

# **Close Out Report for the Combined Decommissioning Programmes for Northern Producer FPF Float-off and Disconnection of Risers and Pipelines**



## **DOCUMENT CONTROL**

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## **REVISION RECORD**

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A4		Issued for consultation

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## **TABLE OF ABBREVIATIONS**

<b>ABBREVIATION</b>	<b>EXPLANATION</b>
AHV	Anchor Handling Vessel
CSV	Construction Support Vessel (section 0)
DFPV	Depressurise, Flush, Purge, Vent
DP	Decommissioning Programme(s)
DSW	Don South-West
DWCM	Diamond Wire Cutting Machine
FPF	Floating Production Facility
HPU	Hydraulic Power Unit
ID	Identifier (PL Number) or Ident within Pipeline Works Authorisation
MAT	Master Application Template (used in Table 2.4.2)
mm	millimetre
MWA	Mid-Water Arch
NB	Nominal Bore
No	Number (of)
NORM	Naturally Occurring Radioactive Material
NP	Northern Producer
NSTA	North Sea Transition Authority
OD	Outside Diameter
OGA	Oil and Gas Authority rebranded NSTA in early 2022.
OPEP	Oil Pollution Emergency Plan
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
PWA	Pipeline Works Authorisation
Qualimar	Qualimar Shipping Company Limited
RBS	Riser Base Structure
ROV	Remotely Operated Vehicle
SFF	Scottish Fishermen's Federation
UNO	Unless Noted Otherwise
WD	West Don

# 1. INTRODUCTION

## 1.1 Overview

This document contains the close out report for the two NP Decommissioning Programmes. One for each set of notices under Section 29 of the Petroleum Act 1998 and concerns the decommissioning of:

- The Northen Producer Floating Production Facility ('FPF');
- The nine associated pipelines.

To allow departure of the vessel the following risers and pipelines were to be disconnected and recovered to a point where no snagging hazards remain within the 500m zone:

Between NP and Riser Base Structure ('RBS'):

- PL2572 8" production oil flexible riser (DSW)
- PL2573 3" gas lift flexible riser (DSW)
- PL2574 8" water injection flexible riser (DSW & WD)
- PLU2575 umbilical riser (DSW & WD)
- PL2578 8" oil export flexible riser
- PL2579 3" gas export flexible riser
- PL2583 8" production oil flexible riser (WD)
- PL2584 3" gas lift flexible riser (WD)
- PL4261 8" water injection pipeline (part thereof (spools within RBS))
- PL4262 8" water injection pipeline (part thereof (spools within RBS)).

Downstream of combined Riser Base Structure:

- PL2572 8" Production Oil pipeline (DSW) c/w PL2573 3" gas lift (piggybacked)
- PLU2576 4" umbilical (DSW)
- PL2578 8" oil export pipeline
- PL2579 3" gas export pipeline (piggybacked to PL2578)
- PL2581 8" water injection (already disconnected and out of use)
- PL2582 8" water injection (already disconnected and out of use)
- PL2583 8" Production Oil pipeline (WD) c/w PL2584 3" gas lift (piggybacked)
- PLU2585 4" umbilical (WD)
- PL4261 replacement 8" water injection pipeline (WD)
- PL4262 replacement 8" water injection pipeline (DSW)

The Riser Base Structure and mid-water arch together with the clump weight were also to be recovered.

The Decommissioning Programmes underwent Statutory Consultation between 15 December 2020 and 29 January 2021, and were approved by the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) 11 March 2021.

The Decommissioning Programmes explain the principles of the removal activities and are supported by an examination of the key environmental impacts. The close out report marks the formal close out submission to the Offshore Petroleum Regulator for Environment and Decommissioning ('OPRED').

The pipelines and umbilicals were flushed, cleaned and disconnected between end of March and beginning of April 2021. The risers, mid-water arch and riser base were removed October 2022. The final trawl sweep was conducted in Q2 2023.

## 1.2 Field overview

The Northern Producer was an AKER H3 semi-submersible unit originally constructed by Trosvik Framnaes in Norway in 1976. In 1996 the vessel was purchased by Northern Offshore Ltd, Norway and renamed the Northern Producer.

Since May 2009, the Northern Producer had provided the export route for the Don South West, Conrie Ythan and West Don fields that are situated within Blocks 211/13b, 211/18a, and 211/18e of the Northern North Sea sector of the United Kingdom Continental Shelf and was operated by EnQuest Heather Limited. These fields are located approximately 527km north-north-east of Aberdeen in water depths between ~165m and ~178m.

The Northern Producer was operated by EnQuest Heather Limited as the duty holder but owned by Qualimar Shipping Company Limited. The decommissioning programme in respect of the Northern Producer FPF was prepared by EnQuest for and on behalf of Qualimar Shipping Company. As pipeline owner, EnQuest, prepared the decommissioning programme for the relevant pipelines. The decommissioning document, containing both programmes, was submitted jointly by Qualimar and EnQuest.

The Cessation of Production application was submitted on 05 February 2021 and accepted by the then Oil and Gas Authority ('OGA')<sup>1</sup> on 26 February 2021. Production ceased 08 March 2021.

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<sup>1</sup> Rebranded North Sea Transition Authority ('NSTA') in early 2022.

### 1.3 Field Locations including field layout and adjacent facilities

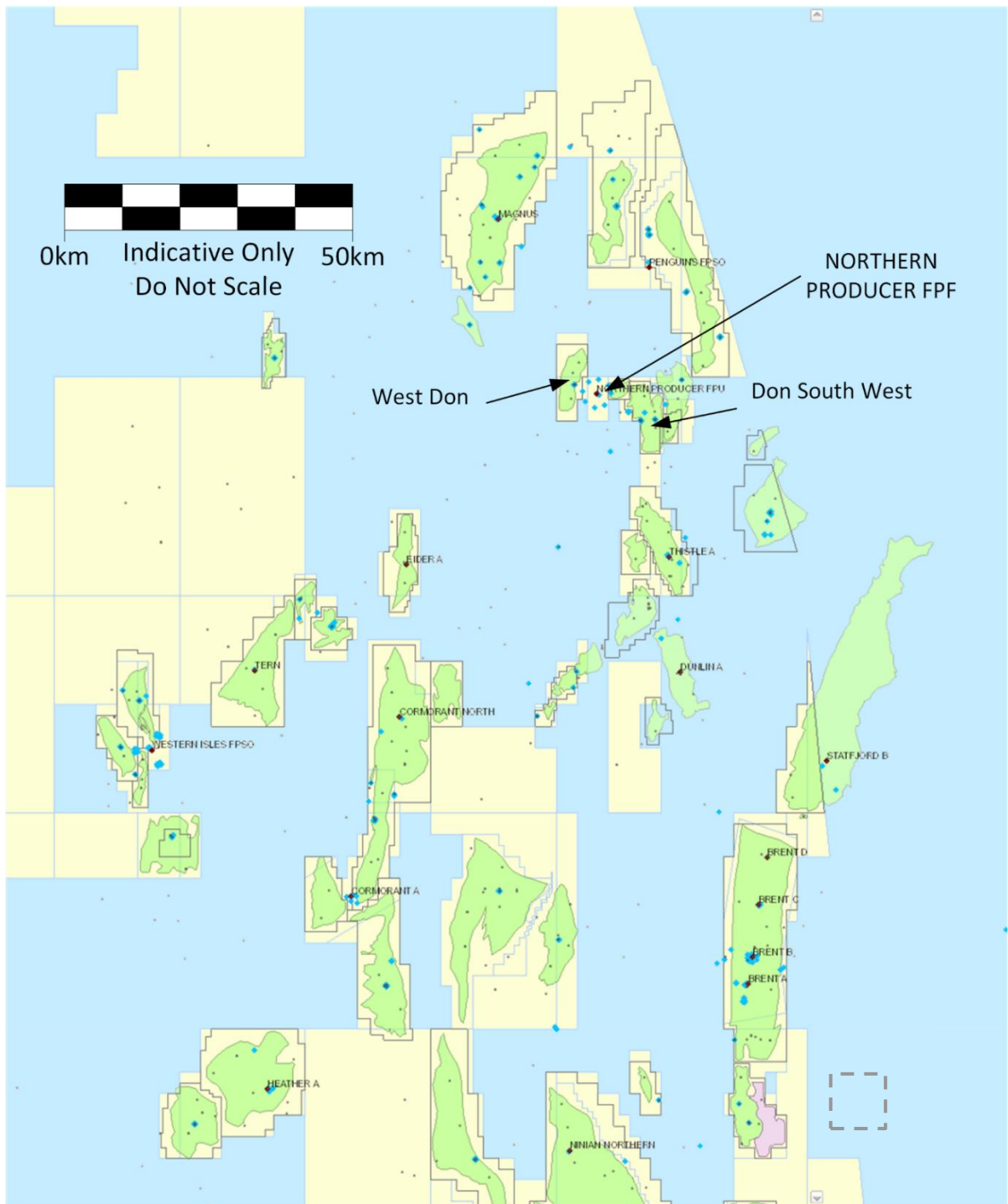


Figure 1.3.1: Northern Producer adjacent fields and surface facilities



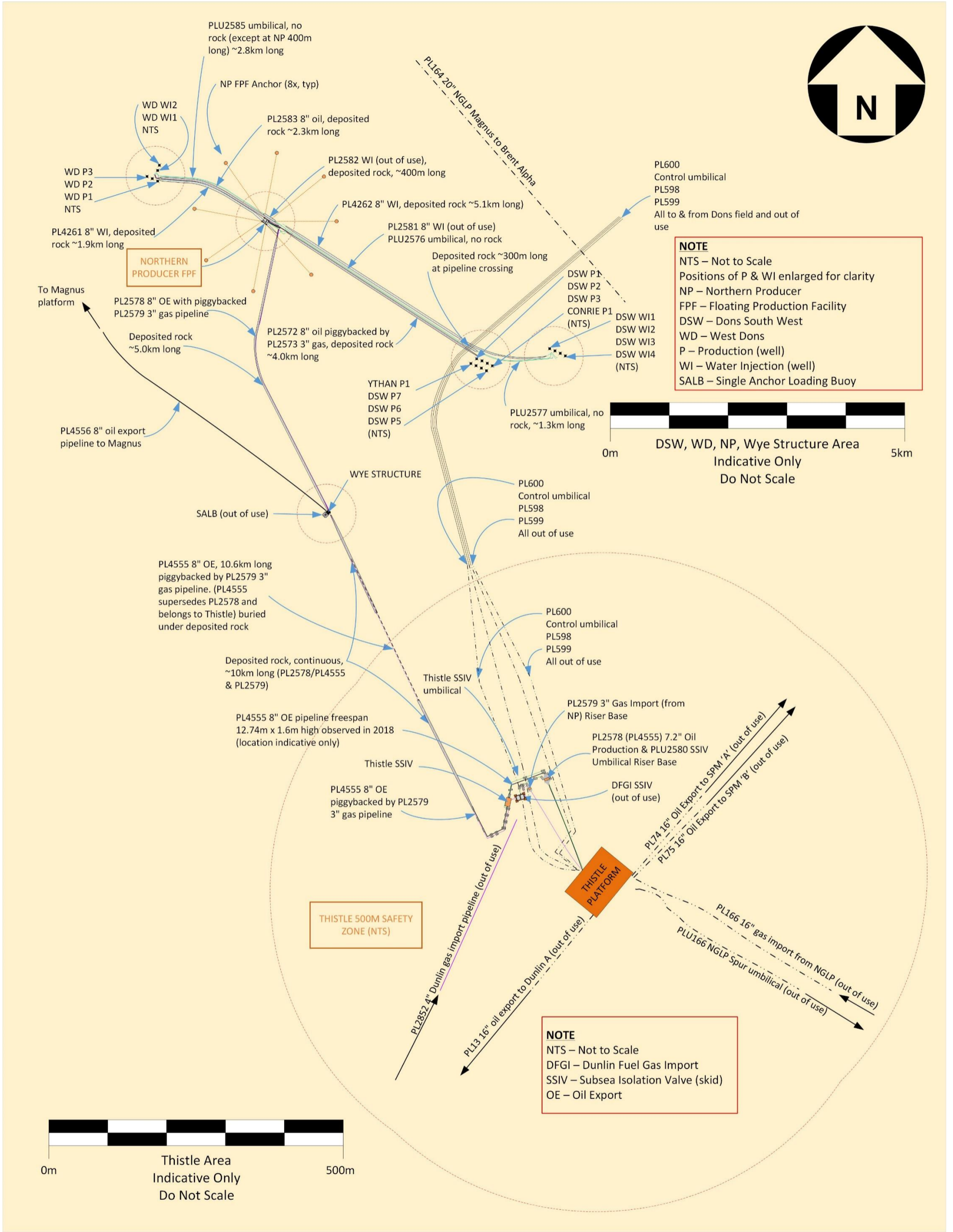


Figure 1.3.2: Overview of Northern Producer and its locality

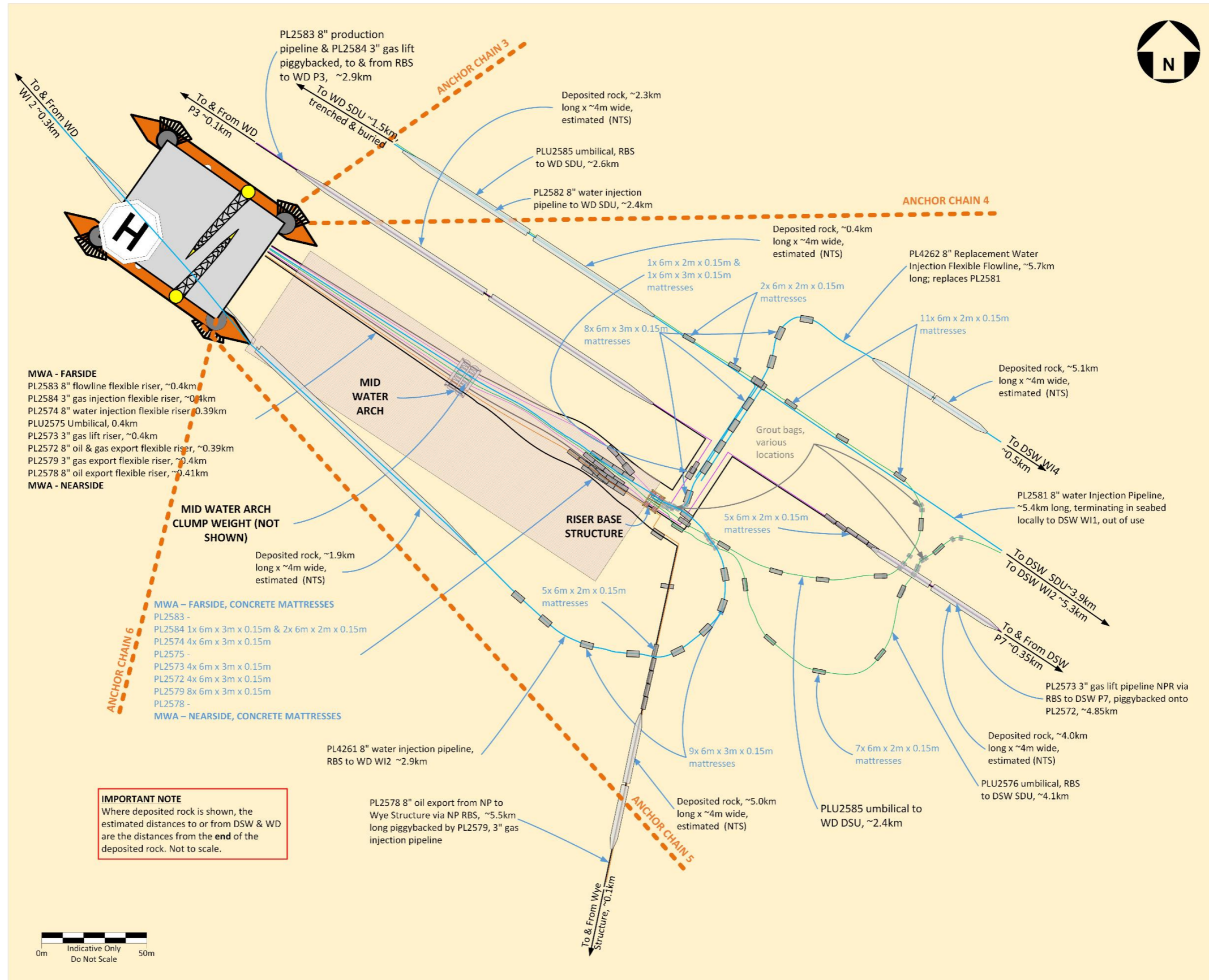


Figure 1.3.3: Northern Producer prior to departure

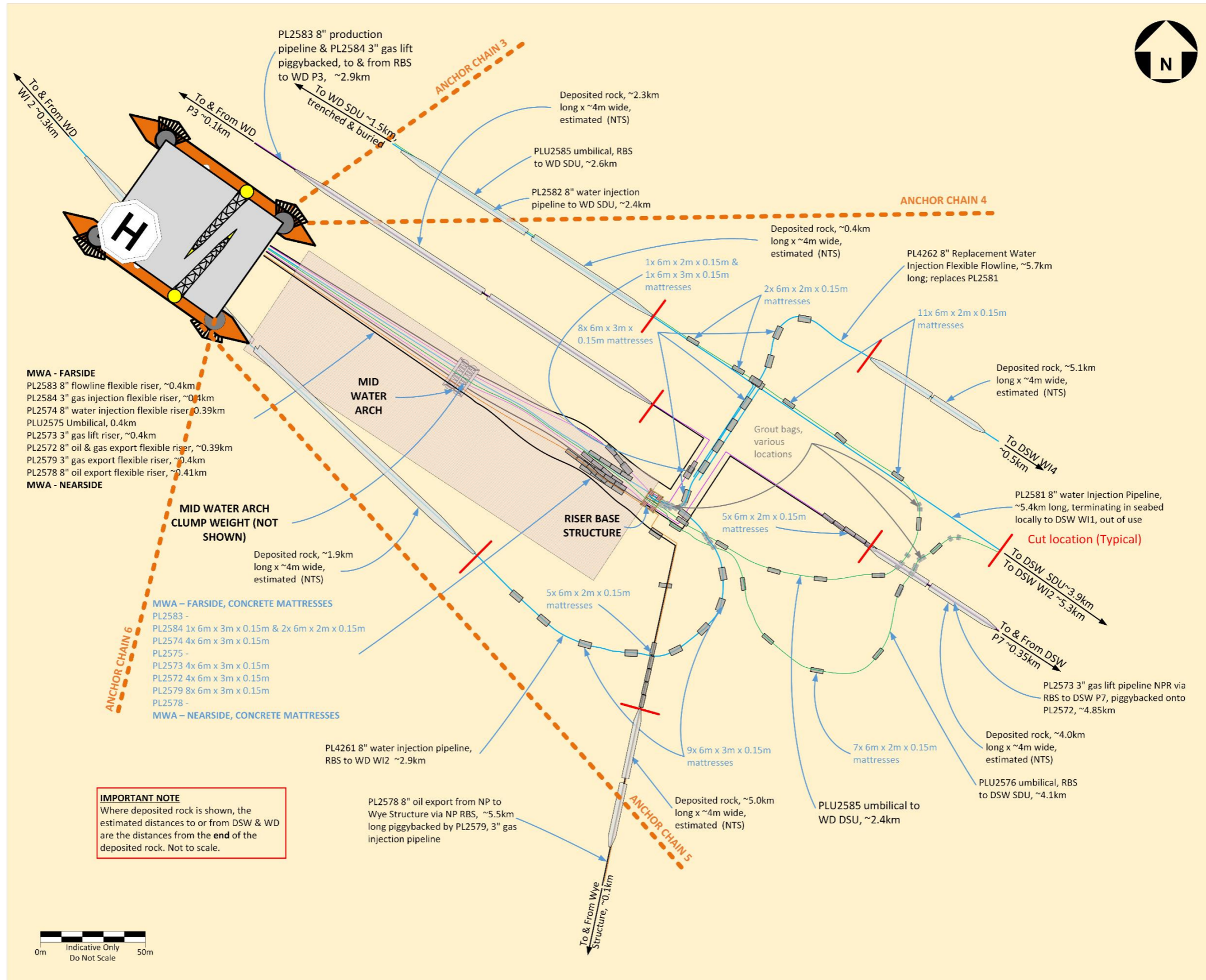


Figure 1.3.4: Northern Producer pipeline cut locations

## 2. DECOMMISSIONING PROGRAMMES

The NP Decommissioning Programmes underwent the Statutory Consultation between 15 December 2020 to 29 January 2021. The final version of the document was submitted to OPRED 02 March 2021 and was approved on 11 March 2021.

Key elements of the approved Decommissioning Programmes are summarised below:

- Completely remove the NP FPF with its future being determined by Qualimar Shipping Company Limited.
- Fully recover the anchors and anchor chains.
- All the flexible risers and pipelines associated with the Don South West and West Don infrastructure will be cleaned and flushed, with the risers and surface laid sections of the pipelines in and around the 500m safety zone being fully removed, including the mid-water arch ('MWA') and the riser base structure ('RBS'). This will remove potential snagging hazards from the area.

### 2.1 Overview of assets being decommissioned

#### 2.1.1 Installation(s)

Table 2.1.1: Installation Being Decommissioned			
<b>Field(s):</b>	Don South West, West Don, Conrie & Ythan	<b>Production Type</b>	Oil & Gas
<b>Water Depth (m)</b>	~171.9m	<b>UKCS Block</b>	211/18a
<b>Topside Installation(s)</b>		<b>Weights</b>	
<b>Number</b>	<b>Type</b>	<b>Weight</b>	<b>Anchor Weight (Te)</b>
1	FPF	11,000	1,578 (8)
<b>Subsea Installation(s)</b>		<b>Number of Wells</b>	
n/a	n/a	<b>Topsides</b>	<b>Subsea</b>
n/a	n/a	n/a	n/a
<b>Drill Cuttings piles</b>		<b>Distance to median</b>	<b>Distance from nearest UK coastline</b>
n/a		~12.6km	527km NNE of Aberdeen

#### 2.1.2 Don South West & West Don Fields - pipelines

Table 2.1.2: DSW & WD pipelines being decommissioned						
Pipeline ID	Diameter (NB)	PWA ID	Length (m)	PWA ID	Length (m)	Status/Other
PL2578	8in	1-4	5,547	n/a	n/a	The remaining sections of pipeline (not coloured green) will remain 'as is' meantime until full field decommissioning is carried out.
PL2579	8in	1-6	5,539	7-11	10,471	
<b>NOTE:</b>						
1. PWA Idents highlighted in green for the parts of pipelines affected by proposals in this document; the remaining sections of pipeline will remain 'as is' meantime until full field decommissioning is carried out.						

### 2.1.3 DSW & WD pipeline stabilisation features

Table 2.1.3: DSW & WD subsea pipeline stabilisation features				
Stabilisation feature	Total No	Total mass (Te)	Location(s)	Exposed/Buried/Condition
Concrete mattresses <sup>1</sup>	15	61.3	<b>PL2578</b> 2x Downstream of MWA. Refer Figure 1.3.3	Latest survey information suggests the concrete mattresses are exposed.
			<b>PL2579</b> 8x Downstream of MWA. Refer Figure 1.3.3	
			<b>PL2578/9</b> 5x Between RBS and deposited rock. Refer Figure 1.3.3	
Grout bags	n/a	n/a		
Riser Base Structure (8.6m x 7m x 3.1m)	1	82	Downstream of NP	
Mid-Water Arch (15.8m x 10.8m x 4.6m) Incl. clump weight guide frame (18.4m x 7m x 2.3m)	1	298.8	Adjacent to NP vessel. Combined mass includes Buoyancy, Tether Chain, Clump Weight Guide Frame, Clump Weights (2x), Guide Gutter	MWA itself sits within the water column, clump weights on seabed
<b>NOTES:</b>				
1. Concrete mattresses are 'SPS' type: 6m x 2m x 0.15m (Approx. mass each mattress 3.14Te) or 6m x 3m x 0.15m (Approx. mass each mattress 4.72Te).				

### 2.1.4 Don South West Field - pipelines

Table 2.1.4: DSW pipelines being decommissioned						
Pipeline ID	Diameter (NB)	PWA ID	Length (m)	PWA ID	Length (m)	Status/Other
PL2572	6in/ 8in	1-27	314	28-31	4,490	The remaining sections of pipeline (not coloured green) will remain 'as is' meantime until full field decommissioning is carried out.
PL2573	3in	1-6	4,500	7-33	350	
PL2574	285.4mm	1	390	n/a	n/a	
PLU2575	114.5mm	1-25	400	n/a	n/a	
PLU2576	114.5mm	DSWJR1-8, cores 1-8	4,172	DSWJS1-8	10	
PL2581	8in	1	5,237	2	27	
PL4262	8in	1-2	5,559	3-13	109	
<b>NOTE:</b>						
1. If diameter is expressed in mm it refers to outside diameter of electrical cable or umbilical;						
2. PWA Idents highlighted in green for the parts of pipelines affected by proposals in this document; the remaining sections of pipeline will remain 'as is' meantime until full field decommissioning is carried out.						

## 2.1.5 DSW pipeline stabilisation features

Table 2.1.5: DSW subsea pipeline stabilisation features				
Stabilisation feature	Total No	Total mass (Te)	Location(s)	Exposed/Buried/Condition
Concrete mattresses <sup>1</sup>	32	113.2	<b>PL2572</b> 4x Downstream of MWA. Refer Figure 1.3.3.	Latest survey information suggests the concrete mattresses are exposed.
			<b>PL2573</b> 9x Downstream of MWA (4x) and upstream of deposited rock (5x). Refer Figure 1.3.3.	
			<b>PLU2576</b> 7x Downstream of RBS. Refer Figure 1.3.3.	
			<b>PL4262</b> 8x Downstream of RBS. Refer Figure 1.3.3.	
Grout bags	n/a	n/a		
<b>NOTES:</b>				
1. Concrete mattresses are 'SPS' type: 6m x 2m x 0.15m (Approx. mass each mattress 3.14Te) or 6m x 3m x 0.15m (Approx. mass each mattress 4.72Te).				

## 2.1.1 West Don Field - pipelines

Table 2.1.6: WD pipelines being decommissioned						
Pipeline ID	Diameter (NB)	PWA ID	Length (m)	PWA ID	Length (m)	Status/Other
PL2582	8in	1-2	2,335	3	27	The remaining sections of pipeline (not coloured green) will remain 'as is' meantime until full field decommissioning is carried out.
PL2583	6in / 8in	1-17	141	18-21	2,745	
PL2584	8in, 285.4mm	1-5	2,744	6-22	145	
PLU2585	114.5mm	WDJR1-8, cores 1-8	2,610	WDJS1-8	10	
PL4261	114.5mm	1-2	2,850	3-7	81	
<b>NOTE:</b>						
1. If diameter is expressed in mm it refers to outside diameter of electrical cable or umbilical;						
2. PWA Idents highlighted in green for the parts of pipelines affected by proposals in this document; the remaining sections of pipeline will remain 'as is' meantime until full field decommissioning is carried out.						

## 2.1.2 WD pipeline stabilisation features

Table 2.1.7: WD subsea pipeline stabilisation features				
Stabilisation feature	Total No	Total mass (Te)	Location(s)	Exposed/Buried/Condition
Concrete mattresses <sup>1</sup>	34	124.2	<b>PL2582</b> 11x Downstream of RBS. Refer Figure 1.3.3.	Latest survey information suggests the concrete mattresses are exposed.
			<b>PL2582</b> 1x Downstream of RBS, approaching deposited rock. Refer Figure 1.3.3.	

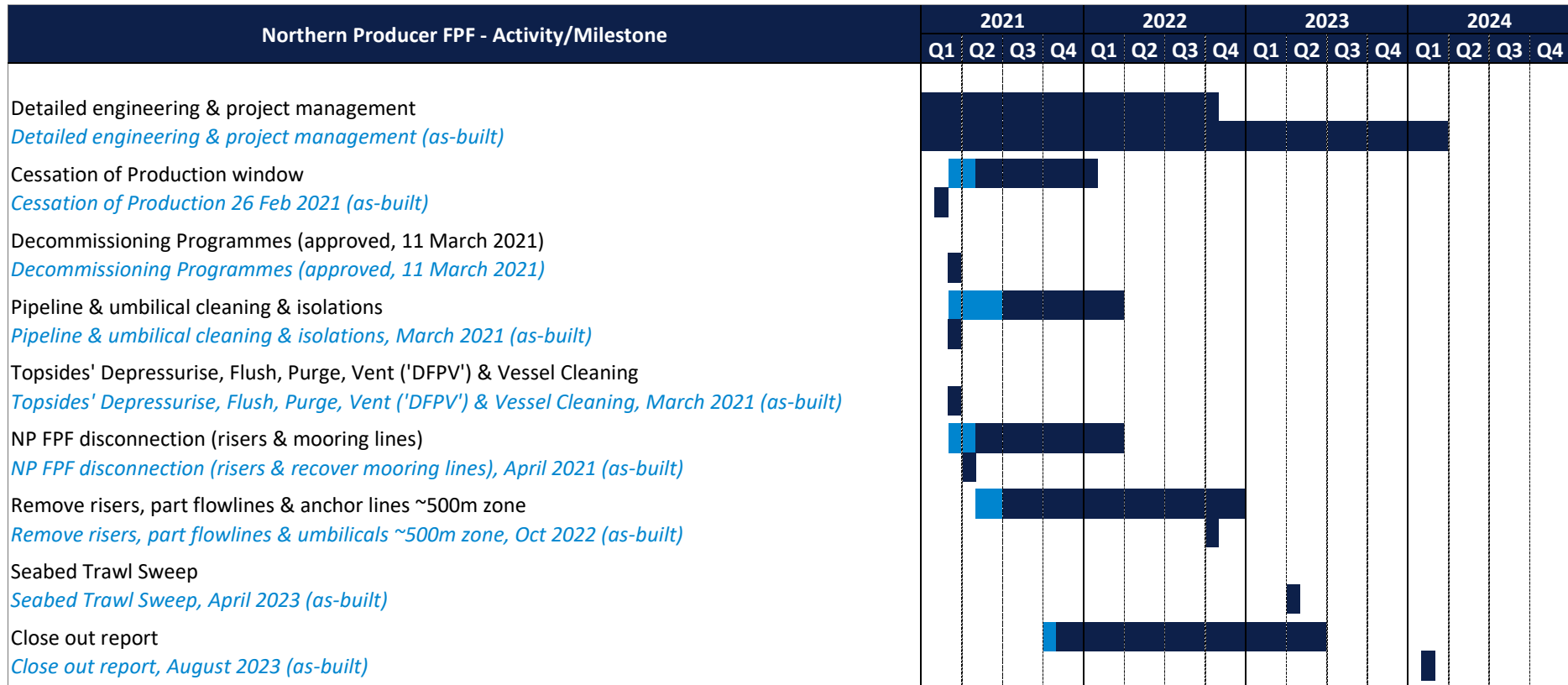
Table 2.1.7: WD subsea pipeline stabilisation features				
Stabilisation feature	Total No	Total mass (Te)	Location(s)	Exposed/Buried/Condition
			<b>PL2584</b> 2x Downstream of RBS. Refer Figure 1.3.3.	
			<b>PL2584</b> 3x Downstream of MWA. Refer Figure 1.3.3.	
			<b>PLU2585</b> 1x Downstream of RBS, approaching deposited rock. Refer Figure 1.3.3.	
			<b>PL4261</b> 9x Downstream of RBS. Refer Figure 1.3.3.	
<b>NOTES:</b>				
3. Concrete mattresses are 'SPS' type: 6m x 2m x 0.15m (Approx. mass each mattress 3.14Te) or 6m x 3m x 0.15m (Approx. mass each mattress 4.72Te).				

## 2.2 Summary of Decommissioning Programmes

Table 2.2.1: Summary of Decommissioning Programmes	
Asset	Approved decommissioning option(s)
Northern Producer FPF	<p>Complete removal. The FPF will be removed and recovered, with its future being determined by Qualimar Shipping Company Limited.</p> <p>The vessel will be taken to shore, dismantled, and recycled unless alternative re-use options are found by the owner to be viable and more appropriate.</p>
Mooring chains and anchors	<p>The anchors and anchor chains will be fully recovered.</p> <p>Any permit applications required for work associated with the anchors will be submitted to the regulator as required.</p>
Pipelines	<p>All the flexible risers and pipelines associated with the Don South West and West Don infrastructure will be cleaned and flushed, with the risers and surface laid sections of the pipelines in and around the 500m safety zone being fully removed. This will remove potential snagging hazards from the area.</p> <p>Pipeline stabilisation features such as concrete mattresses and any grout bags found that are exposed (i.e. not buried under deposited rock) will be removed as part of the pipeline severance and recovery activities. Although some deposited rock may be disturbed during the removal activities, it will remain <i>in situ</i>.</p>
Wells	<p>The wells associated with the Don South West, Conrie, Ythan and West Don fields are not being decommissioned at this time and will be subject to a separate decommissioning programme. Therefore, their current status will be risk assessed to determine how they should be isolated, left and monitored until such time in future when they are decommissioned. Monitoring arrangements are being discussed with OPRED and HSE.</p>



## 2.3 Gantt Chart



### Notes / Key

Most likely period of activity ■

Activity window to allow commercial flexibility associated with decommissioning activities ■

Text in *italics* is the 'As-Built' plan

Figure 2.3.1: Gantt Chart of original c/w 'as-built' project plan

## 2.4 Associated decommissioning approvals and permits

The decommissioning operations were executed in accordance with the scope described in the approved Decommissioning Programmes [1].

Table 2.4.1: Associated decommissioning approvals			
Activity	Document	Approval	Completion Date
Disconnection and removal of risers.	Pipeline Works Authorisations: Associated with <b>4/W/08</b> : 36/V/21 (cat 2 var) 394/V/21 (cat 2 var) 397/V/21 (decommissioning) 2/V/22 (cat 2 var) 82/V/22 (decommissioning) 198/V/22 (decommissioning) 342/D/22 (deposit consent) Associated with <b>05/W/08</b> : 396/V/21 (decommissioning) 343/D/22 (deposit consent)	Authorised by NSTA  26 Feb 2021 16 Sept 2022 08 Nov 2021 15 Dec 2021 10 Jan 2022 28 Mar 2022 01 June 2022  15 Dec 2021 16 Sept 2022	April 2021

Table 2.4.2: Related permits				
MAT Reference	Type	Permit Reference	Approval Dates	Description
DCA/124	Marine License	ML/653/10	Last variation approved 06.09.22	Placement of rock, wet storage, potential use of explosives, discharge of marine growth, clearance of NP 500 m zone, mooring lines
PRA/158	Consent to Locate	CL/311/7	Variations approved between 18.04.17 to 03.03.21	Deploy guard vessel, Cardinal Buoys
DCA/124	Chemical Permit	CP/2522/0	Last variation approved 23.02.21	Pipeline flushing
DCA/124	Oil Discharge Permit	OTP/1064/0	Last variation approved 01.02.21	Disconnection of pipelines and risers
SA/1630	Geophysical survey	GS/1432/0	05.07.22	Clearance survey of 500 m zone

## 2.5 Amendments to & deviations from the DP

No formal amendments were made to the approved Decommissioning Programmes.

### 3. DECOMMISSIONING ACTIVITIES

#### 3.1 Contracts awarded

Table 3.1.1: Contracts awarded		
Activity	Award date	Contractor(s)
<b>NORTHERN OFFSHORE</b>		
Disposal of NP moorings and stored equipment (includes disconnection and recovery of mooring lines)	24/06/21	InterMoor Ltd
<b>ENQUEST</b>		
FPF Drain, Flush, Purge, & Vent and pipeline & umbilical flushing	12/01/21	Altus Intervention
FPF process vessel cleaning (separators V-2011 & V-2012 and degasser V-4014)	13/01/21	Muehlhan Industrial Services (Now part of Altrad Energy Support Services Ltd)
Disconnection of risers	17/02/21	DeepOcean Subsea Services Ltd
500m zone clearance Services (including recovery of risers and parts of pipeline and umbilicals)	19/10/21	
Logistics and material management (see note below)	19/10/21	Phoenix Decom Limited
<b>NOTE:</b> Provided by 500m zone clearance services contractor; disposal via a subcontract.		

#### 3.2 Platform operations

Table 3.2.1: FPF operations		
Activity	Period of activity	Contracted by
Pipeline & umbilical cleaning and isolations	March 2021	EnQuest
Topsides DFPV & cleaning - vessels & pipework	April 2021	EnQuest
FPF disconnection & recovery of mooring lines	April 2021	Northern Offshore
FPF sail away	April 2021	Northern Offshore
Deployment of anchors near Kishorn dry dock	April 2021	Northern Offshore

#### 3.3 Well Decommissioning

All the DSW and WD production and water injection wells were subject to an integrity inspection before the risers and pipelines were disconnected. The inspection activities were carried out March-April 2021. The results of the inspection were communicated to HSE and OPRED on 07 October 2022. The next well integrity inspections are due in 2024.

#### 3.4 Subsea installations

Table 3.4.1: Subsea installation decommissioning				
Description	No.	Agreed decommissioning solution	Extent of removal	Status
FPF mooring lines and anchors	8	Complete removal	Completely removed	

#### 3.5 Risers, pipelines, umbilicals & jumpers

The riser cutting durations varied between 17 and 61 minutes (Table 3.5.1). On completion of the first cut (PL2579) the DWCM was retrieved to deck to allow inspection of the diamond wire for wear

and tear. The diamond wire was replaced after the first cut and after some of the subsequent cuts as well.

Table 3.5.1: Riser cutting durations		
Riser ID	NB or OD (mm)	Time to fully sever
PL2579	3in	49 minutes
Diamond wire changed		65 minutes
PL2573	3in	17 minutes
PLU2575	114.5mm (umbilical)	51 minutes
Diamond wire changed		20 minutes
PL2584	3in	24 minutes
Diamond wire and jaws changed.		67 minutes
PL2578	8in	47 minutes
PL2572	8	38 minutes
PL2574	8	56 minutes
PL2583	8	61 minutes

The risers were lowered to the seabed for recovery in a subsequent part of the campaign. The coordinate locations of the risers were recorded and the risers were recovered in reverse order of the cutting sequence.

Table 3.5.2: Risers, pipelines, umbilicals & jumpers			
ID	Activity	Period of activity	Completion date
<b>Don South-West &amp; West Don</b>			
PL2578	Pipeline cleaning and disconnection (cutting) of flexible riser. Removal of flexible riser and partial removal of pipeline. Recovery to shore as per Decommissioning Programme [1].	March - April 2021	05 Oct 2022
PL2579 (Ident 1 to 6)		June 2022	
<b>Don South-West</b>			
PL2572 (excl. ident 5 to 8)	Pipeline cleaning and disconnection (cutting) of flexible riser. Recovery of riser and partial removal of umbilical. Recovery to shore as per DP [1]	March - April 2021	05 Oct 2022
		June 2022	
PL2573 (excl. dent 18 to 21)	Pipeline cleaning and disconnection (cutting) of flexible riser. Recovery of riser, partial removal of pipeline. Recovery to shore as per DP [1].	March - April 2021	05 Oct 2022
		June 2022	
PL2574	Pipeline cleaning and disconnection (cutting) of flexible riser. Recovery to shore as per DP [1].	March - April 2021	05 Oct 2022
		June 2022	
PLU2575 (Ident 1 to 25)	Pipeline cleaning and disconnection (cutting) of umbilical riser. Recovery of riser and partial removal of umbilical. Recovery to shore as per DP [1].	March - April 2021	05 Oct 2022
		June 2022	
PLU2576	Pipeline cleaning and disconnection (cutting) of umbilical riser. Recovery of riser and partial removal of umbilical. Recovery to shore as per DP [1].	March - April 2021	05 Oct 2022
		June 2022	
PLU2577	Pipeline cleaning. Removed to isolate the wellhead. Left on seabed to be recovered in future as part of the wider scope of decommissioning activities. (See Note 3).	March - April 2021	n/a
PL2581	Pipeline cleaning, and part removal of pipeline. Recovery to shore as per DP [1].	March - April 2021	05 Oct 2022

**Table 3.5.2: Risers, pipelines, umbilicals & jumpers**

ID	Activity	Period of activity	Completion date
PL4262	Pipeline cleaning and partial removal of pipeline. Recovery to shore as per DP [1].	March - April 2021	05 Oct 2022
<b>West Don</b>			
PL2582	Pipeline cleaning and partial removal of pipeline. Recovery to shore as per DP [1].	March - April 2021	05 Oct 2022
PL2583	Pipeline cleaning and disconnection (cutting) of riser. Recovery of riser and partial removal of pipeline. Recovery to shore as per DP [1].	March - April 2021 June 2022	05 Oct 2022
PL2584	Pipeline cleaning and partial removal of pipeline. Recovery to shore as per DP [1].	March - April 2021	05 Oct 2022
PLU2585	Pipeline cleaning and disconnection (cutting) of umbilical riser. Recovery of riser and partial removal of pipeline. Recovery to shore as per DP [1]	March - April 2021 June 2022	05 Oct 2022
PL4261	Pipeline cleaning. Disconnection (cutting) of riser. Recovery of riser and partial removal of pipeline. Recovery to shore as per DP [1].	March - April 2021 June 2022	05 Oct 2022
<b>NOTES</b>			
<ol style="list-style-type: none"> <li>1. Completion date is the date the PWA was 'as-built' and closed out.</li> <li>2. Several pipelines were modified to allow flushing and cleaning activities to be conducted as well as to isolate the wells. As these were not strictly part of the decommissioning scope they are not listed here.</li> <li>3. The wider scope of decommissioning activities is captured in the Decommissioning Programmes for Conrie, DSW, WD and Ythan [2].</li> <li>4. Dredging for the spool piece to pipeline flange disconnections took a long time due to presence of stiff clay.</li> <li>5. Tried and tested diamond wire saws were used to cut the risers. Clash check studies and cutting trials were performed beforehand. All performed using remotely operated equipment.</li> </ol>			

### 3.6 Pipeline structures

**Table 3.6.1: Pipeline structures**

Description	Status	Period of Activity
<b>DSW &amp; WD pipeline structures</b>		
Mid-Water Arch ('MWA') including tether chain and clump weight.	Removed	June 2022
Riser base structure	Removed	June 2022

### 3.7 Other (PON2 related)

**Table 3.7.1: Other (PON2 related)**

Description	Status	Period of Activity
<b>Northern Producer</b>		
Escape to sea ladder from area local to PL4261	Removed.	June 2022

### 3.8 Pipeline protection & stabilisation features

**Table 3.8.1: Pipeline protection & stabilisation features**

Description	Status	Period of Activity
<b>DSW &amp; WD pipeline protection and stabilisation features</b>		
PL2578: 2x mattresses	Removed.	June 2022
P2579: 8x mattresses	Removed.	
PL2578/9: 5x mattresses	Removed.	
Riser Base Structure ('RBS')	Removed.	
Mid-Water Arch ('MWA')	Removed.	
PL2578, PL2579: 6 Te rock.	Installed.	
<b>DSW pipeline protection and stabilisation features</b>		
PL2572: 4x mattresses	Removed.	June 2022
PL2573: 9x mattresses	Removed.	
PLU2576: 7x mattresses	Removed.	
PL4262: 8x mattresses	Removed.	
PL2572, PL2573: 6 Te rock.	Installed.	
PL2581: 4 Te rock.	Installed.	
PL4262: 6 Te rock.	Installed.	
PLU2576: 4 Te rock.	Installed.	
<b>WD pipeline protection and stabilisation features</b>		
PL2582: 11x mattresses	Removed.	June 2022
PL2584: 5x mattresses	Removed.	
PLU2585: 1x mattress	Removed.	
PL4261: 9x mattresses	Removed.	
PL2583, PL2584: 6Te rock	Installed.	
PL2582, PLU2585: 6 Te rock.	Installed.	
PL4261: 6 Te rock	Installed.	
<b>NOTE:</b>		
1. All materials removed as proposed in the Decommissioning Programmes unless noted otherwise ('UNO').		
2. All deposited rock was installed as per the Marine Licenses and Deposit Consents listed in Table 2.4.1.		

### 3.9 Post decommissioning survey results

A trawl sweep was conducted by a Scottish Fishermen's Federation representative using trawl mimic gear and trawl fishing equipment deployed from the MV Endurance LK416 vessel between 19 April and 24 April 2023. Trawl mimic gear is used first to reduce the potential for damage to trawl fishing equipment. A clear seabed certificate was issued 22 April 2023 (Figure 3.9.2).

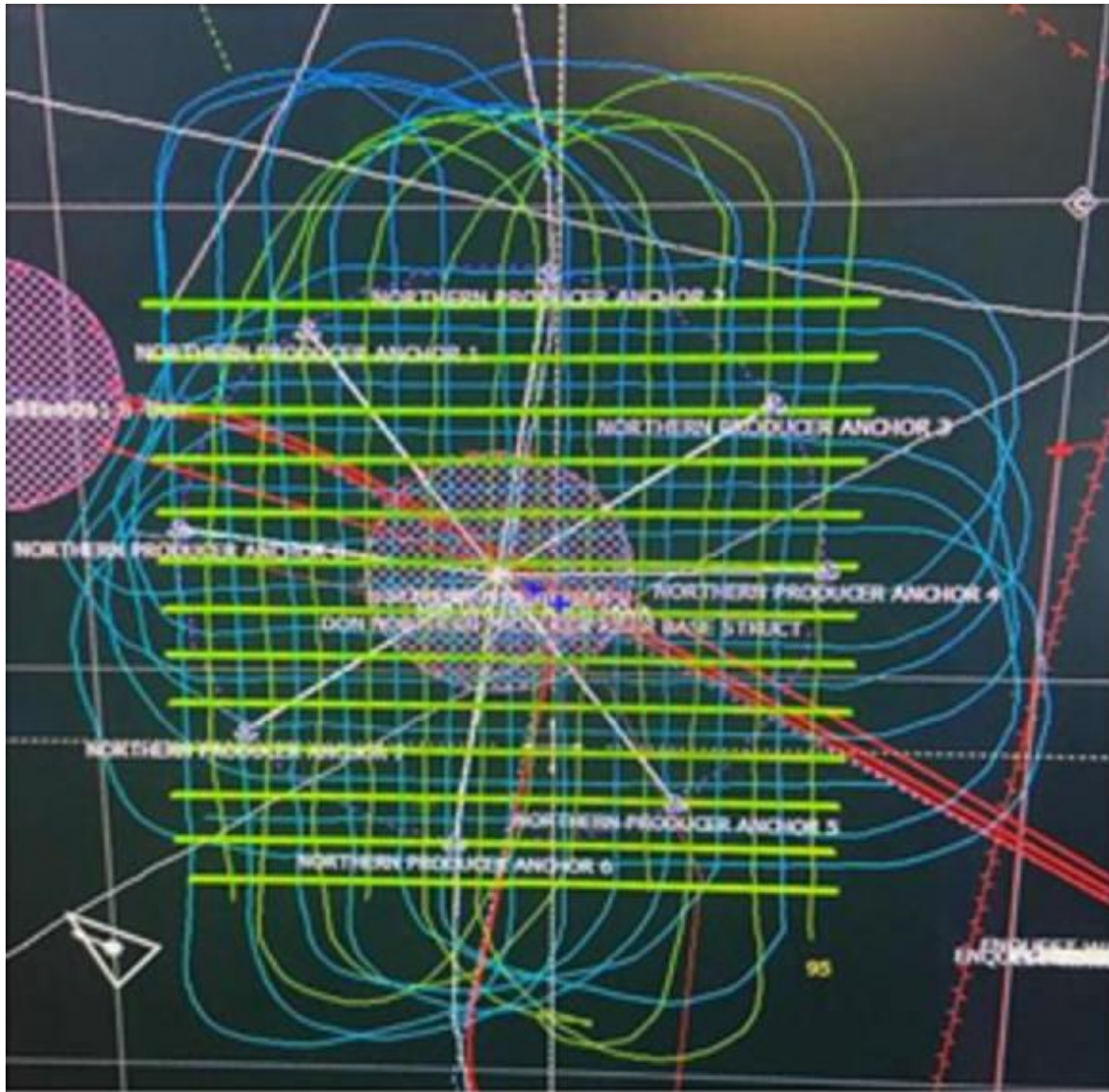


Figure 3.9.1: Trawl sweeps using mimic fishing gear

The thin blue and green lines show the vessel tracks.



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Date: 22/04/2023

**ENQUEST: DONS FIELD – NORTHERN PRODUCER LOCATION POST DECOMMISSIONING VERIFICATION TRAWL SWEEPS**

This is to certify that the MV “Endurance” LK416 has carried out a post decommissioning seabed trawl verification sweep of the former Northern Producer 500 metre safety zone and anchor locations and has found, using best endeavours and practice available, that there are no oil field related obstructions remaining that should affect current and future fishing activity in the defined area.

Although no gear was damaged or objects retrieved during the trials, whilst crossing some area of pipelines the vessel did have a slight reduction in speed and gear spread loss. As with all pipelines, vessels should operate with caution when trawling over pipelines in this area.

A snagging occurred out with the 500 metre safety zone and anchor locations which is presumed to have been caused by a natural obstruction. Fishermen are therefore recommended to avoid trawling over this position: 61° 29.132’N, 001° 27.019’E.

To the best of our knowledge the swept areas have been successfully cleared of all equipment / infrastructure are considered safe to allow normal fishing operations to proceed.

Signed for on behalf of the Owners of MV “Endurance” LK416

Edward Leask, Skipper

Signed for on behalf of SFF Services Limited

Andrew Third, Marine Assurance Officer

SFFSL-QU-T-5 Rev 10, Nov-22

A company wholly owned by the Scottish Fishermen’s Federation  
VAT Reg. No: 498 420 807  
Registered in Scotland Company No: SC 098563  
Registered Office: 24 Rubislaw Terrace Aberdeen, UK, AB10 1XE



Figure 3.9.2: Trawl sweep verification certificate





### 3.10 Key milestones

Table 3.10.1: Key milestones	
Activity	Start / completion date
Contract awarded for pipeline cleaning and disconnection	Refer Table 3.1.1
Contract awarded for decommissioning works	Refer Table 3.1.1
Vessel mobilisation for pipeline cleaning and disconnection	Refer Table 3.2.1
Vessel mobilisation for decommissioning works	Refer Table 3.2.1
Disconnection of risers	Refer Table 3.2.1
Removal of anchors and mooring lines	Refer Table 3.2.1
Departure of Northern Producer FPF	Refer Table 3.2.1
Removal of infrastructure in 500m zone completed	Refer Table 3.8.1
Trawl sweep completed	24 April 2023

### 3.11 Stakeholder engagement

Table 3.11.1: Stakeholder engagement	
Description	
The scope of the work was such that engagement with an extensive range of stakeholders was not required. Apart from various contacts with the various regulators such as OPRED, NSTA, and liaison with joint venture partners, there was liaison with the SFF throughout the project.	

## **4. IMPACT ON ENVIRONMENT**

### **4.1 Activities**

The decommissioning works aligned with the proposals submitted in the Decommissioning Programmes were undertaken under the existing Oil Pollution Emergency Plan ('OPEP') for the facilities, OPEP reference number 170039/12.

As the operations were completed with the environmental impacts being controlled and mitigated using the measures described in the DP, the environmental impacts arising from this work are low.

### **4.2 Future monitoring**

Decommissioning of the remaining installations and infrastructure that remain after the FPF has departed are the subject of a separate DP [2] submitted by EnQuest. Future monitoring requirements will be assessed as part of the Close Out report submitted for the decommissioning of the wider infrastructure. The pipeline infrastructure for PL2579 (DSW & WD), PL2572 (DSW), and PL2583 (WD) will meantime continue to be subject to a risk-based inspection regime agreed with OPRED, conducted every six years, with the next pipeline surveys due in 2025.

Note that Northern Offshore will not be involved in any future monitoring activities as the vessel and associated mooring lines and anchors have been fully recovered.

## **5. IMPACT ON HSE**

Details of incidents or accidents during project execution are presented are described in section 5.1 and section 5.2.

### **5.1 Northern Producer sailaway**

Whilst connecting one of the tugs to the Northern Producer's No. 5 mooring chain to assist with station keeping. The 75m x 61.2t dyneema messenger line failed at 0605hrs on the 25/04/21, approx. 25m from the NP end. At the time of the failure the tug reported a load of approx. 5t. The line parted and the load dropped from the tug. The tug had a clear deck at the time of the incident and there were no personnel in the area.

### **5.2 Riser cutting**

Near miss. Tether Management System for the ROV tether. The tether mechanism paid out the tether faster than the descent of the ROV. This resulted because of a maloperation of the ROV tether management resulting in downtime required to fix it.

The diesel driven Hydraulic Power Unit ('HPU') had been tested and checked prior to operating in the field. However, a day later whilst operating in the field the HPU sustained a leak onto the bunded tray underneath. As a result of the bunding, no oil was released to sea.

## 6. WASTE

### 6.1 Commitments

Qualimar Shipping Company Limited (Qualimar) and EnQuest adhered to the waste management commitments described in section 3 of the DP [1]. The principles of the waste hierarchy were followed to minimise the production of waste from the decommissioning scope and opportunities for reuse were explored and taken wherever possible. The materials recovered to shore were dealt with at suitably licensed waste facilities and appropriate testing was carried out on the recovered materials to identify the presence and extent of contaminated material such as Naturally Occurring Radioactive material ('NORM'). Monitoring and testing of the production risers and related pipelines confirmed that the products were not contaminated by NORM.

The "quantity" of material is the total amount of material associated with the scope for the work associated with this Decommissioning Programme [1].

**Table 6.1.1: Inventory associated with NP FPF & mooring systems**

Material	Percentage	Quantity (Te)	Phase 1 Recovery (Te)
Steel	93.5%	11,755	11,755.1
Plastics	2.2%	277	276.9
Non-Ferrous	0.1%	9	9.1
Grout / concrete	4.3%	537	536.9
Other non-hazardous	0.0%	0	0
Other hazardous	0.0%	0	0
<b>TOTAL</b>	<b>100%</b>	<b>12,578</b>	<b>12,578.0</b>

**NOTE:**

1. The inventory identified for recovery during decommissioning works associated with Phase 1 includes the mass of material associated with the Northern Producer FPF including the mooring lines and anchors.
2. Following advice OPRED's regulations cease to apply once the NP FPF has disconnected from the field as this is the point at which it is no longer classed as an installation and is instead classed as a vessel. Therefore, a breakdown of the waste components will not be reported directly through the Close Out Report. However, an end state position has been agreed. The FPF will be recycled at the Kishorn Port and Dry Dock owned by Kishorn Port Ltd.

**Table 6.1.2: Summary of inventory associated with the pipelines**

Material	Percentage	Quantity (Te)	Phase 1 Recovery (Te)
Steel	57.7%	2,838	487.6
Plastics	6.7%	332	36.2
Non-Ferrous	2.9%	145	18.5
Grout / concrete	32.5%	1,603	132.9
Other non-hazardous	0.2%	11	1.2
Other hazardous	0.0%	0	0.0
<b>TOTAL</b>	<b>100%</b>	<b>4,928</b>	<b>676.4</b>

**NOTES**

1. **DSW & WD:** The inventory identified for recovery during decommissioning works associated with Phase 1 includes the mass of material associated with the flexible risers for PL2758, PL2579 as well as part of the pipelines inside the NP 500 m zone. Total mass to recovered in Phase 1 is 449.1 Te.
2. **DSW:** The inventory identified for recovery during decommissioning works associated with Phase 1 includes the mass of material associated with the flexible risers for PL2572, PL2573, PL2574, PLU2575

**Table 6.1.2: Summary of inventory associated with the pipelines**

and PLU2576 as well as part of the pipelines PL2581 and PL4262 inside the NP 500 m zone. Total mass recovered in Phase 1 is 113.6 Te.

- WD:** The inventory identified for recovery during decommissioning works associated with Phase 1 includes the mass of material associated with the flexible risers for PL2782, PL2783, PL2584, PLU2585 and PL4261 as well as part of the pipelines inside the NP 500 m zone. Total mass to be recovered in Phase 1 is 49.1 Te.

## 6.2 Performance

Northern Producer's mooring lines and anchors were retained by the mooring company responsible for their retrieval. Their age was such that they will be suitable for reuse.

**Table 6.2.1: Summary of waste management performance for NP FPF mooring**

Item	Quantity (Te)	Landed Location	Landed Date	Fate	Notes / Comments
<b>ANCHORS &amp; MOORING LINES</b>					
8x mooring lines (chains & anchors)	1,982.78	Montrose	25 April 2021	Recycled	
8x mooring lines (fibre ropes)	28.8	Retained on board vessel	n/a	Re-used	Fibre ropes were reused as drum fillers on the anchor handling vessels.
<b>SUB-TOTAL</b>	<b>2,011.58</b>				

The performance of the waste management aspects for the pipelines was that in overall terms little of the material returned to shore were disposed of to landfill, and this was limited to the Uraduct material recovered from inside the risers and the buoyancy modules. As indicated in Table 6.2.2, most of the pipeline related material was recycled.

**Table 6.2.2: Summary of waste management performance for pipelines**

Item	Quantity (Te) <sup>i</sup>	Landed Location	Landed Date	Fate	Notes / Comments
<b>PIPELINES &amp; UMBILICALS</b>					
4x flexible risers	178.900	Lerwick	26/6/22	Recycled	PL2583, PL2574, PL4261, PL2572, K2 Polymers
4x flexible risers	118.291	Lerwick	6/7/22	Recycled	PL2578, PL2584, PL2573, PL2579, K2 Polymers
2x umbilicals	14.000	Lerwick	26/6/22	Recycled	PLU2585, PLU2576 K2 Polymers
1x umbilical	41.800	Lerwick	6/7/22	Recycled	PLU2575, K2 Polymers
400x Uraduct half-shell sections <sup>Note 1</sup>	4.780	Lerwick	26/4/22	Landfill	Gremista landfill
Buoyancy modules and bend stiffeners	22.538	Lerwick	6/7/22	Landfill	Gremista landfill
8in spool sections	6.700	Peterhead	4/10/22	Recycled	
3in spool sections	6.000	Peterhead	4/10/22	Recycled	
15x flexible flowline sections	7.440	Peterhead	4/10/22	Recycled	K2 Polymers
<b>SUB-TOTAL</b>	<b>400.149</b>				

**Table 6.2.2: Summary of waste management performance for pipelines**

Item	Quantity (Te) <sup>i</sup>	Landed Location	Landed Date	Fate	Notes / Comments
<b>MID-WATER ARCH, RISER BASE &amp; OTHER</b>					
MWA c/w chains	113.000	Lerwick	6/7/22	Recycled	John Lawrie Metals
MWA clamp	2.000	Peterhead	6/7/22	Recycled	John Lawrie Metals
MWA gravity base	59.000	Peterhead	4/10/22	Recycled	John Lawrie Metals
2x MWA clump weights	220.000	Peterhead	4/10/22	Recycled	John Lawrie Metals
MWA ballast weights	179.000	Peterhead	4/10/22	Recycled	John Lawrie Metals
Riser base	82.000	Peterhead	4/10/22	Recycled	John Lawrie Metals
<b>SUB-TOTAL</b>	<b>655.000</b>				
<b>CONCRETE MATTRESSES</b>					
56x	317.600	Lerwick	15/4/22	Recycled	48x 6x3x0.15m, 8x 6x3x0.3m, EMN Plant Ltd
8x	63.000	Lerwick	26/6/22	Recycled	Size not specified, EMN Plant Ltd
Grout bags <sup>Note 1</sup>	17.860	Peterhead	4/10/22	Recycled	A & M Smith
<b>SUB-TOTAL</b>	<b>383.700</b>				
<b>MISCELLANEOUS</b>					
Banding, escape stairs, MWA clamp	1.432	Lerwick	26/6/22	Recycled	John Lawrie Metals
Ladder section	0.600	Lerwick	26/6/22	Recycled	John Lawrie Metals
Metallic debris	14.000	Peterhead	4/10/22	Recycled	John Lawrie Metals
Mixed debris	12.000	Peterhead	4/10/22	Landfill	NorSea Shorebase
Mixed debris		Peterhead	4/10/22	Recycled	A&M Smith,
<b>SUB-TOTAL</b>	<b>28.032</b>				
<b>TOTAL</b>	<b>1,481.641</b>				
<b>NOTES</b>					
<p>1. There is a 0.3 Te discrepancy in the mass of Uraduct (4.780 vs. 4.480 Te) quoted in the project waste tracker, and a discrepancy of 14.76 Te (17.86 vs. 3.1 Te) in the overall mass of grout bags quoted in the project waste tracker.</p> <p>2. Of the total material recovered (1,481,941 kg), 98.87% was recycled, and 1.13% was destined to landfill. A very small amount of material recovered was not project related, but this has been ignored for this assessment.</p> <p>3. The difference between the estimate and actual recovered material can be explained by the presence of ballast and gravity base material (sub-total 458 Te) not being accounted for in the original estimate used in the Decommissioning Programme.</p>					

## **7. LESSONS LEARNED**

Lessons learned reviews were carried out using data from previous projects (departure of EnQuest Producer from the Alma and Galia fields) and with assistance from another operator familiar with the work associated with cleaning and flushing pipelines.

### **7.1 Northern Producer**

- The sailaway procedures were written with only two towing vessels (AHVs) to deploy lines at Kishorn location. On review, the Northern Producer marine team agreed this was not considered safe or efficient and the request for an additional vessel to rendezvous at Kishorn was agreed. The vessel was a harbour tug.
- Consideration should be given to install a more robust emergency tow line for future tows.
- Consideration should also be given to provide an anchor with sufficient chain installed to enable an emergency anchor deployment during the tow if weather or sea conditions merited it during tow.

### **7.2 Riser cutting**

- Some inspection operations were at the limit of the length of tether provided, and this meant that the tether needed to be changed out for a longer one at port. The length of tether should be determined prior to the work commencing to ensure a tether of sufficient length is fitted. A spare tether should be provided.

### **7.3 Recovery of risers and clearance of 500 m zone**

- Non-productive time associated with diving operations inside the NP anchor pattern was a factor. The riser cutting scope was originally earmarked to be carried out using divers. However, following review of the scope of work the decision was made to execute the complete scope of work using remotely operated equipment and a DWCM rather than hydraulic shears. The decision was vindicated.
- If equipment is required to support a critical scope on the critical path of a plan, its functionality should be confirmed in sufficient time to ensure it is operational and that it could be repaired onsite in the event of a breakdown. It was beneficial carrying out cutting trials and clash checks. The DWCM performed well and as expected.
- The size of the concrete mattresses was not as stated in the documentation. Best endeavours to be used to ensure the data is as accurate as possible, although it is recognised that 'as-built' data can be difficult to secure and can still be inaccurate.
- The rock used in the deposited rock was stated as 1in to 5in. However, larger sizes of rock (over 12in) were encountered. The larger size of rock lead to blockages when using the dredger mounted on the ROV leading to time lost when the ROV was recovered to deck to so that the blockage could be cleared.
- The accuracy of the required primary cut locations (as can be stated in Decommissioning Programmes, PWAs, scopes of work, etc) was too precise. Flexibility is required taking account the depth and profile of any existing rock cover.

## **8. COST SUMMARY**

Cost data will be provided to OPRED separately.



## 9. PHOTOGRAPHS

### 9.1 Northern Producer under tow



Figure 9.1.1: NP FPSO under tow using Anchor Handler Vessels ('AHV')



Figure 9.1.2: Northern Producer near Kishorn Port and Dry Dock

## 9.2 Northern Producer anchor & mooring chain



Figure 9.2.1: Northern Producer anchor & chain recovery

### 9.3 Cutting of flexible risers and umbilicals



Figure 9.3.1: DWCM in position on riser PL2574



Figure 9.3.2: Cut flexible riser and umbilical

## 9.4 Recovery of flexible risers and umbilicals



Figure 9.4.1: Umbilical riser on AHV drum



Figure 9.4.2: Flexible riser being recovered to drum on AHV



Figure 9.4.3: Flexible risers and umbilical risers in Lerwick



Figure 9.4.4: Flexible risers and umbilical risers stacked in Lerwick

## 9.5 Recovery of Mid-Water Arch



Figure 9.5.1: Mid-Water Arch viewed from back of AHV



Figure 9.5.2: Mid-Water Arch stabilising from having been released





Figure 9.5.3: Mid-Water Arch alongside quayside



Figure 9.5.4: Mid-Water Arch lifted onto quayside

## 9.6 Concrete mattresses



Figure 9.6.1: Concrete mattresses being recovered using a "Speedloader"

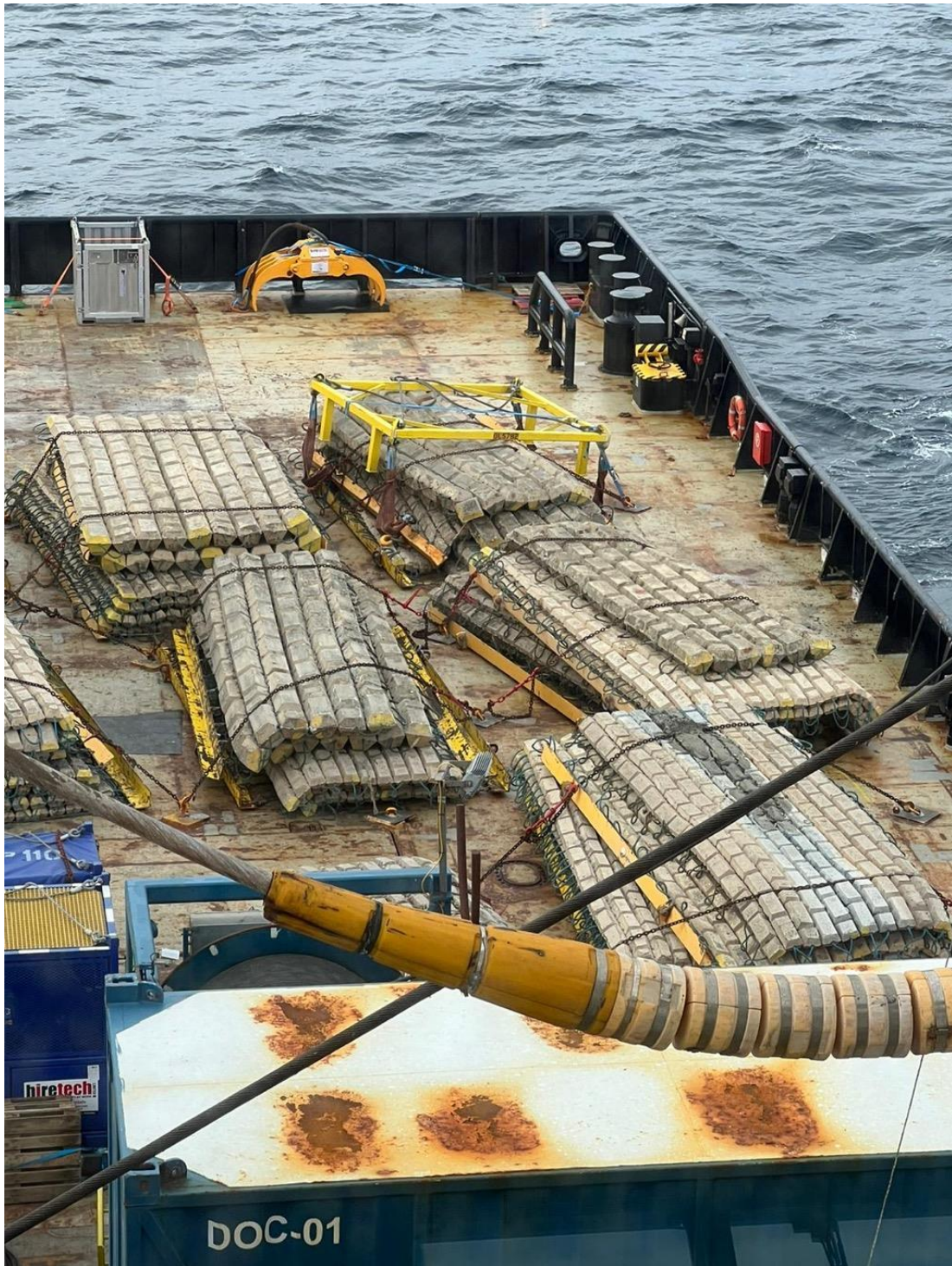


Figure 9.6.2: Concrete mattresses on deck of CSV

## **10. REFERENCES**

- [1] EnQuest (2020) Combined Decommissioning Programmes for Northern Producer FPF Float-off and Disconnection of Risers and Pipelines, M4109-ENQ-NPR-DN-00-PRG-0001
- [2] EnQuest (2020) Decommissioning Programmes for Conrie, DSW, WD & Ythan, M4109-ENQ-NPR-DN-00-PRG-0002
- [3] EnQuest (2019) Decommissioning Environmental Appraisal, M4109-X0D-NPR-SA-00-REP-0001

# APPENDIX A AS LEFT SCHEMATICS

## Appendix A.1 NP 500m Zone after Phase 1

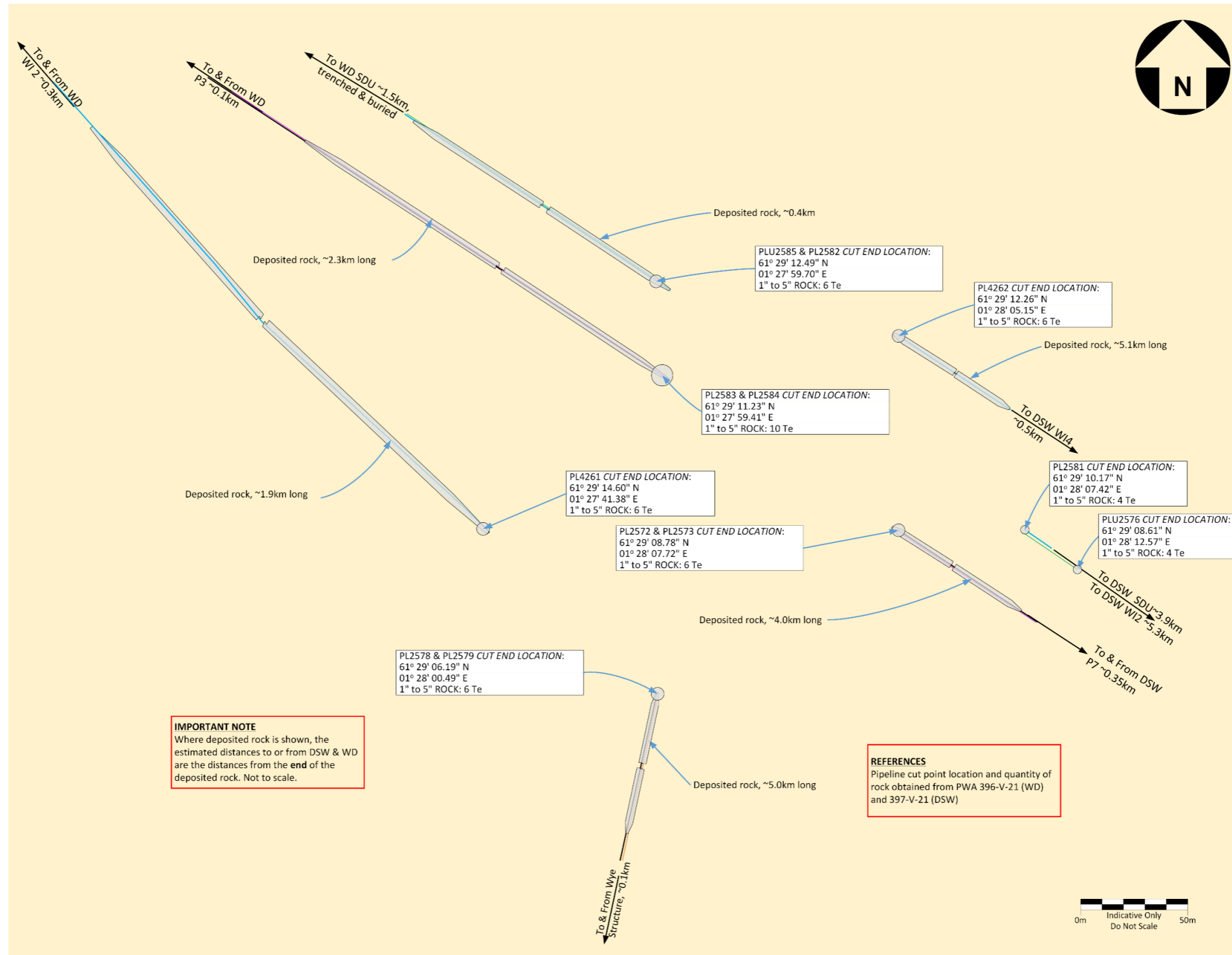


Figure A.1.1: Infrastructure inside NP 500 m zone after removal of risers, etc.