550,253	545,648
% of UK total	0.2	0.2	0.3	0.2	0.3	0.2	0.4	0.2	0.2	0.1

Figure 5-10 shows the fishing intensity by fishing vessels ≥ 15 m in length using demersal gear and pelagic, therefore targeting different species, in the North Sea. It can be seen that the most intense fishing effort is concentrated in different areas dependent on the fishing gear used (Scottish Government NMPI).

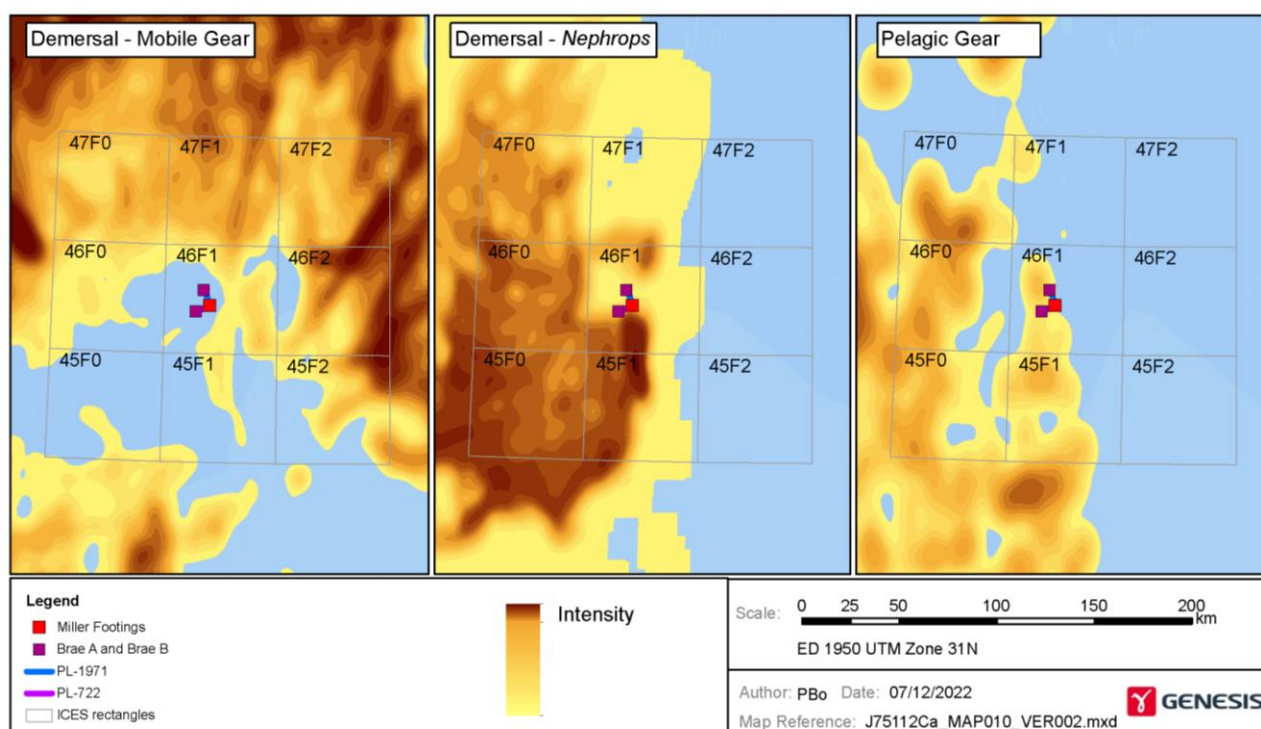


Figure 5-10: Fishing Intensity for ICES Rectangle 46F1 (ICES, 2019a; ICES, 2019b; ICES, 2019c).

5.7.2 Vessel Density

The North Sea contains some of the busiest shipping routes in the world, with significant traffic generated by vessels trading between ports at either side of the North Sea and the Baltic. The 2023 vessel densities in the North Sea have been presented by EMODnet (2023b) as hours per km² per month. The vessel density in the area ranges from 0 to > 50 hours per km² per month (Figure 5-11).

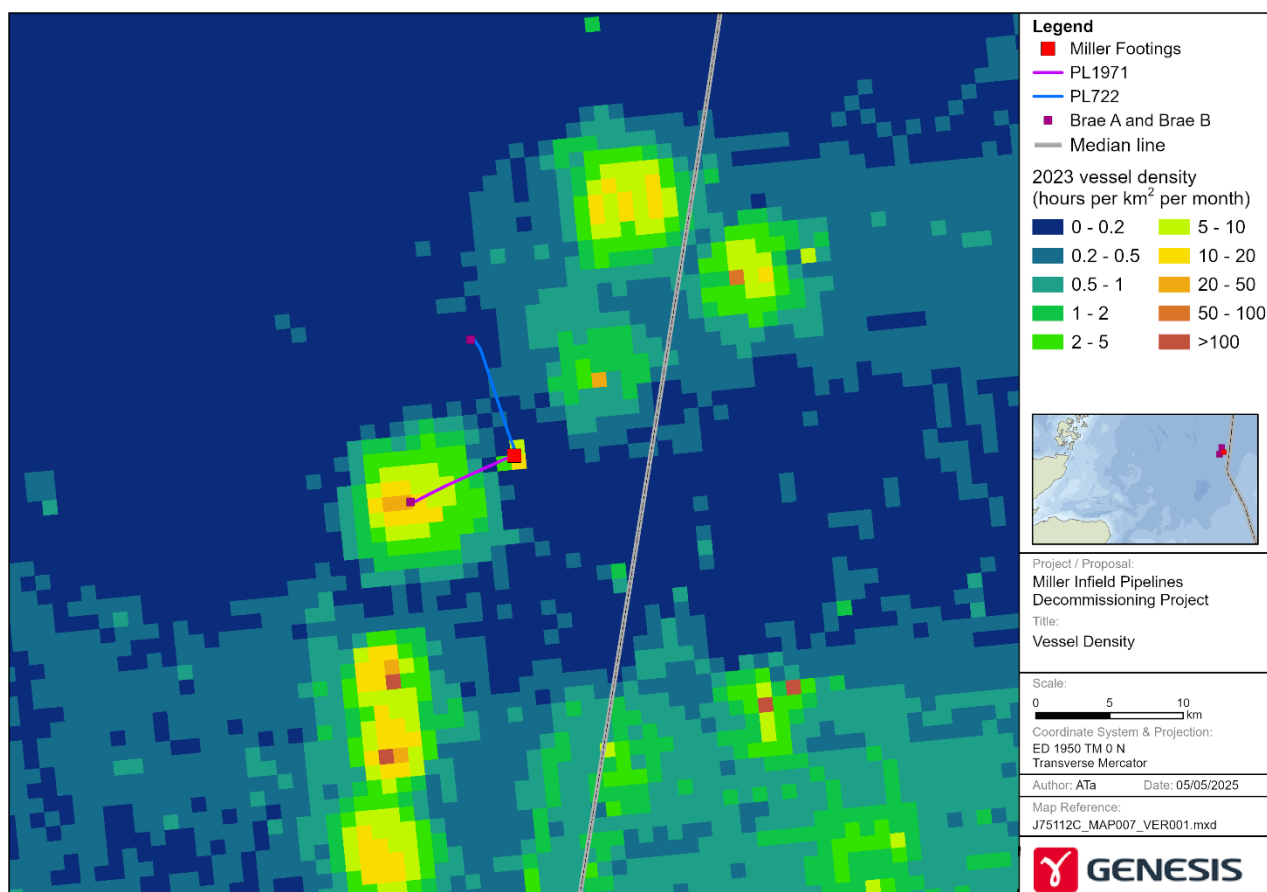


Figure 5-11: Shipping Density in the Vicinity of the Miller Pipelines, as Categorised by EMODnet (2023b).

5.7.3 Oil and Gas Exploration

The Miller field is situated within a well-developed area of the North Sea, featuring a lot of oil and gas infrastructure and activity. Figure 5-12 shows installations in closest proximity to the Miller field area.

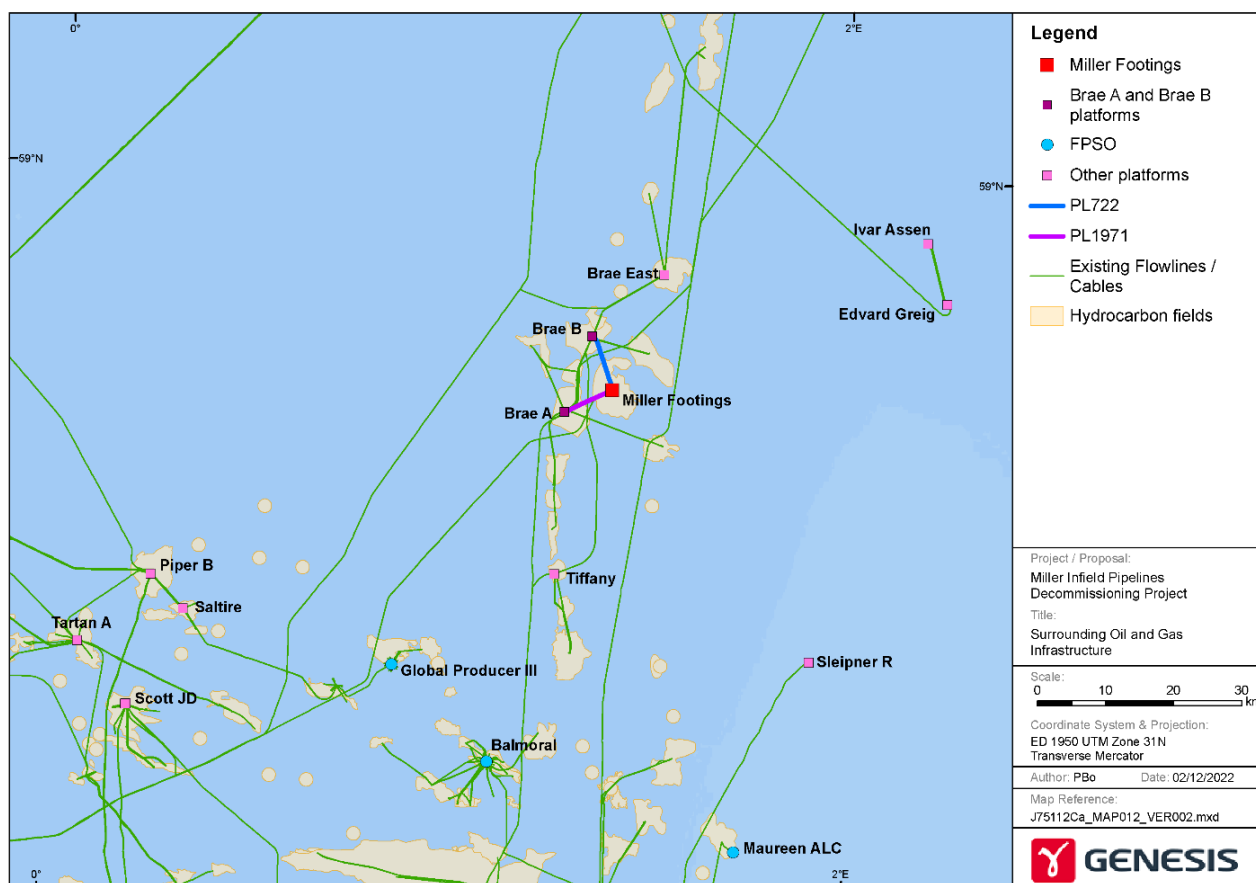


Figure 5-12: Existing Oil and Gas Installations within the Vicinity of the Miller Field.

5.7.4 Other Activities

There are no military exercise areas within the vicinity of the Miller infrastructure (Scottish Government NMPi). There are no offshore wind farm sites or successful Innovation and Targeted Oil & Gas (INTOG) sites within 40 km of the Miller infrastructure. The closest CO₂ appraisal and storage licence is c. 5.6 km to the southwest (Figure 5-13).

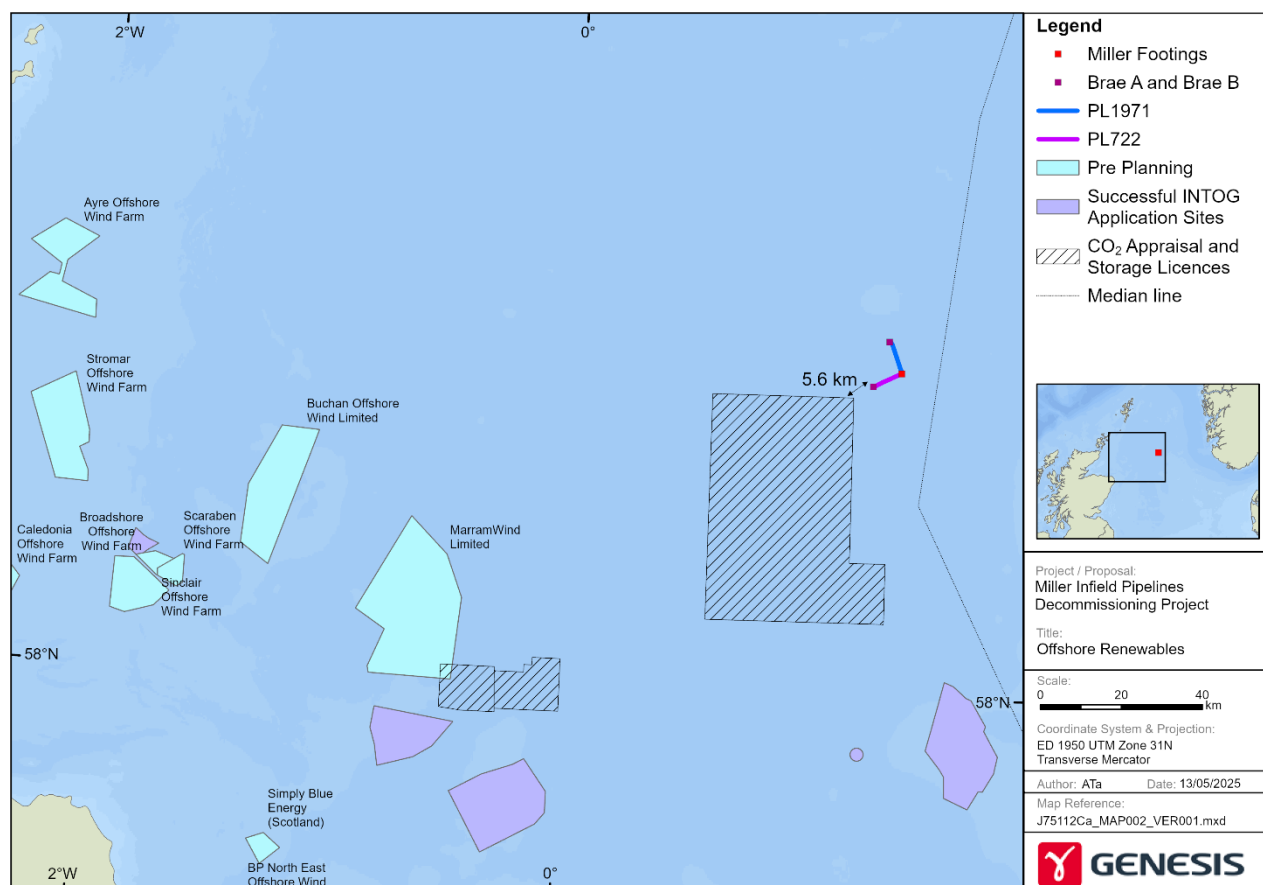


Figure 5-13: Offshore Wind Energy Sites, Successful INTOG sites and CO₂ Appraisal and Storage Licences in the Vicinity of the Miller Infrastructure.

6. SCOPING OF POTENTIAL ENVIRONMENTAL IMPACTS

6.1 Methodology

To determine the significance of the potential impacts associated with the proposed decommissioning activities, an ENVIID Workshop was undertaken following a structured methodology as described in Appendix A and summarised here.

The ENVIID identified the key environmental and societal sensitivities, discussed all the sources of potential impact, and ultimately highlighted those impacts which required further assessment within the EA. The decision on which impacts required further assessment was reinforced by a review of industry experience of decommissioning impact assessment and on an assessment of wider stakeholder interest (informed in part by the stakeholder engagement described in Section 2).

Where relevant, the aspects considered in the ENVIID for the different activities (e.g. recovery of structure) included:

- Physical presence/interaction with other sea users;
- Seabed and habitat disturbance;
- Under water noise impacts;
- Discharges to sea;
- Atmospheric emissions;
- Waste; and
- Accidental events.

Where relevant, the following environmental receptors were considered in the ENVIID for each activity:

- | | |
|------------------------|---|
| • Air quality; | • Designated areas; |
| • Climate; | • Cultural heritage (e.g. wrecks); |
| • Water quality; | • Shipping; |
| • Plankton; | • Fisheries; |
| • Sediment quality; | • Resource availability (e.g. landfill and fuel); and |
| • Benthic communities; | • Local communities (e.g. yard activities). |
| • Fish; | |
| • Marine mammals; | |
| • Birds; | |

During the ENVIID, the significance of the environmental/ social impact of planned activities on each of the susceptible receptors was derived by considering the 'Impact Severity' in relation to the 'Duration/ Frequency' of the aspect. This was carried out by applying the BPEAL Environmental Impact Identification methodology (GP 48-06) described in Appendix A. For, unplanned events, as well as considering the 'Impact Severity', the 'Likelihood' of an event occurring was taken into consideration.

6.2 Scoping

Applying the industry standard mitigation measures, the significance of impact for most of the planned activities was considered in the ENVIID workshop to be Minor, such that any environmental and social impacts are considered negligible. The ENVIID concluded that the majority of the aspects could be screened

out and would not require further assessment within the EA. Table 6-1 presents the findings of the ENVIID and provides justification for the aspects not being assessed further.

The following aspects were not screened out and are assessed further in the EA:

- Seabed Disturbance impacts on the environment (Section 7);
- Legacy impacts on the environment and on other sea users (Section 8); and
- Impacts of atmospheric emissions on climate change (Section 9).

The potential impact of a loss of diesel inventory resulting, for example, from a vessel collision or fire was also considered in the ENVIID. The significance of impact of a release of diesel inventory from one of the vessels was considered Minor, while the impact severity was considered (3), such that it could result in discernible environmental and social risks. The duration/likelihood of such an event was considered Very Low (1) which, when combined with the impact severity, results in an overall Minor environmental risk. In line with Subsection 12.4 of the OPRED Decommissioning Guidance (BEIS, 2018), the impacts of accidental events are not assessed further in the EA.



Table 6-1: ENVIID results and justification for selecting / deselecting the impact for further assessment in the EA.

Key (for planned activities, accidental events are scored differently):								
Negligible			Minor	Moderate			Major	
No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
Vessel Use								
1	Emissions to air. Fuel combustion emissions (CO ₂ , CO, SO _x , NO _x , etc.) from vessels.	Receptor: Air quality.	- Minimise use of vessels through efficient journey planning and use of relevant vessels for each activity, as well as low sulphur diesel. - Prior to contract award BPEAL will review vessel Common Marine Inspection Documents (CMID) as part of vessel assurance (evidence of maintenance). - All vessels will follow BPEAL's maintenance programme Marine Assurance Standards (MAS). - Vessels will be MARPOL compliant.	1	3	M	Total fuel use associated with the anticipated vessel use is c. 795.3 te (Table 3-6), resulting in c. 2,595 te of CO₂e. Impact severity on air quality is considered (1), whilst the duration is considered Medium (3) such that the overall impact significance on air quality is considered Minor. As the impacts on air quality or climate change are not considered significant this aspect is not considered further in the EA.	No
		Receptor: climate change		1	4	M	Given the relatively small quantity of emissions from the expected vessel use the impact severity on climate change is considered (1) whilst the duration is considered (4). The overall impact significance on climate change is therefore considered Minor. However due to stakeholder concerns and the cumulative impacts of emissions on climate change, these impacts are considered further in the EA.	Yes



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
2	Resource use.	Receptor: Fuel	- Scheduling/design to optimise opportunities to use vessels more efficiently (i.e. minimise transits, ensure vehicles are fully loaded). -Under MARPOL Annex VI, all vessels will adhere to the Ship Energy Efficiency Management Plan (SEEMP) such that the vessels will have best practices for fuel efficiency in place.	1	3	M	BPEAL recognise that hydrocarbon-based fuel is a finite resource, however given the relatively short duration of the proposed decommissioning activities (47.7 days vessel use) and the use of MARPOL compliant vessels, impact severity for resource use is considered (1), whilst the duration is considered Medium (3) such that the overall impact significance is considered Minor and is not discussed further in the EA.	No
3	Physical presence of vessels.	Receptors: Other sea users.	-Minimise use of vessels, through efficient journey planning (campaign, logistics, sharing vessels (across BPEAL portfolio)). -Notify other sea users (stakeholder consultation) - e.g. Kingfisher and SFF. - Ongoing consultation with SFF. -All vessels engaged in the project operations will have markings and lightings as per COLREGS. -Navigational aids including radar, lighting and Automatic Identification Systems (AIS) will be used. -A vessel Collision Risk Assessment (CRA) will be produced if required.	1	3	M	Presence of vessels will have the potential to impact on other sea users for example through restriction of fishing operations, collision with towed fishing gear and a navigation hazard. The Miller pipelines are located in a well-developed oil and gas region, where vessels in transit are the norm and thus additional impacts on other sea users are limited. Taking account of this, the mitigation measures identified and the relatively short number of vessel days, the impact severity for physical presence of vessels on other sea users is considered (1), whilst the duration is considered Medium (3) such that the overall impact significance is considered Minor and is not discussed further in the EA.	No
		Receptors: Marine mammals and birds.		1	3	M	Presence of vessels have the potential to cause behavioural changes in marine mammals e.g. could be attracted to the vessel or may move away from the area. Migrating birds could be attracted to the	No



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
							lights on the vessels, be displaced from foraging habitat or detour from their flight routes. For example, auk species (e.g. guillemot and little auk) are believed to avoid vessels by up to 200 to 300 m but gull species (e.g. kittiwake, herring gull and great black-backed gull) are attracted to the presence of them (Furness and Wade, 2012 and Weise <i>et al.</i>, 2001). Though evidence suggests that the presence of the vessels could cause some bird species to be displaced from their foraging area, the very small proportion of their overall available habitat that will be occupied by the vessels means the impact is not considered to be noticeable. In addition to being a busy shipping area, the North Sea has well developed fishing and oil and gas industries, such that marine mammals in the region are habituated to the presence of vessels. In addition, the evidence for lethal injury from boat collisions with marine mammals suggests that collisions with vessels are very rare (Cetacean Stranding Investigation Programme, 2011). Out of 478 post-mortem examinations of harbour porpoise in the UK carried out between 2005 and 2010, only four (0.8%) were attributed to boat collisions. Impact severity for physical presence of vessels on marine mammals and birds is considered (1), whilst the duration is considered Medium (3) such that the overall impact significance is considered Minor and is not discussed further in the EA.	



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
4	Discharges to sea.	Receptors: Water quality and fauna associated with the water column. Routine vessel discharges such as domestic sewage, food waste, greywater, ballast, drains water.	-Minimise use of vessels, through efficient journey planning. -Vessel assurance conducted to ensure that contracted vessels meet BPEAL marine standards and demonstrate relevant compliance requirements for IMO/ MARPOL. -BPEAL audit procedures will ensure that the contracted vessels ballasting procedures are in line with the IMO Ballast Water Management Convention, including Ballast water plan and logbook. -All contracted vessels will originate from countries adhering to the IMO Convention. -All discharges of ballast water will be monitored, and records maintained. -Won't be discharging close to shore (in line with MARPOL there will be no discharges within 3 nm of the nearest coast.	1	3	M	Water quality in the immediate vicinity of discharges of vessel sewage or ballast water may be reduced, but effects are usually minimised by rapid dilution in the receiving body of water and non-continuous discharge. May result in organic enrichment and chemical contaminant effects in water column and seabed sediments. Ballast water could introduce invasive species depending on vessel routes. Bio-invasions as a result of biofouling (accumulation of organisms including plants, algae, or animals such as barnacles) on vessels could also occur. All vessels will be IMO and MARPOL compliant such that impact severity for vessel discharges to sea is considered (1), whilst the duration is considered Medium (3) such that the overall impact significance is considered Minor and is not discussed further in the EA.	No
5	Underwater noise from vessels.	Receptors: Marine mammals and fish. General vessel noise from operations, including Dynamic Positioning (DP) and generating elevated sound levels. All vessels involved will use dynamic	-Minimise use of vessels, through efficient journey planning.	1	3	M	In addition to being a busy shipping area, the North Sea has well developed fishing and oil and gas industries, such that marine mammals and fish in the region are habituated to the underwater noise associated with vessels. Any impacts from vessel noise will be behavioural rather than physical, such that they may cause marine mammals or fish to be temporarily displaced from the area, however they would be expected to return once the vessels have left.	No



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
		positioning and no anchoring.					Impact severity for underwater noise from vessels is considered (1), whilst the duration is considered Medium (3) such that the overall impact significance is considered Minor and is not discussed further in the EA.	
6	Waste production from vessels.	Receptor: Use of landfill. In addition, there is the potential for impact on communities located in proximity to the landfill site (e.g. from traffic, noise, and odour).	-Waste hierarchy will be adhered to: Reduce, Reuse, Recycle/Recover and Dispose. -All wastes to be properly segregated for recycling / disposal / treatment. -Waste will be dealt with in accordance with regulatory requirements. Monthly reporting of waste sent to shore. -Vessels will conform with their own WMPs. -Minimise use of vessels through efficient journey planning. -Vessel audits to ensure that they meet BPEAL's marine assurance standards. -Vessels will be MARPOL compliant.	1	4	M	Effects associated with onshore disposal are dependent on the nature of the site or process. Landfills - land take, nuisance, emissions (methane), possible leachate, limitations on future land use. Treatment plants - nuisance, atmospheric emissions, potential for contamination of sites. MARPOL Annex V applies to all ships/ vessels and generally prohibits the discharge of all garbage into the sea (there are some exceptions which relate for example to food waste and cleaning agents). As vessels will be compliant with MARPOL, there will be no significant impact offshore. BPEAL recognise landfill sites as a finite resource, however, the vessels will have WMPs in place that will adhere to the waste hierarchy principle of reduce, reuse recycle, therefore impact severity for waste production from vessels is considered (1), whilst the duration is considered long-term (4) due to any material ending up in landfill being a permanent impact. The overall impact significance is considered Minor and is not discussed further in the EA. Furthermore, Section 12.8 of OPRED's Guidance Notes (BEIS, 2018) advises that an assessment of wastes returned to shore is not required in the EA	No



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
							(as it is not relevant to the impacts in the marine environment).	
Decommissioning of Pipelines, Umbilical and Stabilisation Features								
7	Underwater noise from cutting, recovery and rock cover activities	Cutting is only potentially applicable to the exposed end of PL1971.	-Hydraulic shears will be used to ensure the effectiveness of the cutting and minimise the duration, disturbance and risk of the activity. -No abrasive cutting to be used.	1	3	M	Impact severity is ranked 1 across all relevant Options as the main potential environmental impact is likely to be from disturbance, rather than injury. Magnitude of impact is expected to be less than that of vessels and no requirement for use of explosives has been identified. Duration is ranked 3 (medium duration) for all relevant Options, reflecting the duration of the activities taking place for each Option. Impact significance across all Options is considered minor and thus this is not a significant differentiator between the Options for further consideration in the CA.	No
8	Disturbance to the seabed.	Receptors: Sediment quality and benthic communities. The preferred decommissioning option is trenching and burying full length of PL722 and to cut and remove the exposed end of PL1971. The exposed end of PL1971 could also be covered with rock (if not	-Dredging/ jetting work plans will be in place. -Dredging/jetting will be minimised. -Cut and remove or trench and bury will be prioritised over rock cover. -If rock cover is used, volumes will be minimised, and a fall pipe will be used to lay it on the seabed. -If used, rock cover profiles will align with industry standards with respect to the size of rock.	1	3	M	The full length of PL722 is to be trenched and buried, except for an existing pipeline crossing protected with rock cover. Around 7.11 km length of pipeline will be trenched and buried in total. There will be no impact within any protected areas. In addition, there will be no transboundary impacts. As noted in the CA, the preferred decommissioning option for PL1971 is to decommission the rock covered length <i>in situ</i> and to cut and remove the exposed end section. Recovery of the seabed and associated benthic communities is expected to occur naturally once	Yes



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
		removed via cut and remove or trenched and buried).					activities are completed, without company intervention. Impact severity of seabed disturbance from trenching and burying PL722 and cutting and removing the exposed end of PL1971 is considered (1), whilst the duration is considered Medium (3) such that the overall impact significance is considered Minor. However, to allow an assessment of the cumulative seabed disturbance across all activities, the impact of seabed disturbance resulting from these activities is discussed further in the EA.	
		Receptors: Sediment quality and benthic communities. Recovery of exposed mattresses, SSIV umbilical PLU1972, (several small diameter jumper spool and one spool crossing frame). Note: Mattresses which are rock covered or buried under Brae Bravo drill cuttings will remain <i>in situ</i> and not be recovered to shore.	-Lifting procedures in place.	1	3	M	Minimal disturbance as these are simply lifted off the seabed. Impact severity of seabed disturbance from lifting is considered (1), whilst the duration is considered Medium (3) such that the overall impact significance is considered Minor. However, to allow an assessment of the cumulative seabed disturbance across all activities, the impact of seabed disturbance resulting from these activities is discussed further in the EA.	Yes



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
9	Physical presence (Legacy Impacts)	Receptor: Other sea users. Legacy impacts of infrastructure left <i>in situ</i>. Trenched and buried PL722 Covered mattresses and existing rock-cover to be left <i>in situ</i> and any additional rock cover added to make cut ends on PL1971 and PLU1972 safe (c. 30 te rock in total)	-Seabed clearance surveys. -Over trawl trials to be carried out if considered necessary. -No additional rock-cover added to existing rock-cover. -Post decommissioning survey strategy agreed with OPRED. -Where possible BPEAL will reprofile existing rock profile, however small volumes may be added to end of existing rock berms.	2	4	M	Other sea users may be impacted. The pipelines to be decommissioned transverse areas relatively important to the UK fishing industry such that fishing activity in the area can be considered moderate. Species targeted in the area include Norway pout, <i>Nephrops</i> and haddock. There are areas with the use of bottom-trawls and seine nets. Trawl gear has the potential to interact with any infrastructure or rock-cover remaining on the seabed. Impact severity of legacy impacts on other sea users is considered (2), whilst the duration is considered long-term (4) such that the overall impact significance is considered Moderate and will be discussed further in the EA.	Yes
		Receptor: Benthic communities. Environmental impacts of infrastructure left <i>in situ</i>.		1	4	M	Impact severity of environmental impacts from physical presence is considered (2). Despite preference for trench and bury, there is the potential for rock cover to be used (PL722 and PL1971), with the subsequent introduction of hard substrate in a predominantly soft sediment environment. The duration is considered long-term (4) such that the overall impact significance is considered Minor, however, will be discussed further in the EA to allow an assessment of the cumulative physical presence across all activities.	Yes



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
		Receptor: Water quality, sediment quality and benthic communities. Degradation of pipelines decommissioned <i>in situ</i>. Physical breakdown of pipeline components and discharge of pipeline contents over time. Approximately 4,174 te of carbon steel and 41 te of aluminium will be left on the seabed. All Miller pipelines to be decommissioned <i>in situ</i> (PL722, and PL1971) have been flushed and cleaned with a single pig train consisting of four pigs with slugs of surfactant and (two off) debris pick up gel. They have then been left with de-aerated seawater treated with TROS 650@750 ppm.	-All pipelines used to transport hydrocarbons have been flushed and cleaned in line with ALARP procedures to minimise oil concentrations remaining.	1	4	M	Over time, the Miller pipelines decommissioned <i>in situ</i> will breakdown. The degraded components of the pipelines could potentially become bioavailable to benthic fauna in the immediate vicinity. Some metals have the potential to exert toxic effects in biota and can bioaccumulate through the food web (Neff, 2002). Within benthic animals, accumulated metals may act as enzyme inhibitors, adversely affect cell membranes, damage reproductive and nervous systems, cause changes in metabolic and respiratory efficiency, affect growth and behaviour or act as carcinogens (Kennish, 1997; and Ansari <i>et al.</i>, 2004). As degradation will take place over decadal or centurial timescales it is not expected that metal concentrations in the sediment will accumulate significantly. Concrete associated with the pipelines is expected to degrade over centuries. The degradation products will be the aggregates (sand and gravel) used in the concrete and the reacted cement compounds, predominantly calcium carbonate. These degradation products are relatively chemically inert and are likely to result only in a slight increase in the coarse sediment around the pipeline. Plastics contained within the pipelines could breakdown to form microplastics, which can cause adverse effects on marine organisms such as physical obstruction or damage of feeding appendages/ digestive tracts/ breathing tubes. It is thought the deterioration of plastics within the	Yes



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
		Approximately 1,357 te of concrete is associated with PL722. The pipelines to be decommissioned <i>in situ</i> also have c. 94 te of plastic and miscellaneous pipe coatings associated with them in total.					pipelines will take significantly longer than the time expected for the steel pipelines to degrade (Dames <i>et al.</i>, 1999). Impact severity of environmental impacts from physical presence is considered (1), given the slow anticipated rate of metal, concrete and plastic degradation, the very gradual release of contents in the lines, the fact that any chemicals contained within the pipelines are approved chemicals, the lines only contain treated seawater, degradation products of concrete are chemically inert, and trace metals have not been found to significantly accumulate in marine organisms. The duration is considered long-term (4) such that the overall impact significance is considered Minor. However, given public concern with respect to the impact of plastics in the environment the legacy impact of decommissioning the pipelines <i>in situ</i> is considered further in the EA..	
10	Waste processing.	Receptor: Use of landfill. In addition, there is the potential for impact on communities located in proximity to the landfill site (e.g. from traffic, noise, and odour).	- BPEAL will award contract to an established yard with appropriate experience, capability, licences, and consents in place. As part of this the sites must demonstrate waste stream management throughout the deconstruction process. -Waste management will follow the waste hierarchy: reduce, reuse, recycle/recover and dispose.	1	4	M	BPEAL recognise landfill sites as a finite resource, however applying the mitigation measures identified and considering the relatively small volumes of material to be returned (636 te), as well as the low impact on local communities due to the use of permitted sites only, the impact severity of waste processing and the use of landfill is considered (1). Duration is considered long-term (4) as the landfill space is gone permanently, such that the overall	No



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
		Treatment of recovered materials. Exposed mattresses, SSIV and umbilical PLU1972 (169 m), several small jumper spools and one spool crossing frame are recovered.	-All waste will be handled and disposed of in line with regulations which will be detailed in the WMP. -Volumes of waste are minimal.				impact significance is considered Minor and will not be discussed further in the EA. Furthermore, Section 12.8 of OPRED's Guidance Notes (BEIS, 2018) advises that an assessment of wastes or waste management returned to shore for treatment or disposal is not required in the EA as it is not relevant to the impacts in the marine environment.	
Post-decommissioning Surveys								
11	Seabed disturbance. Clear seabed surveys and over trawl trials.	Receptor: Benthic communities. Potential for trawl sweeps using standard nets to be carried out to demonstrate a clear seabed and/ or over trawl trials.	-Preference will be given to the use of SSS/MBES to determine a clear seabed. -Possible that SSS/MBES surveys would also negate requirement for an over trawl trial.	2	2	M	As a worst case a trawl sweep using standard nets will be required to demonstrate a clear seabed. This will result in disturbance to the seabed habitats in the area. As fishing in the area is considered moderate, the impact of a trawl sweep or over trawl trial is not expected to be more significant than the impact of the demersal trawl gear associated with the wider area such that the impact severity is considered (2). Duration is considered (2), such that the overall impact significance is considered Minor. However, this impact will be considered further in the EA, to allow an assessment of the cumulative seabed disturbance across all activities.	Yes



No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
Accidental Events								
12	Unplanned Event: Minor chemical / hydrocarbon release from vessels e.g. from drains.	Receptors: water quality, sediment quality, fisheries, marine mammals, birds, fish, plankton, benthic communities.	-Vessels shall comply with applicable IMO / MARPOL requirements and have associated Ship Oil Pollution Emergency Plan) SOPEPs in place. -COSHH (Control of Substances Hazardous to Health), Task Hazard Assessments are completed, and Safety Data Sheets (SDS) will be available on the vessel. -Standard operating procedures adhered to, e.g. bunkering in good light, regular hose inspection, correct storage and segregation of chemicals etc. -Spill kits shall be available on board.	H	8	8	Given the nature of diesel, a large volume of any diesel spill would be expected to evaporate In line with Subsection 12.4 of the OPRED Decommissioning Guidance (BEIS, 2018), the impacts of accidental events are not assessed in the EA.	No
13	Unplanned Event: Major oil / chemical (e.g. fuel oil and diesel) release (potentially due to vessel collision).	Receptors: water quality, sediment quality, fisheries, marine mammals, birds, fish, plankton, benthic communities.	-Emergency response plans in place including vessel SOPEPs. -Simultaneous Operations (SIMOPS) will be managed through bridging documents and communications (e.g. if vessels are within the 500 m zone). -Vessels shall comply with applicable IMO/MARPOL requirements. -Kingfisher bulletins shall be updated with vessel activities (if required). -Vessels shall abide with International Collision Regulations.	E	3	6	Pollution of water column, threat to biodiversity harm to surrounding ecosystems, flora and fauna. Fuel would disperse relatively quickly. In line with Subsection 12.4 of the OPRED Decommissioning Guidance (BEIS, 2018), the impacts of accidental events are not assessed in the EA.	No

No.	Aspect/Activity	Observations	Existing Mitigation	Impact Severity	Duration Frequency	Impact Significance	Justification for selecting/deselecting the aspect/impact for further assessment in the EA	Assessed further in the Environmental Appraisal
14	Unplanned Event: Interaction between trencher on seabed and live lines e.g. near crossings.	Receptors: water quality, sediment quality, fisheries, marine mammals, birds, fish, plankton, benthic communities.	-Trenching plan -BPEAL guidelines -Survey -Marine procedures -Proximity agreements between operators.	D	1	5	In line with Subsection 12.4 of the OPRED Decommissioning Guidance (BEIS, 2018), the impacts of accidental events are not assessed in the EA.	No

7. SEABED DISTURBANCE

When assessing the impact of the proposed activities during the ENVIID Workshop (see Section 6), none of the seabed impacts were considered to result in a significant environmental impact. However, it was acknowledged that the activities were considered in isolation and therefore those activities resulting in seabed disturbance are considered further here to allow for a cumulative assessment to be completed.

7.1 Activities (Cause of Impact)

Activities that will result in an impact to the seabed include:

- Trenching and burying of PL722;
- Cut and recovery of surface laid end of PL1971;
- Recovery of 161 m of PLU1972 (8 m of this umbilical is associated with a rock covered crossing will remain *in situ*);
- Recovery of SSIV, spool crossing frame and 57 exposed mattresses;
- Potential addition of 10 te of rock at three different locations to make cut ends of lines safe (i.e. 30 te in total; 10 te associated with PL1971 and 20 te associated with PLU1972); and
- Over trawl trials.

Note: it is recognised that not all of these activities will necessarily be undertaken (e.g. over trawl trials and addition of rock cover), however, they have been fully assessed in this section to ensure the potential 'worst case' impact is assessed.

7.1.1 Quantification of Temporary Disturbance

Table 7-1 presents the anticipated total area of temporary disturbance associated with the proposed decommissioning activities, other than those associated with the over trawl trial/sweeps. Table 7-2 presents the anticipated area of temporary disturbance associated with the over trawl trial.

In order to demonstrate a safe seabed, BPEAL will explore the use of a SSS or MBES survey as an alternative to the over trawl trials/sweeps to demonstrate a safe seabed, therefore minimising the area of temporary seabed disturbance to that estimated in Table 7-1. Should over trawl trials/ sweeps be undertaken to demonstrate 'a safe seabed', the disturbance footprint for the activities captured within Table 7-1 would fall within the area impacted by the over trawl trial (estimated to be c. 0.711 km²). Thus, the total area of temporary disturbance is estimated to be 0.711 km² if an over trawl trial is undertaken, or 0.078 km² if a non-intrusive method of assuring a safe seabed is agreed with OPRED.

Table 7-1: Anticipated Area of Temporary Seabed Disturbance Associated with the Proposed Activities.

Activity	Assumptions made	Temporary area of disturbance (km ²)
Trench and burying of PL722	Using information provided in Table 3-1 (see footnote 2), the total length of the pipeline to be decommissioned <i>in situ</i> by trenching and burying is c. 7.11 km (see footnote 2 in Table 3-1). As a worst-case, the calculation of seabed disturbance assumes a corridor of temporary disturbance of 10 m along the length of each of the sections to be trenched and buried.	0.0711
Recovery of spools associated with PL722	PL722 spools: 200 m (L) (see footnote 2 in Table 3-1). As a worst-case, the calculation of the seabed disturbance assumes temporary disturbance along a corridor width of 2 m. Temporary area of disturbance = length (200 m) x corridor width (2 m).	0.0004
Cut and remove exposed end of PL1971	Cut and recover the exposed end of PL1971 (9 m) . A corridor of disturbance of 2 m has been allowed for along the length of pipeline to be recovered. Temporary area of disturbance = length (9 m) x corridor width (2 m).	0.00002
Recovery of spools associated with PL1971	PL1971 spools: 149 m (L) (see footnote 3 in Table 3-1). As a worst-case, the calculation of the seabed disturbance assumes temporary disturbance along a corridor width of 2 m. Temporary area of disturbance = length (149 m) x corridor width (2 m).	0.0003
Recovery of PLU1972	Total length of PLU1972 is 169 m (L), however, 161 m is being recovered (see footnote 5 in Table 3-1). As a worst-case, the calculation of the seabed disturbance assumes temporary disturbance along a corridor of 5 m. Temporary area of disturbance = length x corridor width (i.e., 161 m x 5 m).	0.0008
Recovery of spool crossing frame	Spool crossing frame measuring 15.5 m (L) x 6 m (W) x 2.5 m (H) Piles will be internally cut such that excavation of the seabed is not required. As a worst-case, the calculation of the seabed disturbance assumes temporary disturbance out to 2 m on each side of the spool crossing frame Temporary area of disturbance = 19.5 m x 10 m.	0.00020
Recovery of the SSIV structure	SSIV dimensions: 13.6 m (L) x 7.7 m (W) x 3.5 m (H). As a worst-case, the calculation of the seabed disturbance assumes temporary disturbance out to 2 m on each side of each structure (extended length/width). Temporary area of disturbance therefore is 17.6 m x 11.7 m	0.00021
Recovery of all exposed mattresses	As detailed in Table 3-4 a total of 57 mattresses of varying sizes will be recovered to shore. As a worst-case, the calculation of the seabed disturbance assumes all mattresses are of the largest size i.e. 6 m (L) x 3 m (W) x 0.3 m (H). In addition, temporary disturbance out to 2 m on each side of each mattress has been allowed for.	0.0040

Activity	Assumptions made	Temporary area of disturbance (km ²)
	Temporary area of disturbance = 57 x 10 m x 7 m width.	
Total area of temporary disturbance		0.0778 km ²
Note: area of disturbance calculated for each line item will overlap with other line items in a number of instances (for example, removal of the mattresses and then cut and removal of PL1971), such that the area calculated is a worst case estimate.		

Table 7-2 Estimate of Area Temporarily Impacted by Over-Trawl Trials.

Activity	Assumptions made	Temporary area of disturbance (km ²)
Over trawl of full length of trenched and buried portion of PL722	Assume total pipeline length of 7,110 m and a 100 m corridor.	0.711
Notes:		
1. All other activities will occur within either the Brae A or the Brae B 500 m exclusion zones such that any close out surveys will be part of the wider survey of the 500 m exclusion zones and are not considered here.		
2. It is assumed that any inspections of the rock profile over PL1971 will be visual as opposed to over trawling.		

7.1.2 Quantification of Potential Permanent Disturbance

Following the cut and remove activities associated with the exposed end of PL1971 it may be necessary to add spot rock to the cut end of the pipeline to ensure it is not a snagging risk. As the remaining length of the pipeline is already rock covered the anticipated required rock volume (10 te) is expected to extend the length of the existing rock berm by around 1 m.

Spot rock cover may also be required to make the cut ends of PLU1972 (cut at either side of a crossing) safe. In this case c. 10 te of rock would be added to either end of the existing 8 m crossing, thereby extending the length of the crossing to c. 10 m.

The seabed area considered to be impacted permanently is limited to the areas where the rock cover detailed above (30 te in total) will be deposited if required. Table 7-3 presents the estimated area of permanent disturbance associated with the potential rock cover.

Table 7-3 Anticipated Area of Potential Permanent Seabed Disturbance Associated with Rock Cover.

Activity	Assumptions made	Permanent area of disturbance (km ²)
Remediation of cut end of PL1971	Pipeline end will be cut and removed, with 10 te of spot rock cover placed to remediate the exposed end. Assume exposed end length of 1 m and a 6 m corridor.	0.00001
Remediate cut ends of PLU1972 at either side of a crossing	Umbilical is cut at either side of the existing crossing with 10 te of spot rock cover required to cover a length of 1 m and a 10 m corridor at each side of the crossing.	0.00002
Total area of permanent disturbance:		0.00003 km ²

7.2 Impact on Receptors

7.2.1 Temporary Impact

The maximum area of temporary seabed disturbance associated with the worst case proposed decommissioning activities is 0.711 km². However, this value encompasses the area impacted by the over trawl trials and would be significantly less (0.0778 km²) if SSS/MBES surveys are used to obtain evidence of a safe seabed. Impacts on the seabed are considered temporary (rather than permanent) because, following completion of activities, the seabed will begin to recover.

Temporary impact from trenching and burying will directly disturb the benthic communities and their habitat within the trenched area and on either side the route. Whilst there may be some mortality of individual benthic organisms as a result of the passage of the trencher, it is expected that most mobile benthic species will vacate the area in advance of the trencher going past. It is possible that some exposed organisms that would normally be buried may not be able to re-bury before being predated upon. The direct effects of the trenching and burying activities are expected to be temporary and recolonisation from the surrounding area is expected to commence as soon as the trenching activities are completed.

Mechanical ploughing, and the recovery of subsea infrastructure will create an increase in the amount of suspended solids within the water column. This increase in turbidity may result in short term smothering and difficulties for filter feeding organisms. Increased suspended solids in the water column can also cause environmental stress if individuals ingest the suspended particles rather than food. It is possible that these disturbed sediment particles may be transported via tidal currents for re-settlement over adjacent seabed areas. Sessile epifaunal species may be particularly affected by increases in suspended sediment concentrations as a result of potential clogging or abrasion of sensitive feeding and respiratory apparatus (Nicholls *et al.*, 2003). In the case of filter feeders, an increased suspended sediment concentration could impact the ability to feed. Larger, more mobile animals, such as crabs and fish, are expected to be able to avoid areas of deposition and elevated suspended solid concentrations.

To enhance the existing survey data available for the Miller area BPEAL proposed to carry out an additional environmental baseline survey in Q3 2025. The survey results will be used to inform the required environmental permits prior to any proposed decommissioning activities (e.g. marine licence applications).

Previous environmental surveys within the area have identified the PMF species *A. islandica* in the Brae Area Pipeline Route Survey area (Gardline, 2002). Re-suspended sediments could have a negative impact on suspension feeding organisms such as bivalves, including *A. islandica*, which are known to occur in the Brae area (see Section 5.6). Within the Feature Activity Sensitivity Tool (FeAST), *A. islandica* are described as having a high sensitivity to sub-surface abrasion and siltation changes although damage is related to body size with larger specimens being more vulnerable (Scottish Government, 2025b). Although *A. islandica* burrow into the sediment, they use a short inhalant siphon which sits above the sediment surface for feeding and respiration (Taylor, 1976). Surface abrasion and siltation may therefore damage/clog the inhalant siphon, however it should be noted that following smothering/burial (up to 40 cm), they are able to burrow to the surface (Powilleit *et al.*, 2009). *A. Islandica* is considered not sensitive to smothering of up to 30 cm of material added to the seabed in a single event (Tyler-Walters & Sabatini, 2017).

A component biotope of the PMF habitat 'Offshore deep sea muds' was also identified in the Brae area (Marathon Oil, 2017). Within FeAST, continental shelf muds are considered to have a medium sensitivity to the abrasion and penetration pressures associated with demersal trawling (e.g. from overtrawl trials) (Scottish Government, 2025b). However, the degree to which particular examples of the biotope are sensitive to the pressure will be dependent on the species present. Fugro (2018) found evidence of the OSPAR listed threatened and/or declining habitat 'sea pens and burrowing megafauna communities' at the nearby Kingfisher Field c. 7.5 km away. However, Aurora Environmental Ltd (2005a) found no evidence of this habitat in the area of the Miller Infield Decommissioning Project. Additionally, due to the sandy sediment

types identified in Section 5.3.6, this habitat is not expected to occur in the Project area. However, prior to any proposed decommissioning activities, the 2025 environmental survey results will be used to inform the impact assessments in the appropriate environmental permits.

Any impacts from sediment disturbance and sediment re-suspension are expected to be short lived since most of the smaller sedentary species associated with the area have short lifecycles and recruitment of new individuals from outside the disturbed area will occur. Recolonisation of the impacted areas can take place in a number of ways, including mobile species moving in from the edges of the area (immigration), juvenile recruitment from the plankton and burrowing species digging back to the surface. Recovery times for soft sediment faunal communities are difficult to predict, although some recent studies have attempted to quantify timescales. Collie *et al.* (2000) examined impacts on benthic communities from bottom towed fishing gear and concluded that, in general, sandy sediment communities (as seen in the vicinity of the Miller platform footings (see Section 5.3.6) were able to recover rapidly, although this was dependent upon the spatial scale of the impact. It was estimated that recovery from a small-scale impact, such as a fishing trawl, could occur within about 100 days assuming that recolonisation was through immigration into the disturbed area rather than from settlement or reproduction within the area. Recovery through immigration would be expected to take longer for the more extensive trawled areas, and larval recruitment or local reproduction by surviving individuals may be more important determining factors (Collie *et al.*, 2000). Therefore, given the relatively small area of impact and the evidence for recovery from small scale impacts, the impact significance of the proposed activities on benthic communities is considered Low.

Evidence suggests that the sensitivity of fish to suspended sediments varies greatly between species and their life history stages and depends on sediment composition (particle size and angularity), concentration and the duration of exposure (Newcombe and Jensen, 1996). Being the major organ for respiration and osmoregulation, gills are directly exposed to, and affected by, suspended solids in the water. If sediment particles are caught in or on the gills, gas exchange with the water may be reduced leading to oxygen deprivation (Essink 1999; Clarke and Wilber, 2000). This effect is greatest for juvenile fish as they have small easily clogged gills and higher oxygen demand (FeBEC 2010). As described in Section 5.4.3., a number of fish species recognised as PMFs occur in the area, and it is possible that suspended sediments in the water column resulting from the recovery, and/or trench and bury activities, could impact on individual fish including PMFs. However, given the short duration of the activities, any impacts on fish in the area will be at an individual level such that the impact significance is considered Low.

The resuspension and disturbance of drill cuttings can result in the release of hydrocarbons and other contaminants into the environment as well as an increase in turbidity with the resuspension of potentially fine sharp particles. These fine particles may interfere with the breathing and feeding of both benthic and pelagic species. Filter feeders such as mussels and scallops preferentially feed during times of higher suspended solids, and tissues are damaged by 'sharp' suspended barite particles compared with weathered marine sediments. 100% mortality has been observed at deposition levels of 0.5 mm per day in the laboratory through damage to gills and altered filtration rates. Being the major organ for respiration and osmoregulation, gills are directly exposed to, and affected by, suspended solids in the water. If sediment particles are caught in or on the gills, gas exchange with the water may be reduced leading to oxygen deprivation (Essink 1999; Clarke and Wilber, 2000). This effect is greatest for juvenile fish as they have small easily clogged gills and higher oxygen demand (FeBEC 2010).

Section 5.3.6.1 describes the drill cutting piles at the Brae A, and Brae B platforms locations. The potential disturbance of drill cuttings at each location is described below for the pipelines and umbilical associated with the Miller Infield Pipelines DP:

- PL722 runs from Miller to Brae A and is to be trenched and buried along its entire length. However, on approach to Brae A, there are pipeline crossings associated with PL872 and PL301 (see Table 3-2). Trenching of PL722 at these crossing locations may need to be scheduled to suit the decommissioning schedule for these other lines (further details are provided in the DP Table 15).

Contact with the cuttings piles at Brae A is highly unlikely, however, there is the possibility that a thin veneer of cuttings may be present. The trenching and burying activities may result in the resuspension of these cuttings; however, it is likely that this will be on a small scale, resulting in a negligible volume of cuttings resuspended.

- PL1971 runs from Miller to Brae B and is rock covered along the length of the line, the Brae B end of the pipeline must however be remediated. At the site of remediation, contact with the Brae B cuttings pile is highly unlikely, however there is the possibility that a thin veneer of cuttings may be present. The remediation activities may result in the resuspension of these cuttings; however, it is likely that this will be on a small scale, resulting in a negligible volume of cuttings resuspended.
- PL1971 spools will be cut at the transition to the Brae B cuttings pile (on behalf of Brae partners) and will be removed up to this point, which may result in a negligible volume of cuttings being resuspended. The remaining 71 m of the spool pieces and associated 8 protective concrete mattresses will be left *in-situ* buried under cuttings, therefore there will be no further disturbance to the Brae B cuttings pile.
- PLU1972 is located within the Brae B 500 m zone. As such it is likely that there will be disturbance to the possible veneer of cuttings previously described. Dependent of how close PLU1972 runs to the platform, there is the potential that the drill cuttings pile will be disturbed (e.g. if it is closer than c. 100 m). Disturbance to the veneer or drill cuttings pile would result in the resuspension of drill cuttings; however, it is likely to be a small volume, resulting in minimal impacts.

Therefore, the likelihood of resuspension occurring from operations within the scope of this EA is low, and if it does occur it will be a small volume, thus the impacts are likely to be minimal.

7.2.2 Permanent Impact

The maximum area of permanent seabed disturbance associated with the worst case proposed decommissioning activities is 0.00003 km² and is associated with the potential requirements for laydown of spot rock cover (30 te in total). Impacts on the seabed are considered permanent (rather than temporary) because, following completion of activities, the seabed will remain in an altered state. The loss of habitat and smothering of the benthos associated with the potential placement of rock cover creates habitats for benthic organisms that live on hard substrates, leading to a change in the local seabed community.

As described in Section 3.1.2, there are existing areas of rock deposits along the Miller pipelines (47,310 te). If possible, existing rock will be utilised at the PLU1972 crossing to cover the cut ends. The worst-case volume of rock protection potentially required (c. 30 te) is not considered to significantly alter the natural character of the seabed in the area given that, if used, it will be laid either at the end of an existing rock berm (PL1971) or adjoining existing rock at a crossing (PLU1972). Given the relatively low footprint of disturbance, the severity of the environmental impact of any additional rock protection is therefore considered to be Low.

7.3 Transboundary and Cumulative Impacts

Given the distance from the nearest transboundary line (c. 9.2 km), and relatively small scale and local nature of the decommissioning activities, there are no transboundary seabed impacts anticipated.

The worst-case volume of rock protection potentially required is not considered to significantly alter the natural character of the seabed in the area given that, if used, it will be laid either at the end of an existing rock berm or adjoining existing rock at a crossing, with a maximum seabed footprint of 0.00003 km². This additional rock volume represents <0.1% of the existing rock cover associated with the Miller pipelines and therefore will not greatly increase the rock cover in the area. The impact significance of any cumulative impacts is therefore still considered low.

If the overtrawl trials are undertaken more than 100 days after the decommissioning works, then some recolonisation of the area may have taken place in that time (Collie *et al.*, 2000), therefore there may be an

element of cumulative impact from more than one episode of disturbance in this area. However, given that bottom trawl fishing is regularly undertaken in the area, the relative impact from the decommissioning activities is small and is not considered to be significant.

7.4 Mitigation Measures

The following mitigation measures are proposed to minimise the environmental impacts related to the planned seabed disturbance associated with the proposed decommissioning activities.

Proposed Mitigation Measures

- Dredging/jetting will be minimised.
- With respect to remediation of the exposed end of PL1971, cut and remove has been selected over the option to rock cover the full exposed length.
- If rock cover is required, volumes will be minimised, and a fall pipe will be used to lay it on the seabed.
- If possible, preference will be given to the use of side scan sonar surveys (or similar) to determine a safe seabed.
- Additional environmental data will be collected along the pipeline routes to inform the permit applications to be submitted prior to execution.

7.5 Conclusions

The decommissioning activities associated with the Miller Infield Pipelines Decommissioning Project will result in localised temporary disturbance to the seabed from decommissioning activities and subsequent overtrawl trials. Overtrawl trials may be required to confirm a safe seabed and, if required, will result in the largest area of temporary impact. BPEAL will investigate opportunities for the use of SSS/MBES with OPRED to determine a safe seabed and therefore may potentially remove the worst-case impact associated with this activity. Due to the relatively small area of impact and the evidence for recovery, the impact significance of the temporary disturbance associated with the proposed decommissioning activities is considered Low.

Permanent disturbance is limited to that associated with potential use of the addition of rock cover to the exposed end section of PL1971 and the PLU1972 crossing. The worst-case volume of rock protection potentially required is not considered to significantly alter the natural character of the seabed in the area, given the relatively small footprint of permanent disturbance. The severity of the environmental impact of any additional rock protection is therefore considered to be Low.

Considering the scope of activities and the receptors in the area, the impact significance of disturbing the seabed is considered Low. In addition, the activities assessed in this Chapter will not contradict the NMP objectives (see Appendix B) and BPEAL will aim to comply with the relevant NMP policies. In addition, the Project will aim to comply with the oil and gas marine planning policies.

8. LEGACY IMPACTS

When assessing the impact of the proposed activities during the ENVIID Workshop (Section 6), several of the activities were considered to result in a potential legacy environmental or social impact. These legacy impacts are considered further here.

8.1 Activities (Cause of Impact)

Proposed activities that could result in a legacy impact include:

- PL722 decommissioned in a trench and buried to a target depth of 0.6 m;
- 8 m length of PLU1972 that will remain in situ under a pipeline crossing;
- Placement of additional rock cover (spot rock cover at PL1971 end after cut and removal, and rock cover at PLU1972 crossing);
- Decommissioning *in situ* of the existing rock-cover, rock-covered protection structures (concrete mattresses) and mattresses buried under drill cuttings.
- 71 m of spool pieces associated with PL1971 which are buried under drill cuttings at the Brae B platform and therefore will be decommissioned *in-situ*.

The significance risk of these decommissioning activities, with respect to legacy impacts on fishermen, was considered to be Moderate in the ENVIID, hence identifying it as an impact requiring further assessment in this chapter.

Note that exposed mattresses, the SSIV and most of the associated umbilical PLU1972 (161 m of the 168 m), nine jumper spools and one spool crossing frame will be recovered to shore and are not considered to represent a legacy impact.

8.2 Environmental Impacts of Infrastructure to be Decommissioned *In-Situ*

Over time, the Miller pipelines decommissioned *in-situ* will breakdown. Water depth in the area is c. 103 m. At this depth if the lines were exposed on the seabed there would likely be abrasion, accumulation of marine organisms and salt-water corrosion over time (Angulo *et al.*, 2017).

A dataset compiled by Solan *et al.* (2019), based on a literature review of papers published since 1864, found that the mixed sediment depth (bioturbation depth) in the North Sea is up to 25 cm. This means that any material remaining in the seabed sediments at a depth greater than this is unlikely to have any interaction with benthic organisms, provided that it remains buried to this depth.

The following quantities of materials will be left on the seabed by source: steel (c. 4,072 te), aluminium (c. 38 te), concrete (c. 1,357 te), plastic and miscellaneous pipe coatings (c. 93 te), and stabilisation features¹ (47,473 te). The environmental and socio-economic legacy impacts of decommissioning are discussed in the following sections.

8.2.1 Pipelines

8.2.1.1 Pipeline Contents

Both Miller pipelines are to be decommissioned *in situ* (PL722, and PL1971) have been flushed and cleaned with a single pig train consisting of four pigs with slugs of surfactant and (two off) debris pick up gel pigs.

¹ The number and location of the mattresses being left *in situ* is listed in Table 3-3 of the EA. The calculation for the weight of the mattresses remaining *in situ* is provided in Table 3-4 of the DP submission.

They have then been left with de-aerated seawater treated with TROS 650@750 ppm. As the lines corrode, their contents will be slowly released into the surrounding sediments and water column. Given that:

- The release will be gradual; and
- The hydraulic fluids are water based, and their efficacy will reduce over time as they degrade,

the impact significance of these discharges is considered **Low**.

8.2.1.2 Pipeline Metals

Approximately 4,174 te of carbon steel will be left on the seabed. OEUK suggest that steel structures below the seabed will corrode at rates in the region of 0.01 to 0.02 mm/year (OGUK, 2013). During this long-term process, the degraded components of the pipelines could potentially become bioavailable to benthic fauna in the immediate vicinity.

Some metals have the potential to exert toxic effects in biota and can bioaccumulate through the food web (Neff, 2002). Within benthic animals, accumulated metals may act as enzyme inhibitors, adversely affect cell membranes, damage reproductive and nervous systems, cause changes in metabolic and respiratory efficiency, affect growth and behaviour or act as carcinogens (Kennish, 1997; Ansari *et al.*, 2004). In addition to the steel, there will be around 41 te of aluminium alloy (associated with the pipelines) remaining *in-situ*, which will become exposed to the surrounding sediment as the pipelines degrade. However, aluminium is a trace metal, which has generally not been seen to significantly bioaccumulate in marine organisms.

The long-term environmental impact significance of leaving the Miller pipelines *in-situ* is considered **Low**, given:

- The buried nature of some of the lines following decommissioning activities: PL722 (trenched and buried) and PL1971 (rock covered);
- The slow anticipated rate of metal degradation;
- The very gradual release of contents in the lines;
- That any chemicals contained within the pipelines are approved chemicals, whose efficacy will degrade over time;
- The lines have been flushed and only contain treated seawater; and,
- The remaining trace metal has not been found to significantly accumulate in marine organisms.

8.2.1.3 Concrete, Plastic and Miscellaneous Pipeline Coatings

Approximately 1,357 te of concrete is associated with PL722. For lines that will be buried following decommissioning activities, any concrete is expected to degrade over centuries. The degradation products will be the aggregates (sand and gravel) used in the concrete and the reacted cement compounds, predominantly calcium carbonate. These degradation products are relatively chemically inert and are likely to result only in a slight increase in the coarse sediment in the area of the pipeline. Impacts of concrete on benthic fauna and the water column are therefore expected to be negligible.

The pipelines to be decommissioned *in situ* also have c. 93 te of plastic and miscellaneous pipe coatings associated with them in total (the majority of which is associated with the PL722 Oil Export Pipeline (c. 69 te). It is thought the deterioration of plastics within the pipelines will take significantly longer than the time expected for the steel pipelines to degrade (Dames *et al.*, 1999).

There are four mechanisms by which plastics degrade in the environment (Andrady, 2011):

- Photodegradation – action of light (usually sunlight);
- Thermooxidative degradation – slow oxidative breakdown at moderate temperatures;

- Hydrolytic degradation – reaction with water; and
- Biodegradation – action by living organisms, usually microbes.

Generally speaking, natural degradation of plastic begins with photodegradation, which leads to thermooxidative degradation. Fragmentation and biodegradation proceeds through a combination of photodegradation, thermooxidative degradation and microbial activity. In the marine environment, ultraviolet (UV) radiation is the dominant weathering process (photodegradation). It causes embrittlement, cracking and fragmentation, leading to the production of microplastics (Andrady, 2011). This means that fragmentation is greatest when debris is directly exposed to UV radiation on shorelines. The effect of photodegradation is significantly decreased in seawater due to the lower temperature and oxygen availability and that the rate of hydrolysis of most polymers is very low in the ocean (Andrady, 2011). The decreased effect of photodegradation is particularly relevant to the Miller area given the water depths in the area (in the region of 100 m, and the fact that some of the pipelines are/ will be buried following decommissioning, which will reduce the potential for photodegradation even further.

During this long-term process, the degraded components of the pipelines and their contents will be released into the sediments. Once released, mechanisms such as biodegradation and ingestion by benthic species could result in the introduction of heavy metals and plastics into the food chain, although given that the pipelines will be remediated as part of the decommissioning, the likelihood of this occurring is reduced.

The release of plastics into the water column may occur through mechanisms such as scouring. Plastics in the marine environment pose a chemical hazard, as toxic chemicals from ingested plastics can be released into the guts of marine species, or they may otherwise leach to the environment as the plastic weathers (Gallo *et al.*, 2018; Thushari and Senevirathna, 2020).

As many organic pollutants are lipophilic; in the same way as fats, plastic particles can also adsorb and concentrate contaminants such as persistent organic pollutants (POP) from the water column and act as pathways for transfer into the food chain (Bai *et al.*, 2021). Because of the persistence of such compounds, humans and other animals continue to be exposed long after a chemical has been withdrawn from production (UNEP, 2016).

Chronic exposure to the presence of microplastics has been linked to effects on populations, including the negative influence of microplastics and nanoplastics on survival and mortality of different species of zooplankton who ingest plastic (Desforges, 2015).

Evidence of microplastic ingestion is summarised by Anderson (Anderson, *et al.*, 2016) and is presented here. Microplastics can be ingested by aquatic organisms that feed from the water column including, ciliates, zooplankton, rotifers, polychaete worms, coral, sea cucumbers, barnacles, amphipods, molluscs, crustaceans, and fish. Once ingested, these particles can be transferred to higher trophic levels. Some species are capable of rapid excretion or egestion, while others retain, accumulate, and/ or mobilise microplastics into their circulation. Particles can be ingested by filter feeders directly from the water column and filter feeders might have greater exposure to microplastics than organisms employing other feeding strategies.

Uncertainties remain regarding the extent of harm caused to marine species by ingestion of microplastics, and over the contribution they make to overall exposures to hazardous chemicals. Some studies report little or no physical or chemical harm to marine biota (Koelmans, *et al.*, 2014), while others, suggest that chemicals in plastics might be released to organisms after ingestion (Teuten, *et al.*, 2009; Tanaka, *et al.*, 2013; Browne, *et al.*, 2013; and Bakir, *et al.*, 2014). In mussels, *Mytilus galloprovincialis*, exposed to polyethylene and polystyrene microplastics contaminated with poly aromatic hydrocarbons, marked bioaccumulation of these chemicals was recorded in both digestive glands and gills (Avio *et al.*, 2015). Ingestion by copepods was found to affect swimming behaviour, growth and reproduction, depending on the size and type of plastics ingested and can lead to malnutrition and starvation (Bai *et al.*, 2021).

Once plastics become buried in sediment, then the rate of fragmentation decreases rapidly. Microorganisms, animals, salt, sunlight, fluctuations of water, etc. all play a part in the degradation process (Krasowska *et al.*, 2015). Degradation can therefore be impeded by cold temperatures and a lack of UV light. As the pipelines will be buried or rock covered after decommissioning it can be expected that most of these degradation sources, such as UV light and high temperatures will not be relevant. In addition, the impacts of mechanical forces acting on these pipelines are predicted to be low, and it is expected that much of the eventual plastic contaminants produced will be contained within the sediment and prevented from reaching the water column.

Physical forces such as heating/ cooling or seabed movements can cause mechanical damage such as the cracking of polymeric materials. The growth of microorganisms within the sediment can also cause small-scale swelling and bursting (Krasowska *et al.*, 2015), leading to fragmentation and the eventual breakdown into microplastics (1 µm to 5 mm) or nanoplastics (1 nm to 1 µm). The potential ecological and human health risks of microplastics/ nanoplastics are relatively new areas of research, and there is currently a large degree of uncertainty surrounding this issue (GESAMP, 2015). Adverse effects of plastics on marine organisms have been observed through the physical obstruction or damage of feeding appendages/digestive tracts/breathing tubes has been frequently observed (GESAMP, 2015).

The long-term environmental impact significance of leaving the concrete, plastic and miscellaneous pipeline coatings associated with Miller pipelines and protection structures (concrete mattresses) *in-situ* is considered **Low**, given:

- The buried nature of most of the lines following decommissioning activities (PL722 and PL1971);
- The slow anticipated rate of concrete and plastic degradation; and
- The relatively chemically inert nature of concrete degradation products.

8.2.2 Existing and Additional Rock-Cover

Approximately 47,310 te of rock-cover has previously been deposited at various locations along the Miller pipelines in total. The existing rock-cover has been in place since pipeline installation, creating a habitat for benthic organisms that live on hard substrate.

As described in Section 3.2.3, as a worst case, an additional 30 te of rock cover may be required to provide protection at the PLU1972 crossing and to provide spot cover after the cut and removal of PL1971 exposed pipeline end. This represents <0.1% of the existing rock cover associated with the Miller pipelines, and therefore this will not significantly alter the habitat for benthic species that occur in the area. The environmental impact of leaving existing rock-cover *in situ* and adding a small additional volume of further rock cover, is therefore considered **Low**.

8.3 Socio-Economic Impacts of Infrastructure to be Decommissioned *In-Situ*

There are areas with the use of bottom-trawls and seine nets in the Miller Field, trawl gear has the potential to interact with any infrastructure or rock-cover remaining on the seabed.

Based on a range of penetration depths of main fishing gear components (demersal trawls, seines and dredges) across different sediment types as estimated from a literature review by Eigaard (Eigaard, *et al.*, 2016), the depths of penetration from different fishing gear for a seabed dominated by mud and sand ranges from 0 cm to 35 cm. Any material remaining in the seabed sediments at a depth greater than 35 cm is therefore unlikely to have any interaction with fishing gear, providing that it remains buried to this depth.

The pipelines occur in an area where the seabed is stable. Trawl gear currently working in the area have regularly traversed the buried sections of the pipelines without any interaction.

For existing rock-cover on the Miller pipelines, and any additional rock cover that will be used, the rock size and profiles will be in accordance with industry best practice and SFF recommended practice such that

demersal trawl gear would be expected to be able to access the area. As part of the DP, BPEAL will commit to a post decommissioning survey strategy (agreed with OPRED) to monitor the status of the lines and stability of the rock profiles.

Following decommissioning activities independent verification of the seabed state will be obtained and evidence of a safe seabed will be provided to all relevant governmental and non-governmental organisations.

Therefore, considering:

- The current condition of the lines;
- The stability of the seabed;
- The use of industry preferred rock size and profiles;
- Demonstration of a clear seabed; and
- A post decommissioning survey strategy,

the socio-economic impact significance of these lines and rock being decommissioned *in situ* is considered **Low**.

8.4 Transboundary and Cumulative Impacts

Given the distance from the nearest transboundary line (c. 9 km), there are no transboundary impacts anticipated because of the activities captured in this Chapter.

Additional rock cover may be required for the remediation of the PLU1972 pipeline crossing (either from existing rock or additional spot rock) and for the remediation of the exposed end of PL1971 (by cut and remove with spot rock cover). Rock volumes will be minimised and represent a small volume in comparison to the existing rock cover, therefore the cumulative impact of these proposed decommissioning activities is not considered significant.

8.5 Mitigation Measures

The following mitigation measures are proposed to minimise the environmental and socio-economic impacts associated with the Miller infrastructure to be decommissioned *in situ*.

Proposed Mitigation Measures

- Exposed infrastructure (including stabilisation/protection material) will be recovered to shore.
- Lines decommissioned *in situ* have been flushed to reduce hydrocarbons and chemicals to as low as reasonably practicable.
- Locations of remaining materials will be marked on FishSafe.
- Spot rock cover may be required to remediate the exposed end of PL1971 (following cut and remove), and additional rock will be required to remediate the PLU1972 crossing. Rock volumes will be minimised.
- Surveys, and potentially over trawl trials, will be used to ensure no snagging risks remain following the decommissioning.
- Adherence to a post-decommissioning survey strategy agreed with OPRED.

BPEAL's commitment to adhering to the mitigation measures identified means that the environmental and socio-economic impact significance of decommissioning the pipelines, buried protection structures (concrete mattresses) and existing rock *in situ* is considered **Low**.

The activities assessed in this chapter will not contradict the National Marine Plan (NMP) objectives (see Appendix B) and as the project progresses BPEAL will aim to comply with the NMP policies. In addition, the Project will aim to comply with the oil and gas marine planning policies.

9. ATMOSPHERIC EMISSIONS

9.1 Activities (Cause of Impact)

In 2019, the UK's independent Committee on Climate Change (CCC) released their publication 'Net Zero: The UK's contribution to stopping global warming' (CCC, 2019). In the report, the CCC concluded that it is achievable for the UK to implement a new target of net-zero greenhouse gas (GHG) emissions by 2050 in England and Wales, and by 2045 in Scotland. The report acknowledges that a diverse energy mix is needed in the transition to a net-zero future to maintain security of supply, which includes the continued extraction and use of oil and gas.

To achieve the net zero goal, the CCC report calls for concerted effort and action by all to reduce emissions and for any remaining emissions in 2050 to be offset. As part of this, the offshore oil and gas industry is focussed on the continued management and reduction of its operational emissions (OEUK, 2021) and the recently announced North Sea Transition Deal (NSTD) (DESNZ, 2021) further commits the sector to early targets for the reduction of greenhouse gas emissions from production, against a 2018 baseline.

Greenhouse gases differ in their abilities to trap heat. Global Warming Potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere; usually expressed as carbon dioxide (CO₂) equivalent (CO₂e). For example, methane (CH₄) is estimated to have a GWP up to 34 times greater than CO₂ over 100 years (Intergovernmental Panel on Climate Change (IPCC), 2014), although it has a shorter life span in the atmosphere. Overall, CO₂e emissions from UK upstream oil and gas operations in 2018 contributed three percent (14.63 million te) of total domestic CO₂e emissions (OEUK, 2021).

The predominant source of emissions associated with the decommissioning programme is emissions from the vessels using during the operations.

The main combustion products associated with power generation on the vessels is CO₂ with small quantities of CH₄, volatile organic compounds (VOCs), oxides of nitrogen (NO_x), carbon monoxide (CO) and very small quantities of nitrous oxide (N₂O) and sulphur dioxide (SO₂).

9.2 Impact on Receptors

Table 9-1 shows the expected vessel emissions based on predicted vessel requirements identified in Table 3-6. Emissions factors used were taken from the Environmental Emissions Monitoring System (EEMS) Atmospheric Emission Calculations guidance (EEMS, 2008).

Table 9-1: Predicted Atmospheric Emissions Associated with the Proposed Vessel Use.

Source	Atmospheric emissions (te)							
	CO ₂	NO _x	N ₂ O	SO ₂	CO	CH ₄	VOC	CO ₂ e
EEMS Emissions Factor¹	3.2	0.0594	0.00022	0.002	0.0157	0.00018	0.002	-
GWP²	1	-	265	-	-	28	-	-
Total fuel use (see Table 3-5) and emissions	795 te	2,545	47	0.17	1.59	12	0.14	1.59
Total upstream UKCS CO ₂ e emissions in 2018 ³								18,900,000
Total project CO ₂ e emissions as a % of UKCS CO ₂ e emissions in 2018:								0.014
Total CO ₂ e emissions from upstream oil and gas activities in the UK in 2022 ⁴								14,300,000
Total project CO ₂ emissions as a % of upstream oil and gas activities in 2022:								0.018
Notes:								
¹ Emissions calculated using EEMS emission factors (EEMS, 2008).								
² CO ₂ e figure is calculated by multiplying CO ₂ , N ₂ O and CH ₄ by their relevant GWP value. GWP values are as defined on a 100-year horizon according to the IPCC Fifth Assessment Report (IPCC, 2014), as required by the United Nations Framework Convention on Climate Change (UNFCCC) and in line with the United Kingdom's National Inventory Report (DESNZ, 2022).								
³ Total CO ₂ e emissions from UKCS 2018 (OGUK, 2019).								
⁴ (OEUK, 2023)								

As a worst-case the emissions from vessel use for the proposed decommissioning operations will amount to approximately 0.014% of total upstream UKCS CO₂e emissions in 2018 and approximately 0.018% of the total upstream UKCS CO₂e emissions in 2022 (Table 9-1). This represents a relatively small contribution to total UKCS emissions.

The emissions associated with these operations may result in short-term deterioration of local air quality within the vicinity, however, in the exposed conditions that prevail offshore, these emissions are expected to disperse rapidly such that they are not expected to have a significant impact on air quality. These emissions may also have a cumulative effect on climate change as described in Section 9.3.

9.3 Transboundary and Cumulative Impacts

The Miller Field is approximately 9 km from the UK/Norway median line, therefore transboundary impacts are expected to be minimal.

The potential cumulative effects associated with the atmospheric emissions produced by vessel use during decommissioning operations include global warming (greenhouse gases), acidification (acid rain) and local air pollution as well as, elevated levels of atmospheric emissions in the immediate area. The emissions associated with these operations may result in short-term deterioration of local air quality within the vicinity of the Miller field, however, in the exposed conditions that prevail offshore, these emissions are expected to disperse rapidly such that emissions from the vessels are not considered to have a significant impact. Given the worst-case estimates of emissions presented, the cumulative impact is also not considered to be significant. Due to the high dispersion rates and minimal nature of the emissions in relation to total UKCS emissions, no further mitigation measures are proposed.

9.4 Mitigation Measures

The impact of the vessel emissions will be mitigated by optimising vessel efficiency (i.e., minimising the number of vessels used, and vessel trips required to achieve the decommissioning end states) and hence minimising fuel use and avoiding the unnecessary operation of power generation / combustion equipment.

9.5 Summary

Emissions generated during the proposed operations are expected to disperse quickly and with the mitigation measures in place, are not expected to have a significant impact on air quality in the immediate vicinity of the operations. It is recognised the emissions will contribute to climate change, however given the quantity of emissions associated with the proposed activities, the impacts are also not considered to be significant. The proposed operations do not contradict the applicable Scottish NMP Objectives (see Appendix B).

10. ENVIRONMENTAL MANAGEMENT

BPEAL are committed to conducting activities in compliance with all applicable legislation and in a manner that will minimise impacts on the environment. Environmental and social impacts identified through the impact identification process will be input to the projects risk register. A summary of key environmental and social impacts and risks shall be included within the project's decision documentation throughout all phases of the project.

BPEAL has established a clear framework for the effective management of Health, Safety, and Environmental (HSE) issues involving their activities in the UK. The Company regards environmental management as being an integral part of its overall management responsibility, the fundamental aims being to support environmental protection, prevent pollution and comply with legislation and regulations. The principles of the International Standard for Environmental Management Systems (ISO14001:2004) are incorporated within the Company's Environmental Management System (EMS), which is an integral part of the company's overall management system. The Miller Infield Pipelines Decommissioning Project will be delivered in compliance with BPEAL's EMS.

BPEAL's HSE Policy is a public declaration of the Company's commitment to create a safe working environment such that no harm is caused to people and where environmental impact is minimised. The Company's HSE policy is provided in Figure 10-1.



bp North Sea UK HSE Policy

bp's commitment to **health, safety and environmental** (HSE) performance

Our HSE goals are simply stated:
no accidents, no harm to people and no damage to the environment.

We strive to be a safety leader in our industry, a world-class operator, a good corporate citizen and a great employer. Nothing is more important to us than the health, safety and security of our workforce and the communities in which we operate, and behaving responsibly towards our shared environment. We must be vigilant, disciplined and always looking out for one another.

We are committed to:

- complying with applicable laws and company policies and procedures
- systematically managing our operating activities and risks
- reporting our HSE performance
- learning from internal and external HSE events

In the North Sea our mission is to achieve zero life changing injuries, zero serious process safety events and have the lowest possible environmental impact, emissions, and methane intensity. We therefore expect all staff and contractors to stop work when there is an unsafe act or condition, non-compliance with legislation or when unable to meet bp requirements.

Everyone who works for bp has a part to play in meeting our HSE commitment. Our Safety Leadership Principles are an important guide on how we can achieve this. Together we:

1. Genuinely care about each other
2. Will not compromise our focus on safety
3. Encourage and recognize speak up
4. Understand how work actually happens
5. Learn why mistakes occur and respond supportively



Doris Reiter
SVP North Sea

19 October 2022 (updated 3 yearly)

Figure 10-1 BPEAL's Health, Safety, and Environment (HSE) Policy.

11. CONCLUSIONS

Having previously decommissioning the Miller platform and infrastructure located with the platforms 500 m exclusion zone, BPEAL are currently preparing to decommission the infield pipelines and associated structures (and associated stabilisation material). Included in the decommissioning activities is the:

- Remediation *in situ* by trenching and burying the full length of PL722 (oil export pipeline from Miller to Brae A); and
- Decommissioning *in situ* of PL1971 (gas import pipeline from Brae B to Miller), with the exposed ends cut and removed.

The following will be recovered to shore: exposed mattresses, an SSIV on PL1971 (referred to as Brae B SSIV), the SSIV umbilical (PLU1972), spool pieces associated with PL722 spool and PL1971 and a spool crossing frame.

On approach to the Brae B platform, eight mattresses and 71 m of PL1971 spool pieces which are buried under drill cuttings will be left *in situ*. Existing rock cover and mattresses associated with crossings will also be left *in situ*.

It is expected that around 30 te of rock will be added to the seabed in support of the proposed decommissioning activities: 10 te on the cut end of PL1971 following removal of the exposed end of the pipeline. The remaining 20 te will be associated with the decommissioning of the SSIV umbilical (PLU1971). This umbilical has a crossing associated with it such that during recovery a short section (8 m) will remain *in situ* beneath the crossing. Should it be necessary to mitigate snagging risk on the exposed ends of the umbilical up to 10 te of rock may be laid at either side of the crossing.

Note due to being subject to possible reuse considerations for carbon capture and storage (CCS) by third parties the main export pipeline to St Fergus (PL720) does not form part of the DP submission and therefore is not considered in the CA or this EA

Following a detailed review of the project activities, the environmental sensitivities of the project area, industry experience with decommissioning activities and of stakeholder concerns, it was determined that further assessment of the following issues was required to properly define the potential impact of the proposed decommissioning activities for the Miller pipelines:

- Cumulative seabed disturbance impacts– during recovery of infrastructures, trenching and burying of PL722, potential cut and remove of the exposed end of PL1971, potential rock cover on the exposed end of PL1971, and over-trawl sweeps and over-trawl trials.
- Legacy impacts:
 - The release of chemicals, metals, plastic, concrete etc. as material decommissioned *in situ* degrades.
 - The physical presence of infrastructure decommissioned *in situ* on other sea users, both in terms of physical exclusion and risk of snagging.
- Impact of atmospheric emissions on climate change.

A review of each of these potentially significant environmental interactions has been completed and, considering the mitigation measures that will be built into the decommissioning project activities, there is expected to be no significant impact on receptors. As part of this review, cumulative and transboundary impacts were assessed and determined to be not significant.

The potential impact on protected sites in the wider vicinity has been considered in the assessment, however, following an assessment of the impact of the decommissioning activities, there is not expected to be a significant impact on any protected sites.

The EA has considered the objectives and marine planning policies of the Scottish NMP across the range of policy topics including biodiversity, natural heritage, cumulative impacts, and oil and gas. BPEAL considers that the proposed decommissioning activities are in broad alignment with such objectives and policies. Similarly, BPEAL considers that the proposed activities are aligned with the oil and gas specific marine planning policies.

Based on the findings of this EA and the identification and subsequent application of the mitigation measures identified for each potentially significant environmental and societal impact, it is concluded that the proposed Miller infield pipelines decommissioning activities will result in no significant environmental or societal impacts.

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¹ OGA are now known as the North Sea Transition Authority (NSTA).

² OGUK are now known as Offshore Energies UK (OEUK).

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APPENDIX A

This appendix presents the Environmental and Socio-Economic Impact Assessment (ESIA) and the Environmental and Socio-Economic Risk Assessment (ESRA) matrices used to determine the impact of the planned activities and unplanned events (respectively) associated with the project.

A.1. Receptors and Aspects

Prior to carrying out the ESIA / ESRA the potential receptors likely to be impacted were identified (Chapter 5), and the ways in which the activities may interact with the environment, i.e. the "aspects" (Chapter 3) were ascertained.

A.1.1 Environmental and Socio-Economic Receptors

Where relevant, the following environmental receptors were considered in the ENVIID for each activity:

- Air quality;
- Climate;
- Water quality;
- Plankton;
- Sediment quality;
- Benthic communities;
- Fish;
- Marine mammals;
- Birds;
- Designated areas;
- Cultural heritage (e.g. wrecks);
- Shipping;
- Fisheries;
- Resource availability (e.g. landfill and fuel); and
- Local communities (e.g. yard activities).

A.1.2 Identification of Aspects

Where relevant, the aspects considered in the ENVIID for the different activities included:

- Physical presence/interaction with other sea users;
- Seabed and habitat disturbance;
- Under water noise impacts;
- Discharges to sea;
- Atmospheric emissions;
- Waste; and
- Accidental events.

The aspects associated with each activity were assessed in terms of their impact on the receptors in the area. For example, the use of vessels will result in atmospheric emissions, discharges to sea, underwater noise, physical presence/interaction with other sea users and, if anchored, seabed and habitat disturbance. Receptors potentially impacted by these aspects include air quality, climate, marine mammals, birds, other users of the sea, and benthic communities (if anchored).

A.2. Assessment Methodology

The Impact Significance of the environmental/social impact of planned activities on each of the susceptible receptors is derived by considering the 'Impact Severity' (Section A.2.1) of each impact and the 'Duration/ Frequency' of the impact/activity (Section A.2.2). These are then combined to give an Impact Significance rating (Section A.2.3).

A.2.1 Impact Severity

Four categories of Impact Severity are applied, ranging from 1-4 as shown in Table A-1.

Table A-1: Impact Severity.

Impact Severity	Environmental	Social
4	Widespread area affected resulting in a severe negative impact to the environment. Examples: • Major increase in the air pollutants loads. • Major degradation of groundwater used for drinking. • Killing of a threatened or protected species damage to a protected area or permanent loss of unique or fragile habitat.	Catastrophic or severe negative impacts to communities, workers or cultural heritage. Examples: • Long term widespread damage or exclusion to fisheries. • Physical resettlement of a community. • Workers exposed to modern slavery practices (e.g., passport retention, paying exorbitant recruitment fees, no contracts). • Destruction of, or severe damage to, iconic international cultural heritage such as World Heritage Site, or iconic national heritage. • Labour unrest or community demonstration leads to major human rights incident due to security personnel actions.
3	Large area affected resulting in a substantial negative damage to the environment. Examples: • Considerable increase in the air pollutant loads. • Degradation of groundwater aquifers currently used for irrigation or stock watering. • Disturbance of a threatened or protected species or temporary loss of a unique or fragile habitat.	Substantial negative impacts to communities, workers or cultural heritage. Examples: • Damage or exclusion to fishing area, resulting in medium term suspension of fishing activity. • Large scale land acquisition programme leads to lost income for many land owners and users. • Development induced migration completely alters the demographic and security situation within a community. • Labour unrest or community demonstration leads to significant human rights incident due to security personnel actions. • Serious deficiencies in labour rights e.g. salaries delayed and below minimum wage, non compliances with working hours and leave, no workforce grievance mechanism. • Damage to iconic international cultural heritage such as World Heritage Site, or iconic national heritage.
2	Widespread area affected resulting in a severe negative impact to the environment: Examples: • Major increase in the air pollutants loads. • Major degradation of groundwater used for drinking. • Killing of a threatened or protected species damage to a protected area or	Catastrophic or severe negative impacts to communities, workers or cultural heritage. Examples: • Long term widespread damage or exclusion to fisheries. • Physical resettlement of a community. • Workers exposed to modern slavery

	permanent loss of unique or fragile habitat.	practices (e.g., passport retention, paying exorbitant recruitment fees, no contracts). • Destruction of, or severe damage to, iconic international cultural heritage such as World Heritage Site, or iconic national heritage. • Labour unrest or community demonstration leads to major human rights incident due to security personnel actions.
1	Localised area and minor negative impacts on the environment. Examples: • Undetectable or limited local degradation of the environment. • No significant contribution to global or regional air pollution problem. • No significant waste volumes. • Minor elevation in ambient pollutant levels well below environmental quality guidelines or standards. • Little or no ecological impact which may include temporary disturbance to species or habitats of local amenity value.	Minor negative impacts to communities, workers or cultural heritage. Examples: • Community disturbance impact e.g. noise, vibration, lighting. • Limited economic displacement. • Damage to locally recognised cultural heritage. • Inadequate quality of some worker facilities.

A.2.2 Duration / Frequency

Four categories of duration / frequency are applied, ranging from 1 (very low) to 4 (long or continuous), as shown in Table A-2.

Table A-2: Activity duration or frequency (planned events only).

Rating Level	Duration	Frequency
1	Very low duration	• Series of events of combined duration less than 6 h/yr. or • Single event with duration of less than 60 h/5 d.
2	Low duration	• Series of events of duration up to 3 d/yr. or • Single event with duration of up to a month.
3	Medium duration	• Series of events of duration up to 1 m/yr. or • A single event with the duration up to 1 yr.
4	Long duration or continuous	• Series of events of duration more than 1 m/yr. or • Continuous.

A.2.3 Significance of Impacts

The 'Impact Severity' and the 'Duration/ Frequency' were combined using the matrix presented in Table A-3 to determine the level of impact for planned activities. Definitions of the Impact Significance categories are provided in Table A-4. A definition of each Impact Significance is not provided in the BP methodology and have been derived by Genesis for use in this project.

Table A-3: Impact Significance Matrix.

Impact severity	4				
	3				
	2				
	1				
		1	2	3	4
Activity duration or frequency					
					

Table A-4: Definitions of the Impact Significance Categories.

Impact Significance	Definition
Negligible	- Risks are acceptable when managed within the scope of existing controls and mitigation measures as described. - Does not require further assessment in the Environmental Assessment (EA).
Minor	- Risks are acceptable when managed within the additional controls and mitigation measures as described. - Does not require further assessment in the EA.
Moderate	- Risks are acceptable provided the risks are reduced to As Low as Reasonably Practicable (ALARP) and managed under the additional controls and mitigation measures as described. - Requires further assessment in the EA.
Major	- For planned activities, risk of impact cannot be justified under the given criteria. For unplanned events, frequency of event must represent a tolerable level of likelihood, in addition to being reduced to ALARP and managed under the additional controls and mitigation measures as described. - Requires further assessment in the EA.

APPENDIX B

B.1. Scotland's National Marine Plan (NMP)

Scotland's NMP (Marine Scotland, 2015) covers the management of both Scottish inshore waters (out to 12 nm) and offshore waters (12 to 200 nm). 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 activities associated with the proposed Miller Infield Pipelines Decommissioning Project have been assessed against each of the NMP objectives, details of which can found in Table B-1.

Table B-1: The proposed Miller Infield Pipelines DP assessed against Scotland's NMP planning principles.

Scotland's National Marine Plan Principle Number	Assessment Against Principle
GEN 1 General planning principle	
There is a presumption in favour of sustainable development and use of the marine environment when consistent with the policies and objectives of this Plan.	The proposed project is the decommissioning of an existing field. The EA assesses the impacts to the environment and to other sea users.
GEN 3 Social benefit	
Sustainable development and use which provides social benefits is encouraged when consistent with the objectives and policies of this Plan.	The EA considers impacts to other sea users in decision making e.g. fisheries and pipelines. Lifecycle of the project is assessed for environmental and economic implications.
GEN 4 Co-existence	
Proposals which enable coexistence with other development sectors and activities within the Scottish marine area are encouraged in planning and decision-making processes, when consistent with policies and objectives of this Plan.	BPEAL will ensure that any potential impacts on other sea users associated with the decommissioning operations will be kept to a minimum, and that liaison with other marine users will be undertaken prior to and during the decommissioning phase.
GEN 5 Climate change	
Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change.	Vessel movements and therefore associated fuel use will be minimised.
GEN 9 Natural heritage	
Development and use of the marine environment must: a) Comply with legal requirements for protected areas and protected species. b) Not result in significant impact on the national status of Priority Marine Features. c) Protect and, where appropriate, enhance the health of the marine area.	Decommissioning activities will take account of existing environmental surveys in the area to minimise the impact to any PMFs.
GEN 10 Invasive non-native species	
Opportunities to reduce the introduction of invasive non-native species to a minimum or proactively improve the practice of existing activity should be taken when decisions are being made.	All vessels will follow IMO regulations. All vessels will be regulatory compliant, e.g. the International Convention for the Control and Management of Ships' Ballast Water and Sediments, and subject to audit prior to contract award.
GEN 11 Marine litter	
Developers, users and those accessing the marine environment must take measures to address marine litter where appropriate. Reduction of litter must be taken into account by decision makers.	Contractor management plans will be in place. All vessels will follow IMO requirements.

Scotland's National Marine Plan Principle Number	Assessment Against Principle
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, MSFD or other related Directives apply.	All vessels will be IMO and MARPOL compliant such that impact severity for vessel discharges to sea is considered Minor and is not discussed further in the EA. Pipelines have been flushed and cleaned to reduce hydrocarbon content to as low as reasonably practicable and left filled with inhibited seawater. Therefore any discharges from the pipelines are not expected to have a significant impact on the environment.
GEN 13 Noise	
Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.	There will be no piling or explosive use associated with the proposed activities. Vessel noise is not expected to significantly impact on the receptors in the area.
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.	Given the offshore location, impacts of vessel emissions are not considered significant and will be minimised through project planning.
GEN 21 Cumulative impacts	
Cumulative impacts affecting the ecosystem of the marine plan area should be addressed in decision making and plan implementation.	Cumulative impacts are considered in the EA and are considered proportionate to the size of the project. Cumulative impacts will be limited to impacts on climate change and those associated with the potential deposit of rock. Project planning will minimise the use of vessels.

B.2. Marine Strategy Framework Directive (MSFD)

The aim of the European Union's MSFD is to protect more effectively the marine environment across Europe. The MSFD outlines a transparent, legislative framework for an ecosystem-based approach to the management of human activities which supports the sustainable use of marine goods and services. The overarching goal of the Directive is to achieve 'Good Environmental Status' (GES) by 2020 across Europe's marine environment. Note following EU-Exit, the UK has made amendments to the Marine Strategy Regulations 2010, which transpose the requirements of the EU's Marine Strategy Framework Directive into domestic law, so that they continue to be effective now that the UK is no longer part of the EU.

The MSFD does not state a specific programme of measures that Member States should adopt to achieve GES, except for the establishment of MPAs. The MSFD does, however, outline 11 high level descriptors of GES in Annex I of the Directive. The activities associated with the proposed Miller Infield Pipelines DP have been assessed against each of the GES descriptors details of which can be found in Table B-2.

Table B-2: The proposed Miller Infield Pipelines DP assessed against the MSFD GES descriptors.

MSFD: GES Objectives	Assessment Against Objective
GES 1	
Biological diversity is maintained and recovered where appropriate. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.	Linked to GEN 9. Environmental surveys undertaken in the project area.
GES 2	
Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.	Linked to GEN 10. All vessels will follow IMO regulations. All vessels will be regulatory compliant, e.g. the International Convention for the Control and Management of Ships' Ballast Water and Sediments, and subject to audit prior to contract award.
GES 3	
Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.	Linked to GEN 9. Environmental surveys undertaken in the project area.
GES 4	
All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.	Linked to GEN 9. Environmental surveys undertaken in the project area.
GES 5	
Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms and oxygen deficiency in bottom waters.	Linked to GEN 9. Environmental surveys undertaken in the project area.
GES 6	
Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.	Linked to GEN 9. Environmental surveys undertaken in the project area.
GES 7	
Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.	Linked to GEN 12. Seabed disturbance and potential impact on marine ecosystems assessed in EA.
GES 8	
Concentrations of contaminants are at a level not giving rise to pollution effects.	Linked to GEN 12. The proposed activities will not result in the noticeable deterioration of water quality in the project vicinity.
GES 9	
Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.	Linked to GEN 12. The proposed activities will not result in the noticeable deterioration of water quality in the project vicinity.
GES 10	
Properties and quantities of marine litter do not cause harm to the coastal and marine environment.	Linked to GEN 11. Contractor management plans will be in place. All vessels will follow IMO requirements.
GES 11	
Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.	Linked to GEN 13. The proposed activities will not result in a noticeable prolonged period of increased underwater noise in the project vicinity.

B.3. Oil and Gas Sector Specific Policies

Objectives and policies for the Oil and Gas sector should be read subject to those set out in the NMP and the MSFD. It is recognised that not all the objectives can necessarily be achieved directly through the marine planning system, but they are considered important context for planning and decision making. The proposed project activities have been assessed against the oil and gas marine planning policies, details of which can be found in Table B-3.

Table B-3: The proposed Miller Infield Pipelines DP assessed against Oil and Gas Marine Planning Policies.

Oil and Gas Marine Planning Policies	Assessment Against Policy
Oil & Gas 1	
The Scottish Government will work with DESNZ, NSTA, and the industry to maximise and prolong oil and gas exploration and production whilst ensuring that the level of environmental risks associated with these activities are regulated. Activity should be carried out using the principles of Best Available Technology (BAT) and Best Environmental Practice (BEP). Consideration will be given to key environmental risks including the impacts of noise, oil and chemical contamination, and habitat change.	BAT will continue to be used as a key tool for the proposed Miller Infield Pipelines DP. Environmental risks are assessed and addressed in the EA, where necessary.
Oil & Gas 2	
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.	Infrastructure will be decommissioned in line with legislation in force at the time. The DP will be developed in consultation with the relevant statutory authorities and will ensure that potential effects on the environment resulting from the decommissioning activities are considered and minimised.
Oil & Gas 3	
Supporting marine and coastal infrastructure for oil and gas developments, including for storage, should utilise the minimum space needed for activity and should take into account environmental and socio-economic constraints.	The proposed decommissioning project is located over 200 km from the nearest coastline such that this principle is not relevant.
Oil & Gas 5	
Consenting and licensing authorities should have regard to the potential risks, both now and under future climates, to oil and gas operations in Scottish waters, and be satisfied that installations are appropriately sited and designed to take account of current and future conditions.	The infrastructure will be decommissioned in a way that there will not be a significant impact on the physical, biological, or socio-economic environment. The DP will be developed in consultation with the relevant statutory authorities and will ensure that potential effects on the environment resulting from the decommissioning of the decommissioning activities are considered and minimised.
Oil & Gas 6	
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 (NCP) and the Offshore Safety Directive.	The proposed decommissioning Project has been subject to this EA process and potential environmental impacts have been assessed and appropriate mitigation measures developed. The response strategy to an emergency will be developed with due reference to the NCP.