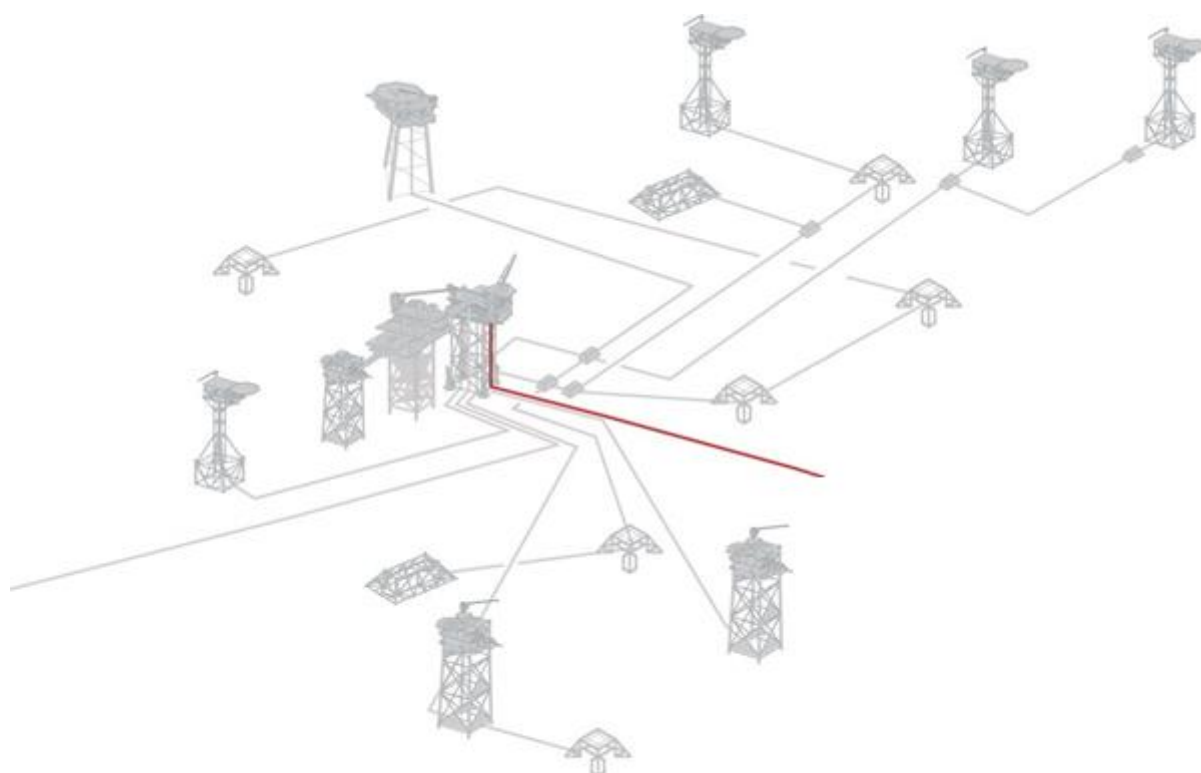




CHRYSAOR



Decommissioning Programme for Caister CM pipelines, CDP1b

Caister CM pipelines

FINAL
30 June 2022

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Abbreviation	Explanation
~	Approximately
approaches	Refer to pipelines as they come nearer to the risers and installations
CA	Comparative Assessment (Report)
Caister	Caister CM (installation)
Chrysaor	Chrysaor Production (U.K.) Limited
CMS	Caister Murdoch System
CO ₂	Carbon Dioxide
CTE	Coal Tar Epoxy
Cut and lift	The 'cut and lift' method of removing trenched and buried pipelines would involve excavating the pipelines from within the seabed and thereafter cutting the pipeline into recoverable and transportable lengths.
CWC	Concrete Weight Coated
DNO	DNO North Sea (ROGB) Limited
DP	Decommissioning Programme
EA	Environmental Appraisal
EMS	Environmental Management System
EPS	European Protected Species
ESDV	Emergency Shutdown Valve
EU	European Union
EUNIS	European Nature information System
Exposed	Visible without protection and recognisable
Exposure	An exposure occurs when the 'crown' of a pipeline or umbilical can be seen
FBE	Fusion Bonded Epoxy
FishSAFE	The FishSAFE database contains a host of oil & gas structures, pipelines, and potential fishing hazards. This includes information and changes as the data are reported for pipelines and cables, suspended wellheads pipeline spans, surface & subsurface structures, safety zones & pipeline gates (www.fishsafe.eu)
FOCI	Feature of Conservation Importance
FPAL	First Point Assessment Limited (UK)
Freespan	Sometimes referred to as a 'span'. Similar to an exposure except that the whole of the section of pipeline is visible above the seabed rather than just part of it. Once the height and length dimensions meet or exceed certain criteria it becomes a potential snagging hazard, and the span becomes reportable to FishSAFE and is called a 'reportable span'
Full removal	The full removal options for decommissioning the pipelines would involve using the 'cut and lift' method of removal especially for the larger pipeline and the presence of concrete weight coating and piggyback clamps on the platform approaches
GJ	Giga Joules (unit of energy in the International System of Units)
GMG	Global Marine Group
HLV	Heavy Lift (Crane) Vessel
HSE	Health & Safety Executive
in	Inch (1in = 25.4mm)
Ineos	INEOS UK SNS Limited
Ithaca	Ithaca Energy (UK) Limited
Kelvin PMA	Kelvin Pigging Manifold Assembly
Kelvin STA	Kelvin Subsea Tee Assembly
kg	kilogram
km	kilometre
KP	Kilometre Point, usually measured from point of origin, the start of the pipeline. When expressed as a negative number it means the distance back along the pipespools from the pipeline flange
Leave <i>in situ</i>	Leave <i>in situ</i> for pipelines would involve leaving trenched and buried pipelines <i>in situ</i> and risk assessing any exposures and spans
LOD	Limit of Detection
m, µm	metres, micrometre (1m = 1,000,000µm)

Abbreviation	Explanation
MCV	Multipurpose Construction Vessel
MeOH	Methanol
mg/l	milligrams per litre
mm	Millimetre (1m = 1000mm)
MoD	Ministry of Defence
Murdoch Installation	The Murdoch Installation comprises Murdoch MA, Murdoch MC, and Murdoch MD. All installations are bridge linked.
n/a	Not Applicable
N,S,E,W	North, South-East & West
Neptune	Neptune E&P UKCS Limited
NFFO	National Federation of Fishermen's Organisations
NIFPO	Northern Ireland Fish Producers Organisation
NORM	Naturally Occurring Radioactive Material
OGA	Oil and Gas Authority
OGUK	Oil and Gas United Kingdom
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
Partial removal	The partial removal decommissioning option for pipelines would involve excavating trenched and buried pipelines local to the exposed ends of the pipeline and thereafter effecting removal of the section of pipeline using the 'cut and lift' method. Typically, the excavated locations and cut pipeline ends in the seabed may need to be remediated in some way, either by back-filling the excavated material or by depositing rock
Perenco	Perenco UK Limited
Piggybacked	Pipeline clamped or connected to another pipeline along its length
Pipeline crossing	A pipeline with a higher identification number will usually cross over the top of a pipeline with a lower identification number. Typically, pipeline crossings might be protected with concrete mattresses and overlain with deposited rock
PL	Pipeline identification numbers
Platform	Installation, typically comprising topsides and jacket
p.l.c.	Public Limited Company
Premier Oil	Premier Oil E&P UK Limited
PWA	Pipeline Works Authorisation
Riser	Pipe that connects the pipeline to the topsides' pipework
SAC	Special Area of Conservation
SACFOR	The semi-quantitative SACFOR abundance scale (super-abundant, abundant, common, frequent, occasional, rare) was developed to support the observation of marine habitats, communities and species and is widely used in the UK
SEI	Significant Environmental Impact
SFF	Scottish Fishermen's Federation
SNS	Southern North Sea
SOPEP	Shipboard Oil Pollution Emergency Plans
SPA	Special Protection Area
Span	Sometimes referred to as a 'freelspan'. Similar to an exposure except that the whole of the section of pipeline is visible above the seabed rather than just part of it. Once the height and length dimensions meet or exceed certain criteria it becomes a potential snagging hazard, and the span becomes reportable to FishSAFE and is called a 'reportable span'
SSCV	Semi-Submersible Crane Vessel
Tampnet AS	Owners of the 36km long MCCA fibre-optic cable between two platforms in the Southern North Sea, and the NorSea Com 1 fibre-optic cable, connecting Draupner, Ula, Ekofisk, Valhal and Murdoch platforms to Lowestoft in Suffolk, UK and Kårstø, Rogaland, Norway. https://www.tampnet.com/about
Te	Tonne(s)
Tee	Section of pipeline furnished with additional valves and pipework to allow for future expansion. It is also provided with a protection structure with its own protection and stabilisation features such as mattresses and deposited rock
TGT	Theddlethorpe Gas Terminal (WGS84 Degrees: 53.362438° N .237783° E)

Abbreviation	Explanation
THC	Total Hydrocarbon Content
UK	United Kingdom
UK BAP	UK Biodiversity Action Plan
UKCS	United Kingdom Continental Shelf
UKOOA	United Kingdom Offshore Operators Association
Uraduct	Uraduct is a protective system designed and developed to protect fibre optic cables, power cables, umbilicals, flexible flowlines, rigid flowlines, hoses and bundled products from abrasion and impact. It is wrapped around the item requiring protection
WGS84	World Geodetic System 84 is the reference coordinate system used by the Global Positioning System
Wintershall	Wintershall Noordzee B.V.
X	Number of (e.g. 16x = 16 in Number)

1 Executive summary

1.1 Decommissioning Programme

This document contains one Decommissioning Programme, for the notice under Section 29 of the Petroleum Act 1998. The Decommissioning Programme concerns the following assets:

- The pipelines associated with the Caister CM installation, PL935 and PL936.

The Decommissioning programme for the Caister CM installation was submitted separately and approved in March 2020 [1].

Although decommissioning of these pipelines is being treated in this document as a standalone project, the operational phase may be carried out as part of a wider decommissioning campaign in the CMS area. Chrysaor Production (U.K.) Limited (Chrysaor) shall also continue to explore cost saving synergies with other projects.

1.2 Requirement for Decommissioning Programme

Pipelines: In accordance with the Petroleum Act 1998, Chrysaor, as operator of the Caister CM pipelines, and on behalf of the Section 29 notice holders listed in Table 1.4.2 is applying to OPRED to obtain approval for decommissioning the pipelines detailed in Section 2 of this document. Following Statutory Consultation, the partner letters of support are included in Appendix 3.

In conjunction with public, stakeholder and regulatory consultation, this Decommissioning Programme is submitted in compliance with national and international regulations and OPRED decommissioning guidance notes [12]. The schedule outlined in this document is for a decommissioning project with the offshore works potentially commencing in 2022 and continuing until completion in 2027 depending on synergies with other decommissioning activities in the area.

1.3 Introduction

1.3.1 Overview of Caister

The Caister Bunter Field and Caister Carboniferous Field are in the UK Southern North Sea in block 44/23a, licence P.452.

The block was first licenced to BP as Licence P.003. The 44/23-1 discovery well was drilled in 1967. For a variety of reasons, the block was relinquished in 1971.

In 1983, licence P.452 was granted to a Texas Gas Exploration (UK) led consortium and the 44/23-3 Bunter appraisal well was drilled. In 1985, the 44/23-4 exploration well encountered gas in the Carboniferous Westphalian A and B sandstones and shales. This was followed by the 44/23-5, 44/23-6 and 44/23-7 exploration and appraisal wells, drilled in 1985 and 1986, which penetrated the Caister Sandstone Formation.

In 1988, operatorship was assigned to Total Oil Marine p.l.c. who operated it until 2000. During this period, the 44/23 block was partially relinquished and the 44/23a sub-block was created. Annex B approval for the Caister Field development was awarded in April 1992. First production was in 1993 and the last development well was drilled in 2000.

Caister CM ceased production 28 November 2015 and its associated pipelines were cleaned and flushed shortly after the cessation of production. The wells were decommissioned in 2017, and the platform was then put into cold suspension. In 2019, the operatorship and associated remaining decommissioning operations was taken over by Chrysaor Production (U.K.) Limited.

The Caister CM platform was installed in 1993 and a 16" diameter gas pipeline and 3" diameter methanol pipeline were laid to the Murdoch complex. The Decommissioning Programmes for the Caister CM platform and riser sections attached to the Caister platform were approved March 2020 [1]. The remaining pipeline lengths spanning from the base of the Caister jacket to Murdoch - including the two risers at Murdoch MD, are addressed in this Decommissioning Programme. As the risers are an integral part of the jacket they will be removed at the same time as the Murdoch MD jacket.

The Decommissioning Programmes for the Caister CM installation, Murdoch installations and pipelines, and the Caister-Murdoch System installations and infrastructure are addressed in Decommissioning Programmes submitted separately [1], [2] and [3]. The Caister CM platform and associated risers was removed in 2020.

Caister is tied back to Murdoch as shown in Figure 1.3.1.

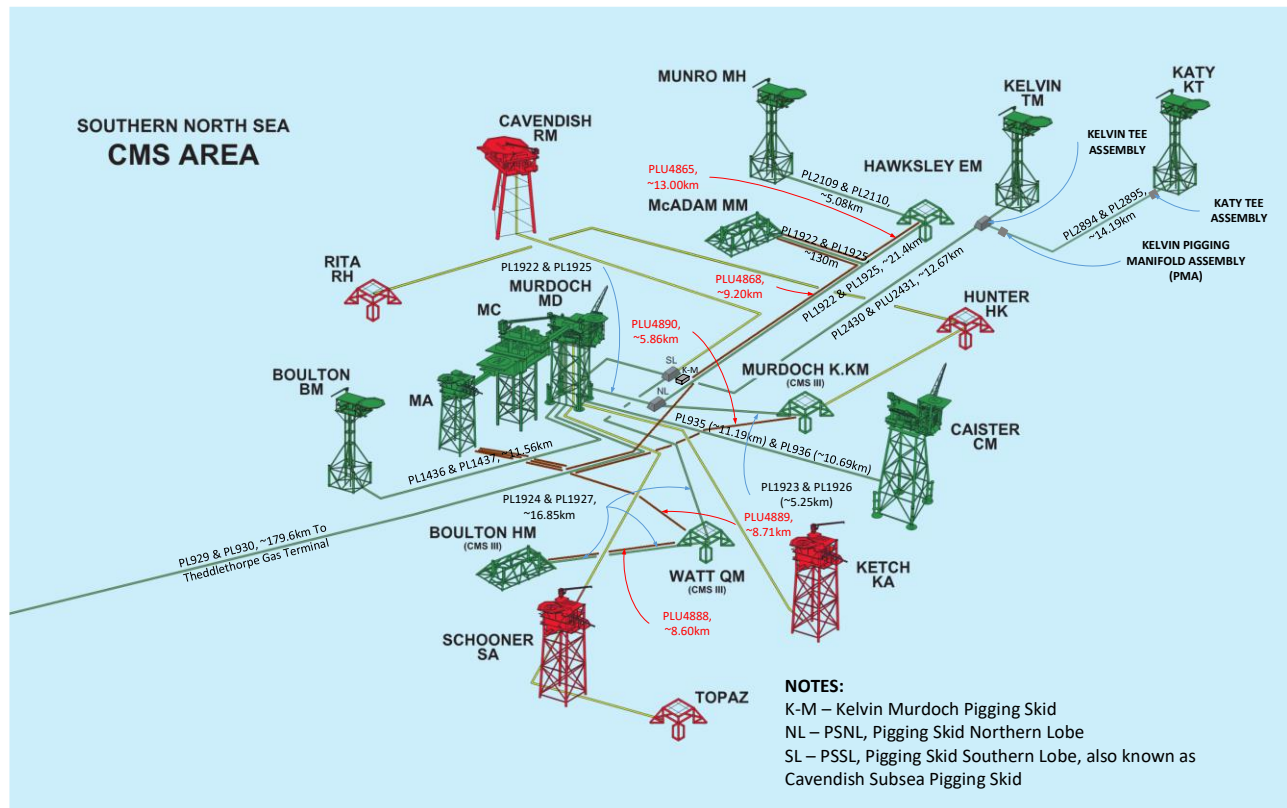


Figure 1.3.1: Murdoch and CMS area installations, pipelines and umbilicals

The CoP application for Caister was accepted by OGA on 04 May 2016. Production and export from Murdoch MD ceased in 2018.

Chrysaor is aware that pipeline PL935 has been flagged as having potential for reuse/repurposing for CCUS projects or otherwise and will undertake discussions with the NSTA. No decommissioning activity will take place on PL935 that would preclude potential reuse/repurposing for CCUS projects or otherwise until reuse/repurposing opportunities have been exhausted. Chrysaor will advise OPRED as soon as reuse/repurposing opportunities are determined to have been exhausted. Once repurposing options for PL935 are exhausted, the recommended option for decommissioning the pipeline will be triggered and this will involve removal of surface laid sections of the pipeline and remediation of the pipeline ends as described in section 3.2.2 and as per the schedule presented in Figure 6.3.1. The Decommissioning Programme progress reports will detail the timeframes associated with the reuse/repurposing considerations and any decisions made on reuse/repurposing.

1.3.2 Submission of Decommissioning Programmes

Following public, stakeholder and regulatory consultation, the Decommissioning Programme will be submitted without derogation and in full compliance with the OPRED decommissioning guidance notes [12]. The Decommissioning Programme explains the principles of the removal activities and is supported by an Environmental Appraisal [4] and Comparative Assessment [5].

1.4 Decommissioning overview

1.4.1 Installations

Decommissioning of the Caister CM installation is addressed separately [1] and is not within the scope of this Decommissioning Programme.

1.4.2 Pipelines

Table 1.4.1: Pipelines being decommissioned

Field	Number of pipelines	
Caister	2	Refer Table 2.2.1

Table 1.4.2: Pipeline Section 29 Notice Holder details – Caister

Section 29 Notice Holders	Registration number	Equity interest
Chrysaor Production (U.K.) Limited	00524868	9.00%
Chrysaor (U.K.) Beta Limited	02316577	30.00%
Premier Oil E&P UK Limited	02761032	40.00%
Neptune E&P UKCS Limited	03386464	21.00%

1.5 Summary of proposed Decommissioning Programmes

Table 1.5.1: Summary of Decommissioning Programmes	
Proposed decommissioning solution	Reason for selection
1. Topsides (Caister CM)	
Refer separate Decommissioning Programme [1].	n/a
2. Jackets (Caister CM)	
Refer separate Decommissioning Programme [1].	n/a
3. Pipelines (Caister)	
PL935 (~11.2km long) & PL936 (~10.7km long) have been flushed and the main pipelines except for the ends will be left buried <i>in situ</i>. PL935 & PL936 at Caister CM remove surface laid piggybacked pipes ~46m long up to point of burial in rock and leave concrete mattresses buried under rock (10x) <i>in situ</i>. PL935 & PL936 at Murdoch MD remove the surface laid piggybacked pipe ~100m long up to point of burial in rock and remove overlying mattresses (19x) to shore. Cut pipeline end(s) will each be dealt with by the deposition of a small quantity of rock (nominally up to ~25Te) with the amount used being kept to a practical minimum. The deposition of rock will be covered by a deposit consent. At the two points of separation at each end of the pipelines (Figure 2.2.1 & Figure 2.2.3) unless more than 50% of the perimeter edge of one mattress is exposed, the mattresses and underlying surface laid flexible pipespool(s) ~40m long will be left <i>in situ</i>, otherwise completely remove to shore. At the separation points, should the point of burial of the cut pipeline end be in the seabed, it will be excavated locally with small quantities of rock potentially used to ensure that the remaining pipeline end is buried; It is intended that all mattresses on the approaches at both ends be fully recovered to shore for re-use, recycling or disposal as appropriate. However, in the event of practical difficulties OPRED will be consulted. The quantity of rock deposited over the pipelines is nominally up to 25Te per location. Any permit applications required for work associated with cutting and removal will be submitted.	Outside the 500m safety zones the pipelines will already have been exposed to fishing activity and the situation would be no different to what it is now. The comparative assessment recommends that the pipelines be left <i>in situ</i> while the surface laid ends and overlying mattresses will be fully recovered. The survey data for PL935 has exhibited a good depth of burial and excellent depth of cover throughout its length except for the final approaches which are to be recovered. Regrettably, no recent survey data were available for PL936 but given the bathymetry of the seabed it is assumed that PL936 would exhibit the same burial characteristics as PL935, but this will need to be confirmed by survey. PL936 will be surveyed in 2022. Note that while PL935 was originally trenched to a minimum 0.5m to top of pipe below seabed, PL936 was trenched to a minimum 1.0m to top of pipe below seabed throughout its length. Minimal seabed disturbance, lower energy usage, reduced risk to personnel engaged in the activity. Minimises the requirement for the introduction of new material such as deposited rock to the Dogger Bank Special Area of Conservation (SAC). Monitoring to confirm the burial status of the pipelines will be completed to a schedule agreed with OPRED.
4. Risers	
The risers at Caister CM are dealt with separately. Refer separate Decommissioning Programme for the Caister installation [1]. The risers at Murdoch MD will be removed along with the Murdoch MD jacket. Refer Decommissioning Programmes for CDP3 [3].	Removal of the jackets meets regulatory requirements.
5. Well Decommissioning (Caister CM)	
Refer separate Decommissioning Programme [1].	n/a
6. Drill Cuttings (Caister CM)	
Refer separate Decommissioning Programme [1].	
7. Interdependencies	
No third-party pipeline crossings will be disturbed as a result of the decommissioning proposals. Any concrete mattresses and exposed grout bags that are removed to gain access to infrastructure will be fully recovered to shore for re-use, recycling, or disposal as appropriate. Grout bags that are not exposed and not disturbed will remain <i>in situ</i>. Deposited rock will remain <i>in situ</i>.	

1.6 Field location incl. field layout and adjacent facilities

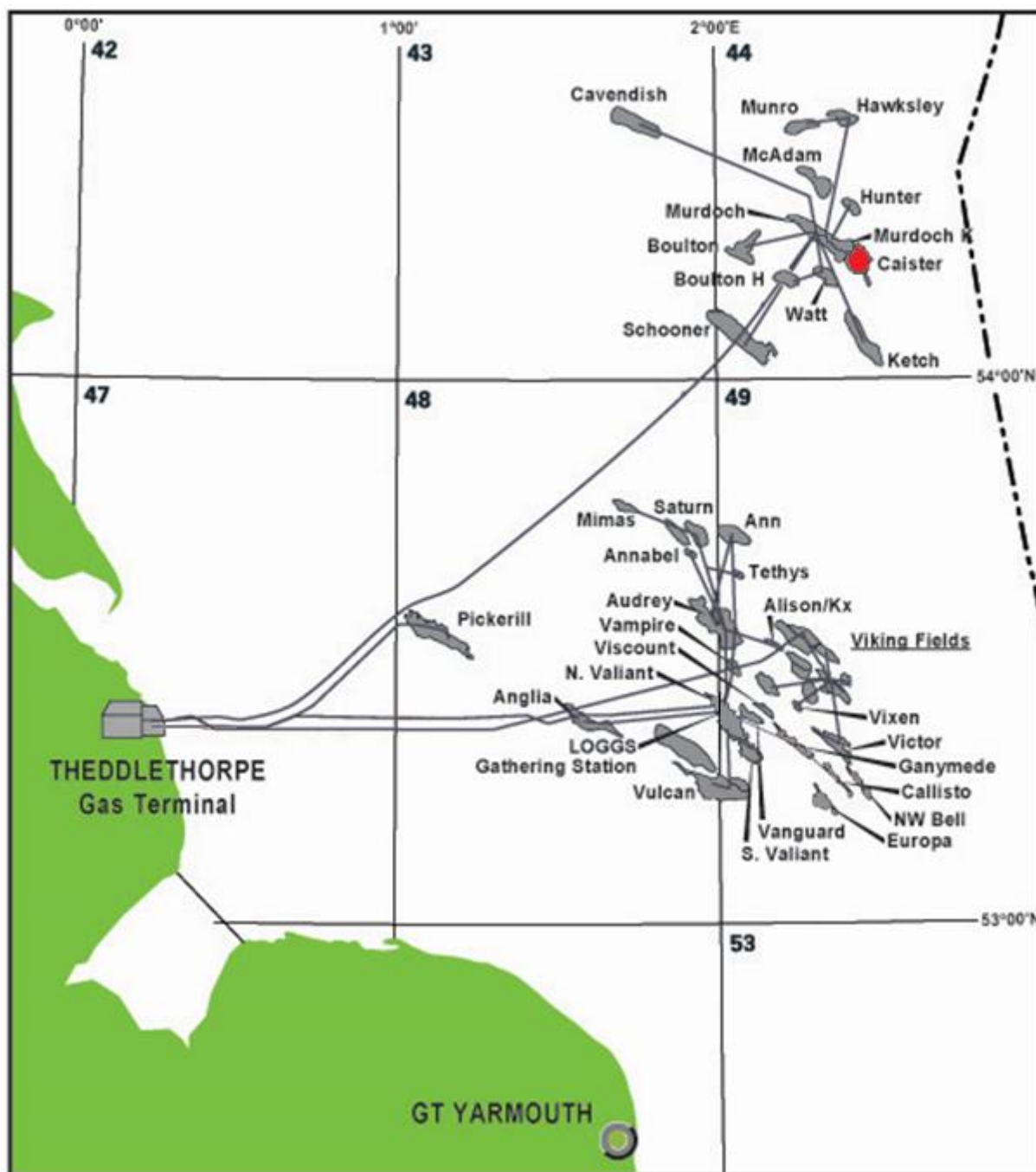


Figure 1.6.1: Caister location in UKCS (indicated in red)

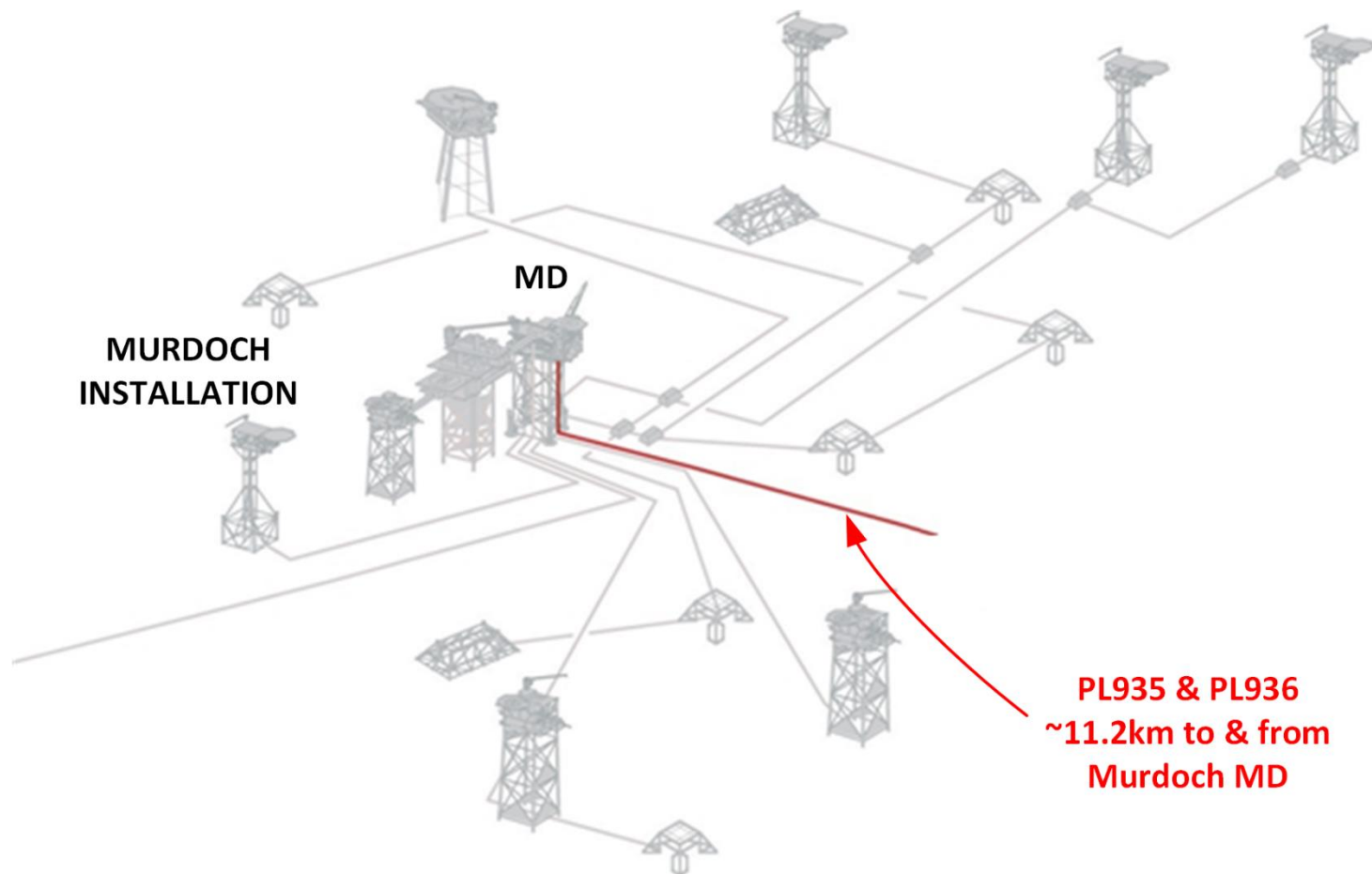


Figure 1.6.2: Caister pipeline layout

Table 1.6.1: List of adjacent facilities

Owner	Name	Type	Caister CM	Information	Status
Chrysaor	Murdoch MA	Accommodation Platform	NWW, 18.4km	Refer DP for CDP3 [3]	Out of use
Chrysaor	Murdoch MC	Compression Platform	NWW, 18.4km	Refer DP for CDP3 [3]	Out of use
Chrysaor	Murdoch MD	Drilling Platform	NWW, 18.3km	Refer DP for CDP3 [3]	Out of use
Chrysaor	Murdoch K.KM	Subsea Template (1-Slot)	NWW, 22.6km	Refer DP for CDP2 [2]	Out of use
Chrysaor	Boulton BM	Wellhead Platform	W, 23.2km	Refer DP for CDP2 [2]	Out of use
Chrysaor	McAdam MM	Subsea Template (2-Slot)	NNW, 10.6km	Refer DP for CDP2 [2]	Out of use
Chrysaor	Munro MH	Wellhead Platform	NNW, 0km	Refer DP for CDP2 [2]	Out of use
Chrysaor	Hawksley EM	WHPS (1-Slot)	NNW, 5km	Refer DP for CDP2 [2]	Out of use
Chrysaor	Kelvin TM	Wellhead Platform	N, 16.2km	Refer DP for CDP2 [2]	Out of use
Chrysaor	Katy KT	Wellhead Platform	NNE, 23.6km	Refer DP for CDP2 [2]	Out of use
Chrysaor	Watt QM	WHPS (1-Slot)	WSW, 26.8km	Refer DP for CDP2 [2]	Out of use
Chrysaor	Boulton HM	WHPS (1-Slot)	WSW, 27.9km	Refer DP for CDP2 [2]	Out of use
Premier Oil	Hunter HK	WHPS	NNW, 16.2km	Export via Murdoch K.KM. Refer [13]. DP approved in April 2021	Out of use
Chrysaor	Kelvin STA	Pipeline Tee Piece	N, 16.3km	Refer DP for CDP2 [2]	Out of use
Chrysaor	Kelvin PMA	Pigging Manifold Assembly	N, 16.3km	Refer DP for CDP2 [2]	Out of use
Wintershall	Wingate	Satellite Platform	NNE, 24.5km		Operational
Chrysaor	Katy Tee	Pipeline Tee Piece	NNE, 23.6km	Refer DP for CDP2 [2]	Out of use
Perenco	Tyne	Wellhead Platform	N, 11.8km	DP approved Jan 2019	Out of use
Neptune	Minke	Wellhead Platform	NEE, 35.1km	DP approved Sept 2019	Out of use
Premier	Rita	WHPS	NWW, 18.5km	Refer [13]. DP approved April 2021	Out of use
Various	Various	Pipeline crossings	Within Murdoch 500m zone	Refer Table 2.2.2	All pipelines are out of use
Tampnet	Tampnet fibre-optic cables	Cable crossings	Within Murdoch 500m zone	Refer Table 2.2.2 for PL935 & PL936 crossing information and Figure 2.2.2 for general routing of Tampnet cables.	Operational

Impact of Decommissioning Proposals

No impact is expected, although there are pipeline crossings near the Murdoch complex that will need to be dealt with in a coordinated effort. Please also refer Decommissioning Programmes for CDP2 [2].



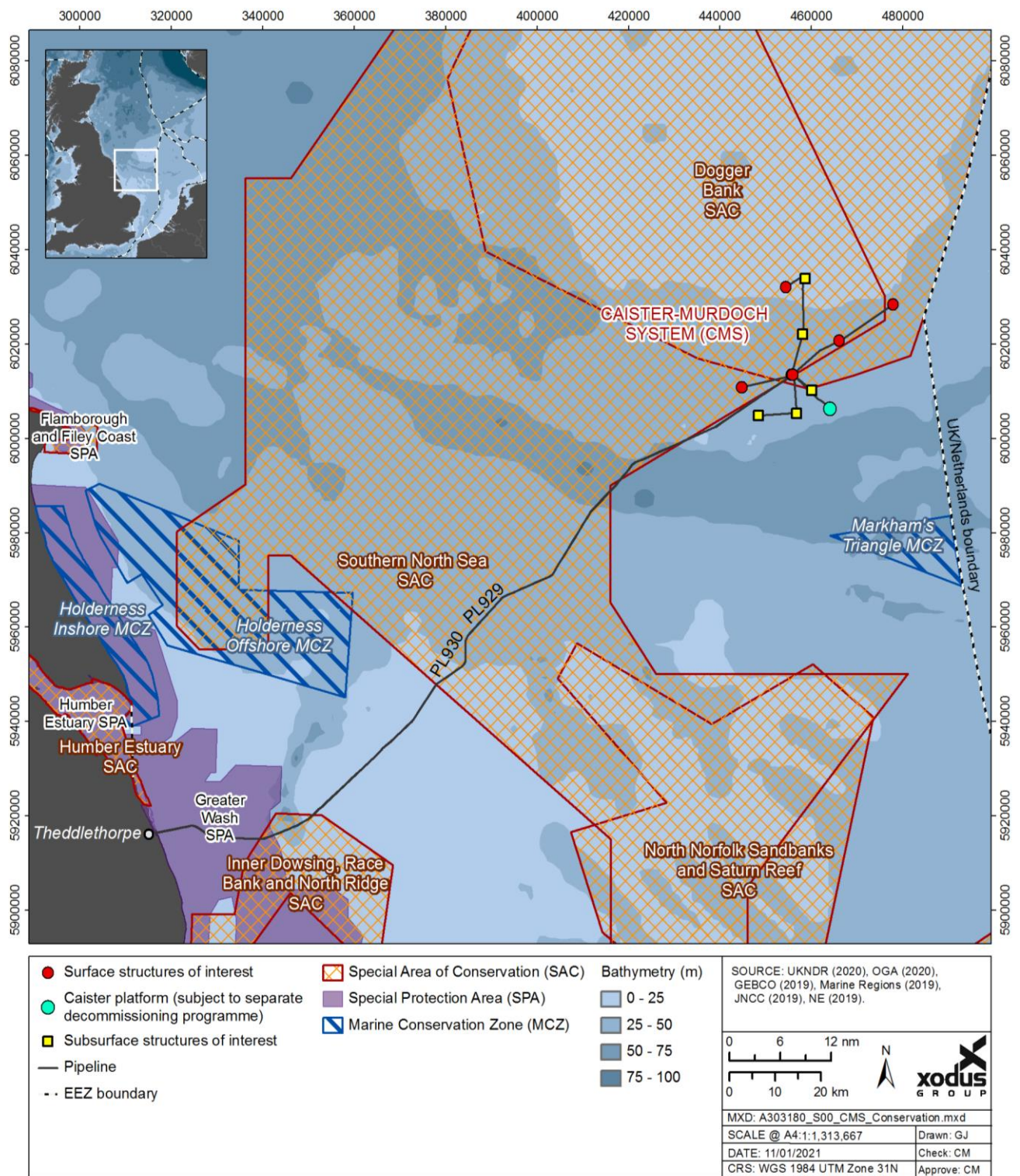


Figure 1.6.4: Location and environmentally sensitive areas

1.7 Industrial implications

It is Chrysaor's intention to develop a contract strategy and Supply Chain Action Plan that will result in an efficient and cost-effective execution of the decommissioning works. Principles of the contracting and procurement strategies to be used by Chrysaor as operator and on behalf of the other Section 29 notice holders, for the decommissioning of the Caister pipelines are listed below:

- 1) Chrysaor participates in the PILOT Share Fair events providing one-to-one sessions with the UK supply chain on the SNS decommissioning programmes and timeline.
- 2) The First Point Assessment (FPAL) database is the primary source for establishing tender lists for contracts or purchases valued at US\$ 100,000 and above, although it is also used under this limit.
- 3) Chrysaor is committed to competitively bidding all its major contracts where possible and practicable. We are supporters of the UK Supply Chain Code of Practice and our performance in this regard has been acknowledged through Excellence Awards from Oil & Gas UK.
- 4) Chrysaor are active participants in various industry initiatives including:
 - a. Oil & Gas UK Supply Chain Forum;
 - b. Inventory sharing initiative (Ampelius);
 - c. OGA Decommissioning & Supply Chain Task Forces.

2 Description of items to be decommissioned

2.1 Surface facilities (topsides and jackets)

n/a

2.2 Pipelines including stabilisation features

Table 2.2.1: Pipeline / flowline / umbilical information

Description	Pipeline No (as per PWA)	Diameter (inches)	Length (km)	Description of component parts	Product conveyed	From – to end points	Burial status ¹	Pipeline status	Current content
16in gas export pipeline	PL935	16in	11.188	CTE coated steel pipeline coated with CWC for most of its length	Natural gas, condensate, water	Cut point B at Caister CM to ESDV at Murdoch MD topsides	Trenched and buried. As-built trench depth to $\geq 0.5\text{m}$ to top of pipe.	Out of use	Seawater
3in methanol import pipeline	PL936	3in	10.692	FBE resin coated steel pipeline with 4x polyethylene flexible tie-in spools ³	Methanol and corrosion inhibitor	ESDV at Murdoch MD topsides to Flexible Spool End Fitting at Caister	Trenched and buried. As-built trench depth $\geq 1.0\text{m}$ to top of pipe.	Out of use	Potable water

NOTES:

1. For further information refer to the Comparative Assessment [5];
2. For pipeline crossing information refer Table 2.2.2;
3. PL936 is piggybacked on PL935 for the first ~500m from Murdoch MD and for ~500m on approach to the Caister installation; The length of PL936 includes four flexible spool pieces at the ends of the pipeline, ~65m long at Murdoch MD, 2x ~40m long where PL935 and PL936 separate near the Caister and Murdoch 500m zone limits, and ~85m long at Caister. The as-built lengths and number of flexible flowlines may differ from the PWA details.

Table 2.2.2: Pipeline crossing information

INSIDE MURDOCH 500M ZONE	KP	Protection
Tampnet fibre-optic cable crosses over PL935 & PL936.	KP0.258	Details unknown, but the Tampnet cable could be protected using Uraduct 15m long but it is buried to 400mm below seabed including where it crosses over PL935 & PL936.
PLU4890 Murdoch MA to Murdoch K.KM umbilical.	KP0.050	2x 6m x 3m x 0.3m concrete mattresses laid side by side; crossing protection shared with PLU4686.
PL1924 & PL1927 Boulton HM 10in & 3in pipelines.	KP0.037	8x fronded mattresses 6.6m x 3m x 0.3m.
PLU4686 Murdoch MA to McAdam MM umbilical.	KP0.010	2x 6m x 3m x 0.3m concrete mattresses laid end on end; crossing protection shared with PLU4890.
PL1612 & PL1613 Ketch 18in & 3in pipelines.	KP -0.021	21x 6m x 3m x 0.3m concrete mattresses and several hundred grout bags forming a protective bridge over PL935; refer Ketch decommissioning programmes [7] which state that these will all be fully recovered to shore.
PL1222 & PL1223 Schooner 16in & 3in pipelines.	KP -0.032	13x 6m x 3m x 0.3m concrete mattresses and several hundred grout bags; refer Schooner decommissioning programmes [8] which state that these will all be fully recovered to shore.
NOTES: 1. All of these pipeline crossings are out of scope but have been included for reference given the complexity of the infrastructure inside the Murdoch 500m zone; 2. Origin of KP taken for PL935 (& PL936) at the base of the riser at Murdoch MD; 3. All pipeline crossings bar the Tampnet fibre-optic cable crossing are close to the Murdoch platform; 4. A higher PL number will cross over the top of a pipeline with a lower PL number. For example, PL1612 & PL1613 would be crossing over PL935.		



Caister CM Pipelines

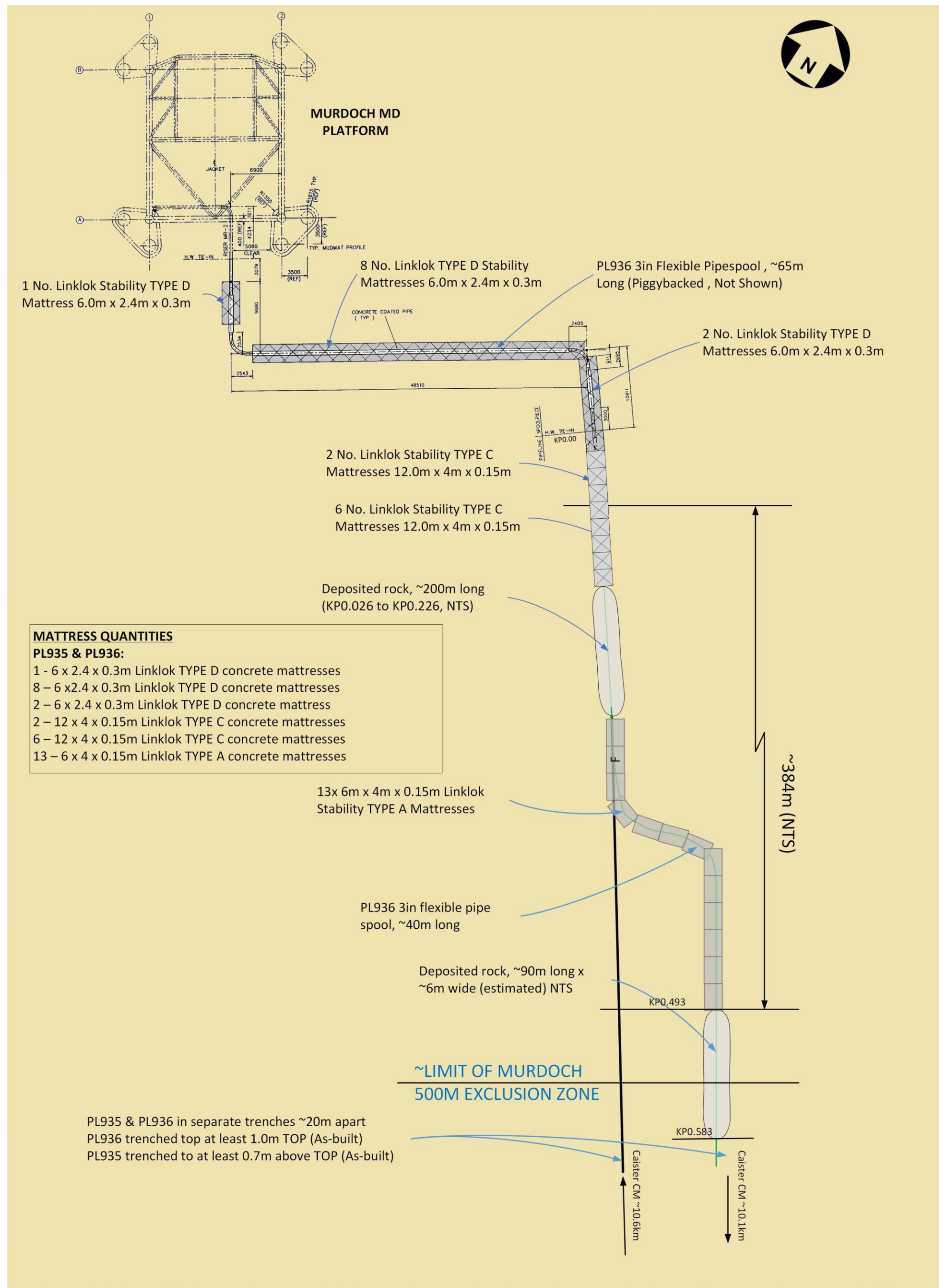


Figure 2.2.3: PL935 & PL936 approaching Murdoch MD installation

Table 2.2.3: Subsea pipeline stabilisation features

Stabilisation feature	Total number	Total mass (Te)	Location(s)	Exposed / buried / condition
CAISTER CM 500M ZONE				
Concrete mattresses	2	9.2	Caister 500m Zone and Approach (PL935 & PL936), 6m x 4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.1.	Survey data not specific. Expected to be at least partly if not fully buried. Current status unknown.
	2	11.1	Caister 500m Zone and Approach (PL935 & PL936), 6m x 2.4m x 0.3m Linklok concrete mattresses. Refer Figure 2.2.1.	2021 survey data indicates that the mattresses are buried under deposited rock.
	8	73.7	Caister 500m Zone and Approach (PL935 & PL936), 12m x 4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.1.	2021 survey data indicates that the mattresses are buried under deposited rock.
	13	59.9	Caister 500m zone and approach (PL936), 6m x 4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.1.	Survey data not specific. Expected to be at least partly if not fully buried. Current status unknown.
Deposited rock	45m	557	Between KP10.440 and KP10.485, over PL936 ~ Caister CM 500m zone limit. Refer Figure 2.2.1.	Likely exposed with dusting of sediment.
	235m	3,736	Between KP10.965 and KP11.200, over PL935 & PL936 on approach to Caister CM. Refer Figure 2.2.1.	Likely exposed with dusting of sediment.
MURDOCH 500M ZONE				
Concrete mattresses	11	60.8	Murdoch 500m zone and approach (PL935 & PL936), 6m x 2.4m x 0.3m Linklok concrete mattresses. Refer Figure 2.2.3.	Survey data not specific. Expected to be at least partly if not fully buried. Current status unknown.
	8	73.7	Murdoch 500m zone and approach (PL935 & PL936), 12m x 4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.3.	Survey data not specific. Expected to be at least partly if not fully buried. Current status unknown.
	13	59.9	Murdoch 500m zone and approach (PL935 & PL936), 6m x 4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.3.	Survey data not specific. Expected to be at least partly if not fully buried. Current status unknown.
Deposited rock	200m	1,885	Between KP0.026 and KP0.226 over PL935 & PL936 inside Murdoch 500m. Refer Figure 2.2.3.	Likely exposed with dusting of sediment.
	90m	669	Between KP0.493 and KP0.583 over PL936 ~ Murdoch 500m limit. Refer Figure 2.2.3.	Likely exposed with dusting of sediment.

NOTES:

1. No mention of grout bags on drawings or survey reports;
2. Mass of deposited rock is based on 'as-built' records;
3. Total numbers of mattresses as follows:
 - 13x - 6m x 2.4m x 0.3m;
 - 28x 6m x 4m x 0.15m;
 - 16x 12m x 4m x 0.15m.

2.3 Wells

Decommissioning of the Caister wells is addressed separately [1] and so shall not be repeated here.

2.4 Inventory estimates

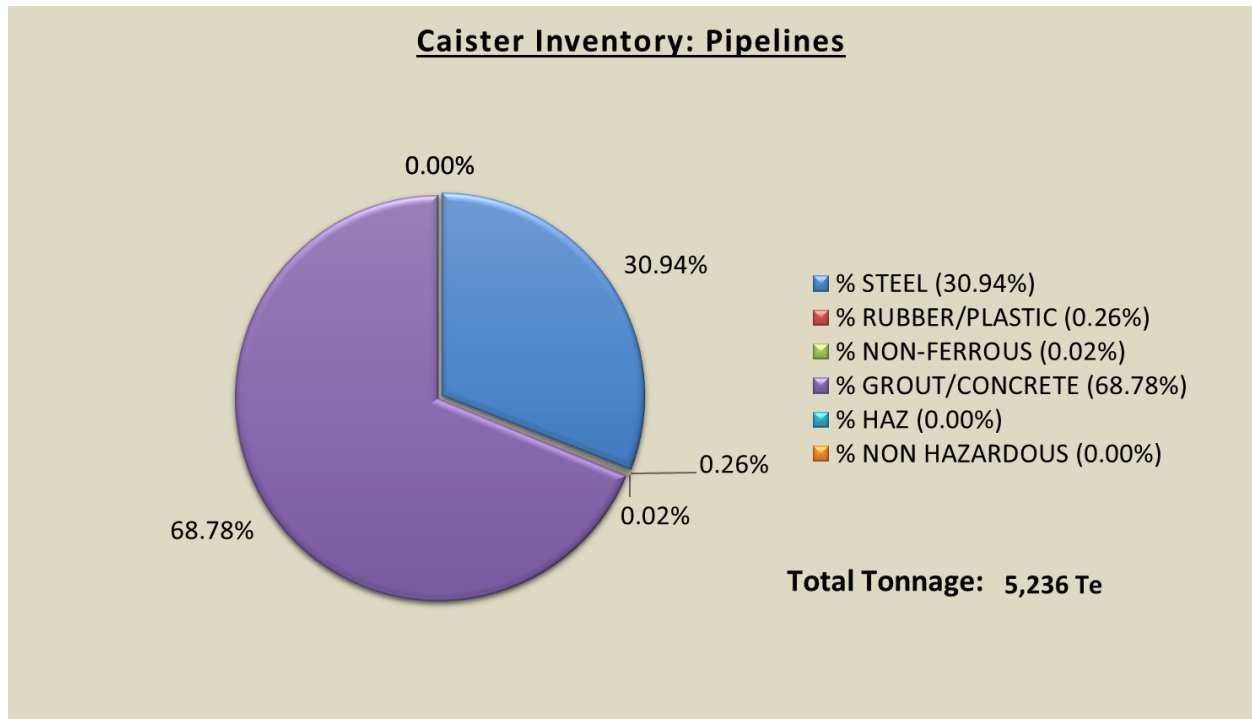


Figure 2.4.1: Pie-chart of estimated pipeline inventory, excl. deposited rock

3 Removal and disposal methods

Waste will be dealt with in accordance with the Waste Framework Directive [9]. The reuse of an installation or pipelines (or parts thereof) is first in the order of preferred decommissioning options. However, given the age of the installations and infrastructure it is unlikely that reuse opportunities will be realised. Waste generated during decommissioning will be segregated by type and periodically transported to shore in an auditable manner through licensed waste contractors. Transfrontier shipment of waste will not be required. Steel and other recyclable metal are estimated to account for the greatest proportion of the materials inventory. Refer to section 5.4 of the Environmental Appraisal [4] for further details concerning disposal of waste.

3.1 Topsides & jacket decommissioning

n/a

3.2 Pipelines and stabilisation features

3.2.1 Decommissioning options

For the purposes of the comparative assessment there is an implicit assumption that options for re-use of the pipelines have been exhausted prior to the facilities and infrastructure moving into the decommissioning phase and associated comparative assessment [5]. Therefore, this option has been excluded. The decommissioning options considered for the pipelines in Table 3.2.1 are:

- 1) **Complete removal** – This would involve the complete removal of the pipelines by whatever means most practicable and acceptable from a technical perspective;
- 2) **Leave in situ** – This would involve leaving the pipeline(s) *in situ* with no remedial works but possibly verifying their status via future surveys.

The pipelines ends, that is, the mattresses and the underlying pipelines on the approaches were also subject to a comparative assessment. All pipelines or pipespools and overlying protection and stabilisation features on approach to the various installations associated with the scope in this Decommissioning Programme will be completely removed up to the point of burial in deposited rock as described in Table 3.2.2.

Table 3.2.1: Pipeline or pipeline groups / decommissioning options

Pipelines Group 1	Condition of line / group (surface laid/trenched/buried/spanning)	Whole or part of pipeline/group	Decommissioning options considered
PL935	Trenched and buried in the seabed throughout the length of the pipeline with no exposures or spans.	Whole 16in pipeline, except for short-exposed lengths of welded pipespools on approach to Caister CM and Murdoch MD. Refer Table 2.2.1.	1, 2
PL936	Trenched and buried in the seabed throughout the length of the pipeline with no exposures or spans, subject to confirmation by survey.	Whole 3in pipeline, except for short-exposed lengths of welded pipespools on approach to Caister CM and Murdoch MD. Refer Table 2.2.1.	1, 2

3.2.2 Outcomes of comparative assessment

A comparative assessment of the decommissioning options was carried out in accordance with the OPRED decommissioning guidance notes[12]. Each decommissioning option was qualitatively assessed against Safety, Environment, Technical and Societal and Cost. Refer [5] for details. Pipeline burial profiles can be found in section 3.0 of the Comparative Assessment report.

The chosen option is 'leave *in situ*'. The influence of existing infrastructure that had been removed could affect the mobility of the local seabed. Given the burial status of PL935 it was considered that leave *in situ* would be appropriate and, subject to survey the same approach would be appropriate for PL936. Use of historical pipeline survey data with future pipeline surveys would better inform the future strategy for monitoring the pipelines.

Table 3.2.2: Outcomes of comparative assessment

Pipeline or group	Recommended option	Justification
PL935	Leave <i>in situ</i>. Piggybacked by PL936 on approaches. All the associated mattresses and underlying pipeline up to point of burial in deposited rock will be removed. At Caister remove surface laid pipe that is piggybacked by PL936 ~46m long up to point of burial in rock and remove overlying concrete mattresses. At Murdoch MD remove the surface laid section of pipeline ~100m long up to point of burial in rock and remove overlying mattresses.	The pipeline is buried and stable throughout its length. (refer Table 2.2.1). This approach will result in minimal seabed disturbance, minimises the deposition of additional rock in a sensitive area, lower energy use, and reduced risk to personnel and lower cost; all these aspects contribute to the proposed recommendation. Please refer the Comparative Assessment [5] for burial profiles.
PL936	Leave <i>in situ</i>. Piggybacked onto PL935 on approaches. All the associated mattresses and underlying pipeline up to point of burial in deposited rock will be removed. At Murdoch MD remove the surface laid section of pipeline and pipespools ~100m long up to point of burial in rock and remove overlying mattresses. At the two points of separation at each end of the pipelines (Figure 2.2.1 & Figure 2.2.3) unless more than 50% of the perimeter edge of one mattress overlying the flexible pipespool is exposed the mattresses and underlying surface laid flexible pipespool(s) ~40m long <i>in situ</i>, otherwise completely remove to shore. At Caister remove surface laid section of flexible pipespool ~46m long up to point of burial in rock and remove overlying concrete mattresses.	According to the as-built alignment sheets PL936 was buried to a minimum 1.0m below seabed to of pipe, so the expectation is that this pipeline is also buried and stable, although this will need to be confirmed by survey. This approach will result in minimal seabed disturbance, minimises the deposition of additional rock in a sensitive area, lower energy use, and reduced risk to personnel and lower cost; all these aspects contribute to the proposed recommendation.

NOTES

1. Cut pipeline end(s) will each be dealt with by the deposition of a small quantity of rock (up to ~25Te) with the amount used being kept to a practical minimum;
2. At the separation points, should the point of burial of the cut pipeline end be in the seabed, it will be excavated locally with small quantities of rock potentially being used to ensure that the remaining pipeline end(s) are buried;
3. The remaining pipeline will be subject to inspection and monitoring to a schedule agreed with OPRED;
4. The deposition of rock will be covered by a deposit consent.

3.2.3 Pipeline protection & stabilisation features

Table 3.2.3: Pipeline protection & stabilisation features			
Protection or stabilisation features	Number (UNO)	Description	Disposal route (if applicable)
CAISTER CM 500M ZONE			
Concrete mattresses	2	Caister 500m zone and approach (PL935 & PL936), 6m x 4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.1.	Remove to shore for re-use, recycling, or disposal.
	2	Caister 500m zone and approach (PL935 & PL936), 6m x 2.4m x 0.3m Linklok concrete mattresses. Refer Figure 2.2.1..	Leave <i>in situ</i> buried under deposited rock
	8	Caister 500m zone and approach (PL935 & PL936), 12m x 4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.1.	
	13	Caister 500m zone where the pipelines diverge and approach (PL936), 6m x 4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.1.	Leave <i>in situ</i> unless exposed in which case remove all to shore for re-use, recycling, or disposal.
Deposited rock	557	Between KP10.440 and KP10.485, over PL936 on approach to Caister CM. Refer Figure 2.2.1.	Leave <i>in situ</i> .
	3,736	Between KP10.965 and KP11.200, over PL935 & PL936 on approach to Caister CM. Refer Figure 2.2.1.	
MURDOCH 500M ZONE			
Concrete mattresses	n/a	Tampnet fibre-optic cable crosses over PL935 & PL936 at KP0.258. Details unknown but the Tampnet cable could be protected using Uraduct ~15m long. It is buried to 400mm below seabed including where it crosses over PL935 & PL336.	n/a
Concrete mattresses	n/a	PLU4890 Murdoch MA to Murdoch K.KM umbilical at KP050. 2x 6m x 3m x 0.3m concrete mattresses laid side by side; crossing protection shared with PLU4686.	Refer CDP2 Decommissioning Programmes [2]. Remove to shore for re-use, recycling, or disposal.
Concrete fronded mattresses	n/a	PL1924 & PL1927 Boulton HM 10in & 3in pipelines at KP0.037. 8x fronded mattresses 6.6m x 3m x 0.3m.	
Concrete mattresses	n/a	PLU4686 Murdoch MA to McAdam MM umbilical at KP0.010. 2x 6m x 3m x 0.3m concrete mattresses laid end on end; crossing protection shared with PLU4890.	
Concrete mattresses & grout bags	n/a	PL1612 & PL1613 Ketch 18in & 3in pipelines at KP-0.021. 21x 6m x 3m x 0.3m concrete mattresses and several hundred grout bags forming a protective bridge over PL935.	Refer Ketch Decommissioning Programmes [7] which state that these will all be fully recovered to shore.
Concrete mattresses & grout bags	n/a	PL1222 & PL1223 Schooner 16in & 3in pipelines at KP-0.032. 13x 6m x 3m x 0.3m concrete mattresses and several hundred grout bags.	Refer Schooner Decommissioning Programmes [8] which state that these will all be fully recovered to shore.
Concrete mattresses	11	Murdoch 500m zone where the pipelines diverge and approach (PL935 & PL936), 6m x 2.4m x 0.3m Linklok concrete mattresses. Refer Figure 2.2.3.	Leave <i>in situ</i> unless exposed in which case remove all to shore for re-use, recycling, or disposal.
	8	Murdoch 500m zone and approach (PL935 & PL936), 12m x 4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.3.	Remove to shore for re-use, recycling, or disposal

Table 3.2.3: Pipeline protection & stabilisation features

Protection or stabilisation features	Number (UNO)	Description	Disposal route (if applicable)
	13	Murdoch 500m zone and approach (PL935 & PL936), 6m x 2.4m x 0.15m Linklok concrete mattresses. Refer Figure 2.2.3.	Leave <i>in situ</i> unless exposed in which case remove all to shore for re-use, recycling, or disposal.
Deposited rock	1,885Te	Between KP0.026 and KP0.226 inside Murdoch 500m. Refer Figure 2.2.3.	Leave <i>in situ</i> .
	669Te	Between KP0.493 and KP0.583 inside Murdoch 500m. Refer Figure 2.2.3.	

NOTES:

- Items noted as n/a are out of scope but included for reference given the complexity of infrastructure inside Murdoch 500m zone;
- Origin of pipeline KP taken at base of risers at Murdoch MD;
- No mention of grout bags on drawings or survey reports;
- Mass of deposited rock is based on 'as-built' records;
- Apart from the mattresses at each of the diversion points (13x and 11x respectively), it is intended that unless buried under rock mattresses be fully recovered to shore. However, in the event of practical difficulties OPRED will be consulted.

3.3 Wells

Decommissioning of the Caister wells is addressed separately [1] and so shall not be repeated here.

3.4 Waste streams

Table 3.4.1: Waste stream management method

Waste stream	Removal and disposal method
Bulk liquids	Hydrocarbons have already been evacuated from the gas pipeline. Further cleaning and decontamination of pipespools that have been removed will take place as required onshore prior to re-use or recycling.
Marine growth	Where necessary and practicable, to allow access some marine growth may need to be removed offshore. The remainder will be brought to shore and disposed of according to guidelines and company policies and under appropriate permit.
NORM	Tests for NORM will be carried out offshore by the Radiation Protection Supervisor. and recorded. Any NORM encountered onshore will be dealt with and disposed of in accordance with guidelines and company policies and under appropriate permit.
Asbestos	In the unlikely event that asbestos is recovered it will be dealt with and disposed of in accordance with guidelines and company policies.
Chromium VI	In the unlikely event that Chromium VI paints are encountered they will be dealt with and disposed of according to guidelines and company policies and under appropriate permit.
Other hazardous wastes	Other hazardous waste will be recovered to shore and disposed of according to guidelines and company policies and under appropriate permit.
Onshore dismantling sites	Appropriate licensed sites will be selected. The dismantling site must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver re-use and recycling options.

Table 3.4.2: Inventory disposition

Asset	Inventory	Total (Te)	Planned materials to shore (Te)	Planned materials decommissioned <i>in situ</i> (Te)
Caister pipelines	Pipelines	5,236	197	5,039
	Deposited rock	9,063	-	9,063

4 Environmental Appraisal overview

4.1 Environmental sensitivities (summary)

Table 4.1.1: Environmental sensitivities

Environmental Receptor	Main Features
Conservation interests	Protected habitats: The majority of the CMS infrastructure is located within the Dogger Bank Special Area of Conservation (SAC) and the Southern North Sea SAC, while the export pipelines also pass-through Inner Dowsing and Race Bank SAC, Greater Wash Special Protection Area (SPA) and Humber Estuary SPA. The Dogger Bank SAC is the largest sandbank in UK waters and is designated for the Annex I feature '<i>Sandbanks which are slightly covered by seawater all the time</i>'. The Conservation Objectives for the site are to ensure that the features are to be in favourable condition thus ensuring site integrity in the long term and contribution to Favourable Conservation Status (FCS). This contribution would be achieved by maintaining or restoring, subject to natural change: • The extent and distribution of the qualifying habitat in the site; • The structure and function of the qualifying habitat in the site; and • The supporting processes on which the qualifying habitat relies. The Southern North Sea SAC has been identified as an area of importance for the Annex II species the harbour porpoise. This site includes key winter and summer habitat for this species. The Conservation Objectives of the site are to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining FCS for harbour porpoise in UK waters. In the context of natural change, this will be achieved by ensuring that: • Harbour porpoise is a viable component of the site; • There is no significant disturbance of the species; and • The condition of supporting habitats and processes, and the availability of prey is maintained. The Inner Dowsing, Race Bank and North Ridge SAC is designated for '<i>Sandbanks slightly covered by water at all times</i>' and for '<i>Reefs</i>'. The area encompasses a wide range of sandbank types which host a diverse variety of species, and biogenic reef formed by the Ross worm, <i>Sabellaria spinulosa</i>. Both the Humber Estuary SPA and the Greater Wash SPA are designated for a number of breeding and non-breeding bird species. The Humber Estuary SPA is additionally designated for the presence of waterbird assemblages. Protected species: Annex II species likely to be sighted within the area of the proposed decommissioning activities include harbour porpoise, grey seals and harbour seals. Cod <i>Gadus morhua</i> are OSPAR listed threatened and/or declining species and are known to use the CMS for spawning and

Table 4.1.1: Environmental sensitivities

Environmental Receptor	Main Features
	as a nursery. Survey footage identified three fish belonging to the family Gadidae, which cod are part of, however the species was not identified. The ocean quahog (<i>Arctica islandica</i>) is among the longest-lived and slowest growing marine bivalves and is on the OSPAR list of threatened and/or declining species and habitats in the North Sea. It is also a Feature of Conservation Importance (FOCI) for which Marine Conservation Zones can be designated. One <i>A. islandica</i> individual was identified in a 2015 survey. A single juvenile individual was identified at in 2020. Bivalve siphons were observed in the 2020 survey throughout the CMS area however it is not possible to identify the species from the siphon alone therefore this cannot confirm the presence of more <i>A. islandica</i>. <i>S. spinulosa</i> is a small, tube-building polychaete worm and is also on the OSPAR list of threatened and/or declining species and habitats in the North Sea. Twenty-one (21) individuals of <i>S. spinulosa</i> were identified from samples taken at the Murdoch Hub, however none were observed in seabed imagery. Three small patches ($\leq 2\text{m}$ long) of <i>S. spinulosa</i> were observed along the PL935/PL936, close to the Murdoch Hub. Faunal burrows were observed throughout the area surveyed in 2020. However, only one site at Kelvin TM displayed burrows at a density sufficient to register on the Marine Nature Conservation Review SACFOR scale as showing a level of similarity to the OSPAR habitat 'seapens and burrowing megafauna community'. Despite this, the burrows observed cannot be confidently attributed to any of the 'megafauna' species associated with this OSPAR habitat. Instead, the burrows observed at Kelvin TM and within the CMS area more likely relate to a number of species characteristic of the Dogger Bank community, including sand eels. Therefore, this habitat is not thought to be present within the CMS area.
Seabed and benthos	The seabed near the CMS infrastructure is predominantly composed of EUNIS biotope A5.23 or A5.24: Infralittoral fine sand or Infralittoral muddy sand and A5.25 or A5.26: Circalittoral fine sand or Circalittoral muddy sand. The mean particle size across the CMS was consistent with the SNS UKOOA mean particle size of $243\mu\text{m}$ (fine sand). There were some observed patches of coarser sediments at Boulton BM, Munro MH, Katy KT and Hawksley EM, in addition to some gravel observed at the Murdoch Hub (where particle size was up to $2063\mu\text{m}$). The seabed sediments remain relatively consistent along the pipelines to shore. Total Hydrocarbon (THC) concentrations were below the Significant Environmental Impact (SEI) threshold across the CMS, and there is no evidence of drilling related hydrocarbon contamination. Reported Polycyclic Aromatic Hydrocarbon (PAH) concentrations were in line with levels typical of the wider SNS. Polychlorinated biphenyl (PCB) levels were below Limit of Detection (LOD). All detectable concentrations of heavy metals were above their respective OSPAR (2005) Background Concentrations. However, this is to be expected due to the heavily industrialised nature of the SNS. Organotin concentrations were below LOD, except at a single station at the Murdoch Hub. <i>Spatangoida</i> (juveniles; the order of heart urchins) and <i>Spipohanes bombyx</i>, a polychaete, featured across the CMS. Juvenile <i>Spatangoida</i> dominated the benthos by number at almost every location however, when assessing the adult-only populations, the dominant taxa were more variable across the CMS though generally were polychaetes. Only at Katy KT

Table 4.1.1: Environmental sensitivities

Environmental Receptor	Main Features
	was the infaunal community dominated by molluscs.
Fish	The CMS is located within an area of high intensity spawning for plaice and sandeel. The following species are also known to use the area for spawning: cod, herring, mackerel, <i>Nephrops</i>, sole, sprat, and whiting. Additionally, the following species use the area as nursery grounds: anglerfish, blue whiting, cod, European hake, herring, ling, mackerel, <i>Nephrops</i>, sandeel, spurdog, sprat, and tope shark. Whiting use the area as a high intensity nursery. The probability of juvenile fish aggregations occurring in the CMS is low for: plaice, sole, hake, anglerfish, blue whiting, Norway pout, mackerel, haddock, and cod. The probability of juvenile herring, horse mackerel, sprat, and whiting being present in the CMS area is low-moderate.
Commercial fishing	The CMS area is located in International Council for the Exploration of the Seas (ICES) statistical rectangle 37F2. The associated PL929 and PL930 pass through rectangles 37F1, 36F1, 36F0, and 35F0. Fisheries landings vary throughout the project area. At the CMS area in 2019, the catch was mostly demersal and was relatively low compared to other rectangles. Closer to shore shellfish make up the majority of landings the value of which was very high; in rectangles 36F1, 36F0 and 35F0 closest to shore the value of catch was >£1,000,000 every year from 2015 onwards. Commercial fishing effort was also highest in rectangle 36F0 (2,344 days in 2019). This effort is consistently high across all months excluding January, February, November, and December when effort is moderate. Effort is much lower around the CMS (rectangle 37F2). Fishing effort in other rectangles is comparatively low (<100 days per month).
Marine mammals	Harbour porpoise, minke whale, white-beaked dolphin, and long-finned pilot whale have all been observed within the vicinity of the project. For all species but harbour porpoise, they are found in relatively low numbers in the CMS or have low abundance estimates. Harbour porpoises are common in the SNS and frequent the area throughout much of the year. They are thought to be found in the area at a density of 0.888 animals/km² which is relatively high compared to other areas of the North Sea. All of the cetacean species are both European Protected Species (EPS) and are covered by the UK Biodiversity Action Plan (UK BAP). The Caister pipelines are ~163km from the nearest UK coastline. Both grey and harbour seal densities are relatively low offshore in the CMS area.
Seabirds	The following species are present in the CMS area across the majority of the year: northern fulmar, northern gannet, great black-backed gull, black-headed gull, common gull, herring gull, Atlantic puffin, black-legged kittiwake, common guillemot, razorbill, little auk, and lesser black-backed gull. Seabird sensitivity to oil (according to the Seabird Oil Sensitivity Index) is low throughout the year and highest in July and between November and January (Blocks 44/21, 44/22, 44/23, 44/17, 44/18, 44/19). Sensitivity is variable along the pipelines to shore but on average higher than offshore at the CMS. Block 48/2, approximately half-way along the PL929 and PL930, is high, very high, or extremely high every month of the year. In the Blocks nearest to the coast (47/17, 47/18) sensitivity is highest between October and December, and in March.
Onshore communities	An onshore decontamination and dismantlement facility will be UK based and will be one that is deemed able to comply with

Table 4.1.1: Environmental sensitivities

Environmental Receptor	Main Features
	all relevant permitting and legislative requirements.
Other users of the sea	The CMS is located in a mature area of the SNS with extensive oil and gas development. There are ten oil and gas surface structures within 50 km of the project, the nearest being 20.1 km away. Shipping in the project area is variable; closest to shore Blocks 47/18, 47/19, 47/20, 47/15, experience very high shipping activity, due to their proximity to the Humber Estuary. In the CMS area shipping is moderate (in Blocks 44/22 and 44/23) to high (Blocks 44/17, 44/18 and 44/19). Two telecom cables come within 1km of the Murdoch platform (Tampnet cable and MCCS). The PL929 and PL930 do not cross any third-party telecom cables. However, as there is much renewable energy activity in the area, the pipelines to shore do cross the Hornsea 1 active export cable. Furthermore, the PL929 and PL930 pass through the Hornsea 2 area for ~25 km, and through the Triton Knoll windfarm area which is currently under construction. The Race Bank windfarm (and proposed extension), and the Lincs windfarm are also both located within 15 km of the PL929/PL930. Blocks 47/18, 47/19, 47/20, 47/15, 43/29, 43/30, and 44/26 are of concern to the Ministry of Defence (MoD) as they lie within training ranges. Additionally, Block 47/17, in which the PL929 and PL930 terminate at the shore, has been excluded from consideration of granting development licenses at the request of the MoD. There are seven non-dangerous wrecks within 20 km of Murdoch. There is a single dangerous wreck 18 km from Murdoch. There are no designated historical wrecks recorded in the area.
Atmosphere	Energy will be used during decommissioning activities, and this will result in atmospheric emissions. Once decommissioning has been completed, pipeline surveys will likely be required in future, incurring further use of energy use and the resulting emissions.

4.2 Potential environmental impacts and their management

4.2.1 Environmental impact assessment summary

The potential environmental impacts associated with the decommissioning activities have been assessed and it is concluded that the proposed decommissioning of the infrastructure can be completed without causing significant adverse impact to the environment. The EA assesses the potential environmental impacts by identifying interactions between the proposed decommissioning activities and the associated environmental receptors. It also describes the proposed mitigation measures designed to avoid or reduce the identified potential environmental impacts and how these will be managed in accordance with Chrysaor's Environmental Management System (EMS) while considering responses from stakeholders. It is expected that CDP1b, CDP2 and CDP3 will be addressed as a campaign of decommissioning work, so much of the following information is explained in these terms.

Table 4.2.1: Environmental Impact Management

Activity	Main Impacts	Management
Vessel activity during pipeline decommissioning activities	Atmospheric emissions	The majority of atmospheric emissions for the decommissioning of CDP1b, CDP2 [2] and CDP3 [3] combined relate to vessel use or are associated with the recycling of material returned to shore. The worst-case estimated CO₂ emissions to be generated by the selected decommissioning options are 339,358 Te, this equates to 2.6% of the total UKCS emissions in 2018 (13,200,000 Te) and includes any theoretical emissions associated with the remanufacture of infrastructure remaining <i>in situ</i>. Almost all future emissions (from project operations and vessels) will cease once decommissioning has been completed. All combustion plant including engines and generators on the vessels will be well maintained and correctly operated to ensure that they are working efficiently to minimise energy use and gaseous emissions. Vessel operations will be minimised where practical.
Decommissioning of pipelines	Seabed disturbance	There is potential for decommissioning activities to generate disturbance to the seabed; including the decommissioning of pipelines <i>in situ</i> and any associated remediation, and the removal of substructures associated with CDP2 [2] and CDP3 [3]. Seabed impacts may range in duration from short-term impacts, such as temporary sediment suspension or smothering, to permanent impacts, such as the introduction of new substrate or any consequential habitat or community level changes which may transpire. The proposed decommissioning activities associated with CDP1b, CDP2 [2] and CDP3 [3] combined may impact an area of 0.093 km² SNS habitat. Much of this activity is due to take place within the Dogger Bank SAC (0.0697 km²) which is designated for the presence of Annex I '<i>Sandbanks which are slightly covered by sea water all the time</i>'. While the activities may result in the mortality of some individuals, many of the taxa within the CMS area are relatively resilient; sandy communities are comparatively quick to recover from disturbance.

Table 4.2.1: Environmental Impact Management

Activity	Main Impacts	Management
		Additionally, <i>S. spinulosa</i> is unlikely to be directly affected by the project activities within the CMS or associated with contingency activities along the PL929/PL930 associated with CDP3 [3]. With regards to the sediment and benthic features within the Dogger Bank SAC, the CMS activities are unlikely to affect the natural physical processes of the area. Pipelines being decommissioned <i>in situ</i> are also unlikely to have an impact on these processes and their gradual degradation over time will have a negligible impact on the surrounding sediments. Chrysaor are committed to leaving a clear, safe seabed in the wake of the decommissioning activities. The clear seabed will be validated by an independent verification survey over the installation sites and pipeline corridors. Non-intrusive verification techniques will be considered in the first instance, but where these are deemed inconclusive by the NFFO, seabed clearance is likely to require conventional overtrawl survey methods. The methods used will be discussed and finalised with OPRED.
Decommissioning of pipelines <i>in situ</i>	Physical presence of infrastructure decommissioned <i>in situ</i>	The preferred option from the CA is to decommission the pipelines PL935 & PL936 <i>in situ</i>. The physical presence of infrastructure decommissioned <i>in situ</i> has the potential to impact other sea users. The potential impacts identified to commercial fisheries were limited to the potential for legacy impacts such as the snagging of fishing gears on flowlines decommissioned <i>in situ</i>, and any snagging risk due to existing seabed depressions. The majority of pipelines within the CMS are stably buried to a suitable depth. The pipeline exposures are at the pipeline ends and will be addressed when ends are cut, removed, and remediated. Owing to the nature of the seabed and physical processes in the CMS, depressions are likely to become backfilled over time and the incidence of a snagging event is highly unlikely. Pipelines and stabilisation features decommissioned <i>in situ</i> will continue to be shown on Navigational charts. A clear seabed verification survey (using non-intrusive techniques in the first instance) will be undertaken following completion of decommissioning works. The presence of stabilisation features remaining <i>in situ</i> will not compromise the integrity of the environmental feature of the seabed in the area.
Vessel activity during pipeline decommissioning operations	Physical presence of vessels in relation to other sea users	The presence of a small number of vessels for decommissioning activities associated with CDP1b [3], CDP2 [2] and CDP3 will be short-term in the context of the life of the CMS fields. Activity will occur using similar vessels to those currently deployed for oil and gas installation, operation, and decommissioning activities across the SNS. Furthermore, all decommissioning works will be carried out within the 500m zones, thereby using the area around existing infrastructure, and not occupying 'new' areas. Vessel presence will be spatially and temporally restricted so exclusion will only be short-term. The decommissioning of the CMS area is estimated to require eight different vessel types. They would not all be on location at the same time. For the overall campaign covering CDP1b, CDP2, and CDP3 the vessel activities are expected to over approximately 804 days; most of these days are attributed to the removal of the

Table 4.2.1: Environmental Impact Management

Activity	Main Impacts	Management
		surface installations. Overall levels of vessel activity attributed to the decommissioning are likely to be similar to those experienced under typical conditions. The nearshore activities associated with this project are very likely to be limited in duration and limited to passing vessels. Other sea users will be notified in advance of planned activities through the appropriate mechanisms, meaning those stakeholders will have time to make any necessary alternative arrangements during the finite period of operations.
Underwater activities during decommissioning operations	Underwater noise	A noise assessment has been completed to determine the likely impact of noise generated by the proposed operations on marine mammals in the surrounding area. The results of the assessment will be used during the planning of vessel operations. Given the location of the project within the Southern North Sea SAC, the generation of underwater noise is also a concern, particularly with regards to Annex II harbour porpoise for which the site is designated. Noise emissions are expected to be sufficiently low that injury will not occur from any of the activities. With regards to disturbance, potential zones of avoidance around vessels or cutting activities are not predicted to extend beyond approximately 100m. Furthermore, the levels of noise generated by project activities are unlikely to be detectable above background levels. There is no intention to use underwater explosives during these activities. In the extremely unlikely event that the requirement changes, project-specific noise modelling may be undertaken to inform the risk of injury in the impact assessment and mitigation requirements. The requirement will be discussed with OPRED Environmental Management Team.
Vessel activity during pipeline decommissioning operations	Discharges to sea	Discharges from vessels are regulated activities that are managed on an ongoing basis through existing legislation and compliance controls. All subsea infrastructure in the CMS area has been drained and flushed at CoP. This is a pre-decommissioning activity which has been permitted as appropriate, and therefore, falls outside the scope of the EA. Any discharges from infrastructure occurring during decommissioning activities will similarly be assessed in more detail as part of the environmental permitting process (e.g. through Master Application Templates/Subsidiary Application Templates). Controls will be in place, as relevant, through the Offshore Chemical Regulations and the Oil Pollution Prevention and Control regulations. The pipelines have already been flushed and cleaned.
Vessel activity during pipeline decommissioning operations; manufacture of materials required to	Resource Use	Generally, resource use from the proposed activities will require limited raw materials and be largely restricted to fuel use. Any opportunities for increasing fuel efficiency and reducing use of resources will be identified and implemented by Chrysaor where possible. The estimated total energy usage for the combined CDP1b, CDP2 and CDP3 project is 3,635,554 GJ. This

Table 4.2.1: Environmental Impact Management

Activity	Main Impacts	Management
carry out the decommissioning activities		number accounts for all operations, material recycling, and the resource loss associated with decommissioning items <i>in situ</i> . This is considered low compared to the resources generated during the production phase of the project.
Waste management	Waste	The onshore treatment of waste from the CMS decommissioning activities will be undertaken according to the principles of the waste hierarchy, a conceptual framework which ranks the options for dealing with waste in terms of sustainability. Wastes will be treated using the principles of the waste hierarchy, focusing on the reuse and recycling of wastes where possible. Raw materials will be returned to shore with the expectation to recycle the majority of the returned non-hazardous material. Other non-hazardous waste which cannot be reused or recycled will be disposed of to a landfill site. Facilities requiring removal as part of the CMS DPs will be transferred to shore by a heavy lift vessel for decontamination, dismantlement, disposal, recycling or reuse. Typically, around 95% of the materials from decommissioning projects can be recycled. Hazardous waste resulting from the dismantling of the CMS facilities will be pre-treated to reduce hazardous properties or render it non-hazardous prior to recycling or disposing of it to a landfill site. The recycling and disposal of wastes are covered by Chrysaor's Waste Management Strategy, which is compliant with relevant regulations relating to the handling of waste offshore, transfer of controlled, hazardous (special) waste, and TFSW (Trans-Frontier Shipment of Waste). The Waste Management Strategy is guided by Chrysaor's HSE Policy. Only licenced contractors who can demonstrate they are capable of handling and processing the material to be brought ashore will be considered for onshore activities.
Removal of surface installations	Disturbance or destruction of seabird nests	n/a
Vessel activity during pipeline decommissioning operations	Physical presence of vessels in the field	The area of seabed affected by the physical presence of most likely origin of an accidental event would be from an unplanned instantaneous diesel release from the largest vessel employed in the decommissioning activities. This is expected to be a HLV with a maximum fuel capacity of approximately 1,569m³. The fuel inventory of the HLV vessel is likely to be split between a number of separate fuel tanks, significantly reducing the likelihood of an instantaneous release of the full inventory. Any spills from vessels in transit or participating in decommissioning activities are covered by separate Shipboard Oil Pollution Emergency Plans (SOPEPs). Chrysaor will support response of any vessel-based loss of fuel containment through the vessel owner's SOPEP. There is a very low likelihood of vessel-to-vessel collision occurrence, an estimated one collision in 685 years which is in line with the areas' baseline collision risk.

Table 4.2.1: Environmental Impact Management

Activity	Main Impacts	Management
		Chrysaor maintains manned bridges, navigational aids and monitoring of safety zones. Only project vessels will be present when activity taking is place within 500 m safety exclusion zones. Other vessels will not be present within the 500 m zone at any time prior to well decommissioning. OPRED will be notified of any dropped objects, noting that dropped object procedures are industry-standard and will be used. All unplanned losses in the marine environment will be attempted to be remediated, and notifications to other mariners will be sent out. The post-decommissioning Clear Seabed s will be no Survey will aid in the identification of in-field dropped objects.

5 Interested party consultation

5.1 Consultation summary

During the public consultation period (07 March 2022 to 08 April 2022), copies of the Decommissioning Programmes and supporting documents were forwarded to the following Statutory Consultees:

- The National Federation of Fishermen's Organisations (NFFO);
- The Scottish Fishermen's Federation (SFF);
- The Northern Ireland Fish Producer's Organisation (NIFPO); and,
- Global Marine Group (GMG).

Copies of the Decommissioning Programmes and supporting documents were made available as a download from the Chrysaor website: <https://www.harbourenergy.com>.

A public notice was published in the following publications on 07 March 2022. Please refer to Appendix 2 for a copy of the public notices:

- The London Gazette;
- The Daily Telegraph;
- The Hull Daily Mail.

The public notice gave instructions for representations to be made in writing by Friday Thursday 08 April 2022.

Chrysaor received no comments or any written or verbal representation from the public in direct response to the public notice or during the public consultation period.

Copies were also submitted for consideration to OPRED.

Table 5.1.1: Summary of stakeholder comments

Stakeholder	Comment	Response
STATUTORY CONSULTATIONS		
NFFO	Decommissioning Programmes and supporting documentation issued by letter dated 07 March 2022.	The NFFO would request that post-decommissioning overtrawl surveys are carried out within each of the 500m safety zones to the area is safe to be opened to commercial fishing operations with no snagging hazards or debris is left <i>in situ</i> after the removal of these assets.
NIFPO	Decommissioning Programmes and supporting documentation issued by letter dated 07 March 2022.	No response received.
SFF	Decommissioning Programmes and supporting documentation issued by letter dated 07 March 2022.	Given the locality SFF would wish to defer to the advice from NFFO.
GMG	The Decommissioning Programmes and supporting documentation issued by letter dated 07 March 2022.	GMG advised that as the nearest active cables (TAMPNET Norsea Com 1 and MCCS) are located within 1km of the Murdoch Platforms, it would be prudent to contact the cable owners to ensure they are aware of operations. Contact details of the cable owners can be sourced from https://kis-orca.org/map/ .
Public	Public Notices were Published 07 March 2022.	No response received.

On the advice of GMG, Chrysaor also contacted the TAMPNET Norsea Com 1 cable owners with no issues arising.

6 Programme management

6.1 Project management and verification

Chrysaor has established a UK Decommissioning organisation as a department to manage and execute decommissioning projects. Chrysaor's existing processes for Operations, Planning, Project Management, Procurement, Health Safety and Environment, will be used and tailored to meet the specific requirements of decommissioning projects. Chrysaor will manage all permitting, licences, authorisations, notices, consents and consultations.

Any changes to this decommissioning document will be discussed and agreed with OPRED.

6.2 Post-decommissioning debris clearance and verification

A post decommissioning debris survey will be carried out within all 500m safety zones. Discussions are underway with OPRED regarding the level of appropriate coverage for pipeline corridor survey along each existing pipeline route. Oil and gas debris will be recovered for onshore disposal or recycling in line with existing disposal methods.

Verification of seabed state will be obtained. Whilst the worst-case seabed disturbance from overtrawl has been assessed, it is recognised that some of the decommissioning activity is occurring in the Dogger Bank SAC, therefore different methods of determining debris clearance and snag risk may be required. The methods used will therefore be discussed and finalised with OPRED. This will be followed by a statement of clearance to all relevant governmental departments and statutory consultees.

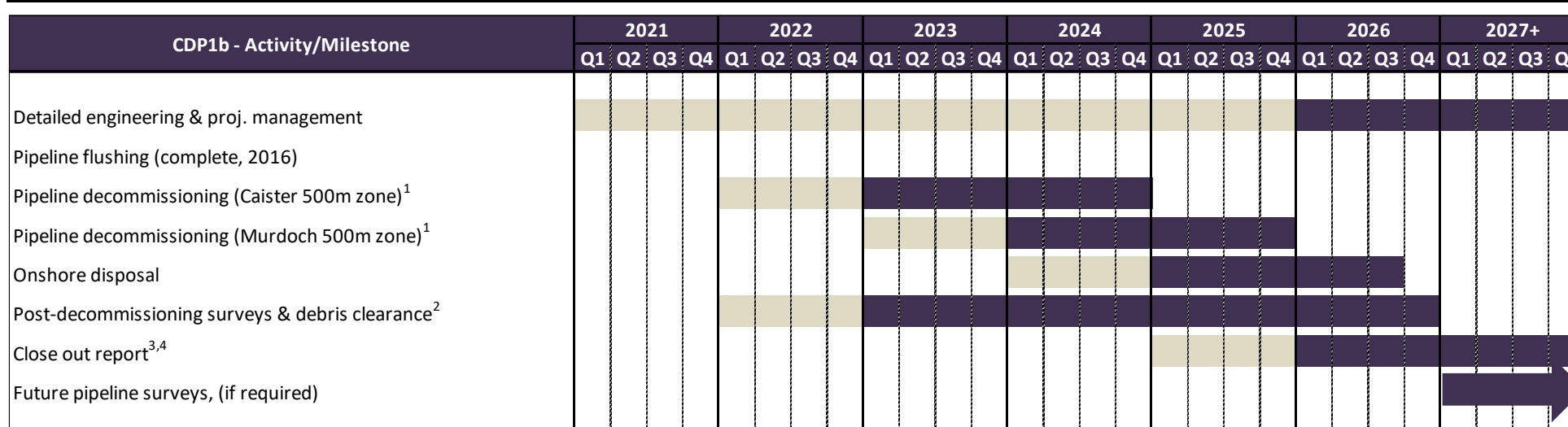
Oil and gas debris activity and verification along the remaining pipeline corridor of the infield pipeline sections not subject to actual decommissioning works will be carried out in accordance with OPRED guidance in operation at the time those activities commence. This activity will reflect the environmental setting of the Dogger Bank SAC.

The outcomes of the clear seabed verification activities in the 500m zones and the alternative survey methods of the pipelines will be reported in the Close Out Report and sent to the Seabed Data Centre (Offshore Installations) at the Hydrographic Office.

6.3 Schedule

A proposed schedule is provided in Figure 6.3.1. The activities are subject to the acceptance of the Decommissioning Programme presented in this document and any unavoidable constraints (e.g. vessel availability) that may be encountered while executing the decommissioning activities. Therefore, activity schedule windows have been included to account for this uncertainty.

The commencement of offshore decommissioning activities will depend on commercial agreements and commitments.



Notes / Key

Earliest potential activity



Activity window to allow commercial flexibility associated with decommissioning activities



1. The pipelines were disconnected at Caister CM before the platform and its template were removed in May-June 2020; The pipelines were disconnected at Murdoch as agreed in a Preparatory Works request to OPRED on 12 Feb 2021.

2. Post decommissioning survey at Murdoch will likely be completed as part of a wider campaign with CDP3 scope;

3. The close out report will be prepared on completion of offshore activities. It will contain results of environmental surveys, debris survey (identification/removal) and clear seabed verification survey;

4. The close out report will explain the strategy based on risk assessments and results of post decommissioning surveys.

Figure 6.3.1: Gantt chart of project plan

6.4 Costs

Decommissioning costs will be provided separately to OPRED and OGA.

6.5 Close out

In accordance with OPRED guidelines, a close out report covering the completion of the offshore decommissioning scope of this Decommissioning Programme will be submitted at a time agreed by OPRED. The close out report will contain debris removal and verification of seabed clearance, the first post decommissioning environmental survey and explanation of any variations to the approved Decommissioning Programmes.

6.6 Post decommissioning monitoring and evaluation

After decommissioning activities have been concluded, pipeline status surveys and environmental surveys will be completed with the findings being sent to OPRED in the Close Out report. The frequency and scope of future surveys will be agreed with OPRED and supported by a risk assessment. Residual liability will remain with the Section 29 holders identified in Table 1.4.2. Unless agreed otherwise in advance with OPRED, Chrysaor will remain the focal point for such matters, such as any change in ownership, for example.

A post decommissioning environmental seabed survey will be carried out once the offshore decommissioning work scope covered by this decommissioning document has been completed. The survey will include seabed sampling to monitor levels of hydrocarbons, heavy metals, and other contaminants to allow for a comparison with the results of the pre-decommissioning survey. Results of this survey will be available once the decommissioning document work scope is complete.

PIPELINE RISK BASED MONITORING PROGRAMME

All pipeline systems covered within this Decommissioning Document scope will be subject to survey. The post decommissioning pipeline (and associated stabilisation features) monitoring programme, to be agreed with OPRED, will:

- Begin with an initial baseline survey covering the full length of each pipeline;
- Be followed by a risk-based assessment for each pipeline (and associated stabilisation materials) which will inform the minimum agreed extent and frequency of future surveying. This will take account of pipeline burial, exposure and spanning data derived from the initial baseline survey, all available historical survey information and fisheries impact assessment;
- Provide a report of each required survey (with analysis of the findings, the impact on the risk-based assessment and identification of the proposed timing of the next survey in accordance with the agreed RBA approach), for discussion and agreement of OPRED;
- Include provision for remediation in the framework where such a requirement is identified. Appropriate remediation will be discussed and agreed with OPRED;
- Where remediation has been undertaken, a follow up survey of the remediated section(s) will be required;
- In the event of a reported snagging incident on any section of a pipeline, the requirement for any additional survey and/or remediation, will be discussed and agreed with OPRED;
- Will include a further fisheries impact assessment following completion of the agreed survey programme;
- Monitoring will become reactive following completion of the agreed survey programme and OPRED agreement of the analysis of the outcomes;
- Require pipeline information to be recorded on Navigation charts and FishSAFE.

The monitoring programme will also include discussion with OPRED of the long-term pipeline degradation and potential risk to other users of the sea following conclusion of the planned survey programme.

7 Supporting documents

- [1] Chrysaor (2020) CDP1a Decommissioning Programme for Caister Installation, COP-SNS-C-CM-X-PM-12-00001; weblink last accessed 06 Feb 2021:
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- [2] Chrysaor (2020) CDP2 Decommissioning Programmes for Caister-Murdoch System Installations and Associated Pipelines, CYR-SNS-C-CM-X-PM-12-00002;
- [3] Chrysaor (2020) CDP3 Decommissioning Programmes for Murdoch Installations and Trunk Pipelines, CYR-SNS-C-XX-P-PM-12-00003;
- [4] Chrysaor (2020) Environmental Appraisal Caister-Murdoch System, CYR-SNS-C-XX-X-HS-02-00003;
- [5] Chrysaor (2020) Comparative Assessment for Pipelines in the Caister-Murdoch System, CYR-SNS-C-XX-X-HS-02-00001;
- [6] ConocoPhillips (2017). Commercial Fisheries Baseline Characterisation: LOGGS South, LOGGS North and CMS Areas. Report No. BMM-SNS-P-XX-S-HS-02-00001;
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- [11] Gardline (2015). SNS Decommissioning Survey Caister Murdoch System (Murdoch Hub and Caister CM). Pre-decommissioning Survey Report. August 2015. Final. Report No. 10554.2, CPUK/INT/PR-258;
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Appendix 1 Pre-works approval communications

Appendix 1.1 Chrysaor to OPRED (6-pages)



Chrysaor Production (U.K.) Limited
Rubislaw House
Anderson Drive
Aberdeen
AB15 6FZ

Offshore Petroleum Regulator for Environment and Decommissioning (OPRED)
Department for Business, Energy and Industrial Strategy (BEIS)
Offshore Decommissioning Unit
AB1 Building
Wing C, 3rd Floor
48 Huntly Street
Aberdeen
AB10 1SH

7th January 2021

Dear Ms Livingston

Request to undertake additional disconnection works in 2021 prior to Decommissioning Programme Approval

Chrysaor Production (U.K.) Limited requests permission to undertake certain works at the Murdoch Complex in the CMS Area of the Southern North Sea (SNS) ahead of the approval of the associated Decommissioning Programmes.

The MD platform was installed in 1992 as a manned production facility and gathering system, initially for the Caister field. A compression platform, Murdoch MC, was added in 1996 and an accommodation platform, Murdoch MA, in 2002 to complete the complex as a collection hub for the Normally Unattended Installations (NUI's) in the surrounding area. At Murdoch, received gas was compressed and exported to TGT via an 188km 26" gas pipeline. At TGT, the gas was processed, sold and exported to the National Transmission System (NTS).

The works required to be undertaken are:

1. Subsea pipeline disconnections at the base of the MD and MA jackets of the Murdoch Complex including 3rd party disconnections

These scopes will be a part of the DSV campaign to be conducted between May and October in 2021 to support the removal of the Murdoch Complex in 2022.

The Decommissioning Programmes associated with the pipeline disconnections are CDP1b, CDP2 and CDP3. These decommissioning programmes will be submitted to OPRED in Q1 2021 for review prior to consultation. Approval of CDP3 (Murdoch Complex & Associated Trunklines) is anticipated by the end of 2021 and the CDP1b (Caister CM Associated Pipelines) and CDP2 (Boulton BM, Katy KT, Kelvin TM, Munro MH platforms and Associated Pipelines including CMSIII manifolds and Associated Pipelines) are expected to be approved in 2021/ 2022.

The detailed scope of work planned at each location in support of decommissioning, for which we request OPRED approval, is as follows:

1. Murdoch Platform Disconnection

To prepare for Murdoch MD, MC, MA removal in 2022, the pipelines at Murdoch MD and umbilicals at MA are required to be disconnected to facilitate enough clearance for the removals contractor to take the platforms away. All the pipelines to Murdoch have been flushed clean and filled with inhibited seawater.

The disconnection methodology is to use a diamond-wire saw (DWS), to cut the gas and methanol spool pieces at a minimum of 5m lateral distance from the platform. Thereafter where a closing span exists at the riser base, a further length will be removed up to the point where the pipeline touches down on the seabed. Shears will be used to cut the outboard end of the pipeline at the touchdown point. The disconnection philosophy at this stage, is to minimise pipeline intervention required proximal to the platform. To achieve this the minimum length of pipeline will be disconnected to achieve sufficient clearance for platform removal. The outboard cut will terminate at a point where the pipeline is buried beneath stabilisation material. Mattress removal will only take place where they obstruct the clearance necessary for the removal criteria. Minimum excavation will be required to expose pipelines as they have been surface-laid at the approaches. Seabed mobility may however have buried the pipelines thus requiring minor unburial to expose the section to the point where it is buried beneath stabilisation material. A ROV dredger will be on board the vessel to facilitate unburial, if necessary.

The pipeline ends at Murdoch MD and MA will not be buried at this stage, as the assessment of the decommissioning of the pipeline ends will be communicated within the comparative assessment and agreed between stakeholders during the decommissioning approval process. The comparative assessment will be submitted to BEIS for initial review in early 2021. Any future remediation of the pipeline ends required to reach an agreed decommissioning as-left state will be undertaken as part of the post removal activities.

The 500m zone will be retained until there are no foreseeable snagging risks to fishermen.

13 pipelines 5 gas pipelines, 5 methanol pipelines and 3 umbilicals) are proposed to be disconnected:

Pipeline Number	Pipeline Description	Removal Length (minimum)	Removed Items*
PL1436	Boulton BM to Murdoch MD 10" Gas Line	3m (Note1)	No mattresses, several grout bags
PL1437	Murdoch MD 3" MeOH Line to Boulton BM	3m (Note1)	No mattresses, several grout bags
PL929	Murdoch MD to TGT 26" Gas Line	3m (Note2)	No mattresses, several grout bags
PL930	TGT to Murdoch MD 4" MeOH Line	3m (Note2)	No mattresses, several grout bags
PL935	Caister CM to Murdoch MD 16" Gas Line	3m (Note2)	Several mattresses, several grout bags
PL936	Murdoch MD to Caister CM 3" MeOH Line	3m (Note2)	Several mattresses, several grout bags
PL1922	Hawksley EM to Murdoch MD 12" Gas Line via McAdam MM and Northern Lobe Pigging Skid (PSNL)	11m	No mattresses, several grout bags
PL1925	Murdoch MD to Hawksley EM 3" MeOH Line via McAdam MM and Northern Lobe Pigging Skid (PSNL)	11m	No mattresses, several grout bags
PL1924	Boulton H HM to Murdoch MD 10" Gas Line via Southern Lobe Pigging Skid (PSSL) via Watt QM	12m	No mattresses, several grout bags
PL1927	Murdoch MD to Boulton H HM 3" MeOH Line via Southern Lobe Pigging Skid (PSSL) via Watt QM	12m	No mattresses, several grout bags
PLU4890 (UM8)	Murdoch MA to Murdoch K KM	8m	No mattresses, several grout bags
PLU4686 (UM7)	Murdoch MA to McAdam MM	8m	No mattresses, several grout bags
PLU4889 (UM5)	Murdoch MA to Watt QM	8m	No mattresses, several grout bags

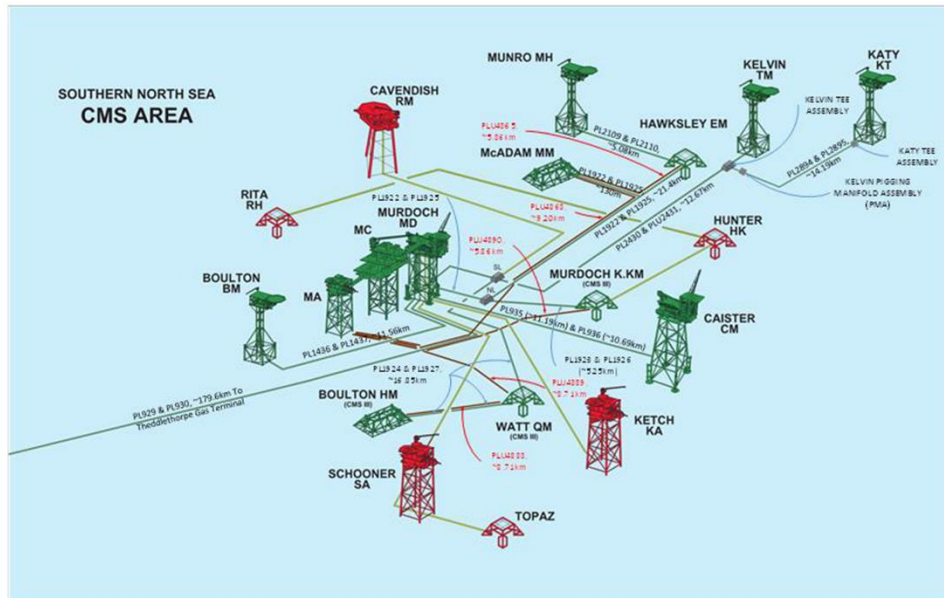
*Removed items are approximate based on as-left information, actual conditions may differ when executing the works.
 Note 1 - - Minimum separation of 3m disconnection length in 2021 for these lines due to access restrictions as they run under the MD platform which causes access issues, so it is proposed we carry out recommended disconnection to this line in 2022

Note 2 - Minimum separation of 3m disconnection length in 2021 for these lines due to access restrictions as they run under the helideck, which causes access issues with getting the vessel in close with necessary tooling etc so it is proposed we carry out recommended disconnection to this line in 2022.

Where safe to do so, all grout bags and mattresses moved to enable access will be recovered for onshore disposal. All cut sections of the pipelines will be recovered to deck for onshore disposal.

To achieve cost efficiencies during the SNS subsea campaign, Chrysaor has invited the 3rd parties that are connected to the complex to participate in the subsea disconnection scope. The 3rd party pipelines that may also be

The CMS infrastructure is illustrated in Fig 1. Chysoar-operated assets are highlighted in green and the pipeline disconnections for which approval is sought ahead of decommissioning programme approval will be performed at the base of the MD and MA jackets at the Murdoch Complex.



4

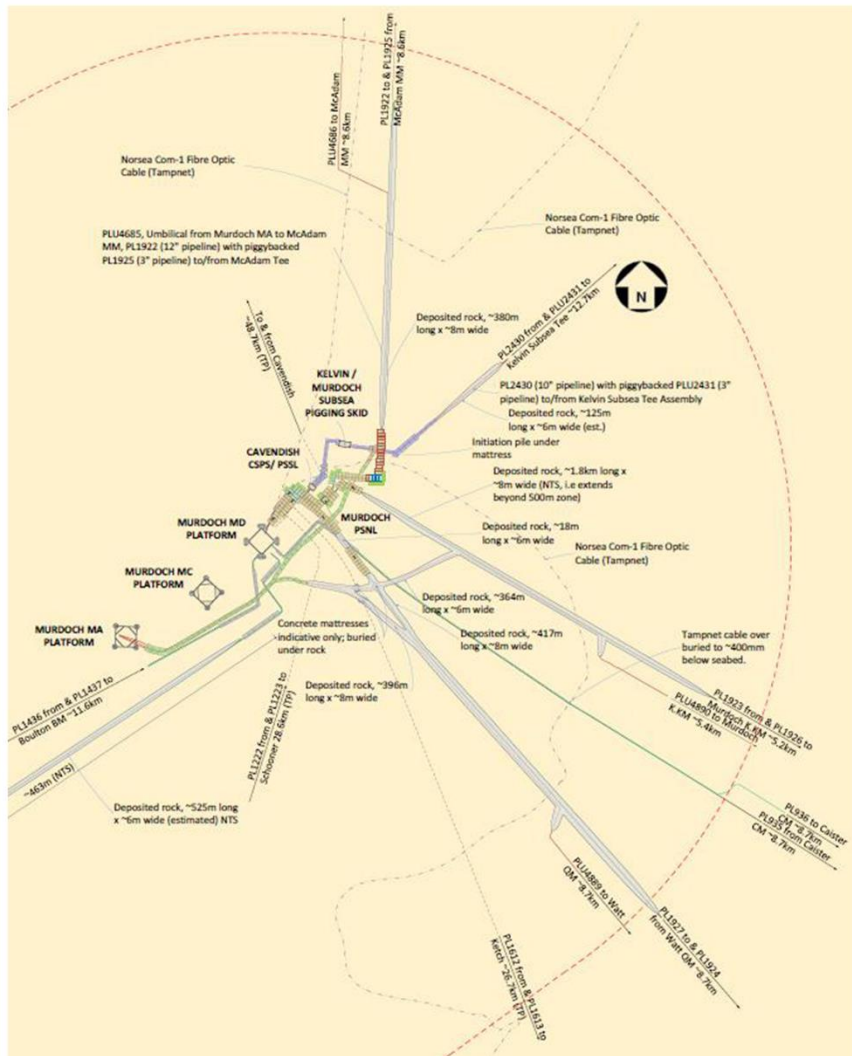


Figure 2 – Schematic of pipelines and current view of stabilization features around Murdoch based on as-left information

Environmental Permit and Consent Applications

A Decommissioning (DCA) Master Application Template (MAT) and supporting Environmental Impact Assessments (EIA) will be submitted detailing the proposed discharge of pipeline contents upon subsea pipeline disconnects and the temporary deposits, removals and seabed disturbance during the proposed subsea pipeline disconnects and spool-piece removals.

The DCA MATs will likely be supported by the following Subsidiary Application Templates (SATs):

- Oil Discharge Permits for the discharge of pipeline flush fluids containing hydrocarbons at a concentration below 30mg/l OIW;
- Marine Licence for the seabed disturbance from dredging activities and the temporary deposits of heavy duty debris baskets for recovery of mattresses/grout sacks and pipeline spool-pieces.

Pipeline Works Authorisation (PWA) variation applications will be submitted to OGA to request consent for these operations.

Chrysaor confirms that the request will not compromise or prejudice feasible decommissioning options for the remaining infrastructure. A copy of the PWR and reference of the work executed will be an appendix to the Decommissioning Programmes.

We request your permission to undertake these works ahead of the Decommissioning Programme approval to avoid the additional expenditure associated with delaying this activity.

Yours sincerely



Catharine Marston
Decommissioning Integration Lead

T: +44 (0)7809 781 392 E: cathy.marston@chrysaor.com

Appendix 1.2 OPRED to Chrysaor (2-pages)

Offshore Petroleum Regulator
for Environment & Decommissioning

Catharine Marston
Chrysaor Production (U.K.) Limited
Rubislaw House
Anderson Drive
Aberdeen
AB15 6FZ

Offshore Petroleum Regulator for
Environment & Decommissioning

Department for Business, Energy &
Industrial Strategy
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ
T: 01224 254042
E: kim.wood@beis.gov.uk
www.gov.uk/beis

12 February 2021

Dear Mrs Marston

RE: Request to undertake preparatory works in 2021 prior to the CDP1b, CDP2 and CDP3 Decommissioning Programme Approvals

I write in reply to your email of 6 January 2021, enclosing a letter dated 7 January 2021 (*sic*), containing an updated request to carry out various preparatory works prior to the approval of the CDP1b, CDP2, CDP3 decommissioning programmes.

Chrysaor proposes various subsea pipeline disconnection works at the base of the MD and MA jackets of the Murdoch complex. Thirteen pipelines (5 methanol, 5 gas and 3 umbilicals) are proposed to be disconnected by diamond-wire saw at the Murdoch MA and MD platforms. The proposed cuts will be made at a minimum lateral distance of 5m from the platforms to allow sufficient minimum clearance for the subsequent platform removals in 2022. The pipeline sections noted below will be removed; if possible, with the outboard cut terminating at a point where the pipeline is buried beneath stabilisation material.

- PL1436 - 3m section from Boulton BM to Murdoch MD
- PL1437 - 3m section from Murdoch MD to Boulton BM
- PL929 - 3m section from Murdoch MD to TGT 26" Gas Line
- PL930 - 3m section from TGT 26" Gas Line to Murdoch MD
- PL935 - 3m section from Caister CM to Murdoch MD
- PL936 - 3m section from Murdoch MD to Caister CM
- PL1922 - 11m section from Hawksley EM to Murdoch MD
- PL1925 - 11m section from Murdoch MD to Hawksley EM
- PL1924 - 12m section from Boulton H HM to Murdoch MD
- PL1927 - 12m section from Murdoch MD to Boulton H HM
- PLU4890 - 8m section from Murdoch MA to Murdoch K KM
- PLU4686 - 8m section from Murdoch K KM to Murdoch MA
- PLU4889 - 8m section from Murdoch MA to Watt QM

The proposal also notes that if any closing span exists at a riser base, a further length of pipeline may be removed up to the point where the pipeline touches down on the seabed. This specific activity may be undertaken in this disconnection campaign, or at a later phase, depending upon whether the platform is obstructing access.



Offshore Petroleum Regulator
for Environment & Decommissioning

In addition, the proposal also notes that the pipeline ends at the Murdoch MD and MA platforms will not be buried during this pipeline disconnection stage. The decommissioning of these pipeline ends will be assessed in the Comparative Assessment, accompanying the future associated Decommissioning Programmes, and agreed with OPRED as part of the decommissioning approval process.

We have considered Chrysaor's proposals, outlined in your updated letter of 7 January 2021, for the above-named pipelines, and conclude that they will not prejudice or compromise feasible decommissioning options and as such we are content to agree the proposals.

However, you are reminded that pipeline PL929, the 26" pipeline from Murdoch MD to Theddlethorpe Gas Terminal (TGT) has been identified for potential re-use and we are aware that the Oil & Gas Authority (OGA) has been discussing this aspect with Chrysaor. Agreement to the disconnection of PL929 as part of this preparatory works request is given only on the basis that PL929 is disconnected and left in such a manner that this does not preclude potential re-use options.

With regards to the PWA and MCAA applications associated with these proposals, Chrysaor must make it clear in these submissions that the only reason that some of the pipelines are being removed in two separate phases is because the platform obstructs access to some of the sections of pipelines attached to it. You are also reminded that PWA applications should be submitted well in advance of proposed work start dates, and clearly state, where applicable, whether third parties are aligned to avoid any delay in approval. Please ensure that start dates are aligned across the supporting applications.

This approval is given only in respect of the disconnections of the Chrysaor owned pipelines noted above, agreement to any associated INEOS or DNO owned pipeline disconnections will require separate approval agreed by the relevant team within OPRED-ODU.

This is the third version of this preparatory works request at the Murdoch Complex; the three iterations (1 October 2020, 1 December 2020 and 7 January 2021) have involved multiple changes to pipeline disconnection lengths, some quite considerable. Triple handling of a request is not helpful to ODU nor its internal and external consultees. This has caused unnecessary, additional workload which is time-consuming and inefficient for all involved. Chrysaor must ensure that any future preparatory works proposals are at a sufficient stage of maturity before submission to avoid this happening again.

I also draw your attention to ensuring that appropriate time is allowed for the review and approval process of decommissioning programmes. Timings for approvals are dependent on the quality and nature of information provided, but also the additional assessments that may be required due to environmental considerations.

Yours sincerely

Fiona Livingston
Senior Decommissioning Manager
Offshore Decommissioning Unit

Appendix 2 Public & consultee correspondence

Appendix 2.1 Public Notices

PUBLIC NOTICE
THE PETROLEUM ACT 1998
CAISTER CM PIPELINES DECOMMISSIONING PROGRAMME
(CDP1b)

Chrysaor Production (U.K.) Limited has submitted, for the consideration of the Secretary of State for Business, Energy & Industrial Strategy, the draft Decommissioning Programme for the Caister CM Pipelines, in accordance with the provisions of the Petroleum Act 1998. It is a requirement of the Act that interested parties be consulted on such decommissioning proposals.

The items/facilities covered by the Decommissioning Programme are:
 The Caister CM infrastructure lies 163 kilometres east of the UK Lincolnshire coast in Block 44/23a. The pipelines to be decommissioned are associated with the Caister CM installation and comprise of two pipelines (one gas, one methanol).

Harbour Energy hereby gives notice that a summary of the Caister CM Pipelines Decommissioning Programme can be viewed at this address: www.harbourenergy.com, or alternatively a hard copy of the document may be requested by contacting Harbour Energy during office hours on 01224 205000.

Representations regarding the Caister CM Pipelines Decommissioning Programme should be submitted in writing to the person named at the address below, or via email to DecommissioningDCMailbox@chrysaor.com, by the consultation closing date of **8 April 2022**. Submissions should state the grounds upon which any representations are being made.

Date: 7 March 2022
 Michael Burnett
 Decommissioning Strategy and Integration Manager
 Harbour Energy
 Rubislaw House
 Anderson Drive
 Aberdeen
 AB15 6FZ (4008764)

4258 | CONTAINING ALL NOTICES PUBLISHED ONLINE ON 7 MARCH 2022 | LONDON GAZETTE

Figure A2.1.1: Public Notice - The London Gazette, 07 March 2022

Monday 7 March 2022 *The Daily Telegraph*

PUBLIC NOTICE

The Petroleum Act 1998

Caister CM Pipelines Decommissioning Programme (CDP1b)

Chrysaor Production (U.K.) Limited (a Harbour Energy company) has submitted, for the consideration of the Secretary of State for Business, Energy & Industrial Strategy, the draft Decommissioning Programme for the Caister CM Pipelines, in accordance with the provisions of the Petroleum Act 1998. It is a requirement of the Act that interested parties be consulted on such decommissioning proposals.

The items/facilities covered by the Decommissioning Programme are:
 The Caister CM infrastructure lies 163 kilometres east of the UK Lincolnshire coast in Block 44/23a. The pipelines to be decommissioned are associated with the Caister CM installation and comprise of two pipelines (one gas, one methanol).

Harbour Energy hereby gives notice that a summary of the Caister CM Pipelines Decommissioning Programmes can be viewed at this address: www.harbourenergy.com, or alternatively a hard copy of the document may be requested by contacting Harbour Energy during office hours on 01224 205000.

Representations regarding the Caister CM Pipelines Decommissioning Programmes should be submitted in writing to the person named at the address below, or via email to DecommissioningDCMailbox@chrysaor.com, by the consultation closing date of **8 April 2022**. Submissions should state the grounds upon which any representations are being made.

Date: 7 March 2022

Harbour Energy
 Rubislaw House
 Anderson Drive
 Aberdeen AB15 6FZ

Michael Burnett
 Decommissioning Strategy and
 Integration Manager

MONDAY, MARCH 7, 2022 **HULL-LIVE.CO.UK** 37

PUBLIC NOTICE
The Petroleum Act 1998
Caister CM Pipelines Decommissioning
Programme (CDP1b)

Chrysaor Production (U.K.) Limited has submitted, for the consideration of the Secretary of State for Business, Energy & Industrial Strategy, the draft Decommissioning Programme for the Caister CM Pipelines, in accordance with the provisions of the Petroleum Act 1998. It is a requirement of the Act that interested parties be consulted on such decommissioning proposals.

The items/facilities covered by the Decommissioning Programme are:
 The Caister CM infrastructure lies 163 kilometres east of the UK Lincolnshire coast in Block 44/23a. The pipelines to be decommissioned are associated with the Caister CM installation and comprise of two pipelines (one gas, one methanol).

Harbour Energy hereby gives notice that a summary of the Caister CM Pipelines Decommissioning Programme can be viewed at this address: www.harbourenergy.com, or alternatively a hard copy of the document may be requested by contacting Harbour Energy during office hours on 01224 205000.

Representations regarding the Caister CM Pipelines Decommissioning Programme should be submitted in writing to the person named at the address below, or via email to DecommissioningDCMailbox@chrysaor.com, by the consultation closing date of **8 April 2022**. Submissions should state the grounds upon which any representations are being made.

Date: 7 March 2022

Michael Burnett
 Decommissioning Strategy and Integration Manager
 Harbour Energy
 Rubislaw House, Anderson Drive, Aberdeen AB15 6FZ

Figure A2.1.2: Public Notice - The Daily Telegraph & The Hull Daily Mail, 07 March 2022

Appendix 2.2 Email from GMG

From: Alex Riddell, GMG

To: C. Marston

Date: 13 April 2022: 13:27

Good afternoon,

Thank you for sending through the Caister CM Pipelines Decommissioning Program.

I have reviewed the content provided and as the nearest active cables (TAMPNET Norsesea Com 1 and MCCS) are located within 1km of the Murdoch Platforms, it would be prudent to contact the cable owners to ensure they are aware of operations.

Contact details of the cable owners can be sourced from <https://kis-orca.org/map/>

Kind regards,

Alex Riddell

Appendix 2.3 Letter from NFFO



The National Federation of
Fishermen's Organisations

Harbour Energy
Rubislaw House
Anderson Drive
Aberdeen
AB15 6FZ

13th April 2022.

Attention of: Catharine Marston.
Decommissioning Integration Lead, Harbour Energy.

Dear Catharine

In reference to the decommissioning program for the CDP2, Caister Murdoch system111
Installations and associated pipelines & the CDP1b Caister CM pipelines.

The National Federation Fisherman's Organisations would like to thank Harbour Energy for
the detailed documentation explaining the planned methodology of the decommissioning of
these assets along with the comparative assessment and environmental statements.

I can confirm The National Federation Fisherman's Organisations would like to comment and
request post decommissioning trawl surveys are carried out at each 500m safety zones to
ensure that the area is safe to be opened to commercial fishing operations with no snagging
hazards or debris is left in situ after the removal of these assets.

NFFO Services department look forward to working closely with Harbour Energy throughout
the decommissioning process.

Kind Regards

Ian Rowe

NFFO Services

General Manager.

The National Federation of Fishermen's Organisations Ltd | 30 Monkgate, York YO31 7PF

Tel: 01904 635430 | Email: nffo@nffo.org.uk | Web: www.nffo.org.uk

Appendix 2.4 Letter from SFF



Our Ref: SA/03/1/DP

Your Ref:

25th March 2022

Scottish Fishermen's Federation
24 Rubislaw Terrace
Aberdeen, AB10 1XE
Scotland UK

T: +44 (0) 1224 646944
F: +44 (0) 1224 647078
E: sff@sff.co.uk

www.sff.co.uk

Catharine Marston
Decommissioning Integration Lead
Chrysaor (U.K) Limited
Rubislaw House
Anderson Drive
Aberdeen AB15 6FZ

Dear Catharine,

CDP1b: Caister CM Pipelines Decommissioning Programme

I refer to your letter of 7th March 2022 and associated documents provided by email on 4th March 2022 regarding the draft Decommissioning Programme for the Caister CM Pipelines.

The Scottish Fishermen's Federation (SFF) appreciates the clearly laid out and detailed explanation of Chrysaor's proposals for the decommissioning of the aforementioned infrastructure and place on record our appreciation of the information provided.

Given the locality of this particular Field, I can advise that the SFF is content to leave it with the National Federation of Fishermen's Organisations (NFFO) to respond to you on these plans.

For your information, please note that the SFF's Oil and Gas Decommissioning Policy and accompanying Key Principles document can be viewed via the SFF's website using the following link: <https://www.sff.co.uk/sff-offshore-oil-gas-decommissioning-policy/>

Yours sincerely,



Steven Alexander
Offshore Liaison

Members:

Anglo Scottish Fishermen's Association · Fife Fishermen's Association · Fishing Vessel Agents & Owners Association (Scotland) Ltd ·
Mallaig & North-West Fishermen's Association Ltd · Orkney Fisheries Association · Scottish Pelagic Fishermen's Association Ltd ·
The Scottish White Fish Producers' Association Ltd · Shetland Fishermen's Association

VAT Reg No: 605 096 748

Appendix 3 Letters of Support



Offshore Petroleum Regulator for Environment and Decommissioning
Department for Business, Energy & Industrial Strategy
3rd Floor, Wing C
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

1st July 2022

Dear Sir or Madam

Caister CM Pipelines Decommissioning Programme: CDP1b

The Petroleum Act 1998

We acknowledge receipt of your letter dated 30th June 2022.

We, Chrysaor (U.K.) Beta Limited confirm that we hereby authorise Chrysaor Production (U.K.) Limited to submit on our behalf the abandonment programme for the Caister CM Pipelines Decommissioning Programme, as directed by the Secretary of State on 30th June 2022.

We confirm that we support the proposals detailed in the Caister CM Pipelines Decommissioning Programme dated 30th June 2022, which are to be submitted by Chrysaor Production (U.K.) Limited in so far as they relate to those facilities in respect of which we are required to submit an abandonment programme under section 29 of the Petroleum Act 1998.

Yours faithfully



Richard Tocher
SVP Decommissioning & Major Projects

For and on behalf of Chrysaor (U.K.) Beta Limited

Chrysaor Production
(U.K.) Limited
Rubislaw House
Anderson Drive
Aberdeen
AB15 6FZ
harbourenergy.com



Offshore Petroleum Regulator for Environment and Decommissioning
Department for Business, Energy & Industrial Strategy
3rd Floor, Wing C
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

1st July 2022

Dear Sir or Madam

Caister CM Pipelines Decommissioning Programme: CDP1b

PETROLEUM ACT 1998

We acknowledge receipt of your letter dated (30th June 2022).

We, Premier Oil E&P UK Limited confirm that we hereby authorise Chrysaor Production (U.K.) Limited to submit on our behalf the abandonment programme for the Caister CM Pipelines Decommissioning Programme, as directed by the Secretary of State on 30th June 2022.

We confirm that we support the proposals detailed in the Caister CM Pipelines Decommissioning Programme dated 30th June 2022, which are to be submitted by Chrysaor Production (U.K.) Limited in so far as they relate to those facilities in respect of which we are required to submit an abandonment programme under section 29 of the Petroleum Act 1998.

Yours faithfully,



Richard Tocher
SVP Decommissioning & Major Projects

For and on behalf of Premier Oil E&P UK Limited



To:

Department for Business, Energy and Industrial Strategy (BEIS)
Offshore Petroleum Regulator for Environment & Decommissioning
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

Date: 01-07-2022

Dear Sir or Madam,

Caister CM Pipelines Decommissioning Programme: CDP1b

PETROLEUM ACT 1998

We acknowledge receipt of your letter dated (30th June 2022).

We, Neptune E&P UKCS Limited confirm that we hereby authorise Chrysaor Production (U.K.) Limited to submit on our behalf the abandonment programme for the Caister CM Pipelines Decommissioning Programme, as directed by the Secretary of State on 30th June 2022.

We confirm that we support the proposals detailed in the Caister CM Pipelines Decommissioning Programme dated 30th June 2022, which are to be submitted by Chrysaor Production (U.K.) Limited in so far as they relate to those facilities in respect of which we are required to submit an abandonment programme under section 29 of the Petroleum Act 1998.

Yours faithfully,

DocuSigned by:

A69CBA92DA884EF...

Lyn Strachan

Commercial Lead Non-Operated Assets

For and on behalf of Neptune E&P UKCS Limited.

Neptune E&P UKCS Limited
Nova North, 11 Bressenden Place
London SW1E 5BY
United Kingdom
T: +44 (0)1224 281000
F: +44 (0)1224 281025
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