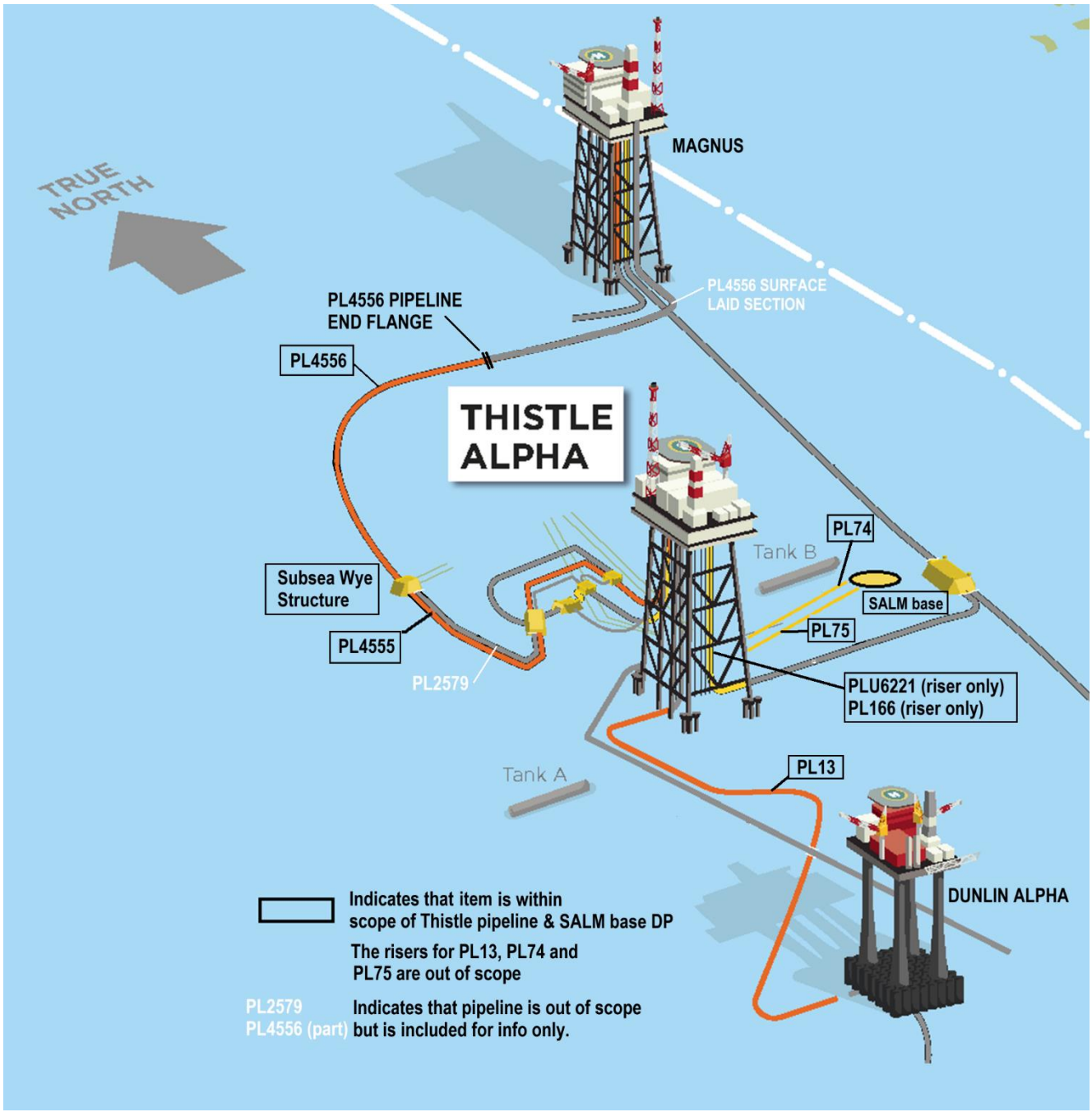
Thistle Pipeline & SALM Base Decommissioning Programmes



Consultation Draft

EnQuest

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TABLE OF CONTENTS			INST	P/L
1.	**Executive Summary**	**7**	√	√
1.1	Decommissioning Programmes	7	√	√
1.2	Requirement for Decommissioning Programmes	7	√	√
1.3	Introduction	8	√	√
1.4	Overview of installations being decommissioned	9	√	√
1.5	Overview of pipelines being decommissioned	9	√	√
1.6	Summary of proposed Decommissioning Programmes	11	√	√
1.7	Field Location including field layout and adjacent facilities	13	√	√
1.8	Industrial Implications	18	√	√
2.	**Description of items to be decommissioned**	**19**	√	√
2.1	Subsea installations	19	√	
2.2	Pipelines including stabilisation features	20		√
2.3	Pipeline structures	24		√
2.4	Pipeline crossings	26		√
2.5	Wells	27		√
2.6	Inventory estimates	28	√	√
3.	**Removal and disposal methods**	**29**	√	√
3.1	Use of Waste Framework Directive	29	√	√
3.2	Installations	29	√	√
3.3	Pipelines	29		√
3.4	Pipeline protection and stabilisation features	32		√
3.5	Pipeline protection structures	35		√
3.6	Pipeline crossings	35		√
3.7	Waste streams	35	√	√
4.	**Environmental Appraisal Overview**	**37**	√	√
4.1	Environmental sensitivities	37	√	√
4.2	Potential environmental impacts and their management	37	√	√
5.	**Interested party consultations**	**40**	√	√
5.1	Consultation summary	40	√	√
6.	**Programme Management**	**41**	√	√
6.1	Project Management and Verification	41	√	√
6.2	Post-Decommissioning Debris Clearance and Verification	41	√	√
6.3	Schedule	41	√	√
6.4	Interim monitoring and evaluation	43	√	√
6.5	Costs	43	√	√
6.6	Close Out	43	√	√
6.7	Post-decommissioning monitoring and evaluations	43	√	√
7.	**References**	**44**	√	√
Appendix A	**Pipeline crossings**	**45**	√	√
Appendix A.1	PL4556 over PL164	45		√
Appendix A.2	PL4556 over PLU1762	46		√
Appendix A.3	PL4556 over PLU4570	47		√
Appendix B	**Thistle baseline environment**	**48**	√	√
Appendix B.1	Summary of characteristics & sensitivities	48	√	√
Appendix C	**Public Notice & consultee correspondence**	**50**	√	√
Appendix C.1	Public Notices	50	√	√

FIGURES AND TABLES

TABLE OF ABBREVIATIONS

ABBREVIATION	EXPLANATION
~	Approximately
BNOC	British National Oil Corporation
BP	British Petroleum
Britoil	Britoil Limited
CA	Comparative Assessment
Chrysaor	Chrysaor Production (U.K.) Limited (refer Table 1.7.1)
CI	Chemical Injection
CNRI	CNR International (UK) Limited (refer Table 1.7.1)
CTEE	Coal Tar Epoxy Enamel (refer Table 2.2.1)
DFGI	Dunlin Fuel Gas Import
DNO ASA	Norwegian oil and gas operator founded in 1971
DP	Decommissioning Programme(s)
DPN	Disused Pipeline Notifications
DSW	Don South-West
EA	Environmental Appraisal
EnQuest	EnQuest Heather Limited
ENVID	Environmental Identification
ESDV	Emergency Shutdown Valve
FPF	Floating Production Facility
FPU	Floating Production Unit (refer Table 1.7.1)
GBS	Gravity base Structure (concrete) (refer Table 1.7.1)
GMG	Global Marine Group
HSE&A	Health, Safety, Environment and Assurance
ICES	International Council for the Exploration of the Sea
IPR	Interim Pipeline Regime
Jacket	substructure that supports topsides
Jacket footings	Part of jacket or substructure resting on the seabed up to the highest point of the piles, or a part of the steel installation that is so closely connected as to present major engineering problems in being severed
kg	Kilogram = 1,000 grams
km	Kilometre = 1,000 metres
KP	Kilometre Point, usually measured from point of origin, the start of the pipeline at the pipeline flange. A negative KP means that the features (e.g. tie-in spools) lie between the riser flange and the start of the pipeline.
LAT	Lowest Astronomical Tide
Lockheed Chamber	A diver accessible chamber at the base of a riser to allow the pipeline to riser weld to be executed
MBES	Multi-Beam Echo Sounder
MCX	MCX Dunlin (UK) Limited (refer Table 1.7.1)
MPA	Marine Protected Area
MPA (NC)	The North-East Faroe-Shetland Channel Nature Conservation Marine Protected Area
NE	North-East (direction)
NFFO	National Fishermen's Federation Organisation

ABBREVIATION	EXPLANATION
NIFPO	National Fish Producer's Organisation
NLGP	Northern Leg Gas Pipeline
No	Number (of)
NORM	Naturally Occurring Radioactive Material
NSTA	North Sea Transition Authority
OBM	Oil Based Mud
OGA	Oil and Gas Authority (rebranded 'NSTA' on 21 March 2022)
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo Paris Convention. (The Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention')
PL, PLU	Pipeline Identification Number as defined by NSTA using the PWA application process or Pipeline (refer Table 1.7.1)
PWA	Pipeline Works Authorisation
SALB	Single Anchor Leg Base (used to be the Northern Producer export route)
SALM base	Single Anchor Leg Mooring base
SDC	Subsea Decommissioning Collaboration (SDC) (Figure 6.3.1)
SFF	Scottish Fishermen's Federation
SPA	Special Protection Area
SSIV	Subsea Isolation Valve
TAQA	TAQA Europa B.V. (refer Table 1.7.1)
Te	1 Tonne (=1,000 kg)
TFSW	Transfrontier Shipment of Waste
TUTU	Topsides Umbilical Termination Unit
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
UTM	Universal Transverse Mercator
WD	West Don
WNAS	Wintershall Norsk AS (refer Table 1.7.1)

1. EXECUTIVE SUMMARY

1.1 Decommissioning Programmes

This document presents the Thistle Alpha (referred to as Thistle) pipeline and SALM Base Decommissioning Programmes ('DP') and the document is supported by a Comparative Assessment ('CA') and Environmental Appraisal ('EA').

The Thistle pipelines include:

- PL13 16in oil export pipeline to Dunlin.12.7 km long.
- PL74 16in seawater pipeline to SALM base, 2.4 km long.
- PL75 16in oil export pipeline to SALM base, 2.4 km long.
- PL166 (NLGP) riser attached to the Thistle jacket, 0.2 km long.
- PL4555 8in oil export pipeline to Wye structure, 10.26 km long.
- PL4556 from the Wye structure to the pipeline end flange near the Magnus platform inside the Magnus 500m zone, 23.39 km long.
- PLU6221 (NLGP) riser, 0.17km long for the umbilical that serves PL166 SSIV.
- Wye structure.

PL13, PL74, PL75, and PL4556 are logged in the Interim Pipeline Regime ('IPR') and are subject to Disused Pipeline Notifications ('DPN').

The topsides and jacket covered by notices under Section 29 of the Petroleum Act 1998 are subject to separate Decommissioning Programmes. The Thistle topsides Decommissioning Programme was approved 23 December 2021. The Decommissioning Programmes for the upper jacket and jacket footings will be submitted at a later stage. Decommissioning Programmes for the NLGP related infrastructure (i.e. PL166 and PLU6221 excluding the risers) will be submitted separately by the owners.

Although decommissioning of the Thistle pipelines is treated in this document as part of the Thistle decommissioning project, EnQuest will continue to explore cost saving synergies with other projects.

1.2 Requirement for Decommissioning Programmes

Installations: In accordance with the Petroleum Act 1998, EnQuest Heather Limited (as operator of the Thistle field), and the Section 29 Notice Holders (Table 1.4.2), are applying to the Offshore Petroleum Regulator for Environment and Decommissioning ('OPRED') to obtain approval for decommissioning the Thistle SALM as detailed in Section 1.4.1 of this document. Partner letters of support will be provided directly to OPRED.

Pipelines: In accordance with the Petroleum Act 1998, EnQuest Heather Limited (as operator of the Thistle field), and the Section 29 Notice Holders (Table 1.5.2, Table 1.5.4, Table 1.5.6, Table 1.5.8, Table 1.5.10) are applying to the Offshore Petroleum Regulator for Environment and Decommissioning ('OPRED') to obtain approval for decommissioning the Thistle pipelines and Wye structure as detailed in Section 1.5.1 of this document. Partner letters of support will be provided directly to OPRED.

In conjunction with public, stakeholder and regulatory consultation, this Decommissioning Programme document is submitted in compliance with national and international regulations and

OPRED guidance notes [10]. The schedule outlined in this document is for a ten-year period[1] to decommission the pipelines beginning in 2026.

1.3 Introduction

The Thistle field was discovered in 1972 in the fourth UK acreage licensing round in block 211/18 and 211/19 (licenses P236 and P475). The field is produced over the Thistle Alpha platform (here after referred to as the Thistle platform), a fixed installation providing manned production, drilling, and utilities facilities. The Thistle platform is situated in block 211/18a of the United Kingdom Continental Shelf and operated by EnQuest Heather Limited. The Thistle field is located ~201 km North-East of Shetland, in a water depth of ~162 m.

The Thistle jacket was installed in 1976 with the topsides' modules being installed the following year. Oil production commenced in February 1978.

Decommissioning of the Thistle topsides and upper jacket associated with Thistle will be subject to separate Decommissioning Programmes. The Thistle topsides Decommissioning Programme was approved 23 December 2021.

The licensing operators for the Thistle field were British National Oil Corporation ('BNOC'), Britoil and BP, which subsequently transferred to DNO ASA in 2003, followed by Lundin in 2004. EnQuest then became the operator in 2010 after demerging of Lundin's UK assets. Thistle is currently operated in partnership between EnQuest and BP, with EnQuest generally holding over 99% of the total ownership of the Thistle assets. The decommissioning liabilities are different and are as stated in section 1.4.1 and section 1.5.1.

A Cessation of Production application for Thistle was accepted by the North Sea Transition Authority[2] on 14th September 2020.

Before the Northern Producer Floating Production Facility ('FPF') was decommissioned, production from the Conrie, Don South-West, West Don and Ythan fields was exported to Thistle using PL2578 (the section between the Wye and Thistle being renumbered PL4555) with the produced fluids being commingled with the production from Thistle and exported to Dunlin. As the Dunlin platform was to be decommissioned, in 2019 the Dunlin Fuel Gas Import ('DFGI') project was implemented. This involved the installation of a new pipeline and various modifications to the existing pipeline infrastructure to allow produced fluids to be exported via Magnus instead of Dunlin. This involved installing two new pipelines, PL2852 and PL4556, and repurposing PL2578 as an export pipeline from Thistle rather than act as an import pipeline for the Northern Producer FPF, which was due to be decommissioned shortly. PL2578 was renumbered PL4555 as part of the process. Some pipespools were removed from PL13 near Dunlin.

Along with the SALM base, the following pipelines are to be decommissioned in the Decommissioning Programmes:

Thistle

- PL13 16in oil export pipeline to Dunlin,12.7 km long
- PL74 16in seawater pipeline to SALM Base, 2.4 km long
- PL75 16in oil export pipeline to SALM Base, 2.4 km long
- PL166 NLGP spur riser, 0.2 km long

[1] Activity window extended as per North Sea Transition Authority ('NSTA') strategy which aspires to combine multiple scopes in a single campaign.
[2] Oil and Gas Authority was rebranded North Sea Transition Authority in early 2022.

- PL4555 8in oil export pipeline to Wye structure, 10.26 km long.
- PL4556 from the Wye structure to Magnus, 23.75 km long but only 23.39km of the pipeline (up to the pipeline flange near Magnus) is being decommissioned in this DP
- PLU6221 NLGP umbilical for PL166 SSIV, riser section only, 0.17 km long.

The Decommissioning Programmes explain the principles of the decommissioning activities and is supported by a pipeline comparative assessment [6] and an environmental appraisal [7].

1.4 Overview of installations being decommissioned

1.4.1 Installations

Table 1.4.1: Installation being decommissioned			
Field(s):	Thistle	**Production Type**	Oil
Water Depth (m)	~162 m	**UKCS Block**	211/18a
Distance to median (km)	~11km (Norway)	**Distance from nearest UK coastline**	~201 km NE of Shetland
Surface Installations			
Number	**Type**	**Mass (Notes 1,2)**	
1	SALM base	1,450 Te	

NOTE
1. The SALM base is located ~2.4 km North-North-East of the Thistle installation.
2. Estimated mass of SALM base includes concrete (~250 Te) and baryte (~1,100 Te) ballast. The mass of the SALM Base itself without ballast is ~100 Te.

Table 1.4.2: Section 29 Notice Holder details – installation		
Section 29 Notice Holder	**Registration Number**	**License interest[3]**
EnQuest Heather Limited	02748866	-
Britoil Limited	SC077750	81.72%
Chrysaor Production (U.K.) Limited	00524868	18.28%
EnQuest Thistle Limited	04487223	-

1.5 Overview of pipelines being decommissioned

1.5.1 Pipelines

Table 1.5.1: Thistle pipelines being decommissioned (PL13, PL74, PL75)		
Number of risers, pipelines, cables, umbilicals	3	Refer Table 2.2.1

Table 1.5.2: Section 29 Notice Holder details – Thistle pipelines (PL13, PL74, PL75)		
Section 29 Notice Holder	**Registration Number**	**License interest Decom liability[3]**
EnQuest Heather Limited	02748866	-
Britoil Limited	SC077750	81.72%
Chrysaor Production (U.K.) Limited	00524868	18.28%
EnQuest Thistle Limited	04487223	-

Table 1.5.3: Thistle pipelines being decommissioned (PL4555)		
Number of risers, pipelines, cables, umbilicals	1	Refer Table 2.2.1

Table 1.5.4: Section 29 Notice Holder details – Thistle pipeline (PL4555)		
Section 29 Notice Holder	**Registration Number**	**Working interest**
EnQuest Heather Limited	02748866	100%

Table 1.5.5: Thistle pipelines being decommissioned (PL4556, Wye structure)		
Number of risers, pipelines, cables, umbilicals	1	Refer Table 2.2.1

Table 1.5.6: Section 29 Notice Holder details – Thistle pipeline (PL4556, Wye structure)		
Section 29 Notice Holder	**Registration Number**	**Working interest**
EnQuest Heather Limited	02748866	100%

Table 1.5.7: NLGP pipelines being decommissioned (PL166 riser)		
Number of risers, pipelines, cables, umbilicals	1	Refer Table 2.2.1

Table 1.5.8: Section 29 Notice Holder details – NLGP pipelines (PL166 riser)		
Section 29 Notice Holder	**Registration Number**	**Working interest**
EnQuest Heather Limited	02748866	-
Britoil Limited	SC077750	81.72%
Chrysaor Production (U.K.) Limited	00524868	18.28%
EnQuest Thistle Limited	04487223	-

Table 1.5.9: NLGP pipelines being decommissioned (PLU6221 riser)		
Number of risers, pipelines, cables, umbilicals	1	Refer Table 2.2.1

Table 1.5.10: Section 29 Notice Holder details – NLGP pipelines (PLU6221 riser)		
Section 29 Notice Holder	**Registration Number**	**Working interest**
EnQuest Heather Limited	02748866	-

[3] During the latter period of production, the Thistle Field was beneficially owned 1% by Britoil and 99% by EnQuest. However, following Cessation of Production, equity has been retransferred to the original field owners.

Table 1.5.10: Section 29 Notice Holder details – NLGP pipelines (PLU6221 riser)		
Section 29 Notice Holder	**Registration Number**	**Working interest**
Britoil Limited	SC077750	81.72%
Chrysaor Production (U.K.) Limited	00524868	18.28%
EnQuest Thistle Limited	04487223	- -
NOTE 1. This table concerns ownership of PLU6221 riser. The riser is considered the portion of riser between the Thistle topsides and 1m outside of the bell mouth of the J tube.		

1.6 Summary of proposed Decommissioning Programmes

Table 1.6.1: Summary of Decommissioning Programmes	
Proposed Decommissioning Solution	**Reason for Selection**
1. Installations	
Complete removal. The gravity based SALM base will be completely removed and taken to shore to be dismantled and recycled unless alternative reuse options are found to be viable and more appropriate. Environmental permit applications required for work associated with removal of the installations will be applied for.	To comply with mandatory OSPAR requirements. Allows installations to be removed and maximises opportunity for re-use or recycling of materials.
2. Pipelines	
All pipelines will be flushed and cleaned with seawater. All pipelines will be decommissioned as follows: **PL13**. PL13. Remove the surface laid sections of the pipeline on approaches to the Thistle and Dunlin 'A' platforms in accordance with mandatory requirements. Bury the remaining section of the pipeline inside the trench under rock. This will result in ~29,300 Te of rock being deposited on the pipeline. OPRED will be consulted with regards to profiling of the deposited rock along the pipeline. **PL74 & PL75**. Completely remove both pipelines. **PL4555 & PL4556**. Leave *in situ*. Completely remove surface laid sections up to the point of burial in rock and completely remove all associated protection and stabilisation features. Deposit rock on the cut pipeline ends. The deposition of rock on cut pipeline ends (PL4555, PL4556) will be kept to a practical minimum. For the purposes of the EA, it is assumed that up to 15 Te of rock will be required at each location, total quantity ~60 Te. Leave all original deposited rock *in situ*. Environmental permit applications required for work associated with decommissioning of the pipelines will be applied for.	PL13, PL4555 and PL4556 - Preferred outcome of the comparative assessment [1]. PL74 & PL75 - complies with OPRED guidance notes and mandatory requirement for a clear seabed.

Table 1.6.1: Summary of Decommissioning Programmes	
Proposed Decommissioning Solution	**Reason for Selection**
3. Risers & umbilical	
PL4555. The catenary riser will be completely removed. **PLU6221**. The umbilical inside riser caisson 929 will be completely removed.	Meets regulatory requirements.
4. Pipeline structures	
The Wye structure will be completely removed. Environmental permit applications required for work associated with decommissioning of the Wye structure will be applied for.	In accordance with mandatory requirements.
5. Interdependencies	
None of the proposals for the decommissioning of pipelines around Thistle are affected by the presence of drill cuttings. Due to timescales of decommissioning, separate Decommissioning Programmes are submitted for the Thistle topsides, Thistle jacket and Thistle pipelines. The topsides Decommissioning Programme was approved 23 December 2021 [4]. Proposals for the sections of the risers (**PL13, PL74, PL75, PL166**) are addressed in the Decommissioning Programme for the Thistle upper jacket. **Riser caisson 930** contains the Don field pipelines PL598, PL599, PL600, and PLU6267. These are all grouted into the caisson. The decommissioning of the Don pipelines inside and outside of the Thistle 500 m zone is subject to separate Decommissioning Programmes [1][2]. **PL13** has been subject to remedial works in the past, where grout mattresses have been installed to reduce spans and support the pipeline. It is proposed that such remediation materials be left undisturbed and *in situ,* buried under deposited rock as outlined in the decommissioning proposals herein. **PL4556** is connected to the Magnus platform which is operated by EnQuest Heather Limited. Decommissioning of the surface laid sections of PL4556 inside the Magnus 500m zone are out of scope of this DP, but will be addressed in the Magnus Decommissioning Programmes that will be submitted at a time to be agreed with OPRED. **PL4556** crosses over several pipelines connected to Magnus. No third-party infrastructure will be directly affected because of the decommissioning proposals although the operating status of Magnus may influence the efficiency and timing of decommissioning works near the platform.	

1.7 Field Location including field layout and adjacent facilities

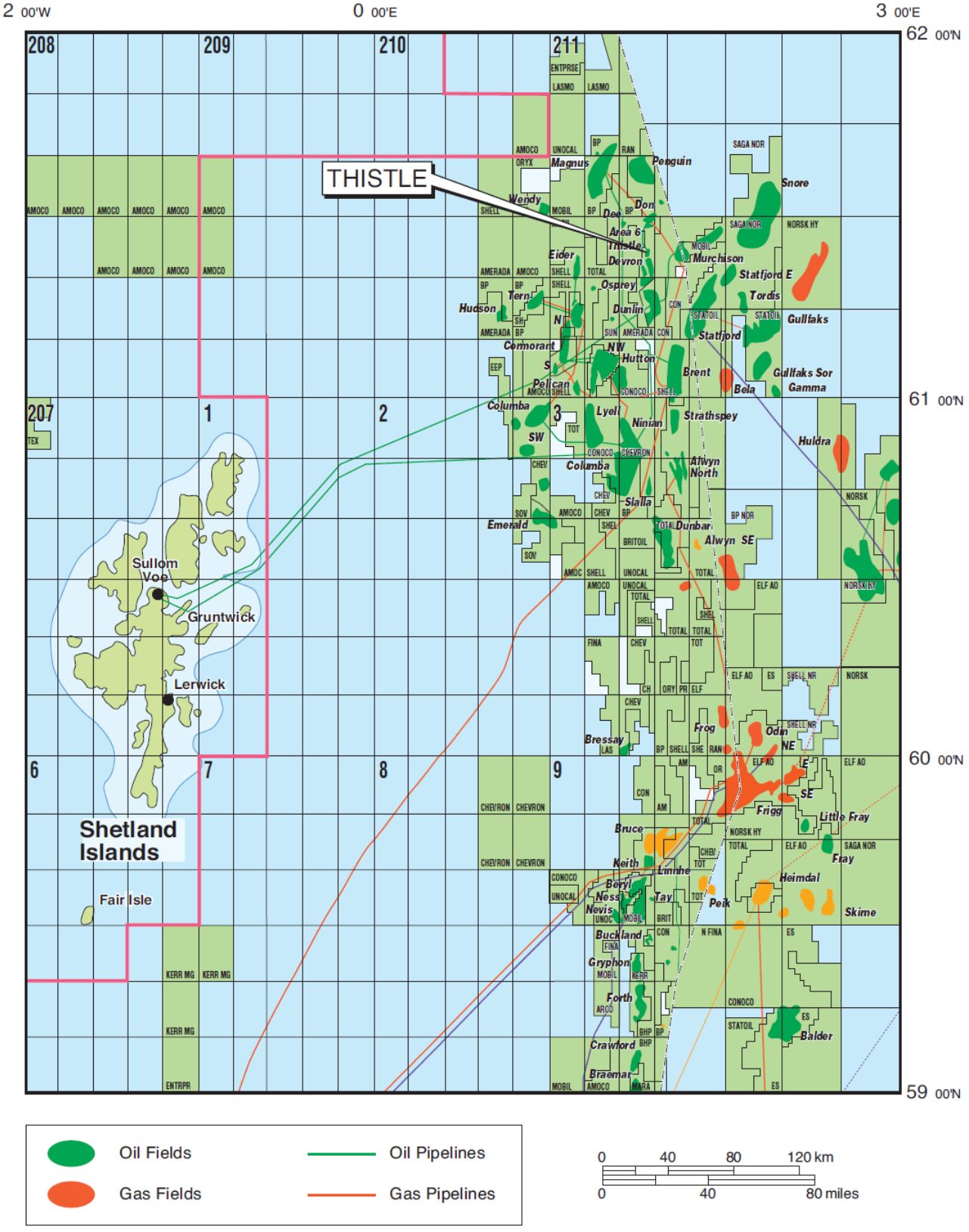


Figure 1.7.1: Thistle Field location in UKCS

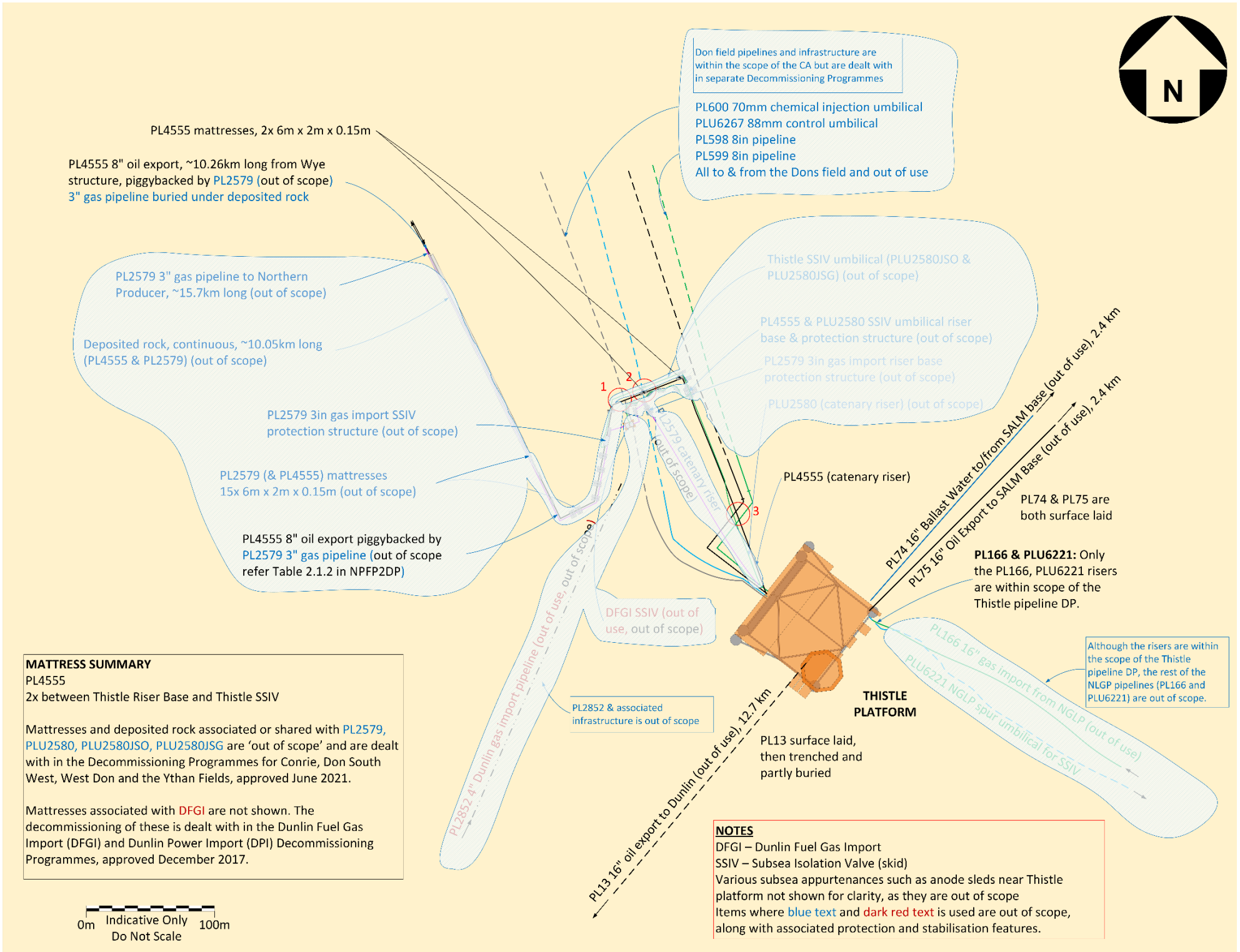


Figure 1.7.2: Thistle approaches

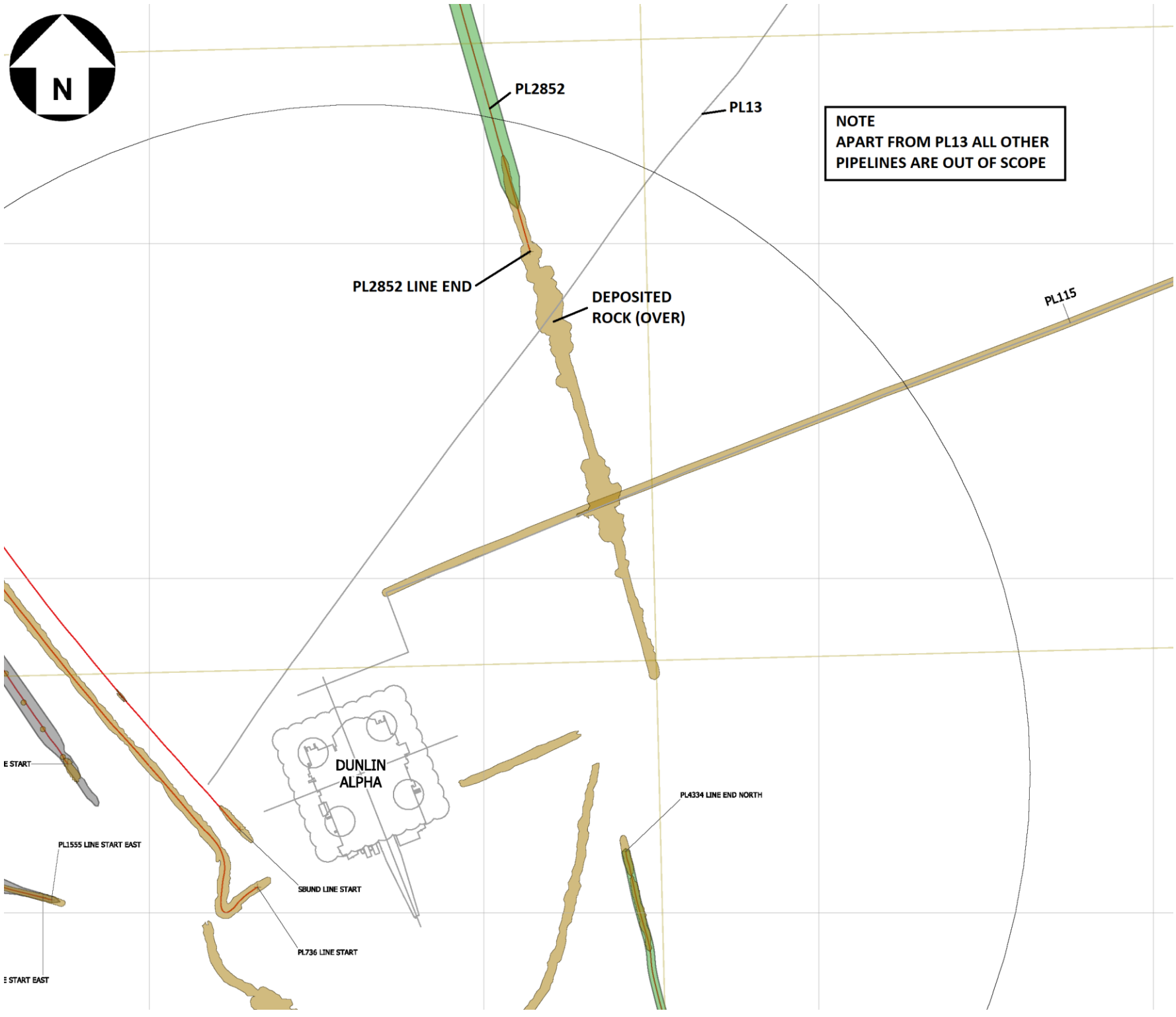


Figure 1.7.3: Dunlin approaches

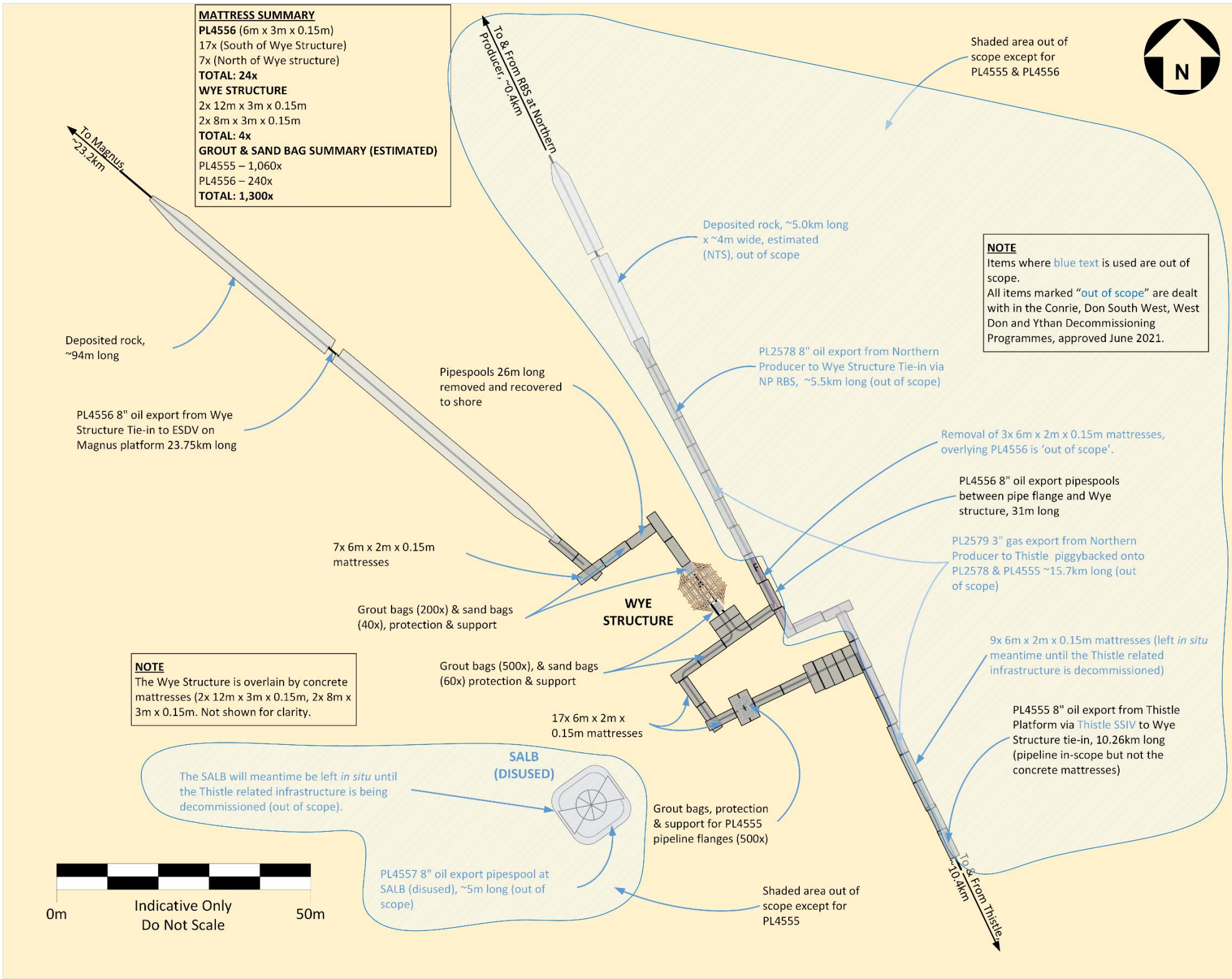


Figure 1.7.4: Wye structure & SALB approaches

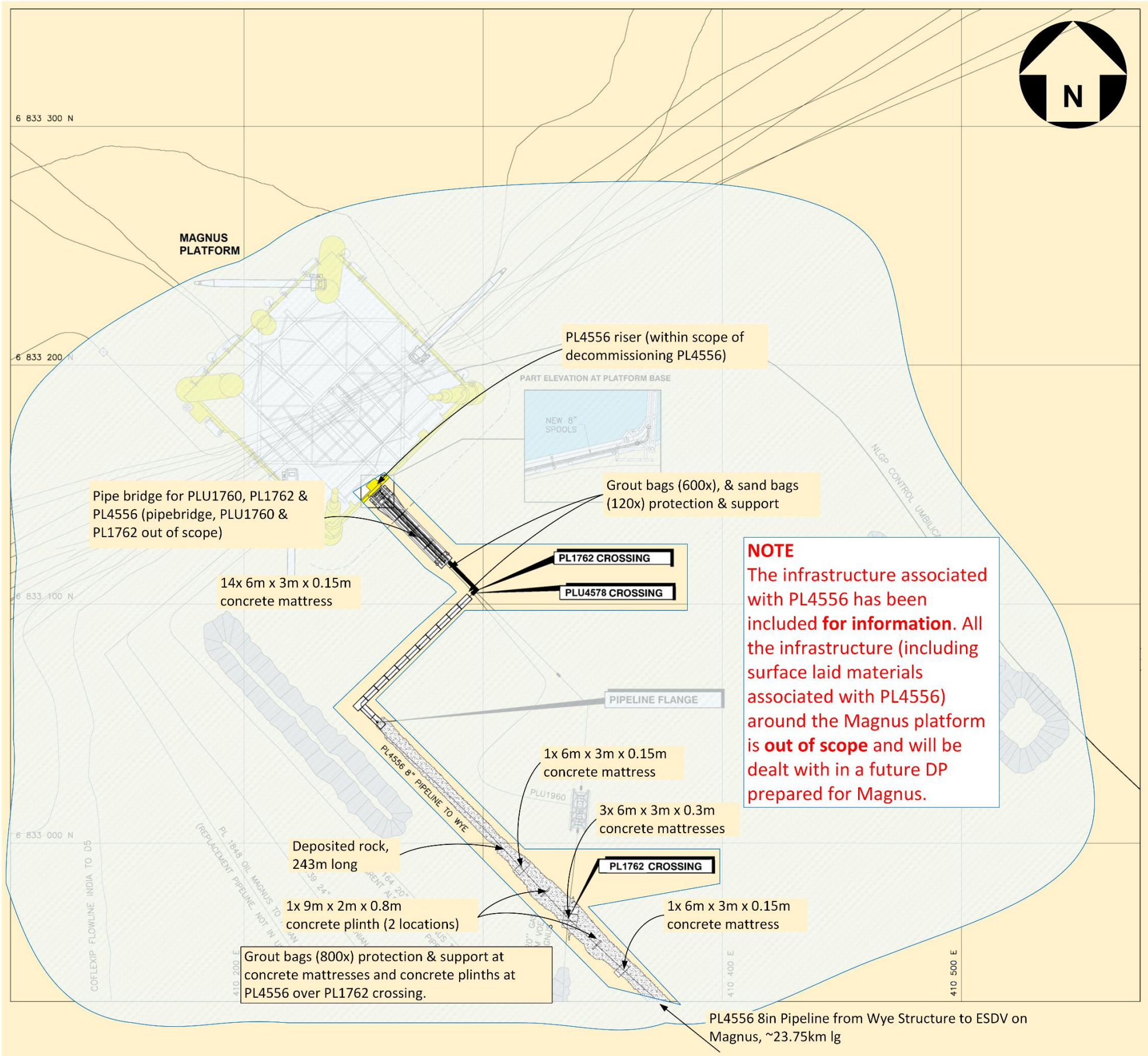


Figure 1.7.5: Magnus platform approaches

Table 1.7.1: Adjacent facilities (relative to Thistle)					
Operator	**Name**	**Type**	**Direction & distance**	**Information**	**Status**
CNRI & WNAS	Murchison	Jacket footings	NE, 9.5 km		Decommissioned
MCX	Dunlin A	GBS	S, 9.7 km		Decommissioned
TAQA	Eider A	Steel jacket	W, 22.5 km		Out of use
EnQuest	Northern Producer	FPU	NNW, 5.1 km		Decommissioned
Britoil	PL598	8in PL	All within Thistle 500 m zone.	Don, tied back to Thistle. Refer [1][2]	Partially decommissioned
Britoil	PL599	8in PL			
Britoil	PL600	70mm CI umbilical			
Britoil	PLU6267	88mm control umbilical			
EnQuest	Magnus	Fixed steel platform	~32.2 km NNW	Connected to Wye structure via PL4556	Operational
EnQuest	PL2579	3in PL	Piggybacked with PL4555	Refer [3]	Out of use
Fairfield Betula Limited, MCX Dunlin (UK) Limited	PL2852	4in PL	Thistle to Dunlin Platform		Decommissioned
Impacts of decommissioning proposals					
There are no direct impacts on adjacent facilities from the work associated with the Thistle pipeline decommissioning activities, except that decommissioning works will be required at Magnus and inside the Magnus 500 m safety zone (PL4556).					

1.8 Industrial Implications

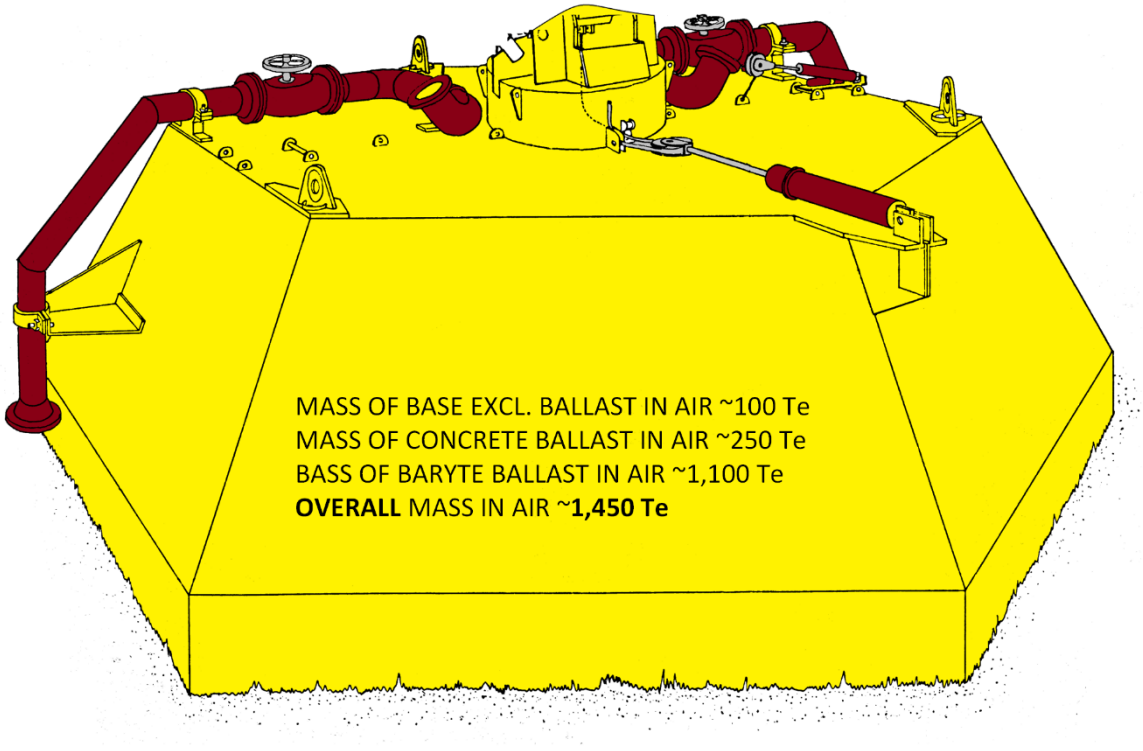
It is EnQuest's intention to develop a contract strategy and Supply Chain Action Plan that will result in an efficient and cost-effective execution of the decommissioning works.

The Thistle pipeline Decommissioning Programme activities will be managed by EnQuest to ensure safe, efficient, and legally compliant delivery of the various elements of the decommissioning scope. The intention is to make efficient use of the supply chain to generate value. This will be done through the application of knowledge, innovation, and technology, explore collaboration opportunities and to employ best practice in the management of the supply chain to deliver a cost effective and reliable service. Where appropriate existing framework agreements may be used for decommissioning activities.

2. DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Subsea installations

Table 2.1.1: Subsea Installation Information					
Subsea Installations Incl. Stabilisation Features	No	Mass (Te) / Size (m)	Location		Comments/ Status
			WGS84 Decimal	WGS84 Decimal Minute	
SALM base	1	1,450 14.65x14.65x7.8	61.377684° N 1.605636° E	61°22.6610' N 1°36.3382' E	Not piled. Refer Figure 2.1.1



SINGLE ANCHOR LEG MOORING (SALM) BASE

Figure 2.1.1: SALM base

2.2 Pipelines including stabilisation features

Table 2.2.1: Pipeline information									
Description	**Pipeline No (as per PWA)**	**Diameter (NB) (inches)**	**Length (km)**	**Description of Component Parts**	**Product Conveyed**	**From – To End Points[1]**	**Burial Status**	**Pipeline Status**	**Current Content**
16in oil pipeline	PL13	16	12.69	Carbon steel pipeline, coated with 4.8mm thick CTEE coating and CWC 36.6mm thick.	Oil, condensate	Thistle 'A' pig trap to Dunlin Alpha leg C Hang Off	Trenched, natural backfill. 3,645 m exposed, 5x spans reportable (2018)	Out of use	Inhibited seawater
16in pipeline	PL74	16	2.4		Seawater	From SALM base to base of riser Thistle	Surface laid. 334 m spans no spans reportable (2021)	Out of use	Seawater
16in pipeline	PL75	16	2.4		Oil, condensate	Base of riser at Thistle to SALM base	Surface laid. 267 m spans, no spans reportable (2021)	Out of use	Seawater
6in riser	PL166	6	0.19	Carbon steel pipeline riser, epoxy coated,	Oil, condensate	Pipeline riser on Thistle jacket	n/a	Out of use	Treated seawater

Table 2.2.1: Pipeline information									
Description	**Pipeline No (as per PWA)**	**Diameter (NB) (inches)**	**Length (km)**	**Description of Component Parts**	**Product Conveyed**	**From – To End Points[1]**	**Burial Status**	**Pipeline Status**	**Current Content**
				routed within a J tube.					
8in pipeline	PL4555	8	10.26	Carbon steel pipeline, coated in 3LPP for most of its length. Risers and pipespools coated in epoxy based Interzone 954.	Exported oil	ESDV on Thistle SDV to Wye structure	Trenched and buried under rock	Operational	Oil
8in pipeline	PL4556	8	23.39			From Wye structure to Pipeline flange near on Magnus	Trenched and buried partly under rock	Out of use	Inhibited seawater
Control umbilical	PLU6221	94mm	0.17	Electro-hydraulic umbilical, 4x9.5mm cores	Hydraulic oil	Thistle TUTU to 1m outside the bellmouth away from Thistle platform	n/a	Operational	Hydraulic fluid, Brayco Micronic SV3

NOTES

1. For brevity, the description of the end-to-end points may differ slightly from those consented in the PWA.
2. If dimensions are expressed in mm this refers to outside diameter of the product.
3. PL13, PL74, PL75 and PL4556 are subject to the IPR and are logged under DPN.
4. Reference PWA **PL13** (PWA dated 18 May 1976, 19-V-96, 80-V-19, and 187-V-19; **PL74 & PL75** (PWA dated 06 Aug 1980, 19-V-96, 80-V-96, 13-V-10, **PL4555** (PWA 136-V-19); **PL4556** (PWA 136-V-19), and **PLU6221** (PWA 379/V/22, 60/V/24).

Table 2.2.2: Pipeline protection & stabilisation features				
Stabilisation Feature	**No**	**Total Mass (Te)**	**Location**	**Exposed/Buried/Condition**
INSIDE THISTLE 500M ZONE (PL13, PL74, PL75, PL4555, PL4556, PLU6221)				
Concrete mattresses (6 x 2 x 0.15m)	2	5.4	PL4555 at Thistle (inside Thistle 500 m zone). Refer Figure 1.7.2.	Exposed. Burial status will be confirmed during decommissioning operations.
INFIELD BETWEEN THISTLE & DUNLIN (PL13)				
Concrete mattresses (6 x 2 x 0.15m)	17	45.9	On PL13 at KP0.351, KP0.444, KP0.729, KP0.753, KP11.198 (KP0 is at Thistle).	Concrete mattresses: 17x exposed; grout mattresses: 24x exposed, 5x buried and inside trench. Burial status will be confirmed during decommissioning operations.
Grout mattresses (Size not determined, assume 1.8 x 3 x 0.3m))	29	46.4	On PL13 at various locations between KP0.623 and KP11.556, used to remediate spans (KP0 is at Thistle).	
WYE STRUCTURE (PL4555, PL4556)				
Concrete mattresses (6 x 2 x 0.15m)	17	45.9	On PL4555 on southern approach to Wye structure. Refer Figure 1.7.4.	Exposed. Burial status will be confirmed during decommissioning operations.
Concrete mattresses (6 x 2 x 0.15m)	7	28.9	On PL4555 on northern approach to Wye structure. Refer Figure 1.7.4.	
Grout or sandbags (25kg), quantity estimated.	500	12.5	PL4555 pipeline flange protection south of the Wye structure. Refer Figure 1.7.4.	Exposed. Burial status will be confirmed during decommissioning operations.
Grout or sandbags (25kg), quantity estimated.	800	6.25	PL4555 & PL4556 near Wye Refer Figure 1.7.4.	
PIPELINE CROSSING (PL4556)				
Concrete mattresses (6 x 3 x 0.3m)	5	29.4	PL4555 over PL164	Concrete mattresses and plinths all buried under deposited rock. Refer Figure A.1.1.
Concrete plinths (9 x 2 x 0.8m)	2	36.8		
Deposited rock	352 m	1,773		
Concrete mattresses (6 x 3 x 0.3m)	3	27.3	PL4556 over PL1762 crossing. Refer	Concrete mattresses and plinths

Table 2.2.2: Pipeline protection & stabilisation features				
Stabilisation Feature	**No**	**Total Mass (Te)**	**Location**	**Exposed/Buried/Condition**
Concrete plinths (9 x 2 x 0.8m)	2	36.8	Figure 1.7.5.	all buried under deposited rock. Refer Figure A.2.1
Concrete mattresses (6 x 3 x 0.15m)	2	9.8		
Deposited rock	234 m	1,656		
Concrete mattresses (6 x 3 x 0.3m)	3	27.3	PL4555 over PLU4570.	Concrete mattresses and plinths all buried under deposited rock. Refer Figure A.3.1.
Deposited rock,	198 m	36.8		
DEPOSITED ROCK				
Deposited rock on PL4556 (balance of deposited rock on PL4556 after subtracting pipeline crossings)	91 m	520	North of Wye structure (between KP0.000 and KP0.083 and between KP9.436 and 9.444).	Exposed. Burial status will be confirmed during decommissioning operations.
NOTES: 1. There are no protection and stabilisation features associated with PL13 inside the Dunlin 500 m zone or PL74 and PL75.				

2.3 Pipeline structures

Table 2.3.1: Pipeline structure information					
Pipeline structure incl. stabilisation features	**No**	**Mass (Te)** / **Size (m)**	**Location**		**Comments / status**
			WGS84 Decimal	**WGS84 Decimal Minute**	
Wye structure	1	30.7 10.5 x 6.2 x 1.8	61.445088° N 1.486407° E	61°26.7053' N 01°29.1844' E	Not piled. Refer Figure 1.7.4 and Figure 2.3.1.
Concrete mattress (12 x 3 x 0.15m)	2	15.0 12 x 3 x 0.15	As above	As above	Not shown in Figure 2.3.1.
Concrete mattress (8 x 3 x 0.15m)	2	13.1 8 x 3 x 0.15	As above	As above	Not shown in Figure 2.3.1.

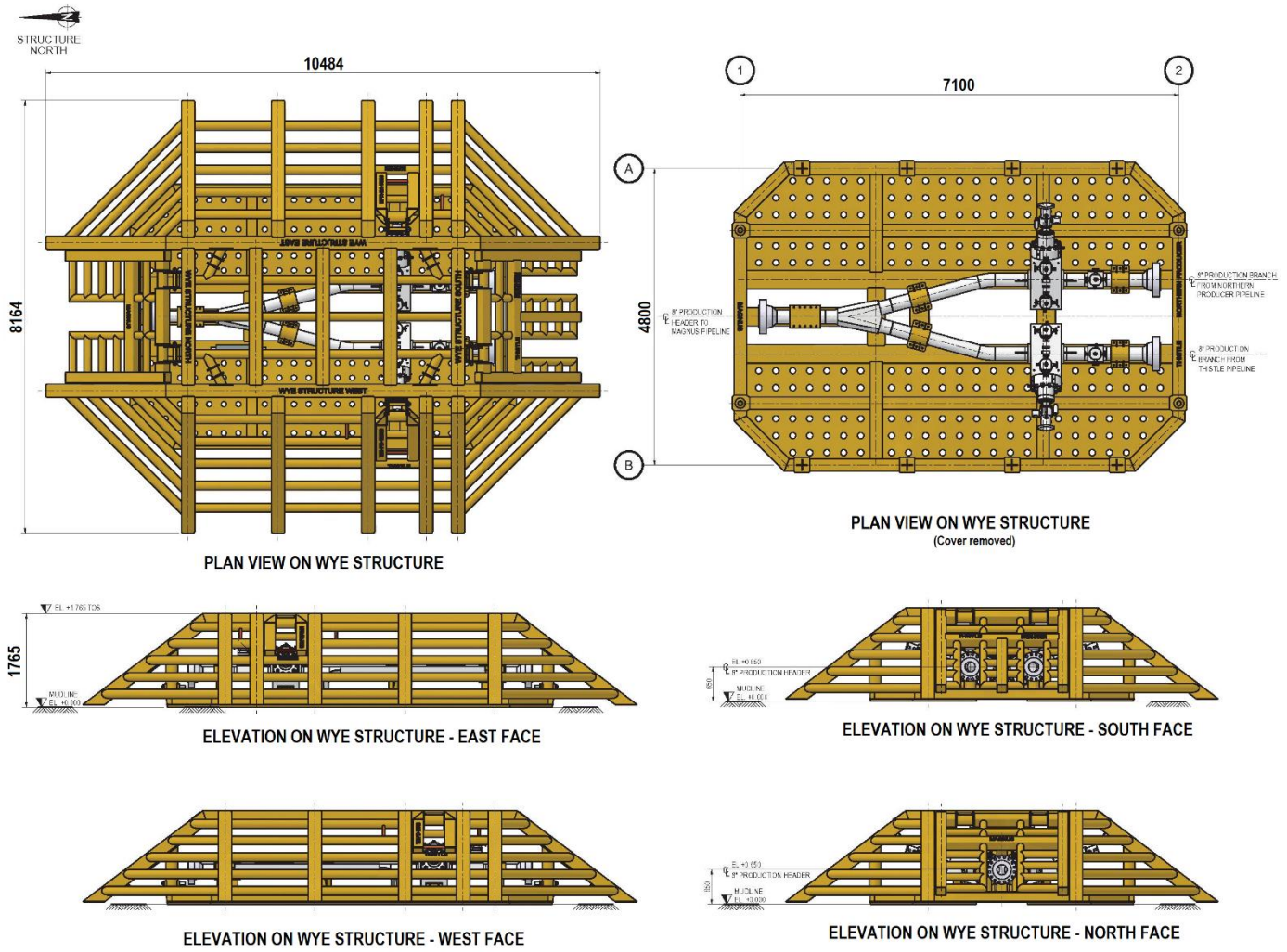


Figure 2.3.1: PL2578, PL4555 & PL4556 Wye structure

2.4 Pipeline crossings

Table 2.4.1: Thistle pipeline crossing information			
ID[2]	**Pipeline or umbilical description**	**Location[1]**	**Protection**
THISTLE 500 M ZONE Error! Reference source not found.			
1	PL4555 crosses over PL600 (Don field)	Inside Thistle 500 m zone	None. Refer Figure 1.7.2.
2	PL4555 crosses over PLU6267 (Don field)	Inside Thistle 500 m zone	1x concrete mattress. Refer Table 2.2.2 and Figure 1.7.2.
3	The PL4555 catenary riser crosses over PL598 & PL599 (Don field)	Inside Thistle 500 m zone	Refer Figure 1.7.2.
OUTSIDE THISTLE 500 M ZONE			
PL4556 over PL164		413851.1E 6828541N	Refer Table 2.2.2, Figure 2.4.1,and Figure A.1.1
PL4556 over PLU4570		411423.3E 6831755.2N	Refer Table 2.2.2, Figure 2.4.1,and Figure A.1.1
PL4556 over PL1762 (crosses twice)		Inside Magnus 500 m zone	Refer Table 2.2.2, Figure 1.7.5 and Figure A.2.1.
PL4556 over PLU1960		Inside Magnus 500 m zone near pipe bridge	None. Refer Figure 1.7.5
PL4556 over PL1762		Inside Magnus 500 m zone near pipe bridge	None. Refer Figure 1.7.5
PL4556 over PLU4578		Inside Magnus 500 m zone near pipe bridge	None. Refer Figure 1.7.5
NOTES 1. Universal Transverse Mercator ('UTM') Eastings and Northings are indicative only. 2. Pipeline crossing ID in Thistle 500 m zone is used in Figure 1.7.2.			

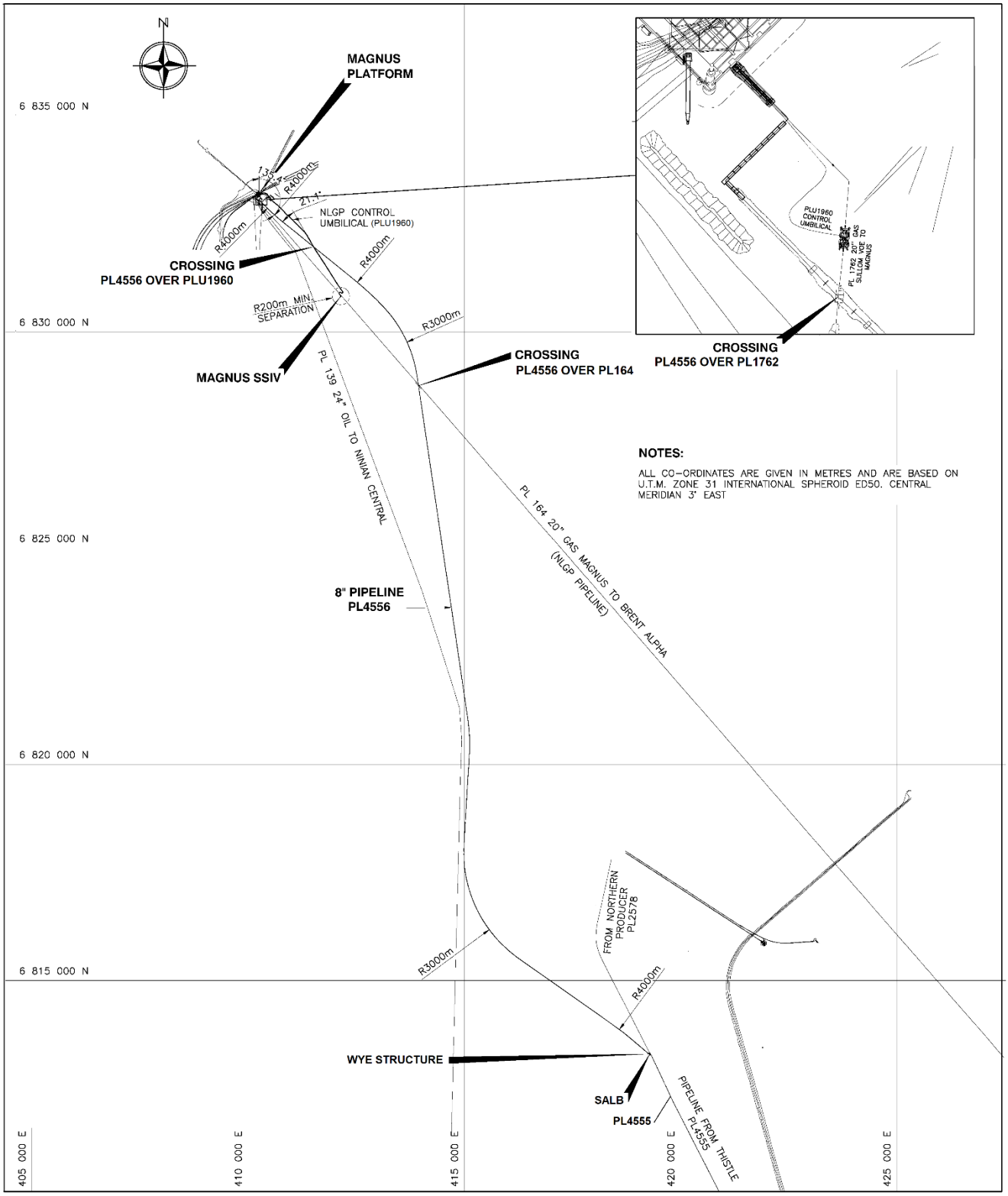


Figure 2.4.1: PL4556 pipeline crossings

2.5 Wells

n/a

2.6 Inventory estimates

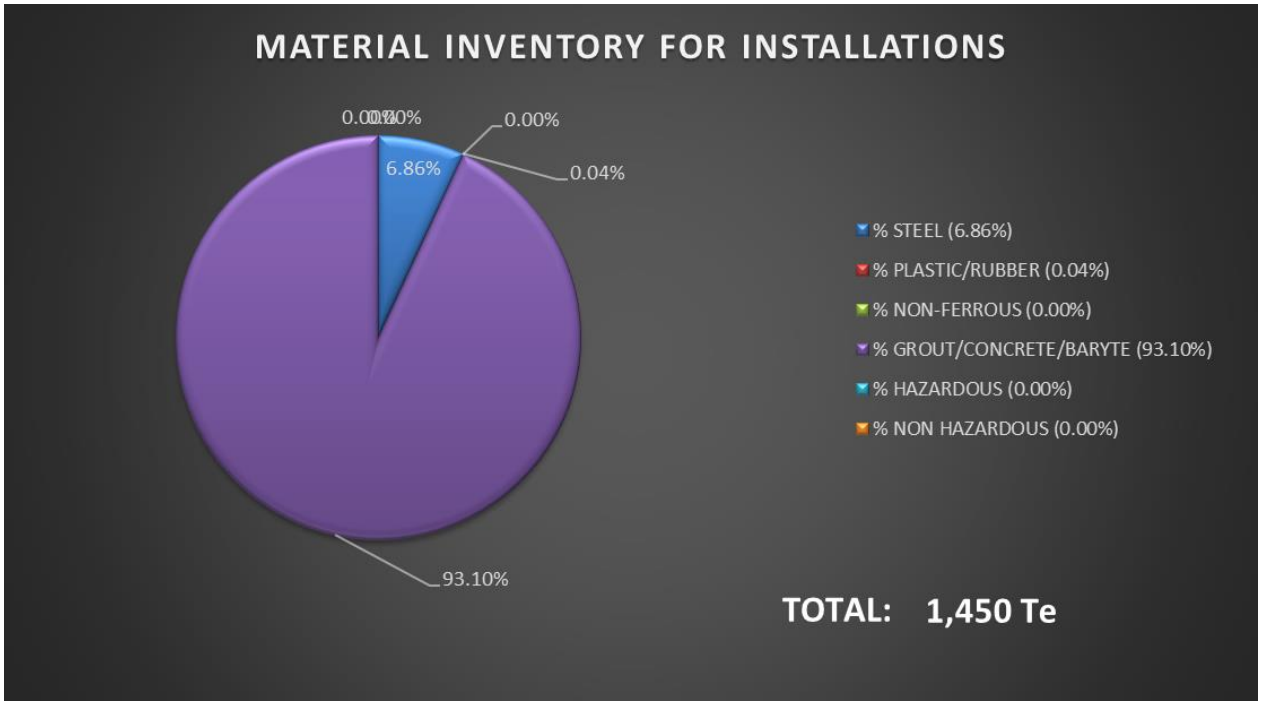


Figure 2.6.1: Estimated material inventory for installation(s)

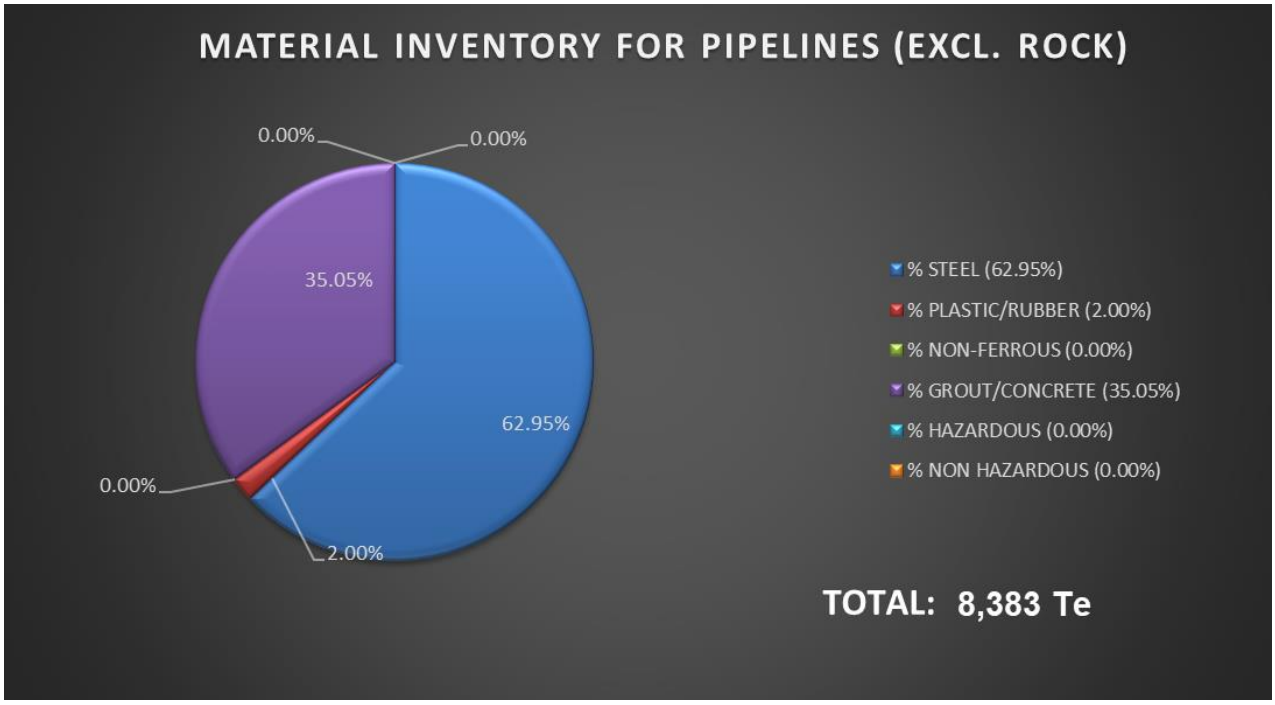


Figure 2.6.2: Estimated material inventory for pipeline(s)[4]

[4] This figure excludes deposited rock.

3. REMOVAL AND DISPOSAL METHODS

3.1 Use of Waste Framework Directive

Waste will be dealt with in accordance with the Waste Framework Directive. The re-use of an installation, pipeline, or umbilical or parts thereof, is first in the order of preferred decommissioning options and such options are currently under investigation. Waste generated during decommissioning will be segregated by type and periodically transported to shore in an auditable manner through licensed waste contractors. Steel and other recyclable metals are estimated to account for the greatest proportion of the materials inventory.

Geographic locations of potential disposal yard options may require the consideration of Transfrontier Shipment of Waste ('TFSW'), including hazardous materials. Early engagement with the relevant waste regulatory authorities will ensure that any issues with TFSW are addressed.

3.2 Installations

Table 3.2.1: Subsea installations and associated features			
Subsea Installations Including Stabilisation Features	**No.**	**Option**	**Disposal route (if applicable)**
SALM base	1	Completely remove.	Return to shore for reuse, recycling, or disposal, whichever is the most appropriate.

NOTE

1. It is estimated that there is between 1,100 and 1,350 Te of loose ballast inside the SALM base. The lifting attachments on the original SALM base will not have sufficient capacity for removing the SALM Base complete with the ballast inside. Therefore the ballast will need to be removed separately and before the SALM Base itself can be recovered.
2. Assuming there would be no technical issues, loose ballast inside the SALM base will be dredged and recovered to the vessel before being taken to shore. Should any difficulties be encountered when dredging the ballast and recovering to the vessel OPRED will be consulted.

3.3 Pipelines

3.3.1 Decommissioning options

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. Therefore, this option has been excluded from the assessment. PL74 and PL75 will be removed in accordance with the mandatory requirement for a clear seabed. Except for PL74 and PL75, the three decommissioning options considered are:

- **Complete removal** – This involves the complete removal of the pipelines by whatever means would be most practicable and acceptable from a technical perspective.
- **Partial removal or remediation** – PL13 only. This would involve removing exposed or potentially unstable sections of pipelines or carrying out remedial work (deposition of rock) to make the remaining pipeline safe for leaving *in situ*. This option is relevant for those pipelines that are known to have exposures or spans. There will be a need to verify their status via future surveys.

- **Leave *in situ*** – This involves leaving the pipeline(s) *in situ* with no remedial works, but likely needing to verify their status via future surveys.

3.3.2 Outcome of the comparative assessment

Table 3.3.1: Pipeline decommissioning proposals

Pipeline or group	Recommended option	Justification
Risers		
PL166	Remove upper riser, severing it at a height between 65 m and 75 m below LAT with the lower part remaining *in-situ* until the fate of the jacket footings has been determined.	Proposals for the sections of the risers connected to the Thistle jacket footings will be addressed in the Decommissioning Programme for the jacket footings.
PLU6221	Completely remove from inside riser caisson 930	Maximises recovery of material.
Pipelines		
PL13	Remove the surface laid sections of the pipeline on approaches to the Thistle and Dunlin 'A' platforms in accordance with mandatory requirements. Bury the remaining section of the pipeline inside the trench under rock. This will result in ~29,300 Te of rock being deposited on the pipeline. OPRED will be consulted with regards to profiling of the deposited rock along the pipeline. Thereafter, the pipeline burial status will be monitored using a Risk Based Inspection regime to a frequency and timescale agreed with OPRED.	Complies with OPRED guidance notes and requirement for clear seabed, and is the preferred outcome of the comparative assessment [6].
PL74, PL75	Completely remove the pipeline(s).	Complies with OPRED guidance notes and is the preferred outcome of the comparative assessment [6].
PL4555, PL4556	Completely remove all pipespools and surface laid sections of pipeline and associated protection and stabilisation features up to the point of burial in rock. Deposit ~15 Te of rock on both ends of each pipeline. Total rock ~60 Te. The combined lengths of pipeline and pipespools to be removed are estimated as follows PL4555 (Thistle) ~200 m long PL4555 (Wye structure) ~112 m long PL4556 (Wye structure) ~80 m long Refer Figure 3.4.1 and Figure 3.4.2 for details.	Complies with OPRED guidance notes and is the preferred outcome of the comparative assessment [6]. Apart from the surface laid ends, the pipelines are buried.

Table 3.3.1: Pipeline decommissioning proposals		
Pipeline or group	**Recommended option**	**Justification**
	The surface laid infrastructure associated with PL4556 that is inside the Magnus 500m zone will be addressed in a future DP prepared for Magnus. The deposition of rock on cut pipeline ends (PL4555 and PL4556) will be kept to a practical minimum. For the purposes of the EA, it is assumed that up to 15 Te of rock will be required at a total of four locations to ensure the pipeline ends remain buried. Thereafter, the pipeline burial status will be monitored using a Risk Based Inspection regime to a frequency and timescale agreed with OPRED.	

3.4 Pipeline protection and stabilisation features

Table 3.4.1: Pipeline protection & stabilisation features			
Stabilisation Feature	**No**	**Recommended option**	**Disposal route (if applicable)**
INSIDE THISTLE 500M ZONE (PL13, PL74, PL75, PL4555, PL4556, PLU6221)			
Concrete mattresses (6 x 2 x 0.15m)	2	Complete removal.	Recover to shore for re-use, recycling or disposal.
INFIELD BETWEEN THISTLE & DUNLIN (PL13)			
Concrete mattresses (6 x 2 x 0.15m)	17	Complete removal.	Recover to shore for re-use, recycling or disposal.
Grout mattresses (Size not determined, assume 1.8 x 3 x 0.3m)	24	Complete removal along with surface laid sections of pipeline.	Recover to shore for re-use, recycling or disposal.
	5	Leave *in situ* as they are buried and inside trench.	Leave *in situ*.
WYE STRUCTURE (PL4555, PL4556)			
Concrete mattresses (6 x 2 x 0.15m)	17	Complete removal.	Recover to shore for re-use, recycling or disposal.
Concrete mattresses (6 x 2 x 0.15m)	7		
Grout / sandbags (25kg)	500		
Grout / sandbags (25kg)	800		
PIPELINE CROSSING (PL4556)			
Concrete mattresses (6 x 3 x 0.3m)	5	Leave *in situ*.	
Concrete plinths (9 x 2 x 0.8m)	2		
Deposited rock	1,773 Te		
Concrete mattresses (6 x 3 x 0.3m)	3	Leave *in situ*.	
Concrete plinths (9 x 2 x 0.8m)	2		
Concrete mattresses (6 x 3 x 0.15m)	2		
Deposited rock	1,656 Te		
Concrete mattresses (6 x 3 x 0.3m)	3	Leave *in situ*.	
Deposited rock	36.8 Te		
DEPOSITED ROCK			
Deposited rock on PL4556 (balance of deposited rock on PL4556 after subtracting pipeline crossings)	520 Te	Leave *in situ*.	

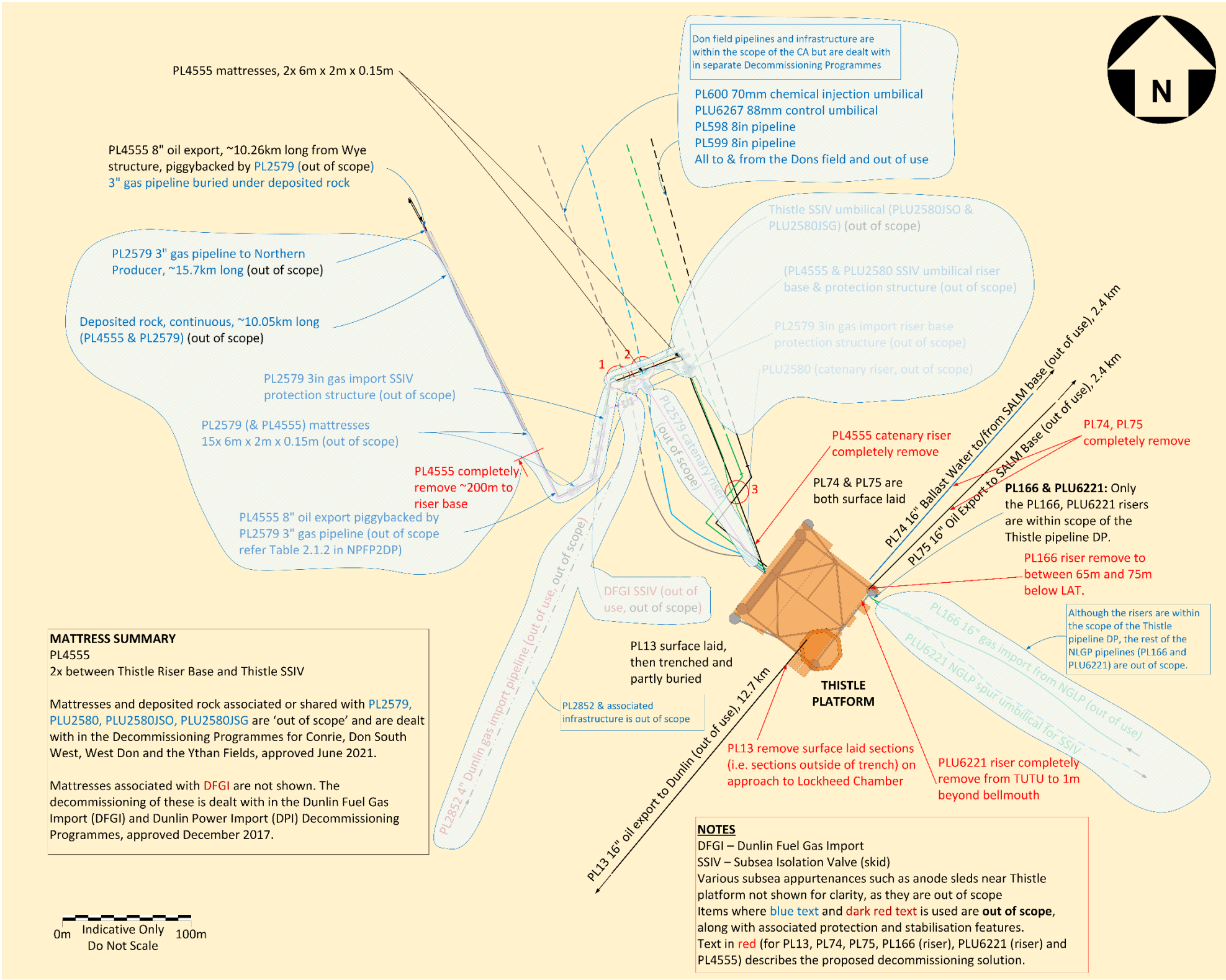


Figure 3.4.1: Decommissioning proposals near Thistle

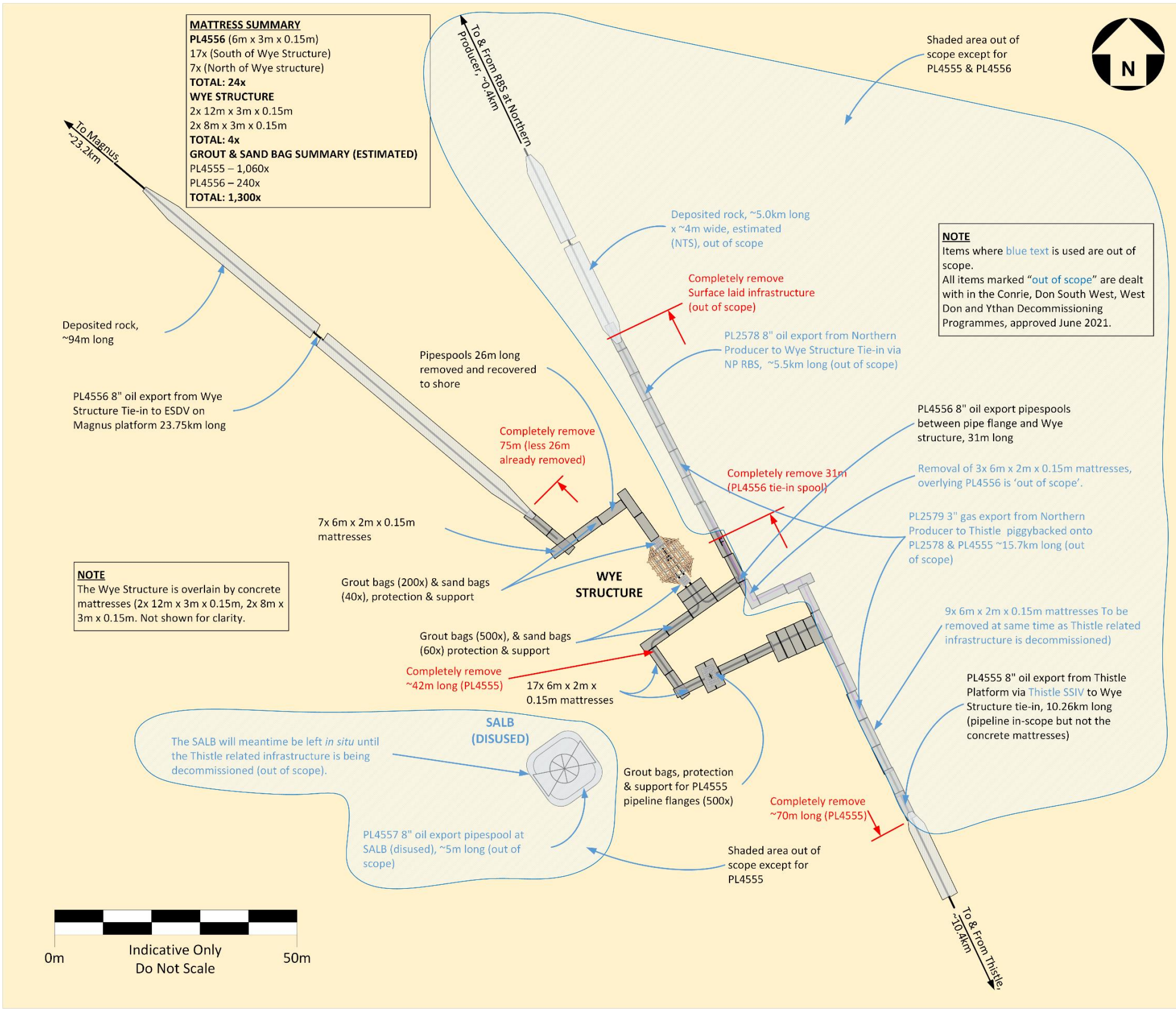


Figure 3.4.2: Decommissioning proposals for PL4555 & PL4556 near Wye structure

3.5 Pipeline protection structures

Table 3.5.1: Subsea pipeline structure & stabilisation features			
Subsea pipeline structure and stabilisation features	**No.**	**Option**	**Disposal Route (if applicable)**
Wye structure	1	Complete removal.	Return to shore for reuse or recycling.
Concrete mattress (12 x 3 x 0.15m)	2		
Concrete mattress (8 x 3 x 0.15m)	2		

3.6 Pipeline crossings

EnQuest's decommissioning proposals will not affect any pipeline crossing infrastructure. However, the expectation is that the owners of the third -party crossing will liaise with EnQuest regarding any future decommissioning proposals and such proposals will also be discussed and agreed with OPRED.

3.7 Waste streams

Table 3.7.1: Waste stream management method	
Waste stream	**Removal and disposal method**
Marine growth	Where necessary and practicable, to allow access some marine growth will 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 Naturally Occurring Radioactive Material ('NORM') will be undertaken offshore on the recovery vessel 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.
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 3.7.2: Inventory disposition			
Inventory	**Total inventory (Te)**	**Planned tonnage to shore (Te)**	**Planned left *in situ* (Te)**
Installation(s)	1,450	1,450	0
Pipeline(s)	8,383	1,287	7,096
Deposited rock	4,988	0	4,988
NOTE Thistle pipeline inventory excludes deposited rock. The inventory of pipeline(s) taken to shore includes the length of section between 'cut point 'A' and cut point 'B' near Dunlin.			

Table 3.7.3: Re-use, recycle & disposal aspirations for recovered material			
Inventory	**Re-use**	**Recycle**	**Disposal (e.g. Landfill)**
Thistle pipelines	<5%	>90%	<10%

All recovered material will be transported onshore for re-use, recycling, or disposal. It is not possible to predict the market for reusable materials with any confidence so the figures in Table 3.7.2 are aspirational.

4. ENVIRONMENTAL APPRAISAL OVERVIEW

4.1 Environmental sensitivities

Thistle is in Block 211/18a of the NNS in water depth of approximately 162 m. Mean residual currents for the field are 0.12 m/s, with direction of residual water movement generally to the south or east. Prevailing winds are from the south-west or north-north-east.

The environmental characteristics and sensitivities are listed in Appendix B.1. Sediments in the NNS are predominantly sand and muddy sand and in the vicinity of Thistle comprise of sand and gravelly sand. They are such that the seabed area is generally stable with relatively homogenous community. Multi-Beam Echo Sounder ('MBES') identifies a drill cuttings pile below the platform, and historical records of some Oil Based Mud ('OBM') discharge will likely result in elevated levels of hydrocarbon contamination above background in the vicinity of platform.

There are no offshore conservation sites within 40 km of the Thistle Field (Figure 4.2.1). The North-East Faroe-Shetland Channel Nature Conservation Marine Protected Area ('MPA (NC)') is located approximately 143 km north-west, the Hermaness Saxa Vord and Valla Field Special Protection Area ('SPA') is located approximately 140 km west and the Pobie Bank Reef Special Areas of Conservation ('SAC') is located approximately 103 km southwest of the Thistle platform respectively.

This information is supported by a full pre-decommissioning Environmental Baseline Survey conducted in May 2021 by GEOxyz [9]. More details of the environmental sensitivities are discussed in the Environmental Appraisal ('EA') [7].

4.2 Potential environmental impacts and their management

An EA has been prepared in accordance with the OPRED Decommissioning Guidance Notes [10]. It focusses on the key issues related to the specific activities proposed and the narrative is proportionate to the scale of the project and the environmental sensitivities of the area.

It has been informed by several different processes, including the identification of potential environmental issues through project engineer and marine environmental specialist review in an Environmental Identification ('ENVID') screening workshop and consultation with key stakeholders.

The impact assessment screening identified ten potential impact areas based on the proposed decommissioning activities:

- Atmospheric emissions
- Seabed disturbance
- Physical presence of infrastructure decommissioned *in situ*
- Physical presence of vessels in relation to other sea users
- Underwater noise
- Discharges to sea
- Resource use
- Waste
- Disturbance to seabirds; and,
- Accidental events.

Of these, two were taken forward for assessment based on the potential severity and/or likelihood of their respective environmental impact: seabed disturbance and physical presence of infrastructure decommissioned *in situ*.

- Impact on physical presence of infrastructure decommissioned *in situ*

- Seabed disturbance

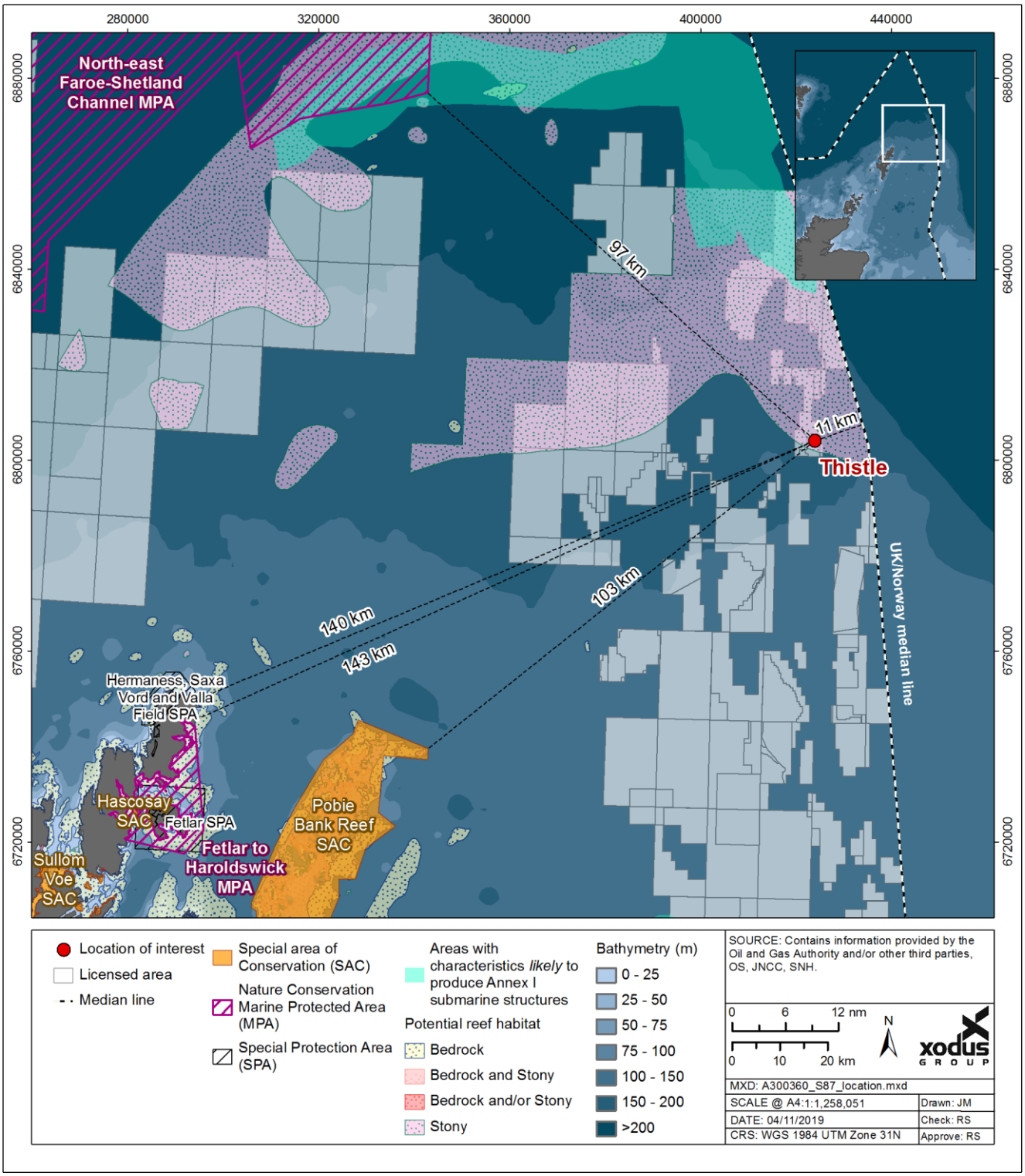


Figure 4.2.1: Protected sites around Thistle

The environmental impact assessment of these aspects is summarised below.

Impact on physical presence of infrastructure decommissioned *in situ*

Physical presence of infrastructure decommissioned *in situ* was investigated as a potential impact on commercial fisheries. Understanding the use of the Thistle areas for commercial fisheries purposes and the risk posed by exposed infrastructure decommissioned *in situ* as a gear snagging risk was of key importance.

Following full assessment of this aspect, taking into consideration fishing, vessel, and shipping activity within ICES Rectangle 51F1, along with industry and implementation of mitigation measures, the overall assessment was reduced to 'Low'. While the Magnitude of this aspect could not be lowered, both Consequence (spatial extent) and Probability were reduced to 'Low'.

Seabed disturbance

Following full assessment of this aspect, taking into consideration the benthic environment, seabed characteristics, commercial fishing, relatively small size of disturbance area along with industry and implemented mitigation measures, the overall assessment was reduced to 'Low'. While the Probability of this aspect could not be lowered, both Magnitude and Frequency were reduced to 'Low'.

The Environmental Appraisal has considered the relevant Marine Plans, adopted by the UK and Scottish Governments to help ensure sustainable development of the marine area. EnQuest consider that the proposed decommissioning activities are in alignment with its objectives and policies.

Having reviewed the project activities within the wider regional context and taking into consideration the mitigation measures to limit any potential impacts, the findings of the Environmental Appraisal conclude that the activities do not pose any significant threat to environmental or societal receptors within the UKCS.

There will be some planned environmental impacts arising from decommissioning of the Thistle pipelines. The Long-term environmental impacts from the decommissioning operations are expected to be low. Incremental cumulative impacts and trans-boundary effects associated with the planned decommissioning operations are also expected to be low.

For further details please refer Environmental Appraisal [7].

5. INTERESTED PARTY CONSULTATIONS

5.1 Consultation summary

Table 5.1.1 will be updated when the statutory consultation is completed.

Table 5.1.1: Summary of stakeholder comments		
Stakeholder	**Comment**	**Response**
GMG		
NFFO		
NIFPO		
SFF	The outcome of the comparative assessment and decommissioning proposals were discussed with SFF at a meeting 14 November 2023.	While the SFF have a policy of a clear seabed following decommissioning activities, they could understand the arguments and rationale supporting the decommissioning proposals.
CONSULTATIONS		
Stakeholder	**Comment**	**Response**
GMG		
NFFO		
NIFPO		
SFF		
NSTA	It is a requirement that NSTA be consulted during decommissioning planning and works. This is covered under S29(2)(a) of the Petroleum Act 1998.	The Cessation of Production report for Thistle and Deveron fields was accepted by OGA on 14 September 2020. EnQuest will continue to consult with NSTA through the annual stewardship meetings.. The cost of carrying it out is kept to the minimum that is reasonably practicable. To this end, the Thistle pipeline decommissioning works will be executed as part of a wider Subsea Decommissioning Collaboration ('SDC') portfolio of work.
Public		

6. PROGRAMME MANAGEMENT

6.1 Project Management and Verification

An EnQuest project management team will manage the operations of competent contractors selected for all decommissioning activities. The team will ensure the decommissioning is executed safely, in accordance with legislation and EnQuest HSE&A Policy and Principles.

6.2 Post-Decommissioning Debris Clearance and Verification

The Decommissioning Programmes cover the SALM base as well as pipelines PL13, PL74, PL75, PL4555, PL4556 (between Thistle and the pipeline end flange near Magnus) and PL166 and PLU6221 risers. Once all offshore decommissioning activities have been completed, a post decommissioning site survey will be carried out.

It is proposed that EnQuest will work with OPRED and SFF on behalf of the Section 29 Notice Holders to investigate use of an evidence-based approach to establish an acceptable clear seabed for the sections of pipeline within the 500 m safety zone. As the seabed is not in an environmentally sensitive area, where it is safe to do so, an overtrawl will be carried out inside the SALM base 500 m zone and along a 100 m wide (50 m each side) corridor along the route of each pipeline to verify the condition of the seabed after decommissioning activities have been completed. The overtrawl will be supported by a Certificate of Clearance. Evidence of a clear seabed will also be included in the Close Out Report and sent to the Seabed Data Centre (Offshore Installations) at the Hydrographic office.

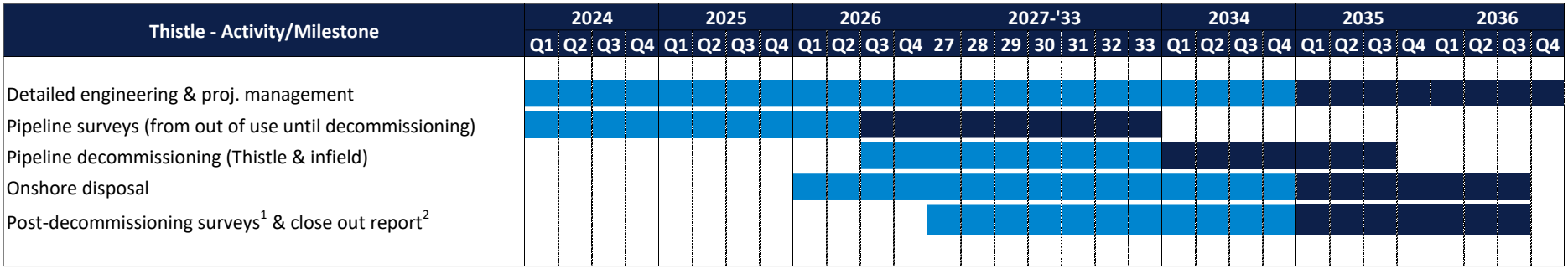
Any oil related debris that is found with the 500 m zone of the SALM base and pipeline corridors will be recovered and returned to shore for recycling or appropriate disposal.

The post-decommissioning survey results will be notified to the UK Fisheries Offshore Oil and Gas Legacy Trust Fund Limited for inclusion in the FishSAFE System, and to the United Kingdom Hydrographic Office for notification and marking on Admiralty charts and notices to mariners.

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 extended as per NSTA strategy which aspires to combine multiple scopes in a single campaign;

A wide activity window is proposed in order to increase the opportunity to capture cost efficiencies by decommissioning at scale (a strategic priority of the North Sea Transition Authority ('NSTA') Decommissioning Strategy) e.g. via EnQuest's commitment to explore scope aggregation opportunities as a member of the Subsea Decommissioning Collaboration (SDC)

1. Post decommissioning surveys to follow completion of decommissioning activities;
2. Decommissioning activities within the Magnus 500m zone will be addressed in a future DP for Magnus
3. Close out report within 1 year of completion of offshore activities.

Figure 6.3.1: Gantt-chart of project plan

6.4 Interim monitoring and evaluation

EnQuest has already submitted a Decommissioning Programme for the Thistle upper jacket [5]. The jacket footings will be subject to a separate Decommissioning Programme that will be submitted as part of the application to derogate from the requirements of OSPAR Decision 98/3.

All risers connected to the jacket footings will continue to be subjected to risk based Inspection, Repair and Maintenance campaigns to ensure that they do not pose a hazard to mariners.

If footings are removed, and parts of pipelines are no longer buried under drill cuttings, EnQuest will discuss and agree any action required with OPRED.

Monitoring of all the pipelines in this DP will continue as follows:

- PL166 and PLU6221 are risers connected to the Thistle jacket. They will be surveyed at the same time as the jacket.
- PL13 was last surveyed in 2018, and the next survey is due 2026.
- PL74, PL75 were last surveyed in 2021, and the next survey is due 2027.
- PL4555 was last surveyed in 2023, and the next survey is due in 2026/2027.
- PL4556 was last surveyed in 2019, and the next survey is due in 2025.

It is proposed that these pipelines will be surveyed at least once before they are decommissioned. The frequency of surveys will not prejudice the ability to decommission these pipelines.

6.5 Costs

Decommissioning costs will be provided separately to OPRED.

6.6 Close Out

A decommissioning close out report will be submitted within 1 year of the completion of the decommissioning works. The offshore scope will include debris removal and independent verification of seabed clearance and the post-decommissioning environmental survey.

Any variances from the approved Decommissioning Programme will be explained in the close out report.

6.7 Post-decommissioning monitoring and evaluations

EnQuest will carry out a post-decommissioning environmental survey, centred on the Thistle pipelines. A survey of the status of the pipelines and adjacent seabed will also be undertaken at the end of the decommissioning activities. As it is proposed to leave some sections of the pipelines *in situ*, these will be subject to a monitoring programme agreed between EnQuest and OPRED.

A copy of the survey results will be provided to OPRED. After these have been reviewed, a future monitoring regime will be agreed by EnQuest and OPRED, and take account of ongoing liability, the status and findings of previous surveys and a risk-based approach to frequency and scope.

Residual liability for the pipelines will remain with the Section 29 notice holders identified in section 1.5.1. Unless agreed otherwise in advance with OPRED, EnQuest will remain the focal point for this including any change in ownership.

7. REFERENCES

Please note the link names presented below have been abbreviated.

[1] BP (2011) Don Decommissioning Programme, DON-BP-001, published May 2011. Weblink last accessed: 04 June 2023: don-dp4 .pdf

[2] BP (2023) Don Decommissioning Programme for pipelines inside Thistle 500 m zone, DECOM-DON-HS-PRO-BP

[3] EnQuest (2021) Decommissioning Programmes for Conrie, Don South-West, West Don and Ythan fields, M4109-ENQ-NPR-DN-00-PRG-0002. Weblink last accessed 13 May 2023: Conrie-DSW-WD-Ythan DP.pdf

[4] EnQuest (2021) Thistle Alpha Topsides Decommissioning Programme, M3524-ENQ-HEA-DN-0000-REP-0004. Weblink last accessed 03 June 2023: Thistle Topsides DP.pdf

[5] EnQuest (2023) Thistle Alpha Upper Jacket Decommissioning Programme, M3525-ENQ-THI-DN-0000-REP-0008. Weblink last accessed 22 June 2023: Thistle UJ DP.pdf

[6] EnQuest (2023) Thistle pipeline Comparative Assessment, M3525-ENQ-THI-DN-0000-REP-0011

[7] EnQuest (2021) Thistle pipeline Decommissioning Environmental Appraisal, M3525-XOD-THI-DN-0000-ENS-0001

[8] Fairfield Betula Limited (2017) Dunlin Fuel Gas Import (DFGI) and Dunlin Power Import Decommissioning Programmes (DP4), FBL-DUN-DUNA-HSE-01-PLN-00002. Weblink las accessed 04 June 2023: DFGI-DPI Final DP .pdf

[9] GeoXYZ (2022) Thistle Final Environmental Baseline & HAS Survey Results Report, M3525-GXY-THI-DN-0000-REP-0008

[10] OPRED (2018) Guidance Notes, Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998, Version 6, Department of Business, Energy, and Industrial Strategy. Weblink last 19 May 2021: OPRED Guidance Notes.

APPENDIX A PIPELINE CROSSINGS

Appendix A.1 PL4556 over PL164

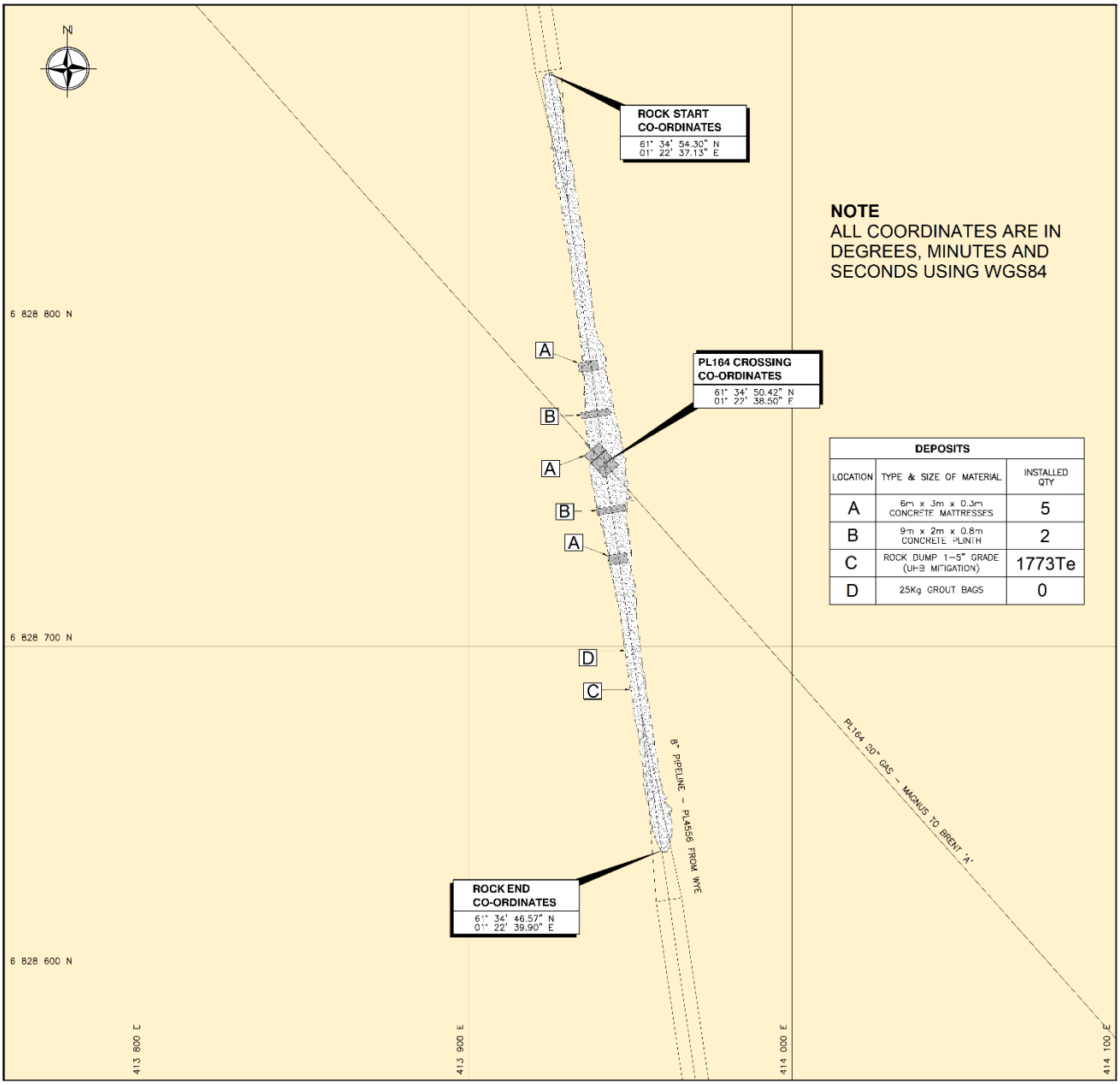


Figure A.1.1: PL4556 over PL164 pipeline crossing

Appendix A.2 PL4556 over PLU1762

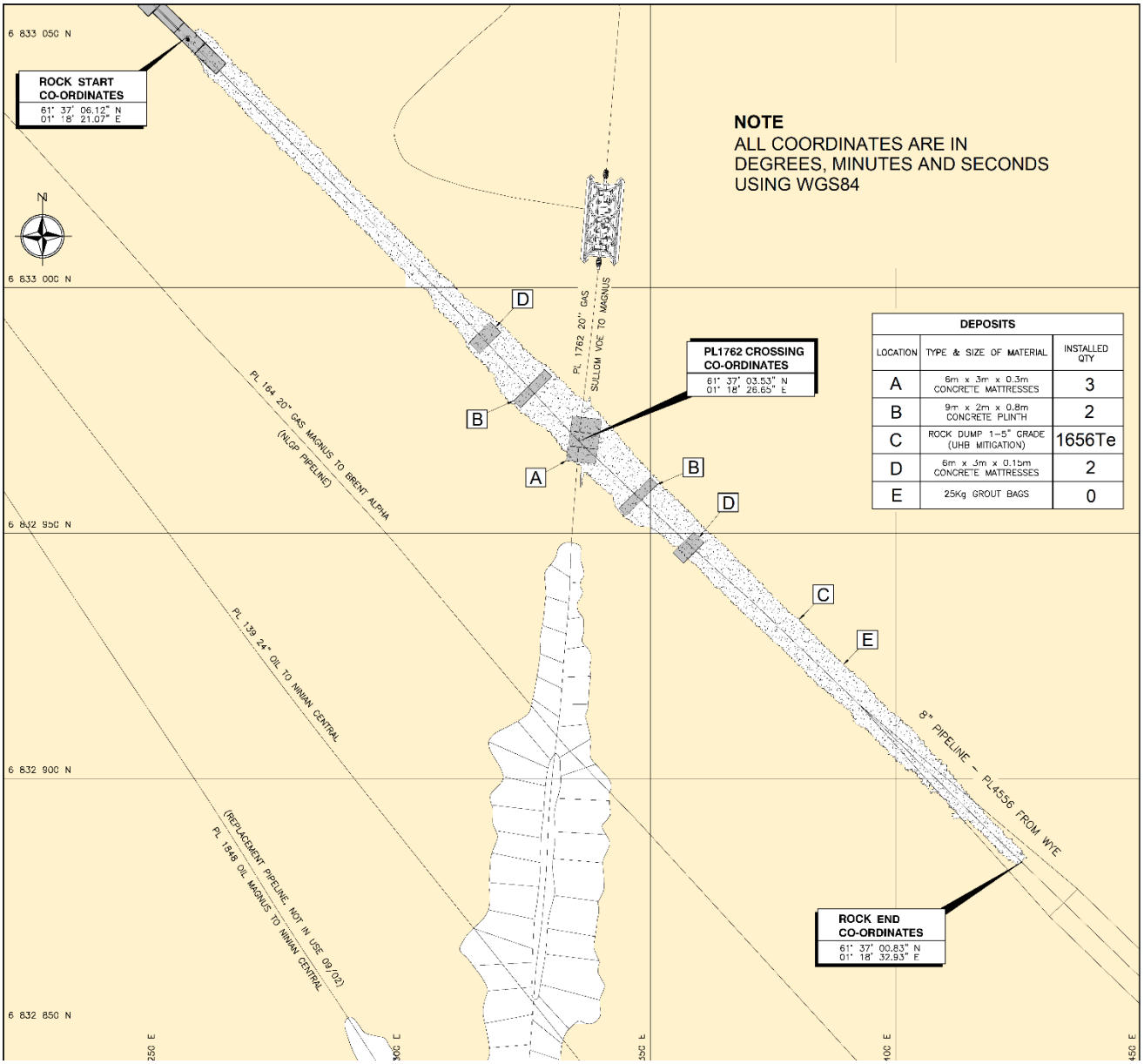


Figure A.2.1: PL4556 over PL1762 pipeline crossing

Appendix A.3 PL4556 over PLU4570

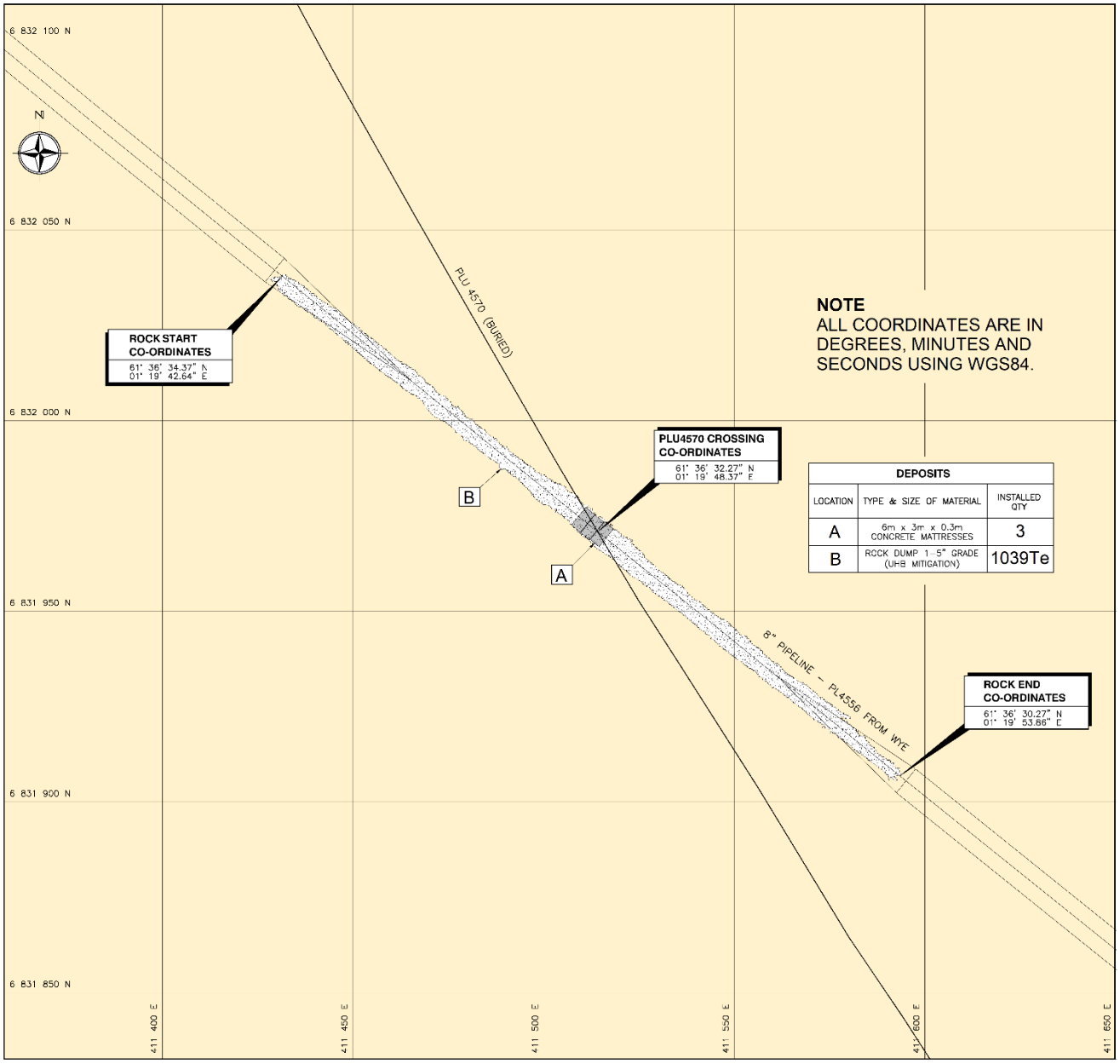


Figure A.3.1: PL4556 over PLU4570 pipeline crossing

APPENDIX B THISTLE BASELINE ENVIRONMENT

Appendix B.1 Summary of characteristics & sensitivities

Table B.1.1: Summary of environmental characteristics and sensitivities
Physical Environment: Thistle Alpha is in Block 211/18 and 211/19 of the NNS in water depth of approximately 162 m. Mean residual currents in the area are 0.26 m/s and are generally from the west. Prevailing winds are from the south or south-west.
Seabed Sediments and Contamination: Sediments in the NNS are predominantly sand and within the Thistle area are classified as sand, slightly gravelly sand, and gravelly sand. MBES identifies a drill cuttings pile below the platform, and historical records of Oil Based Mud discharge will likely result in elevated levels of hydrocarbon contamination in the vicinity of the platform. The pipelines are not affected.
Fish: The Thistle field lies within ICES Rectangle 51F1. Thistle is known to have spawning grounds in the area for Cod (Jan-April), Haddock (Feb-May), Norway Pout (Jan-Mar), Saithe (Jan-Apr) and Whiting (Feb-June). The area is used as nursery grounds for Blue Whiting, Haddock, European Hake, Herring, Ling, Mackerel, Norway Pout, Spurdog and Whiting.
Benthic Communities: Surveys in 2007 and 2018 identified a generally diverse homogenous faunal community associated with sandy sediments. Visible fauna observed included *annelida*, *arthopoda*, *decapoda, bryozoa, cnidaria* and *echinoidea* typical of the area. It is expected that elevated levels of hydrocarbons close to the platform will lead to modified communities of hydrocarbon tolerant species. There was no evidence from seabed imagery of any protected habitats or species.
Plankton: The phytoplankton community is dominated by the dinoflagellate genus Ceratium (*C. fusus, C. furca, C. lineatum*), along with the diatoms, *Thalassiosira spp*. and *Chaetoceros spp*. The zooplankton community comprises *C. helgolandicus* and *C. finmarchicus* as well as *Paracalanus spp*., *Pseudocalanus spp*., *Acartia spp*., *Temora spp*. and *Oithona spp*. larger zooplankton species such as euphausiids and decapod larvae are also important in the area.
Seabirds: The following species have been recorded in the wider area: Northern fulmar, Northern gannet, Great skua, Black-legged kittiwake, Arctic skua, Razorbill, European storm petrel, Great black-backed gull, Lesser black-backed gull, Herring gull, Common guillemot, Glaucous gull, little auk, and Atlantic puffin. These seabirds are present for most of the year except October with overall numbers greatest in August and September. As is typical for the North Sea breeding occurs between April and September. Seabird sensitivity in the Thistle area is low for most of the year except for winter months (Nov-Jan) where it is classed as 'high'. The Thistle field is located ~201km North-East of Shetland and is remote for sensitive seabird breeding areas on the coast.
Marine Mammals: Harbour porpoise have been sighted in moderate densities in July and low densities in May and August, whilst both killer whales and minke whales have been sighted in moderate densities in July. Atlantic white-sided dolphin, Risso's dolphin and long-finned pilot whale may be considered occasional visitors.
Conservation Designations: There are no designated conservation sites close to Thistle, with the nearest being the Pobie Bank Reef Sites of Community Importance (103 km south-west), the North-East Faroe-Shetland Channel Nature Conservation Marine Protected Area (97 km north-west).
Commercial Fisheries: The project area lies within ICES rectangle 51F1. Commercial fishing activity within this area is medium to high in comparison with other areas. Landings are a combination of demersal, pelagic and shellfish species representing 0.19% of total UK fishing value in 2018.

Table B.1.1: Summary of environmental characteristics and sensitivities
Shipping: Shipping density within the area is low, with any traffic associated with oil and gas developments or cargo vessels.
Other Offshore Industries: Thistle is in the northern North Sea oil and gas development area with several fields nearby.
Other Users of the Sea: The closest submarine telecommunication cable is the CANTAT-3 telecommunications cable owned by Faroese Telecom within 1km to the south-west of Thistle. There are no Ministry of Defence exercise areas or danger areas nearby that might be used for military training. There is only one wreck located within Block 211/18.

APPENDIX C PUBLIC NOTICE & CONSULTEE CORRESPONDENCE

Appendix C.1 Public Notices

To be added once the Statutory Consultation is complete.