Don South West, Conrie, Ythan and West Don Fields Decommissioning Environmental Appraisal

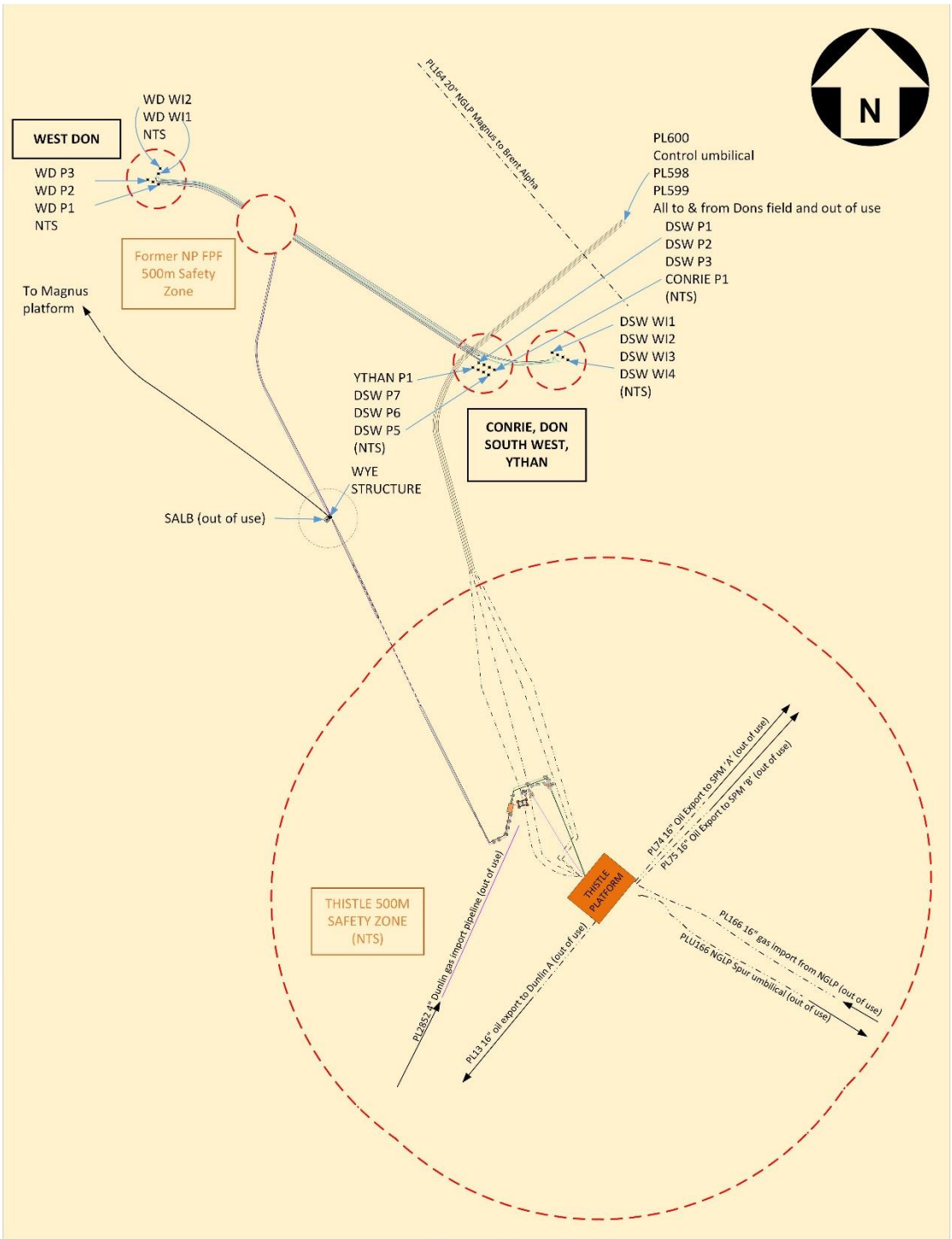

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TABLE OF CONTENTS

FIGURES AND TABLES

ABBREVIATION	EXPLANATION
~	Approximately
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
Approach	Initial or final stretch of pipeline (or umbilical) as it leaves its point of origin or reaches its destination
AWMPs	Active Waste Management Plans
BEIS	Department for Business, Energy and Industrial Strategy
CA	Comparative Assessment
CSV	Construction Support Vessel
CCS	Carbon Capture & Storage
CPR	Continuous Plankton Reader
Cut and lift	The 'cut and lift' method of removing trenched and buried pipelines would involve excavating the pipelines from within the seabed and thereafter cutting the pipeline into recoverable and transportable lengths. This method of removal can be very time-consuming for long pipelines and, would be problematic for concrete coated pipelines. The method is usually only viable for short pipelines
DP	Decommissioning Programme
DoB	Depth of Burial
Don fields	Don South West, Conrie, Ythan and West Don fields collectively.
DSW	Don South West
DSV	Dive Support Vessel
EA	Environmental Appraisal
EBS	Environmental Baseline Survey
EERV	Emergency Response and Rescue Vessel
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EnQuest	EnQuest Heather Limited
ENVID	Environmental Risk Identification
EPS	European Protected Species
EU	European Union
Exposure	An exposure occurs when the 'crown' of a pipeline or umbilical can be seen. This does not generally mean it is a hazard
FishSAFE	The FishSAFE database contains a host of oil & gas structures, pipelines, and potential fishing hazards. This includes information and changes as the data are reported for pipelines and cables, suspended wellheads pipeline spans, surface & subsurface structures, exclusion zones& pipeline gates (www.fishsafe.eu)
FPF	(Northern Producer) Floating Production Facility
HSE	Health & Safety Executive
HSE&A	Health, Safety, Environment and Assurance
ICES	International Council for the Exploration of the Seas
″	Inch; 25.4 millimetres
JNCC	Joint Nature Conservation Committee
km	Kilometre
KPIs	Key Performance Indicators

ABBREVIATION	EXPLANATION
LAT	Lowest Astronomical Tide
m	Metre(s)
MAIB	Marine Accident Investigation Branch
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	Multibeam Echosounder
N,S,E,W	North, South, East, West
n/a	Not Applicable
NCMPA	Nature Conservation Marine Protected Area
NFFO	National Federation of Fishermen's Organisations
NMP	Scottish National Marine Plan
NNS	Northern North Sea
NORM	Naturally Occurring Radioactive Material
NP	Northern Producer
NPI	Non-Production Installation
NtMs	Notices to Mariners
OPEP	Oil Pollution Emergency Plan
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo Paris Convention
Piggybacked	Clamped or connected to another pipeline along its length
Pipeline	Pipeline or umbilical pipeline
P1, P2, WI1	Production (P) or Water Injection (WI) Tree Identifier
PL, PLU	Pipeline, Umbilical Pipeline Identification numbers (UK)
PMF	Priority Marine Feature in Scottish waters
Q1, Q2, Q3, Q4	Quarter 1, Quarter 2, Quarter 3, or Quarter 4 of any given year
Qualitative	Result determined using judgement and use of risk and impact matrices
Quantitative	Result determined using numerical data and by calculation
RBS	Riser Base Structure
Remediation	For the purposes of this document remediation can mean one of, or a combination of the following: re-trenching, removal of exposures and spans, deposition of additional rock
Reportable span	A reportable span is a significant span which meets set criteria (FishSAFE criteria) of height above the seabed and span length
Reel lay/reverse reel	Using the reel-lay method a flexible pipeline or small diameter rigid pipeline is installed from a large reel mounted on a pipelay barge. A pipe is spooled from a drum (reel) straightened with tension applied and laid over a ramp to the seabed
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
SACFOR	Super-abundant, Abundant, Common, Frequent, Occasional, Rare, Present
SALB	Single Anchor Loading Buoy
SBP	Sub-Bottom Profiler
SDU	Subsea Distribution Unit
SFF	Scottish Fishermen’s Federation
SOPEP	Shipboard Oil Pollution Emergency Plans
SOSI	Seabird Oil Sensitivity Index

ABBREVIATION	EXPLANATION
SPA	Special Protection Area
Span	Similar to an exposure except that the whole of the section of pipeline is visible above the seabed rather than just part of it. Once the height and length dimensions meet or exceed certain criteria the spam becomes a reportable span
SSIV	Subsea Isolation Valve
SSS	Sidescan Sonar
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
Umbilical	Flexible pipeline manufactured of various materials including steel and plastics typically used to send electrical power, communication signals, chemicals and hydraulic fluid to a manifold or wellhead. An umbilical pipeline will include cables and tubes that are covered with an outer sheath to protect them from damage
VMS	Vessel Monitoring System
WI	Water Injection
WHPS	Wellhead Protection Structure

1. EXECUTIVE SUMMARY

1.1 Introduction and background

This section provides a non-technical summary of the Environmental Appraisal (EA) conducted by EnQuest Heather Limited (EnQuest) for the proposed decommissioning of the Don South West (DSW), Conrie, Ythan and West Don fields (the Don fields). Production from the Don fields is exported to the Northern Producer Floating Production Facility (FPF), located approximately 527 km north-north-east of Aberdeen and 13 km from the UK/Norway median line in the Northern North Sea (NNS). All the infrastructure to be decommissioned as part of the Don fields decommissioning programme (DP) sits within the United Kingdom Continental Shelf (UKCS) Block 211/18.

The decommissioning of the Don fields will be undertaken in two phases. Phase 1 decommissioning includes the Northern Producer FPF disconnection and float-off, as well as 500m exclusion zone clearance. This is covered under a separate DP and is out of the scope of this appraisal. This EA has been conducted to assess potential environmental impacts which may arise from the planned activities for Phase 2 decommissioning of the Don fields.

1.2 Regulatory context

The Petroleum Act 1998 (as amended by the Energy Act 2008) governs the decommissioning of offshore oil and gas infrastructure, including pipelines, on the United Kingdom Continental Shelf (UKCS). The responsibility for ensuring compliance with the Petroleum Act 1998 rests with Department of Business, Energy and Industrial Strategy (BEIS), formerly the Department for Energy and Climate Change (DECC) and is managed through its regulatory body the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED). OPRED is also the Competent Authority on decommissioning in the UK for OSPAR purposes and relevant legislation. The Petroleum Act requires the operator of an offshore installation or pipeline to submit a draft DP for statutory and public consultation, and to obtain approval of the DP from OPRED, part of BEIS, before initiating decommissioning work. The DP outlines in detail the infrastructure being decommissioned and the method by which the decommissioning will take place. Well decommissioning is determined under a different process to the DP, called the Well Operations Notification System.

Formal Environmental Impact Assessment (EIA) to support the DP is not explicitly required under existing UK legislation. However, the primary guidance for offshore decommissioning that was updated and published by OPRED in 2018, detailed the need for an Environmental Appraisal to be submitted in support of the DP.

In terms of activities in the NNS, the Scottish National Marine Plan (NMP) has been adopted by the Scottish Government to help ensure sustainable development of the marine area. This Plan has been developed in line with the UK, the European Union (EU) and the Oslo Paris Convention (OSPAR) legislation, directives and guidance. With regards to decommissioning, the Plan states that ‘where re-use of oil and gas infrastructure is not practicable, either as part of oil and gas activity or by other sectors such as carbon capture and storage, decommissioning must take place in line with standard practice, and as allowed by international obligations. Re-use or removal of decommissioned assets from the seabed will be fully supported where practicable and adhering to relevant regulatory process. As part of the Don fields infrastructure decommissioning, EnQuest has given due consideration to the NMP during project decision making and the interactions between the proposed decommissioning project and the Plan.

1.3 Decommissioning overview

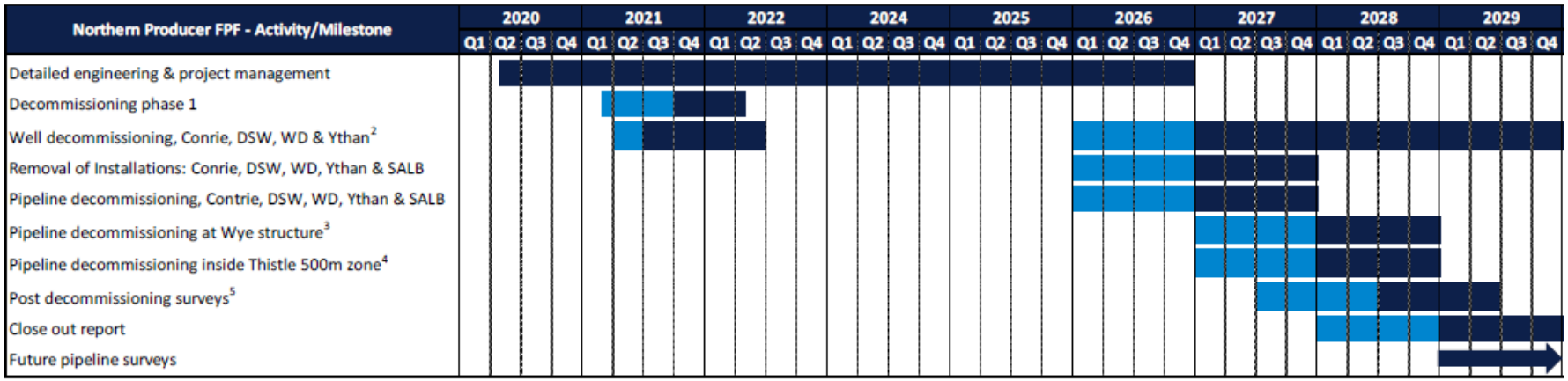
As part of the planning phase and to obtain regulatory approval for the proposed activities, a DP has been prepared for the Don fields. This is supported by this combined EA report covering the environmental impacts for all four fields. This report will cover all flowlines and subsea installations associated with the DSW, Conrie, Ythan and West Don fields. The decommissioning of the Northern Producer FPF, however, is covered under a separate DP and is therefore out of the scope of this EA.

The Subsea Isolation Valve (SSIV) and riser bases located in the Thistle field are included as part of the subsea infrastructure for consideration under this EA; however, these installations will be removed as part of the Thistle field decommissioning operations, at a later date. Further detail on the infrastructure to be decommissioned is provided in Section 3.

The DP for the decommissioning of the infrastructure described above and this supporting EA do not cover well decommissioning, or the flushing and cleaning operations that will be undertaken prior to the commencement of the decommissioning activities.

1.4 Proposed schedule

The high-level Gantt chart in Figure 1.4.1 provide the overall schedule for the Don fields DP.



Notes / Key

Most likely period of activity

Activity window to allow campaigning flexibility associated with decommissioning activities

1. Current indications are that NP FPF sailaway & Phase 1 of the decommissioning will be carried out early Q2 2021;
2. The first phase of well decommissioning will address wells with known integrity issues;
3. Decommissioning of pipelines and infrastructure at Wye structure (i.e. PL2578 & PL2579) will likely be carried out in the same campaign as PL4555 & PL4556; both these pipelines are part of the Thistle pipeline infrastructure;
4. Decommissioning of pipelines (i.e. PLU2580, PLU2580JSO, PLU2580JSG, and PL2579) and associated infrastructure on approach to Thistle 'A' will likely be carried out in the same campaign as PL4555 and other pipelines associated with Thistle.
5. Post decommissioning surveys near the Wye Structure (i.e. SALB) and Thistle 500m zone will be addressed and reported as part of Thistle decommissioning activities.

Figure 1.4.1: Gantt Chart of the Don fields decommissioning project

1.5 Options for decommissioning

All Don fields infrastructure was assessed against the BEIS (2018) Guidance Notes: *Decommissioning of Offshore Oil and Gas Installations and Pipelines* [1]. The recommended Comparative Assessment (CA) process was applied.

All possible decommissioning options for the pipelines were coarsely screened including complete removal (option 1), partial removal or remediation (option 2) and leave *in situ* (option 3). This involved consideration of each option against the primary criteria as specified within the Guidance including safety, environment, technical, societal and economic.

For efficiency of analysis the options for decommissioning these pipelines were assessed as three separate groups since many aspects of the assessment are common to all in a group. No scores were determined; however, risk matrices were used to determine if the planned and unplanned impacts would be broadly acceptable, possibly acceptable, unlikely to be acceptable or not acceptable.

The method for decommissioning of the risers or surface laid sections of pipelines and pipeline approaches is the same irrespective of which option is pursued. Therefore, decommissioning of these parts of the pipelines were not included in the comparative assessment. All options included removal of features such as pipespools, surface laid pipelines, jumpers, concrete mattresses, and grout bags in accordance with mandatory guidelines.

The decision-making process underpinning the proposed DP is described in Section 3 and the decommissioning options carried forward to CA are presented in Table 1.5.1 to Table 1.5.3 with the selected options in bold.

Item Description	Option 1 Complete removal	Option 3 Leave *in situ*
Riser & surface laid sections of pipeline in the Northern Producer 500m zone	Phase 1 scope. Remove.	Phase 1 scope. Remove.
Trenched and buried section of pipeline (PL2578 & PL2579, PL2572 & PL2573, PL2583 & PL2584)	Uncover the pipeline using mass flow excavator. Completely remove pipelines using either the reverse reel or the 'cut and lift' method.	**Leave *in situ*. No remedial work required.**
Surface laid section of pipeline protected and stabilised with concrete mattresses on approach to, West Don (PL2583 & PL2584) production wellheads, and DSW (PL2572 & PL2573) production wellheads, and the near Wye Structure (applicable to PL2578 & PL2579 only)	**Remove all surface laid pipespools and associated concrete mattresses and grout bags.**	Remove. As option 1.
Trenched and buried section of pipeline (PL2579 only although this is piggybacked on Thistle oil export pipeline PL4555[1])	Uncover the pipeline using mass flow excavator. Completely remove pipelines using 'cut and lift' method.	**Leave *in situ*. No remedial work required.**
Surface laid section of pipeline protected and stabilised with concrete mattresses Thistle SSIV and Riser Base Structure (RBS) (PL2579 only)	**Remove all surface laid pipespools and associated concrete mattresses and grout bags.**	Remove. As option 1.
NOTE: 1. The section of PL2578 between the Single Anchor Loading Buoy (SALB), subsequently replaced by the Wye structure, was renumbered PL4555 and is now owned by the Thistle pipeline owners.		

Table 1.5.1: Decommissioning options considered for Group 1 pipelines

Item Description	Option 1 Complete removal	Option 3 Leave *in situ*
Riser & surface laid sections of pipeline in the Northern Producer 500m zone	Phase 1 scope. Remove.	Phase 1 scope. Remove.
Trenched and buried section of pipeline (PL4261 & PL4262)	Uncover the pipeline using mass flow excavator. Completely remove pipelines using either the reverse reel or the 'cut and lift' method.	**Leave *in situ*. No remedial work required.**
Surface laid section of pipeline protected and stabilised with concrete mattresses on approach to West Don water injection wellheads (PL4261) and DSW water injection wellheads (PL4262)	**Remove all surface laid pipespools and associated concrete mattresses and grout bags.**	Remove. As option 1.

Table 1.5.2: Decommissioning options considered for Group 2 pipelines

Item Description	Option 1 Complete removal	Option 2 Partial removal	Option 3 Leave in situ
Riser & surface laid sections of pipeline in the Northern Producer 500m zone	Phase 1 scope. Remove.	Phase 1 scope. Remove	Phase 1 scope. Remove.
Trenched and buried section of pipeline (PLU2576, PLU2577 & PL2581, PL2582, PLU2585)	Uncover the pipeline(s) using mass flow excavator. Completely remove rigid pipelines either using reverse reel or the 'cut and lift' method. Completely remove umbilical pipeline(s) using reverse reel method.	Either remove exposed sections of pipelines and remediate the remaining pipeline ends or cover exposed sections by retrenching or depositing additional rock.	**Leave *in situ*. No remedial work required.**
Surface laid section of pipe spools and umbilical jumpers protected and stabilised with concrete mattresses on approach to West Don (PL2582, PLU2585) and DSW (PLU2576, PLU2577 & PL2581)	**Remove all surface laid pipespools and jumpers and associated concrete mattresses and grout bags**	Remove. As option 1.	Remove. As option 1.
NOTES: 1. PLU2576, PLU2577 and PL2581 were trenched into the seabed and left to backfill naturally; deposited rock was used to bury all the other pipelines. Both umbilicals (PLU2576 from RBS up to DSW SDU followed by PLU2577) and the pipeline share the same trench; 2. PL2582 was trenched in the seabed but emerges at the Don pipeline crossings where it is buried under deposited rock.			

Table 1.5.3: Decommissioning options considered for Group 3 pipelines

1.6 Environmental and societal sensitivities

The key environmental and societal sensitivities in the Don fields decommissioning area have been summarised in Table 1.6.1 and Table 1.6.2.

Environmental Receptor	Description
Physical environment	
Weather and sea conditions	The Don fields are located in Block 211/18 at a water depth of 170m. The mean residual current through the Dons field area is approximately 0.05 to 0.1m/s (Wolf et al., 2016). Wave energy at the seabed is 'low' (less than 0.21N/m2) within the area. The annual mean wave height within the area ranges from 2.71m – 3.00m and the annual mean wave power is 41.71kW/m.
Key Conservation interests	
Conservation sites	
Special Area of Conservation (SAC)	The nearest SAC to the Don fields decommissioning area is the Pobie Bank Reef SAC, located approximately 108km south-west. It is protected for bedrock and stony reefs which provide a habitat to an extensive community of encrusting and robust sponges and bryozoans. These include encrusting coralline algae, cup sponges, and bryozoans in the shallower areas; and small erect sponges, cup corals and brittlestars in the deeper areas.
Nature Conservation Marine Protected Area (NCMPA)	The nearest NCMPA to the Don fields decommissioning area is the North-East Faroe-Shetland Channel NCMPA, located approximately 92km north-west. It is protected for deep-sea sponge aggregations, offshore deep-sea muds, offshore subtidal sands and gravels, the continental slope feature and for a wide range of features representative of the West Shetland Margin Palaeo-depositional, Miller Slide and Pilot Whale Diapirs Key Geodiversity Areas.
Special Protection Area (SPA)	The nearest SPA to the Don fields decommissioning area is the Hermaness, Saxa Vord and Valla Field SPA, located approximately 140km south-west. This site is important for a number of breeding seabird species that nest on the cliffs and the heathland and grassland here. During the breeding season, the area regularly supports 152,000 seabirds including guillemots, kittiwakes, shags, fulmars, puffins, great skuas and gannets.
Protected species	
Pinnipeds – Harbour and Grey Seals	Pinnipeds are not expected in significant numbers within the project area, given its distance from shore. Densities are currently estimated at approximately 0-1 individuals per 25km^2 for both harbour and grey seals. This is due to the site being approximately 137km offshore and even farther from important seal haul outs.
European Protected Species (EPS)	Harbour porpoise, minke whale and white-beaked dolphins are the most likely EPS to be encountered in the Don fields decommissioning area. Densities remain low within the project area.
Benthic environment	
Bathymetry and seabed features	Across the areas surveyed around the Don fields, the bathymetry ranged from 156m LAT at East Don and 171m along the Thistle pipeline route. The most prominent features included iceberg ploughmarks that were identified along the Magnus to Dunlin pipeline corridor and at the East Don, West Don and DSW survey areas.

Environmental Receptor	Description
Seabed type	Seabed imagery and video footage taken across the Magnus, Dunlin, Thistle, DSW and West Don site and pipeline survey areas consistently showed similar seabed sediments, comprising predominantly clayey to gravelly sand with occasional gravel and shell fragments, with high reflectivity areas consisting of gravel, cobbles and occasional boulders.
Benthic fauna	Visible fauna was consistent across the Don fields, and included Annelida, Arthropoda, Bryozoa, Chordata, Cnidaria, Echinodermata, Mollusca and Porifera. Hard substrate sponge communities were observed at most stations; however, they were not present in sufficient densities to constitute OSPAR-listed sponge aggregations. Bioturbation and tracks were evident at some stations at East Don and West Don, and seapens were observed at some stations in very low numbers. It was concluded that the sensitive biotope 'seapens and burrowing megafauna communities' are not present.
Plankton	
In both the northern and central regions of the North Sea, the phytoplankton community is dominated by dinoflagellates of the genus *Ceratium* (*fusus, furca, lineatum*) and diatoms such as *Thalassiosira* spp. and *Chaetocer*os spp. In recent years the dinoflagellate *Alexandrium tamarense* and the diatoms *Pseudo-nitzschia* spp. (known to cause amnesic shellfish poisoning) have been observed in the area. Zooplankton species richness is greater in the northern and central areas of the North Sea, than in the south and displays greater seasonality. Zooplankton in this area is dominated by calanoid copepods, in particular *Calanus* and *Acartia* spp. and Euphausiids and decapod larvae are also important to the zooplankton community in this region.	
Fish – spawning and nursery grounds	
The Don fields decommissioning area is located within the spawning grounds of cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), Norway pout (*Trisopterus esmarkii*), saithe (*Pollachius virens*) and whiting (*Merlangius merlangus*). The following species have nursery grounds near the project: blue whiting (*Micromesistius poutassou*) for which it is a main nursery ground, European hake (*Merluccius merluccius*), haddock, herring (*Clupea harengus*), ling (*Molva molva*), mackerel (*Scomber scombrus*), Norway pout, spurdog (*Squalus acanthias*), and whiting.	
Probability of 0 age group fish aggregation	Across the Don fields decommissioning area the probability of juvenile fish aggregations occurring is very low for most species (<0.2), except for blue whiting and hake for which the probability is up to medium in Block 211/18.
Seabirds	
The following species could be found within the Don fields decommissioning area: European storm-petrel (*Hydrobates pelagicus*), northern gannet (*Morus bassanus*), great skua (*Stercorarius skua*), black-legged kittiwake (*Rissa tridactyla*), great black-backed gull (*Larus marinus*), common gull (*Larus canus*), herring gull (*Larus argentatus*), common guillemot (*Uria aalge*), little auk (*Alle alle*) and Atlantic puffin (*Fratercula arctica*). Seabird Oil Sensitivity Index (SOSI) identifies areas at sea where seabirds are likely to be most sensitive to surface pollution. Seabird vulnerability in Block 211/18 is high between November and January, and low for the rest of the year, with no data for May and October. The risk of an oil spill from the proposed operations at the Don field is considered remote and therefore the overall risk to birds is considered negligible.	

Table 1.6.1: Key environmental receptors and sensitivities for the Don fields area

Societal Receptor	Description
Commercial fishing	
The Don fields decommissioning area is in International Council for the Exploration of the Seas (ICES) Rectangles 51F1. Vessel Monitoring System (VMS) data from 2009-2013 indicates that fishing intensity within Block 211/18 is low for demersal and shellfish species, and medium for pelagic species (mackerel). In 2018 fishing effort in ICES rectangle 51F1 was highest in April, accounting for 20% of the total number of days fished, followed by the period running from August to October contributing for 42% of fishing effort. In February, May and July the effort was lower, together accounting for 23% of the annual effort. The effort for the rest of the months are disclosive. Trawls were the only used gear in rectangle 51F1. The five top landed species in rectangle 51F1 in 2018 in terms of weight included saithe, cod, haddock, whiting and ling.	
Other sea users	
Shipping activity	Shipping activity is assessed to be low in Block 211/18.
Oil and Gas	The Don fields decommissioning area is located in the NNS within an area of extensive oil development.
Tele-communication and power cables	There is one historic power cable running passing 4km south-east from the Don fields, which was owned by OceanWise. Sections of this cable may remain on the seabed. The nearest telecommunications cable is the CANTAT 3 cable, running north-west to south-east direction approximately 60km east of the Don fields, in Norwegian waters.
Military activities	There are no military restrictions on Block 211/18 and known military activity does not take place in this region.
Renewables	There are no renewable energy sites within 100km of the Don fields.
Wrecks	The nearest wreck is located approximately 15km south of the Don fields, in Block 211/18, and is classified as a possible obstruction.

Table 1.6.2: Key societal receptors and sensitivities for the Don fields area

1.7 Impact assessment

This EA Report has been prepared in line with the OPRED Decommissioning Guidelines and with Decom North Sea's EA Guidelines for Offshore Oil and Gas Decommissioning. The OPRED Decommissioning Guidance states that an EA in support of a DP should be focused on the key issues related to the specific activities proposed; and that the impact assessment write-up should be proportionate to the scale of the project and to the environmental sensitivities of the project area.

The environmental impact assessment has been informed by several different processes, including the identification of potential environmental issues through project engineer and marine environmental specialist review in a screening exercise and consultation with stakeholders (see Section 2.5).

The impact assessment screening exercise discussed the proposed decommissioning activities and any potential impacts these may pose. This exercise identified ten potential impact areas based on the proposed removal and decommissioning *in situ* activities. Two of the ten potential impacts were screened in for further assessment based on the potential severity and/or likelihood of their respective environmental impact. These include seabed disturbance and impacts to commercial fisheries.

All subsea installations, surface-laid pipelines, pipe spools, surface jumpers, anchors and exposed concrete mattresses and grout bags will be fully removed from the area. Due to the potential for decommissioning and legacy activities to generate disturbance to the seabed, including activities

associated with the pipeline, flowline, and umbilical decommissioning activities of the Don fields, as well as any associated remediation post-decommissioning, including over-trawling, impacts to the seabed from project activities have been taken further for assessment in Section 6.1.

All pipelines assessed as part of the comparative assessment (laid in trenches or buried under deposited rock) will be decommissioned *in situ* in addition to concrete mattresses buried under deposited rock. Pipeline crossings over the Don pipelines that are out of use will also be left undisturbed. Trenched and buried rigid flowlines will have the ends cut and lifted, with remediation where necessary. Long-term degradation may compromise the integrity of the buried flowlines and introduce free spans which pose a potential snagging hazard to commercial fisheries which use the seabed. Further assessment related to potential snagging risks associated with the decommissioning of infrastructure *in situ* is provided in Section 6.2.

1.8 Assessment and mitigation of significant impacts

Seabed disturbance and impacts to commercial fisheries were investigated further due to the low energy environment in the Don fields, which is likely to take some time to recover from disturbance, and the presence of demersal fisheries in the region which have the potential to interact with the flowlines and stabilisation materials that are planned to be decommissioned *in situ*.

The key following measures have been or will be taken in order to mitigate against potential impacts on the seabed environment from the various decommissioning activities:

- It is proposed that EnQuest will work with OPRED and SFF to investigate use of an evidence-based approach to establish an acceptable clear seabed for the 500m zone. As the seabed is not in an environmentally sensitive area, an over-trawl may be carried out to verify the condition of the seabed after decommissioning activities have been completed;
- Depth of Burial (DoB) surveys have been conducted to indicate the integrity of the pipelines; and
- Any snagging risk to other sea users will be minimised by continual monitoring of degrading pipelines or free spans.

Having reviewed the project activities and taken into consideration that works are out with any areas of conservation and have a small surface area affected as well as the undertaking of mitigation to limit this impact, there is not expected to be a significant impact on the seabed environment.

Given that the demersal fishing activity in the Don fields decommissioning area is low and that the DoB assessment has shown that the pipelines are considered to be sufficiently buried or stable, with all spans to be remediated in Phase 1, no significant impacts on commercial fisheries are anticipated.

1.9 Conclusion

Given the remote offshore location of the Don fields decommissioning project and the highly localised impacts of the proposed decommissioning activities, it is considered that there is no potential for decommissioning activities to impact any European or nationally designated protected sites.

This EA has considered the Scottish NMP, adopted by the Scottish Government to help ensure sustainable development of the marine area. EnQuest considers that the proposed decommissioning activities are in alignment with its objectives and policies.

Based on the findings of this EA, including the application of appropriate mitigation measures and Project management according to EnQuest's HSE&A Policy and commitments, it is considered that the proposed Don fields decommissioning activities do not pose any significant threat to environmental or societal receptors within the UK.

2. INTRODUCTION

2.1 Background

In accordance with the Petroleum Act 1998, EnQuest Heather Limited ("EnQuest") an established United Kingdom Continental Shelf (UKCS) operator, and on behalf of the Section 29 notice holders, is applying to the Department for Business, Energy and Industrial Strategy (BEIS) to obtain approval for decommissioning the surface and subsea infrastructure associated with the Don South West (DSW), Conrie, Ythan and West Don fields (the "Don fields").

Since May 2009, the EnQuest operated Northern Producer Floating Production Facility (FPF), has provided the export route for the DSW, Conrie Ythan and West Don fields situated within Blocks 211/13b, 211/18a, and 211/18e of the Northern North Sea (NNS). These fields are located approximately 137km from the Shetland coast and 6km from the UK/Norway median line, in water depths between 172m and 178m (Figure 2.1.1). The Cessation of Production documentation for these fields is currently under consideration by the Oil and Gas Authority.

EnQuest is the owner and operator of the DSW, Conrie, Ythan and West Don installations and pipelines.

The decommissioning of the Don fields will be undertaken in two phases. Phase 1 decommissioning includes the Northern Producer FPF disconnection and float-off, as well as 500m exclusion clearance, which is covered under a separate decommissioning programme (DP) [2] and is therefore out of the scope of this EA. This Environmental Appraisal (EA) has been conducted to assess the potential environmental impacts which may arise from the planned activities for Phase 2 decommissioning of the Don fields. This EA supports the DP associated with the Don fields, which include: DSW, Conrie, Ythan and West Don. This DP will be submitted to the Offshore Petroleum Regulator for Environment & Decommissioning (OPRED), the offshore decommissioning regulator under BEIS which covers the statutory review of the decommissioning plans for the Don fields.

Processed oil from these fields was initially transported to the SALB to facilitate shuttle tanker oil loading. Crude oil was then exported to a Wye connection comingling the fluids from the Northern Producer FPF and Thistle for export to the Magnus platform within the Magnus field. Processed gas was used as lift gas and fuel, and the excess was flared.

Detailed engineering for the Phase 2 decommissioning of the Don fields started in Q2 2020, and activities are planned to commence in Q2 2021, when well decommissioning will commence. Decommissioning works will be carried out through to 2029, after which, the post-decommissioning environmental and seabed clearance verification surveys will be completed.

Well decommissioning will have been assessed, permitted, and completed prior to any of the decommissioning activities progressing. The wells will be systematically and permanently closed in accordance with well decommissioning best practice. Similarly, flushing and cleaning operations for subsea flowlines and subsea installations will also have been completed under existing operational permits prior to commencement of decommissioning activities.

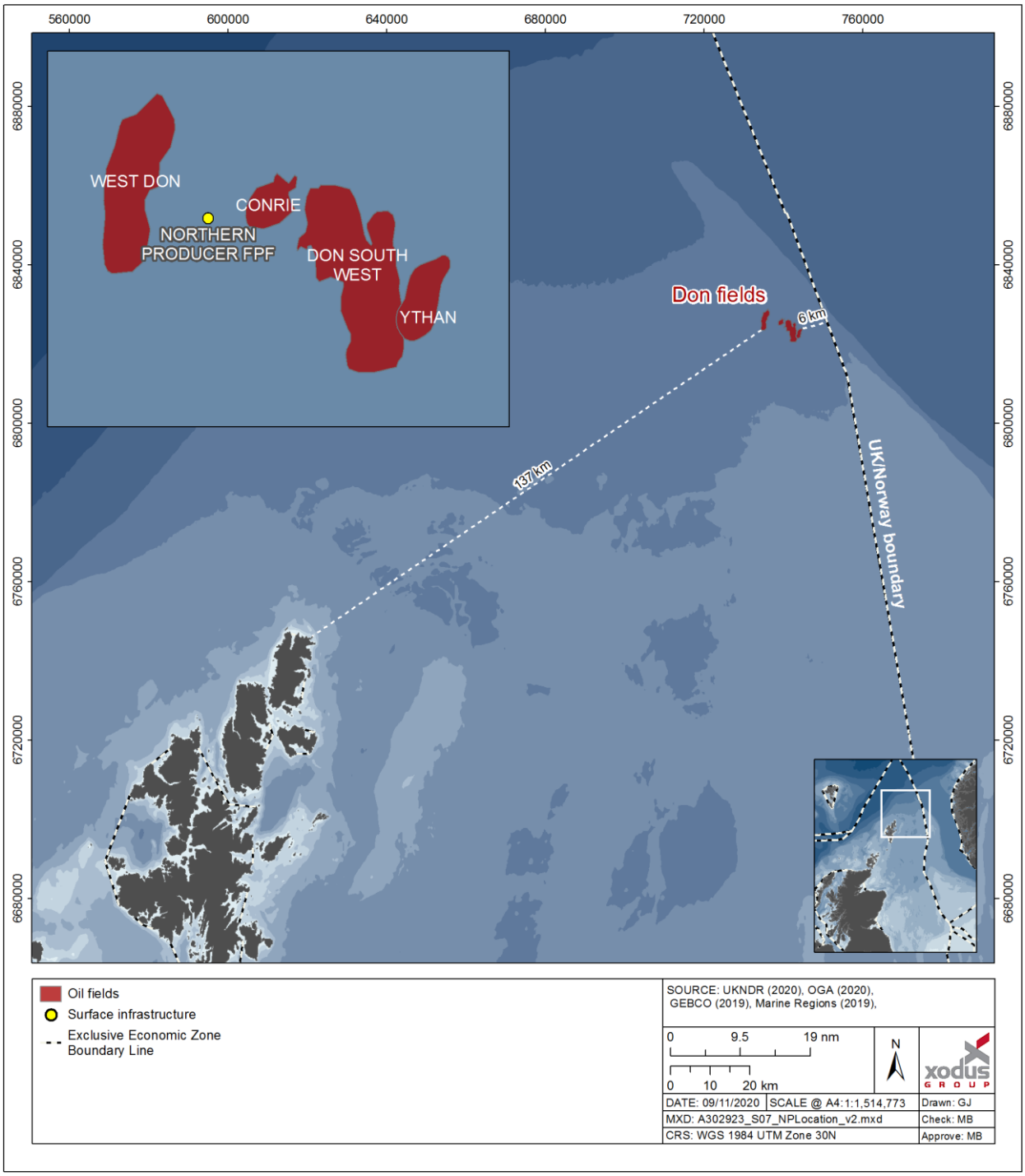


Figure 2.1.1: Location of the Don fields

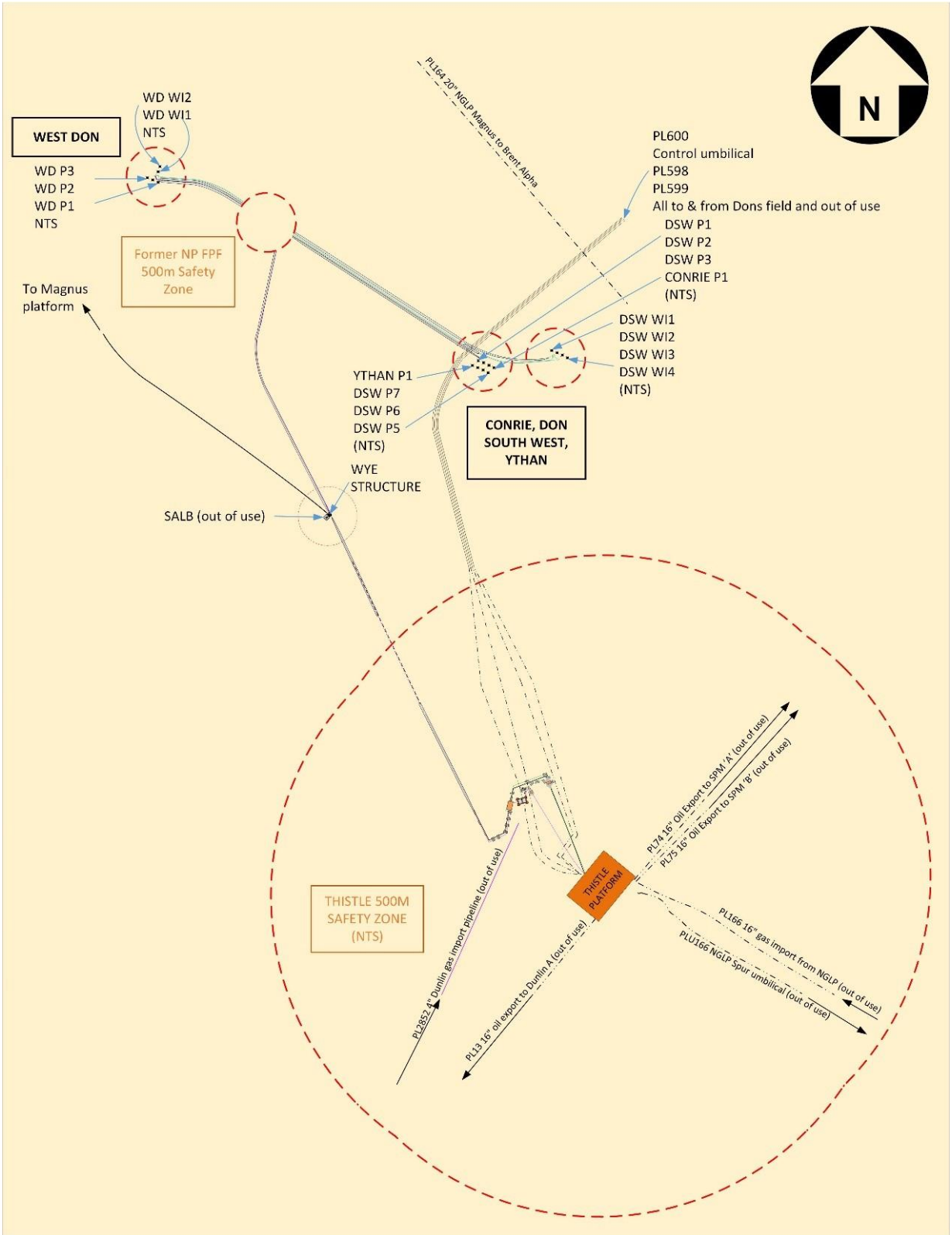


Figure 2.1.2: Don fields layout

2.2 Regulatory context

The Petroleum Act 1998 (as amended by the Energy Act 2008) governs the decommissioning of offshore oil and gas infrastructure, including pipelines, on the United Kingdom Continental Shelf (UKCS). The responsibility for ensuring compliance with the Petroleum Act 1998 rests with Department of Business, Energy and Industrial Strategy (BEIS), formerly the Department for Energy and Climate Change (DECC) and is managed through its regulatory body the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED). OPRED is also the Competent Authority on decommissioning in the UK for OSPAR purposes and relevant legislation. The Petroleum Act requires the operator of an offshore installation or pipeline to submit a draft DP for statutory and public consultation, and to obtain approval of the DP from the OPRED, part of BEIS, before initiating decommissioning work. The DP outlines in detail the infrastructure being decommissioned and the method by which the decommissioning will take place. Well decommissioning is determined under a different process to the DP, called the Well Operations Notification System.

Formal Environmental Impact Assessment (EIA) to support the DP is not explicitly required under existing UK legislation. However, the primary guidance for offshore decommissioning that was updated and published by OPRED in 2018, detailed the need for an Environmental Appraisal to be submitted in support of the DP. The new guidance recognises that environmental deliverables to support DPs were overly lengthy and did not focus in on the key issues, and now describes a more proportionate Environmental Appraisal process that culminates in a streamlined Environmental Appraisal Report which focuses on screening out of non-significant impacts and presents a detailed assessment of potentially significant impacts.

In terms of activities in the NNS, the Scottish National Marine Plan (NMP) has been adopted by the Scottish Government to help ensure sustainable development of the marine area. This Plan has been developed in line with the UK, the European Union (EU) and the Oslo Paris Convention (OSPAR) legislation, directives and guidance. With regards to decommissioning, the Plan states that 'where re-use of oil and gas infrastructure is not practicable, either as part of oil and gas activity or by other sectors such as carbon capture and storage, decommissioning must take place in line with standard practice, and as allowed by international obligations. Re-use or removal of decommissioned assets from the seabed will be fully supported where practicable and adhering to relevant regulatory process'. As part of the conclusions to this assessment (Section 7), EnQuest has given due consideration to the NMP during project decision making and the interactions between the proposed decommissioning project and the Plan.

2.3 EA structure

This EA report sets out to describe, in a proportionate manner, the potential environmental impacts of proposed activities associated with decommissioning of the Don fields and to demonstrate the extent to which these can be mitigated and controlled to an acceptable level. This is presented in the following sections, which will cover:

- The process by which EnQuest has arrived at the selected decommissioning strategy (Section 3.1.2);
- A description of the proposed decommissioning activities (Section 3.5);
- A summary of the baseline sensitivities and receptors relevant to the assessment area that supports this EA (Section 4.2);
- A review of potential impacts from the proposed decommissioning activities and justification for the assessments that support this EA (Section 5);

- Assessment of key issues (Section 6); and
- Conclusions (Section 7).

This EA report has been prepared in line with EnQuest's environmental assessment requirements and has given due consideration to the regulatory guidelines [1] and to Decom North Sea's Environmental Appraisal Guidelines for Offshore Oil and Gas Decommissioning [3].

2.4 Stakeholder engagement

Engagement with stakeholders is an important part of the decommissioning process as it enables the issues and concerns of stakeholders to be incorporated into the EA and presented within the Conrie, DSW, West Don and Ythan Fields DPs, where applicable, and acted upon during the subsequent planning and implementation stages of the project.

Informal responses received to date from stakeholders have been incorporated into the DPs. Formal stakeholder consultation will begin with the submission of the draft DPs, supported by this EA report, to OPRED. The consultation process, at this stage, will include the use of the EnQuest website to make these documents publicly available.

2.5 EA process

In order to evaluate the potential environmental impact of the proposed DP on the environment an EIA process is conducted in accordance with the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (as amended). This EA documents the results of the EIA process and is used to communicate the process. An overview of the EIA process is provided in Figure 2.5.1. We simply included a flow chart here.

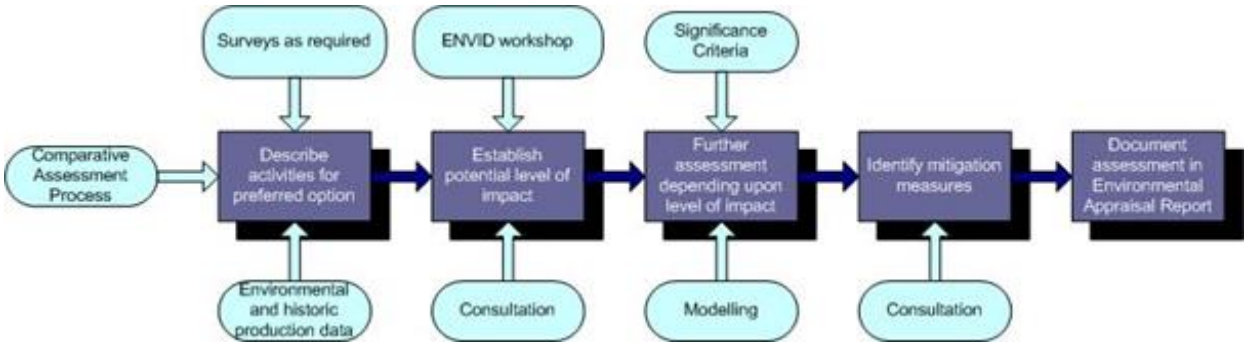


Figure 2.5.1: EA process

The EA document includes the following key elements:

- An executive summary of the EA (Section 1);
- Description of the background to the decommissioning plans; purpose and process of the EA and legislative context (this Section);
- Description of the proposed decommissioning activities and process by which the selected strategy was arrived at (Section 3);
- Description of the environment and identification of the key environmental sensitivities which may be impacted by the proposed decommissioning activities (Section 3.8);

- Impact assessment screening and justification (Section 5);
- Assessment of the key environmental impacts (Section 6);
- Conclusions (Section 7);
- Layout of the Don fields (Appendix A)
- EA Method (Appendix B)
- Environmental Risk Identification (ENVID) results summary (Appendix C);
- Don fields materials inventory (Appendix D)
- Depth of burial profiles (0).

3. PROJECT SCOPE

3.1 Project outline

The Don fields area decommissioning is divided into two phases. Phase 1 covers the removal of the Northern Producer FPF and 500m exclusion zone infrastructure, Phase 2 covers all the remaining Don fields area infrastructure.

3.1.1 Decision making context

In the latest guidance, BEIS state that subsea installations (e.g. drilling templates, wellheads and their protective structures, production manifolds and risers) must, where practicable, be completely removed for reuse, recycling or final disposal on land [1]. Operators should aim to achieve a cut depth for subsea installation footings of 3m below the natural seabed level, however consideration will be given to the prevailing seabed conditions and currents and this should be detailed in the decommissioning programme and discussed with the relevant decommissioning team. Should an Operator wish to make an application to leave in place a subsea installation because of the difficulty of removing it, justification in terms of the environmental, technical or safety reasons would be required. With regards to pipelines (including flowlines and umbilicals), these should be considered on a case-by-case basis. The guidance does provide general advice regarding removal for two categories of pipelines:

- For small diameter pipelines (including flexible flowlines and umbilicals) which are neither trenched nor buried, the guidance states that they should normally be entirely removed; and
- For pipelines covered with rock protection, the guidance states that these are expected to remain in place unless there are special circumstances warranting removal.

The guidance also highlights instances where pipelines could be decommissioned *in situ*. For example, pipelines that are adequately buried or trenched or which are expected to self-bury. Where an Operator is considering decommissioning pipelines *in situ*, the decision-making process must be informed by 'Comparative Assessment' of the feasible decommissioning options. This Comparative Assessment takes account of safety, environmental, technical, societal and economic factors to arrive at a preferred decommissioning solution.

Finally, the guidance states that mattresses and grout bags installed to protect pipelines should be removed for disposal onshore, if their condition allows. If the condition of the mattresses or grout bags is such that they cannot be removed safely or efficiently, any proposal to leave them in place must be supported by an appropriate Comparative Assessment of the options.

3.1.2 Scope of proposed decommissioning operations

Assets to be decommissioned include both infrastructure that has been comparatively assessed to determine the decommissioning strategy and infrastructure that is to be fully removed. The infrastructure being decommissioned is located in the DSW, Conrie Ythan and West Don fields.

The DSW infrastructure comprises:

- Six subsea production wells;
- Four water injection wells;
- The DSW Subsea Distribution Unit (SDU);
- Flexible flowlines (production, gas lift, and water injection pipelines, and chemical and hydraulic control umbilical pipelines).

The Conrie infrastructure comprises:

- One production well, daisy-chained to the DSW infrastructure;
- Production, gas lift, water injection tie-in pipespools, chemical and electrical control umbilical jumpers.

The Ythan infrastructure comprises:

- One production well, daisy-chained to the DSW infrastructure;
- Production, gas lift, water injection tie-in pipespools, chemical and electrical control umbilical jumpers.

The West Don infrastructure comprises:

- Three subsea production wells;
- Two water injection wells;
- The West Don SDU;
- Flexible flowlines (production, gas lift, and water injection pipelines, and chemical and hydraulic control umbilical pipelines).

Within the CA all infrastructure is grouped into three groups:

- DSW and West Don;
- DSW; and
- West Don.

There are a number of subsea structures within the Thistle A 500m exclusion zone that will be decommissioned at the same time at the Thistle facilities, including the Thistle Subsea Isolation Valve (SSIV) skid and risers bases and associated stabilisation materials (see Figure 2.1.2), however, their environmental impact is assessed under this EA.

For infrastructure that was comparatively assessed to determine a decommissioning strategy more information can be found within Section 3.3.

3.2 Alternatives to decommissioning

EnQuest have undertaken a number of studies regarding alternatives to decommissioning. The conclusions of this work present no feasible options for redevelopment i.e. Carbon Capture & Storage (CCS) and there are limited opportunities for reuse as no resources remain in the area. This leaves decommissioning of the Don fields area the only option for the assets remaining.

3.3 Comparative assessment

All of the Don fields infrastructure was assessed against the BEIS (2018) Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines [1]. The recommended Comparative Assessment (CA) process was applied.

There is an implicit assumption that opportunities 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, the re-use option was excluded. The three decommissioning options considered were:

- Complete removal – This would involve the complete removal of the pipelines by whatever means would be most practicable and acceptable from a technical perspective;

- Partial removal or remediation – This would involve removing exposed or potentially unstable sections of pipelines. Remedial work may need to be carried out to make the remaining pipeline safe for leaving *in situ*. This option is relevant for those pipelines that have known exposures because of poor depth of cover. There will likely be a need to verify their status via future surveys;
- Leave in *situ* – This would involve leaving the pipelines *in situ* with no remedial works but possibly verifying their status via future surveys.

All possible decommissioning options for the pipelines were coarsely screened. For efficiency of analysis the options for decommissioning these pipelines were assessed as three separate groups since many aspects of the assessment are common to all in a group.

The grouping of infrastructure and the justification behind the grouping can be seen Table 3.3.1, Table 3.3.2, Table 3.3.3 and Table 3.3.4.

The CA was largely qualitative, carried out at a level that is sufficient to differentiate between the options. The comparative assessment considered the following generic evaluation criteria and specific sub-criteria in line with OPRED guidance notes [1]:

- Technical:
  - Risk of project failure;
  - Technological challenge; and
  - Technical challenge (legacy).
- Safety:
  - Health and safety risks for project personnel carrying out decommissioning activities offshore;
  - Residual risks to marine users on successful completion of decommissioning; and
  - Safety risks for project personnel engaged in carrying out decommissioning activities onshore.
- Environment:
  - Emissions to atmosphere;
  - Seabed disturbance and area affected;
  - Disturbance to protected areas;
  - Effect on water column (Liquid discharges to sea, Liquid discharges to surface water and Noise); and
  - Waste creation and use of resources such as landfill. Recycling and replacement of materials.
- Socio-economic:
  - Effects on commercial activities e.g. fishing;
  - Employment; and
  - Communities or impact on amenities.
- Economic:
  - Difference in cost compared for like-for-like activities.

These elements are considered for short-term work as the assets are decommissioned as well as over the longer-term as legacy impacts and risks.

The CA considered the above generic evaluation criteria and specific sub-criteria in line with OPRED guidance notes. No scores were determined, however, risk matrices were used to determine if the planned and unplanned impacts would be broadly acceptable, possibly acceptable, unlikely to be acceptable or not acceptable.

Asset	Pipeline ID	Complete removal	Partial removal	Leave *in situ*	Group	Comments
DSW & West Don	PL2578 & PL2579	X		X	1	Reasonable depth of cover, no exposures
DSW	PL2572 & PL2573	X		X	1	Good depth of cover, no exposures
DSW	PLU2576, PLU2577 & PL2581	X	X	X	3	Poor cover, numerous exposures; partial removal or remedial works considered
DSW	PL4262	X		X	2	Good depth of cover, no exposures
West Don	PL2582, PLU2585	X	X	X	3	Poor cover, numerous exposures; partial removal or remedial works considered
West Don	PL2583 & PL2584	X		X	1	Good depth of cover, no exposures
West Don	PL4261	X		X	2	Good depth of cover, no exposures

NOTES:

1. The pipelines listed here excludes those pipelines that were wholly surface laid and covered with concrete mattresses;
2. PLU2576, PLU2577 and PL2581 were trenched into the seabed and left to backfill naturally; deposited rock was used to bury all the other pipelines. Both umbilicals (PLU2576 from RBS up to DSW SDU followed by PLU2577) and the pipeline share the same trench;
3. PLU2585 and PL2582 were trenched in the seabed and left to backfill naturally but they emerge at the Don pipeline crossings where it is buried under deposited rock. Both pipelines share the same trench.

A summary of the infrastructure for which a CA of options was made and the considered options (with the selected options in bold) is given in Table 3.3.1, Table 3.3.2 and Table 3.3.3.

Table 3.3.1: Pipeline decommissioning options and grouping

Item Description	Option 1 Complete removal	Option 3 Leave *in situ*
Riser & surface laid sections of pipeline in the Northern Producer 500m zone	Phase 1 scope. Remove.	Phase 1 scope. Remove.
Trenched and buried section of pipeline (PL2578 & PL2579, PL2572 & PL2573, PL2583 & PL2584)	Uncover the pipeline using mass flow excavator. Completely remove pipelines using either the reverse reel or the 'cut and lift' method.	**Leave *in situ*. No remedial work required.**
Surface laid section of pipeline protected and stabilised with concrete mattresses on approach to, West Don (PL2583 & PL2584) production wellheads, and DSW (PL2572 & PL2573) production wellheads, and the near Wye Structure (applicable to PL2578 & PL2579 only)	**Remove all surface laid pipespools and associated concrete mattresses and grout bags.**	Remove. As option 1.
Trenched and buried section of pipeline (PL2579 only although this is piggybacked on Thistle oil export pipeline PL4555[1])	Uncover the pipeline using mass flow excavator. Completely remove pipelines using 'cut and lift' method.	**Leave *in situ*. No remedial work required.**
Surface laid section of pipeline protected and stabilised with concrete mattresses Thistle SSIV and RBS (PL2579 only)	**Remove all surface laid pipespools and associated concrete mattresses and grout bags.**	Remove. As option 1.
NOTE: 1. The section of PL2578 between the SALB (subsequently replaced by the wye structure) was renumbered PL4555 and is now owned by the Thistle pipeline owners.		

Table 3.3.2: Decommissioning options considered for Group 1 pipelines

Item Description	Option 1 Complete removal	Option 3 Leave *in situ*
Riser & surface laid sections of pipeline in the Northern Producer 500m zone	Phase 1 scope. Remove.	Phase 1 scope. Remove.
Trenched and buried section of pipeline (PL4261 & PL4262)	Uncover the pipeline using mass flow excavator. Completely remove pipelines using either the reverse reel or the 'cut and lift' method.	**Leave *in situ*. No remedial work required.**
Surface laid section of pipeline protected and stabilised with concrete mattresses on approach to West Don water injection wellheads (PL4261) and DSW water injection wellheads (PL4262)	**Remove all surface laid pipespools and associated concrete mattresses and grout bags.**	Remove. As option 1.

Table 3.3.3: Decommissioning options considered for Group 2 pipelines

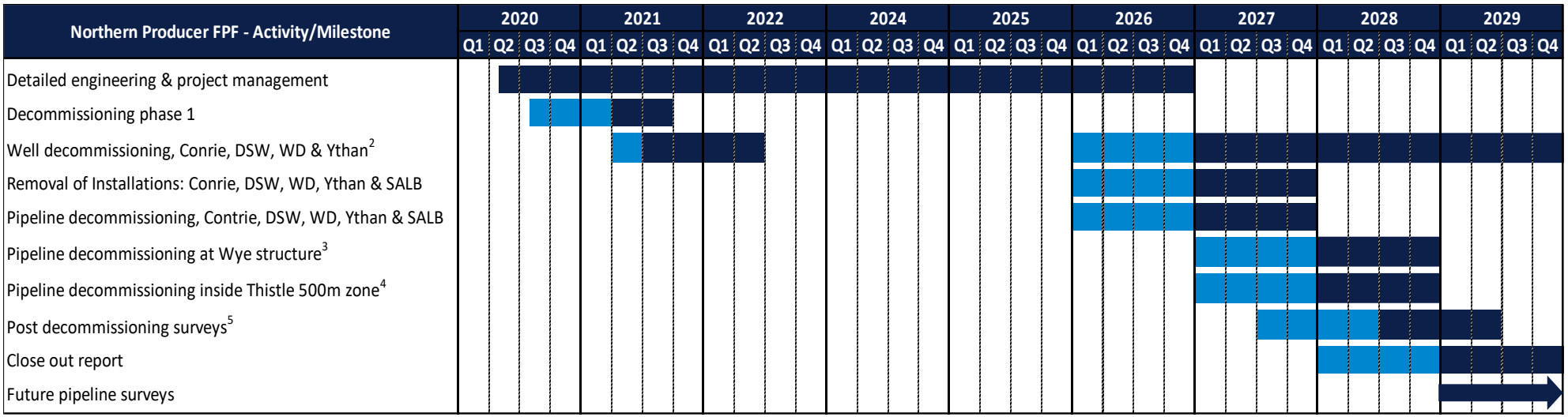
Item Description	Option 1 Complete removal	Option 2 Partial removal	Option 3 Leave in situ
Riser & surface laid sections of pipeline in the Northern Producer 500m zone	Phase 1 scope. Remove.	Phase 1 scope. Remove	Phase 1 scope. Remove.
Trenched and buried section of pipeline (PLU2576, PLU2577 & PL2581, PL2582, PLU2585)	Uncover the pipeline(s) using mass flow excavator. Completely remove rigid pipelines either using reverse reel or the 'cut and lift' method. Completely remove umbilical pipeline(s) using reverse reel method.	Either remove exposed sections of pipelines and remediate the remaining pipeline ends or cover exposed sections by retrenching or depositing additional rock.	**Leave *in situ*. No remedial work required.**
Surface laid section of pipe spools and umbilical jumpers protected and stabilised with concrete mattresses on approach to West Don (PL2582, PLU2585) and DSW (PLU2576, PLU2577 & PL2581)	**Remove all surface laid pipespools and jumpers and associated concrete mattresses and grout bags**	Remove. As option 1.	Remove. As option 1.
NOTES: 1. PLU2576, PLU2577 and PL2581 were trenched into the seabed and left to backfill naturally; deposited rock was used to bury all the other pipelines. Both umbilicals (PLU2576 from RBS up to DSW SDU followed by PLU2577) and the pipeline share the same trench; 2. PL2582 was trenched in the seabed but emerges at the Don pipeline crossings where it is buried under deposited rock.			

Table 3.3.4: Decommissioning options considered for Group 3 pipelines

3.4 Proposed schedule

A proposed schedule is provided in Figure 3.4.1. The activities are subject to the acceptance of the DP 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. EnQuest will examine the possibility of including the offshore work in a wider campaign of subsea works to reduce costs.



Notes / Key

Most likely period of activity

Activity window to allow campaigning flexibility associated with decommissioning activities

1. Current indications are that NP FPF sailaway & Phase 1 of the decommissioning will be carried out early Q2 2021;
2. The first phase of well decommissioning will address wells with known integrity issues;
3. Decommissioning of pipelines and infrastructure at Wye structure (i.e. PL2578 & PL2579) will likely be carried out in the same campaign as PL4555 & PL4556; both these pipelines are part of the Thistle pipeline infrastructure;
4. Decommissioning of pipelines (i.e. PLU2580, PLU2580JSO, PLU2580JSG, and PL2579) and associated infrastructure on approach to Thistle 'A' will likely be carried out in the same campaign as PL4555 and other pipelines associated with Thistle.
5. Post decommissioning surveys near the Wye Structure (i.e. SALB) and Thistle 500m zone will be addressed and reported as part of Thistle decommissioning activities.

Figure 3.4.1: Gantt Chart of Project Plan

3.5 Decommissioning activities

3.5.1 Phase 1 activities

The following activities are part of Phase 1 decommissioning and are not covered as part of this EA:

- All pipework will be flushed to an acceptable level of cleanliness prior to decommissioning activities commencing, reflecting current guidance from OPRED and the Health & Safety Executive (HSE). Wells are out of scope and will be decommissioned under their own permitting regime;
- A clear seabed verification survey will be required within the Northern Producer FPF 500m exclusion zone following the sailaway of the FPF along with its anchors;
- The risers will be cut and laid on the seabed by a suitable support vessel during disconnection of the FPF, within the 500m exclusion zone.

3.5.2 Subsea installations and pipeline structures

A subsea contractor will sequentially mobilise a fleet comprising vessels with a range of crane capabilities for lifting objects of different sizes and weights off the seabed, vessels that can support underwater operations including remotely operated vehicle (ROV) deployment, diving, cutting, trench ploughing and backfilling, excavation and rock placement, survey vessels and guard vessels. The vessels will deploy ROVs or divers only if necessary, to disconnect the subsea installations and tie-in spools and to cut the spools and ends of flowlines. The vessels' cranes will lift the subsea structures to the vessel.

All subsea installations are to be fully recovered. Where possible any piled structures will have their piles cut internally thus avoiding the need for any excavation work.

The tables below show the size and type of subsea installations and pipeline structures associated with the DSW, Conrie, Ythan and West Don fields.

Dimensions			Description
L (m)	W (m)	H (m)	
6.1	2.8	0.5	PL2578 8" Oil Export and PLU2580 Thistle 3" SSIV umbilical riser base and protection structure
6	3.5	3.0	PL2579 3" SSIV and protection structure
3.8	2.8	0.5	PL2579 3" gas import riser base and protection structure
13	13	8.1	SALB

Table 3.5.1: Combined West Don and DSW pipeline structures

Dimensions			Description
L (m)	W (m)	H (m)	
8.8	9.2	6.7	10 x wellhead protection structures (WHPS)
8.5	5.2	3.5	DSW SDU and protection structure (4-piled structure)

Table 3.5.2: DSW installations and pipeline structures

Dimensions			Description
L (m)	W (m)	H (m)	
8.8	9.1	6.7	Conrie WHPS

Table 3.5.3: Conrie installation

Dimensions			Description
L (m)	W (m)	H (m)	
8.8	9.2	6.7	Ythan WHPS

Table 3.5.4: Ythan installation

Dimensions			Description
L (m)	W (m)	H (m)	
8.5	5.2	3.5	West Don SDU and protection structure (4-piled structure)
8.8	9.2	6.7	5 x WHPS

Table 3.5.5: West Don installations and pipeline structures

3.5.3 Protection and support materials

All subsea protection and stabilisation features will be fully removed using a CSV or DSV, if stabilisation features lack the integrity to be safely fully removed then EnQuest will engage with the regulator with regards to decommissioning these stabilisation features *in situ*. A summary of all the stabilisation and protection features located across all fields can be found in Table 3.5.6.

Item	Description
Combined West Don & DSW	
Removal of exposed concrete mattresses	46 mattresses with maximum dimensions of 6m x 2m x 0.15m
Removal of exposed grout bags	Burial status will be determined when decommissioning activities are being carried out. Assumed exposed. 1,280 x 25kg grout bags – 1m^2 footprint, piled up
Introduction of rock to protect the surface laid sections outside the trenches	Two pipelines to be left *in situ* x 2 ends per pipeline x 30m^2 footprint at each end
DSW	
Introduction of rock to protect flowlines cut ends	5 pipelines routes to be left *in situ* x 2 ends per pipeline x 30m^2 footprint at each end
Concrete mattresses	256 mattresses with maximum dimensions of 6m x 2m x 0.15m
Grout bags	2,320 x 25kg grout bags – 1m^2 footprint, piled up
DSW - Conrie	
Removal of Concrete mattresses	28 mattresses with maximum dimensions of 6m x 2m x 0.15m
Removal of Grout bags	80 x 25kg grout bags – 1 m^2 footprint, piled up
DSW - Ythan	
Removal of Concrete mattresses	30 mattresses with maximum dimensions of 6 m x 2m x 0.15m
Removal of Grout bags	1,600 x 25kg grout bags – 1m^2 footprint, piled up
West Don	
Introduction of rock to protect flowlines cut ends	5 pipelines routes to be left *in situ* x 2 ends per pipeline x 30m^2 footprint at each end
Concrete mattresses	135 mattresses with maximum dimensions of 6m x 2m x 0.15m
Grout bags	1,315 x 25kg grout bags – 1m^2 footprint, piled up

Table 3.5.6: Protection and stabilisation features

3.5.4 Pipelines, umbilicals, jumpers and spools

The tables below set out the decommissioning option and method for all the pipelines and umbilicals within the scope of this project. Final decommissioning removal methods will be determined at a later stage of the project prior to the execute phase and will follow the philosophy set out below.

<table>
<tr><th>Pipeline or Group</th><th>Recommended Option</th><th>Method</th></tr>
<tr><td>PL2578</td><td rowspan="2">Leave most of the pipelines in situ.

Remove surface laid sections including those currently protected and stabilised with concrete mattresses, but otherwise leave in situ.

Removal of surface laid sections of both PL2578 & PL2579 near the Wye Structure (total ~100m each pipeline).

For PL2579 at Thistle ‘A’ this involves removal of ~400m on approach to Thistle.</td><td rowspan="2">The surface laid end sections of the pipeline will be cut and lifted and recovered using a suitable vessel. All stabilisation and protection features surrounding the pipeline will be fully removed (as per current guidance). Once the end sections have been recovered, rock will be placed over the cut ends to remediate and residual snag risk.</td></tr>
<tr><td>PL2579</td></tr>
<tr><td>PLU2580</td><td rowspan="3">Complete removal</td><td rowspan="3">As above.</td></tr>
<tr><td>PLU2580JSO</td></tr>
<tr><td>PLU2580JSG</td></tr>
<tr><td colspan="3">NOTES:
1. The decommissioning of the pipeline ends at or near the original Northern Producer 500m exclusion zone is addressed in the DP for Phase 1 – the departure of the Northern Producer FPF;
2. Note that the protection and stabilisation features associated with PL2579 as it by-passes the Wye Structure also protect and stabilise PL4555 which belongs to the Thistle owners. These features will likely be left in situ until PL4555 (formerly PL2578) between Thistle ‘A’ and the Wye Structure is decommissioned as part of the Thistle ‘A’ pipeline infrastructure;
3. In order to explore synergistic opportunities PLU2580 (which incorporates PLU2580JSO and PLU2580JSG) and associated infrastructure such as riser bases (PLU2580 & PL2579), SSIV skids and pipelines within the Thistle ‘A’ 500m exclusion zone will likely be decommissioned at the same time as the Thistle ‘A’ installation and infrastructure.</td></tr>
</table>

Table 3.5.7: DSW & West Don pipeline decommissioning method

Pipeline or Group	Recommended Option	Method
PL2572 (5-8)	Completely remove.	These sections will be fully removed using a suitable vessel using a cut and lift method. Prior to removal of the lines all stabilisation and protections features will be fully removed, as per OPRED guidance. No remediation work will be required as full removal leaves a clear seabed
PL2573 (18-21)		
PLU2576JP4		
NOTE: 1. The Conrie pipelines are not affected by the proposals for Phase 1 of the decommissioning works, described in Section 3.1.2.		

Table 3.5.8: Conrie pipeline decommissioning method

Pipeline or Group	Recommended Option	Method
PL2572 except (5-8)	Leave most of the pipelines *in situ*. Remove surface laid sections including those currently protected and stabilised with concrete mattresses or connected to the DSW production wells (total length to be removed ~100m each), but otherwise leave *in situ*.	The surface laid end sections of the pipeline will be cut and lifted and recovered using a suitable vessel. All stabilisation and protection features surrounding the pipeline will be fully removed (as per current guidance). Once the end sections have been recovered, rock will be placed over the cut ends to remediate and residual snag risk.
PL2573 except (18-21)		
PLU2576	Leave most of the umbilical *in situ*. Remove surface laid sections including those currently protected and stabilised with concrete mattresses and connected to the DSW SDU (total length ~100m), but otherwise leave *in situ*.	As above.
PLU2576JP1 to JP7	Completely remove.	These sections will be fully removed by a cut and lift method using a suitable vessel. Prior to removal of the lines all stabilisation and protections features will be fully removed, as per OPRED guidance. No remediation work will be required as full removal leaves a clear seabed.

Pipeline or Group	Recommended Option	Method
PLU2577	Leave most of the umbilical *in situ*. Remove first 70m of the umbilical that is buried so that it includes the 11m anomaly inside the trench. Remove surface laid sections including those currently protected and stabilised with concrete mattresses and connected to the DSW water injection wells (total length~200m), but otherwise leave *in situ*.	The surface laid end sections of the pipeline will be cut and lifted and recovered using a suitable vessel. All stabilisation and protection features surrounding the pipeline will be fully removed (as per current guidance). Once the end sections have been recovered, rock will be placed over the cut ends to remediate and residual snag risk
PLU2577JWI2 to JWI4	Completely remove.	These lines will be fully removed using a suitable vessel . Prior to removal of the lines all stabilisation and protections features will be fully removed, as per OPRED guidance. No remediation work will be required as full removal leaves a clear seabed.
PL2581	Leave most of the pipelines *in situ*. Remove wet stored pipespools (total length ~27m) as well as surface laid sections including those currently protected and stabilised with concrete mattresses, but otherwise leave *in situ*.	These surface laid sections will be cut and lifted and recovered using a suitable vessel. All stabilisation and protection features surrounding the pipeline will be fully removed (as per current guidance). Once the end sections have been recovered, rock will be placed over the cut ends to remediate and residual snag risk. The wet stored pipe spools will be fully recovered.
PL4262	Leave most of the flowline *in situ*. Remove surface laid sections including those currently protected and stabilised with concrete mattresses and connected to the DSW water injection wells (total length ~200m), but otherwise leave *in situ*.	These sections will be cut and lifted and recovered using a suitable vessel. All stabilisation and protection features surrounding the pipeline will be fully removed (as per current guidance). Once the end sections have been recovered, rock will be placed over the cut ends to remediate and residual snag risk.
PL4557	Completely remove.	This line is mounted on the DSW and West Don SALB and will be fully recovered along with this structure.

NOTES:

1. Where buried in the seabed, local excavations will be required to locate the pipeline cut point. Following severance of the pipeline, the excavation will be mechanically backfilled;
2. Where buried in deposited rock, remedial work may be required to bury the end of the pipeline where it protrudes out from the rock. As a contingency measure, small deposits of rock may need to be added to the existing rock to make sure that the pipeline ends remain buried.

Table 3.5.9: DSW pipeline decommissioning method

Pipeline or Group	Recommended Option	Method
PL2582	Leave most of the pipelines *in situ*. Remove wet stored pipespools (total length ~50m) surface laid sections including those currently protected and stabilised with concrete mattresses, but otherwise leave *in situ*.	The surface laid section of pipelines will be cut and lifted and recovered using a suitable vessel. All stabilisation and protection features surrounding the pipeline will be fully removed (as per current guidance). Once the end sections have been recovered, rock will be placed over the cut ends to remediate and residual snag risk.
PL2583	Leave most of the pipelines *in situ*. Remove surface laid sections including those currently protected and stabilised with concrete mattresses and connected to the West Don production wells (total length ~160m for each pipeline), but otherwise leave *in situ*.	As above.
PL2584		
PLU2585	Leave most of the umbilical *in situ*. Remove surface laid sections including those currently protected and stabilised with concrete mattresses and connected to the West Don SDU total length ~175m), but otherwise leave *in situ*.	As above.
PLU2585 JP1 to JP3	Completely remove.	This line will be cut and lifted and recovered using a suitable vessel. Prior to removal of the lines all stabilisation and protections features will be fully removed, as per OPRED guidance. No remediation work will be required as full removal leaves a clear seabed.
PLU2585JW1 to JW2		
PL4261	Leave most of the flowline *in situ*. Remove surface laid sections including those currently protected and stabilised with concrete mattresses and connected to the West Don water injection wells (total length ~120m), but otherwise leave *in situ*.	The surface laid end sections of the pipeline will be cut and lifted and recovered using a suitable vessel. All stabilisation and protection features surrounding the pipeline will be fully removed (as per current guidance). Once the end sections have been recovered, rock will be placed over the cut ends to remediate and residual snag risk.

NOTES:

1. Where buried in the seabed, local excavations will be required to locate the pipeline cut point. Following severance of the pipeline, the excavation will be mechanically backfilled;
2. Where buried in deposited rock, remedial work may be required to bury the end of the pipeline where it protrudes out from the rock. As a contingency measure, small deposits of rock may need to be added to the existing rock to make sure that the pipeline ends remain buried.

Table 3.5.10: West Don pipeline decommissioning method

Pipeline or Group	Recommended Option	Method
PL3749	Completely remove.	It is anticipated that these lines will be cut and lifted and recovered using a suitable vessel. Prior to removal of the lines all stabilisation and protections features will be fully removed, as per OPRED guidance. No remediation work will be required as full removal leaves a clear seabed.
PL3751		
PLU3752		
PLU3753		
PLU3754		

Table 3.5.11: Ythan pipeline decommissioning method

3.6 Clear seabed verification

Following the decommissioning of all infrastructure, it is necessary to identify any potential snagging hazards associated with any changes to the seabed. A clear seabed will be validated by an independent verification survey of all of the installation sites and pipeline corridors, as well as any 500m exclusion zones. The aim of these clean seabed verification actions is to ensure the seabed is left in a safe condition for future fishing effort, in line with the current Decommissioning Guidance [1].

Survey techniques which do not make contact with the seabed, such as Side Scan Sonar (SSS) and Remotely Operated Vehicle (ROV), will be considered to verify the condition of the seabed during the post decommissioning survey. The survey methods will be discussed and finalised with OPRED prior to survey commencement to ensure the survey meets the requirements for clear seabed verification.

As the seabed is not in an environmentally sensitive area, an over-trawl may be carried out to verify the presence of snagging hazards requiring remediation (e.g. any spans, dropped objects, etc.) after decommissioning activities have been completed. Should over-trawling be required, it will be conducted by fishing vessel(s) using trawl gear that is appropriate for the area. If an over-trawl is carried out this will be supported by a Certificate of Clearance. Evidence of a clear seabed will be included in the Close Out Report and sent to the Seabed Data Centre (Offshore Installations) at the Hydrographic Office.

Removal of surface laid flowlines and other subsea infrastructure is not anticipated to generate any snagging hazards. Similarly, field debris will be small and are expected to be on the seabed surface or partially buried, precluding the requirement of intrusive methods of remediation. Any debris identified during the clear seabed verification survey will be removed with the area of disturbance minimised where practicable.

3.7 Waste management

The management of waste during decommissioning is a highly regulated activity, which potentially requires compliance with both national and international legislation, depending on the destinations identified for dismantling and treating any wastes generated.

Decommissioning of the Don fields will generate a quantity of waste. EnQuest is committed to establishing and maintaining environmentally acceptable methods for managing wastes in line with the Waste Framework Directive and principles of the waste hierarchy.

Table 3.7.1 summarises the various waste management processes for different waste streams that EnQuest will follow, and Table 3.7.2 details the materials inventory for the Don fields.

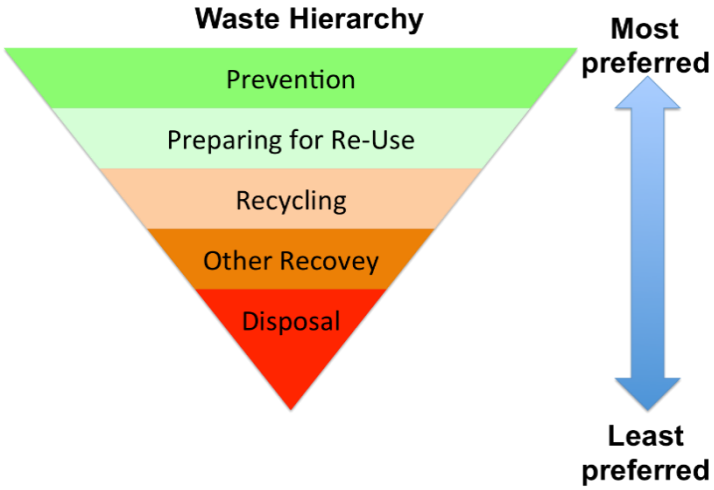


Figure 3.7.1: Waste Hierarchy

Waste Stream	Removal and disposal method
Bulk liquids	As part of Phase 1 of the decommissioning operations, bulk hydrocarbons will have been exported with any residual hydrocarbons removed from the Northern Producer in accordance with contractual agreements with the vessel owner. Any associated bulk seawater from topsides will have been be cleaned and disposed overboard under permit. The production risers, pipelines and water injection flowlines will have been flushed and left filled with seawater as appropriate prior to being disconnected. Further cleaning and decontamination of materials recovered to shore will take place onshore prior to recycling / re-use or disposal.
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.
Naturally Occurring Radioactive Material (NORM)	Based on production records to date, NORM is expected. Tests for NORM will be undertaken offshore and any NORM encountered will be dealt with and disposed of in accordance with guidelines and company policies.
Asbestos	It unlikely that asbestos will be present in the pipeline infrastructure and structures that are being recovered to shore. However, should any such material found will be dealt with and disposed of in accordance with guidelines and company policies.
Other hazardous wastes	Will be recovered to shore and disposed of according to guidelines and company policies and will also take place under appropriate permits.
Onshore Dismantling sites	Appropriately licensed sites will be selected for dealing with materials recovered to shore. 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 3.7.1: Waste stream management process

Inventory disposition		Total inventory (Te)	Phase 1 planned to shore (Te)	Phase 2 planned to shore (Te)	Remaining (Te)	Steel (Te)	Plastic / rubber (Te)	Non ferrous (Te)	Grout/ concrete (Te)	Other non-hazardous (Te)	Non-hazardous (Te)	Rock (Te)
Installations (dry weight and fluids)	DSW & West Don	103	-	103		102	1	-	1	-	-	-
	Conrie	56	-	56	-	55	1	-	0	-	-	-
	DSW	663	-	663	-	654	6	-	3	-	-	-
	West Don	280	-	280	-	274	6	-	-	-	-	-
	Ythan	56	-	56	-	55	1	-	0	-	-	-
Pipelines and protection	DSW & West Don	1,556	449	310	797	1,274	45	0	236	1	-	-
	Conrie	69			69	3	4	2	61	-	-	-
	DSW	2,589	114	1,356	1,120	1,058	184	24	1,318	5	-	-
	West Don	783	49	216	518	506	103	121	49	5	-	-
	Ythan	139	-	139	0	4	5	0	130	-	-	-
Deposited rock	DSW & West Don	58,000	-		58,000	-	-	-	-	-	-	58,000
	Conrie	-			-	-	-	-	-	-	-	-
	DSW	72,705	-	-	72,705	-	-	-	-	-	-	72,705
	West Don	35,159	-		35,159	-	-	-	-	-	-	35,159
	Ythan	-			-	-	-	-	-	-	-	-
Sub-total (excl. rock)		**6,295**	**612**	**3,179**	**2,504**	**3,986**	**355**	**146**	**1,797**	**11**	**-**	**165,864**
Sub-total (rock only)		**165,864**	-	-	**165,864**	-	-	-	-	-	-	-

Table 3.7.2: Don fields materials inventory

3.8 Environmental management approach

EnQuest implements and operates an integrated Health, Safety, Environment and Assurance (HSE&A) management system which was audited in 2018 and was granted verification as meeting the requirements of an EMS in relation to OSPAR Recommendation 2003/5.

The HSE&A management system is an integral part of the overall management system. It is laid down in policies, procedures, standards and work instructions. Its general purpose is to prevent EnQuest activities from putting people, the environment, property or the reputation of the company at risk. EnQuest's signed HSE&A management system policy is show in Figure 3.8.1.

HSEA Policy

Health, Safety, Environment & Assurance

EnQuest

EnQuest is a production and development company, with operations in the UK North Sea and Malaysia. We are committed to operating responsibly and will not compromise our health, safety or environmental standards to meet our business objectives.

Through respect for our people, our contractors, our customers, our stakeholders and the environment, we will operate to achieve our principal aim: ***safe results, with no harm to people and respect for the environment.***

To achieve this we will manage our business such that we:

Process Safety Management
- Demonstrate strong process safety leadership
- Provide trained and competent resources
- Maintain high-quality systems and processes
- Maintain the integrity of our assets over their life cycles
- Recognise, assess and manage HSE risks
- Plan and be prepared for potential emergencies

Environment
- Integrate environmental management into all aspects of our operations
- Manage and mitigate our impact on the environment

Wellbeing
- Maintain safe and healthy workplaces

Engagement
- Encourage open and honest communication
- Ensure our contractors and suppliers comply with our policies and procedures
- Comply with all applicable legislation and industry standards
- Recognise, assess and manage change

Sharing & Learning
- Investigate and learn from HSE events
- Strive for continual improvement in our HSE performance

Should operational results and this policy ever come into conflict, we all have a responsibility to our principal aim of ***safe results, with no harm to people and respect for the environment*** over operational results. This includes the responsibility to stop a job whenever activities may conflict with this policy.

Amjad Bseisu
Chief Executive Officer
EnQuest PLC, January 2020

Bob Davenport
Managing Director – North Sea
EnQuest PLC, January 2020

ENQ-COR-HS-POL-00005 Rev.C10

www.enquest.com

Figure 3.8.1: EnQuest's HSE&A policy

4. ENVIRONMENT AND SOCIETAL BASELINE

4.1 Summary of environmental surveys

A number of environmental surveys were undertaken in Block 211/18 between 2007 and 2018. These surveys have been used to describe the seabed environment for the Don fields area and are listed in Table 4.1.1. The locations of the environmental stations and sample points from these surveys are presented in Figure 4.1.1.

Survey Report	Description
Magnus to Dunlin pipeline	
Environmental Baseline Report [4]	During July 2018, Gardline completed a habitat assessment, geophysical survey and EBS along the proposed Dunlin to Magnus pipeline route in Blocks 211/18 and Block 211/12. The geophysical survey used MBES, SSS, magnetometer and pinger equipment along a pipeline corridor approximately 375m wide.
Habitat Assessment Report [5]	A total of six video targets and co-located sampling stations were investigated along the pipeline route. All stations were then sampled with a 0.1m^2 Day grab. Three sediment samples were collected at all stations for faunal and physico-chemical analyses.
Thistle pipeline	
Environmental Baseline Survey [6]	During July 2018, Gardline completed a habitat assessment, geophysical survey and environmental baseline survey (EBS) along a proposed Thistle pipeline route in Block 211/18. The geophysical survey used multi-beam echo sounder (MBES), side-scan sonar (SSS), magnetometer and pinger equipment.
Habitat Assessment Report [7]	The geotechnical survey assessed a total of six video targets and co-located sampling stations along the Dunlin to Thistle pipeline route. All video targets and sampling stations were investigated with a drop-down camera system followed by sampling with a 0.1m^2 Day grab with samples acquired for faunal and physico-chemical analyses.
East Don	
Environmental Baseline Survey [8]	During June 2012, a habitat assessment was undertaken at the East Don field within Blocks 211/18 and 211/19. The geophysical survey investigated seabed conditions within a 1.5km x 1.5km survey area encompassing a previously proposed drilling location at East Don, using MBES and SSS. The seabed was investigated using a digital stills camera and video system, followed by sampling with a 0.1m^2 Day grab.
Habitat Assessment Report [9]	A total of 15 stations placed in a cruciform pattern were chosen to ground truth the area using the camera system. Two camera transects were undertaken at Stations ENV8 and ENV9 to further assess the extent of possible iceberg scars at these locations. Sediment samples were taken at 12 out of the 15 stations for faunal and physico-chemical analyses.

Survey Report	Description
West Don	
Site and Pipeline Route Survey [10]	During July 2010, a site and pipeline route survey was conducted in Block 211/18 at the Don West field. The survey covered a 2km x 1km area and comprised single beam echosounder and MBES, SSS, SBP, mini airgun, magnetometer and 2D high resolution multichannel seismic surveys. In addition, two previously proposed pipeline routes were surveyed using MBES, SSS, SBP, magnetometer and mini airgun. Gravity cores were obtained within the vicinity of a previously proposed well 211/18-H, along the proposed pipeline routes and at other selected locations. A total of ten gravity cores were acquired to assess sub seabed conditions. Three video transects were acquired and one station was photographed to enable areas of interest to be confirmed by ground truthing.
West Don & Pipelines- West Don to DSW; West Don to Thistle; West Don to Magnus	
Habitat Assessment [11]	In 2007, a 3km x 3km site survey was undertaken at West Don and along three adjoining pipeline corridors extending from West Don to DSW, the Thistle field and the Magnus field. The environmental habitat assessment involved the use of digital stills camera to obtain imagery and video footage of the seabed at 36 stations. Geophysical data were used to assist with the survey strategy and data interpretation. As part of the baseline survey, grab sampling was undertaken at 35 of the stations using a 0.1m^2 Day grab for physico-chemical and macrofaunal analysis.
DSW & DSW to Thistle pipeline	
Environmental Baseline Survey [12]	In May – July 2007, an EBS was conducted in Block 211/18 within a 3km x 3km area and along a 10.4 km previously proposed pipeline running from DSW to Thistle. MBES and SSS data were obtained during the geophysical survey and were used to refine the environmental survey strategy and aid subsequent data interpretation. The EBS used underwater digital still and video photography for ground-truthing, and a 0.m^2 Day grab to obtain sediment samples for physico-chemical and macrofaunal analysis. A total of 25 stations were sampled.

Table 4.1.1: Environmental survey reports used to summarise the Don fields environment

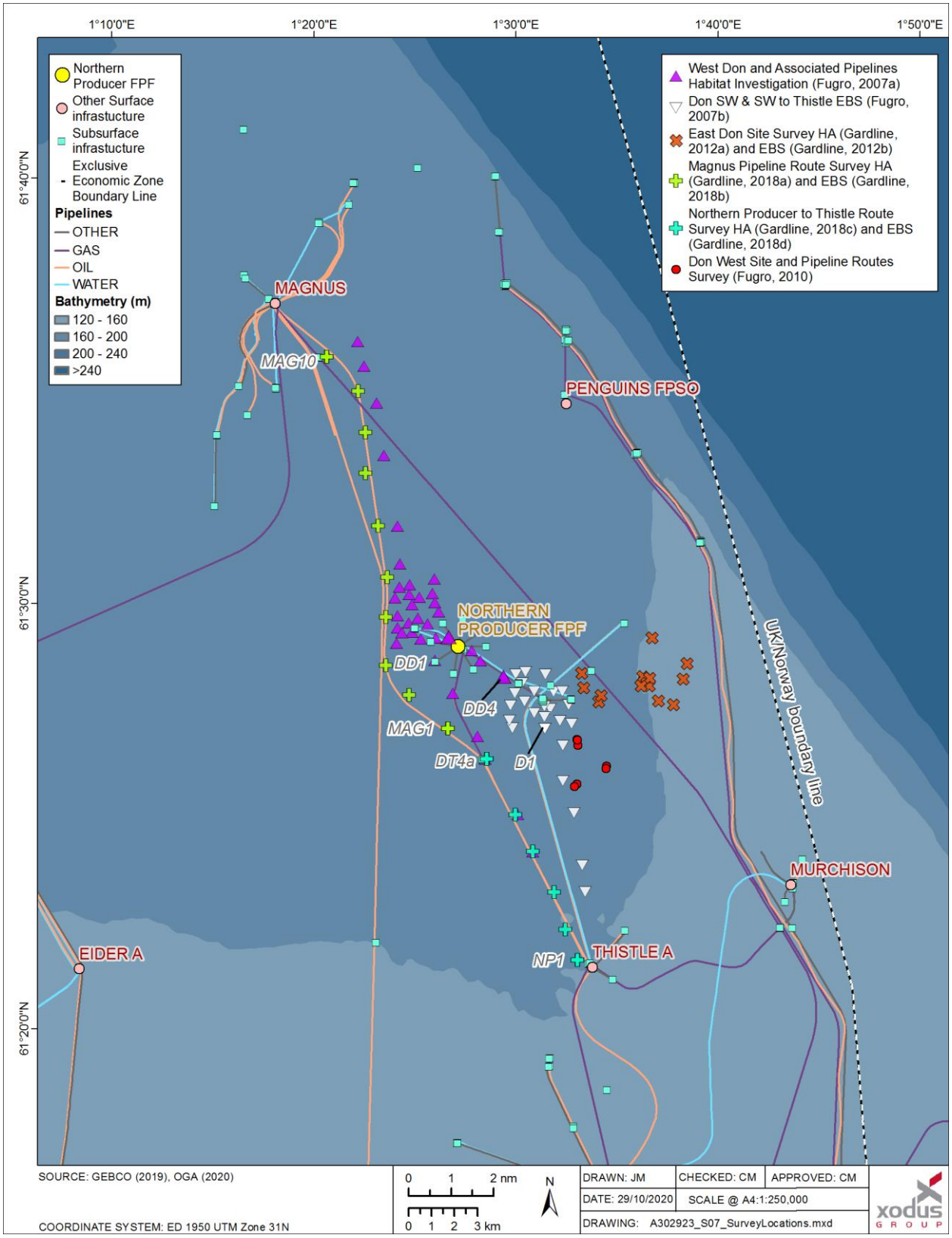


Figure 4.1.1: Environmental survey stations around the Don fields

4.2 Summary of receptors

The baseline environment in the project area is summarised in Table 4.2.1 and Table 4.2.2. For most receptors, the information provided below is considered sufficient to inform the environmental assessment of potential impacts of the DP. Receptors identified during the ENVID (see Appendix C) and consultation meetings of potential concern to stakeholders include the seabed and benthic environment and commercial fisheries. These receptors are discussed in more detail in the following sections.

Environmental Receptor	Description
Physical environment	
Weather and sea conditions	The Don fields are located in Block 211/18 at a water depth of 170m. The mean residual current through the Dons field area is approximately 0.05 to 0.1m/s [13] Wave energy at the seabed is 'low' (less than 0.21N/m^2) within the area [14]. The annual mean wave height within the area ranges from 2.71m – 3m and the annual mean wave power is 41.71kW/m [15].
Key Conservation interests	
Conservation sites	
Special Area of Conservation (SAC)	The nearest SAC to the Don fields decommissioning area is the Pobie Bank Reef SAC, located approximately 108km south-west. It is protected for bedrock and stony reefs which provide a habitat to an extensive community of encrusting and robust sponges and bryozoans. These include encrusting coralline algae, cup sponges, and bryozoans in the shallower areas; and small erect sponges, cup corals and brittlestars in the deeper areas.
Nature Conservation Marine Protected Area (NCMPA)	The nearest NCMPA to the Don fields decommissioning area is the North-East Faroe-Shetland Channel NCMPA, located approximately 92km north-west. It is protected for deep-sea sponge aggregations, offshore deep-sea muds, offshore subtidal sands and gravels, the continental slope feature and for a wide range of features representative of the West Shetland Margin Palaeo-depositional, Miller Slide and Pilot Whale Diapirs Key Geodiversity Areas.
Special Protection Area (SPA)	The nearest SPA to the Don fields decommissioning area is the Hermaness, Saxa Vord and Valla Field SPA, located approximately 140km south-west. This site is important for a number of breeding seabird species that nest on the cliffs and the heathland and grassland here. During the breeding season, the area regularly supports 152,000 seabirds including guillemots, kittiwakes, shags, fulmars, puffins, great skuas and gannets.
Conservation Species	
Coastal and Offshore Annex II species most likely to be present in the project area	
Pinnipeds – Harbour and Grey Seals	Pinnipeds are not expected in significant numbers within the project area, given its distance from shore. Densities are currently estimated at approximately 0-1

Environmental Receptor	Description
	individuals per 25km^2 for both harbour and grey seals [16]. This is due to the site being approximately 137km offshore and even farther from important seal haul outs.
European Protected Species most likely to be present in the project area	
Harbour porpoise	The harbour porpoise (*Phocoena phocoena*) is a small, highly mobile species of cetacean that is the most commonly occurring cetacean in UK waters. As such, harbour porpoise can also be found in the waters of the proposed decommissioning area. Particularly large numbers occur in near the project area during the summer months, with a peak in numbers in July and August [17] [18]. The density of harbour porpoise is roughly estimated at 0.3-0.4 animals/km^2 across the project area [18].
Minke whale	Minke whales (*Balaenoptera acutorostrata*) are usually sighted in pairs or in solitude, though groups of up to 15 individuals can be sighted feeding within their seasonal feeding grounds. The relative density of minke whales is estimated at 0.030 – 0.035 animals/km^2 in the project area [18].
White- beaked dolphin	White-beaked dolphins (*Lagenorhynchus albirostris*) are usually found in water depths of between 50 and 100m in groups of around 10 individuals, though groups of up to 500 animals have been seen. They are present in the UK waters throughout the year, however more sightings have been made between June and October. The relative density of white-beaked dolphin is estimated at 0 – 0.05 animals/km^2 in the project area [18].
Benthic environment	
Bathymetry and seabed features	Across the areas surveyed around the Don fields, the bathymetry ranged from 156m LAT at East Don and 171m along the Thistle pipeline route. The most prominent features included iceberg ploughmarks that were identified along the Magnus to Dunlin pipeline corridor and at the East Don, West Don and DSW survey areas [4][5][6][7][8][9][10][11][12].
Seabed type	Seabed imagery and video footage taken across the Magnus, Dunlin, Thistle, DSW and West Don site and pipeline survey areas consistently showed similar seabed sediments, comprising predominantly clayey to gravelly sand with occasional gravel and shell fragments, with high reflectivity areas consisting of gravel, cobbles and occasional boulders.
Benthic Fauna	Visible fauna was consistent across the Don fields, and included Annelida, Arthropoda, Bryozoa, Chordata, Cnidaria, Echinodermata, Mollusca and Porifera. Hard substrate sponge communities were observed at most stations; however, they were not present in sufficient densities to constitute OSPAR-listed sponge aggregations. Bioturbation and tracks were evident at some stations at East Don and West Don, and seapens were observed at some stations in very low numbers. It was concluded that the sensitive biotope 'seapens and burrowing megafauna communities' are not present.
Water column	
Plankton	In both the northern and central regions of the North Sea, the phytoplankton community is dominated by dinoflagellates of the genus Ceratium (*fusus*, *furca*, *lineatum*) and diatoms such as *Thalassiosira* spp. and *Chaetoceros* spp. In recent years the dinoflagellate *Alexandrium tamarense* and the diatoms Pseudo-nitzschia

Environmental Receptor	Description
	(known to cause amnesic shellfish poisoning) have been observed in the area [19]. Zooplankton species richness is greater in the northern and central areas of the North Sea, than in the south and displays greater seasonality. Zooplankton in this area is dominated by calanoid copepods, in particular *Calanus* and *Acartia* spp. and Euphausiids and decapod larvae are also important to the zooplankton community in this region [19]. *Calanus finmarchicus* has historically dominated the zooplankton of the North Sea and is used as an indicator of zooplankton abundance. Analysis of data provided by the Continuous Plankton Reader (CPR) surveys in the 10-year period between 1997 and 2007 shows a sharper spring increase in C*. finmarchicus* biomass in May in the NNS compared to more southerly areas. This peak in numbers is 70% greater than seen in the central North Sea and 88% greater than the southern North Sea over the same period [20]. The increase is likely a reflection of the increased availability of nutrients and food (including phytoplankton) in spring. Overall abundance of C. finmarchicus has declined dramatically over the last 60 years, which has been attributed to changes in seawater temperature and salinity [21] [22]. *C. finmarchicus* has largely been replaced by boreal and temperate Atlantic and neritic (coastal water) species in particular, and a relative increase in the populations of Calanus helgolandicus has occurred [23][24][25].
Fish – spawning and nursery grounds	
Spawning grounds	The Don fields decommissioning area is located within the spawning grounds of cod (*Gadus morhua)*, haddock (*Melanogrammus aeglefinus),* Norway pout (*Trisopterus esmarkii),* saithe *(Pollachius virens)* and whiting (*Merlangius merlangus*) [26][27].
Nursery grounds	The following species have nursery grounds near the project: blue whiting (*Micromesistius poutassou)* for which it is a main nursery ground, European hake (*Merluccius merluccius)*, haddock, herring (*Clupea harengus)*, ling (*Molva molva)*, mackerel (*Scomber scombrus)*, Norway pout, spurdog (*Squalus acanthias)*, and whiting [26][27]. Fisheries sensitivity maps indicate that the probability of significant aggregations of juveniles of these species in the offshore project area is low for all species but blue whiting and hake, for which the probability is up to medium in Blocks 211/13 and 211/18 [27].
Probability of 0 age group fish aggregation	Aires *et al.* provides modelled spatial representations of the predicted distribution of 0 age group fish [28]. The modelling indicates the presence of juvenile fish (less than one year old) for multiple species: anglerfish, blue whiting, European hake, haddock, herring, mackerel, horse mackerel, Norway pout, plaice, sprat, and whiting. Across the Don fields decommissioning area the probability of juvenile fish aggregations occurring is very low for most species (<0.2), except for blue whiting and hake for which the probability is up to medium in Block 211/18 [27].
Seabirds	
The following species could be found within the Don fields decommissioning area: European storm-petrel (*Hydrobates pelagicus),* northern gannet (*Morus bassanus)*, great skua (*Stercorarius skua)*, black-legged kittiwake (*Rissa tridactyla)*, great black-backed gull (*Larus marinus)*, common gull (*Larus canus)*, herring gull (*Larus argentatus)*, common guillemot (*Uria aalge)*, little auk (*Alle alle)* and Atlantic puffin (*Fratercula arctica)* [29]. Seabird Oil Sensitivity Index (SOSI) identifies areas at sea where seabirds are likely to be most sensitive to surface pollution [30]. Seabird vulnerability in Block 211/18 is high between November and January, and	

Environmental Receptor	Description
the rest of the year, with no data for May and October [30]. The risk of an oil spill from the proposed operations at the Don field is considered remote and therefore the overall risk to birds is considered negligible.	

Seabird Oil Sensitivity Index

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
211/12	3*	5	4	5	5*	5*	5	5	5*	N	3*	3
211/13	3*	5	5	5	5*	5*	5	5*	N	N	3*	3
211/14	3*	5	4	4	4*	5*	5	5*	N	N	3*	3
211/17	3*	5	5	5*	N	5*	5	5	5*	N	3*	3
211/18	**3***	**5**	**5**	**5***	**N**	**5***	**5**	**5**	**5***	**N**	**3***	**3**
211/19	3*	5	5	5*	N	5*	5	5*	5*	N	3*	3
211/22	5	5	5	5*	N	5*	5	5	4	4*	4*	4
211/23	5	5	5	5*	N	5*	5	5	5	5*	3*	3
211/24	5	5	5	5*	N	5*	5	5	5	5*	3*	3

Key	1 = Extremely high	2 = Very high	3 = High	4 = Medium	5 = Low	N = No data
	* in light of coverage gaps, an indirect assessment of SOSI has been made					

Table 4.2.1: Key environmental receptors for the Don fields

Societal Receptor	Description
Commercial fishing	

The Don fields decommissioning area is in International Council for the Exploration of the Seas (ICES) Rectangles 51F1 [31].

Vessel Monitoring System (VMS) data from 2009-2013 indicates that fishing intensity within Block 211/18 is low for demersal and shellfish species, and medium for pelagic species (mackerel) [32].

In 2018 fishing effort in ICES rectangle 51F1 was highest in April, accounting for 20% of the total number of days fished, followed by the period running from August to October contributing for 42% of fishing effort. In February, May and July the effort was lower, together accounting for 23% of the annual effort. The effort for the rest of the months are disclosive [31]. Trawls were the only used gear in rectangle 51F1 [31].

The five top landed species in rectangle 51F1 in 2018 in terms of weight included saithe, cod, haddock, whiting and ling.

Fisheries landings in ICES rectangle 51F1

Species type	2018		2017		2016		2015		2014	
	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)
Demersal	846	1,381,095	545	824,054	482	709,207	525	724,269	753	948,798
Pelagic	1	637	D	D	<1	12	1,404	830,843	1,314	799,329

Societal Receptor		Description								
Shellfish	1	3,272	<1	1,711	<1	765	3	7,819	<1	220
Total	**848**	**1,385,005**	**545**	**825,765**	**482**	**709,983**	**1,562,931**	**1,933**	**2,067**	**1,748,346**
Other sea users										
Shipping activity	Shipping activity is assessed to be low in Block 211/18 [19] [33].									
Oil and Gas	The Don fields decommissioning area is located in the NNS within an area of extensive oil development. There are numerous oil and gas surface installations within 40km of the project area is described below: **Installation** / **Installation Type** / **Operator** / **Distance & direction** Thistle A / Platform / EnQuest / 11.9km SSE Penguin / FPSO / Shell / 12.9km NNW Magnus / Platform / EnQuest / 20.8km NNW Dunlin A / Platform / Fairfield / 21.6km SSE Eider A / Platform / TAQA / 23.4km WSW Statfjord B / Platform / Equinor / 32.6km SSE Cormorant North / Platform / TAQA / 32.7km SSW Tern / Platform / TAQA / 39.2km WSW									
Tele-communication and power cables	There is one historic power cable running passing 4km south-east from the Don fields, which was owned by OceanWise. Sections of this cable may remain on the seabed. The nearest telecommunications cable is the CANTAT 3 cable, running north-west to south-east direction approximately 60km east of the Don fields, in Norwegian waters [15].									
Military activities	There are no military restrictions on Block 211/18 and known military activity does not take place in this region [34].									
Renewables	There are no renewable energy sites within 100km of the Don fields [15].									
Wrecks	The nearest wreck is located approximately 15km south of the Don fields, in Block 211/18, and is classified as a possible obstruction [15].									

Table 4.2.2: Key societal receptors for the Don fields

4.3 Seabed habitats and benthos

The natural seabed depth across the project area ranges from approximately 156m LAT at the East Don field, to 188m below LAT close to the Magnus platform.

The Don fields decommissioning area has been surveyed on numerous occasions, with this review incorporating surveys conducted between 2007 and 2018. The extent of the geophysical survey effort conducted across the Don fields decommissioning area and the locations of camera stations and transects, environmental grab samples and geotechnical samples are illustrated in Figure 4.1.1.

Seabed imagery and video footage taken across the Magnus, Dunlin, Thistle, DSW and West Don site and pipeline survey areas consistently show similar seabed sediments. These comprise of predominantly clayey to gravelly sand with occasional gravel and shell fragments, with high reflectivity areas consisting of gravel, cobbles and occasional boulders (Figure 4.3.1 and Figure 4.3.2). This

seabed habitat also falls within the area of distribution of the 'offshore subtidal sands and gravels' habitat [15] listed as Priority Marine Feature (PMF) in Scotland [35]. At the West Don and associated pipelines survey area, the seabed habitat was classified under the biotope complex 'offshore circalittoral mixed sediment' (SS.SMX.OMx) [10].

Visible fauna observed in seabed imagery across the surveyed areas included species of the following phyla: Annelida, Arthropoda, Bryozoa, Cnidaria, Echinodermata, Mollusca and Porifera. Soft and hard substrate sponge communities were observed at all transects along the Thistle and Magnus pipelines except at Stations NP1 and MAG5 (Figure 4.1.1), with the majority of sponges observed comprising less than 1% coverage in each image and therefore were not present in sufficient densities to constitute a sponge aggregation [5][7]. At East Don, there were very few sponges and only a few sparsely distributed soft corals [9]. At West Don and associated pipelines, sponges were observed at a number of stations, however they were present in low numbers [10][11]. However, sponges were not present in sufficient densities to constitute sponge aggregations, which are protected under the OSPAR List of Threatened and/or Declining Species and Habitats.

Some seapens were observed across the Thistle pipeline route survey area. Seapens of the order Pennatulacea are listed on the OSPAR list of Threatened and/or Declining Species and Habitats and the habitat [36] seapens and burrowing megafauna is listed as PMF in Scottish waters. OSPAR defines this habitat as plains of fine muds, extending over an area of at least 25m^2 and at water depths ranging from 15m to 200m or more [37]. Furthermore, these areas are defined as being heavily bioturbated by burrowing megafauna with burrows and mounds typically forming a prominent feature of the sediment surface, and which may include conspicuous populations of seapens. A detailed assessment of this habitat was conducted when seapens were observed, using the SACFOR[1] abundance scale [38]. SACFOR is a semi-quantitative abundance scale that was developed to support the observation of marine habitats, communities and species and is widely used in the UK, thus allowing comparing species abundance data.

Across the Thistle and Magnus pipeline survey areas, the abundance of seapens using the SACFOR scale was classed as 'rare' (one seapen observed along Thistle pipeline and five along the Magnus pipeline) [5][7]. Bioturbation was evident at East Don, with occasional faunal burrows and faunal tracks observed on seabed images [9]. At West Don, tracks and bioturbation were observed. However, burrows and mounds did not form a prominent feature, and therefore there was no evidence of the presence of the OSPAR listed habitat seapens and burrowing megafauna communities [10]. At the West Don and associated pipelines survey area, there was no evidence of seapens and no reported burrows [11]. One ocean quahog (*Arctica islandica*), under the OSPAR List of Threatened and/or Declining Species and Habitats, was observed at the East Don site survey [9].

There were no other habitats of conservation importance including Annex I habitats, OSPAR-listed habitats or species [36], PMFs or species listed under the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species [39] or Scottish Biodiversity List [40].

[1] SACFOR stands for 'Super-abundant, Abundant, Common, Frequent, Occasional, Rare, Present'.

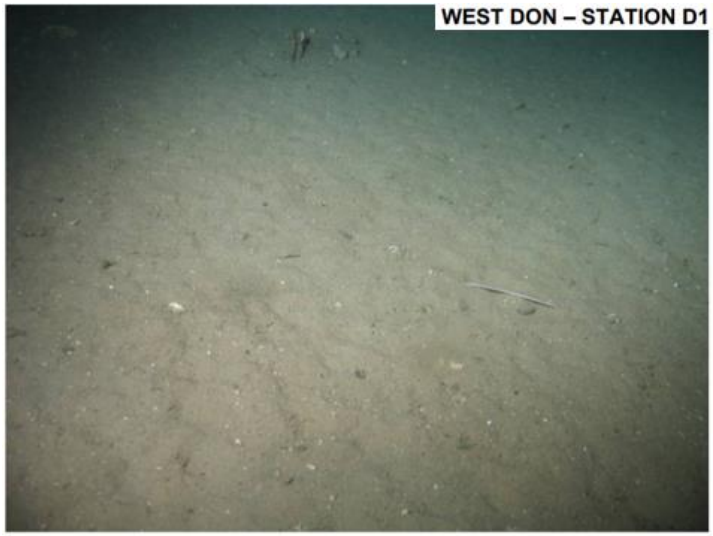


Photo No: 67-9320.4 St1 (5)

Easting: 417 816.6 mE

Northing: 6 818631.7 mN

Sediment Description:

Rippled silty fine sand with a high proportion of shell fragments

Fauna Description:

Tubicolous polychaete (Hyalinoecia tubicola), starfish

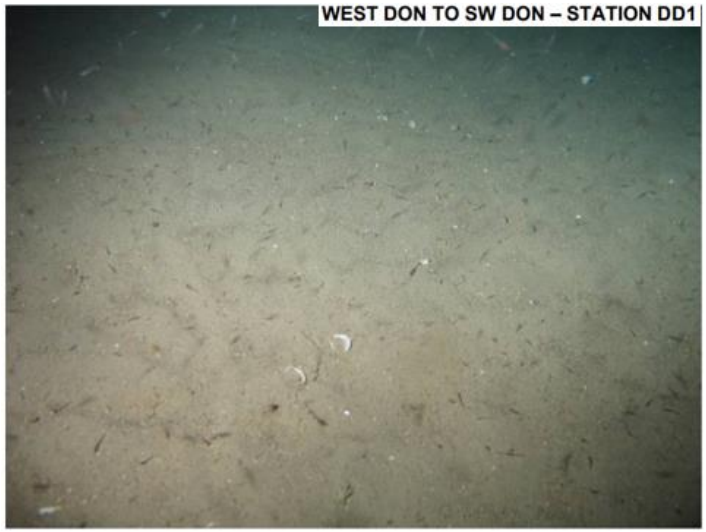


Photo No: 67-9320.4 St1 (2)

Easting: 420 212.7 mE

Northing: 6 816 897.2 mN

Sediment Description:

Rippled silty fine sand with a low proportion of shell fragments

Fauna Description:

Pelagic crustacea (Euphausiacea)

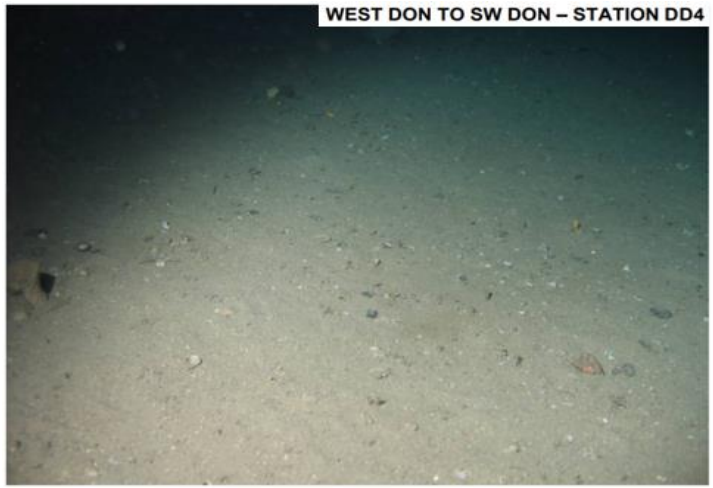


Photo No: 67-9320.5 St4 (5)

Easting: 419 394 mE

Northing: 6 813 306 mN

Sediment Description:

Rippled coarse sand with a low proportion of shell fragments and pebbles

Fauna Description:

Axinellidae?, Porifera, Bryozoa / Hydrozoa

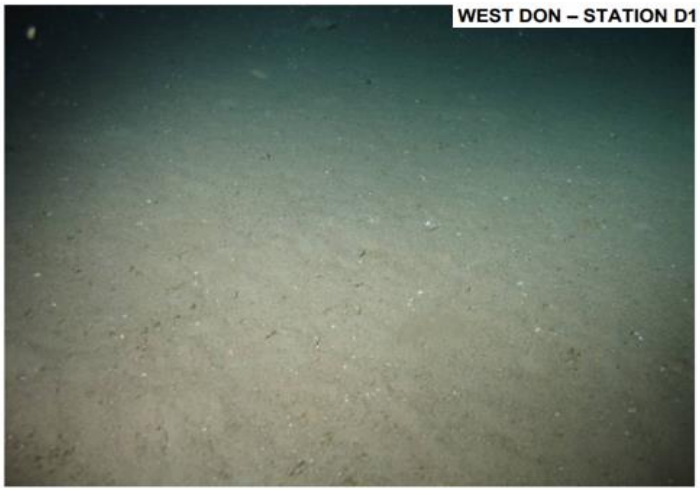


Photo No: 67-9320.2 St1 (1)

Easting: 417 176.5 mE

Northing: 6 821 152.1 mN

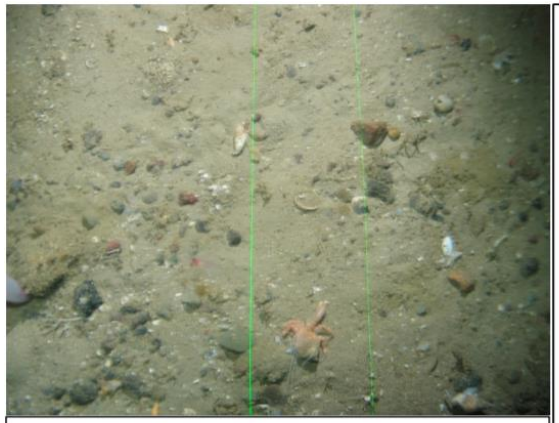
Sediment Description:

Rippled silty fine sand with low proportion of shell fragments

Fauna Description:

No visible fauna

Figure 4.3.1: Seabed photograph examples from the West Don to DSW pipeline survey [11]



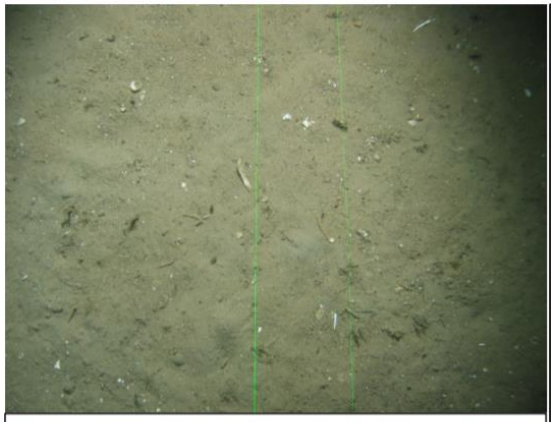
Fix: 254 **E:** 419465 **N:** 6813285 **Depth:** 168m

Station: DT4a
Sediment Description:
Fix240: Gravelly sand with shell fragments

Fix254: Gravelly sand with cobbles, pebbles and shell fragments

Fauna Description:
Fix240: Cnidaria (Scleractinia)

Fix254: Arthropoda (Pagiuroidea), Mollusca (*Buccinidae* sp.), Chordata (Ascidiacea), Porifera



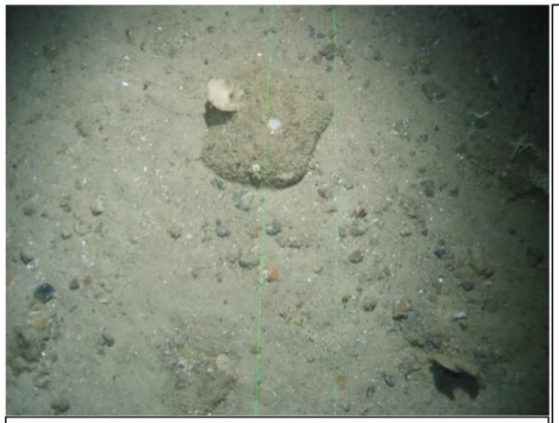
Fix: 421 **E:** 423413 **N:** 6804525 **Depth:** 162m

Station: NP1
Sediment Description:
Fix397: Gravelly sand with shell fragments

Fix421: Gravelly sand with shell fragments

Fauna Description:
Fix397: Annelida (Polychaeta tube), Cnidaria (Hydrozoa, Scleractinia)

Fix421: Annelida (Polychaeta tube), Mollusca (Scaphopoda), Cnidaria (Hydrozoa)



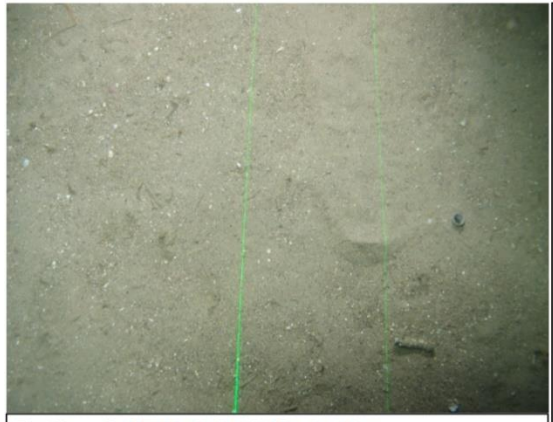
Fix: 236 **E:** 412473 **N:** 6830873 **Depth:** 179m

Station: MAG10
Sediment Description:
Fix216: Gravelly sand with pebbles and shell fragments

Fix236: Gravelly sand with cobbles, pebbles and shell fragments

Fauna Description:
Fix216: No visible fauna

Fix236: Annelida (*Ditrupa* sp.), Bryozoa, Chordata (Pleuronectiformes), Porifera (*Axinella infundibuliformis*)



Fix: 26 **E:** 417777 **N:** 6814638 **Depth:** 170m

Station: MAG1
Sediment Description:
Fix14: Gravelly sand with shell fragments

Fix26: Gravelly sand with shell fragments

Fauna Description:
Fix14: Annelida (Polychaeta tube)

Fix26: Annelida (Polychaeta tube), Cnidaria (*Virgularia* sp.)

Figure 4.3.2: Seabed photograph from the Thistle and Magnus pipeline route surveys [12][7]

4.4 Other sea users

4.4.1 Maritime activities

The North Sea contains some of the world's busiest shipping routes, with significant traffic generated by vessels trading between ports at either side of the North Sea and the Baltic. North Sea oil and gas fields also generate moderate vessel traffic in the form of support vessels [19]. Shipping activity is assessed to be low in Block 211/18 [33][19]. Figure 4.4.1 below illustrates the relative vessel activity surrounding the Don fields decommissioning area.

In average, there are up to 5 vessel transits per week pass within Block 211/18 [41]. Vessels that pass within the vicinity of the project area include cargos, non-port service crafts tankers, passenger vessels and fishing vessels (Figure 4.4.1).

There are no renewable energy sites within 100km of the Don fields [15].

There are no military restrictions on Block 211/18 and military activity does not generally take place in this region [34].

There is one historic power cable running passing through the DSW field which was owned by OceanWise. Sections of this cable may remain on the seabed. The nearest telecommunications cable is the CANTAT 3 cable, running north-west to south-east direction approximately 60km east of the Don fields, in Norwegian waters [15].

The nearest wreck is located approximately 15km south of the Don fields, in Block 211/18, and classified as a possible obstruction [15].

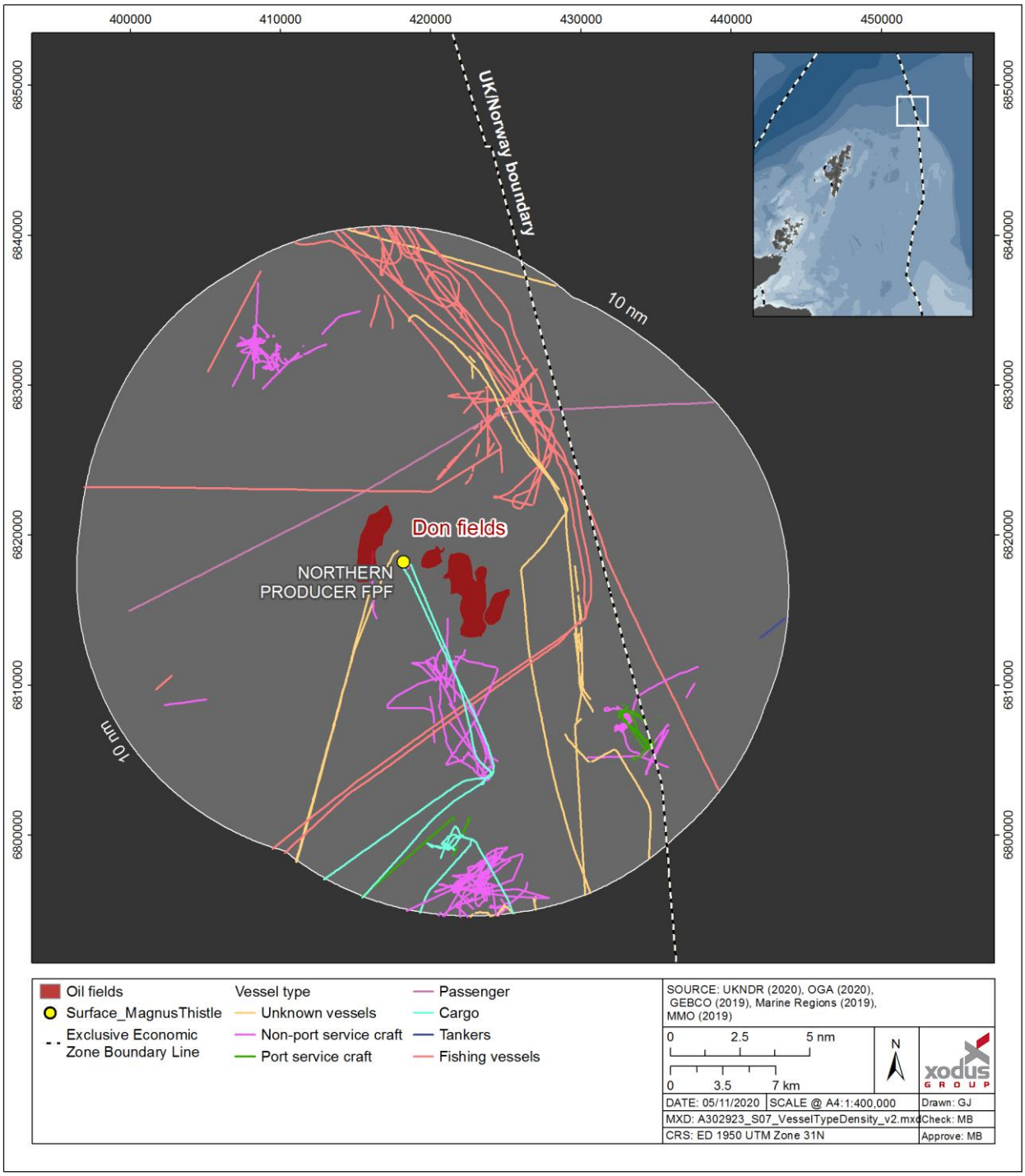


Figure 4.4.1: Vessel activity around the Don fields from July 2016 - June 2017 [41]

4.4.2 Commercial fisheries

The Don fields decommissioning area is in International Council for the Exploration of the Seas (ICES) Rectangle 51F1 [31].

The ICES Rectangle 51F1 is predominantly targeted for demersal fish, with demersal fisheries landing 99% of the total value and weight of fish landed in this area in 2018 (Table 4.4.1). The

five top landed species in rectangle 51F1 in 2018 in terms of weight included saithe, cod, haddock, whiting and ling.

Before 2016 however, pelagic fisheries were relatively important in this area, representing 53% of the value and 73% of the weight of fish landed Rectangle 51F1 in 2015, with demersal fisheries presenting 46% of the total value and 27% if the total weight that year. In 2014, pelagic fisheries also accounted for a large part of landings, representing 46% of the value (after demersal fisheries) and 64% of the weight (before demersal fisheries), as shown in Table 4.4.1.

Vessel Monitoring System (VMS) data from 2009-2013 indicates that fishing intensity within Block 211/18 is low for demersal and shellfish species, and medium for pelagic species (mackerel) [32]. However, landings value and weight for Rectangle 51F1 in 2018 were low for pelagic fish in comparison to other areas in the NNS, and moderate for demersal fish in comparison to the adjacent ICES Rectangles located west and south.

In 2018 fishing effort in ICES rectangle 51F1 was highest in April, accounting for 20% of the total number of days fished, followed by the period running from August to October contributing for 42% of fishing effort. In February, May and July the effort was lower, together accounting for 23% of the annual effort. The effort data for the rest of the months are disclosive [31].

Trawls were the only used gear in rectangle 51F1 [31].

Species type	2018		2017		2016		2015		2014	
	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)	Live weight (Te)	Value (£)
Demersal	846	1,381,095	545	824,054	482	709,207	525	724,269	753	948,798
Pelagic	1	637	D	D	<1	12	1,404	830,843	1,314	799,329
Shellfish	1	3,272	<1	1,711	<1	765	3	7,819	<1	220
Total	**848**	**1,385,005**	**545**	**825,765**	**482**	**709,983**	**1,933**	**1,562,931**	**2,067**	**1,748,346**

Table 4.4.1: Commercial fisheries landings in ICES Rectangle 51F1 in 2014 – 2018 [31]

4.5 Sites and species of conservation importance

4.5.1 Offshore conservation

There are no protected areas within 40km of the Don fields decommissioning area; the closest of which is the North-East Faroe-Shetland Channel NCMPA, located approximately 92km north-west [15]. It is protected for deep-sea sponge aggregations, offshore deep-sea muds, offshore subtidal sands and gravels, the continental slope features and for a wide range of features representative of the West Shetland Margin Palaeo-depositional, Miller Slide and Pilot Whale Diapirs Key Geodiversity Areas.

4.5.2 Onshore conservation

The Don fields decommissioning area is located approximately 137km from the north-east coast of Shetland as shown on Figure 4.5.1. The closest onshore conservation site is the Hermaness, Saxa Vord and Valla Field SPA, located approximately 140km south-west [15]. Due to this distance, there will not be interactions with onshore conservation sites from operations taking place within the Don fields decommissioning area.

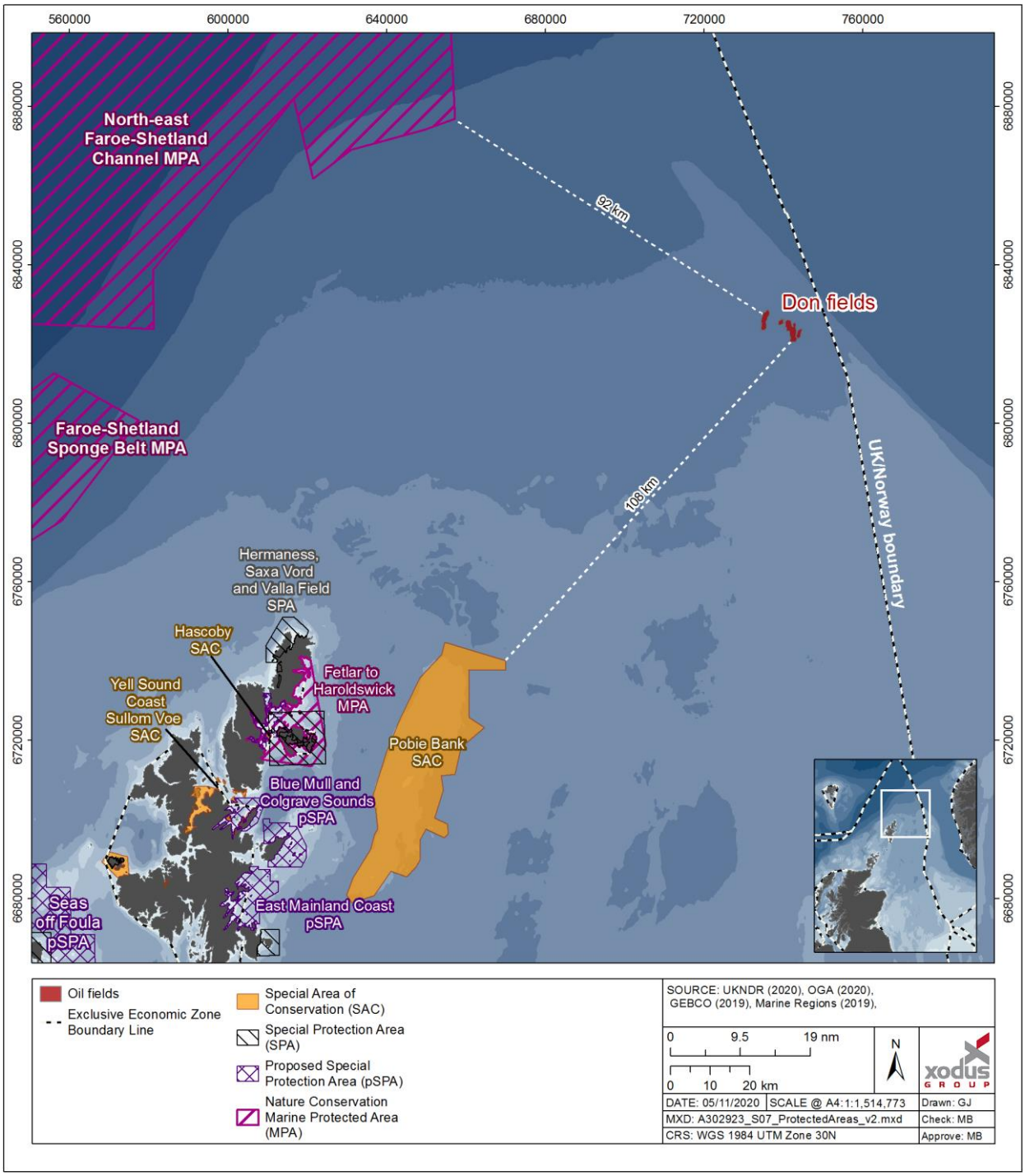


Figure 4.5.1: Protected sites around the Don fields decommissioning area

4.5.3 Protected species

Four species listed under Annex II of the EU Habitats Directive are found in UK waters; harbour porpoise, bottlenose dolphin, grey seal, and harbour seal. Grey and harbour seals are unlikely to be observed near the Don fields decommissioning area with any regularity, as both species have very low densities (see Section 4.2). Harbour porpoise and minke whale are the two Annex II

species which could be present near the Don fields decommissioning area.

All species of cetacean recorded within the proposed operations area are listed as European Protected Species. Other marine species listed as EPSs include turtles and sturgeon (*Acipenser sturio*), which are not likely to be present within this area of the North Sea.

Sponges (Porifera) were observed at most stations across the survey areas at the Don fields, however their abundance was relatively low and no sponge aggregations were evident from seabed images (Section 4.3).

No ocean quahogs were observed during the surveys at the Don fields (Section 4.3). However, the area of distribution of ocean quahog is relatively wide in the North Sea [42] [43] and individuals may be found across the Don fields. This species is listed as PMF in Scottish waters [35] and is on the OSPAR List of Threatened and/or Declining Species [36]. Ocean quahog is may be present in low abundance near the Don field decommissioning area.

4.5.4 National Marine Plan

In addition to adhering to the suite of marine policies, regulations, and guidance for the offshore oil and gas industry, this project considers the objectives set by the Scottish National Marine Plan (NMP). The NMP covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). The aim of the NMP is to help ensure the sustainable development of the marine area through informing and guiding regulation, management, use and protection of the Marine Plan areas. The proposed operations described in this EA have been assessed against the NMP's objectives and policies, specifically GEN 1, 4, 5, 9, 12, 14 and 21.

The proposed operations do not contradict any of the NMP's objectives and policies, including those identified as of particular relevance to the project, and EnQuest will ensure compliance with all new policies which are introduced during the proposed activities. The following sections describe the aims of each policy and how EnQuest's commitments will achieve them.

4.5.4.1 GEN 1 – General planning and principle

Development and use of the marine area should be consistent with the NMP, ensuring activities are undertaken in a sustainable manner that protects and enhances Scotland's natural and historic marine environment. EnQuest will ensure that any potential impacts associated with the Don fields decommissioning operations will be kept to a minimum.

4.5.4.2 GEN 4 – Co-existence

Where conflict over space or resource exists or arises, marine planning should encourage initiatives between sectors to resolve conflict and take account of agreements where this is applicable. EnQuest will ensure that any potential impacts on other sea users associated with the proposed Don fields decommissioning operations will be kept to a minimum.

4.5.4.3 GEN 5 – Climate change

Marine planners and decision makers should seek to facilitate a transition to a low carbon economy. They should consider ways to reduce emissions of carbon and other greenhouse gasses. EnQuest will ensure that any potential impacts associated with Don fields decommissioning operations will be kept to a minimum.

4.5.4.4 GEN 9 – Natural heritage

Development and use of the marine environment must:

- Comply with legal requirements for protected areas and protected species.
- Not result in significant impact on the national status of PMF.

- Protect and, where appropriate, enhance the health of the marine area.

EnQuest will ensure that any potential impacts to protected species and sites associated with Don fields decommissioning operations will be kept to a minimum.

4.5.4.5 GEN 12 – Water quality and resource

Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives that apply. EnQuest will ensure that any potential impacts to water quality associated with Don fields decommissioning operations will be kept to a minimum.

4.5.4.6 GEN 14 – Air quality

Development and use of the marine environment should not result in the deterioration of air quality and should not breach any statutory air quality limits. Some development and use may result in increased emissions to air, including particulate matter and gasses. Impacts on relevant statutory air quality limits must be taken into account and mitigation measures adopted, if necessary, to allow an activity to proceed within these limits. EnQuest will ensure that any potential impacts to air quality with Don fields decommissioning operations will be kept to a minimum.

4.5.4.7 GEN 21 – Cumulative impacts

Cumulative impacts affecting the ecosystem of the marine plan area should be addressed in decision making and plan implementation. EnQuest will ensure that any potential impacts to air and water quality and biological communities with Don fields decommissioning operations will be kept to a minimum.

5. IMPACT ASSESSMENT SCREENING AND JUSTIFICATION

5.1 Assessment of potential impacts

The screening of potential environmental impacts from the decommissioning of the Don fields area for further assessment in Section 6 is provided below, including summarised rationales for the screening outcomes.

Potential impact	Emissions to air	Further assessment?	No
Rationale			
Emissions during decommissioning activities, (largely comprising fuel combustion gases) will occur in the context of the CoP. As such, emissions generated by infrastructure, equipment and vessels associated with operation of the Don fields assets will be replaced by those from vessels and equipment required for decommissioning activities, as well as the recycling of decommissioned materials. Assessment of impacts from onshore energy use and atmospheric emissions for well decommissioning activities will be included in license applications for appropriate onshore disposal facilities. Review of available decommissioning EAs shows conclusively that atmospheric emissions in highly dispersive offshore environments do not present significant impacts and are extremely small in the context of UKCS and global emissions. Most submissions also note that emissions from short-term decommissioning activities are trivial compared to those previously arising from the asset over its operational life. The majority of atmospheric emissions for the Don fields decommissioning project relate to vessel time or are associated with the recycling of material returned to shore. The estimated total CO_2 emissions to be generated by the selected decommissioning option activities is 37,075Te, of which 27,596Te is related to vessel emissions. This equates to 0.48% of the total annual UKCS vessel emissions (excluding fishing vessels) when considering 2017 data (7,800,000Te [44]). The remaining 9,479Te CO_2 will be generated through the life cycle of the project materials; those recovered and not reused or left *in situ*. The CO_2 emissions total has been calculated assuming an anticipated maximum of 2,237 days of operational vessel activity for the duration of the project. This is split across multiple vessel types (including, but not limited to: a DSV/CSV, anchor handling vessel, fishing vessel for the over-trawl survey, supply vessels, Emergency Response and Rescue Vessel (ERRV) and guard vessel). This is a worst-case estimate of vessel days based on ample over-trawling, which is not expected to be required. Reviewing historical EU Emissions Trading Scheme data and comparison with the likely emissions from the proposed work suggests that emissions relating to decommissioning will be relatively small in comparison to those generated during production. For example, estimated CO_2 emissions from the project are 61% of the emissions from Northern Producer in 2018. Atmospheric emissions in highly dispersive offshore environments do not present significant impacts and are extremely small in the context of UKCS and global emissions. Furthermore, emissions from short-term decommissioning activities are small compared to those previously arising from the asset over its operational life. Considering the above, atmospheric emissions do not warrant further assessment.			

Table 5.1.1: Atmospheric emissions impact assessment screening

Potential impact	Seabed disturbance	Further assessment?	Yes
Rationale			
There is potential for decommissioning and legacy activities to generate disturbance to the seabed; these include activities associated with the pipeline, flowline and umbilical decommissioning activities of the Don fields, as well as any associated remediation post-decommissioning, including over-trawling. Seabed impacts may range in duration from short-term impacts, such as temporary sediment suspension or smothering, to permanent impacts, such as the introduction of new substrate or any consequential habitat or community level changes which may transpire. Additionally, seabed disturbance from the removal of infrastructure and deposition of protection material has the potential to modify the habitat in a way which might impact upon other sea users which used the seabed. Post-decommissioning, the clear seabed will be validated by an independent verification survey over the installation sites and pipeline corridors. The methods used will be discussed and finalised with OPRED. Non-intrusive verification techniques will be considered in the first instance, but where these are deemed inconclusive by the SFF, seabed clearance is likely to require conventional over-trawl survey methods. Field debris items are anticipated to be located on the surface of the seafloor, or partially buried by surface sediments, and will be recovered with minimal intervention (e.g. using an ROV). The area of potential impact will be superficial, temporary, and largely limited to the dimensions of the debris item being retrieved, which will be determined during the Seabed Clearance Verification survey. As such, seabed disturbance associated with field debris items is considered negligible and has thus been screened out of further assessment. Impacts to the seabed from project activities have been assessed further in Section 6.1, whilst impacts to commercial fisheries generated by seabed disturbance are assessed in Section 6.2.			

Table 5.1.2: Seabed impact assessment screening

Potential impact	Physical presence of vessels in relation to other sea users	Further assessment?	No
Rationale			
The presence of a small number of vessels for decommissioning activities will be short-term in the context of the life of the area and assets. Activity will occur using similar vessels to those currently deployed for oil and gas installation, operation, and decommissioning activities. The vessels required will also generally be within the existing 500m exclusion zones. The decommissioning of the Don fields will reduce the number of vessels occupying the area long-term and will increase access to commercial fishing grounds by removing the existing exclusion zone. For the Don fields decommissioning (Phase 2), vessel use will comprise the intermittent employment of a DSV (37 days), CSV (36 days), four anchor handling vessels (25 days combined), a Survey vessel (5 days), Fishing vessel (over-trawl survey, 10 days) and supply vessels for the limited period the ERRV (112 days) remains on-station (assumed one visit per week). During Phase 2, vessel use will comprise the deployment of a CSV (52 days), Survey vessel (5 days). Fishing vessel (over-trawl survey, 12 days) and supply vessels for the limited period the ERRV (76 days) remains on-station (assumed one visit per week). As a contingency (if required) in between the two phases, a guard vessel will be on site, generating a total of 1,825 days of vessel activity associated with the decommissioning activities. Other sea users will be notified in advance of planned activities through the appropriate mechanisms,			

Potential impact	Physical presence of vessels in relation to other sea users	Further assessment?	No
Rationale			
meaning those stakeholders will have time to make any necessary alternative arrangements during the finite period of operations. Although the decommissioning of the Don fields infrastructure is estimated to require various vessels depending on the selected method of removal, these would not all be on location at the same time. In consideration of the duration and location of vessel presence in conjunction with employment of standard practices, as well as the long-term decrease in vessel presence post-decommissioning, the short-term presence of vessels does not require further assessment.			

Table 5.1.3: Other sea users impact assessment screening (1 of 2)

Potential impact	Physical presence of infrastructure decommissioned *in situ* in relation to other sea users	Further assessment?	Yes
Rationale			
All subsea installations, surface-laid pipelines, pipe spools, surface jumpers and exposed concrete mattresses and grout bags will be fully removed from the area. All pipelines assessed as part of the comparative assessment (laid in trenches or buried under deposited rock) will be decommissioned *in situ* in addition to concrete mattresses buried under deposited rock. Pipeline crossings over the Don pipelines that are out of use will also be left undisturbed. Trenched and buried rigid flowlines will have the ends cut and lifted, with remediation where necessary. Depth of Burial (DoB) surveys have confirmed the integrity of these flowlines in groups 1 & 2 as good with no exposures. However, the DoB survey of group 3 flowlines identified poor depth coverage with multiple exposures. Any pipeline being left *in situ* would be subject to at least three legacy burial surveys (see depth of burial (DoB) profiles in Appendix E). Long-term degradation may compromise the integrity of the buried flowlines and introduce free spans which pose a potential snagging hazard to commercial fisheries which use the seabed. Future monitoring work will ensure the integrity of the DoB of these structures, but further consideration of the proposed activities is necessary. For the exposures found at Group 3, as long as pipelines remain exposed rather than become reportable spans this would be acceptable from the snagging risk perspective. There is currently a low incidence of fishing activity in the area. The base position is to remove all uncovered mattresses if safe to do so, including the potentially unrecoverable (these are the older types which are known to potentially have no or reduced integrity). Should difficulties be encountered which would make it disproportionately problematic to remove any particular mattress, EnQuest will open a dialogue with OPRED to agree an alternative decommissioning approach. Where it is deemed unsafe to recover mattresses, they may be decommissioned *in situ* in agreement with OPRED and made safe for trawling using profiled rock placement to mitigate potential snagging hazards. Alternative strategies to the base position for the decommissioning of mattresses shall be discussed with OPRED prior to execution to gain confirmation of the alternative decommissioning approach. These activities will be covered by the requisite permitting. Post-decommissioning, the clear seabed will be validated by an independent verification survey over the installation sites and pipeline corridors. The methods used will be discussed and finalised with OPRED. Non-intrusive verification techniques will be considered in the first instance, but where these are deemed inconclusive by the SFF, seabed clearance is likely to require conventional over-trawl			

Potential impact	Physical presence of infrastructure decommissioned *in situ* in relation to other sea users	Further assessment?	Yes
Rationale			
survey methods. Further assessment related to potential snagging risks associated with the decommissioning of infrastructure *in situ* is provided in Section 6.2.			

Table 5.1.4: Other sea users impact assessment screening (2 of 2)

Potential impact	Water Quality	Further assessment?	No
Rationale			
All the decommissioning activities in the area will take place after the cleaning and flushing of its relevant infrastructure. Any permit applications required for work associated with pipeline pigging and flushing operations, will be submitted to the regulator as required. The wells are out with the scope of this EA and will be P&A, covered by their own permitting regime. Vessel discharges are managed through existing, International Convention for the Prevention of Pollution from Ships (MARPOL) compliant controls, including bilge management procedures and good operating practices. Post-flushing and/or water jetting, residual liquids present during the decommissioning of pipelines and subsea installations will be treated before being discharged to sea, such that the discharge will comprise treated water. Any residual remaining material will be in trace levels/volumes following the pigging and flushing regime and will not pose any significant risk to water quality. All residual solids will be shipped to shore for disposal. The long-term degradation of the pipelines and umbilicals to be decommissioned *in situ* will lead to the release of very small amounts of chemical residues. These chemical releases will remain in trace levels/volumes and will not pose any significant risk to water quality. Considering all of above and the fact that there is no requirement for drill cuttings removal during these decommissioning activities water quality does not require further assessment.			

Table 5.1.5: Water quality impact assessment screening

Potential impact	Underwater noise	Further assessment?	No
Rationale			
Vessel presence will be limited in scale (i.e. the size and number of vessels) and duration and, therefore, does not constitute a significant or prolonged increase in noise emissions across the project area. To remove the subsea installations, the cutting of flowlines will likely be done with diamond wire cutting equipment; however, noise associated with this activity will be temporary and generated very close to the seabed, where absorption rates are highest. Geophysical surveys undertaken for post-decommissioned infrastructure left *in situ* will be assessed through the process of permit application. Multibeam echosounder survey equipment is likely to be used for imaging and identification of pipeline exposures. The Joint Nature Conservation Committee (JNCC) Guidelines will be employed for mitigation of identified noise impacts to marine mammals for future survey work involving seismic survey equipment [45]. All other noise generating activities associated with the decommissioning of the area are considered negligible in the context of ambient noise levels and are likely to be masked by vessel activities related to the Project and within the wider region. None of the activities associated with the decommissioning of the area are considered to generate significant noise levels which may cause injury or significant disturbance to marine species. The project is not located within a marine mammal protection area and EAs for offshore oil and gas decommissioning projects generally show no potential injury or significant disturbance associated with the non-survey decommissioning activities covered within the project scope. On this basis, underwater noise does not require further assessment.			

Table 5.1.6: Underwater noise impact assessment screening

Potential impact	Resource Use	Further assessment?	No
Rationale			
Generally, resource use from decommissioning activities requires limited raw materials and will be largely associated with vessel fuel use. Use of fuel resources is not typically an issue of concern in offshore oil and gas, which generates fuels. Regardless, EnQuest has committed to minimise fuel use throughout the decommissioning campaign where it is possible and safe to do so. In line with the BEIS Guidance [1], energy use was considered during the CA process and the options identified reflect the best possible outcomes for a variety of technical, environmental and safety and risk considerations. The estimated total energy usage for the project is 522,847GJ, of which 378,196GJ are associated with lifecycle energy use. The vast majority of energy use comes from the removal of mattresses and grout bags, as required by OSPAR Decision 98/3. The worst-case estimate of energy use assumes offshore vessels and this accounts for over 72.3% of the total lifecycle emissions. However, every attempt will be made to recycle or reuse the concrete in recovered mattresses. Methods for recycling or reuse of the mattresses will be agreed upon with the relevant regulators following their recovery. When the worst-case estimate from the disposal of all stabilisation materials is discounted from the energy use calculations, the lifecycle energy use is reduced to 512,317GJ. It is likely that actual energy use will fall closer to this figure, as the base case is to reuse the stabilisation materials. The energy use anticipated for the decommissioning of the area is considered minor compared to the resources generated during its production phase. Considering all of the above, resource use does not warrant further assessment.			

Table 5.1.7: Energy use impact assessment screening

Potential impact	Onshore Activities	Further assessment?	No
Rationale			
The OPRED Guidance states that onshore activities are not in scope of Decommissioning EAs, and this topic does not require further assessment. It should be noted that, only licenced contractors which can demonstrate they are capable of handling and processing the material to be brought ashore will be considered for onshore activities and this will form an integral part of the commercial tendering process.			

Table 5.1.8: Onshore impact assessment screening

Potential impact	Waste	Further assessment?	No
Rationale			
Waste will be dealt with in accordance with the EU Waste Framework Directive (Directive 2008/98) and will be segregated to shore in an auditable manner through licenced waste contractors. The Waste Framework Directive is compliant with relevant regulations relating to the handling of waste offshore, transfer of controlled, hazardous, and special waste, and transfrontier shipment of waste. The EnQuest Waste Framework Directive is also guided by EnQuest's HSE&A Policy and commitments to best practice in waste management. This includes the mapping and documenting of waste management arrangements for each phase of the Decommissioning scopes with individual Active Waste Management Plans (AWMPs) and ongoing monitoring of waste procedures and performance review against target Key Performance Indicators (KPIs). Wastes will be treated using the principles of the waste hierarchy, focusing on the reuse and recycling of wastes where possible. Raw materials will be returned to shore with the expectation to recycle much of the returned material. There may be instances where infrastructure returned to shore is contaminated (e.g. by Naturally Occurring Radioactive Material (NORM), hazardous, and/or special wastes) and cannot be recycled. In these instances, the materials will require disposal. However, the weight and/or volume of such material is not expected to result in substantial landfill use. On this basis, no further assessment of waste is necessary.			

Table 5.1.9: Waste generation impact assessment screening

Potential impact	Unplanned Events	Further assessment?	No
Rationale			
As the decommissioning activities will be taking place after well P&A and pipeline flushing, well blowout and pipeline blowout scenarios have been ruled out as a possibility and any unplanned events during the decommissioning activities will be limited to vessel-related losses. The CSV to be used for removing rigid pipelines, large installations, and subsea installations is expected to have the largest fuel inventory of the vessels involved in the decommissioning activities. However, the inventory is expected to be less than the worst-case diesel loss of containment modelled and assessed in the Northern North Sea Regional Offshore Oil Pollution Emergency Plan (OPEP), which considered the full diesel inventory of a Non-Production Installation (NPI), in addition to well blowout and pipeline loss of containment scenarios [46]. The OPEP considered an instantaneous release of the full diesel inventory in the Don area of an NPI of approx. 3,000m^3, as well as crude releases of 18,865 m^3 from a well blowout scenario in the Don area and 114,589.53 m^3 from a Ninian pipeline installation release scenario [46]. These losses are expected to be greater than any instantaneous release from any large vessel proposed for decommissioning activities, such as the CSV employed during flexible and riser recovery. Moreover, the decommissioning			

Potential impact	Unplanned Events	Further assessment?	No
Rationale			
vessels are expected to have their fuel inventories split between several separate tanks, further reducing the potential for an instantaneous release of the full vessel inventory. The results of the dispersion modelling of the diesel release indicate that there is 10-20% probability that crude oil would cross the UK/Norway transboundary line after approximately 6 hours throughout the year. However, results indicate there was no shoreline oiling predicated of this diesel release to the Norwegian coastline [46]. Impacts from unplanned events associated with decommissioning vessel activities will be less than the loss of containment scenarios previously assessed and mitigated against within the existing OPEP [46]. However, management, response and control procedures will align with those detailed in the OPEP. Any spills from vessels in transit and outside the 500m exclusion zone are covered by separate Shipboard Oil Pollution Emergency Plans (SOPEPs). EnQuest will support response of any vessel-based loss of fuel containment through the vessel owner's SOPEP [46]. In addition to the mitigation measures outlined in the OPEP, EnQuest maintains manned bridges, navigational aids, and monitoring of exclusion zones (e.g. with Navaid's, or other technology). Considering the above, the potential impacts from accidental chemical/ hydrocarbon releases during decommissioning activities do not warrant further assessment. As the method for the removal of subsea installations and surface laid ends of pipelines and return to shore has not been defined in detail, there exists the remote possibility that during transport of those materials, elements may dislodge and drop from the transport vessel. However, all subsea installations are considered sound and no issues regarding their integrity have been identified. Dropped object procedures are industry-standard. All unplanned losses in the marine environment will be attempted to be remediated, and notifications to other mariners will be sent out. Seabed clearance verification surveys will aid in the identification of any dropped objects or debris in the decommissioning area. In line with the mitigation measures in place, unplanned loss of materials to the sea do not require further assessment. Risk of vessel collision during the scope of work will be mitigated by way of a Collision risk management plan which will be developed and implemented. The risk of vessel collision is low given location in an area of low to very low activity. In line with the mitigation measures in place, risk of collision does not require further assessment.			

Table 5.1.10: Unplanned events impact assessment screening

5.2 Aspects taken forward for further assessment

Based on the initial screening provided in Section 5.1, the following potential environmental and societal impacts have been identified as requiring further assessment within the EA:

- Seabed impacts; and
- Commercial fisheries.

These potential impacts are addressed in detail within Section 6.

5.3 Proposed mitigation and existing controls

To ensure that impacts remain as described above, EnQuest will follow routine environmental management activities, for example appropriate project planning, contractor management, vessel audits, activity permitting and legal requirements to report discharges and emissions, such that the environmental and societal impact of the decommissioning activities will be minimised. The activities associated with the decommissioning of the Don fields assets are not likely to result in significant impacts to the environment or other sea users, including fishing or seabed communities, if appropriate mitigation and control measures are effectively applied.

EnQuest will ensure that lessons learnt from previous decommissioning scopes will be reviewed and implemented as appropriate to all aspects of the Don fields DP. A summary of the proposed control and mitigation measures is shown below.

General and Existing
• Vessels will be managed in accordance with EnQuest's existing marine procedures; • All contracted vessels will have a ship-board oil pollution emergency plan (SOPEP) in place; • A Collision Risk Management Plan will be developed and implemented; • Agreed arrangements in place with oil spill response organisation for mobilising resources in event of a spill; • Existing field OPEP in place to reduce the likelihood of hydrocarbon release and define spill response in place; • Lifting operations will be planned to manage the risk; • Recovery of any dropped objects will take place; • Vessel contactors will have procedures for fuel bunkering that meet EnQuest's standard; • Where practicable, re-fuelling will take place during daylight hours only. The vessels' work programme will be optimised to minimise vessel use where possible. • All vessels will comply with standard marking conditions and consent to locate conditions; • If required, a specific SIMOPS plan for vessel activity in the field will be put in place, noting that a standard DSV SIMOPS Guideline already exists for the asset; • Small quantities of rock may be required where exposed pipeline ends remain after severance at existing deposited rock; • A seabed clearance certificate will be issued if an over-trawl survey is carried out, otherwise survey findings will be described in the close out report; • All pipeline routes and installation sites will be the subject of field debris clearance and as-left verification surveys when operations have concluded in order to locate obstructions and to localise (and minimise) any post-decommissioning over-trawl surveys that will be required; • The infrastructure is currently shown on Admiralty Charts and the FishSAFE system. When decommissioning activity has been competed, updated information will be made available to update Admiralty Charts and FishSAFE system; and • The licence holders recognise their commitment to undertake post-decommissioning monitoring of infrastructure left in situ. After the post-decommissioning survey reports have been submitted to OPRED and reviewed, a post-decommissioning monitoring survey regime, scope, and frequency, will be agreed with OPRED.

Large-scale Releases to Sea
• Post-flushing water will be cleaned before it is discharged to sea in accordance with Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 controls, including MARPOL-compliant bilge management procedures and good operating practices; • All solid waste will be skipped and shipped to shore for disposal, rather than being discharged at sea; and • Risk of full inventory loss from a vessel is very low given that most vessels have multiple, separated fuel tanks, making full contaminant loss highly unlikely and the distance from shore would prevent any significant volume of diesel reaching any shoreline. Any potential diesel fuel spillages resulting from unplanned collisions will be minimised by approved OPEP/SOPEP, in which risks associated with the decommissioning activities have been appropriately assessed and planned for.

Atmospheric Emissions & Energy Use
• Time vessels spend in the field will be optimised, with a SIMOPS plan in place; and • Reuse or recycling of materials will be the preferential option.

Waste Management
• All waste will be managed in accordance with the Waste Management Plan, including any marine growth waste, or NORM identified during flushing and cleaning of subsea installations; • The Waste Management Plan will involve the use of a waste inventory, and all residual wastes being shipped to shore for processing; • Onshore treatment will take place at waste management site with appropriate permits and licenses; and • UK waste disposal sites will be used where practicable.

Seabed disturbance
• Activities which may lead to seabed disturbance planned, managed, and implemented in such a way that disturbance is minimised. A Marine License will be in place for any planned operational disturbance; • The excavated areas will be mechanically backfilled. Remedial seabed levelling may be required along sections of pipeline corridors; and • Debris survey will be undertaken on completion of the activities and where possible resultant debris will be recovered.

6. IMPACT ASSESSMENT

6.1 Seabed impact assessment

The impact of the Don fields decommissioning activities on seabed receptors is discussed in this section, along with measures proposed to minimise the scale and duration of any potential impacts.

6.1.1 Approach

There are two seabed impact pathways associated with the decommissioning operations: direct and indirect disturbance.

Direct disturbance is considered the physical disturbance of seabed sediments and habitats. Direct disturbance has the potential to cause temporary or permanent changes to the marine environment, depending upon the nature of the associated activity. Activities which contribute to the direct disturbance impact pathway include the removal of infrastructure and the remediation of snagging hazards, either from over-trawling or placement of rock on the seabed.

The total area of seabed expected to be impacted by direct physical disturbance has been calculated by adding together the individual areas of physical disturbance estimated for each activity. The expected duration of the direct disturbance has been provided.

The second impact mechanism, indirect disturbance, occurs outside of the direct disturbance footprint. It may be caused by the suspension and re-settlement of natural seabed sediments disturbed during pipeline and umbilical removal activities and during over-trawling. This secondary impact pathway is considered temporary, based on the definitions provided in Section 4.

6.1.2 Sources of potential impacts

The following activities have been identified as potential sources of seabed impact:

- Pipeline and umbilical decommissioning:
  - Removal of surface laid pipelines, umbilicals, jumpers and pipespools;
  - Removal of cut ends of flowlines and remediation.
- Decommissioning of subsea installations and structures:
  - Riser bases and protection structures within the Thistle 500m safety zone;
  - Wellhead protection structures at DSW (including Conrie and Ythan) and West Don;
  - SALB (DSW and West Don);
  - Thistle SSIV and protection structure.
- Stabilisation materials:
  - Removal of concrete mattresses; and
  - Introduction of rock to protect ends of buried flowlines decommissioned *in situ*.
- Clear seabed verification – there will be a requirement for over-trawling some areas in the Don fields decommissioning area following decommissioning activities to ensure that the seabed is clear of obstructions to avoid fishing gear snagging. The exact over-trawling requirements will be discussed with OPRED, therefore the footprint of this activity has not been estimated in this section. However, potential impacts from over-trawling activities are discussed.

Field debris items are anticipated to be located on the seabed and are therefore not expected to

require excavation. The area of potential impact will be superficial, temporary, and largely limited to the dimensions of the debris item being retrieved, which will be determined during the clear seabed verification survey. As such, seabed disturbance associated with field debris items is considered negligible and has thus been screened out of further assessment.

Seabed disturbance may be classified as short-term, temporary, prolonged, or permanent, as defined in Appendix B.

6.1.3 Pipelines, flowlines and umbilicals decommissioning

As described in Section 3.5.4, the majority of pipelines, flowlines and umbilicals are trenched and buried and will be left *in situ*, except for the ends that are surface laid outside the trenches. In addition to trenched and buried areas, some areas have deposited rock or are subject to natural backfill. The ends will be cut and removed, and the cut ends will be covered with rock to mitigate snag risk and future exposure due to scour. The pipespools and surface laid sections of flowlines and umbilicals will be entirely removed. Only those surface laid sections will be considered for seabed impacts, as the act of removing pipelines and depositing rock introduces seabed disturbance and snagging risk.

Buried sections of pipelines and umbilicals and associated deposited rock that are decommissioned *in situ* with no remediation are not expected to cause any seabed disturbance. Therefore, the footprint associated with these has not been accounted for when estimating the area of seabed disturbed by the proposed decommissioning activities. However, these pipelines and umbilicals will generate legacy impacts due to their long-term presence on the seabed. The footprint of the pipelines and umbilicals that will be left *in situ* with no remediation has thus been calculated separately in Table 6.1.1 and the legacy impacts associated with these have been assessed in Section 6.2.

However, provision has been made for depositing rock along the full length of the pipelines in Group 3 as these have been identified as having poor depth of cover and multiple exposures along their length. The footprint of contingency rock along the Group 3 pipelines is included in the assessment of seabed disturbance described below.

The disturbance areas associated with decommissioning of the pipelines, flowlines and umbilicals are summarised in Table 6.1.2. The area of seabed directly disturbed through the recovery of the surface laid pipespools has been estimated by multiplying the length of each individual line by the outer diameter. The lengths of these pipelines/umbilicals that are covered by concrete mattresses have been deducted from the lengths of pipeline, as these are accounted for in the footprint of stabilisation materials removal, which is assessed in Section 6.1.5. Disturbance due to placement of rock to protect exposed ends of flowlines decommissioned *in situ* is also assessed separately in Section 6.1.5.

Pipelines	Dimensions	Long term footprint (m^2)	Long term footprint (km^2)
Combined West Don and DSW pipelines			
PL2578 and PL2579 (piggybacked)	8″ x 5,086m in length 3″ x 5,086m in length	103,348	0.10
PL2579 flowline	3″ x 10,089m in length	76,878	0.08
DSW pipelines			
PL2572 and PL2575 (piggybacked)	8″ x 4,027m in length 3″ x 4,027m in length	818.2	0.0008
PL4262	8″ x 5,550m in length	1,127.8	0.0011
West Don pipelines			
PL2583 and PL2584 (piggybacked)	8″ x 2,300m in length 3″ diameter x 2,300m in length	467.4	0.0005
PL4261	228.1mm x 2,842m in length	648.3	0.0006
	Total	**183,287**	**0.18**

Table 6.1.1: Long-term footprint of pipelines being decommissioned *in situ* with no remediation

Activity	Quantity and dimensions	Status	Expected direct disturbance (m^2)	Direct Disturbance (km^2)	Temporary Indirect Disturbance (km^2)
Combined West Don and DSW pipelines					
Complete removal	PL2579 expansion spools: • 1 x 3″ diameter x 45m in length • 1 x 3″ diameter x 30m in length • 1 x 3″ diameter x 7m in length	Surface laid, mostly covered with concrete mattresses	Footprint of concrete mattresses estimated in Table 6.1.4.		
	Flexible thermoplastic umbilicals: • PLU2580JSO: 1 x 66mm x 105m in length • PLU2580JSG: 1 x 66mm x 105m in length	Surface laid and intermittently protected and stabilised by concrete mattresses and grout bags	12.7	0.00001	0.00001
DSW pipelines					
Leave *in situ* and contingency rock deposits	PL2581 water injection pipeline (1 x 5,237m length) and PLU2577 umbilical (1 x 1,312m length) in the same trench. 10m wide corridor for rock deposit along the length of the trench.	Trenched and buried	52,370	0.052	0.10
	PLU2576 1 x 4,162m length 10m wide corridor for rock deposit along the length of the trench.	Trenched and buried	41,620	0.04	0.08
Complete removal	PL2572 expansion spools and gate valves on approach to DSW wellhead 1 x 8″ diameter x 314m in length	Surface laid, covered with concrete mattresses	Footprint of concrete mattresses estimated in Table 6.1.4.		

Activity	Quantity and dimensions	Status	Expected direct disturbance (m^2)	Direct Disturbance (km^2)	Temporary Indirect Disturbance (km^2)
	PL2573 expansion spools and gate valves 1 x 3″ diameter x 350m in length	Surface laid covered with concrete mattresses	Footprint of concrete mattresses estimated in Table 6.1.4.		
	PL2581 surface laid expansion spool: 1 x 8” diameter x 27m in length	Surface laid, covered with concrete mattresses on approach to Xmas trees	Footprint of concrete mattresses estimated in Table 6.1.4.		
	PL4262 surface laid expansion spools 1 x 8″ diameter x 109m in length on approach to water injection wellheads	Surface laid, covered with concrete mattresses on approach to water injection trees	Footprint of concrete mattresses estimated in Table 6.1.4.		
	PLU2576 umbilical jumpers: 1 x 144.5 mm diameter x 10m in length 1 x 114.5 mm diameter x 76m in length 2 x 114.5 mm diameter x 75m in length 1 x 114.5 mm diameter x 115m in length 1 x 114.5 mm diameter x 144m in length 1 x 114.5 mm diameter x 175m in length	Exposed	76.7	0.00008	0.0002
	PLU2577 umbilical jumpers: 3 x 116.5mm diameter x 30m in length	Exposed	10.5	0.00001	0.00002

Activity	Quantity and dimensions	Status	Expected direct disturbance (m^2)	Direct Disturbance (km^2)	Temporary Indirect Disturbance (km^2)
DSW - Conrie					
Complete removal	PL2572 pipespool: 1 x 8″ diameter x 38m in length PL2573 pipespool: 1 x 3″ diameter x 40m in length PLU2576 umbilical jumper: 1 x 114.5mm diameter x 75m in length	Surface laid, protected by concrete mattresses	Footprint of concrete mattresses estimated in Table 6.1.4.		
DSW - Ythan					
Complete removal	PL3749 pipespool: 1 x 8″ diameter x 38.8m in length	Surface laid, protected by concrete mattresses	Footprint of concrete mattresses estimated in Table 6.1.4.		
	PL3751 pipespool: 1 x 3″ diameter x 46.8m in length				
	PLU3752 umbilical: 1 x 41mm diameter x 165m in length				
	PLU3753 umbilical: 1 x 41mm diameter x 165m in length				
	PLU3754 umbilical jumper: 1 x 129mm diameter x 50m in length				

Activity	Quantity and dimensions	Status	Expected direct disturbance (m^2)	Direct Disturbance (km^2)	Temporary Indirect Disturbance (km^2)
West Don pipelines					
Leave *in situ* and contingency rock deposits	PL2582 water injection pipeline (1 x 2,274m length) and PLU2585 static umbilical (1 x 2,600m length) in the same trench. 10m wide corridor for rock placement.	Trenched and buried	26,000	0.026	0.052
Complete removal	PL2582 surface laid pipespools 1 x 8″ diameter x 27m in length	Wet stored local to West Don P1	5.5	0.000005	0.00001
	PL2583 expansion spools: 1 x 8″ diameter x 141m in length	Surface laid, covered with concrete mattresses on approach to water injection Xmas trees	Footprint of concrete mattresses estimated in Table 6.1.4.		
	PL2584 expansion spools: 1 x 3″ diameter x 145m in length	Surface laid, covered with concrete mattresses			
	PL4261 pipespools: 1 x 8″ diameter x 81m in length	Surface laid, covered with concrete mattresses on approach to water injection trees			
	PLU2585 static umbilical jumpers: 1 x 114.5mm diameter x 10m in length 2 x 114.5mm x 50m in length 1 x 66mm x 50m in length 1 x 114.5mm x 60m in length 1 x 66mm x 90m in length	Exposed	28.7	0.00003	0.00006
		Total	**120,154**	**0.12**	**0.24**

Table 6.1.2: Footprint of direct seabed disturbance

6.1.4 Decommissioning of subsea installations

As described in Section 5.2, all seabed installations will be excavated, cut free from any piles as necessary and recovered to the surface. Cut piles will be decommissioned *in situ*.

The disturbance areas associated with the proposed operations are summarised in 6.1. The area of seabed disturbed by recovery of each individual item has been estimated by multiplying the item length by the width. The areas disturbed by recovery of each individual item have then been summed to give the overall area of seabed disturbed. Cut piles that are decommissioned *in situ* are not expected to cause any seabed disturbance and have therefore been excluded from the table.

Activity	Quantity and dimensions	Expected duration of direct disturbance (m^2)	Direct Disturbance (km^2)	Temporary Indirect Disturbance (km^2)
Combine West Don & DSW pipelines				
PL2578 8" Oil Export and PLU2580 Thistle 3" SSIV umbilical riser base and protection structure Note 1	1 x 6.1m (L) x 2.8m (W) x 0.5m (H)	17.1	0.000017	0.000034
PL2579 3" SSIV & Protection Structure Note 1	1 x 6m (L) x 3.5m (W) x 3m (H)	21	0.000021	0.000042
PL2579 3" gas import riser base and protection structure Note 1	1 x 3.8m (L) x 2.8m (W) x 0.5m (H)	10.6	0.000011	0.000021
DSW and West Don SALB	1 x 13m (L) x 13m (W) x 8.1m (H)	169	0.00017	0.00034
DSW				
DSW SDU and protection structure (4 piles structure)	1 x 8.5m (L) x 5.2m (W) x 3.5m (H)	44.2	00000044	0.000088
WHPS	10 x WHPS 8.8m (L) x 9.2m (W) x 6.7m (H)	809.6	0.00081	0.0016
DSW - Conrie				
Conrie WHPS	1 x 8.814m (L) x 9.169m (W) x 6.654m (H)	80.82	0.000081	0.00016

Activity	Quantity and dimensions	Expected duration of direct disturbance (m^2)	Direct Disturbance (km^2)	Temporary Indirect Disturbance (km^2)
DSW - Ythan				
Ythan WHPS	1 x 8.8m (L) x 9.2m (W) x 6.7m (H)	81	0.000081	0.00016
West Don				
West Don SDU and protection structure (4 piles structure)	1 x 8.5m (L) x 5.2m (W) x 3.5m	44.2	00000044	0.000088
Wellhead protection structures	5 x WHPS 8.8m (L) x 9.2m (W) x 6.7m (H)	418	0.00042	0.00084
	Total	**1,695**	**0.0017**	**0.0033**

NOTE:

1. The SSIV and Riser Bases at Thistle 'A' will be left *in situ* meantime pending decommissioning of the Thistle pipelines and infrastructure inside the Thistle 'A' 500m exclusion zone.

Table 6.1.3 Direct footprint of seabed installations decommissioning

6.1.5 Stabilisation and protection materials

Rock, concrete mattresses and grout bags have previously been deployed across the Don fields to stabilise and protect seabed infrastructure.

As noted in Section 2.4.5, the intention is that all exposed materials will be recovered, accounting for approximately 495 concrete mattresses and 6,595 grout bags.

In line with the BEIS (2018) Guidance, existing rock will be left *in situ* to minimise disturbance to the benthic environment. This approach enables the continued protection of buried infrastructure from exposure and reduces potential snagging by fishing gears. However, additional deposits of rock may be required to protect the newly cut ends. The addition of new rock at the cuts at pipeline ends has been calculated based on a worst-case of a 5m length per pipeline end being covered in rock over a 6m wide corridor, which is an approximately 30 m^2 area per pipeline end.

The seabed disturbance associated with the removal and deposition of stabilisation and protection materials is summarised in Table 6.1.4.

Activity	Assumptions	Expected duration of direct disturbance	Direct Disturbance (km^2)	Temporary Indirect Disturbance (km^2)
Combined West Don & DSW				
Removal of exposed concrete mattresses	46 mattresses: 6m x 2m x 0.15m	Temporary	0.0006	0.001
Removal of exposed grout bags	Burial status will be determined when decommissioning activities are being carried out. Assumed exposed. 1,280 x 25kg grout bags – 1 m^2 footprint (although they will likely be piled up which will reduce the footprint)	Temporary	0.001	0.003
Deposition of new rock to protect the surface laid sections outside the trenches	Two pipelines to be left *in situ* x 2 ends per pipeline x 30 m^2 footprint at each end	Permanent	0.00012	0.00024
Footprint of contingency rock deposits along PL2581 water injection pipeline and PLU2577 umbilical.	Refer to Table 6.1.2.			
DSW				
Deposition of new rock to protect flowlines cut ends	5 pipelines routes to be left *in situ* x 2 ends per pipeline x 30 m^2 footprint at each end	Permanent	0.0003	0.0006
Concrete mattresses	256 mattresses: 6m x 2m x 0.15m	Temporary	0.003	0.006
Grout bags	2,320 x 25kg grout bags – 1m^2 footprint (although they will likely be piled up which will reduce the footprint)	Temporary	0.002	0.005
DSW - Conrie				
Removal of Concrete mattresses	28 mattresses 6m x 2m x 0.15m	Temporary	0.0003	0.0007
Removal of Grout bags	80 x 25kg grout bags – 1m^2 footprint (although they will likely be piled up which will reduce the footprint)	Temporary	0.00008	0.0002

Activity	Assumptions	Expected duration of direct disturbance	Direct Disturbance (km^2)	Temporary Indirect Disturbance (km^2)
DSW - Ythan				
Removal of Concrete mattresses	30 mattresses: 6m x 2m x 0.15m	Temporary	0.0004	0.0007
Removal of Grout bags	1,600 x 25kg grout bags – 1m^2 footprint (although they will likely be piled up which will reduce the footprint)	Temporary	0.002	0.003
West Don				
Deposition of new rock to protect flowlines cut ends	5 pipelines routes to be left *in situ* x 2 ends per pipeline x 5 m^2 footprint at each end	Permanent	0.0003	0.0006
Concrete mattresses	135 mattresses: 6m x 2m x 0.15m	Temporary	0.002	0.003
Grout bags	1,315 x 25kg grout bags – 1m^2 footprint (although they will likely be piled up which will reduce the footprint)	Temporary	0.001	0.003
Contingency rock deposition along PL2582 water injection pipeline and PLU2585 static umbilical.	Refer to Table 6.1.2.			
	Total	**13,255**	**0.013**	**0.026**

Table 6.1.4: Seabed disturbance associated with stabilisation materials

6.1.6 Seabed clearance verification

As detailed in Section 5, a seabed clearance verification is required following all decommissioning projects to ensure there is no residual risk to other sea users, particularly those which make contact with the seabed (e.g. demersal trawl or dredge fisheries). Seabed clearance verification will include surveyance of the decommissioned area and independent review of the survey findings. Where residual risks have been identified, intervention in the form of over-trawling to re-level the seabed may be required to limit risks to other sea users upon discussion with OPRED (as described in Section 6.2). Although an important activity for limiting the potential for safety hazards, the use of over-trawling constitutes the greatest potential impact to the benthic environment and therefore decommissioning operations will be designed and executed to minimise the area of seabed that is disturbed.

Any identified snagging hazards will be remediated with rock placement or other stabilisation materials, as required and agreed upon with the regulator. Following this, continued monitoring and remediation will take place to ensure that all buried infrastructure remains stable and without exposures.

6.1.7 Summary of seabed impacts

The contribution to seabed disturbance from the decommissioning activities discussed in Sections 6.1.3 to 6.1.6 are summarised in Table 6.1.5. This table illustrates the worst-case scenario for seabed disturbance, in which the majority of seabed disturbance will be due to the deposition or rock along the Group 3 pipelines, that will be left *in situ*, and at the cut pipeline ends. This will result in a prolonged direct disturbance as it consists of introducing a hard substrate within a sedimentary habitat, thus changing the seabed type in these areas. However, the area of disturbance from rock placement will be remain very small as shown in Table 6.1.5.

Activity	Temporary direct disturbance (km^2)	Temporary indirect disturbance (km^2)	Permanent direct disturbance (km^2)
Decommissioning of pipelines/umbilicals expansion spools and jumpers	0.00013	0.24	0.12
Removal of subsea installations	0.0017	0.003	Non applicable
Stabilisation and protection material	0.013	0.026	0.00012
Total without over-trawl survey	**0.015**	**0.269**	**0.12**

Table 6.1.5: Total potential seabed disturbance from the Don fields decommissioning activities

6.1.8 Effects on sensitive receptors

6.1.8.1 Direct disturbance

Decommissioning activities are expected to lead to two types of direct physical disturbance. The first is temporary disturbance, which will result from the removal of infrastructure from the seabed and from over-trawling. The sediment will be disturbed by the action of retrieving equipment from the seabed and by the trawl running over the seabed, but once decommissioning is complete, the affected areas will be free of anthropogenic material. This is expected to allow recovery in line with natural processes such as sediment re-suspension and deposition, movement of animals into the disturbed area from the surrounding habitat, and recruitment of new individuals from the plankton.

The second type of direct disturbance will be permanent disturbance caused by the decommissioning of stabilisation materials on the seabed (rock and potentially unrecoverable concrete mattresses), and the deposition of additional material (rock) on the seabed to protect infrastructure decommissioned *in situ* and cut pipeline ends. This type of disturbance will effectively change the seabed type in the affected areas from the gravelly sand to a hard substrate. As these materials will be permanently left

on the seabed, the duration of the disturbance is expected to be permanent and will last until the deposited materials are fully buried by the deposition of new natural sediment.

The effects expected to be associated with each type of direct disturbance are discussed in the subsections below.

6.1.8.2 Temporary disturbance

As noted in Table 6.1.5, without over-trawling, approximately 0.015km^2 of seabed would be affected by temporary direct disturbance. The scale of the disturbance is very small when compared to other forms of disturbance that occur in the area, such as commercial trawling. As noted in Section 4.4.2, the majority of demersal fishing effort in the area comprised demersal trawling, and the most important targets were saithe, cod and haddock. The Food and Agriculture Organization of the United Nations (FAO) indicates that commercial beam trawls may be up to 12m wide, and trawl for shellfish at speeds of 1.3 m/s and above [47]. A 12-m wide beam trawl being towed at 1.3m/s would cover approximately 0.056km^2 of seabed per hour and would therefore take 16 minutes to cover the area expected to be disturbed by decommissioning operations (excluding over-trawling). Average fishing effort per year in ICES rectangles 51F1 between 2014 and 2018 was 94.4 days (2,265.6 hours). In this context, the scale of the disturbance associated with the decommissioning activities is clearly limited and EnQuest will aim to limit seabed disturbance further through the selective employment of over-trawling for seabed clearance purposes.

Effects on the benthos from physical disturbance of the seabed during decommissioning activities and over-trawling are expected to include mortality and injury arising from crushing of benthic and epibenthic fauna that cannot move away from the activities, as well as disturbance of motile fauna. The sediment structure, including the burrows of any animals present, will be disturbed.

The habitat 'offshore circalittoral mixed sediment', which was the habitat type identified at West Don [10], which also falls under the offshore subtidal sands and gravels' is representative of the Don fields area, is predicted to cover a very large area of the NNS [15]. As such, a temporary direct disturbance of 0.015km^2 and a 0.029km^2 of indirect disturbance are expected to have a negligible effect in the context of the regional environment.

The Don fields decommissioning area is located within the spawning grounds of cod, haddock, Norway pout, saithe and whiting, however none of these species are benthic spawners and are therefore not anticipated to be disturbed by the proposed decommissioning activities at the Don fields. Apart from one ocean quahog individual observed at East Don, there were no species or habitats of conservation importance concern in the Don fields area (see Section 4.3).

6.1.8.3 Permanent disturbance

Permanent direct disturbance will occur due to leaving hard substrate on the seabed in perpetuity. This encompasses the introduction of rock to protect the cut ends of buried flowlines that will be decommissioned *in situ* and along the full lengths of Group 3 pipelines and umbilicals, as contingency.

Approximately 0.12km^2 of seabed will be subject to permanent direct disturbance due to the introduction of substrate during the decommissioning of pipelines and umbilicals.

The immediate effect of the introduction of new hard substrate will be mortality and injury of benthic and epibenthic fauna that cannot move away from the activities, as well as disturbance of motile fauna. Following the introduction of new material, the ongoing effect will be the change of a small area of gravelly sand habitat to a hard substrate, and related change in the types of organisms that can use the habitat. Organisms such as seapens and burrowing bivalves will no longer be able to use the area affected, while new habitat will be created for other groups such as encrusting sponges.

The scale of the impact is expected to be negligible considering the very large extent of gravelly sand habitat available in the NNS. Recovery of the affected areas is expected to take many years, but will eventually occur as the deposited material is gradually buried by new natural deposits of sediment.

6.1.8.4 Indirect disturbance

Indirect disturbance to the seabed is expected to be caused by the re-suspension and re-settlement of seabed material disturbed during decommissioning operations. This will include natural seabed sediments disturbed during decommissioning of other seabed infrastructure, and over-trawling.

Indirect disturbance is likely to affect seabed receptors through three mechanisms:

- Suspended sediment in the water column affecting the feeding of benthic fauna;
- Re-settlement of suspended sediment causing toxicity and smothering benthic organisms; and
- Re-settlement of suspended sediment changing the sediment type of the seabed in the affected area.

Disturbance of natural sediment was quantified in the manner detailed in Section 6.1.1. The three disturbance mechanisms listed above are discussed in the following sections.

Suspended sediment

There is potential for sediment suspension during removal of subsea installations, removal of flowlines ends, and over-trawling activities. Currently, all the remaining infrastructure will be buried, with several exposures but no reportable free-spans. As agreed with Scottish Fishermen's Federation (SFF) over-trawling will be used to verify the potential for snagging hazards that may arise from the infrastructure that remains *in situ*. However, the area to be over-trawled will be based on pipeline burial data and will be minimised where it is possible or practical to do so.

In any over-trawling activities, the temporary disturbance area of the water column is expected to be confined to tens of metres from the disturbed seabed area and dissipate rapidly as generally it is the coarse, upper layers of sediment that would be disturbed. Increased suspended sediment may reduce feeding efficiency of filter feeders due to clogging of feeding structures. Experimental evidence suggests however that seapens, the main filter feeder of concern in the Don fields area, are not sensitive to increased suspended sediment. Both species observed in the area (*P. phosphorea* and *V. mirabilis*) are capable of cleaning themselves of excess sediment by the production of mucus [48]. As such, effects due to increased suspended sediment are expected to be **negligible.**

Smothering and toxicity

The area affected by re-settlement of seabed sediments as indirect disturbance from removal of subsea installations, removal of flowlines ends and deposition of stabilisation materials is estimated as 0.029km^2. These sediments are expected to rapidly re-settle at or very close to the location from which it was disturbed. Finer sediments may spend more time within the water column, thereby increasing the likelihood of hydrographic movement causing them to settle further away. In all cases however, the layer of re-settled material is expected to be very thin, since only a thin layer of sediment will be resuspended in the first place. As such, there is not expected to be any discernible effects on receptors due to smothering, and there are expected to be no toxic effects as the seabed sediments across the majority of the area are at or below background levels for contaminants.

No cuttings piles will be disturbed during the decommissioning activities, therefore effects from toxicity and smothering due to re-settled sediments are expected to be **negligible.**

Change in sediment type

Natural sediment that re-settles follow re-suspension by over-trawling will become sorted to some extent, with coarser material re-settling very close to the disturbance point and finer material settling further away. However, over-trawling is expected to disturb a thin layer of sediment, resulting in a thin deposition layer which will be insufficient to have any discernible effect on the overall sorting of sediments across the affected area.

Permanent direct impacts from the addition of stabilisation materials will be limited to the deposition of rock along the Group 3 pipelines and umbilicals that will be left *in situ* and minor rock placement at the cut ends of the pipelines to be decommissioned *in situ*. The total area impacted by additional substrate is expected to be 0.12km^2. Given the rock will be spread across the Don fields locations, there is negligible scope to significantly change the habitat within any one area. Moreover, the addition of a small amount of rock will be indiscernible against the vast area of similarly characterised habitat available in the wider region of the NNS. Therefore, rock placement during the proposed decommissioning activities is predicted to have a negligible impact on the benthic habitats and communities the Don fields support.

6.1.9 Cumulative and transboundary impacts

There are no protected areas within 100 km of the Don fields decommissioning area, therefore, there are no cumulative impacts anticipated on the NCMPA network.

The closest installation to the Don fields decommissioning area is the Thistle A platform, located 11.9km south-south-east. It is not expected that impacts from the Don fields decommissioning activities will interact with impacts from operations at the nearby fields as listed in Section 4.2. The Don fields area is also located 6km from the UK/Norway median line and therefore, based on the potential extent of seabed impacts, no transboundary impacts are expected to benthic receptors.

6.1.10 Mitigation measures

In addition to employing non-invasive techniques for the post-decommissioning clear seabed verification survey, several other mitigation measures relating to the placement of rock are in place to minimise the potential total seabed impacts. This will ensure accurate placement of the rock and reducing unnecessary spreading of the rock footprint and ensuring that minimum safe quantity or rock is used.

6.1.11 Residual impact

Receptor	Impact Magnitude	Receptor Sensitivity	Receptor Vulnerability	Receptor Value
Seabed features	**Low**	**Low**	**Low**	**Low**
Validation				
Decommissioning activities at the Don fields will result in temporary and permanent direct and indirect disturbance to the seabed. Temporary direct disturbance has the potential to impact approximately 0.015km^2 of seabed when accounting for the worst-case estimated over-trawling for seabed clearance verification. In addition to this, there will be a permanent disturbance of 0.12km^2 from addition of new substrate associated with rock placement along the Group 3 pipelines, and 0.00012km^2 of permanent disturbance from deposition of protection materials at pipeline ends. Temporary indirect disturbance has the potential to impact approximately 0.029km^2 when accounting for the worst-case estimates. There will also be a footprint associated with over-trawling in order to ensure that there are no obstructions left following decommissioning activities. The exact requirement for over-trawling will be discussed with OPRED and EnQuest will aim to limit the area of disturbance. The seabed sediment analysis combined with the infauna data indicated that the seabed across the Don fields comprises offshore circalittoral mixed sediments, which falls under the subtidal sands and gravels habitat. As such, the small area of disturbance estimated for the Don fields decommissioning may impact only a very small proportion of this characteristic habitat for the region. Therefore, while the receptor value is considered low due to its low regional importance, the scale or magnitude of the impact remains low when considered in the context of the wider region. As well, the vulnerability of benthic receptors to long-term changes in function or status remains low, given the small area of permanent impact from rock placement, and the minor impacts to benthic species associated with smothering and toxicity which are anticipated from the resettlement of the cuttings pile. Based on the anticipated localised and predominantly temporary nature of the disturbance, the impact of Don fields decommissioning activities on seabed receptors is considered negligible.				
Residual Impact Significance	**Negligible**			

Figure 6.1.1: Residual seabed impacts

6.2 Commercial fisheries

6.2.1 Approach

Potential impacts to commercial fisheries from decommissioning of infrastructure are limited to:

- The introduction of possible snagging risks to commercial trawl fisheries which use the area; and
- The presence of decommissioning vessels temporarily modifying access to fishing grounds.

6.2.2 Sources of potential impacts

The greatest identified risk to commercial fisheries is the potential snagging of fishing gears on exposed infrastructure (e.g. exposed section of pipelines, collapse infrastructure) or seabed modified by removal of infrastructure. For commercial fisheries, snagging can mean the loss of gear and catches or, in the worst-case scenario, the possible loss of life if a vessel is capsized [49]. Data from the Marine Accident Investigation Branch (MAIB) (www.gov.uk/maib) shows that 15 vessels have been sunk by snagged fishing gear between 1989 and 2014, resulting in 26 fatalities. According to the 2018 fisheries statistics, demersal mobile gear used in this block includes trawl nets which may be impacted by snagging [31].

Trenched and buried flowlines will be decommissioned *in situ*, whilst the surface laid ends of pipelines, umbilicals, pipespools and jumpers will be removed, and the cut ends of pipelines and umbilicals will be protected with deposited rock. Both decommissioning options (partial removal and *in situ* decommissioning) have the potential to introduce snagging hazards should the buried pipelines or resultant pipeline ends develop exposures. As discussed in Section 4.3, seabed surveys of the location described the seabed at the Don fields decommissioning area as being mostly medium to coarse sand, with areas of gravel, stones, and occasional boulders [12].

The degradation of pipelines and umbilicals decommissioned *in situ* can result in free spans over time. The majority of pipelines are known to be stable, and also exposures have been identified along the pipeline routes, most have remained entirely buried throughout the lifetime of the Don fields and no spans were identified. DoB information about the existing pipeline infrastructure indicates that the Group 3 pipelines, which include PLU2576, PLU2577 and PL2581 at DSW and PL2582 and PLU2585 at West Donm are poorly covered as they indicated a number of exposures along these (see Appendix E – DoB profiles). The other existing pipelines and umbilicals at West Don and DSW have a suitable depth of cover as seen in the DoB profiles. Pipelines will be remediated should any pre-decommissioning or DoB/monitoring surveys indicate the integrity of the pipelines or DoB has been compromised or a free span has emerged. As contingency, it is assumed that additional rock protection will be deposited along the entire length of the Group 3 pipelines and umbilicals, which will be decommissioned *in situ*. In such instances, other sea users would be notified via the appropriate communications channels (as described in Section 6.2.5). However, the potential for legacy impacts due to degradation of infrastructure decommissioned *in situ* remains. The buried pipelines and umbilicals to be decommissioned *in situ* with no remediation will permanently occupy approximately 0.18km^2 of the seabed (Table 6.1.1). The legacy impacts of these pipelines and umiblicals warrants further assessment.

While vessel presence during decommissioning may impact commercial fisheries by temporarily modifying the available fishing area, access to available fishing grounds will increase following completion of decommissioning activities. Existing controls on vessel use across the project area, including notifications to mariners, ensure the vessel presence impacts are limited to a minor disturbance to localised fishing operations during decommissioning and during any post-decommissioning monitoring surveys. The complete removal of the surface laid ends of pipelines, umbilicals, pipespools, jumpers and subsea structures from the area will reduce area restrictions to fisheries operating in the Don field decommissioning area over the long-term. Potential residual impacts to commercial fisheries from the temporary loss of access to fishing grounds during decommissioning activities have been addressed in the Sections below.

6.2.3 Effects on sensitive receptors

Potential impacts to commercial fisheries are most severe for demersal mobile fisheries, which use gears which are dragged along the seabed (e.g. bottom trawlers, dredgers, etc.), as exposures along buried pipelines. Various data sources indicate that area use by demersal mobile fisheries is generally low in the ICES rectangle encompassing the Don fields decommissioning area (see Section 4.4.2). On review of demersal trawling activity in the North Sea, Rouse *et al.* found that a low percentage (0.93%) of demersal trawling trips specifically targeted Oil and Gas pipelines compared with surrounding areas [50]. Furthermore, VMS data show that fishing intensity along the Don fields pipelines is low (< 5 fishing tracks from UK vessels per year) [50].

The intensity of fishing activity in the area is low, and in this instance the pipelines are buried, albeit with extensive exposures. The most recent surveys have indicated that no reportable spans are present, so it is unlikely that leaving the trenched and buried pipelines *in situ* would be detrimental to commercial fishing activities. The Group 3 pipelines, which have been identified as having a poor depth of cover and exposures, will be protected with rock placement which will be over-trawlable.

For the above reasons, the available data suggests that the Don fields decommissioning area is not of particular importance to demersal fisheries and the decommissioning of pipelines *in situ* will not have significant impacts on the safety or economic value of any fisheries operating within this region.

Regardless, EnQuest has a responsibility to ensure all potential residual impacts to fisheries from snagging risk are minimised, given the magnitude of its potential impact. A post-decommissioning seabed clearance verification survey will be employed to provide a collective profile of the buried flowline/seabed interface by which to identify potential free spans, as well as identify any remaining field debris, which may pose hazardous to fishing gear.

The survey will employ geophysical survey methods to ensure that decommissioning activities have not generated any snagging risks, and to identify the requirement for over-trawling. Residual snagging hazards which cannot be remediated using over-trawling techniques may require rock placement or other stabilisation materials, however, these will be determined on a case-by-case basis, following a thorough review of the findings of the seabed clearance verification survey. Following verification of seabed clearance, continued monitoring and remediation will take place to ensure that all buried infrastructure remains stable and without exposures or spans.

For all the decommissioning options seabed clearance and risk assessments would be done to verify that residual snagging hazards remain low and would be unlikely to occur.

The leave *in situ* option for pipelines and umbilicals decommissioning involves leaving all of the pipelines buried, which may result in snagging risk. Pipeline surveys may need to be undertaken to confirm that the pipelines remain buried. While these surveys are being undertaken fishing activity may be disrupted for a short time, but the impact can be expected to be minimal. Typically, at least two post decommissioning surveys would be required; the exact magnitude of the impact will be dependent on the type, frequency and duration of the surveys required. All pipeline ends will be removed, most likely via a cut and lift method, and the ends of the buried pipelines will be protected via rock placement, in a manner that the rock cover will be fishing friendly.

6.2.4 Cumulative and transboundary impacts

The Don fields decommissioning area is located 13 km from the UK-Norway border (Figure 4.5.1). As such, this region may experience above average levels of fishing by foreign vessels compared to other regions of the UKCS. As all infrastructure will either decommissioned *in situ* or removed to an over-trawlable condition, no cumulative impacts to any foreign fishing fleets, demersal or otherwise, are expected to result from the Don fields decommissioning activities. Moreover, a positive outcome of the decommissioning of the Don fields decommissioning will be the increase in available fishing areas following the removal of all seabed installations, concrete mattresses and grout bags at the Don fields, and the fishing exclusion zone surrounding the Northern Producer FPF (which is out of the scope of this EA). This will increase the available fishing grounds for commercial fishing fleets of all

nationalities which have been granted access to fishing in the UKCS.

6.2.5 Mitigation measures

The existing controls of seabed clearance verification with independent review by the NFFO, continued monitoring for an agreed period, remediation where required, and accurate mapping of the locations and state of infrastructure which has been decommissioned *in situ* reduces the probability of important impacts to commercial fisheries through snagging risk.

The physical presence of vessels during decommissioning operations can cause disturbance to commercial fishing vessels. There are a number of existing controls which EnQuest is using for the impact of vessel presence on commercial fisheries. Stakeholder engagement will be continued prior to commencement of operations, including the promulgation of Notices to Mariners (NtMs) detailing any decommissioning activities. Appropriate navigation aids will be used in accordance with the Consent to Locate conditions to ensure that sea users are made aware of the presence of vessels undergoing decommissioning activities. In addition, there will be continual use of Automatic Identification System satellite (AIS) vessel tracking and all decommissioning vessel activities will be in accordance with national and international regulations.

In addition, EnQuest keeps manned bridges to ensure that other sea users adhere to any exclusion zones which are in place, including temporary exclusion zones around decommissioning vessels.

Pipelines will be remediated should any pre-decommissioning or DoB/monitoring surveys indicate the integrity of the pipelines or DoB has been compromised or a free span has emerged. Given the absence of free spans, no such remediation is expected. However, should such an instance arise in future, other sea users would be notified via the appropriate communications channels (as described in Section 5.3).

The decommissioning operations will be designed and executed to minimise the area of seabed that is disturbed. Furthermore, a seabed survey following completion of decommissioning will be carried out and on review of the results of this survey, an over-trawl survey will be considered.

In spite of the above, EnQuest has a responsibility to ensure all potential residual impacts to fisheries from snagging risk are minimised, given the magnitude of this impact factor. A post-decommissioning survey using geophysical survey methods to provide a collective profile of the buried flowline/seabed interface to identify potential free spans, as well as identify any remaining field debris will be carried out. Where necessary, over-trawl surveys will be undertaken to further verify that the seabed is clear of any debris or other snagging risks. Any identified snagging hazards will be remediated with rock placement or other stabilisation materials, as required and agreed upon with the regulator. Following this, continued monitoring and remediation will take place to ensure that all buried infrastructure remains stable and without exposures.

6.2.6 Residual impacts

Receptor	Impact Magnitude	Receptor Sensitivity	Receptor Vulnerability	Receptor Value
Commercial Fisheries	**Minor**	**High**	**Negligible**	**Low**
Validation				
Long-term positive impacts of the proposed decommissioning activities include an increase in access to fishing grounds through the removal of all seabed surface installations and stabilisation materials (including concrete mattresses and grout bags) at the Don fields. Residual impacts from the degradation of buried pipelines decommissioned *in situ* will be managed through continued monitoring and communications with other sea users and are not expected to have any long-term impacts on the access or functioning of currently exploited fishing grounds. Considering the low utilisation of demersal fishing vessels in the Don fields area, the low likelihood of the proposed decommissioning operations generating snagging risk, and the management and control measures that will be in place to mitigate against residual potential snagging risk, it is considered that the decommissioning of flowlines *in situ* and all other infrastructure will not adversely impact upon commercial fisheries operating within the Don fields Area. For these reasons, impacts to commercial fisheries are considered negligible.				
Residual Impact Significance	**Negligible**			

Table 6.2.1: Residual impacts on commercial fisheries

7. CONCLUSIONS

EnQuest have conducted a detailed review of the proposed decommissioning activities and the environmental and societal sensitivities characteristic of the Don fields. With this appraisal and our industry experience in decommissioning activities, it was determined that potential project-related impacts to the seabed and commercial fisheries required further consideration. The worst-case aspects from each decommissioning method were considered and assessed in line with the tried and tested EA Method, described in Section 2.5. The technical evidence and results from these assessments are presented in Section 6.

The deposition of contingency rock along some of the pipelines to be decommissioned *in situ* and at pipeline cut ends has the potential to cause the greatest contributor to seabed disturbance due to extent of the direct impact. However, this impact will be limited to a small area of disturbance and is unlikely to change the baseline conditions of the area. This appraisal has shown that the Don fields decommissioning area can be regarded as an area of low conservation importance (Section 6.1). For these reasons, impacts to seabed receptors due to the proposed decommissioning activities were considered to be of negligible significance. The remaining pipelines to be decommissioned *in situ* are currently considered in a stable burial state and are not anticipated to require further intervention.

The Don fields are located far offshore in the NNS, remote from coastal sensitivities and approximately 92km away from the nearest offshore conservation site, namely the North-East Faroe-Shetland Channel NCMPA. Given the distance to this site coupled with the short-term disturbance of seabed sediments from the decommissioning activities, no significant impacts to any sensitive seabed features are expected.

The potential over-trawling required for the decommissioning area would pose a significant source of impact to the seabed and environmental receptors. All efforts to reduce over-trawling will be made, including consultation with OPRED on appropriate seabed clearance methods. EnQuest will endeavour to minimise impacts to the seabed for any areas identified as posing a potential snagging risk and requiring clearance or remediation.

These efforts to reduce the area of seabed disturbance, coupled with the geographic extent of the impact relative to the surrounding available habitat, support the conclusion that residual impacts from seabed disturbance will be negligible.

Activities with the potential to impact upon commercial fisheries were limited to the possible legacy impacts from the degradation of pipelines *in situ*. However, such impacts are restricted to commercial fisheries which make active contact with the seabed i.e. bottom trawl or dredging gears. The waters of the Don fields area experiences low levels of demersal fishing (see Section 6.3). This low level of use, the predicted sediment stability surrounding flowlines and the mitigation measures presented (including over-trawl surveys, and monitoring for exposures), allow us to conclude that snagging risks to commercial fishery operations has been reduced to as low as reasonably practicable (ALARP) and can be considered negligible.

This EA has fully considered the objectives and marine planning policies of the NMP across the range of policy topics including biodiversity, natural heritage, cumulative impacts and the oil and gas sector. EnQuest considers that the proposed decommissioning activities are in alignment with these objectives and policies.

Based on the findings of this EA, including the identification and subsequent application of appropriate mitigation measures and effective project management according to EnQuest's HSE&A Policy, it is considered that the proposed Don fields decommissioning activities do not pose any threat of significant impact to environmental or societal receptors; locally, within the wider region or internationally.

8. REFERENCES

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Appendix A LAYOUTS OF THE DON FIELDS

Appendix A.1 DSW Production (with Conrie & Ythan)

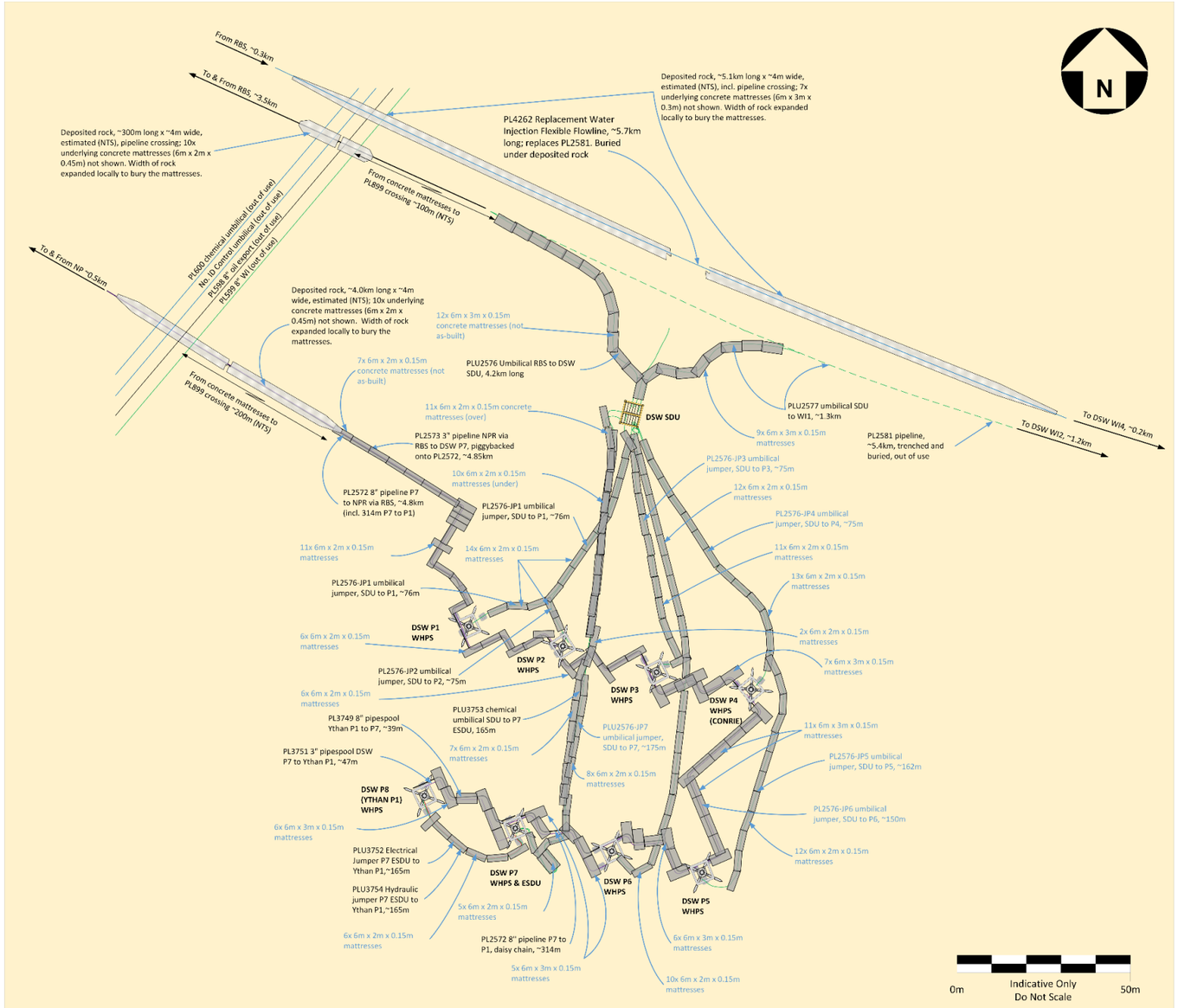

Figure A.1.1 : Layout Showing DSW, Conrie & Ythan and associated infrastructure)

Appendix A.2 DSW WI

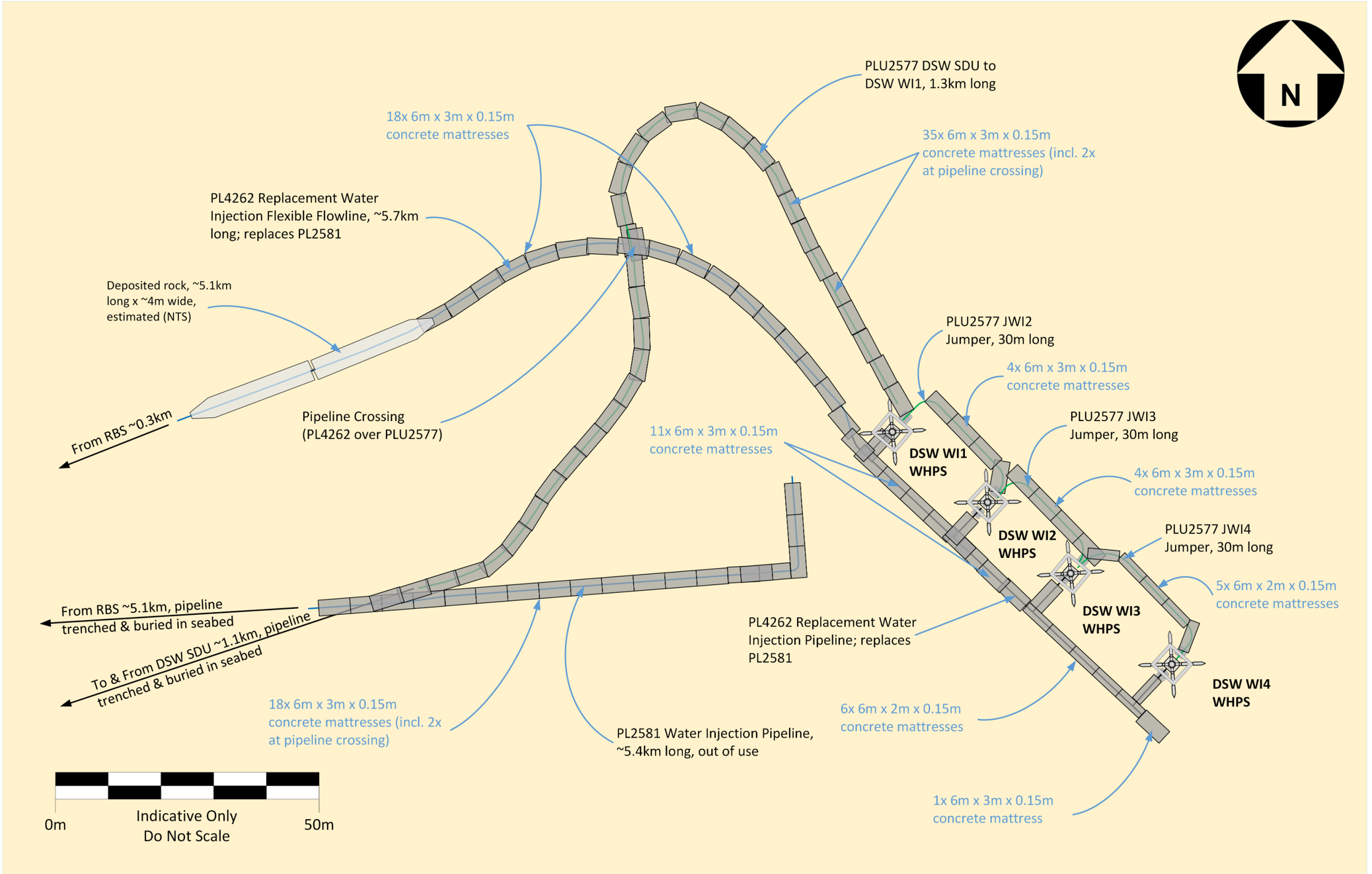

Figure A.2.1 : Layout showing DSW Water Injection (WI) and associated infrastructure

Appendix A.3 West Don Production & WI

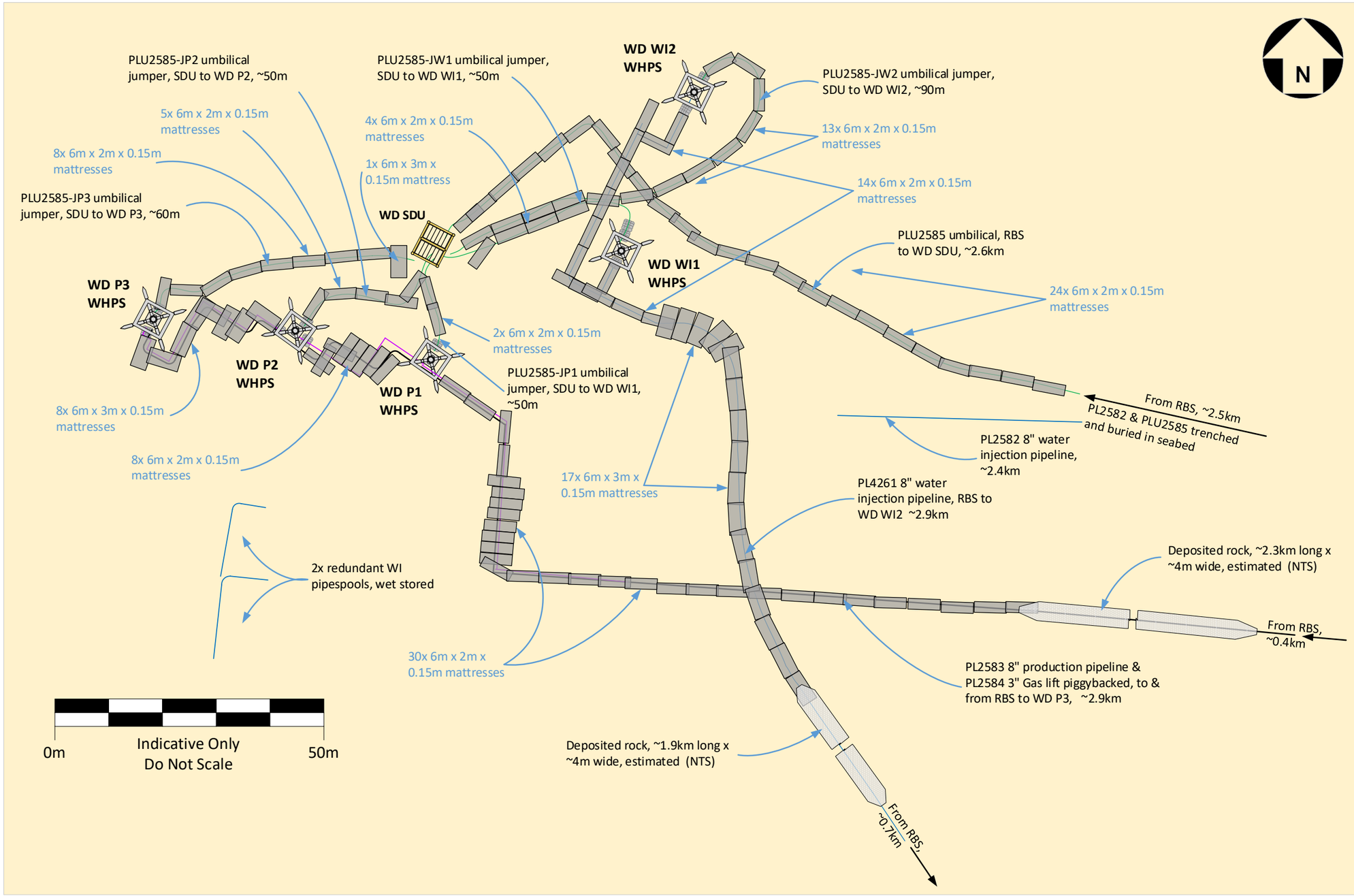

Figure A.3.1: Layout Showing West Don Production & Water Injection

Appendix A.4 Wye Structure Approaches

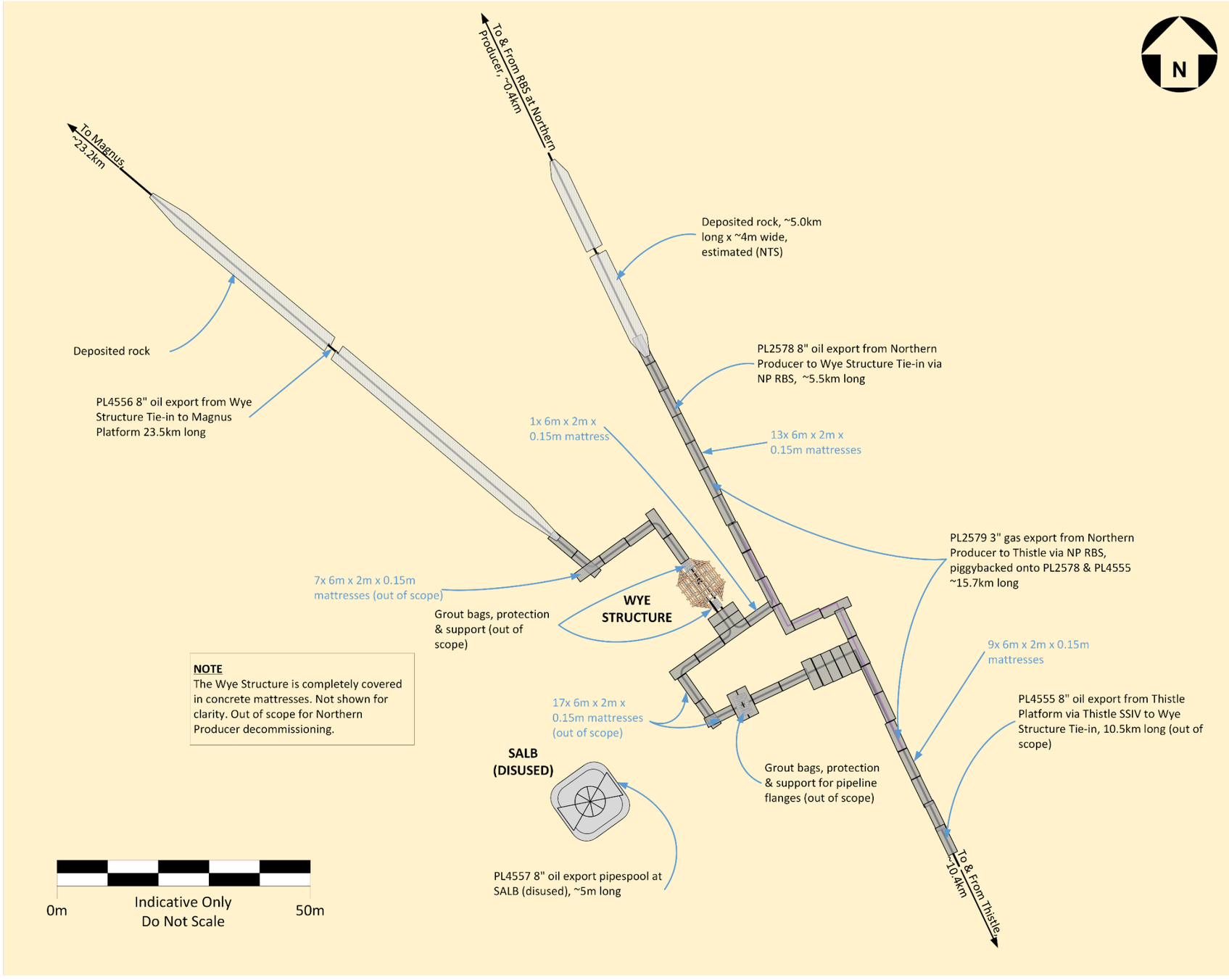

Figure A.4.1: Wye Structure Approaches

Appendix A.5 Thistle Alpha Approaches

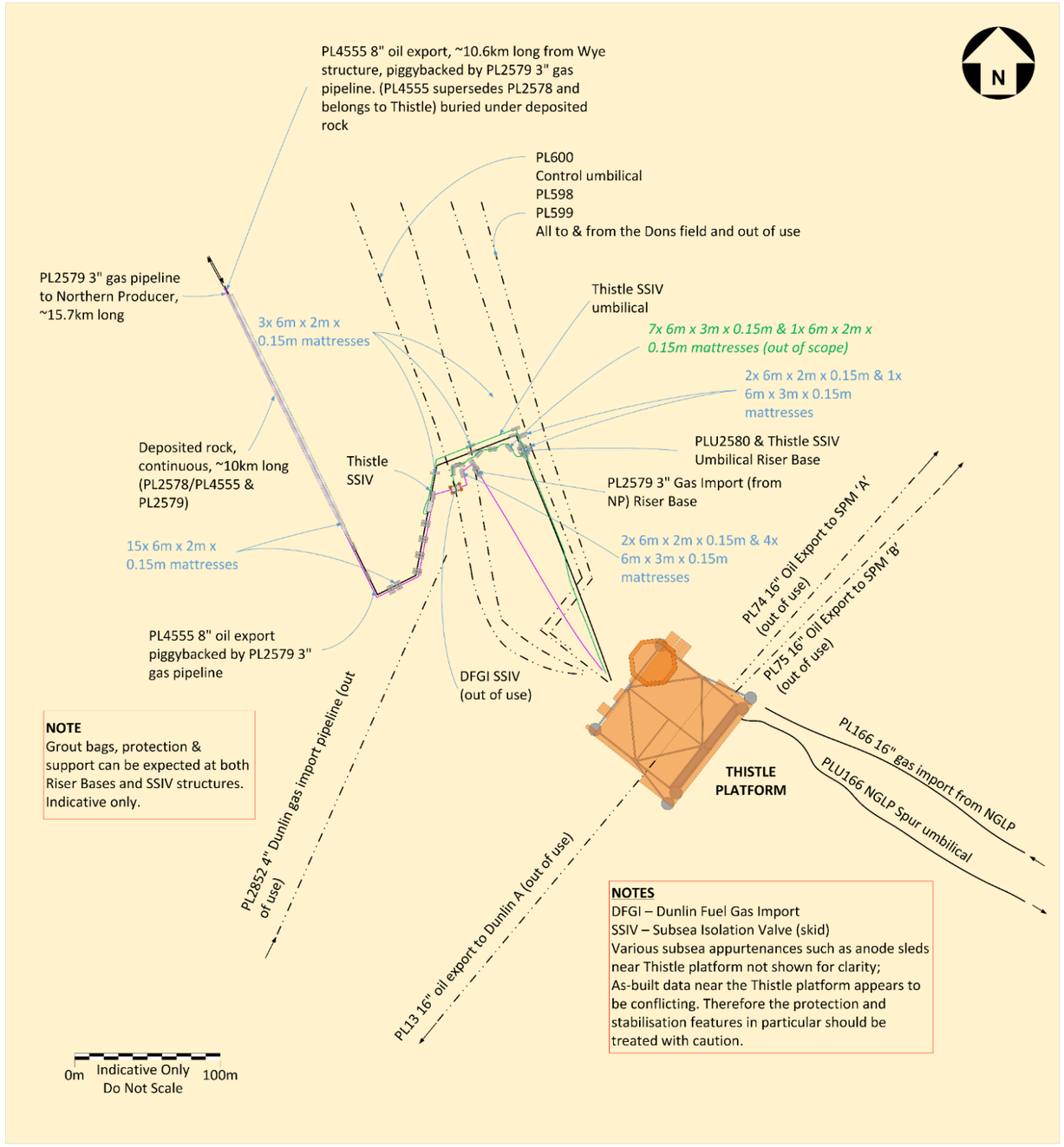

Figure A.5.1: Thistle Alpha Approaches

Appendix B EA METHOD

Appendix B.1 Overview

The decision-making process related to defining if a project is likely to generate a significant impact on the environment is integral to the environmental impact assessment process; the methods used for identifying and assessing potential impacts should be transparent and verifiable.

The method presented here has been developed by reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines for marine impact assessment [51], the Marine Life Information Network (MarLIN) species and ecosystem sensitivities guidelines [52] and guidance provided by Scottish Natural Heritage (SNH) in their handbook on environmental impact assessment [53] and by The Institute of Environmental Management and Assessment (IEMA) in their guidelines for environmental impact assessment [54][55].

Environmental impact assessment provides an assessment of the environmental and societal effects that may result from a project's impact on the receiving environment. The terms impact and effect have different definitions in environmental impact assessment, and one drives the other. Impacts are defined as the changes resulting from an action, and effects are defined as the consequences of those impacts.

In general, impacts are specific, measurable changes in the receiving environment (volume, time and/or area); for example, if several marine mammals are to be disturbed following exposure to underwater noise emissions. Effects (the consequences of those impacts) consider the response of a receptor to an impact; for example, the effect of the marine mammal/noise impact example given above might be exclusion from important habitat caused by disturbance, which may lead to reduced individual fitness and, potentially, population-level consequences. The relationship between impacts and effects is not always so straightforward; for example, a secondary effect may result in both a direct and indirect impact on a single receptor. There may also be circumstances where a receptor is not sensitive to a particular impact and thus there will be no significant effects/consequences.

For each impact, the assessment identifies a receptor's sensitivity and vulnerability to an effect and implements a systematic approach to understand the significance. The process considers the following:

- Assessment of the consequence/extent of the impact, defined by the nature and type of impact, and the spatial extent of the impact on the receptor;
- Identification of the duration and frequency of the effect of the receptor;
- Definition of magnitude of impact, based on the magnitude of the shift from the environmental baseline conditions;
- Definition of the probability of impacts; and
- Ranking of impact significance, considering the probability that it will occur, the spatial and temporal extent and the magnitude of the impact and any residual effects after mitigations are applied.

Each of these variables are expanded upon in the following sections to provide consistent definitions across all EA topics. In each impact assessment, these terms are used in the assessment summary table to summarise the impact and are enlarged upon as necessary in any supporting text. It should be noted that all impacts discussed in this EA report are adverse unless explicitly stated otherwise.

Once the consequence of a potential impact has been assessed it is possible to identify measures that can be taken to mitigate impacts through engineering decisions or execution of the project. This process also identifies aspects of the project that may require monitoring, such as a post-decommissioning survey at the completion of the works to inform inspection reports.

For some impacts, significance criteria are standard or numerically based. For others, for which no

applicable limits, standards or guideline values exist, a more qualitative approach is required. This involves assessing significance using professional judgement.

Despite the assessment of impact significance being a subjective process, a defined method has been used to make the assessment as objective as possible and consistent across different topics. The assessment process is summarised below. The terms and criteria associated with the impact assessment process are described and defined; details on how these are combined to assess consequence and impact significance are then provided.

Appendix B.2 Baseline characterisation

To assess potential impacts on the environment it was necessary to firstly characterise the aspects of the environment that could potentially be affected (the baseline environment). The baseline environment has been described in Section 3.8 and is based on desk studies combined with additional site-specific studies such as surveys and modelling where required. Information obtained through consultation with key stakeholders was also used to help characterise specific aspects of the environment in more detail.

The EA process requires identification of potential receptors which could be affected by the decommissioning Project (e.g. commercial fisheries, water quality, and seabed impacts). Important receptors are identified within the impact assessments (Section 6).

Appendix B.3 Impact definition

Appendix B.3.1 Impact consequence/ extent

The impact consequence is based on the geographical extent, as described in the table below.

Ranking	Consequence	Criteria
High	**Major**	Extent of change: Impact occurs over a large scale or spatial geographical extent.
Medium	**Moderate**	Extent of change: Impact occurs over a local to medium scale/spatial extent and/or has a prolonged duration.
Medium	**Minor**	Extent of change: Impact occurs on-site or is localised in scale/spatial extent.
Low	**Negligible**	Extent of change: Impact is highly localised.

Table B.3.1: Impact consequence criteria

Appendix B.3.2 Duration/ frequency of effect

The duration of effect is key to determining the final ranking of impact significance. This criterion considers the following:

- Duration over which the impact is likely to occur (e.g. days, weeks, etc.); and
- Frequency and/or intensity of impact (i.e. how often the impact is expected to occur).
- These variables are defined below with the overall ranking method of duration of effects.

Duration	Definition
Short-term	Impacts that are predicted to last for a short duration (e.g. less than one year).
Temporary	Impacts that are predicted to last a limited period (e.g. a few years). For example, impacts that occur during the decommissioning activities and which do not extend beyond the main activity period for the works or which, due to the timescale for mitigation, reinstatement, or natural recovery, continue for only a limited time beyond completion of the anticipated activity.
Prolonged	Impacts that may, although not necessarily, commence during the main phase of the decommissioning activity and which continue through the monitoring and maintenance, but which will eventually cease.
Permanent	Impacts that are predicted to cause a permanent, irreversible change.

Table B.3.2: Definition of duration criteria

Frequency	Description
Continuous	Impacts that occur continuously or frequently.
Intermittent	Impacts that are occasional or occur only under a specific set of circumstances that occurs several times during the Don fields Decommissioning Project. This definition also covers such impacts that occur on a planned or unplanned basis and those that may be described as 'periodic' impacts.

Table B.3.3: Definition of frequency criteria

Ranking	Duration	Criteria
High	**Major**	Frequency/intensity of impact: high frequency (occurring repeatedly or continuously for a protracted period) and/or at high intensity.
Medium	**Moderate**	Frequency/intensity of impact: medium to high frequency (occurring repeatedly or continuously for a moderate length of time) and/or at moderate intensity or occurring occasionally/intermittently for short periods of time but at a moderate to high intensity.
Medium	**Minor**	Frequency/intensity of impact: low frequency (occurring occasionally/intermittently for short periods of time) and/or at low intensity.
Low	**Negligible**	Impact is very short term in nature (e.g. days/few weeks).

Table B.3.4: Overall duration/frequency ranking criteria

Appendix B.3.3 Impact magnitude

The impact magnitude requires an understanding of how far the receptor will deviate from its baseline condition because of the impact. The resulting effect on the receptor is considered under vulnerability and is an evaluation based on scientific judgement.

The table below defines the criteria for impact magnitude.

Ranking	Magnitude	Criteria
High	**Major**	Total loss or major alteration to key elements/features of the baseline conditions.
Medium	**Moderate**	Partial loss or alteration to one or more key elements/features of the baseline conditions.
Medium	**Minor**	Minor shift from the baseline conditions. Impact is localised and temporary/short term with minor detectable change to site characteristics or a minor change to a small proportion of the receptor population. Low frequency impact occurring occasionally or intermittently.
Low	**Negligible**	Very slight change from baseline conditions. Impact is highly localised and short term resulting in very slight or imperceptible changes to site characteristics.

Table B.3.5: Impact magnitude criteria

Appendix B.3.4 Impact probability

The probability of an impact is another factor that is considered in this impact assessment. This captures the probability that the impact will occur and the probability that the receptor will be present and is based on knowledge of the receptor and experienced professional judgement. The table below provides definitions of the different levels of probability of impact that are used in the Don fields Decommissioning Project impact assessment.

Ranking	Probability	Criteria
High	**Major**	The impact is likely to occur.
Medium	**Moderate**	The impact is moderately likely to occur.
Medium	**Minor**	The impact is possible.
Low	**Negligible**	The impact is unlikely to highly unlikely.

Table B.3.6: Impact probability criteria

Appendix B.3.5 Receptor definition

As part of the assessment of impact significance it is necessary to differentiate between receptor sensitivity, vulnerability, and value. The sensitivity of a receptor is defined as 'the degree to which a receptor is affected by an impact' and is a generic assessment based on factual information whereas an assessment of vulnerability, which is defined as 'the degree to which a receptor can or cannot cope with an adverse impact' is based on professional judgement taking into account a number of factors, including the previously assigned receptor sensitivity and impact magnitude, as well as other factors such as known population status or condition, distribution and abundance.

Appendix B.3.6 Receptor sensitivity

Receptor sensitivity to potential impact activities ranges from negligible to very high. Definitions for assessing the sensitivity of a receptor are provided in the table below.

Receptor Sensitivity	Definition
Very high	Receptor with no capacity to accommodate a particular effect and no ability to recover or adapt.
High	Receptor with very low capacity to accommodate a particular effect with low ability to recover or adapt.
Medium	Receptor with low capacity to accommodate a particular effect with low ability to recover or adapt.
Low	Receptor has some tolerance to accommodate a particular effect or will be able to recover or adapt.
Negligible	Receptor is generally tolerant and can accommodate a particular effect without the need to recover or adapt.

Table B.3.1: Criteria for assessment of sensitivity of receptor

Appendix B.3.7 Receptor vulnerability

Information on both impact magnitude and receptor sensitivity is required to determine receptor vulnerability. These criteria - described below, are used to define receptor vulnerability.

Receptor Vulnerability	Definition
Very high	The impact will have a permanent effect on the behaviour or condition on a receptor such that the character, composition or attributes of the baseline, receptor population or functioning of a system will be permanently changed.
High	The impact will have a prolonged or extensive temporary effect on the behaviour or condition on a receptor resulting in long term or prolonged alteration in the character, composition or attributes of the baseline, receptor population or functioning of a system.
Medium	The impact will have a short-term effect on the behaviour or condition on a receptor such that the character, composition, or attributes of the baseline, receptor population or functioning of a system will either be partially changed post development or experience extensive temporary change.
Low	Impact is not likely to affect long term function of system or status of population. There will be no noticeable long-term effects above the level of natural variation experience in the area.
Negligible	Changes to baseline conditions or receptor population of functioning of a system will be imperceptible.

Table B.3.2: Criteria for assessment of vulnerability of receptor

It is important to note that the above approach to assessing sensitivity/vulnerability is not appropriate in all circumstances and in some instances professional judgement has been used to determine receptor sensitivity. In some instances, it has also been necessary to take a precautionary approach where stakeholder concern exists regarding a particular receptor. Where this is the case, this is detailed in the relevant impact assessment in Section 6.

Appendix B.3.8 Receptor value

The value, or importance, of a receptor is based on a pre-defined judgement established in legislative requirements, guidance or policy. Where these may be absent, it is necessary to make an informed judgement on receptor value based on perceived views of key stakeholders and specialists. Examples of receptor value definitions are provided below.

Receptor Value	Definition
Very high	Receptor of international importance (e.g. United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site). Receptor of very high importance or rarity, such as those designated under international legislation (e.g. EU Habitats Directive) or those that are internationally recognised as globally threatened (e.g. International Union for Conservation of Nature (IUCN) red list). Receptor has little flexibility or capability to use alternative area. Best known or only example and/or significant potential to contribute to knowledge and understanding and/or outreach.
High	Receptor of national importance (e.g. Nature Conservation Marine Protected Area (NCMPA), Marine Conservation Zone (MCZ)). Receptor of high importance or rarity, such as those which are designated under national legislation, and/or ecological receptors such as United Kingdom Biodiversity Action Plan (UKBAP) priority species with nationally important populations in the study area, and species that are near-threatened or vulnerable on the IUCN red list. Receptor provides the majority of income from the Don fields. Above average example and/or high potential to contribute to knowledge and understanding and/or outreach.
Medium	Receptor of regional importance. Receptor of moderate value or regional importance, and/or ecological receptors listed as of least concern on the IUCN red list but which form qualifying interests on internationally designated sites, or which are present in internationally important numbers. Any receptor which is active in the Don fields and use it for up to half of its annual income/activities. Average example and/or moderate potential to contribute to knowledge and understanding and/or outreach.
Low	Receptor of local importance. Receptor of low local importance and/or ecological receptors such as species which contribute to a national site, are present in regionally. Any receptor which is active in the Don fields and reliant upon it for some income/activities. Below average example and/or low potential to contribute to knowledge and understanding and/or outreach.
Negligible	Receptor of very low importance, no specific value or concern. Receptor of very low importance, such as those which are generally abundant around the UK with no specific value or conservation concern. Receptor of very low importance and activity generally abundant in other areas/ not typically present in the Don fields installation area. Poor example and/or little or no potential to contribute to knowledge and understanding and/or outreach.

Table B.3.3: Criteria for assessment of value of receptor

Appendix B.4 Impact significance ranking

The initial ranking of impact significance is based on the criteria described in the table below involves:

- Determination of the extent, duration/frequency, and magnitude of the impact and its probability;
- Consideration of sensitivity, vulnerability, and value of the receptor and any existing controls which can be industry standards, legislation requirements or prescriptive.

The sensitivity, vulnerability and value of receptor are combined with the impact magnitude (and probability, where appropriate) using informed judgement to arrive at a significance assessment for

each impact, as described below. The assessment of significance considers mitigation measures that are embedded within the proposed activities.

Ranking	Significance	Criteria
High	**Major**	Impacts are likely to be highly noticeable and have long term effects, or permanently alter the character of the baseline, and are likely to disrupt the function and status/value of the receptor population. They may have broader systemic consequences (e.g. to the wider ecosystem/industry). The impacts are a mitigation priority to avoid or reduce the anticipated effects of the impact.
Medium	**Moderate**	Impacts are likely to be noticeable and result in prolonged changes to the character of the baseline and may cause hardship to, or degradation of, the receptor population, although the overall function and value of the baseline/ receptor population is not disrupted. Such impacts are a priority for mitigation in order to avoid or reduce the anticipated effects of the impact.
Medium	**Minor**	Impacts are expected to comprise noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause long term degradation, hardship, or impair the function and value of the receptor. However, such impacts may be of interest to stakeholders and/or represent a contentious issue during the decision-making process, and should therefore be avoided or mitigated as far as reasonably practicable.
Low	**Negligible**	Impacts are expected to be either indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not anticipated to be a stakeholder concern and/or a potentially contentious issue in the decision-making process.

Table B.4.1: Criteria for assessment of significance

Appendix B.5 Cumulative impact assessment

While the scope of this impact assessment is restricted to the decommissioning of the Don fields, there will be other marine activities which have the potential to interact with the activities completed under the decommissioning work scope. The impact assessments presented in the following sections consider the potential for significant cumulative impacts to occur from overlapping activities.

Appendix B.6 Transboundary impact assessment

For most potential impacts from decommissioning, the likelihood of transboundary impact is low. However, where impacts on mobile receptors are of concern, the likelihood of a transboundary impact is higher. The impact assessments presented in the following sections have identified the potential for transboundary impacts within the definition of significance.

Appendix B.7 Mitigation

Where potentially significant impacts (i.e. those ranked as ‘moderate’ or ‘major’) are identified, mitigation measures must be considered. The intention is that mitigations should remove, reduce, or manage potential impacts to a point where the resulting residual significance is at an acceptable or insignificant level. Mitigation is also proposed in some instances to maintain the significance levels of impacts defined as ‘not significant’. The impact assessment conclusions define the residual impact significance after mitigations are applied.

Appendix C ENVID RESULTS SUMMARY

Operational Phase	Project Element	Operation / Aspect	Activity	Summary of Environmental Impact	Existing Controls (Standards, Legislative, or Prescriptive)	Primary Assessment	EnQuest -Specific / Best Practice Standards	Secondary Assessment	Comment	Status
General	Vessels	Physical presence	Vessels	Disturbance to vessel operations offshore (e.g. fisheries and other maritime users); disturbance to marine species	Stakeholder engagement. Existing controls through DP Vessels and the usual notifications (key stakeholders).		• In addition to existing controls, EnQuest keeps manned bridges. • All seabed infrastructure will be fully protected on the seabed in the interim period between Phase 1 & 2 • If full seabed clearance of the FPF 500m zone is not completed, a guard vessel hired by EnQuest will remain on site.		Vessel traffic is low	Scoped out
			Discharges	Vessel discharge of grey water, bilge water, etc.	IMO and MARPOL compliant, bilge management procedures, good operating practices.		• All contracted vessels will operate in line with IMO and MARPOL regulations • All discharges will be permitted under applicable UK legislation.			Scoped out
			Vessel engine noise	Underwater noise - behavioural modifications to marine mammals, turtles and potentially fish.	Vessel noise will not have significant sound levels - unlikely to be far above ambient noise levels.		• A SIMOPS plan for vessel activity in the field will be put in place • Vessel, cutting and trenching operations will use standard methods and equipment. No explosives used.		There are low densities of marine mammals using the area. No protected sites in the vicinity are designated for the protection of marine mammals.	Scoped out
	Power Generation	Power generation	Emissions	Gaseous emissions to atmosphere cause increased degradation of local/regional air quality (NOx and particulates). Transboundary air pollution. Contributing to global warming (CO2).	Emissions associated with vessel use, recycling and replacement of materials decommissioned in situ will contribute to this.				Not assessed at this stage due to global scale. This would be a very small amount of CO2 emissions.	Scoped out
			Energy Use	Impact on climate change and reduction of resources of hydrocarbons. Products used for recycling.	Energy Use associated with vessels, recycling and replacement of materials decommissioned in situ will contribute to this.				Not assessed at this stage due to global scale. This would be a very small amount of fuel use.	Scoped out
	Waste	Waste management	Onshore	Use of landfill and landfill resource take (non- hazardous); special disposal (hazardous)	All waste will be handled and disposed of in line with regulations as detailed in a Waste Management Plan. Inventory of waste - tracking materials to final place. There are potential positive impacts from recycling of steel.		All wastes, including normal, hazardous and special wastes, will be shipped to shore for processing. Any transfrontier shipments of waste, including those for landfill, will be non-hazardous and will be managed under the Waste Management Plan and will comply with relevant legislation.			Scoped out under Waste Management Strategies

Table C.1: ENVID Summary Results - General

Operational Phase	Project Element	Operation / Aspect	Activity	Summary of Environmental Impact	Existing Controls (Standards, Legislative, or Prescriptive)	Primary Assessment	EnQuest -Specific / Best Practice Standards	Secondary Assessment	Comment	Status
Preparations	**Pipelines & Umbilicals**	**Pipelines & umbilicals**	Cutting	Underwater noise - behavioural modifications to marine mammals, turtles and potentially fish. Population impacts due to cumulative impact or impacting a reproductively significant number of individuals or location.	Diamond wire cutting noise will not have significant sound levels.		• A SIMOPS plan for vessel activity in the field will be put in place • Vessel, cutting and trenching operations will use standard methods and equipment. No explosives used.		There are low densities of marine mammals using the area. No protected sites in the vicinity are designated for the protection of marine mammals.	Scoped out
				Liquid / solid discharge to sea - Water quality in immediate vicinity of discharge will be reduced, but effects are usually minimised by rapid dilution in massive receiving body of water; planktonic organisms most vulnerable receptor. Potential NORM impacts? Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments.	Treated water discharged to sea after cleaning. Solids will be shipped to shore for disposal.		• All contracted vessels will operate in line with IMO and MARPOL regulations • Pipelines and spool are to be flushed, filled with seawater, and isolated prior to disconnection • All discharges will be permitted under applicable UK legislation. • Transfer of controlled, hazardous and special wastes to UK ports for disposal will be governed by waste management plans.		Low risk of pipelines emitting fluids/solids - everything cut post-flushing. Residuals released in minute amounts.	Scoped out
				Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub-lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed - expected to be minor		• Activities which may lead to seabed disturbance planned, managed, and implemented in such a way that disturbance is minimised. A Marine License will be in place for any planned operational disturbance • Natural backfill of the excavated areas, no planned mechanical backfill, or remedial seabed levelling of pipeline corridors • Debris survey undertaken on completion of the activities and where possible resultant		There have been no sensitive habitats or species identified during the surveys.	Scoped in
			Disconnect ends	Liquid / solid discharge to sea - Water quality in immediate vicinity of discharge will be reduced, but effects are usually minimised by rapid dilution in massive receiving body of water; planktonic organisms most vulnerable receptor. Potential NORM impacts? Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments.	Treated water discharged to sea after cleaning. Solids will be shipped to shore for disposal.		• All contracted vessels will operate in line with IMO and MARPOL regulations • Pipelines and spool are to be flushed, filled with seawater, and isolated prior to disconnection • All discharges will be permitted under applicable UK legislation.		Residuals at cut ends released into the marine environment (post-flushing - should be low). Flooding into the pipeline only up to a certain level (pressure dependent), so displacement is not complete pipeline.	Scoped out

Table C.2: ENVID Summary Results - Preparations

Operational Phase	Project Element	Operation / Aspect	Activity	Summary of Environmental Impact	Existing Controls (Standards, Legislative, or Prescriptive)	Primary Assessment	EnQuest -Specific / Best Practice Standards	Secondary Assessment	Comment	Status
Decommissioning Activities	Subsea installations	Removal of installations and protection structures.	External cutting with diamond wire or water entrained; hydraulic shears	Underwater noise - behavioural modifications to marine mammals, turtles and potentially fish. Population impacts due to cumulative impact or impacting a reproductively significant number of individuals or location.	Diamond wire cutting noise will not have significant sound levels.		• A SIMOPS plan for vessel activity in the field will be put in place • Vessel, cutting and trenching operations will use standard methods and equipment. No explosives used.		There are low densities of marine mammals using the area. No protected sites in the vicinity are designated for the protection of marine mammals.	Scoped out
				Liquid / solid discharge to sea - Water quality in immediate vicinity of discharge will be reduced, but effects are usually minimised by rapid dilution in massive receiving body of water; planktonic organisms most vulnerable receptor. Potential NORM impacts? Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments.	Treated water discharged to sea after cleaning. Solids will be shipped to shore for disposal.		• Transfer of controlled, hazardous, and special wastes to UK ports for disposal will be governed by waste management plans.			Scoped out
				Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub- lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed - expected to be minor		• Activities which may lead to seabed disturbance planned, managed, and implemented in such a way that disturbance is minimised. A Marine License will be in place for any planned operational disturbance • Natural backfill of the excavated areas, no planned mechanical backfill, or remedial seabed levelling of pipeline corridors • Debris survey undertaken on completion of the activities and where possible resultant debris will be recovered		There have been no sensitive habitats or species identified during the surveys. However, due to the number of installations to be removed, an assessment of the footprint is required.	Scoped in
			Lifting and Removal	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub- lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed - expected to be minor.		• Activities which may lead to seabed disturbance planned, managed, and implemented in such a way that disturbance is minimised. A Marine License will be in place for any planned operational disturbance • Natural backfill of the excavated areas, no planned mechanical backfill, or remedial seabed levelling of pipeline corridors • Debris survey undertaken on completion of the activities and where possible resultant debris will be recovered • Minimising disturbance to seabed from overtrawl through liaison with fishing organisations and regulator.		There have been no sensitive habitats or species identified during the surveys. However, due to the number of installations to be removed, an assessment of the footprint is required.	Scoped in

Table C.3: ENVID Summary Results – Decommissioning Activities

Operational Phase	Project Element	Operation / Aspect	Activity	Summary of Environmental Impact	Existing Controls (Standards, Legislative, or Prescriptive)	Primary Assessment	EnQuest -Specific / Best Practice Standards	Secondary Assessment	Comment	Status
Decommissioning Activities	**Protection/ Stabilisation materials**	Concrete mattresses and grout bags	Lifting and Removal - Most concrete mattresses to be removed, except when buried under deposited rocks (crossings).	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub- lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed - expected to be minor				There have been no sensitive habitats or species identified during the surveys. However, due to the number of installations to be removed, an assessment of the footprint is required.	Scoped in
		Rock deposits	Existing deposited rock to leave in situ Small quantities of rock may be required where exposed pipeline ends remain after severance at existing deposited rock.	No impact anticipated to the seabed. Snagging risk to demersal fisheries.	Continued monitoring for an agreed period and spot remediation as required, accurate mapping of decommissioned in situ location and state.		Overtrawl survey		Assessed due to requirement to calculate total footprint	Scoped in

Table C.4: ENVID Summary Results – Decommissioning Activities (cont'd…)

Operational Phase	Project Element	Operation / Aspect	Activity	Summary of Environmental Impact	Existing Controls (Standards, Legislative, or Prescriptive)	Primary Assessment	EnQuest -Specific / Best Practice Standards	Secondary Assessment	Comment	Status
Decommissioning Activities	**Pipelines and Umbilicals**	Decommissioned *in situ*	Residuals	Liquid / solid discharge to sea - Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments.	Treated water discharged to sea after cleaning. Solids will be shipped to shore for disposal.		• All contracted vessels will operate in line with IMO and MARPOL regulations • Pipelines and spool are to be flushed, filled with seawater, and isolated prior to disconnection • All discharges will be permitted under applicable UK legislation. • Transfer of controlled, hazardous and special wastes to UK ports for disposal will be governed by waste management plans.		There may be some residuals from when cuts take place, but small volumes to shoot out at end, but these will be permitted with flushing of pipelines.	Scoped out
			Freespans	Snagging risk to trawl and other demersal fisheries	Continued monitoring for an agreed period and spot remediation as required, accurate mapping of decommissioned in situ location and state.		• Small quantities of rock may be required where exposed pipeline ends remain after severance at existing deposited rock. • Overtrawl survey			Scoped out
			Rock placement on pipeline ends	Introduction of new substrate which may alter habitat architecture, influencing water movement, sediment accumulation and light conditions.	Minimise introduction of material where possible		• Seabed clearance certificate issued if an overtrawl survey is carried out, otherwise survey findings will be described in the close out report.			Scoped in
				Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific. estimate within EA. Lethal/sub- lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed.		• Small quantities of rock may be required where exposed pipeline ends remain after severance at existing deposited rock; • Seabed clearance certificate issued if an overtrawl survey is carried out, otherwise survey findings will be described in the close out report.		Relatively small footprint compared to volume of fishing taking place in surrounding edges	Scoped in

Table C.5: ENVID Summary Results – Decommissioning Activities (cont'd…)

Operational Phase	Project Element	Operation / Aspect	Activity	Summary of Environmental Impact	Existing Controls (Standards, Legislative, or Prescriptive)	Primary Assessment	EnQuest -Specific / Best Practice Standards	Secondary Assessment	Comment	Status
Decommissioning Activities	**Pipelines & umbilicals**	Removal	Cut & lift or backhaul	Liquid / solid discharge to sea - Water quality in immediate vicinity of discharge will be reduced, but effects are usually minimised by rapid dilution in massive receiving body of water; planktonic organisms most vulnerable receptor. Potential NORM impacts. Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments.	Treated water discharged to sea after cleaning. Solids will be shipped to shore for disposal.		• All contracted vessels will operate in line with IMO and MARPOL regulations • Pipelines and spool are to be flushed, filled with seawater, and isolated prior to disconnection • All discharges will be permitted under applicable UK legislation. • Transfer of controlled, hazardous and special wastes to UK ports for disposal will be governed by waste management plans.		Covered under permits.	Scoped out
				Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub- lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed .		• Activities which may lead to seabed disturbance planned, managed, and implemented in such a way that disturbance is minimised. A Marine License will be in place for any planned operational disturbance • Natural backfill of the excavated areas, no planned mechanical backfill, or remedial seabed levelling of pipeline corridors • Debris survey undertaken on completion of the activities and where possible resultant debris will be recovered • Minimising disturbance to seabed from overtrawl through liaison with fishing organisations and regulator.		There have been no sensitive habitats or species identified during the surveys.	Scoped in

Table C.6: ENVID Summary Results – Decommissioning Activities (cont'd…)

Operational Phase	Project Element	Operation / Aspect	Activity	Summary of Environmental Impact	Existing Controls (Standards, Legislative, or Prescriptive)	Primary Assessment	EnQuest -Specific / Best Practice Standards	Secondary Assessment	Comment	Status
Legacy	Surveys	Surveys for post-decommissioned infrastructure left in-situ	Geotechnical survey activities - may include grab sampling	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub- lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed.		• Activities which may lead to seabed disturbance planned, managed, and implemented in such a way that disturbance is minimised. A Marine License will be in place for any planned operational disturbance • Natural backfill of the excavated areas, no planned mechanical backfill, or remedial seabed levelling of pipeline corridors • Debris survey undertaken on completion of the activities and where possible resultant debris will be recovered • Minimising disturbance to seabed from overtrawl through liaison with fishing organisations and regulator.		Seabed disturbance from benthic surveys will be minute and limited to the immediate vicinity of the installations, with the odd grab sample along the pipelines, though this is unlikely.	Scoped out as no significant impacts identified
			Geophysical survey activities	Underwater noise - Physiological harm, behavioural modifications to marine mammals, turtles and potentially fish. Population impacts due to cumulative impact or impacting a reproductively significant number of individuals or location.	Noise impacts to marine species from use of seismic, sub-bottom profiler, and other survey equipment. JNCC (2017) Guidelines will be employed for mitigation of noise impacts to marine mammals for future survey work involving seismic survey equipment.		• Future permitting will cover post-decommissioning geophysical surveys. Multibeam will likely be used for imaging and identification of any exposures.		Covered by future permitting	Scoped out as covered by future permitting
	Remediation	Remediation of spans	Rock dump/ reburial	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub- lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed .		• The use of rockdump will be minimised where possible.		There have been no sensitive habitats or species identified during the surveys.	Scoped in
	Degradation	Degradation of substructure	Long-term release of pipeline constituents	Liquid / solid discharge to sea - Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments.	Continued monitoring for an agreed period and remediation if required, accurate mapping of decommissioned in situ location and state.		• All contracted vessels will operate in line with IMO and MARPOL regulations • Pipelines and spool are to be flushed, filled with seawater, and isolated prior to disconnection • All discharges will be permitted under applicable UK legislation. • Transfer of controlled, hazardous and special wastes to UK ports for disposal will be governed by waste management plans.			Scoped out
			Free spans	Snagging risk to trawl and other demersal fisheries. Fisheries statistics show that the area is used by demersal trawlers, although fishing activity is low.	Continued monitoring for an agreed period and remediation if required, accurate mapping of decommissioned in situ location and state.		• Eventual corrosion and collapse of structures pose a potential snagging risk. Continued monitoring and remediation will be undertaken where required.		The area is used by demersal trawlers, although fishing activity is low. Due to demersal fisheries activity, there is a requirement for assessing the impact further.	Scoped in

Table C.7: ENVID Summary Results – Legacy

Operational Phase	Project Element	Operation / Aspect	Activity	Summary of Environmental Impact	Existing Controls (Standards, Legislative, or Prescriptive)	Primary Assessment	EnQuest -Specific / Best Practice Standards	Secondary Assessment	Comment	Status
Unplanned events	**Vessels**	Significant Hydrocarbon release	Unplanned collision	Catastrophic loss of containment. Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments.	OPEP MAS Navaids SOPEP		• All contracted vessels will have a ship-board oil pollution emergency plan (SOPEP) in place • A Collision Risk Management Plan will be developed and implemented • Agreed arrangements in place with oil spill response organisation for mobilising resources in event of a spill • Existing field OPEP in place to reduce the likelihood of hydrocarbon release and define spill response in place • Lifting operations will be planned to manage the risk • Vessel contactors will have procedures for fuel bunkering that meet EnQuest's standard • Where practicable, re-fuelling will take place during daylight hours only.		Risk of collision is low given location in an area of low to very low activity.	Scoped out as no significant impacts identified
		Dropped Objects	Unplanned loss of material to sea	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub-lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed. Seabed impact negligible.		• Everything will be endeavoured to be retrieved. All unplanned losses in the marine environment will be attempted to be remediated, and notifications to other mariners will be sent out. Debris clearance surveys will aid in the identification of any dropped objects.			Scoped out as no significant impacts identified

Table C.8: ENVID Summary Results – Unplanned Vessel Impacts

Appendix D DON FIELDS MATERIALS INVENTORY

Subsea installation including stabilisation feature	Total number	Total mass (Te) and dimensions
SALB	1	103.1Te 13m x 13m x 8.1m
PL2578 8” Oil Export and PLU2580 Thistle 3” SSIV umbilical riser base and protection structure	1	62.5Te 6.1m x 2.8m x 0.5m
PL2579 3” SSIV & Protection Structure	1	34Te 6m x 3.5m x 3.0m
PL2579 3” gas import riser base and protection structure	1	29Te 3.8m x 2.8m x 0.5m

Table D.1: Combined DSW & West Don pipeline structures

Type	Pipeline Number	Diameter (inches or mm)	Length (m)	Component
Oil export pipeline	PL2578	8″	5,086	Carbon steel flowline
Gas Import/export	PL2579	3″	5,086	Carbon steel flowline
		3″	45	Expansion spool
		3″	10,089	Carbon steel flowline
		3″	30	Expansion spools
		3″	7	
		175.9mm	300	Flexible riser
Control umbilical	PLU2580	87mm	300	Static umbilical
	PLU2580JSO	66mm	105	Flexible thermoplastic umbilical

Table D.2: Combined DSW & West Don pipelines, flowlines and umbilicals

Subsea installation/ stabilisation feature	Total number	Total mass (Te)	Location
Concrete mattresses(6m x 2m x 0.15m or 6m x 3m x 0.15m)	46	150.9	PL2578 & PL2579 PLU2580JSO and PLU2580JSG
Grout bags (25 kg)	1,280	32	PLU2580
Deposited rock	1	18,784	PL2578& PL2579
	1	38	PL2578& PL2579

Table D.3: Combined DSW & West Don stabilisation features

Subsea installation/stabilisation feature	Total number	Size / mass (Te)
Conrie WHPS	1	8.814m x 9.169m x 6.654m 55.9Te

Table D.4: Conrie subsea installation

Pipeline Number	Diameter (inches or mm)	Length (m)	Component
PL2572	8″	38m	Pipespool, duplex
PL2573	3″	40m	Pipespool, carbon steel
PLU2576JP4	114.5mm	75m	Umbilical jumper

Table D.5: Conrie pipelines, flowlines and umbilicals

Subsea installation/ stabilisation feature	Total number	Total mass (Te)	Location
Concrete mattresses (6m x 2m x 0.15m or 6m x 3m x 0.15m)	17	28.3	PL2572
	11	34.6	PL2576JP4
Grout bags	80	2	PL2572, PL2573 and PL2576JP4.

Table D.6: Conrie pipeline stabilisation features

Subsea installation/ stabilisation feature	Total number	Size / mass (Te)
DSW P1	1	8.8m x 9.2m x 6.7m 55.9Te
DSW P2	1	8.8m x 9.2m x 6.7m 55.9Te
DSW P3	1	8.8m x 9.2m x 6.7m 55.9Te
DSW P5	1	8.8m x 9.2m x 6.7m 55.9Te
DSW P6	1	8.8m x 9.2m x 6.7m 55.9Te
DSW P7	1	8.8m x 9.2m x 6.7m 55.9Te
DSW WI1	1	8.8m x 9.2m x 6.7m 55.9Te
DSW WI2	1	8.8m x 9.2m x 6.7m 55.9Te
DSW WI3	1	8.8m x 9.2m x 6.7m 55.9Te
DSW WI4	1	8.8m x 9.2m x 6.7m 55.9Te

Table D.7: DSW subsea installations

Description	Pipeline Number	Diameter (inches or mm)	Length (m)	Component
Oil pipeline	PL2572	8″	314	Duplex and carbon steel expansion spools and gate valves
Gas lift pipeline	PL2573	3″	350	Carbon steel expansion spools and gate valves
Static umbilical	PLU2576	114.5mm	10	Static umbilical jumpers
Umbilical jumper	PLU2576JP1	114.5mm	76	Static umbilical jumpers
Umbilical jumper	PLU2576JP2	114.5mm	75	Static umbilical jumpers
Umbilical jumper	PLU2576JP3	114.5mm	75	Static umbilical jumpers
Umbilical jumper	PLU2576JP5	114.5mm	115	Static umbilical jumpers
Umbilical jumper	PLU2576JP6	114.5mm	144	Static umbilical jumpers
Umbilical jumper	PLU2576JP7	129mm	175	Static umbilical jumpers
Static umbilical	PLU2577	116.5mm	1,312	Static umbilical jumpers
Static umbilical	PLU2577JWI2	116.5mm	30	Static umbilical jumpers
Static umbilical	PLU2577JWI3	116.5mm	30	Static umbilical jumpers
Static umbilical	PLU2577JWI4	116.5mm	30	Static umbilical jumpers
Water injection pipeline	PL2581	8″	5,237	Carbon steel pipeline
		8″	27	Expansion spool
Replacement water injection pipeline	PL4262	228.1mm	5,550	Flexible pipeline
		8″	109	Pipespools
Oil export pipeline	PL4557	8″	5	Carbon steel pipespool

Table D.8: DSW pipelines, flowlines and umbilicals

Subsea installation/stabilisation feature	Total number	Size / mass (Te)	Location
DSW SDU and protection structure (8.5m x 5.2m x 3.5m)	1	45.5Te	DSW SDU
DSW SDU and protection structure piles (4x)	1	34.2Te	PL2572
Concrete mattresses (6m x 2m x 0.15m or 6m x 3m x 0.15m)	10	79.1	PL2572
	59	231.1	PL2572
	12	37.7	PLU2576
	73	229.5	PLU2576JP1 through JP7
	47	202.8	PLU2577
	13	53.4	PLU2577JWI2, PLU2577JWI3, PLU2577JWI4
	18	84.9	PL2581

Subsea installation/stabilisation feature	Total number	Size / mass (Te)	Location
	7	38.9	PL4262
	17	80.2	PL4262
Grout bags	400	10	PL2572 and PL2573
	40	1	PL2576JP1
	40	1	PL2576JP2
	80	2	PL2576JP3
	320	8	PL2576JP5
	240	6	PL2576JP6
	280	7	PL2576JP7
	40	1	PLU2577
	40	1	PLU2577JWI2
	40	1	PLU2577JWI3
	40	1	PLU2577JWI4
	40	1	PL2581
	720	18	PL4262
	3	3	PL2577JWI4
Deposited rock	1	~41,000	PL2572, PL2573 and PLU2576
	1	~25,090	PL4262
	1	~915	PL4262

Table D.9: DSW subsea pipeline stabilisation features

Subsea installation/ stabilisation feature	Total number	Size / mass (Te)
West Don P1	1	55.9Te 8.8m x 9.2m x 6.7m
West Don P2	1	55.9Te 8.8m x 9.2m x 6.7m
West Don P3	1	55.9Te 8.8m x 9.2m x 6.7m
West Don WI1	1	55.9Te 8.8m x 9.2m x 6.7m
West Don WI2	1	55.9Te 8.8m x 9.2m x 6.7m

Table D.10: West Don subsea installations

Description	Pipeline Number	Diameter (inches or mm)	Length (m)	Component
Water injection pipeline	PL2582	8″	2,274	Pipeline
		8″	27	Pipespools

Description	Pipeline Number	Diameter (inches or mm)	Length (m)	Component
Oil pipeline	PL2583	8″	141	Duplex and carbon steel pipespools
		8″	2,300	Pipeline
Gas injection pipeline	PL2584	8″	2,300	Carbon steel flowline
Gas injection pipeline	PL2584	3″	145	Carbon steel pipespools
Static umbilical	PLU2585	114.5mm	2,600	Static umbilical
Umbilical jumper	PLU2585JP1	n/a	50	Umbilical jumper
	PLU2585JP2	n/a	50	
	PLU2585JP3	n/a	60	
	PLU2585JW1	n/a	50	
	PLU2585JW2	n/a	90	
Water injection pipeline	PL4261	228.1mm	2,842	Flexible pipeline
Water injection pipeline	PL4261	8″	81	Pipespools

Table D.11: West Don pipelines, flowlines and umbilicals

Subsea installation/ stabilisation feature	Total number	Size / mass (Te)	Location
West Don SDU and protection structure (8.5m x 5.2m x 3.5m)	1	45.5Te	West Don SDU
West Don SDU and protection structure piles (4x)	1	34.2 Te	West Don SDU
Concrete mattresses (6m x 2m x 0.15m or 6m x 3m x 0.15m)	46	157.2	PL2583
	24	75.5	PLU2585
	2	6.3	PLU2584JP1
	5	15.7	PLU2584JP2
	5	29.9	PLU2584JP3
	4	12.6	PLU2585JW1
	13	40.9	PLU2585JW2
	32	128.9	PL4261
Grout bags	40	1	PLU2584JP1
	40	1	PLU2584JP2
	40	1	PLU2584JP3
	40	1	PLU2585JW1
	40	1	PLU2585JW2

Subsea installation/ stabilisation feature	Total number	Size / mass (Te)	Location
	1,115	33.4	PL4261
Deposited rock	1	~3,800	PL2583 and PL2584
	1	~22,000	PL2583 and PL2584
	1	~9,359	PL4261

Table D.12: West Don pipeline stabilisation features

Subsea installation/ stabilisation feature	Total number	Size / mass (Te)
Ythan WHPS	1	55.9Te 8.8m x 9.2m x 6.7m

Table D.13: Ythan subsea installation features

Pipeline Number	Diameter (inches or mm)	Length (m)	Component
PL3749	8″	38.8	Pipespool, duplex
PL3751	3″	46.8	Pipespool, carbon steel
PL3752	n/a	165	Electrical umbilical
PLU3753	1	41mm	Chemical umbilical
PLU3754	1	129mm	Umbilical jumper

Table D.14: Ythan pipelines, flowlines and umbilicals

Subsea installation/ stabilisation feature	Total number	Mass (Te)	Location
Concrete mattresses (6m x 2m x 0.15m or 6m x 3m x 0.15m)	6	18.9	PL3749
	18	56.6	PLU3753
	6	18.9	PLU3754
Grout bags	480	12	PL3749
	560	14	PLU3753
	560	14	PLU3754

Table D.15: Ythan pipeline stabilisation features

Appendix E DEPTH OF BURIAL PROFILES

The sections below illustrate the depth of burial profiles for buried flowlines across the Don fields, including those within the DSW, Conrie, Ythan and West Don fields.

Appendix E.1 Combined DSW and West Don pipelines

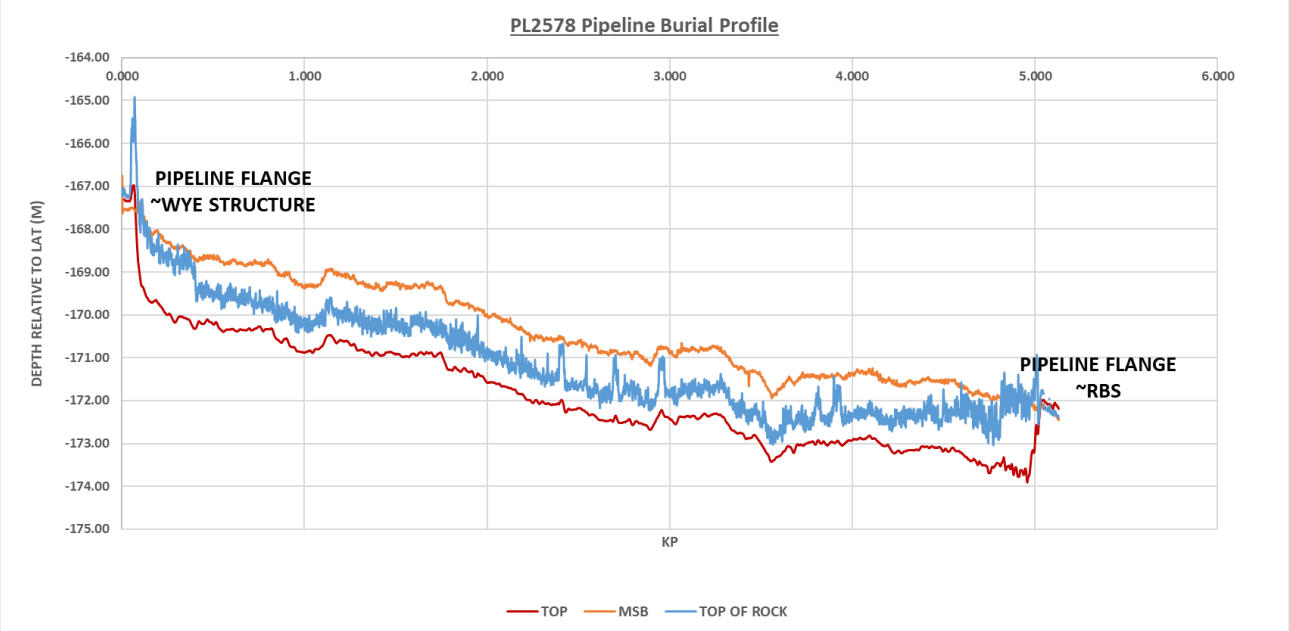

Figure E.1.1: PL2578 seabed & burial profile

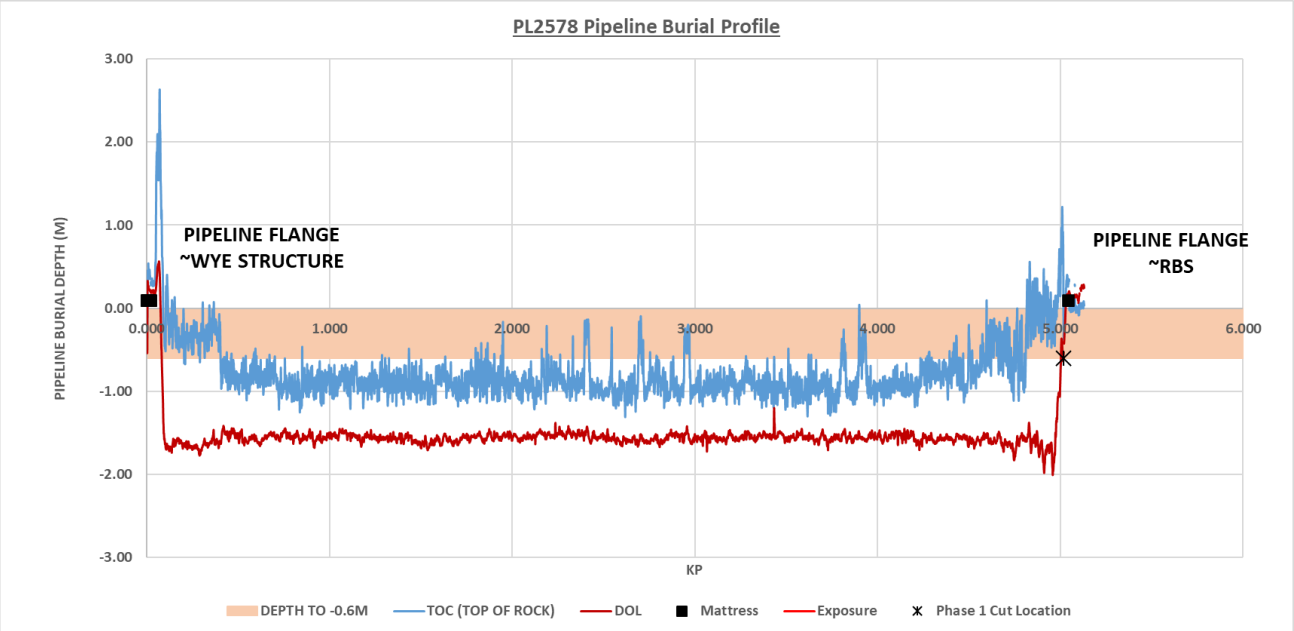

Figure E.1.2: PL2578 depth of burial profile

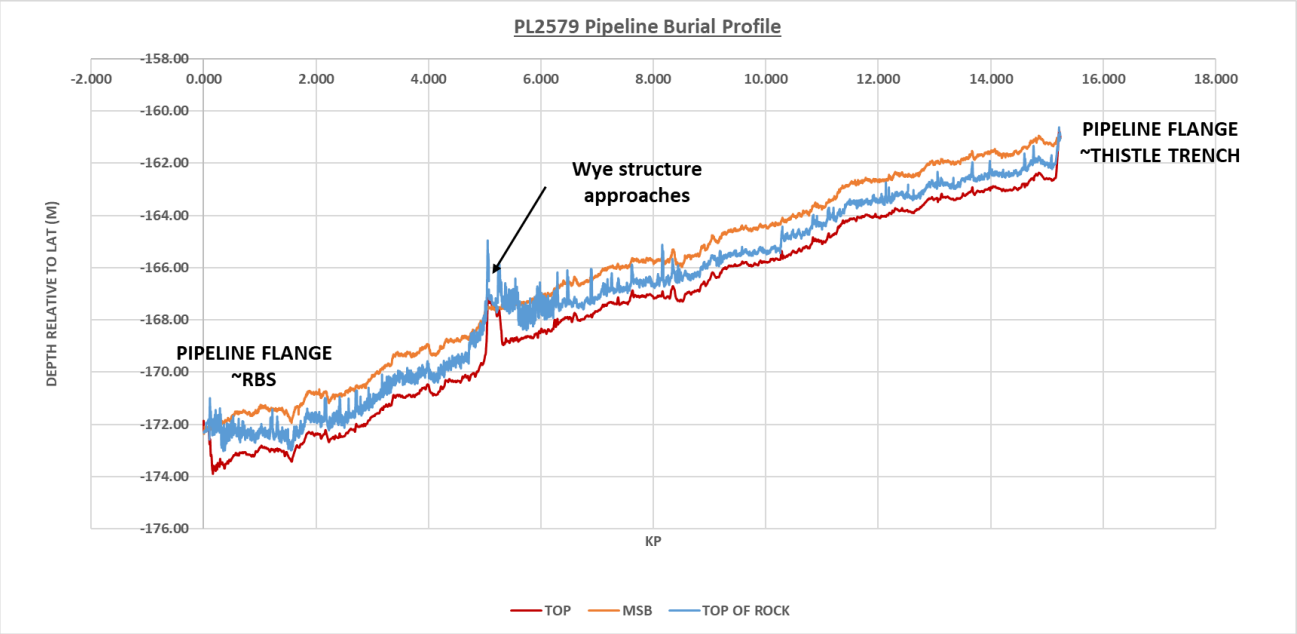

Figure E.1.3: PL2579 seabed & burial profile

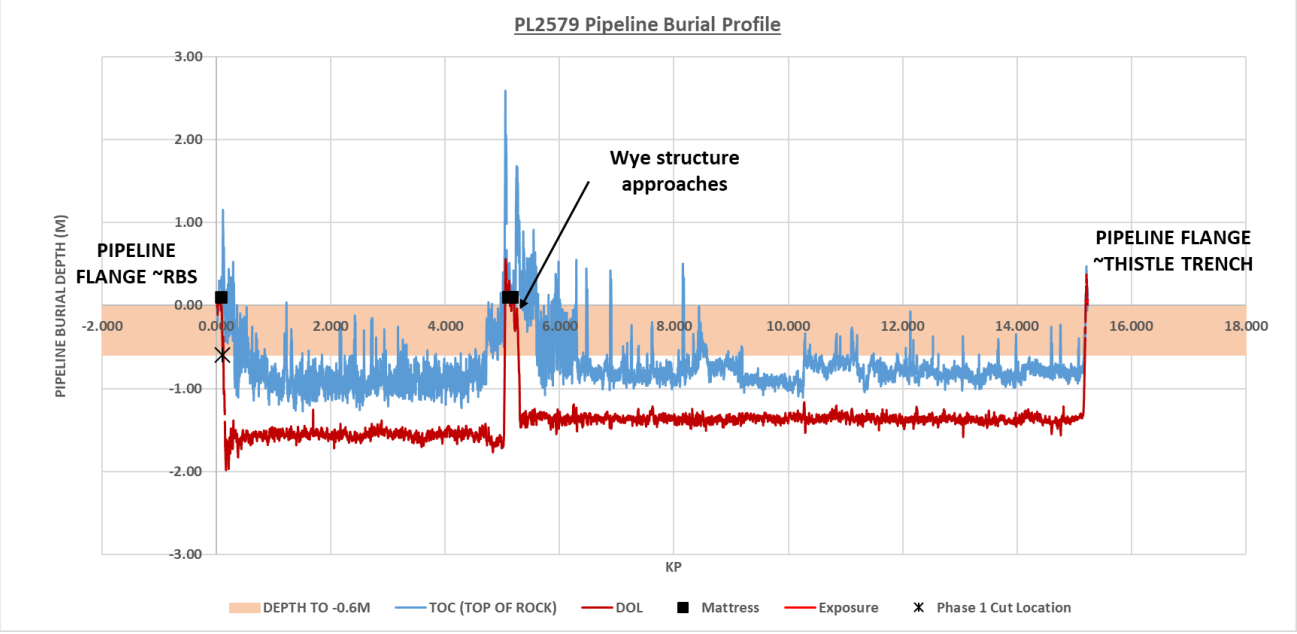

Figure E.1.4: PL2579 depth of burial profile

Appendix E.2 DSW pipelines

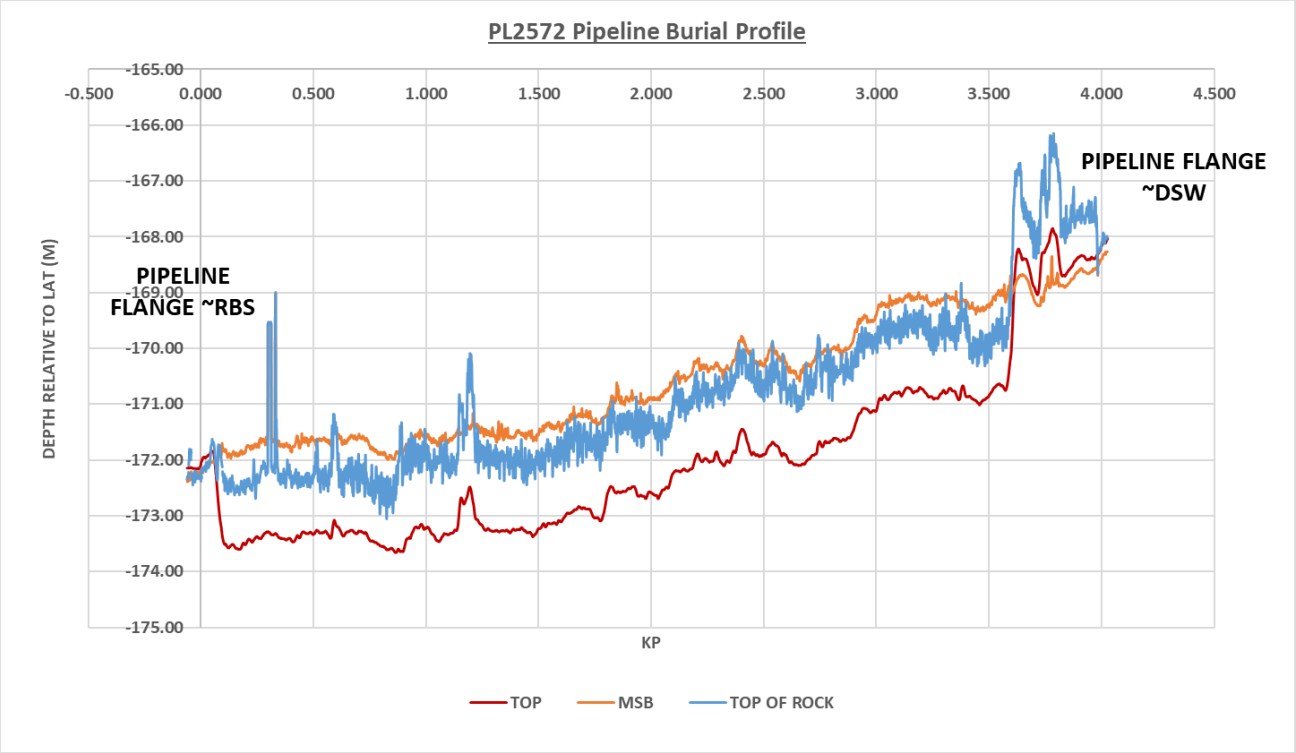

Figure E.2.1:PL2572 seabed & burial profile

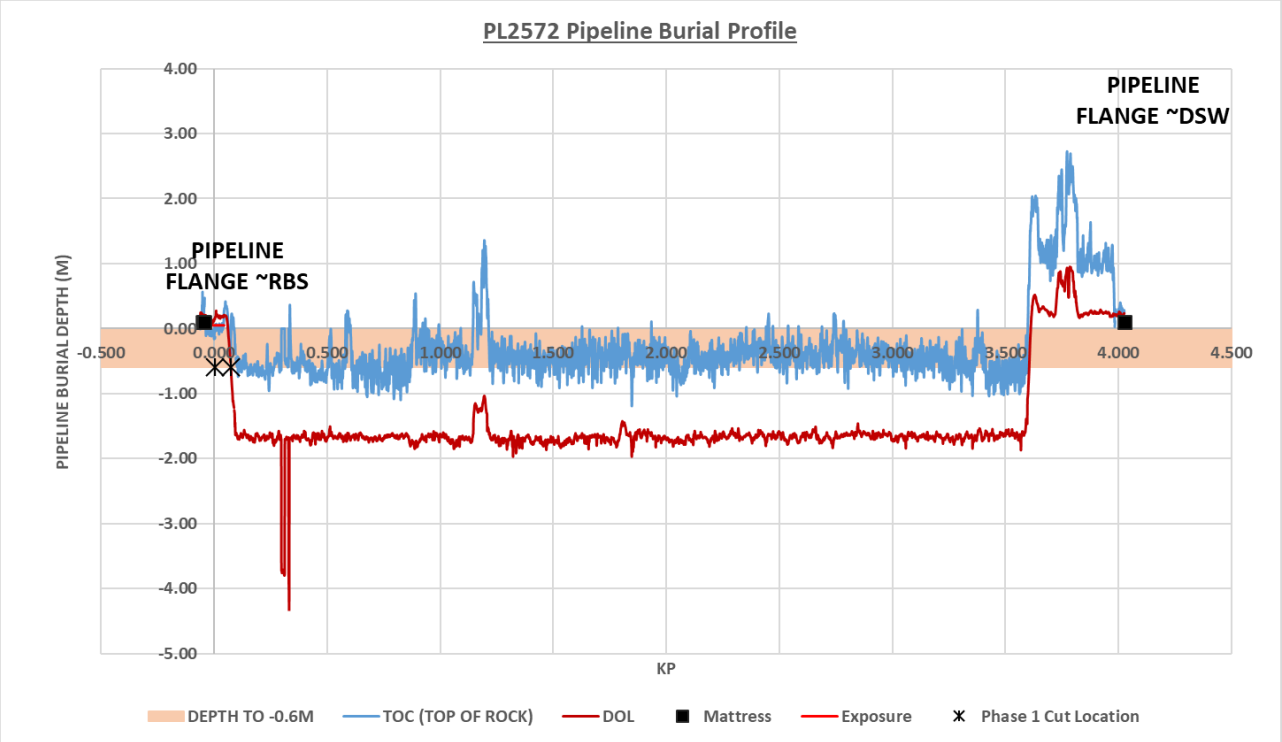

Figure E.2.2: PL2572 depth of burial profile

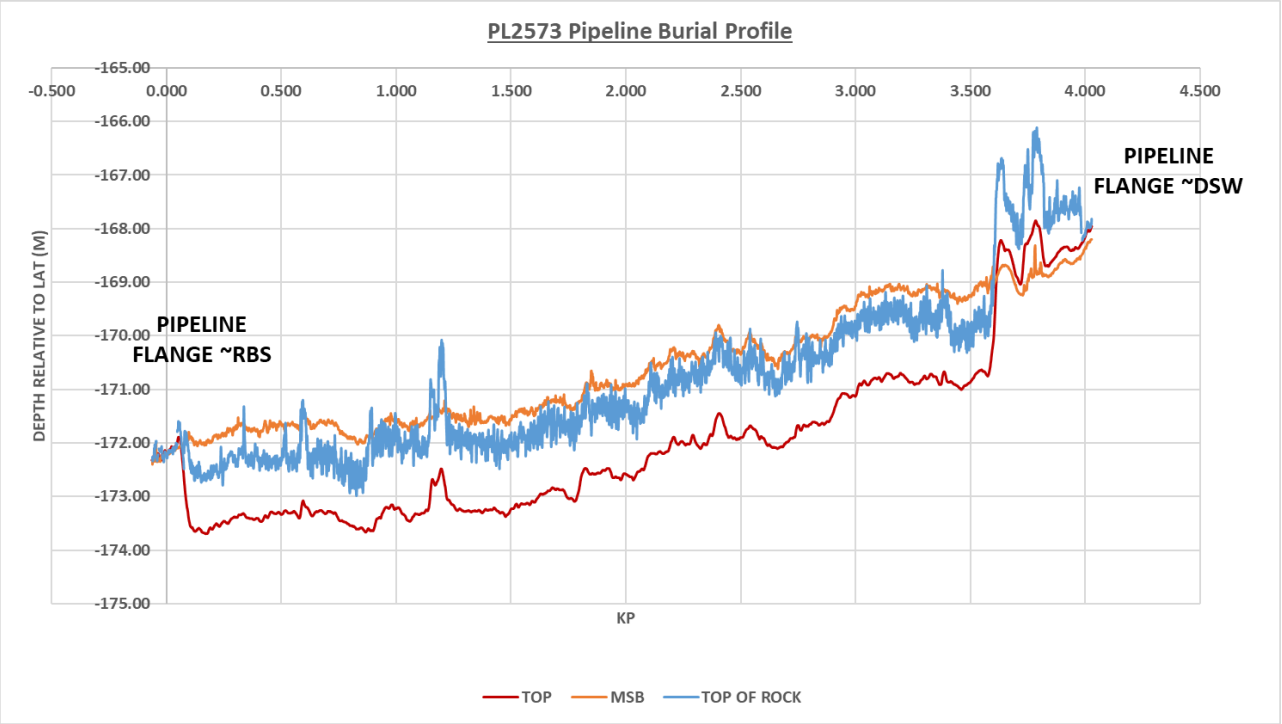

Figure E.2.3: PL2573 seabed & burial profile

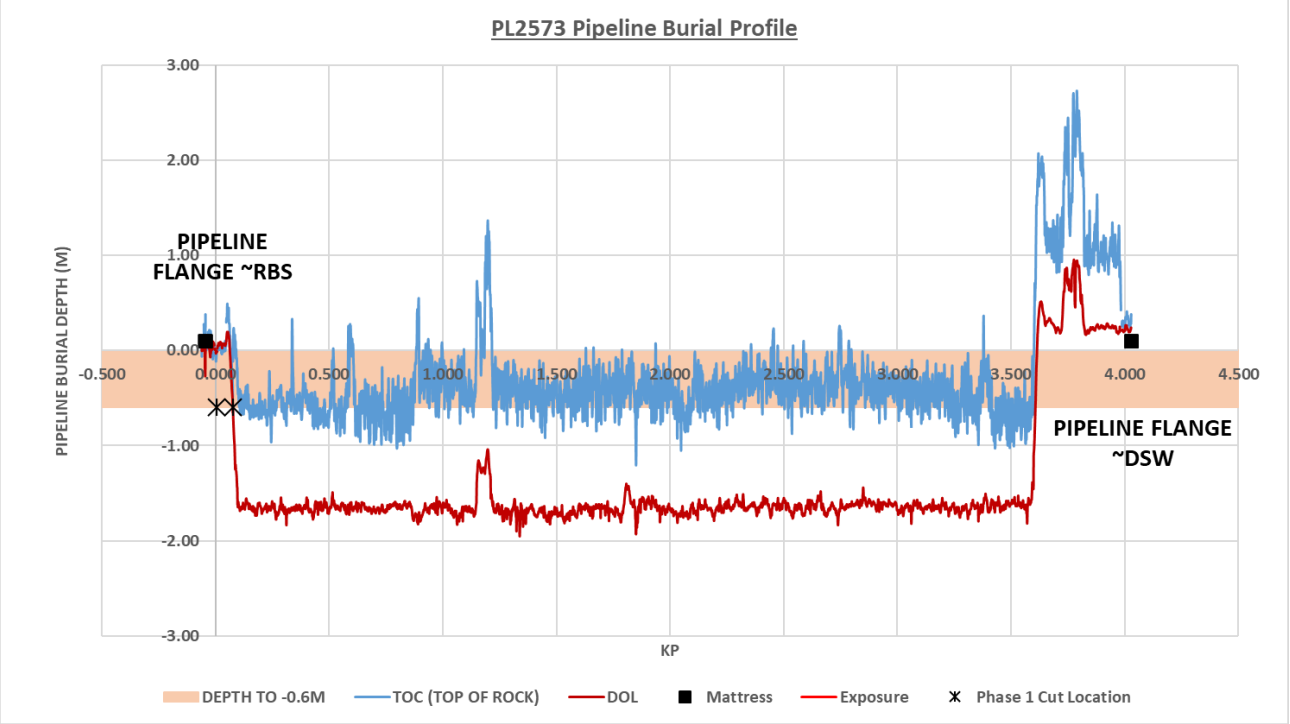

Figure E.2.4: PL2573 depth of burial profile

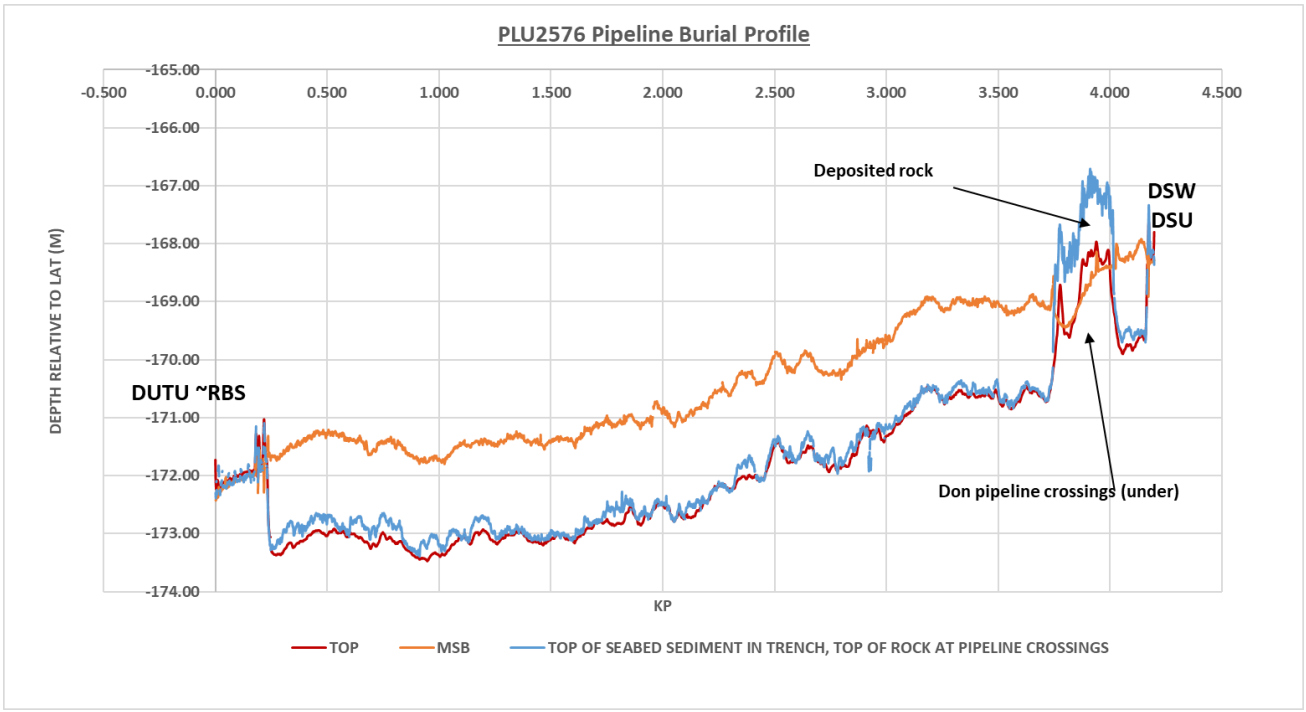

Figure E.2.5: PLU2576 seabed & burial profile

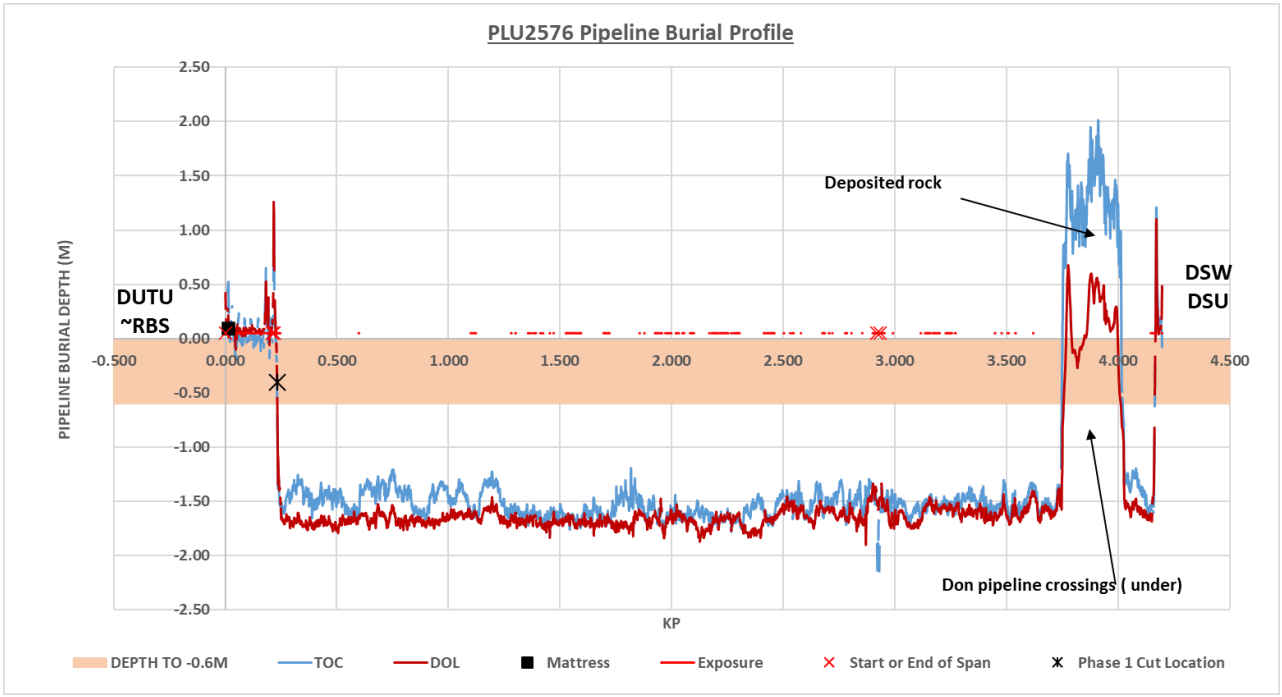

Figure E.2.6: PLU2576 depth of burial profile

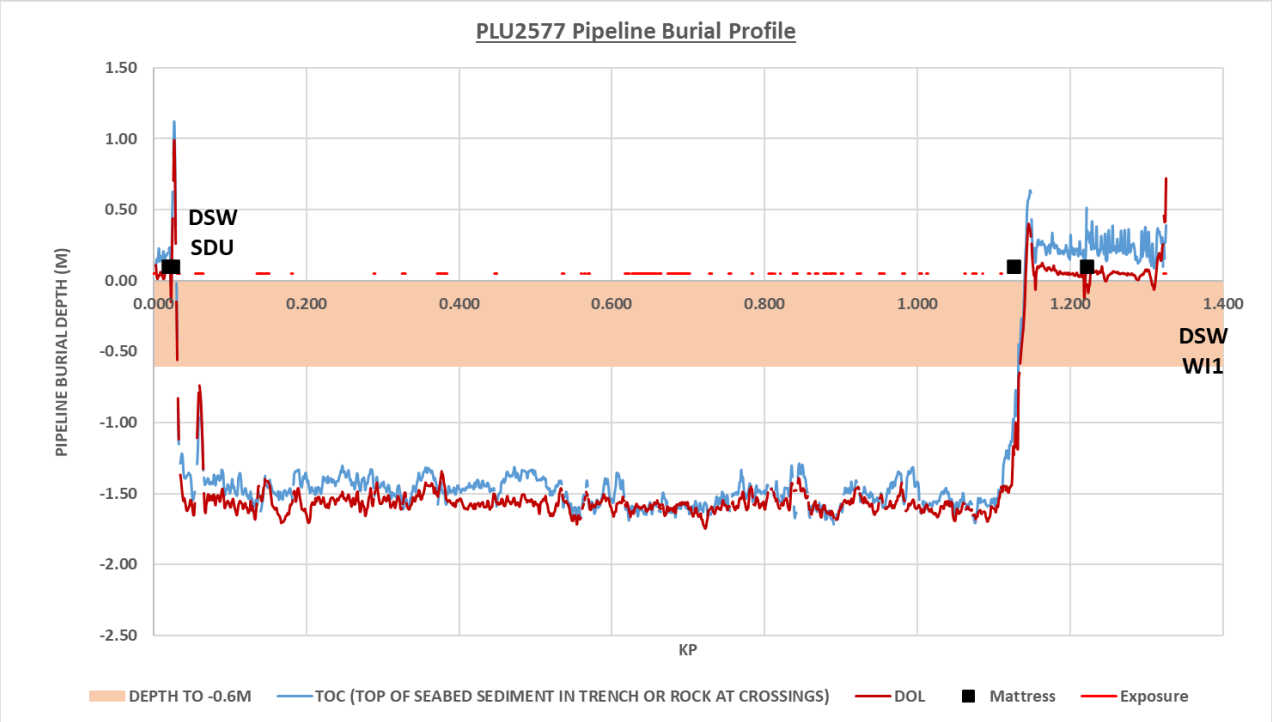

Figure E.2.7: PLU2577 seabed & burial profile

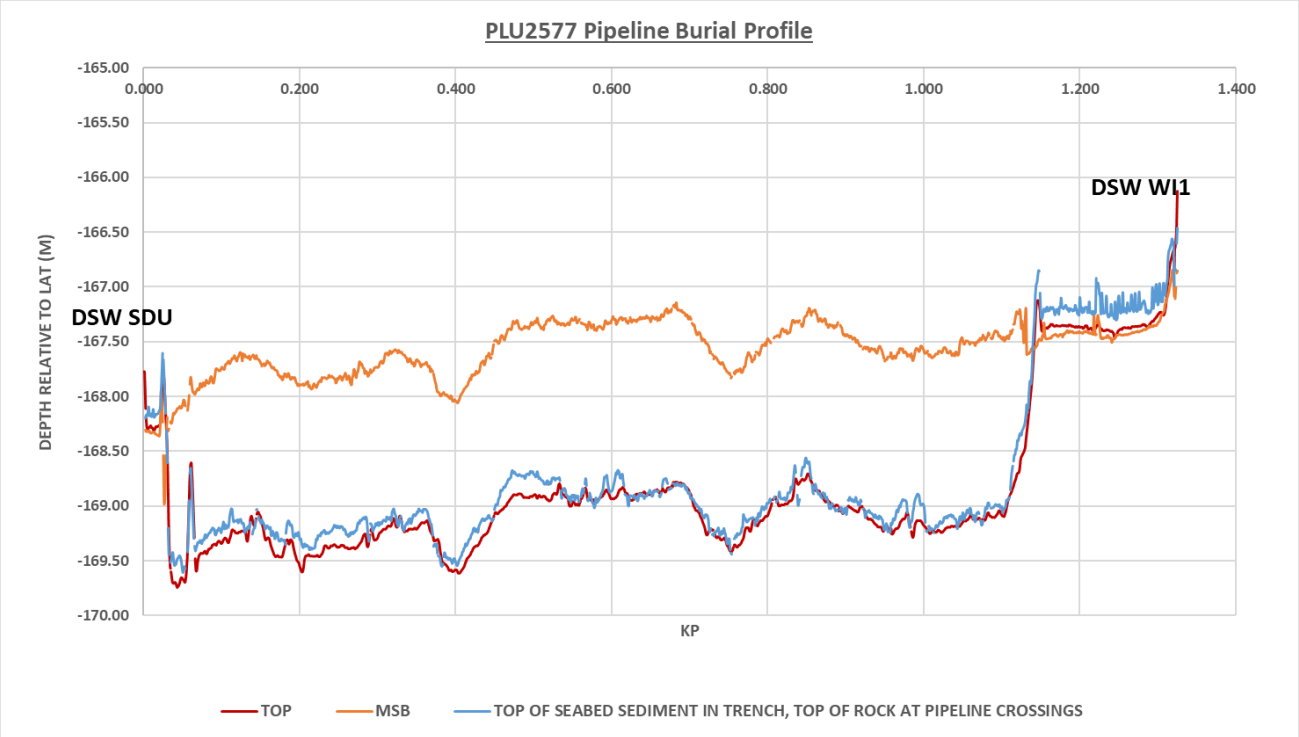

Figure E.2.8: PLU2577 depth of burial profile

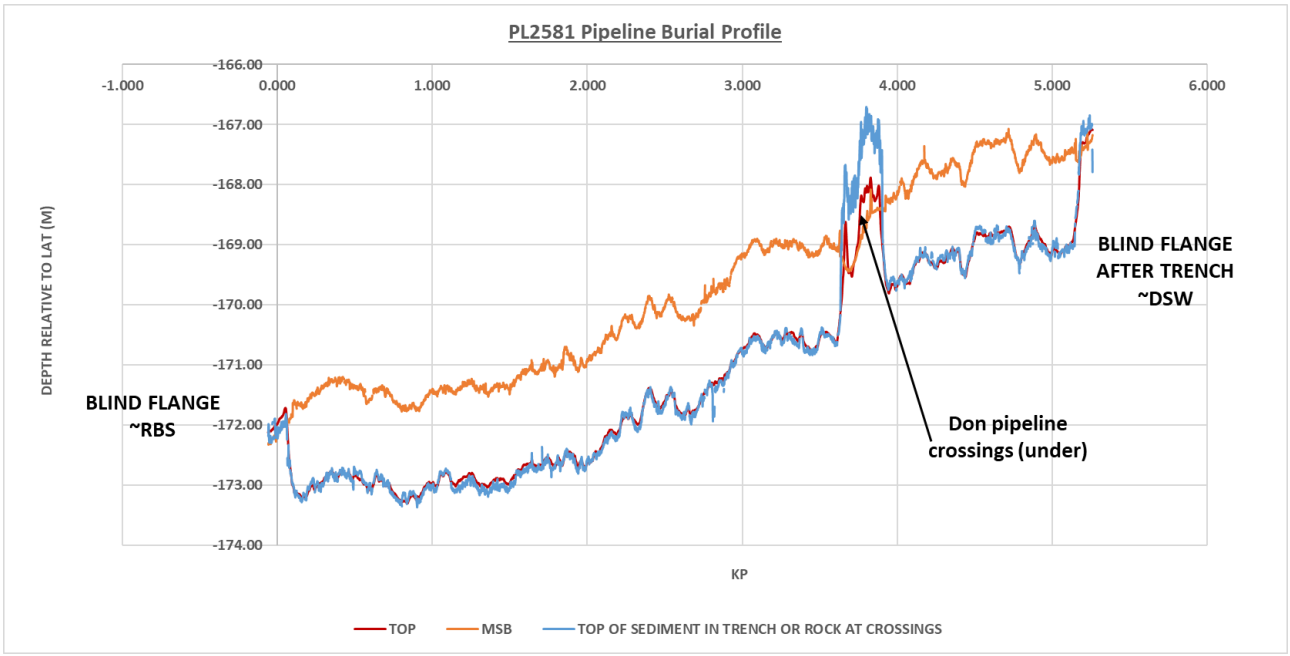

Figure E.2.9: PL2581 seabed & burial profile

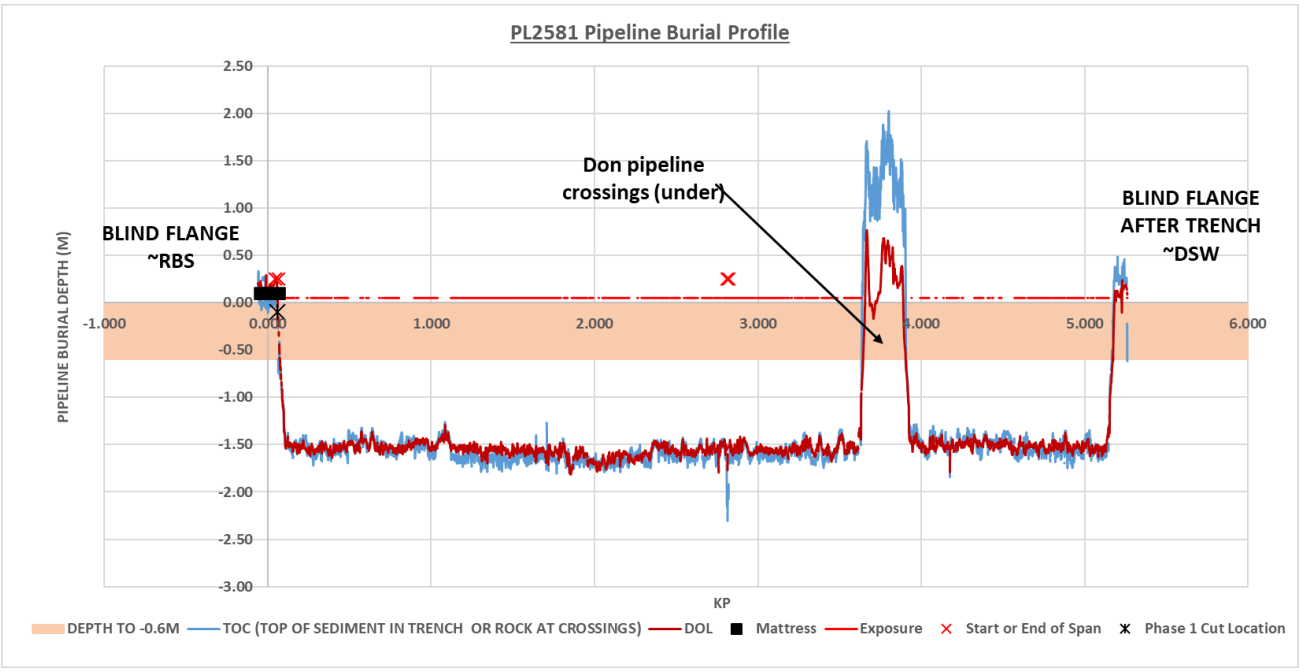

Figure E.2.10: PL2581 depth of burial profile

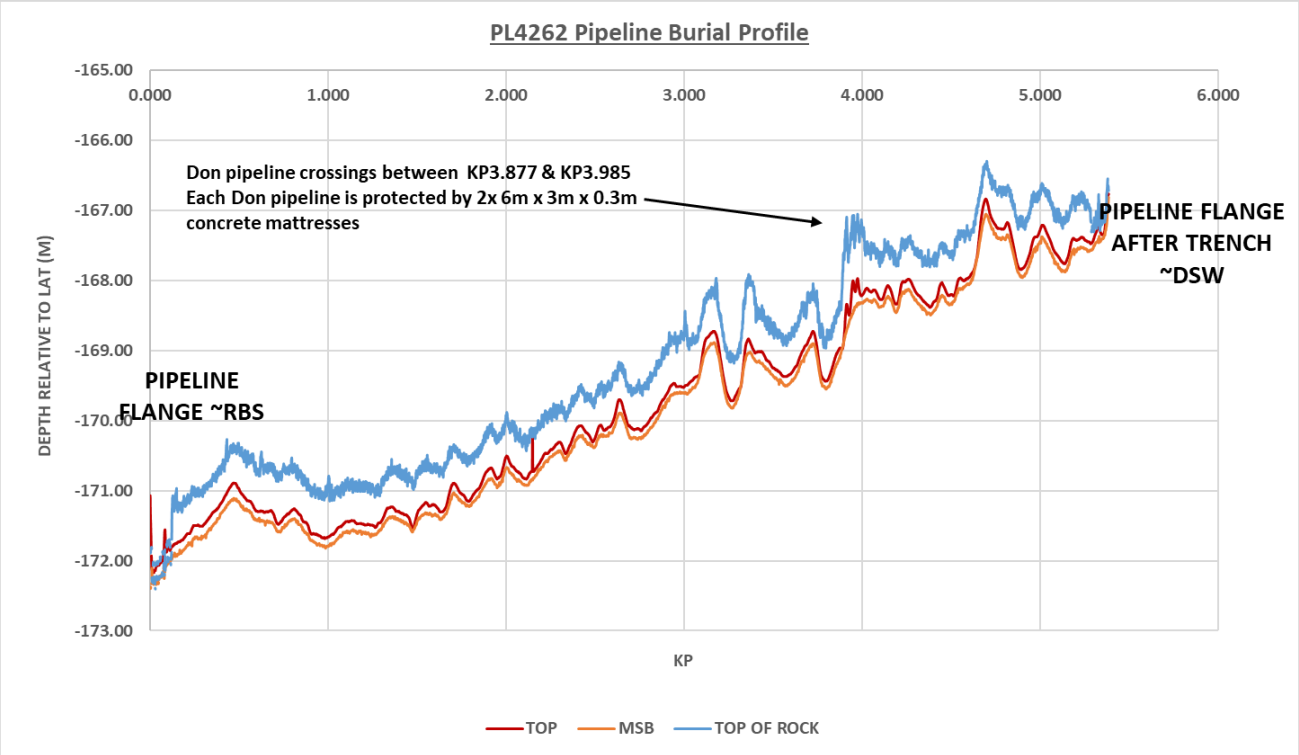

Figure E.2.11: PL4262 seabed & burial profile

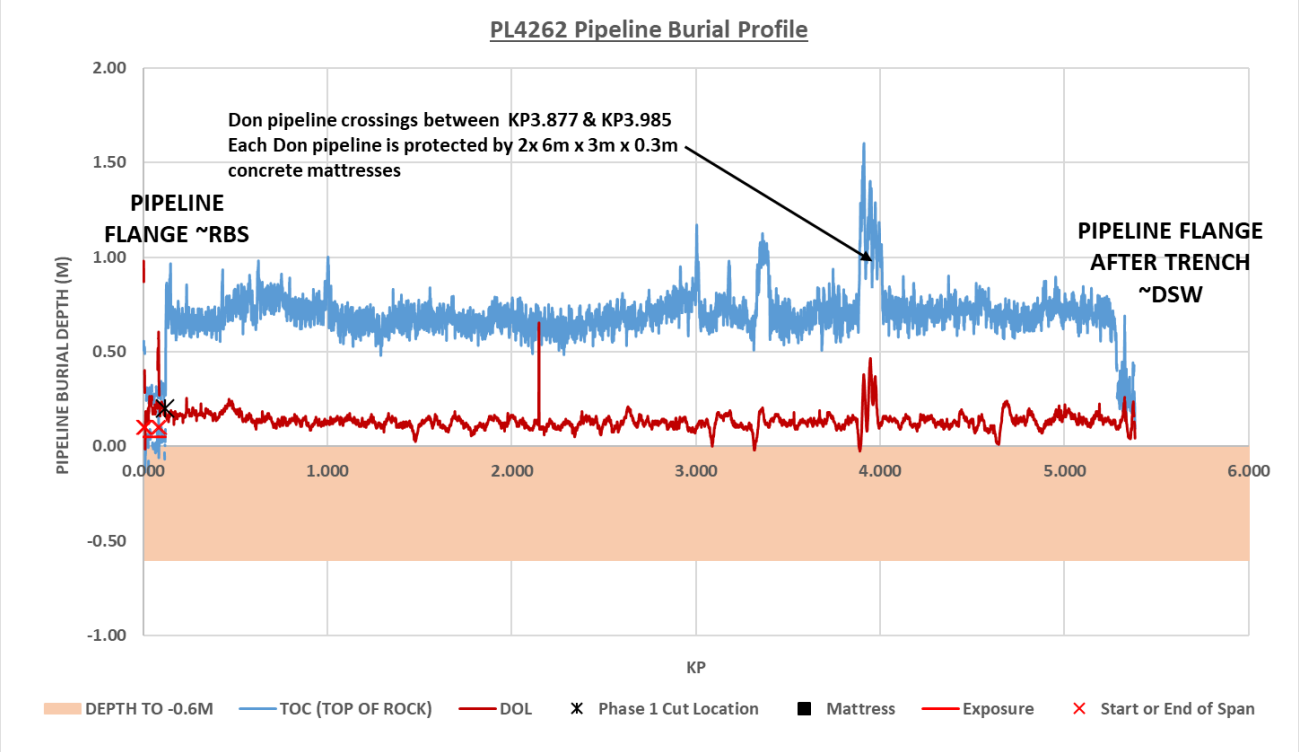

Figure E.2.12: PL4262 depth of burial profile

Appendix E.3 West Don pipelines

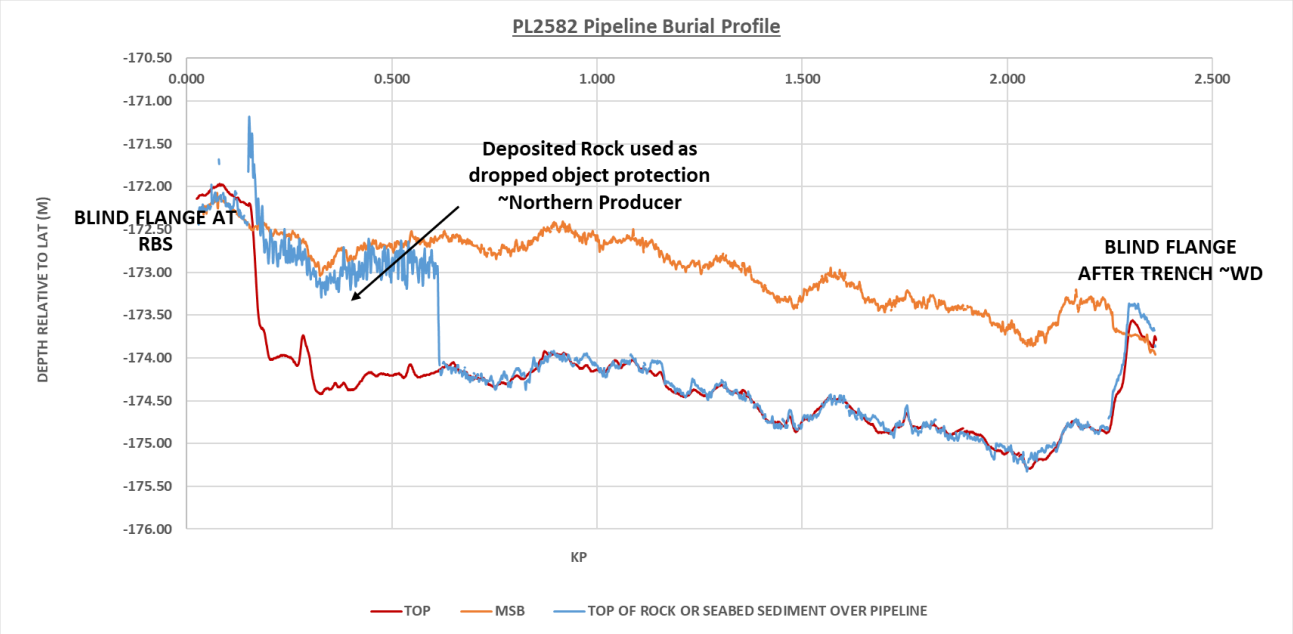

Figure E.3.1: PL2582 seabed & burial profile

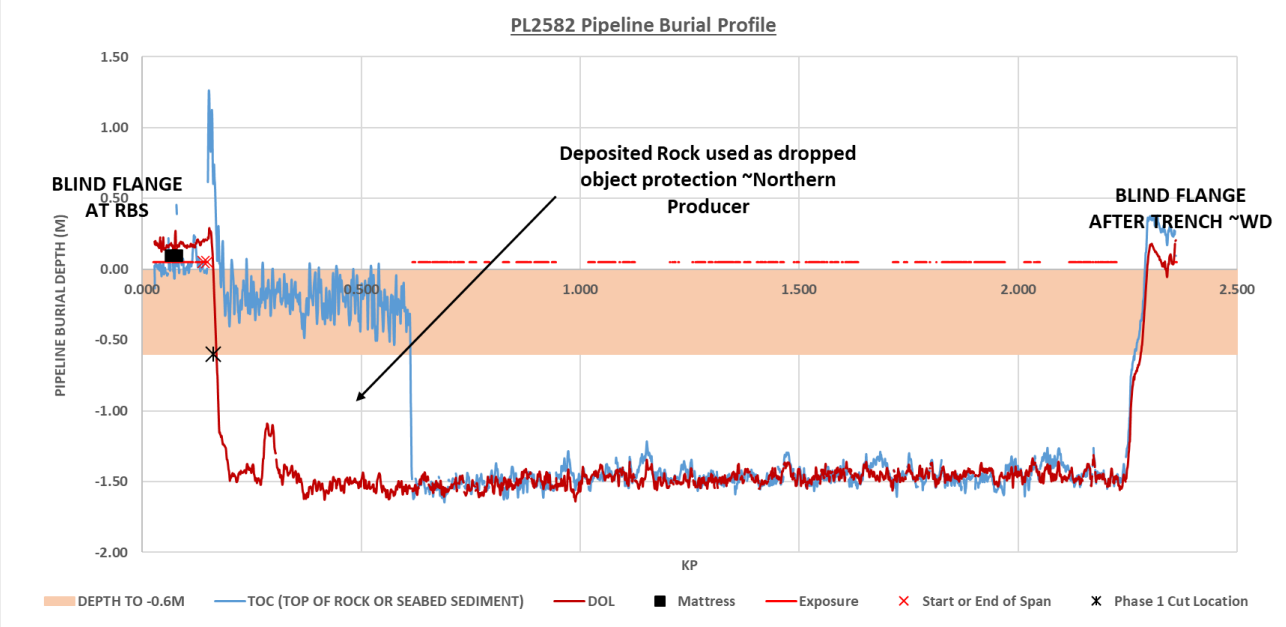

Figure E.3.2: PL2582 depth of burial profile

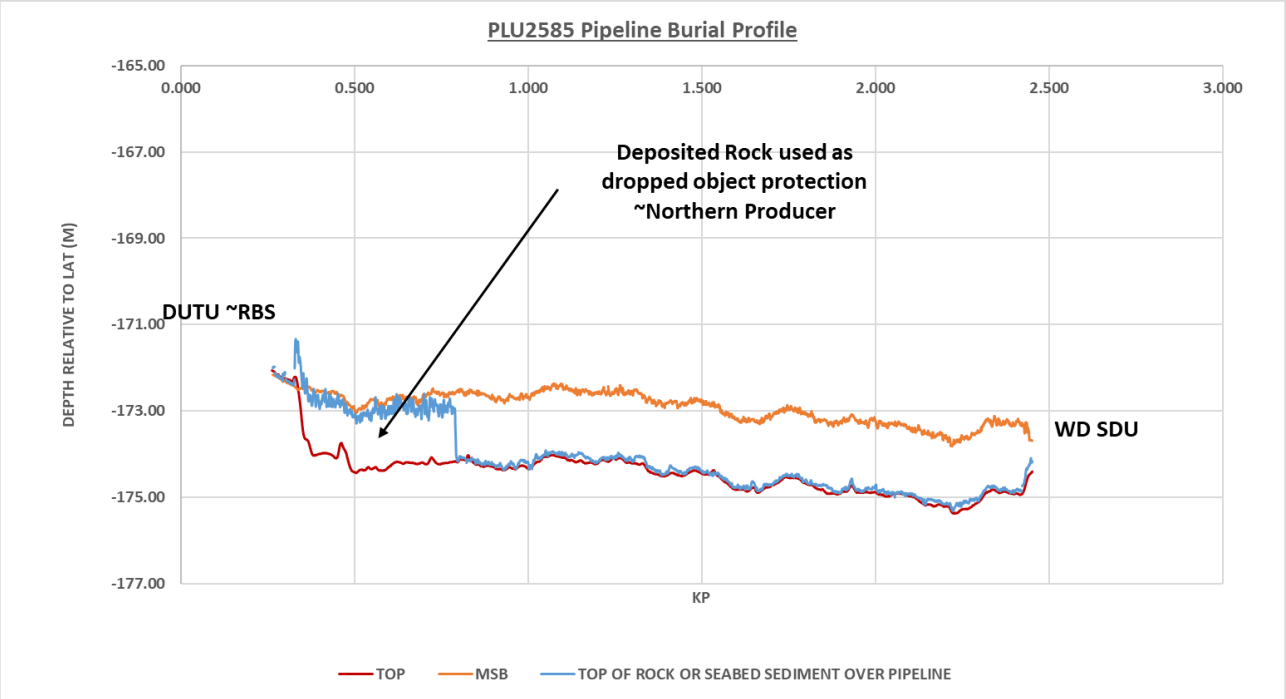

Figure E.3.3: PLU2585 seabed & burial profile

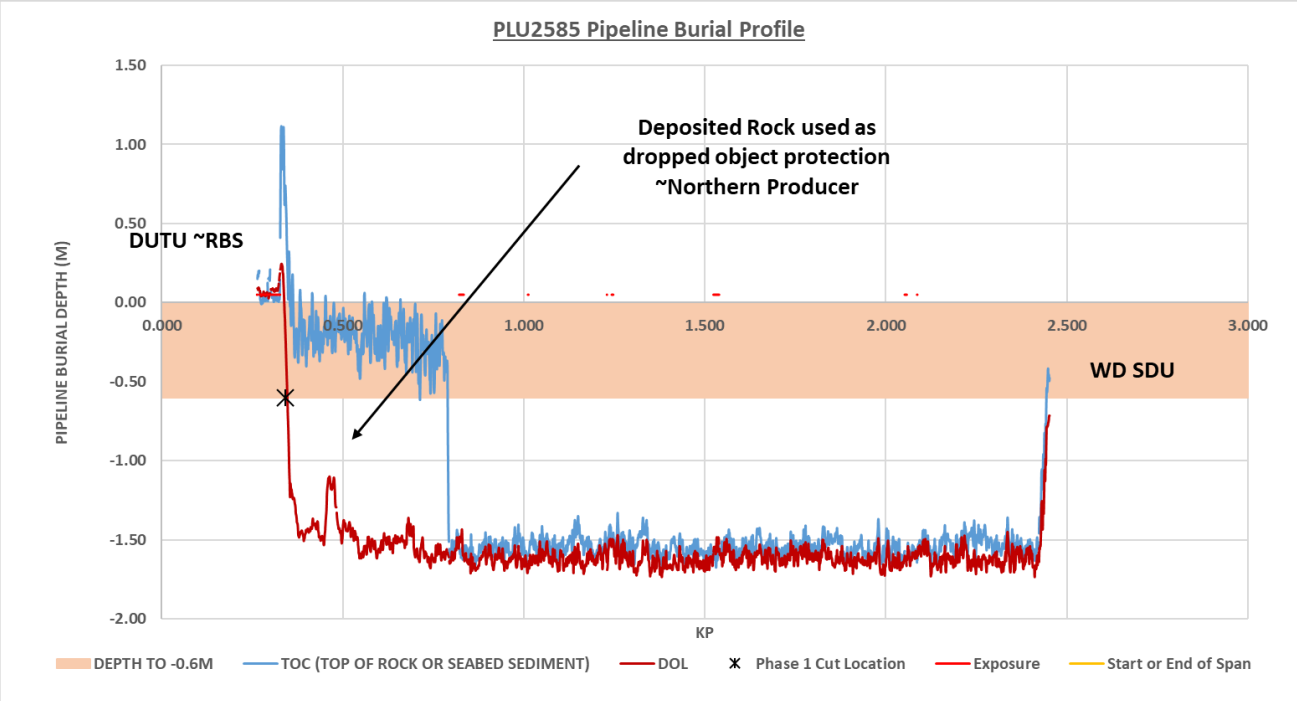

Figure E.3.4: PLU2585 depth of burial profile

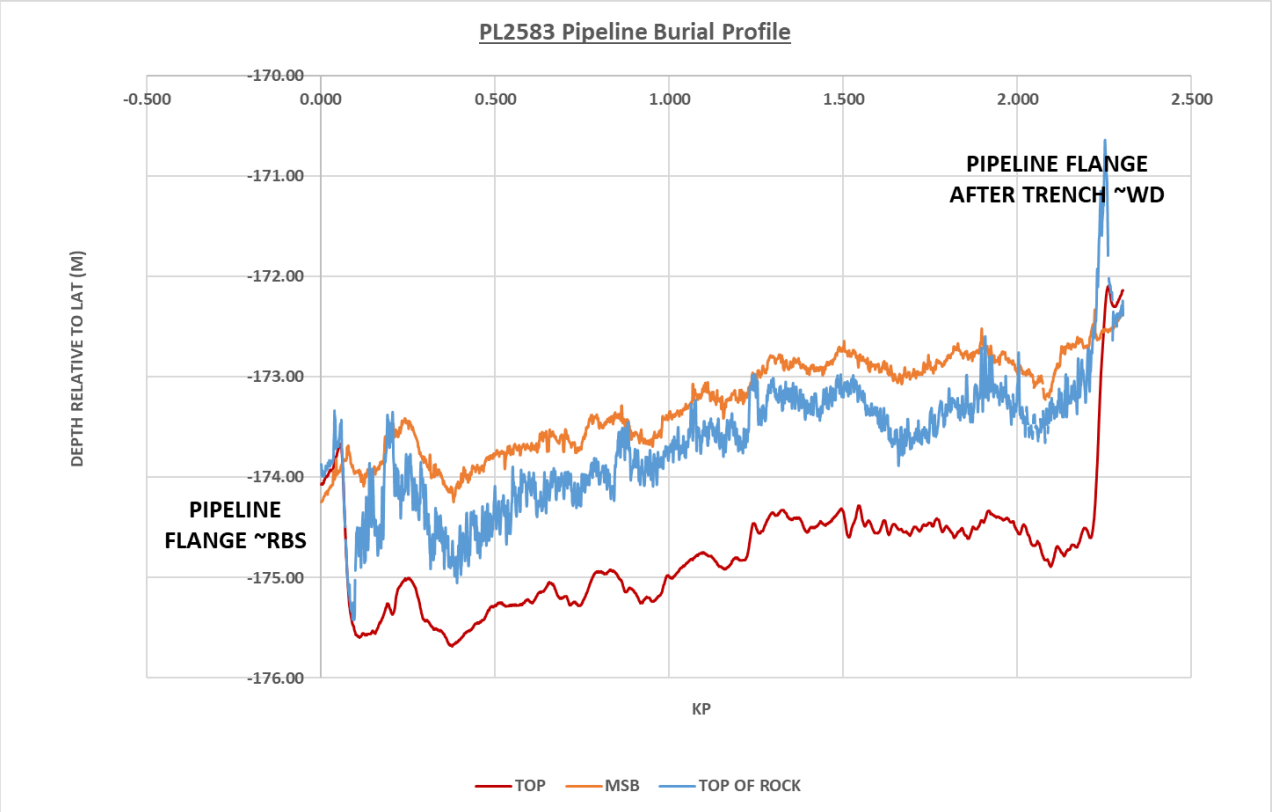

Figure E.3.5: PL2583 seabed & burial profile

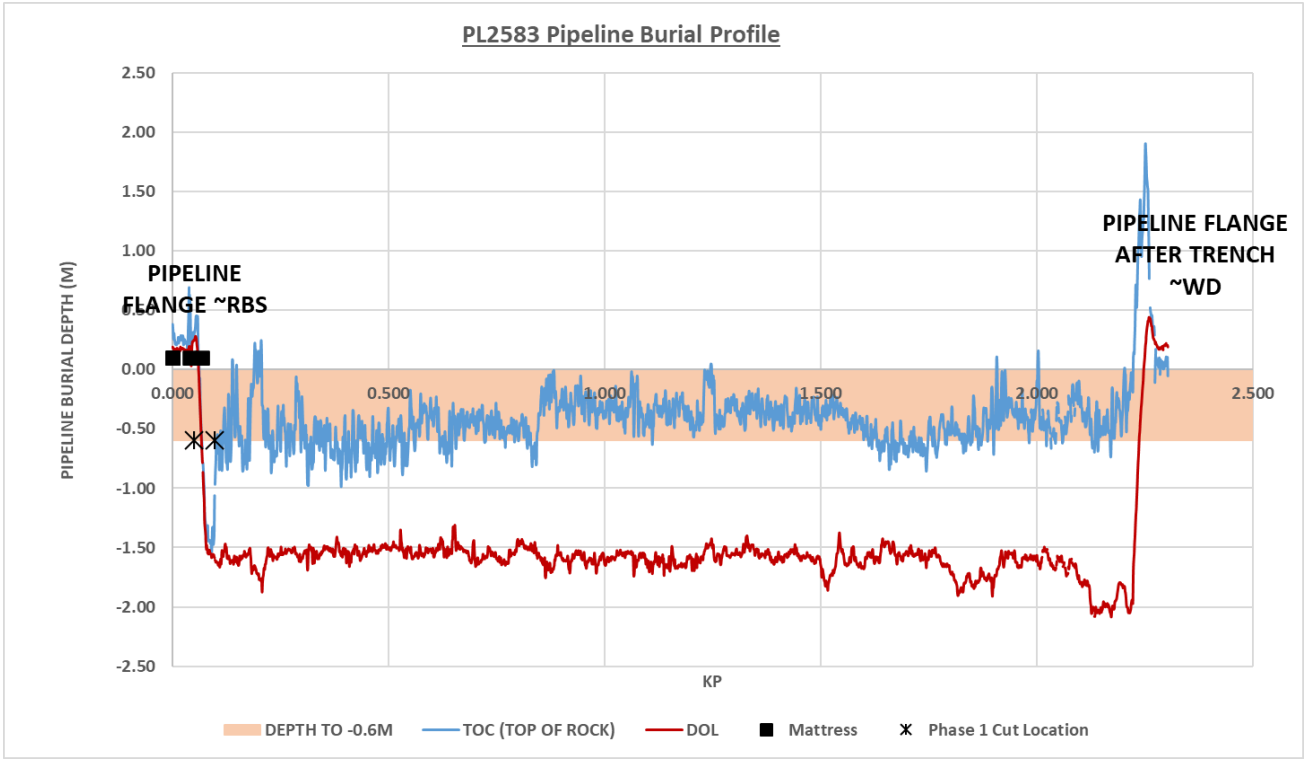

Figure E.3.6: PL2583 depth of burial profile

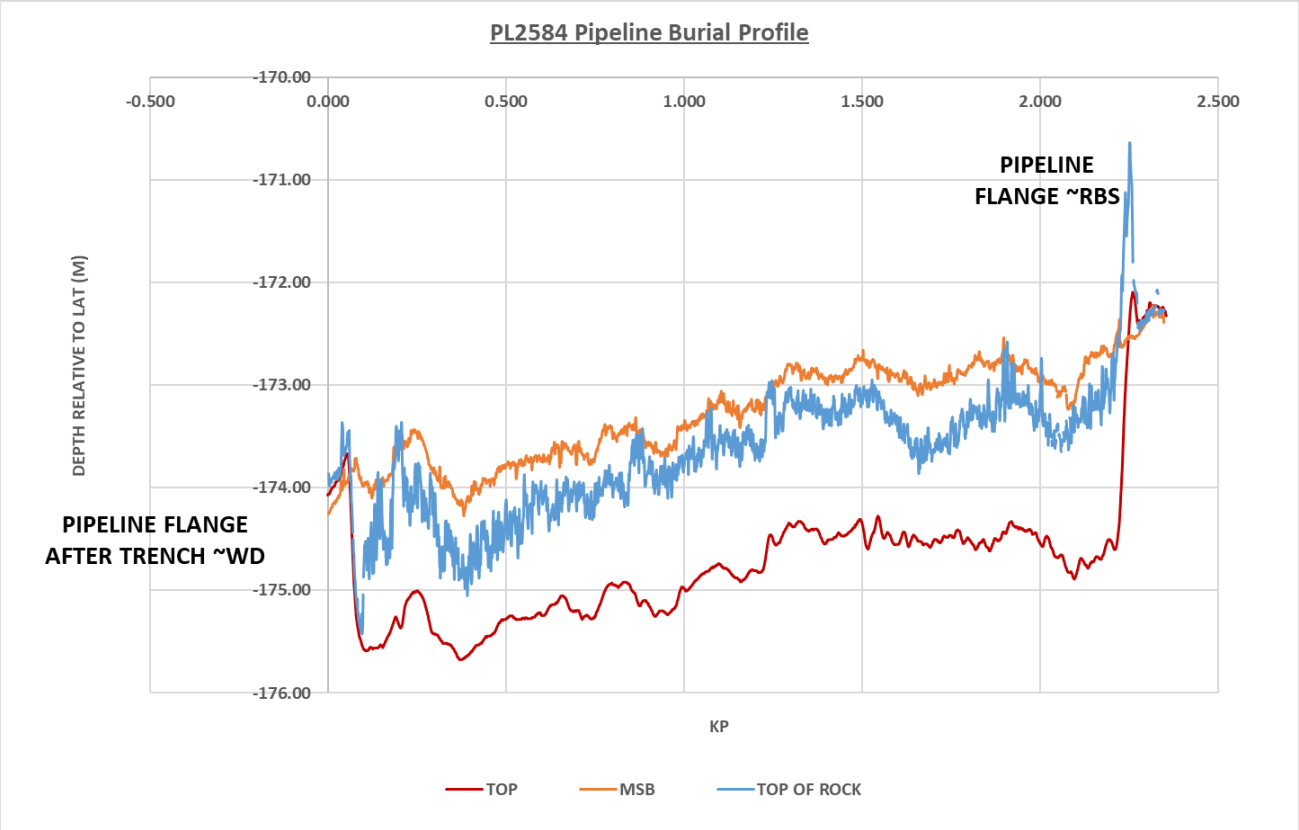

Figure E.3.7: PL2584 seabed & burial profile

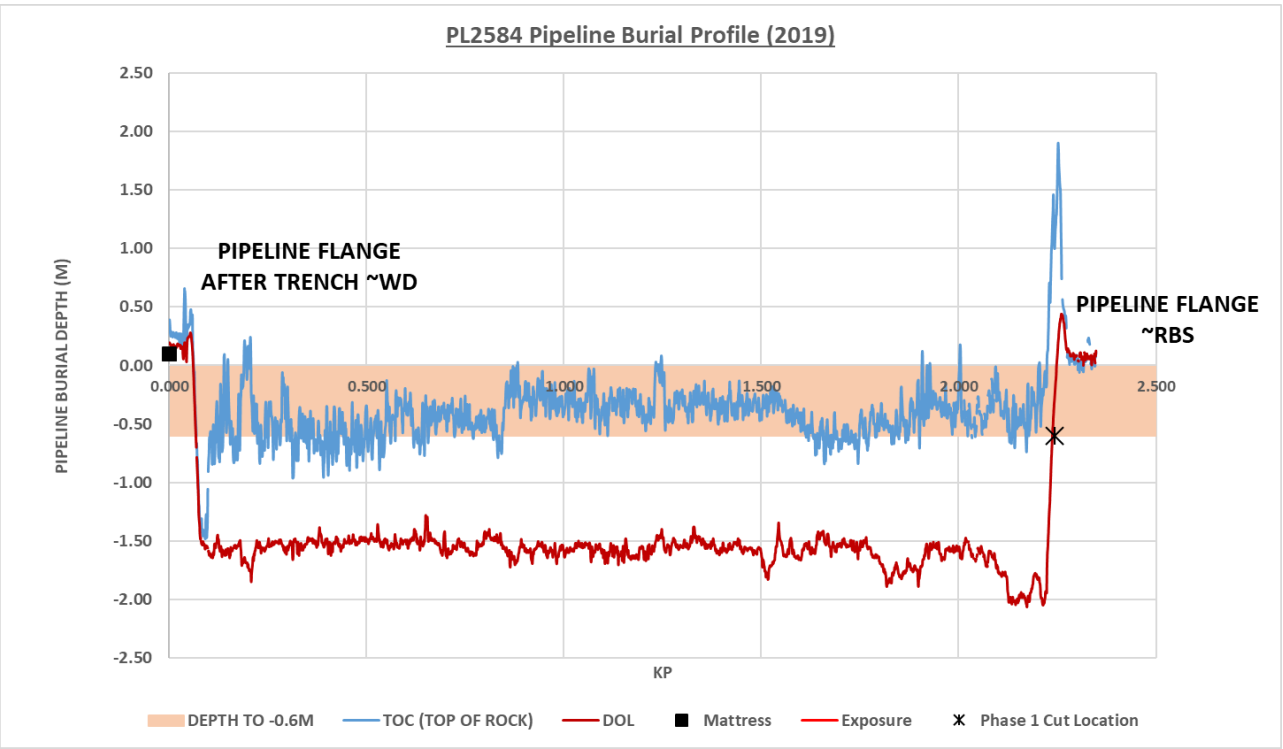

Figure E.3.8: PL2584 depth of burial profile

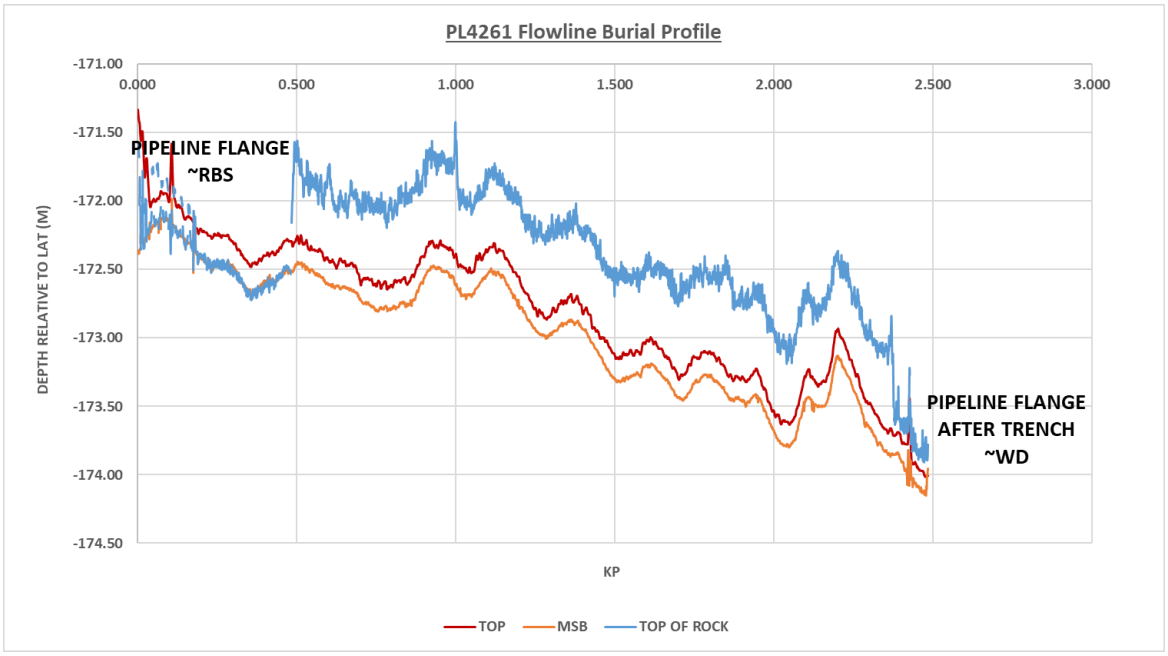

Figure E.3.9: PL4261 seabed & burial profile

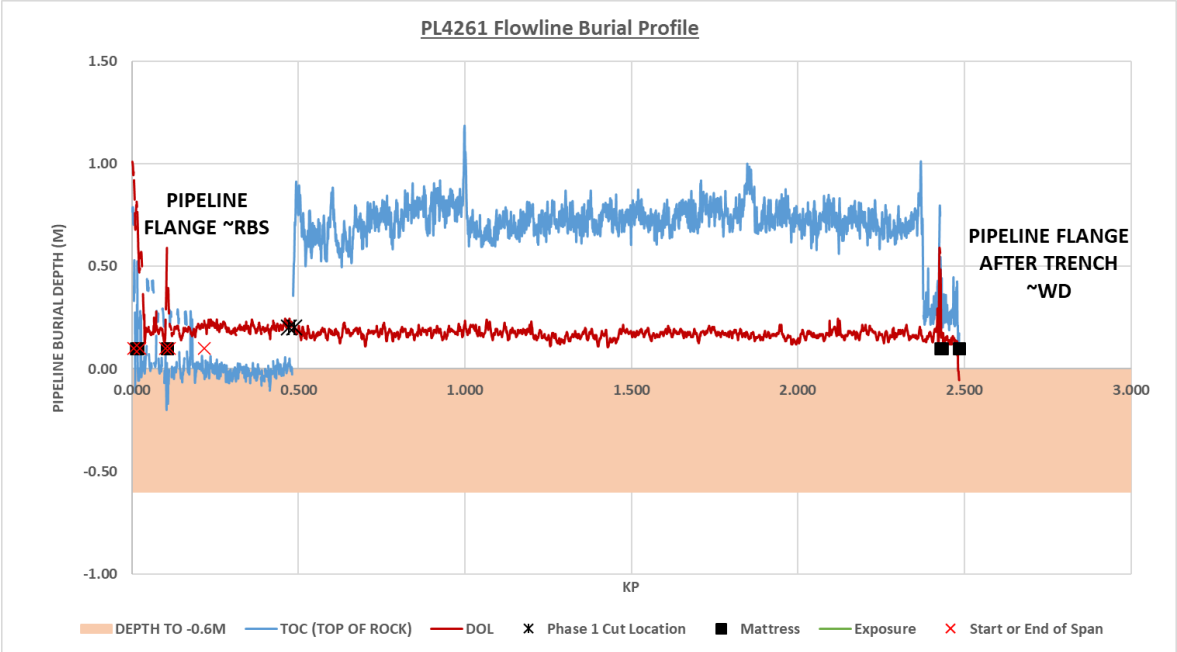

Figure E.3.10: PL4261: depth of burial profile