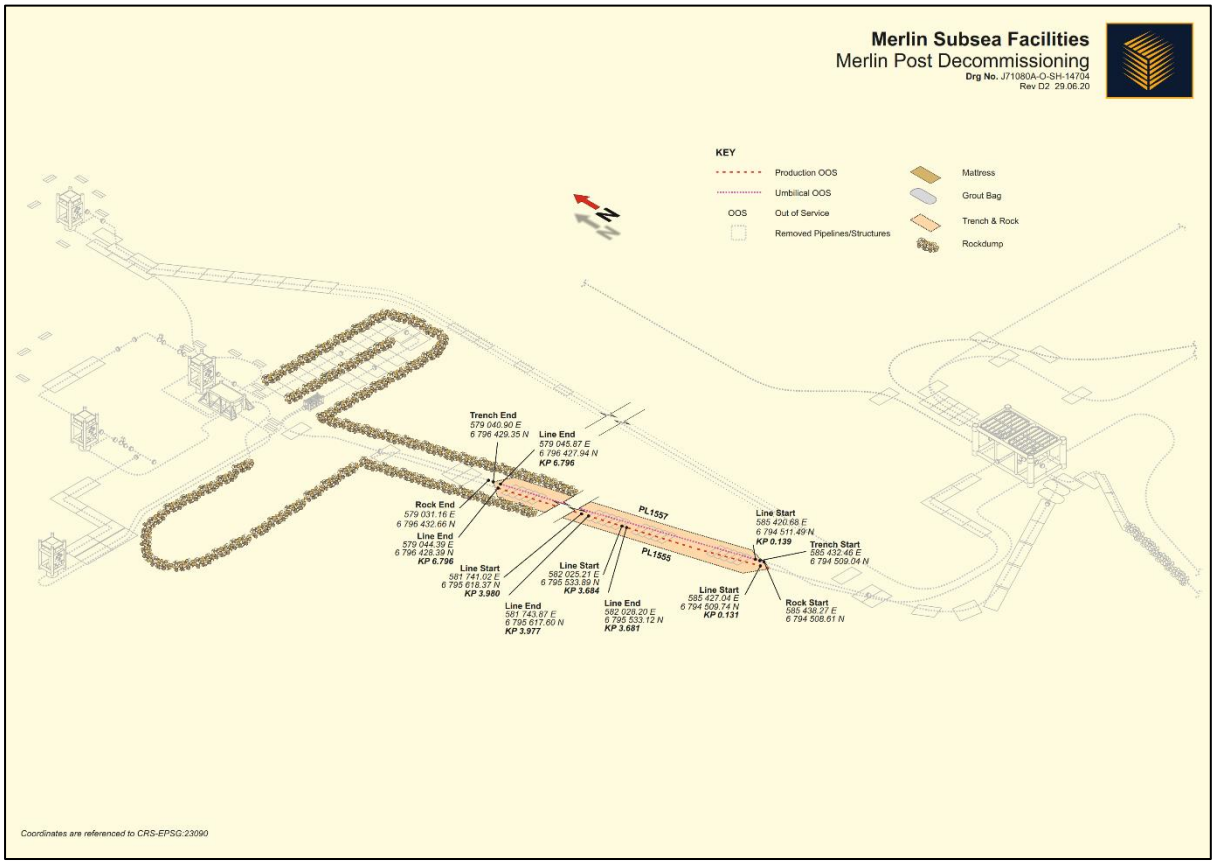
Fairfield Fagus Limited

Merlin Pipelines and Structures Decommissioning Programme Regulatory Close Out Report



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	Name	Signature	Date
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CONTENTS

Terms and Abbreviations

Term	Meaning
BEIS	Department of Business, Energy and Industrial Strategy
CCME	Canadian Council of Ministers of the Environment
CGBS	Concrete Gravity Base Substructure
COP	Cessation of Production
DP	Decommissioning Programme
DSV	Diving Support Vessel
EPRD	Engineering, Preparation, Removal, Disposal
ERM	Effects Range Median
FBL	Fairfield Betula Limited
FEL	Fairfield Energy Limited
FFL	Fairfield Fagus Limited
HS&E	Health, Safety and Environment
MCOM	Merlin Cross Over Manifold
MER	Maximising Economic Recovery
MODU	Mobile Offshore Drilling Unit
N/A	Non Applicable within OPRED regulatory close out report template
NOAA	National Oceanic and Atmospheric Administration
ODU	Offshore Decommissioning Unit (OPRED)
OGA	Oil and Gas Authority
OGUK	Oil and Gas UK
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo Paris Convention
P&A	Plug and Abandonment
PL	Pipeline
PON	Petroleum Operations Notice
ppm	Parts per Million
PWA	Pipeline Works Authorisation
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013
SEPA	Scottish Environment Protection Agency
SFF	Scottish Fishermen's Federation
SID	Subsea Infrastructure Decommissioning
THC	Total Hydrocarbon Content

1 Summary

1.1 Summary of Decommissioning Programme

The Merlin field Decommissioning Programme (FFL-DUN-MER-HSE-01-PLN-00001) was approved on the 14th December 2017. A summary of the infrastructure which has been decommissioned and the approved decommissioning options is outlined below.

The Greater Dunlin Area consists of the Dunlin, Dunlin South West, Osprey and Merlin Fields, located in the Shetland Basin of the northern North Sea. The Dunlin Alpha platform served as the production facility for the Greater Dunlin Area and is located in block 211/23a, approximately 137 km north east of Scotland and 11 km from the UK / Norwegian median line, in a water depth of 151 m.

The Dunlin Alpha platform was installed in 1977 and two subsea tiebacks, Osprey and Merlin, were developed in 1991 and 1997 respectively. During its lifetime, over 522 million barrels of oil were produced from the Greater Dunlin Area.

The Merlin subsea field is located 7 km north-west of Dunlin Alpha platform in block 211/23a and 211/23b in a water depth of 150 m, and originally consisted of three production wells in a daisy-chain arrangement linked by a production pipeline to a crossover manifold. Flexible jumpers extended from the crossover manifold to tee connections on the Osprey risers, which terminated at Dunlin Alpha. A single water injection well was linked to the Osprey water injection pipeline by a flexible flowline via a Y-piece connecting spool.

Termination of Production from the Greater Dunlin Area was announced in May 2015, having Maximised Economic Recovery (MER) from these oilfields. Termination of Production was agreed with the Oil & Gas Authority (OGA) on 9th July 2015, with Cessation of Production (COP) on 15th June 2015, confirmed by letter dated 15th January 2016.

Table 1-1: Overview of the Decommissioned Installation(s)		
Subsea Installation Type	**Quantity**	
Wells	4	
Associated Cuttings Pile(s)	*1*[1]	
Manifolds	1	
Stabilisation Features[2]	**Estimated Quantity**	**Actual Removed**
Concrete Mattresses	149	162[3]
Grout Bags	914	3,834[4]
Sand Bags	4,185	
Other (Trawl blocks)	19	19

[1] Drill cuttings are located at both the Merlin Production and Merlin Water Injection sites. As the Water Injection site cuttings are from a single well, these, by definition, do not formally constitute a 'cuttings pile'. They have however been treated as a pile for the purposes of sampling and analysis and are referred to as a pile in the environmental survey section of this report.

[2] It was agreed with OPRED-ODU and OPRED–EMT that under the Marine Licence sand/grout bags that are wholly buried could remain *in situ* if technical difficulties were experienced in exposing them for recovery. All visible sand/grout bags have been removed.

[3] 13 off additional mattresses from original records were found and recovered.

[4] Summary reports combined grout/sand bags as it was not possible to distinguish them apart during removals. Quantities were derived from weight of 25kg/bag however many bags were split upon retrieval.

Table 1-2: Decommissioned Production/Water Injection Pipelines & Controls Umbilicals				
Item being Decommissioned	**Components**	**Total length (km)**	**Total length removed (km)**	**Total length left *in situ* (km)**
Production/Water Injection Pipelines/Spools/Jumpers	5	14.518	7.859	6.659
Control Umbilicals/Jumpers	8	7.815	0.978	6.837 (0.180 is within the CGBS)
Total	**13**	**22.333**	**8.837**	**13.496**

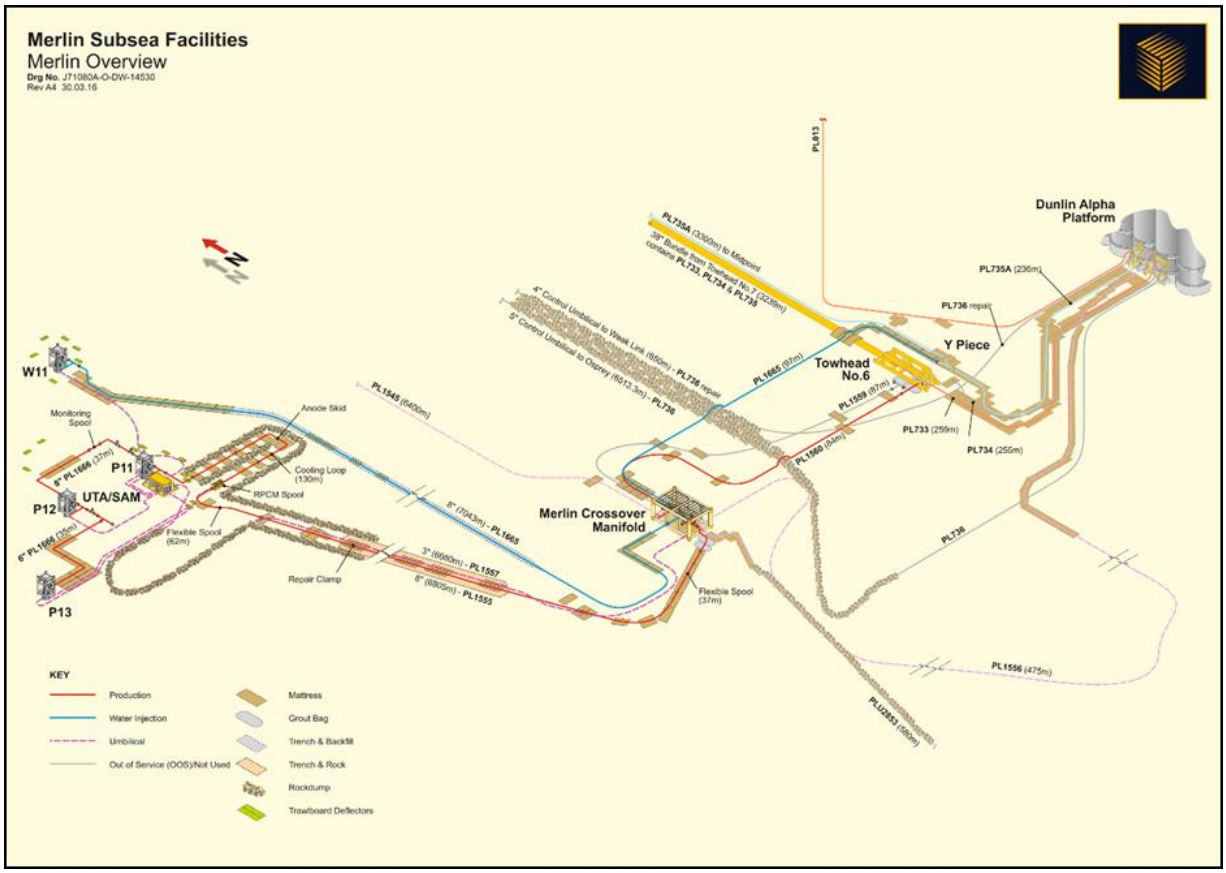
Table 1-3: Summary of the Approved Decommissioning Options		
Selected Option	**Reason for Selection**	**Approved Decommissioning Solution**
Subsea Installations		
Xmas trees (4 off) will be removed using a MODU	Removal of all seabed structures to leave a clear seabed	There are no wellhead protection frames or over trawlable structures in place on the Merlin wells. Wellheads and associated completion materials will be removed to (minus) -3 m.
Merlin Cross Over Manifold (MCOM) removal	Removal of all seabed structures to leave a clear seabed	Full removal
Pipelines, Flowlines and Umbilicals[5]		
Group 1: pipeline and umbilical components	Leaves clear seabed and meets regulations	Full removal
Group 2a: deposits	Leaves clear seabed and meets regulations	Full removal
Group 2b: structures	Leaves clear seabed and meets regulations	Full removal
Group 3: structures and deposits (pipeline route)	Leaves clear seabed and meets regulations	Full removal
Group 4: surface laid flexible jumpers	Leaves clear seabed and meets regulations	Full removal
Group 5: surface laid rigid spools	Leaves clear seabed and meets regulations	Full removal

[5] FBL-DUN-MER-SSP-01-RPT-00003 Merlin Subsea Assets, Burial Status.

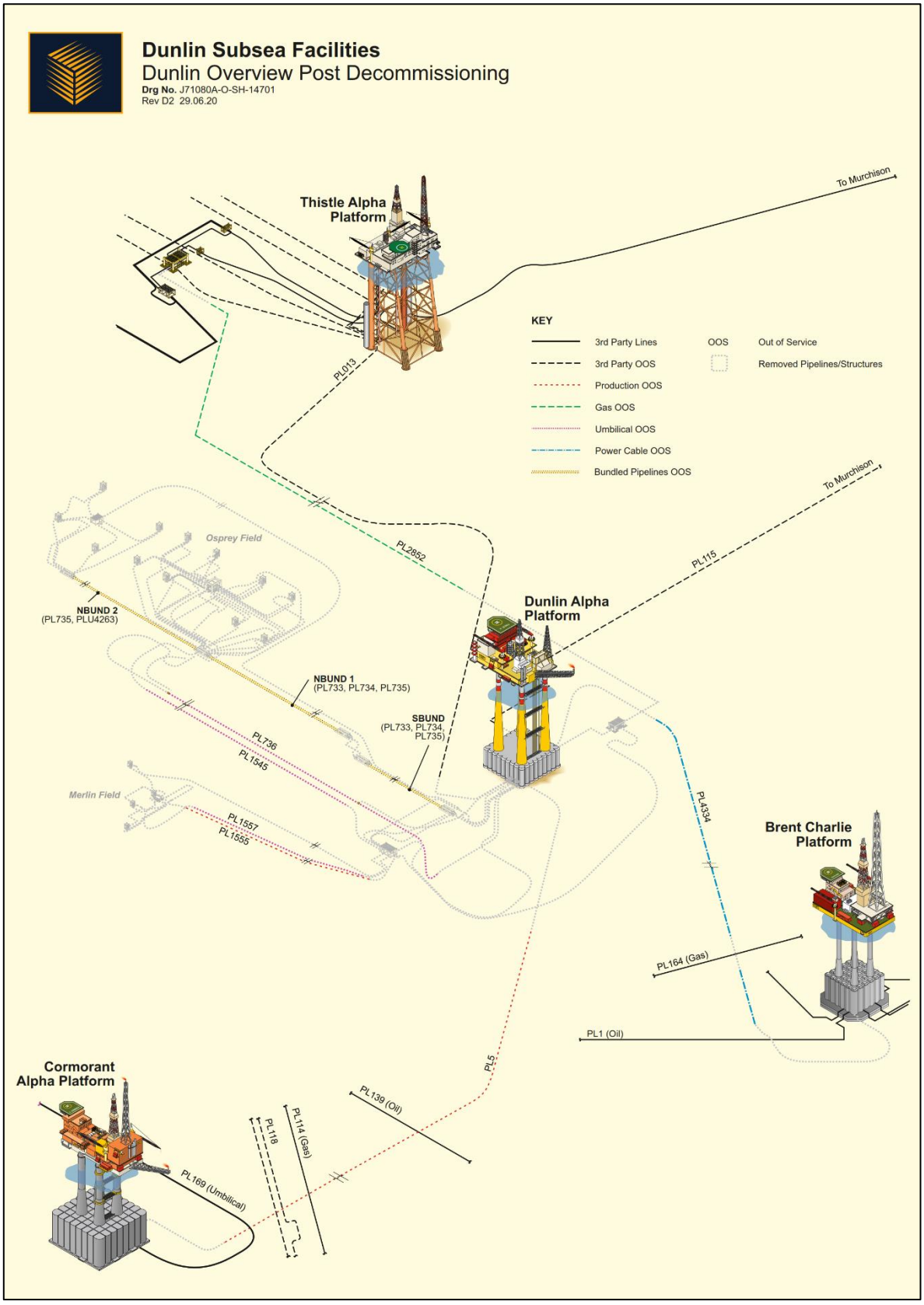
Table 1-3: Summary of the Approved Decommissioning Options		
Selected Option	**Reason for Selection**	**Approved Decommissioning Solution**
Group 6: surface laid umbilicals	Leaves clear seabed and meets regulations	Full removal
Group 7: trenched and rock covered pipelines and umbilicals	Comparatively assessed as preferred option. The pipelines and umbilicals are sufficiently buried and stable, posing no hazard to marine users. Minimal seabed disturbance, lower energy usage, reduced risk to personnel engaged in the activity.	Partial Removal
Group 8: trenched and buried pipelines	Comparatively assessed as preferred option. Leaves clear seabed and meets regulatory requirements.	Full removal
Group 9: umbilical riser	Comparatively assessed as preferred option. The riser is contained within the Dunlin Alpha concrete gravity based structure.	Partial Removal
Wells		
Abandoned in accordance with OGUK guidelines for the Abandonment of Wells, issue 5 July 2015	Meets regulatory requirements	A PON5 will be submitted through the OGA Well Operations and Notification System (WONS) and Chemical Permit and Marine Licences will be submitted through the Portal Environmental Tracking System (PETS) to support the work to be carried out.
Drill Cuttings		
Leave in place to degrade naturally	Cuttings coverage is small, thin and widely dispersed and falls below both OSPAR 2006/5 thresholds	Left undisturbed on seabed
Criteria:	**Merlin Production Wells Cuttings (Pile):**	**Merlin Water Injection Well Cuttings (Single well cuttings accumulation, no pile):**
Area (m^2)	1,876	705
Volume (m^3)	551	187
Average depth of cover (m)	0.37	0.48
Maximum depth of cover (m)	0.83	1.16
Interdependencies		
None		

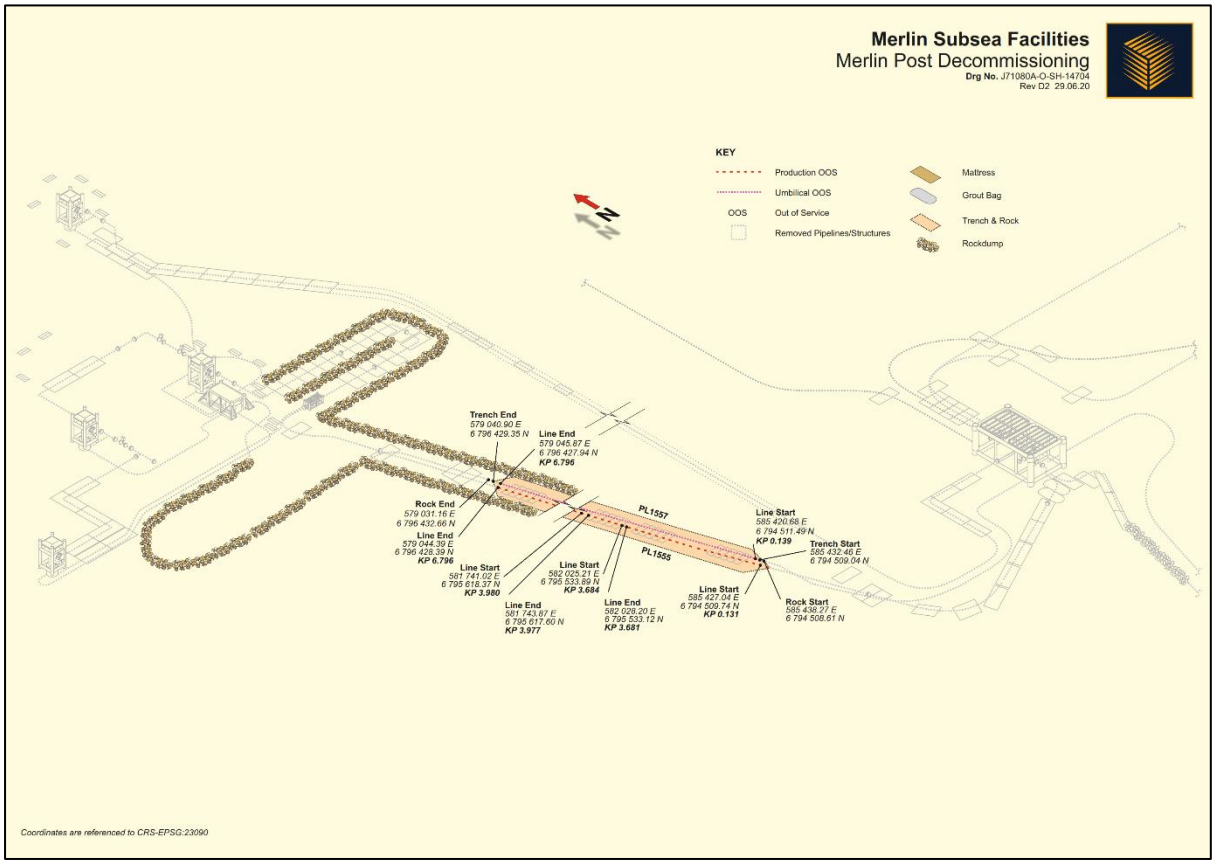
1.2 Schematic of Field Layout

1.2.1 Operational



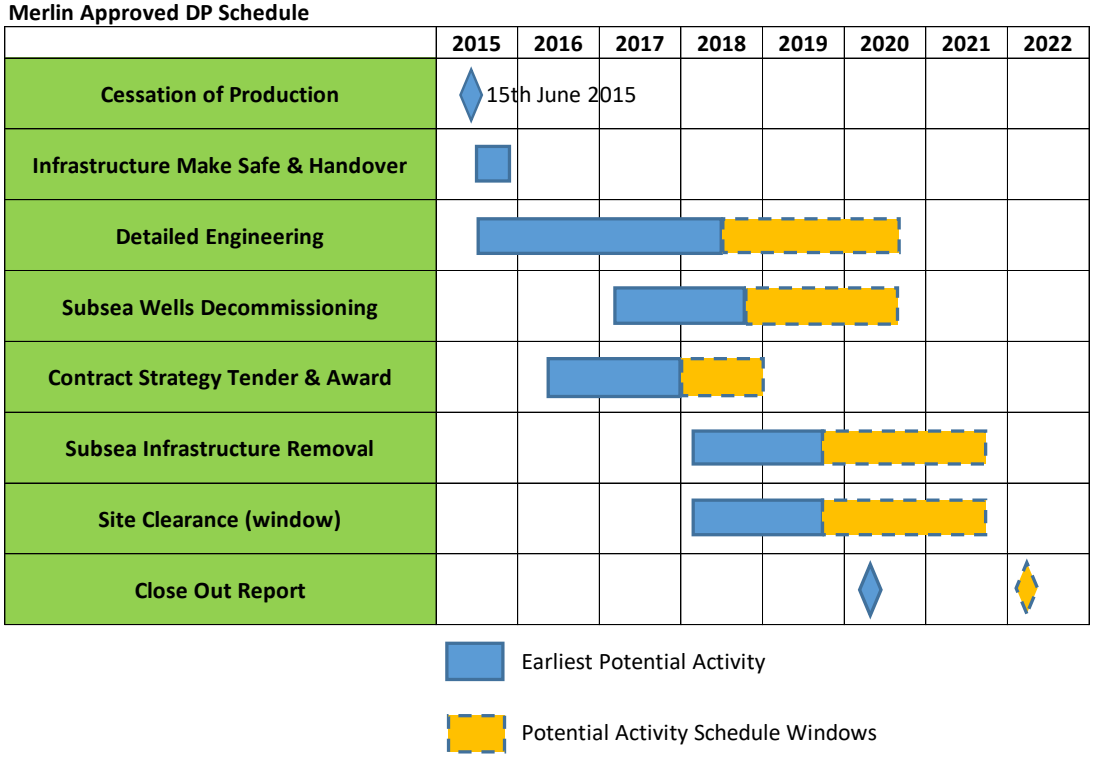
1.2.2 Post Decommissioning



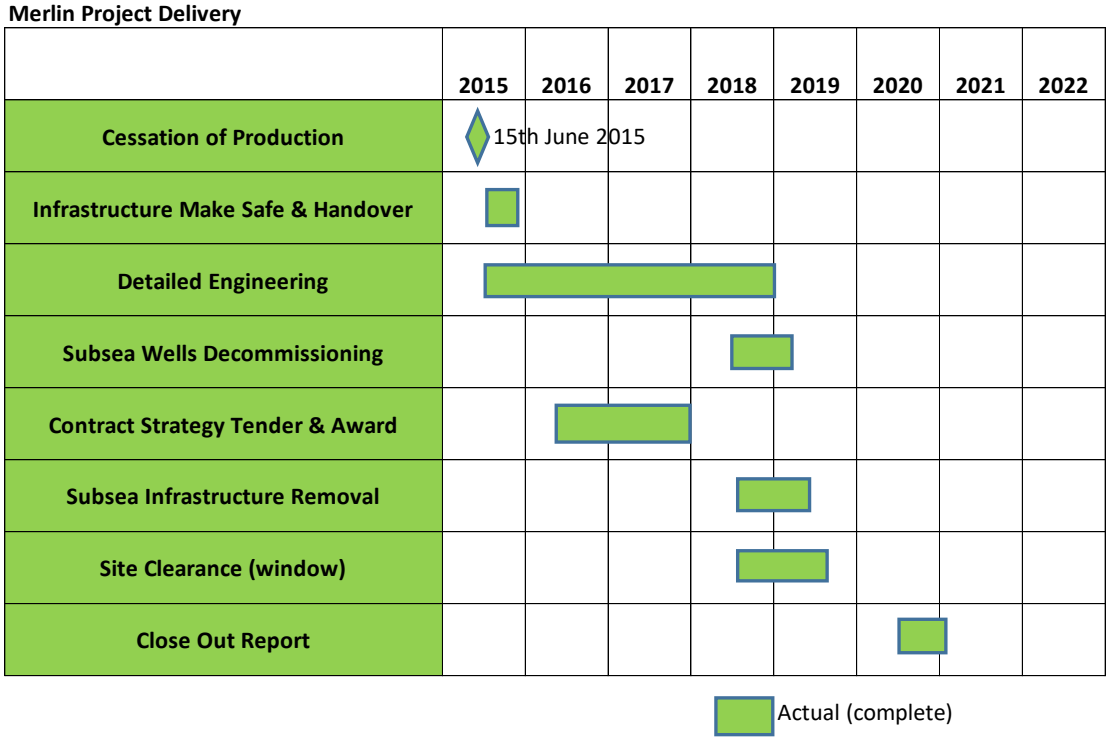

Merlin Subsea Facilities
Merlin Post Decommissioning
Drg No. J71080A-O-SH-14704
Rev D2 29.06.20
KEY
Production OOS
Umbilical OOS
OOS Out of Service
Removed Pipelines/Structures
Mattress
Grout Bag
Trench & Rock
Rockdump
Trench End
579 040.90 E
6 796 429.35 N
Line End
579 045.87 E
6 796 427.94 N
KP 6.796
Rock End
579 031.16 E
6 796 432.66 N
Line End
579 044.39 E
6 796 428.39 N
KP 6.796
Line Start
581 741.02 E
6 795 618.37 N
KP 3.980
Line End
581 743.67 E
6 795 617.66 N
KP 3.977
Line Start
582 025.21 E
6 795 533.89 N
KP 3.684
Line End
582 028.20 E
6 795 533.12 N
KP 3.681
PL1557
PL1555
Line Start
585 420.68 E
6 794 511.49 N
KP 0.139
Trench Start
585 432.46 E
6 794 509.04 N
Line Start
585 427.04 E
6 794 509.74 N
KP 0.131
Rock Start
585 438.27 E
6 794 508.61 N
Coordinates are referenced to CRS-EPSG:23090

1.3 Project Delivery against Approved Schedule

Merlin Approved DP Schedule



Merlin Project Delivery



1.4 Associated Decommissioning Approvals

Table 1-4: Associated Decommissioning Approvals	
Cessation of Production (COP)	15/06/2015
Decommissioning Programme Approval	14/12/2017
Well P&A	P&A activities were approved via Consent to Locate permit CL/852/0 (Version 1) and Well Intervention Application (WIA) permit WIA/741. Campaign commenced July 2018 and completed February 2019.
Topside Removal	This will be completed as part of the Approved Dunlin Alpha Topsides Decommissioning Programme
Subsea Installation Removal	Pipeline Application (PLA) permit PLA/537 (Approved 01/08/18) Required for marine licences and/or oil/chemical discharge Radioactive Substances Act permit RSA/B/70248
Pipeline Preparatory Works	Pipeline Application (PLA) permit PLA/227 (Approved 08/06/2015); Required for pipeline flushing operations Decommissioning Application (DCA) permit DCA/37 (Approved 04/07/2017) Required for subsea umbilical flushing operations
Pipeline Works Authorisation (PWA)	PWA 32/W/97 129/V/18, Approved 07/08/2018 Recovery of 5 off Pipelines and Umbilicals & Modification of 3 off Pipelines and Umbilicals to remain *in situ* Advised work Completed 01/11/2019 PWA 36/W/98 127/V/18, Approved 07/08/2018 Recovery of 5 off Pipelines and Umbilicals Advised work Completed 01/11/2019

Supporting documents are:

1. Merlin Pipelines and Structures Decommissioning Programmes (DP1) (FFL-DUN-MER-HSE-01-PLN-00001 rev A9)
2. Merlin Comparative Assessment Report (FFL-DUN-MER-HSE-01-RPT-00001 rev A02)
3. Merlin Environmental Statement (XOD-DUN-HSE-RPT-00002 (Xodus) rev A02)
4. Merlin Cost Summary Report (confidential) (FFL-DUN-MER-HSE-01-RPT-00002 rev A1)

No amendments have been made since approval.

2 Decommissioning Activities

The Merlin field Cessation of Production (COP) occurred on the 15th June 2015 followed by an approved decommissioning programme on the 14th December 2017.

Prior to this, pipeline preparation was completed in May 2015 and the drilling P&A campaign commenced in July 2018 and completed in February 2019.

The following sections detail the Merlin decommissioning activities that have taken place.

2.1 Contracts Awarded

Table 2-1: Contracts Awarded
Transocean Limited were awarded the Merlin subsea well P&A contract, which included removal of the wellheads, Xmas trees and flowbases. Rever Offshore UK Limited were awarded the full Engineering, Procurement, Removal and Disposal (EPRD) contract for subsea infrastructure decommissioning. Rever's main subcontractors were: Benthic Inc, an Acteon company, for Environmental Sampling and Analysis Van Oord nv for Rock Installation Veolia Environmental Services (UK) plc for Waste Management

2.2 Platform Operations

Table 2-2: Platform Decommissioning
Platform operations for subsea have been completed under the Make Safe and Handover operations for the Dunlin Alpha platform.

2.3 Subsea P&A

Table 2-3: Well Decommissioning			
Subsea Wells	**Designation**	**Status**	**Category of Well**
211/23a-13Z (ME-P11S1)	Oil production	Phase 3 abandoned	SS 0-0-0
211/23a-15 (ME-P12)	Oil production	Phase 3 abandoned	SS 0-0-0
211/23a-16 (ME-P13)	Oil production	Phase 3 abandoned	SS 0-0-0
211/23a-14 (ME-W11)	Water injector	Phase 3 abandoned	SS 0-0-0

The following End of Job Reports (EOJR) were produced for each well:

- ME-P11 Abandonment Phases 1-3 (FBL-WAMEP11-DWO-EOJR-00001)
- ME-P12 Abandonment Phases 1-3 (FBL-WAMEP12-DWO-EOJR-00001)
- ME-P13 Abandonment Phases 1-3 (FBL-WAMEP13-DWO-EOJR-00001)
- ME-W11 Abandonment Phases 1-3 (FBL-WAMEW11-DWO-EOJR-00001)

2.4 Subsea Installations

Table 2-4: Subsea Installations			
Description	**Planned status (Estimated quantity)**	**Total Removed (Actual)**	**Total left *in situ***
Manifold (MCOM)	Removal (1 off)	1	0
Other - Merlin trawl blocks	Removal (19 off)	19	0

2.5 Pipelines / Umbilicals & Jumpers

Table 2-5: Pipelines / Umbilicals & Jumpers			
PL number	**Description**	**Agreed Decom Solution**	**Status**
PL 1666	Merlin production pipeline	Removal	Removed
PL 1555	Merlin production pipeline	Partial removal	Partially removed
PL 1559	Merlin production jumper (out of service)	Removal	Removed
PL 1560	Merlin production jumper	Removal	Removed
PL 1665	Merlin water injection pipeline	Removal	Removed
PL 1557	Merlin umbilical	Partial removal	Partially removed
PL 1556	Merlin umbilical (within Dunlin CGBS)	Partial removal	Partially removed
PL 1667	P12 tree supply control jumper	Removal	Removed
PLU 1880	P13 tree supply control jumper	Removal	Removed
PL2804JP11	Umbilical jumper	Removal	Removed
PLU4306	P11 tree supply control jumper	Removal	Removed
PLU4307	W11 tree supply control jumper	Removal	Removed
PL 4338	RPCM hose	Removal	Removed

There are no 3rd party crossings.

2.6 Pipeline Stabilisation Features

Deposit removal was conducted over the 2018 – 2019 period using diving and ROV techniques.

Table 2-6: Pipeline Stabilisation Features		
Description	**Agreed Decom Solution**	**Status**
Concrete Mattresses	Removal (estimated 149 off)	The amount removed by Fairfield was 162. All visible mats have been removed.
Grout Bags	Removal (estimated 914 off)	The amount of sand/grout bags removed by Fairfield was 3,834, noting that sand/grout bags are indistinguishable from one another upon retrieval. All visible sand/grout bags have been removed.
Sand Bags	Removal (estimated 4,185 off)	

All deposits removed during decommissioning were returned to shore for re-use or disposal. Remaining grout/sand bags were located below mean seabed level and capped with rock.

Marine licence ML/377 was varied throughout the decommissioning campaigns to account for inventory changes discovered during the operations.

Deviations/Dispensations

One deviation to the decommissioning programme, in relation to deposit removal operations, was sought and approved:

- Due to operational difficulties in removing individual 25kg grout/sand bags, sited within the PL1555/PL1557 trench, Fairfield engaged with OPRED to seek a deviation from the approved decommissioning programme. The requested deviation was to allow the sand/grout bags situated below mean seabed level to remain *in situ* capped with rock, as opposed to full removal.
- The acceptance to deviate from the approved decommissioning programme was received on the 20th June 2019 in an email from OPRED to Fairfield's Regulatory Affairs & Stakeholder Engagement Manager.

There were no deviations or dispensations to the decommissioning programme sought or approved for the removal of debris associated with the Merlin to Dunlin Alpha corridor.

2.7 Drill Cuttings

Table 2-7: Drill Cuttings		
Pre Decommissioning Description	**Agreed Decom Solution**	**Status**
The Merlin production well cuttings cover an area of 1,876 m^2 and have a volume of 551 m^3. The average depth of cover is 0.37 m and maximum depth of cover is 0.83 m. Cuttings coverage is small, thin and widely dispersed and falls below both of OSPAR 2006/5 thresholds.	Leave in place to degrade naturally	Left in place to degrade naturally
The Merlin water injection well cuttings cover an area of 705 m^2 and has a volume of 187 m^3. The average depth of cover is 0.48 m and maximum depth of cover is 1.16 m. Cuttings coverage is small, thin and widely dispersed and falls below both of OSPAR 2006/5 thresholds.		

See ROUK-SC-321-K12-0002_1926 for further Cuttings Information.

2.8 Results of Post Decommissioning & Environmental Surveys

Table 2-8: Post Decommissioning & Environmental Surveys Summary

Post decommissioning site surveys were undertaken within the subsea installation 500 m safety zones and along the pipeline corridors to a distance of 100 m either side of the lines. Debris identified during the survey was investigated and oilfield related debris and items that posed a significant risk to other users of the sea were removed and returned to shore for disposal. Multi beam echo sounder, side scan sonar and visual survey methods were employed to verify a clear seabed. In addition, post decommissioning pipeline surveys were undertaken utilising the same survey techniques but with the addition of sub bottom imaging and pipe tracking to verify that the items remaining *in situ* fulfilled the requirements of the decommissioning programme.

A post-decommissioning environmental survey, geotechnical assessment, habitat assessment and cuttings pile assessment were conducted around the Dunlin cluster fields. Environmental operations were carried out by Benthic Solutions Limited (BSL) aboard the DSV Rever Sapphire and Normand Clipper from July to September 2019. The Merlin stations were sampled between 9th September and 13th September 2019 aboard the Normand clipper. A total of 20 stations were sampled around the Merlin Drill Centre and Merlin to Dunlin Alpha pipeline route. At each environmental station, four grab samples were acquired, one for physico-chemical and three for macrofaunal analysis.

Both the drill centre and pipeline route are located on an area of homogeneous bathymetry with little variation or features. Sediment within the survey area was generally dominated by sand with most stations conforming to the Folk classification of muddy sand. Higher proportions of sedimentary fines were observed at the cuttings pile stations, suggesting an influence from past drilling activities. Total Organic Carbon (TOC) levels throughout the survey area reflected an organically deprived environment, typical of the northern North Sea (NNS), with levels similar to those obtained in the 2016 pre-decommissioning survey.

Polyaromatic Hydrocarbon (PAH) concentrations were consistently low across the survey and did not suffer notable changes compared to the previous data. Concentrations of heavy metals were relatively low throughout the entire survey for all metals measured, with all concentrations falling below their corresponding NOAA ERM and CCME PEL levels.

Both species richness and abundance showed the influence of drilling related activity with a reduced species diversity and an increase in the abundance of opportunistic species. Species sensitive to disturbance were found in high abundances along the pipeline route and those sample stations which reflected background North Sea conditions. Significant correlations between the macrofaunal data and physico-chemical parameters all further corroborated the impact of drilling related activity on the macrofaunal communities.

Review of Multi-Beam Echo Sounder (MBES), Side Scan Sonar (SSS) data, two core profiles and eight surface samples obtained from the cuttings piles indicated little to no disturbance had occurred from decommissioning activities with both piles falling within the “small cuttings pile” classification of the OLF guidelines (<5,000 m^3).

The chemical footprint of the two piles (where Total Hydrocarbon Content (THC) was above the OSPAR 50 ppm threshold) covered a surface area of approximately 0.03094 km^2 with a persistence of 2.19 km^2.yr. Results indicated the chemical footprint and persistence of the piles had reduced from the pre-decommissioning survey (area: 0.0508 km^2; persistence: 3.59 km^2.year) with both sets of data falling well below the OSPAR threshold (500 km^2.year).

Table 2-8: Post Decommissioning & Environmental Surveys Summary
There was little to no organic enrichment of the seabed from the piles with TOC levels showing a similarity to those sampled at the environmental stations further afield. The concentrations of PAHs across the stations had decreased by an average of 76% from the levels described in the pre-decommissioning survey with results for all samples acquired falling below both the NOAA Effect Range Low (ERL: 0.52mg.kg^{-1}) and the US EPA Toxicity Reference Value (TRV) 0.87mg.kg^{-1}. The concentrations of Polychlorinated Biphenyls (PCB), organotins and Alkylphenol Ethoxylates (APE) were found at most locations to be below laboratory Levels of Detection, reflecting the low levels of contamination within the piles. Weathering of the compounds was evident with generally lower concentrations recorded in the post-decommissioning survey when compared to 2016. The piles displayed low levels of heavy and trace metal contamination with most metals falling below the background reference levels in both the pre- and post-decommissioning surveys. Overall, the environmental data indicated the sediment was minimally modified by decommissioning activity with the physical and chemical extent of the piles falling within the OSPAR and OLF guidelines and displaying a general decline in the chemical components of the piles when compared to the pre-decommissioning survey

The following reports were produced as part of the final subsea close out documentation:

- Merlin Subsea Assets Site Clearance Summary
  (DUN-SSP-01-RPT-0004)
- Merlin In Situ Subsea Assets, Post Decommissioning Status
  (FBL-DUN-MER-SSP-01-RPT-00004)
- Subsea Inventory, Post Decommissioning - Pipelines, Umbilicals & Structures
  (FBL-DUN-DAOM-SSP-01-RPT-00008)
- Merlin, Osprey and Dunlin Post Decommissioning Survey Report - Habitat Assessment Report
  (ROUK-SC-321-K12-0001)
- Environmental Monitoring and Cuttings Pile Assessment Report – Merlin
  (ROUK-SC-321-K12-0002)
- PL1555 (MER - DA) Alignment Chart
  (UK1077-SVY-DA-PL1555-001 to 002)
- PL1557 (MCOM - MER) Alignment Chart
  (UK1077-SVY-DA-PL1557-001 to 002)

Deviations/Dispensations

One deviation to the decommissioning programme, in relation to overtrawling of the installation site, was sought and approved:

- Fairfield and its main clearance contractor, Rever Offshore, engaged with the Scottish Fisherman's Federation (SFF) on the 8th August 2019, to undertake overtrawl activities of the Merlin 500mZ and provide a 'Clear Seabed Certificate'.
- During the engagement the SFF was advised that the Merlin 500mZ contained a small volume of drill cuttings, located around the previous well positions. Under the decommissioning programme drill cuttings were to remain undisturbed [Ref. 2 Sect. 1.5 and 3.7] and allowed to degrade naturally.
- In an email on the 26th August 2019 from the SFF to Rever Offshore, the SFF advised that they would not be able to issue a 'Clear Seabed Certificate':

"With regard to issuing a clear (clean) seabed certificate, as things stand, we can only do this for an entire 500 metre Safety Zone (i.e. for a statutory 500 metre area of seabed that was a 'no go' area for fishermen when the oil field was in operation, and for which the fishing industry hopes is deemed safe for normal fishing activities to resume on completion of decommissioning). If there are localities within the aforementioned zone that remain a 'no go' area to fishermen, then unfortunately we cannot issue a clear/clean seabed certificate for that particular 500 metre Safety Zone."

Based on the response of the SFF, Fairfield engaged with OPRED to seek a deviation from the approved decommissioning programme. The requested deviation was to allow geophysical and ROV survey evidence in lieu of an overtrawl to demonstrate a clear seabed. The acceptance to deviate from the approved decommissioning programme was received on the 28th August 2019, in an email from OPRED to Fairfield's Regulatory Affairs & Stakeholder Engagement Manager.

2.9 Key Milestones

Table 2-9: Key Milestone Summary	
Jun 2015	COP from the Merlin Field and pipeline preparation for flushing undertaken
Jul 2017	Flushing of subsea umbilicals completed
Dec 2017	Merlin Infrastructure and Pipelines DP approved by OPRED
Jan 2018	Contract awarded to Bibby Offshore (now Rever Offshore) for the engineering, preparation, removal and disposal of subsea infrastructure from the Osprey, Merlin and Dunlin fields.
Jul 2018	Mobilisation of TRO 712 to undertake plug and abandon (P&A) operations
Aug 2018	Commencement of subsea decommissioning activities
Feb 2019	Completion of Merlin field P&A activities
May 2019	Completion of flowline and umbilical recovery operations
Jul 2019	Completion of structure & deposit recovery operations and completion of post decommissioning survey operations
Sep 2019	Completion of environmental surveys and debris recovery and completion of remedial rock cover operations

2.10 Stakeholder Engagement

Table 2-10: Stakeholder Engagement Summary
1. Engaged with SEPA on 12th January 2018 to discuss waste management requirements, which were incorporated in the project waste management plan.
2. Regulatory project execution progress reports (FFL-DUN-MER-HSE-01-RPT-00003) post approval of the Decommissioning Programme were issued to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) for reporting periods Q1-18 (rev A1), Q2-18 (rev A2), Q3-18 (rev A3), Q4-18 (rev A4), Q1-19 (rev A5), Q2-19 (rev A6), Q3-19 (rev A7) and Q4-19 (rev A8). Execution work was completed in Q4-19.
3. Engaged with SFF in relation to Deviations/Dispensations for overtrawling of the installation site, this was sought and approved, see section 2.8 for further details.
4. No payments to UK Fisheries Offshore Oil and Gas Legacy Trust Fund Limited (FLTC) were required.

3 Impact on the Environment

3.1 Activities

There were no significant environmental impacts resulting from the Merlin infrastructure activities. Temporary impacts on the marine environment would have resulted from seabed / drill cuttings disturbance associated with the recovery of infrastructure, concrete blocks, stabilisation materials and debris. Further details of the post-decommissioning environmental status can be found in:

- ROUK-SC-321-K12-0005 for Environmental Survey
- ROUK-SC-321-K12-0001_1926 for Habitat Assessment
- ROUK-SC-321-K12-0002_1926 for Cuttings Information

Marine licence ML/377 was varied throughout the decommissioning campaigns to account for inventory changes discovered during the operations.

3.2 Future Monitoring

The following monitoring plan is proposed for the infrastructure decommissioned *in situ*.

Table 3-1: Future Surveys and Monitoring Proposals
1. Substructure (Jackets)
n/a
2. Pipelines, Flowlines & Umbilicals
The Merlin pipeline corridors are well known since their initial development in 1997 and pipeline surveys have been undertaken periodically to monitor the status of the installed infrastructure. The most recent surveys in this series were conducted in 2009, 2012 and 2016. Data from each of these surveys confirm a stable seabed environment with consistent and acceptable depth of lowering and depth of cover on the two pipelines that have been partially decommissioned *in situ* (PL1555 and PL1557). Details of lowering and cover from these historic reports can be provided upon request. In accordance with the approved Decommissioning Programme, the limited infrastructure remaining *in situ* has been re-confirmed by post decommissioning survey to be fully trenched or buried. Due to its location and the low seabed mobility, this infrastructure is considered unlikely to become exposed such that it could interact with other users of the sea. Fairfield Fagus Limited proposes that one further pipeline condition survey be undertaken to confirm that no exposures, spans or interactions have materialised. Fairfield believes the interval for this follow-up survey should be in the order of five years. If evidence of anomalies are subsequently found, any necessary remedial action would be undertaken and the survey results used to inform both the owners and the regulator on whether an additional future survey was warranted.
3. Pipeline Stabilisation Features
Monitoring of the limited remaining stabilisation features – namely rock-capped grout/sand bags below mean seabed level – will form part of the proposed pipeline condition survey.

Table 3-1: Future Surveys and Monitoring Proposals
4. Drill Cuttings
Post decommissioning survey of the cuttings piles has demonstrated minimal impact from the completed decommissioning activities. In general, the piles have low and reducing hydrocarbon persistence and exhibit low levels of organics, aromatics, PCBs, OTCs, heavy or trace metals. The physical and chemical extent of the piles falls within OSPAR and OLF guidelines and the data suggests a general decline in the chemical components of the piles when compared to the pre-decommissioning survey. It is the opinion of Fairfield Fagus Limited that further survey of the cutting piles is unwarranted.
5. Environmental Surveys
As described above, the post-decommissioning environmental survey confirmed an area of muddy sand with little variation or features, albeit with higher fines evident at the cutting piles from past drilling activity. Results for organics, aromatics and heavy metals were all consistently low across the area of interest and consistent with pre-decommissioning survey data. While the impact of drilling is evident on species diversity at the drill sites, improved species richness and abundance is evident along the pipeline route, suggesting that the macrofaunal community is showing signs of recovery. Given the results of the pre and post-decommissioning surveys being broadly similar and showing signs of recovery, the need for future remedial action seems most unlikely. Based on the above, it is the opinion of Fairfield Fagus Limited that further environmental survey is not warranted.

4 Impact on HS&E

4.1 Details of any Incidents / Accidents during Project Execution

RIDDOR reportable injuries and dangerous occurrences, and reportable releases to sea (PON1):

27/07/2018	PON1 Reported by Transocean	P&A MODU T712	Upon removing the tree cap from the suspended well head, tiny droplets of oil were observed to be leaking from the top of the Subsea Xmas tree by the ROV operators (ME-P13s1)
27/07/2018	PON1 Reported by Transocean	P&A MODU T712	Oil leak observed during attempt to recover tree cap (ME-P11)
07/02/2019	PON2	P&A MODU T712	During pre-rig move inspections noted that #5 PCP* was missing and holder was damaged. PCP lost to sea, Damage sustained to holder. PCP was located and retrieved as part of the debris clearance activity. *PCP is variously called Permanent Chain Pendant, Permanent Chasing Pennant or Permanent Chaser Pendant
14/05/2019	PON1	Normand Clipper	During operations with the Mass Flow Excavator a quantity of hydraulic fluid was seen in the water. The equipment was immediately shut down, the hydraulic leak was located by the ROV flying the line and the joint which was found to be leaking was recovered to deck and tightened.

See UK1077-HSE-RPT-001 for further information on safety performance.

5 Waste

Fairfield have had ongoing engagement with SEPA who have provided positive feedback on the project waste management strategy (FBL-DUN-HSE-STR-00003). The waste management strategy is a key document for informing the production of an Active Waste Management Strategy to ensure compliance with the Waste Framework Directive.

Waste returned to shore during the decommissioning of the Merlin field is detailed below, noting that well P&A waste 3 m below the mudline and lower is not included in the decommissioning programme waste. The tubulars from 3 m below the mudline and above, wellhead, Xmas tree, flowbase and surface laid equipment is included.

Table 5-1: Waste Returned to Shore

Infrastructure	Weight Returned (t)
Ferrous Metal - *Steel all grades*	864 (Subsea) 212 (XMT's, wellhead, tubing hanger, flowbases and top 3 m of the completion)
Non-ferrous Metal - *Non-ferrous (copper; aluminium; zinc; indium)*	
Concrete - *Aggregates (mattresses; grout bags; sand bags)*	933
Plastics - *Rubbers; Polymers*	*16 tonnes included along with the metallic inventory*
Hazardous - Asbestos containing materials, *Residual Fluids (hydrocarbons; chemicals; control fluid)*	1.25
Hazardous - *NORM Scale*	Trace
Other- *Debris*	23
Total	**2,033.25**

It should be noted that the SID (Merlin, Osprey and DFGI/DPI) field decommissioning was completed as a joint campaign to optimise recovery efficiency. The weights recorded above are wet weights as per the materials allocation per field. Due to the proximity of fields some of the material has been combined, leading to over/under allocation per field, however on balance the SID returns are greater than forecast.

All subsea related items were discharged at Greenhead Base, Gremista, Lerwick, all surface P&A related items were discharged at Peterhead for processing. All weight figures are approximate.

For further information see VEOLIA-ROUK-RE-0001-I03 for waste figures.

All recovered infrastructure materials were returned to shore and recycled utilising Fairfield contracted, appropriately licenced, waste management and recycling contractors.

6 Lessons Learned

No significant industry learnings to report. The project was delivered as expected.

7 Cost Summary

Project cost data has been forwarded to OPRED and the OGA separately.

8 Photographs

Combined Merlin, Osprey and DFGI/DPI Decommissioning Album

Debris Recovery

Infield Jumpers and Flowlines Recovered

Normand Clipper Reverse Reeling

Mattresses Recovered from Osprey, Merlin and Dunlin

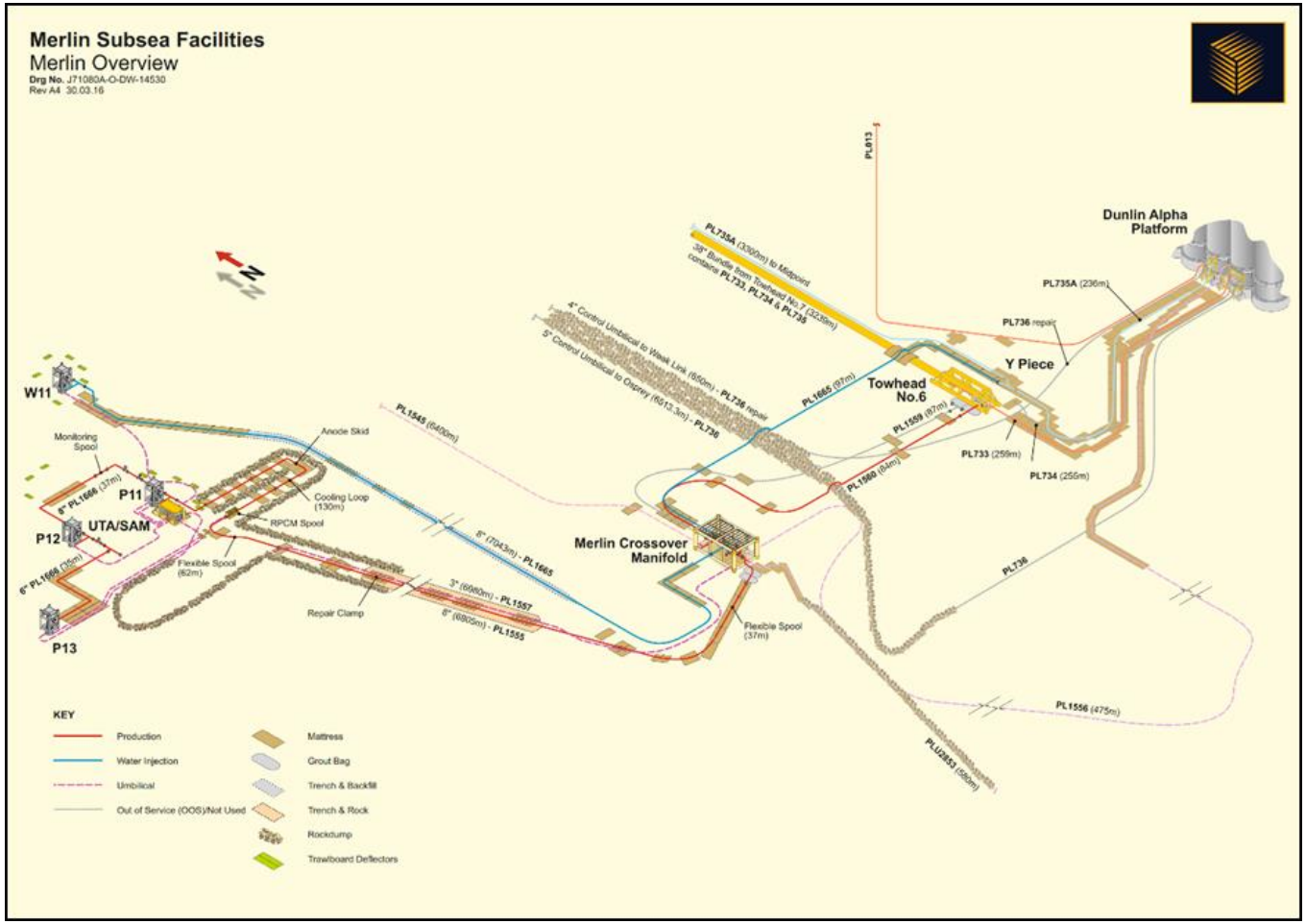
Wire Debris & Fishing Debris Recovered

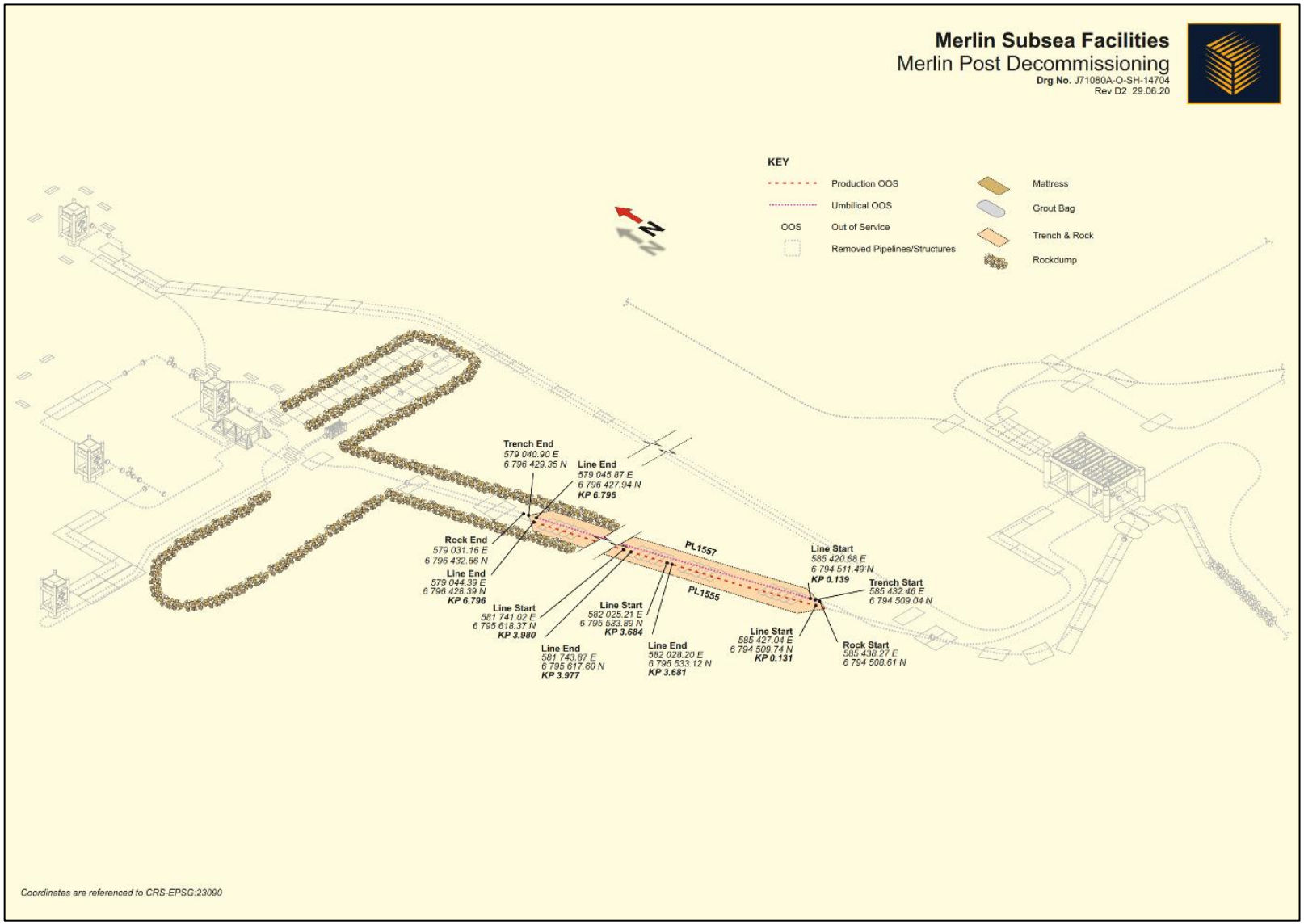
Waste Preparation & Separation

Mixed Sand / Grout / Mattress Deposits Recovered for Landfill
(Note flexible hose and umbilical were not recovered by Fairfield)

Flexible Pipeline and Umbilicals Prepared for Transport to Recycling Facility

9 Appendices




Merlin Subsea Facilities
Merlin Post Decommissioning
Drg No. J71080A-O-SH-14704
Rev D2 29.06.20
KEY
Production OOS
Umbilical OOS
OOS Out of Service
Removed Pipelines/Structures
Mattress
Grout Bag
Trench & Rock
Rockdump
N
Trench End
579 040.90 E
6 796 429.35 N
Line End
579 045.87 E
6 796 427.94 N
KP 6.796
Rock End
579 031.16 E
6 796 432.66 N
Line End
579 044.39 E
6 796 428.39 N
KP 6.796
PL1557
PL1555
Line Start
581 741.02 E
6 795 618.37 N
KP 3.980
Line End
581 743.67 E
6 795 617.60 N
KP 3.977
Line Start
582 025.21 E
6 795 533.89 N
KP 3.684
Line End
582 028.20 E
6 795 533.12 N
KP 3.681
Line Start
585 427.04 E
6 794 509.74 N
KP 0.131
Line Start
585 420.68 E
6 794 511.49 N
KP 0.139
Trench Start
585 432.46 E
6 794 509.04 N
Rock Start
585 436.27 E
6 794 508.61 N
Coordinates are referenced to CRS-EPSG:23090