

PERENCO UK LIMITED

Leman 49/27H and 49/27J

Topsides Decommissioning

Programme

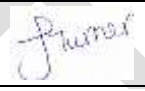
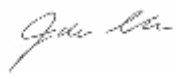
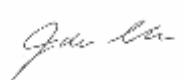


Consultation Version



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Approvals

	Name	Signature	Date
Prepared by	Joanne Turner		
Reviewed by	Julie Summerell		
Approved by	Julie Summerell		

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A. Table of Terms and Abbreviations

Abbreviation	Explanation
"	Inch
%	Percentage
°C	Degrees Celsius
27A	Leman 49/27A
27B	Leman 49/27B
27H	Leman 49/27H
27J	Leman 49/27J
Alpha Petroleum	Alpha Petroleum Resources Limited
AtoN	Aid to Navigation
BAT	Best Available Techniques
BEIS	Department for Business, Energy and Industrial Strategy
BEP	Best Available Practices
BGS	British Geological Survey
BGT	Bacton Gas Terminal
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CIP	Communication and Interface Plan
COP	Cessation of Production
CON	Combined Operation Notifications
CtL	Consent to Locate
DECC	Department of Energy and Climate Change
DP	Decommissioning Programme
DRA	Disturbance Risk Assessment
E	East
E&A	Exploration and Appraisal Well
EIA	Environmental Impact Assessment
EA	Environmental Appraisal
EEGR	East of England Energy Group
EAJ	Environmental Assessment Justification
EL	Elevation
EMT	Environmental Management Team
ESDV	Emergency Shutdown Valve

Abbreviation	Explanation
ESAS	European Seabirds at Sea Database
EUNIS	European Nature Information Systems
EU	European Union
FCS	Favourable Conservation Status
ha	Hectare
HCF	Hydrocarbon Free
HLV	Heavy Lift Vessel
HSE	Health and Safety Executive
ICES	International Council for the Exploration of the Seas
JNCC	Joint Nature Conservation Committee
JUB	Jack-Up Barge
km	Kilometre
km ²	Square Kilometre
LAT	Lowest Astronomical Tide
LLC	Limited Liability Company
LSA	Low Specific Activity
m	metre
m ²	Square Metre
m ³	Cubic metre
MAT	Master Application Template
MMO	Marine Management Organisation
m/s	Metres per Second
N	North
N/A	Not applicable
NFFO	National Federation of Fishermen's Organisations
NIFPO	Northern Ireland Fish Producers' Organisation
NORM	Naturally Occurring Radioactive Material
NSTA	North Sea Transition Authority
NUI	Normally Unattended Installation
OGUK	Oil and Gas UK
OPEP	Oil Pollution Emergency Plan
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSRL	Oil Spill Response Limited

Abbreviation	Explanation
OSPAR	Oslo and Paris Convention
P&A	Plug and Abandonment
PERENCO	Perenco (UK) Limited
PETS	Portal Environmental Tracking System
PL	Pipeline
PDO	Potential Dropped Object
PWA	Pipeline Work Authorisations
RFU	Rock Filter Units
SAC	Special Area of Conservation
SAT	Subsidiary Application Template
SCAP	Supply Chain Action Plan
SEA	Strategic Environmental Assessment
SEMS	Safety and Environmental Management System
SFF	The Scottish Fishermen's Federation
SLV	Sheer Leg Vessels
SNS	Southern North Sea
SPA	Special Protection Areas
Te	Tonne
TFSW	Transfrontier Shipment of Waste
UK	United Kingdom
UKCS	UK Continental Shelf
VTS	Viking Transportation System
W2W	Walk to Work

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1.0 Executive Summary

1.1 Decommissioning Programme

This document is the Decommissioning Programme (DP) for the removal of the topsides of the Leman gas field installations Leman 49/27H (27H) and Leman 49/27J (27J) in the Southern North Sea (SNS).

In accordance with Regulation 14 of the Pipeline Safety Regulations 1996, Perenco UK Limited (Perenco) will notify the Health and Safety Executive (HSE) of the decommissioning of the pipelines and submit the required variations to the Pipeline Work Authorisations (PWA) to carry out the flushing and disconnection activities.

Following public, stakeholder and regulatory consultation, this topsides removal DP (Topside DP) is submitted without derogation and in full compliance with Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) guidelines. The Topsides DP explains the principles of the topsides removal activities. The removal of the topsides will not preclude available decommissioning options for the 27H and 27J jackets.

1.2 Requirement for Decommissioning Programme

Topsides: In accordance with the Petroleum Act 1998, the section 29 notice holders of the 27H and 27J Installations (see Table 1.2) are applying to OPRED to obtain approval for decommissioning the 27H and 27J platform topsides detailed in Section 2.1 of this programme. Partner letters of support will be provided directly to OPRED.

In conjunction with public, stakeholder and regulatory consultation, this Topsides DP is submitted in compliance with national and international regulations and OPRED guidelines. The schedule outlined in this document is for the decommissioning of the 27H and 27J installations topsides, commencing Q1 2023.

This Topsides DP will cover the decommissioning of the 27H and 27J topsides, including Hydrocarbon Free (HCF), abandonment of the platform wells to AB3 status, and pre-dismantlement works.

Subject to regulatory approval, a decommissioning jack-up barge (JUB) or a drilling rig JUB will be used to plug and abandon (P&A) the platform wells and make the platforms HCF. The current plan is to use a decommissioning JUB to remove the topsides modules and transport the topsides onshore for recovery.

In this respect, disturbance of the seabed during removal of the topsides facilities will be limited to the deployment of the decommissioning JUB on the seabed.

However, Perenco are currently reviewing the potential re-use of the 27H installation. If the re-use option proceeds, it is anticipated that the 27H topsides will be rendered HCF and the wells will be P&A to AB3 status using the aforementioned JUB and process vessels containing hazardous materials will be removed and transported onshore for recovery or disposal. At the current time it is anticipated that Perenco will remain liable for the decommissioning of the installation under the applicable regulatory regime (appropriate for the re-use function) at a later date. Perenco will also discuss and agree with OPRED the actions required in connection with transition to the applicable regulatory regime.

Perenco anticipates that the deposit of stabilisation material can be avoided with additional preloading of the JUB during the jacking down procedure.

The 27H and 27J platforms are located within the boundary of the North Norfolk Sandbanks and Saturn Reef Special Area of Conservation (SAC) protected area (see Appendix 1). The Leman tie-back pipeline route Habitat Assessment survey (Benthic Solutions, 2012) indicated a likely presence of Annex 1 Habitat representing biogenic reefs in the surrounding area of the installations. Prior to any decommissioning activities on the 27H and 27J installations, an as-found survey and site specific assessment will be carried out to establish the presence of any reef structures in the vicinity of the installations and the approach and location of the JUB will be selected accordingly to avoid any reef structures identified.

As the Topsides DP will result in minimal environmental interactions (i.e. solely seabed disturbance and atmospheric emissions) from the JUB. Perenco plans to assess these impacts via an Environmental Assessment Justification (EAJ) Document, which will be attached to the Consent to Locate (CtL) Supplementary Assessment Templates (SATs), under the existing Leman Production Master Application Templates (MATs).

Perenco have produced an Environmental Appraisal included in Section 4.0 to support this Topsides DP.

Jacket: There will be a separate DP for the decommissioning of the Leman installation jackets.

Pipelines: There will be a separate DP for the decommissioning of pipelines (PL206 and PL207) associated with 27H and 27J installations.

The pipelines will be flushed and isolated prior to the HCF campaign using seawater in accordance with industry good practice and will be assessed against the principles of best available techniques (BAT) and best environmental practices (BEP). Pipeline flushing is due to commence in Q4 2022 and will be carried out under an approved PWA variation. During the HCF campaign, the pipelines will be physically air-gapped when they come onto the 27H and 27J platforms

1.3 Introduction

The Leman field is located in the SNS, approximately 53 km from the North-East from the Bacton Gas Terminal (BGT), off the coast of East Anglia, see Figure 1.2. The field utilises 16 development platforms; 9 installations are operated by Perenco.

The purpose of the 27H and 27J installations is to provide facilities for the extraction of natural gas from the subsea reservoir and for the export of the gas to the Leman 49/27A (27A) installation.

As a result of the Southern Hub Asset Rationalisation Project, which sought to extend the operating life of the Leman and Indefatigable fields, the 27A platform will become a Normally Unattended Installation (NUI) in 2022. Produced gas and condensate received at 27A from the linked satellite platforms (including 27H and 27J) will be routed to the Leman 49/27B (27B) platform and BGT via PL23.

The Cessation of Production (COP) documentation for 27H and 27J was submitted to the North Sea Transition Authority (NSTA) in November 2021. Approval for COP was granted, and the confirmed COP was 15 December 2021.

The coordinates for the 27H and 27J installations are as follows:

27H	Latitude:	53° 00' 17.1518"N	Longitude:	02° 12' 54.1631"E
27J	Latitude:	53° 01' 57.7494"N	Longitude:	02° 13' 09.2251"E

As shown in Figure 1.1, From the 27H, a 20" subsea pipeline (PL206) conveys gas and condensate to the 27A for processing and onward transmission to the BGT via a 30" subsea pipeline. A 16" pipeline conveying gas and condensate from 27J installation joins this pipeline at a subsea tee approximately midway between 27H and 27A. The 27H is located 6 km to the south of the 27A.

The preferred plan is to commence decommissioning activities in the following order - 27J then 27H. The DP will commence with the HCF operations, followed by removal of the platform topsides by use of a JUB.

However, this sequence is subject to optimisation and is dependent on the availability of the JUB for the removal of the topsides. Following completion of the HCF phase, two different approaches may be applied:

- Approach A – HCF followed by lighthouse mode. The topsides will remain in place and will enter a 'Lighthouse Mode'.
- Approach B – HCF followed by the immediate removal of the topside. The jackets will remain in a 'Dismantlement Interval Phase'.

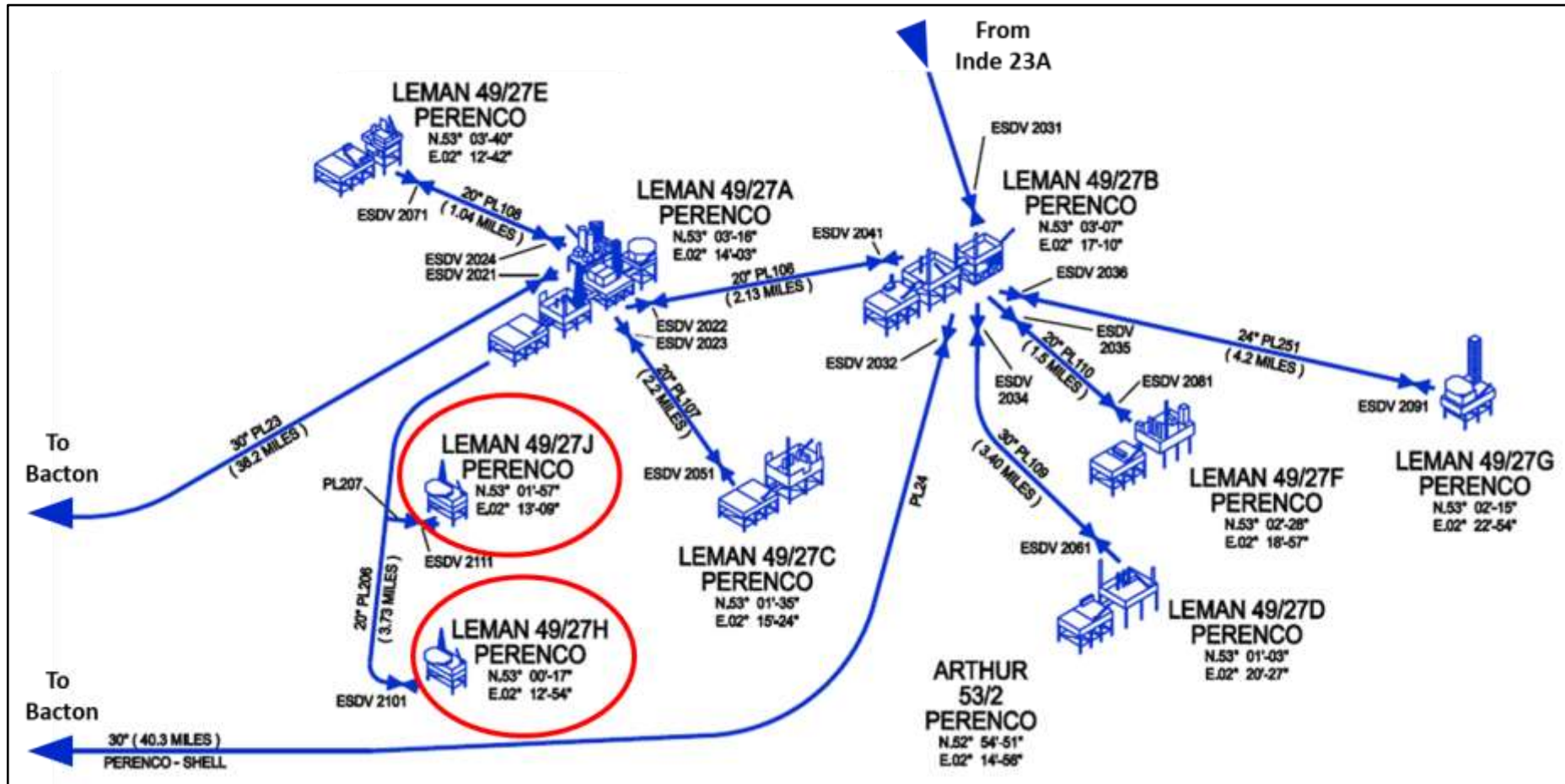


Figure 1.1: Leman Field Layout

Platform Descriptions:

The 27H and 27J installations in the Leman field were installed in 1984. The installations both comprise of a single platform of similar construction, i.e. a four-legged tubular steel jacket piled into the seabed which supports steel deck structures above the sea surface.

Topsides

The topsides superstructure consists of a cellar deck, main deck and a helideck. The deck levels constitute an integral unit formed by horizontal steel trusses supported by vertical members mated to the jacket legs.

Further information on the topsides sizes, weights and elevations are provided in section 3.1, Table 3.1

The Topsides DP includes the following key activities:

- **Hydrocarbon Free Campaign** - The following activities are undertaken with the support of a JUB to render the installation HCF:
 - Platform wells P&A to Phase 2, as defined in the OGUK Well Decommissioning Guidelines.
 - Flushing and purging of topsides process equipment.
 - Disconnection of pipelines, j-tubes, and power cables from platforms.
 - Structural survey to ensure that the structural integrity of the installation will be maintained throughout the DP.
- **Preparation for Lighthouse Mode** - The following activities are undertaken with the support of a JUB once the platform is verified as HCF to prepare the platform for Lighthouse Mode:
 - Positive isolation of topsides and safety equipment to make equipment redundant; redundant equipment may be recovered for re-use on another installation.
 - Platform wells P&A to 'Phase 3' as defined in the OGUK Well Decommissioning Guidelines Issue 6, June 2018.
 - Solar powered self-contained Aids to Navigation (AtoNs) commissioned and tested prior to the departure of the JUB.
 - Removal of potential dropped objects (PDOs)
 - jacket spider deck (i.e. gratings and handrails)
 - corroded pipe and cable supports
 - platform signs, etc.
 - All name signs will remain on the platform.
- **Dismantlement Preparation:** The following activities are undertaken with the support of a JUB once the platform is verified as HCF to prepare the topsides for future removal:
 - Removal of jacket appurtenances (see note below) which may prevent the installation of skid support equipment, such as:
 - clamps and guides for risers, caissons and drain lines
 - escape to sea ladders
 - scaffold starter brackets, etc.
 - Removal of tertiary structures which may present an obstruction during the skidding operation; this may include:
 - vent boom

- helideck (full or partial removal)
 - escape to sea ladder
 - supply hoses (i.e. fresh water and diesel)
- Removal/partial removal of interface items between topsides and jackets which may obstruct separation of topsides and jacket, such as:
 - risers and j-tubes
 - caissons, i.e. seawater lift, seawater dump, black water dump (and associated tanks and lift pumps)
 - conductor centralisers, etc.
- Removal of PDO, such as:
 - jacket spider deck (i.e. gratings and handrails)
 - corroded pipe and cable supports
 - platform signs, etc.
- Removal/securing of process equipment unsecured for skidding, such as:
 - pig receiver
 - emergency shutdown valve (ESDVs)
- Preparation of structure for future removal of platform, including installation of skid support equipment.
- **Topsides Removal and Dismantlement Campaign** - The following activities are undertaken with a decommissioning JUB:
 - Removal of topsides and transport onshore to disposal yard.
 - Installation of self-contained solar powered AtoNs, commissioned/tested prior to the departure of the JUB. The AtoNs will be installed within a grillage box which will be stabbed into one of the jacket legs.
 - Onshore dismantlement of topsides at disposal yard, for reuse, recycling or disposal.

Access to the AtoNs for maintenance or remediation works, once the topsides have been removed, will be enabled by a landing platform integrated to the grillage. The landing platform will be suitable to interface with a vessel, e.g. a Walk to Work (W2W) system operated from a floating vessel. Access can also be gained by basket transfer or rope.

Work platforms and/or temporary scaffold structures will be installed during the dismantlement preparation phase and will remain in place on the jacket. The work platforms/scaffold structures will enable the remediation/replacement of the AtoNs on the grillage and any required remediation work to the jacket structure once the topsides have been removed.

Once the topsides have been removed, any remediation of the jacket and AtoNs will require a JUB to be located next to the jacket. Access will be either by rope access or basket transfer from the JUB.

The Topsides DP approach may vary between platforms and is dependent on vessel availability.

The work proposed in this Topsides DP will be assessed under the Leman and Indefatigable Oil Pollution Emergency Plan (OPEP), the appropriate Non-Production Installation OPEP for the JUB and Heavy Lift Vessel (HLV), and the Communication and Interface Plans (CIPs) for the HCF campaign and Heavy Lift campaign; these will be prepared and submitted prior to commencement of the campaigns.

The AtoNs provide marine coverage for the duration of the lighthouse mode and are monitored remotely from a Perenco Gas Terminal by Perenco Operators to ensure the AtoNs remain



functional. In the event of failure of the AtoNs, a contingency plan will be put in place; this includes the use of a stand-by vessel until the AtoNs can either be repaired or replaced using either a W2W vessel or a JUB.

At the end of the Lighthouse Phase, the topsides will be removed, and it is anticipated that the installation will then go into a 'dismantlement interval' phase prior to the jacket being finally removed.

The following phases are excluded from the Topsides DP and will be part of the Jacket DP and Pipeline DP:

- 1 Jacket Dismantlement Phase: Successful tenderer(s) remove the jacket and transport the module to an onshore dismantlement yard, for reuse, recycling or disposal.
- 2 Seabed clearance and verification: Post-decommissioning environmental surveys undertaken following platform removal.

Jacket

The 27H and 27J jackets are open steel framework design, comprising four legs, connected and cross-braced by horizontal and diagonal steel members.

The jacket incorporates a conductor guide frame. It is secured to the seabed by steel piles driven through the platform legs to an average depth of 44.8 m (147 ft) for 27J and (158 ft) for 27H

This DP only covers the decommissioning/removal of the 27H and 27J platform topsides. Further details of the jacket will be provided in the subsequent Jacket DP.

Pipelines:

Decommissioning of the pipelines will be dealt with in a separate DP, however jacket risers, j-tubes, and caissons will be partially removed prior to the topsides removal. Pipelines will be flushed and isolated prior to the HCF campaign and will be air-gapped on the topsides during the HCF campaign. Prior to the removal of the jacket, the risers will be air-gapped subsea.

1.4 Overview of Topsides Being Decommissioned

Table 1.1a: Decommissioning Programme Leman 27H			
Field:	Leman	Production Type (Oil/Gas/Condensate)	Gas
Water Depth (m)	38.1	UKCS block	49/27H
Surface Installation			
Number	Type	Topsides Weight (Te)	
1	Fixed leg steel NUI platform	914	
Subsea Installation		Number of Wells	
Number	Type	Platform	Subsea
0	N/A	4	0
Drill Cuttings pile		Distance to median	Distance from nearest UK coastline
Number of Piles	Total Estimated volume (m ³)	km	km
N/A	N/A	61	53

Table 1.1b: Decommissioning Programme Leman 27J			
Field:	Leman	Production Type (Oil/Gas/Condensate)	Gas
Water Depth (m)	41	UKCS block	49/27J
Surface Installation			
Number	Type	Topsides Weight (Te)	
1	Fixed leg steel NUI platform	914	
Subsea Installation		Number of Wells	
Number	Type	Platform	Subsea
0	N/A	5	0
Drill Cuttings pile		Distance to median	Distance from nearest UK coastline
Number of Piles	Total Estimated volume (m ³)	km	km
N/A	N/A	60	53



1.5 Section 29 Notice Holders

Table 1.2: Installation Section 29 Notice Holders Details Leman 27H and 27J		
Section 29 Notice Holder(s)	Registration Number	Equity Interest (%)
Perenco UK Limited	04653066	78.26
Rockrose UKCS15 Limited	SC375371	21.74
Amoco (U.K.) Exploration Company, LLC	BR005086	0
Amoco U.K. Petroleum Limited	00799710	0
Apache Beryl I Limited	BR001327 FC005975	0
BG International Limited	00902239	0
Enterprise Oil Limited	01682048	0
Hess Limited	00807346	0
Perenco Gas (UK) Limited	00715529	0

1.6 Summary of Proposed Decommissioning Programme

Table 1.3: Summary of Decommissioning Programme		
Selected Option	Reason for Selection	Proposed Decommissioning Solution
1. Topsides		
Complete removal, re-use or disposal	Complies with Oslo and Paris Convention (OSPAR) requirements and OPRED guidelines and maximises recycling of materials.	Topsides rendered HCF and removed either by (1) HLV, (2) skidding, (3) through a combination of crane vessel lift and piece small dismantling. Re-use followed by recycle and other recovery routes before disposal as a final option is considered.
2. Jacket		
Not covered in this DP		
3. Subsea Installations		
None		
4. Pipelines, Flowlines and Umbilical		
Not covered in this DP		
5. Wells		
Permanent well P&A	Meets HSE regulatory requirements and is in accordance with OGUK and NSTA guidelines.	P&A to comply with the HSE regulation, i.e. "The Offshore Installations and Wells (design and construction etc.) Regulations 1996", and in accordance with OGUK Well Decommissioning Guidelines, Issue 6, June 2018
6. Drill Cuttings		
Not covered in this DP		
7. Interdependences		
27H and 27J is connected into 27A via PL206 and PL207. Decommissioning is planned in the following order to address these interdependencies: 27J and then 27H.		

1.7 Field Location Including Field Layout and Adjacent Facilities

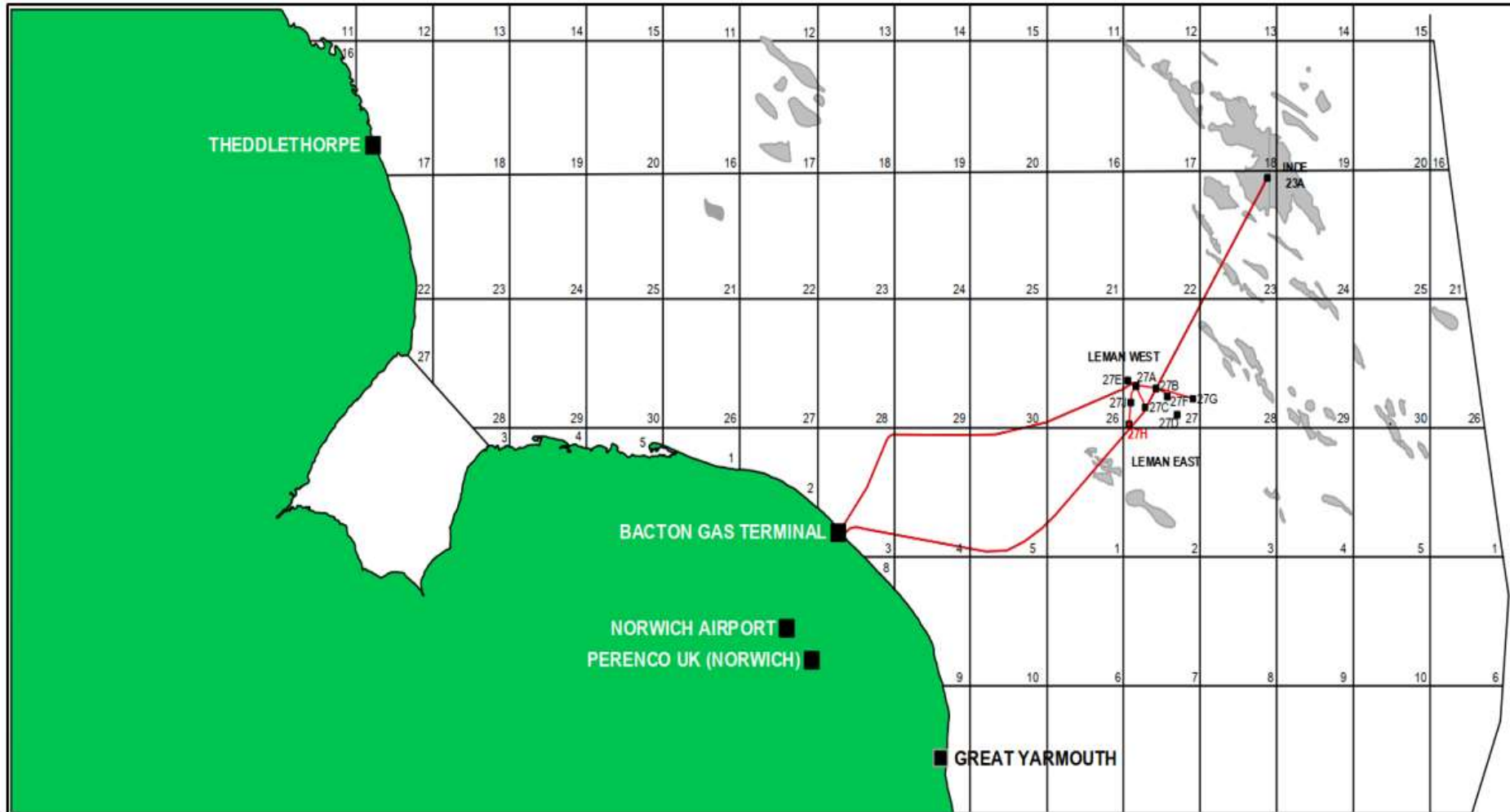
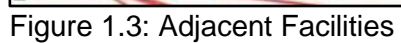


Figure 1.2: Leman field location within the Southern North Sea

Table 1.4: List of Adjacent Facilities

Owner	Name	Type	Distance/Direction	Information	Status
Shell U.K Limited	Leman 26A AC,AD1.AK,AP	Platform	From Leman 27H to Leman 26A is 11.1 km From Leman 27J to Leman 26A is 8.8 km	Adjacent platform	Operational
Shell U.K Limited	Leman 26B BD, BP, BT	Platform	From Leman 27H to Leman 26B is 8.29 km From Leman 27J to Leman 26B is 5.4 km	Adjacent platform	Operational
Shell U.K Limited	Leman 26C CD,CP	Platform	From Leman 27H to Leman 26C is 10.29 km From Leman 27J to Leman 26C is 5.22 km	Adjacent platform	Operational
Shell U.K Limited	Leman 26 D	Platform	From Leman 27H to Leman 26D is 2.08 km From Leman 27J to Leman 26D is 3.46 km	Adjacent platform	Operational
Shell U.K Limited	Leman 26E	Platform	From Leman 27H to Leman 26E is 5.63 km From Leman 27J to Leman 26E is 3.06 km	Adjacent platform	Operational
Shell U.K Limited	Leman 26F	Platform	From Leman 27H to Leman 26F is 15.3 km From Leman 27J to Leman 26F is 13.2 km	Adjacent platform	Operational
Shell U.K Limited	Leman 26G	Platform	From Leman 27H to Leman 26G is 14.6 km From Leman 27J to Leman 26G is 12.2 km	Adjacent platform	Operational
Perenco UK Limited	Leman 27A AC, AD, AP, AQ, AX	Platform	From Leman 27H to Leman 27A is 5.83 km From Leman 27J to Leman 27A is 2.74 km	Adjacent platform	Operational
Perenco UK Limited	Leman 27B BD, BP, BT	Platform	From Leman 27H to Leman 27B is 7.07 km From Leman 27J to Leman 26B is 5 km	Adjacent Platform	Operational
Perenco UK Limited	Leman 27C CD, CP	Platform	From Leman 27H to Leman 27C is 3.82 km From Leman 27J to Leman 27C is 2.65 km	Adjacent Platform	Operational

Table 1.4: List of Adjacent Facilities					
Owner	Name	Type	Distance/Direction	Information	Status
Perenco UK Limited	Leman 27D DD, DP	Platform	From Leman 27H to Leman 27D is 8.6 km From Leman 27J to Leman 27D is 8.37 km	Adjacent platform	Operational
Perenco UK Limited	Leman 27E ED, EP	Platform	From Leman 27H to Leman 27E is 6.12 km From Leman 27J to Leman 27E is 3.21 km	Adjacent Platform	Operational
Perenco UK Limited	Leman 27F FD, FP	Platform	From Leman 27H to Leman 27F is 7.85 km From Leman 27J to Leman 27F is 6.56 km	Adjacent Platform	Operational
Perenco UK Limited	Leman 27G	Platform	From Leman 27H to Leman 27G is 12 km From Leman 27J to Leman 27G is 11 km	Adjacent Platform	Operational
Perenco UK Limited	Leman 27J	Platform	From Leman 27H to Leman 27J is 3.19 km	Adjacent Platform	Operational
Impacts of Decommissioning Proposals					
Decommissioning of the 27H and 27J Platforms will have no impact on the adjacent facilities, i.e. the Leman platforms and pipelines.					



1.8 Industrial Implications

As detailed in section 1.3 above, the Topsides DP includes the following key activities:

- **Pre-decommissioning surveys** - debris and environmental surveys undertaken prior to the HCF campaign.
- **Pipeline flushing** – activities to render the pipeline of hydrocarbons down to <30ppm oil in water content.
- **Hydrocarbon Free Campaign** – activities undertaken during the HCF campaign to render the installation HCF.
- **Preparation for Lighthouse Mode** - activities undertaken at the end of the HCF campaign, once the platform is verified as HCF, to prepare the platform for lighthouse mode; this includes the installation of the solar powered AtoNs.
- **Dismantlement Preparation** - activities undertaken to prepare for removal of the platform; this includes the removal of potential obstructions and installation of removal equipment.
- **Topsides Removal and Dismantlement Campaign** - removal of topsides and transport onshore to disposal yard, and onshore dismantlement of topsides at disposal yard, for reuse, recycling or disposal.

The above activities are planned carefully to recognise synergies and efficiencies. Engineering and planning takes into account potential integration of various activities; therefore, the above activities above may be completed in an alternate order to above.

All contracts will be tendered according to Perenco procedures. Suppliers' offers will be assessed along many criteria, including: their technical ability and capacity to execute the work in a safe and efficient manner that minimises the impact on the environment; the commercial offer; and the experience of carrying out this type of operation in the UK Continental Shelf (UKCS).

Perenco have engaged with the NSTA Supply Chain team, and it has been agreed that a Supply Chain Action Plan (SCAP) is required for the 27H and 27J Topsides DP. The draft SCAP is currently in production and will be submitted to NSTA for review once complete.

Perenco are active participants in various industry initiatives including:

- a. OGUK Supply Chain Forum
- b. OGUK Decommissioning Forum
- c. OGUK Wells Forum
- d. East of England Energy Group (EEGR)

Current operational contracts for items such as environmental permitting, potential vessel sharing, and logistical support will be implemented to support decommissioning activities and wider business optimisation.

2.0 Description of items to be decommissioned

2.1 Installations: Topsides

Table 2.1: Surface Facilities Information				
Name	Facility Type	Location WGS84 Format	Topsides/Facilities	
			Weight (Te)	No of modules
27H	NUI	Latitude : 53° 00' 14.3154"N Longitude : 02° 12' 49.1662"E	914	1
27J	NUI	Latitude: 53° 01' 54.9164"N Longitude : 02° 13' 04.2255"E	914	1

2.2 Installations: Subsea including Stabilisation Features

Decommissioning of the platform jackets and pipelines will be dealt with in a separate DP.

2.3 Wells

Table 2.2a: 27H Well Information			
Platform Wells – 27H	Designation	Status	Category of Well *
49/27-H1	Gas Production	Shut-in	PL-1-1-1
49/27-H2	Gas Production	Shut-in	PL-1-1-1
49/27-H3	Gas Production	Shut-in	PL-1-1-1
49/27-H4	Gas Production	Shut-in	PL-1-1-1
Subsea Wells – 27H			
None	N/A	N/A	N/A

Table 2.2b: 27J Well Information			
Platform Wells – 27J	Designation	Status	Category of Well *
49/27-J1	Gas Production	Shut-in	PL-1-1-1
49/27-J2	Gas Production	Shut-in	PL-1-1-1
49/27-J3	Gas Production	Shut-in	PL-1-1-1
49/27-J4	Gas Production	Shut-in	PL-1-1-1
49/27-J5	Gas Production	Shut-in	PL-1-1-1
Subsea Wells – 27J			
None	N/A	N/A	N/A

There are no exploration and appraisal (E&A) wells associated with the 27J and 27H installations.

2.4 Drill Cuttings

As this DP only covers the topsides. The presence and potential impact of drill cuttings will be assessed in the Jacket DP.

2.5 Inventory Estimates

Tables 2.3a and 2.3b show the estimated topsides inventory to be decommissioned for 27H and 27J respectively. The inventories exclude the jacket and piles, which will be dealt with in a later Jacket DP.

The removed equipment, appurtenances and steelwork will be transported onshore to a dismantlement yard for reuse, recycling or disposal.

Table 2.3a: Inventory Estimate for Leman 27H Topsides

Material	Weight (Te)	Estimated volume (m ³)
Steel	819	105
Concrete	12	1
Plastic	12	1
Non Ferrous	12	1
Hazardous	12	1
Radioactive waste (NORM etc.)	12	1
Other	35	6

Table 2.3b: Inventory Estimate for Leman 27J Topsides

Material	Weight (Te)	Estimated volume (m ³)
Steel	819	105
Concrete	12	1
Plastic	12	1
Non Ferrous	12	1
Hazardous	12	1
Radioactive waste (NORM etc.)	12	1
Other	35	6

3.0 Removal and Disposal Methods

In line with the waste hierarchy, in which the prevention of waste is preferred, Perenco has assessed the options for extending the producing life of the platforms, but this was not commercially viable.

Due to the ageing technology and high maintenance costs of the fabric and structural integrity, technically viable reuse options are limited.

Perenco are currently reviewing the option of the potential re-use of the 27H installation. If the re-use option proceeds, it is anticipated that the 27H topsides will be rendered HCF, the wells will be P&A to AB3 status, and hazardous materials will be removed offshore. The installation will remain in-situ and at the current time it is anticipated that Perenco will remain liable for the decommissioning of the installation under the applicable regulatory regime (appropriate for the re-use function) at a later date. Due to commercial and confidentiality sensitivities, further details

cannot be provided within this document at the current time; however, OPRED have been advised of the potential re-use.

Perenco will continue to review the platforms equipment inventories to assess the potential for adding to their existing asset portfolio spares inventory or for resale to the open market.

Recovered material will be landed ashore for disposal by a contractor. It is not possible to forecast the wider reuse market with any accuracy or confidence this far forward. Perenco will continue to track reuse market trends in order to seize reuse opportunities at the appropriate time.

In the event that a Transfrontier Shipment of Waste (TFSW) permit is required, Perenco will liaise with the relevant Waste Authority and ensure that all relevant permits and consents are in place in accordance with the International Waste Shipments (Amendment) (EU Exit) Regulation 2018, approved by UK parliament on 27th February 2019.

3.1 Topsides

3.1.1 Topsides Decommissioning Overview

The 27H and 27J topsides are similar in configuration, the exact specifications are given in the below table. The topsides are conventional truss steel structures consisting of a cellar deck, main deck, and helideck located above the main deck.

The deck elevations and estimated topsides sizes and weight to be removed and transported onshore for each platform is detailed below. This includes the weights of equipment due to be removed in preparation for the topsides removal.

Table 3.1: Topside Configurations		
	Leman 27 H	Leman 27J
Helideck (EL)*	32.6 m (107 ft)	32.6 m (107 ft)
Main Deck (EL)*	25.3 m (83 ft)	25.3 m (83 ft)
Cellar Deck (EL)*	18.4 m (60.5 ft)	18.4 m (60.5 ft)
Vent Boom (EL)*	39 m (128 ft)	39 m (128 ft)
Topsides Weight (Te)	914	914
Size (m) – Main Deck	28.6 m x 20.1 m (94 ft x 66 ft)	28.6 m x 20.1 m (94 ft x 66 ft)

*Elevations all above LAT

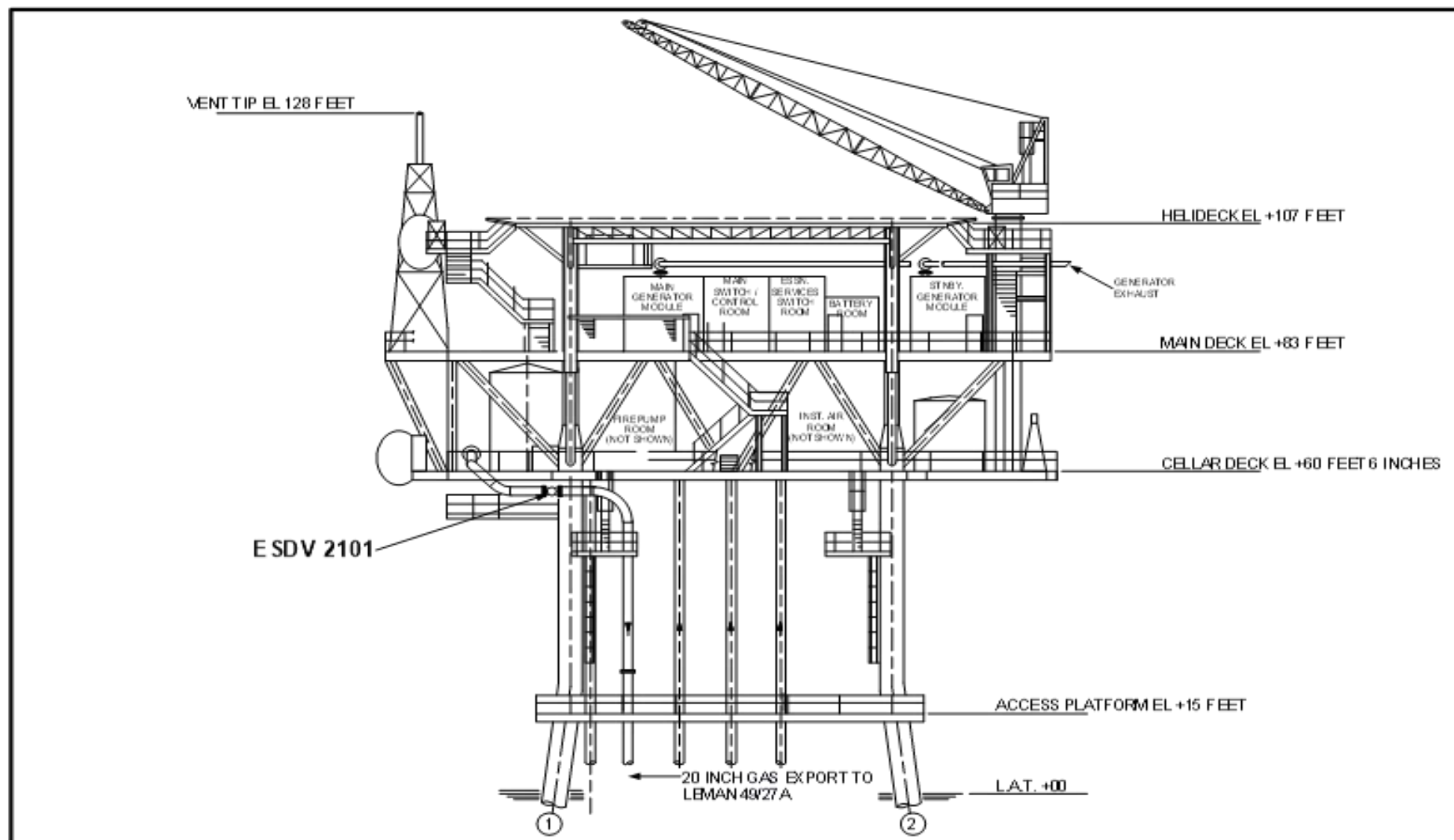


Figure 3.1a: Diagram of Leman 27H Topsides

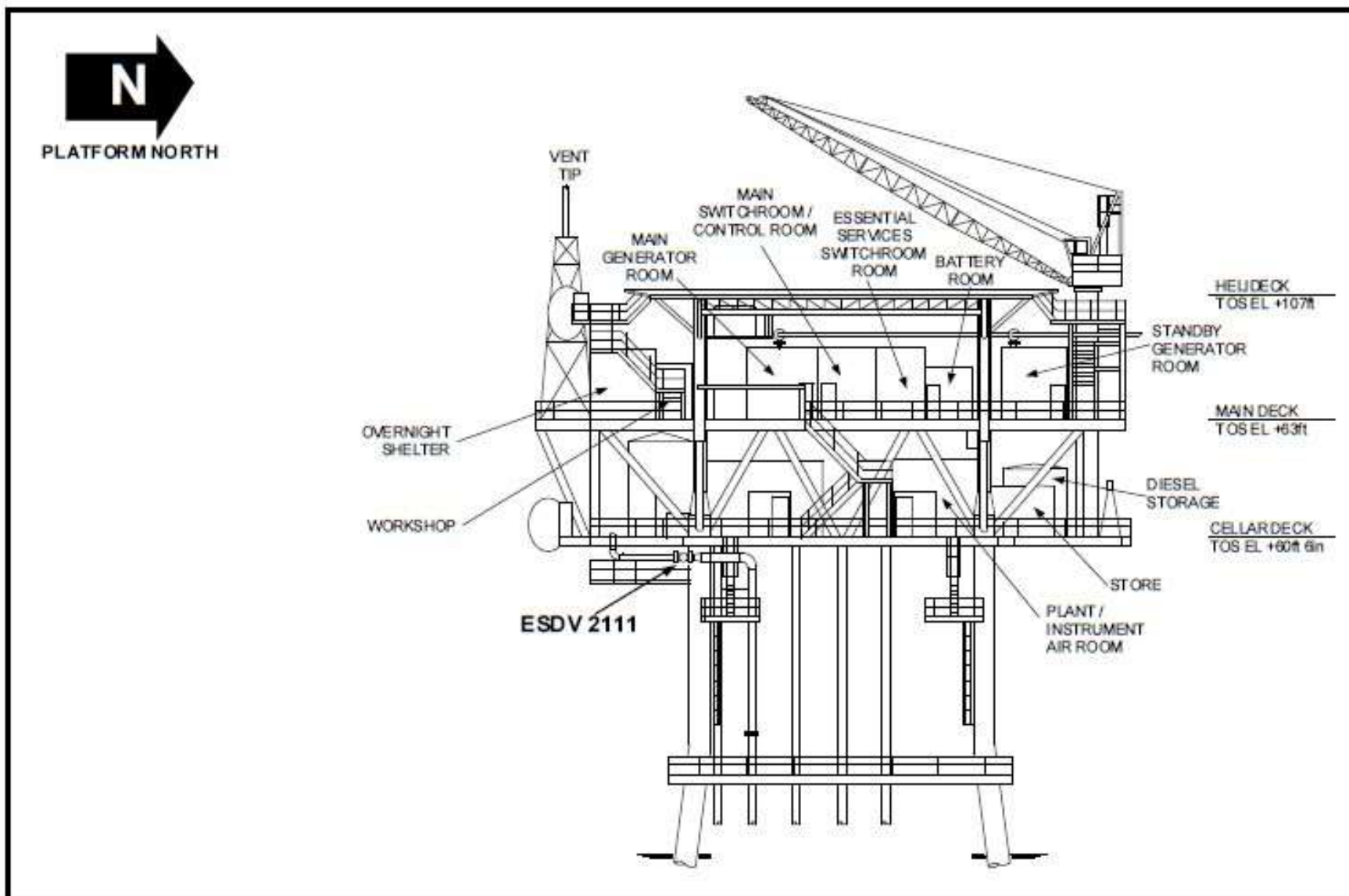


Figure 3.1b: Diagram of Leman 27J Topsides

Preparation/Cleaning:

Table 3.2: Cleaning of Topsides for Removal		
Waste Type	Composition of Waste	Disposal Route
On-board hydrocarbons	Process fluids, fuels and lubricants	Flushed and either injected into platform wells or drained to tote tanks for transport and appropriate disposal onshore.
Other hazardous materials	Naturally Occurring Radioactive Material (NORM) and radioactive material, instruments containing heavy metals, batteries	Transported ashore for re-use, recycling or disposal by appropriate methods. In the event that a TFSW permit is required, Perenco will liaise with the relevant Waste Authority and ensure all relevant permits/consents are in place.
Original paint coating	Lead-based paints	May give off toxic fumes/dust if flame-cutting or grinding/blasting is used so appropriate health safety measures will be taken.
Asbestos and ceramic fibre	Minor quantities	Appropriate control and management will be enforced. Transported ashore for disposal by appropriate methods.

Removal Methods:

Table 3.3: Topsides Removal Methods	
1) HLV (semi-submersible crane vessel) <input checked="" type="checkbox"/> 2) Mono-hull crane vessel <input type="checkbox"/> 3) SLV (sheer leg vessel) <input checked="" type="checkbox"/> 4) Piece small <input checked="" type="checkbox"/> 5) Other <input checked="" type="checkbox"/>	
Method	Description
Single lift removal by SLV/HLV	Removal of topsides as complete unit and transportation to shore for re-use of selected equipment, recycling, break up and/or disposal. Single lift dependant on vessel availability.
Modular removal and re- use/recycle by HLV	Removal of parts/modules of topsides for transportation and reuse in alternate location(s) and/or recycling/disposal.
Other - skidding	Removal of topsides as complete unit using alternative methodologies currently being developed by industry. Transportation to shore for re-use of selected equipment, recycling, break up and/or disposal.
Offshore removal 'piece small' for onshore reuse/disposal	Removal of topsides by breaking up offshore and transporting to shore using work barge. Items will then be sorted for re-use, recycling or disposal.
Proposed removal method and disposal route	<p>Topsides will be removed to shore and disposed of at a selected disposal yard to comply with relevant legislation and company policy. The current plan is to remove the topsides using a JUB and with the use of hydraulic jacks the skidding of the topsides module onto the JUB deck.</p> <p>However, we are assessing other removal options to establish the most efficient and cost effective method to remove the topsides module. A final decision on the removal method will be made following detailed engineering studies and OPRED will be informed of any change to the current plan.</p>

3.2 Wells

The wells which remain to be abandoned, as listed in section 2.3 (Tables 2.2a and 2.2b), will be P&A in accordance with OGUK Guidelines for the suspension and abandonment of wells.

A MAT and the supporting SAT application will be submitted in support of any such work that is to be carried out.

3.3 Waste Streams

Table 3.4: Waste Stream Management Methods	
Waste Stream	Removal and Disposal method
Bulk liquids	Removed from vessels and pipework, and either injected into platform wells for disposal or discharged into tote tanks for transport and appropriate disposal onshore. Vessels, pipework and sumps will be drained prior to removal to shore and shipped in accordance with maritime transportation guidelines. Package filtration equipment for disposal of liquids to sea may be utilised and relevant permits will be sought for such operations.
Marine growth	Removed offshore / onshore. Disposed of according to guidelines.
NORM/LSA Scale	Tests for NORM/LSA will be undertaken offshore by the Radiation Protection Supervisor and any NORM encountered will be dealt with and disposed of in accordance with guidelines and company policies and under appropriate permit.
Asbestos	Tests for asbestos will take place offshore and will be dealt with / disposed of according to guidelines and company policies.
Other hazardous wastes	Detailed survey for other hazardous wastes will be undertaken offshore and will be dealt with / disposed of according to guidelines and company policies.
Onshore Dismantling sites	Appropriate licensed sites will be selected. The chosen facility must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver recycling options.

3.4 Inventory Disposition

Table 3.5: Inventory Disposition				
	Topsides Tonnage Te	Planned tonnage to shore Te	Total Inventory Tonnage Te	*Planned tonnage left in situ Te
Leman 27H	914	914	914	0
Leman 27J	914	914	914	0

Table 3.6: Proposed Fate of Infrastructure Materials		
Infrastructure	Recommended Decommissioning Option	Destination
Jacket	To be confirmed in Jacket DP	To be confirmed in Jacket DP
Topside	Complete removal	Re-use, recycling and disposal

4.0 Environmental Appraisal Overview

4.1 Executive Summary

The Leman field is located in the SNS, approximately 53 km from the BGT, off the coast of East Anglia. The 27H and 27J installations are located within the boundary of the North Norfolk Sandbanks and Saturn Reef SAC protected area (Appendix 1). Given the nature of the topside decommissioning activities, there is minimal opportunity for the decommissioning activities described below to impact any European or nationally designated protected sites.

This DP (and the Environmental Assessment Justifications (EAJ) which will be associated with each of the decommissioning activities) considers the East Offshore Marine Plan, adopted by the Marine Management Organisation (MMO) to help ensure sustainable development of the marine area. Perenco considers the proposed decommissioning activities align with its objectives and policies.

Based on the findings of this EA, which includes the identification and subsequent application of appropriate mitigation measures, and the Project Management procedures which are aligned with the Perenco Environment Policy and the Safety and Environmental Management System (SEMS), it is considered that the proposed decommissioning activities do not pose any significant threat of impact to environmental or societal receptors within the UKCS.

The following sections present:

- **Regulatory Summary** – a description of how the decommissioning activities will be regulated during the HCF campaign and topsides removal campaign.
- **Decommissioning Activities** – a summary of the activities to be carried out during the HCF campaign and topsides removal campaign.
- **Decommissioning Options for Removal of Topsides** – a summary of the dismantlement options being considered.
- **Baseline Environmental and Socioeconomic Sensitivity** – a summary of the baseline sensitivities with respect to the seabed and sediment environment, plankton, fish and shellfish, marine mammals, seabirds, conservation, fisheries and shipping, and other users.
- **Impact Assessment** - a summary of the aspects of the environment that may be impacted by the decommissioning and an assessment of their impacts
- **Environment Management** – an overview of the performance management and internal assurance systems in place to ensure activities take place in a safe, compliant and acceptable manner, and according to agreed plans.

4.2 Regulatory Summary

Master and Supplementary Application Templates (MATs and SATs), OPEPs (Oil Pollution Emergency Plan) and other regulatory requirements are submitted using the Portal Environmental Tracking System (PETS) of the Department for Business, Energy and Industrial Strategy (BEIS) UK Energy Portal, comprising in particular:

1. A Standalone MAT for JUB Co-location and interim Lighthouse mode.
2. Activities to prepare the seabed for placement of the JUB under a Stand-Alone MAT have been completed.
3. Wells Intervention Activities MAT for Well P&A, Conductor and tree removal activities and topsides HCF.
4. Activities to flush and reinject the inventory of the export pipelines are requested for approval under the existing Pipeline MAT.

Should any other regulatory requirements arise, these will be addressed via the relevant permitting process at the appropriate time.

All decommissioning activities will come under the Inde and Leman Hub Field Oil Pollution Emergency Plan (OPEP), and a suitable Communication and Interface Plan (CIP) will be used to interface between OPEPs covering the 27H and 27J installations and any support vessels or barges.

Perenco will undertake a full EA to support the DP for the jacket removal and pipeline decommissioning activities.

4.3 Decommissioning Activities

The proposal is to use a decommissioning JUB to P&A the platform wells, make the platforms HCF, and to remove the topsides leaving the jackets in-situ for up to 5 years until they are permanently removed.

After this, subject to further regulatory approval and completed engineering design, a decommissioning HLV and/or other support vessels will be used to remove the jackets.

The P&A of the nine platform wells (4 on 27H and 5 on 27J) will involve flushing the wells before placing permanent cement barriers at the appropriate depths according to the specific features of each well and following the OEUK Guidelines for the suspension and abandonment of wells. This is deemed to be industry best practice for well abandonment.

Flushing and purging the topsides and export pipelines will also follow industry best practice guidelines to ensure minimal residual hydrocarbon is present the removal of the platform and the decommissioning of the connected pipelines.

Options for reuse of the 27H and 27J installations are limited due to the limited remaining life of the jacket structure and changes in industry requirement. Materials and remaining equipment from the platform may be re-used where practicable. However, Perenco are review potential re-use of the 27H installation. If the re-use option proceeds, it is anticipated that the 27H topsides will be rendered HCF and the wells will be P&A to AB3 status using the aforementioned JUB and process vessels containing hazardous materials will be removed and transported onshore for recovery or disposal.

Due to commercial and confidentiality sensitivities, further details cannot be provided within this

document at the current time; however, OPRED have been advised separately of the ongoing discussions.

Therefore, following Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) decommissioning guidelines, it is proposed to fully remove and transport the 27H and 27J topsides to a suitable onshore facility for dismantling and recycling.

4.4 Decommissioning Options for Removal of Topsides

Four possible strategies are being considered for the removal of the topsides Module:

- **Large Piece/Modular removal** by HLV or JUB means multiple contractors and yards can be used for disposal but may require extensive engineering to ensure lifting can be done safely. Further engineering studies including lift assessments will determine the feasibility of the large piece /modular removal.
- **Small Piece Removal** will negate the need for a HLV, and will have a shorter preparation delay, however significant decontamination would be needed offshore, and the work will involve a high level of exposure to risk for personnel.
- **Single lift** (using a HLV) would involve a single vessel and involve fewer lifts for the removal but has a long schedule with fewer contractor options to provide a competitive bid.
- **Skidding** will involve less prior clean-up (generating streams of waste offshore) and less overall exposure offshore but would require preparation work to make the platform ready for skidding and may have a long schedule.

The current plan is to remove the topsides using a JUB, i.e. with the use of hydraulic jacks the topsides module will be 'skidded' onto the JUB deck.

However, we are assessing other removal options to establish the most efficient and cost effective method to remove the topsides module. A final decision on the removal method will be made following detailed engineering studies and OPRED will be informed of any change to the current plan.

4.5 Baseline Environmental and Socioeconomic Sensitivity

Metrological and Oceanographic Conditions

The 27H and 27J installations are located approximately 53 km off the North Norfolk coastline. Water depths across the Leman development range from 20 to 40m with an average of approximately 40m Lowest Astronomical Tide (LAT) at 27H and 27J platforms. Tidal stream velocities in the vicinity range between 0.3 and 0.6 m/s during spring tides and 0.2 and 0.4 m/s for neap tides. Significant wave heights exceed 1m 75% of the time and exceed 3m for 10% of the time (DECC, 2016).

The predominant wind direction for the SNS is between south and north-west. The calmest months are during summer (May to September) with wind speeds of 5 - 6 m/s. Air temperatures in this area of the SNS are at their lowest in January and February (mean 4°C to 6°C).

Seabed and Sediment Conditions

Seabed sediments within the SNS comprise generally coarse sands and gravels in some areas, which are highly mobile largely due to the increased near seabed currents (DECC, 2016). This is confirmed in British Geological Survey (BGS) seabed mapping which has identified that in large areas of the SNS, seabed sediments comprise Holocene sand and sandy gravels (Marine Scotland, 2021a). Mobile sands and mixed gravelly sands were also the dominant sediment types identified within Block 49/27 during the Leman tie-back pipeline route survey (Benthic Solutions, 2012).

The Leman tie-back pipeline route Habitat Assessment survey (Benthic Solutions, 2012) identified several areas dominated by a *Sabellaria spinulosa* biotope (SS.SBR.PoR.SspiMx).

Both acoustic datasets and specific ground truthing examples (grab and photography) indicated a likely presence of Annex1 Habitat representing biogenic reefs. Prior to any decommissioning activities on The 27H and 27J installations an as-found survey and site specific assessment will be carried out to establish the presence of any reef structures in the vicinity of the installations.

Sandbanks and sandwaves are a common feature of the SNS (DECC, 2016). Notable sandbank features in the vicinity of the Blocks of Interest include the Leman, Ower, Inner, Well and Broken Banks which are situated within the boundary of the North Norfolk Sandbanks and Saturn Reef SAC.

Data from the UKSeaMap Project (JNCC, 2010a) mapped and classified seabed sediment types in British waters according to the European Nature Information Systems (EUNIS) classification. The following EUNIS seabed classifications have been identified for the Blocks of Interest in the surrounding area (refer to Connor et al., 2004):

- A5.13: Infralittoral Coarse Sediment
- A5.14: Circalittoral Coarse Sediment
- A5.15: Deep Circalittoral Coarse Sediment
- A5.23: Infralittoral Fine Sand
- A5.24: Infralittoral Muddy Sand
- A5.25: Circalittoral Fine Sand
- A5.26: Circalittoral Muddy Sand

Numerous surveys have been undertaken within the North Norfolk Sandbanks and Saturn Reef SAC as part of the site selection and assessment process. The faunal communities found are typical of the biotope 'infralittoral mobile clean sand with sparse fauna' (JNCC, 2010b) and are characterised by common epifaunal species widely found in the shallow sandy sediments of the SNS including polychaetes such as *N. cirrosa*, isopods (*Eurydice pulchra*), hermit crabs (*Pagurus bernhardus*), swimming crab (*Liocarcinus depurator*), common shore crab (*Carcinus maenas*) and the starfish (*Asterias rubens*) (JNCC, 2010b).

Plankton

The collective term plankton describes the plants (phytoplankton) and animals (zooplankton) that live freely in the water column and drift passively with the water currents. Plankton form the base of the food chain, therefore changes in the abundance and composition of the planktonic community can have impacts on higher consumers. Typically, in the SNS a phytoplankton bloom occurs every spring, generally followed by a smaller peak in the autumn (DECC, 2016).

The SNS is characterised by shallow, well-mixed waters, which undergo large seasonal temperature variations (JNCC, 2004). The phytoplankton community is dominated by the dinoflagellate genus *Tripos* (*T. fusus*, *T. furca*, *T. lineatus*) along with higher numbers of the diatom, *Chaetoceros* (subgenera *Hyalochaete* and *Phaeoceros*) than are typically found in the northern North Sea. From November to May when mixing is at its greatest, diatoms comprise a greater proportion of the phytoplankton community than dinoflagellates (DECC, 2016).

The zooplankton community is dominated by copepods including *Calanus helgolandicus* and *C. finmarchicus* as well as *Paracalanus* spp., *Pseudocalanus* spp., *Acartia* spp., *Temora* spp. And cladocerans such as *Evadne* spp. (DECC, 2016).

Fish and Shellfish

The North-East Atlantic and North Sea are split into a statistical grids called International Council for the Exploration of the Seas (ICES) Rectangles in order to map statistical information about the area. The block of Interest is located within ICES Rectangles 35F2

ICES Rectangle 35F2 has been identified as a spawning ground for cod, lemon sole, mackerel, Nephrops, plaice, sandeels, sprat, sole, tope shark and whiting (Coull et al. 1998; Ellis et al. 2012).

ICES Rectangle 35F2 has been identified as a nursery grounds for cod, herring, lemon sole, mackerel, Nephrops, sandeels, sprat, tope shark and whiting (Coull et al. 1998; Ellis et al. 2012).

Spatial modelling of 0 group fish (aggregations of fish in the first year of their life) indicates that the area in the vicinity of the blocks of interest is generally not considered to be of high importance to juvenile fish species in their first year of development, with the exception of whiting.

Seabirds

Part 3 of the Conservation of Offshore Marine Habitats and Species Regulations 2017, and in particular regulation 40, gives protection to wild birds, their eggs and nests in UK offshore waters. The presence of wild birds on the 27H and 27J platform topsides may therefore affect the timing of the proposed decommissioning activities. To date, evidence suggests that black-legged kittiwakes are the predominant bird species exploiting nesting opportunities on offshore installations in the SNS (typically those in lighthouse mode prior to dismantlement). Although most kittiwake colonies are located on sheer cliffs, the species is known to nest on man-made structures such as offshore oil and gas installations (JNCC, 2021a).

Kittiwakes are known to be one of the most abundant species of seabird (Kober et al, 2010) with Mitchell et al (2004) using Apparently Occupied Nest (AON) methodology, estimating the UK Kittiwake population to be 378,800 AON, equating to 13.8% of the biogeographic population. Kittiwake is also on the OSPAR List of Threatened and/or Declining Species and Habitats and Red listed in Birds of Conservation Concern 4. Of note is that from 2000 to 2019, the UK population of kittiwake has declined by 25% (JNCC, 2021b). There could be a number of reasons for this decline, with food availability also deteriorating, overfishing has been found to drastically effect breeding success alongside climate changes constricting feedstocks levels and quality. (Mitchell et al, 2004).

Colony size can vary from less than ten pairs to tens of thousands, with individuals returning to the same colony over multiple years. The nearest major colony to the 27H and 27J platforms is the Flamborough and Filey Coast Special Protection Areas (SPA), which supported 45,504

apparently occupied nests in 2017 (JNCC, 2017a), located approximately 190 km to the north west.

During a routine bird inspection on Perenco owned offshore assets in early 2021, the protected species of Black Legged Kittiwake were found to be present both roosting and nesting on the 27H installation (July 19th, 2021). For reference, the sister installation, 27J (approximately 6 km Due south of 27H) was also included in the survey (29th April 2021) but showed no signs of nesting birds. The Perenco bird inspections, which were completed during the nesting period, recorded 27H installation as a “high risk” for nesting kittiwakes on account of the inspections reporting a large colony of birds nesting underneath the platform. However, for the 27J there is no evidence of nesting or roosting birds; therefore, the 27J installation is considered “low risk”.

An intervention to evaluate the full extent of the infiltration of the colony was performed on the 19th July 2022 with a tour of the platform and helideck. The assessment observed approximately 400 birds in total including Kittiwake adults, immature/fledgling birds and up to 200 nests in total.

The phenology of nesting kittiwakes is summarised in Table 4.1, although timings can vary from year to year due to factors such as lack of food. Once the chicks start hatching in June they are particularly vulnerable to human disturbance. The level of human disturbance experienced by seabirds in a particular region is generally related to the degree of human development in that region (Chardine and Mendenhall, 1998). This un-natural environment (offshore platform rather than cliff side) and the existing levels of disturbance (varying human contact via helicopter, vessel interactions or manned installation contact), all enhance the unpredictability of quantifying the true impact of humans on large offshore colonies such as that on 27H.

Table 4.1. Phenology of Kittiwakes		
Behaviour	Approx. Date Range	Observations
First Arrival	February to April	-
Nest Building	End of April – Mid May	Nests are normally built 1-3 weeks before appearance of first eggs. (Coulson, 2011)
Egg Laying	May	At Flamborough and Filey Coast SPA egg laying normally occurs in early to mid-May. Incubation is normally around one month. (Hatch et al., 2020)
Hatching	Mid to Late June	Peak in mid-August, with chicks leaving colony ca. 10 days after first flight. (Keogan et al., 2018)
Fledging	Late July - September	

The European Seabirds at Sea (ESAS) database is the most complete and longstanding dataset detailing the distribution of seabirds at sea, compiling a range of boat and transect data over a period of 29 years. The data indicates that the blocks of Interest are not within a hotspot area, defined as an important area of high seabird density at sea.

Marine Mammals

While surveys of marine mammals across the North Sea indicate other species populations, the JNCC Atlas of Cetacean Distribution in north-west European Waters gives a localised indication of the seasonal distribution of cetaceans. The seasonal sightings data identified the harbour porpoise and the white-beaked dolphin observed in ICES Rectangle 35F2.

In addition, two species of seal, the grey seal and the harbour seal, are common along the east coast of England, particularly around The Wash where harbour seals forage over a wide area. Foraging areas can be up to 100 km offshore and connected to haul-out sites by prominent high-usage corridors. Distribution of grey seals in the vicinity of the 27H and 27J platforms are not considered to be significant (< 5 individuals per 25 km^2), while Harbour seal densities are recorded as very low (< 1 individual per 25 km^2), (Russell et al. 2017).

Perenco will continue to liaise with OPRED and JNCC and apply latest informed guidance with regards to mitigating risk of harm to marine mammals.

Conservation

The 27H and 27J platforms are located within SACs. These are the Southern North Sea and the North Norfolk Sandbanks and Saturn Reef SAC. The Haisborough, Hammond and Winterton SAC is approximately 1 km to the west of the platform (Figure 4 1).

The North Norfolk Sandbanks and Saturn Reef SAC features an offshore linear ridge and tidal sandbanks with extensive sand waves and areas of *Sabellaria spinulosa* biogenic reef. However, the platform is in deeper water than the classification normally relates to ($< 20\text{m}$).

The Haisborough, Hammond and Winterton SAC features a mosaic of different physical habitats corresponding to different biological communities. The fauna of the sandbank crests is predominantly low diversity polychaete (cat worms) and amphipod (shrimp-like crustaceans) communities that are typical of mobile sediment environments. The banks are separated by troughs containing more gravelly sediments and support diverse infaunal and epifaunal communities with occurrences of reefs of the tube-building worm *Sabellaria spinulosa*. Aggregations of *S. spinulosa* provide additional hard substrate for the development of rich epifaunal communities.

The Leman tie-back pipeline route Habitat Assessment survey (Benthic Solutions, 2012) identified several areas dominated by a *Sabellaria spinulosa* biotope (SS.SBR.PoR.SspiMx). Both acoustic datasets and specific ground truthing examples (grab and photography) indicated a likely presence of Annex1 Habitat representing biogenic reefs. Prior to any decommissioning activities on The 27H and 27J installations an as-found survey and site-specific assessment will be carried out to establish the presence of any reef structures in the vicinity of the installations.

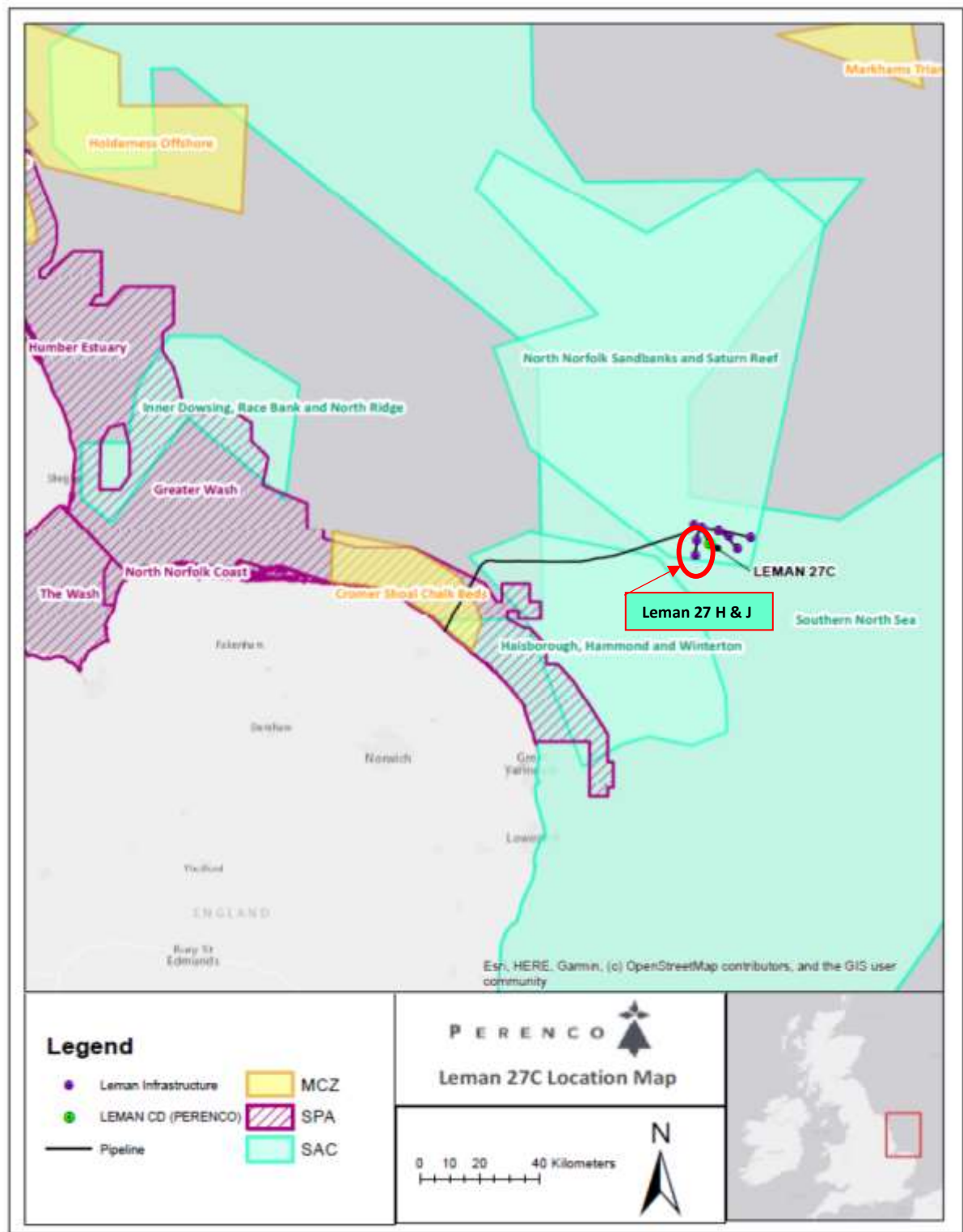


Figure 4.1: Features of Conservation Interest in the Vicinity of the Block 49/27

Fisheries and Shipping

Fishing effort for this ICES Rectangle 35F2 is generally low at 5 days per 100 km² per season, (DECC, 2016). Within ICES Rectangles 35F2 fisheries catches are also low, with several months reporting zero landings between 2009 and 2012 and a significant increase in effort in January 2010, (Marine Scotland, 2021b). The density of traffic within the blocks of interest are described as 'high', (OGA, 2016). This is due to the relative proximity of the development to the coast (53 km) and the presence of important ports around the Norfolk and Lincolnshire coasts. However, the 500m exclusion zone will remain in place for the duration of decommissioning.

Other Users

There is significant surface and subsurface infrastructure in the blocks of interest, predominantly associated with the Leman and Indefatigable fields. The surrounding areas have also been heavily licensed for oil and gas development, with a number of gas fields being suspended or have ceased production. Ref. Table 1.4 and Figure 1.3.

Due to the high oil and gas activity in the area, there are a number of pipelines, flowlines and umbilicals that pass through the Blocks of Interest which service Leman and neighbouring facilities. A total of 18 pipeline pass through Block 49/27 (OGA, 2021). Fifteen of these pipelines are active, two are no longer in use and one is in the pre-commission stage, (OGA, 2021).

There are no other sea uses within the block 49/27. The nearest offshore windfarm site is the Norfolk Vanguard West windfarm in Block 53/2 which is currently in the planning stage. The nearest operational offshore windfarm is the Scroby Sands wind farm located approximately 50 km south west of the Blocks of interest in Block 52/14, (Crown Estates, 2022).

None of these will be affected by the transient decommissioning project.

No tourism and leisure activities are identified as occurring within vicinity of the 27H and 27J installations, largely due to its distance from the shore.

4.6 Impact Assessment

Activities with a Potential Impact

Aspects of the environment that may be impacted by the decommissioning activities have been identified in a receptor-based activity and events matrix Table 4.2. The matrix has been populated by Perenco, with reference to the requirements of Article 3(1) of the EIA Directive, the BEIS OPRED EIA Guidance (2021) and relevant BEIS Offshore SEA Reports (2003-2016).

As shown in Table 4.2, Perenco has undertaken a preliminary assessment of the impacts identified to determine whether there is the potential for any significant effects on the environment to occur. Some Project activities / unplanned events have a potential impact, but the resulting effects are likely to be insignificant. These impacts have therefore been scoped out from detailed assessment. Where it has been identified that a Project activity / unplanned event has the potential to result in a likely significant effect on the environment, a detailed assessment of the impact(s) has been undertaken.

Table 4.2: Receptor-based activity and events matrix

Activities	Direct Hazards	Physical Receptors			Biological Receptors					Human Receptors		Mitigated Risk		
		Seabed Sediments and Benthic Habitats	Water Quality	Air Quality and Climate	Plankton	Fish and Shellfish	Seabirds	Marine Mammals	Conservation Areas	Shipping and Fisheries	Other Sea Users	Receptor Sensitivity*	Magnitude of Impact	Mitigated Risk
Barges and Support Vessels (Presence and positioning activity, use of anchors and fuel combustion)	Seabed Disturbance	PS	NS	-	-	PS	-	-	NS	NS	NS	High	Minor	Minor
	Physical presence risk to sea users and seabirds	-	-	-	-	-	PS	-	-	NS	NS	High	Negligible	Negligible
	Discharge to Sea (inc. runoff)	-	NS	-	NS	NS	NS	NS	NS	NS	NS	Medium	Negligible	Negligible
	Atmospheric Emissions	-	-	PS	-	-	NS	NS	-	-	-	Medium	Negligible	Negligible
Topsides Removal/Dismantlement	Marine Noise	-	-	-	-	NS	PS	PS	PS	PS	-	High	Minor	Negligible
	Discharge to Sea (Inc. runoff)	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	Minor	Minor	Negligible
	Hazardous and High-Volume Waste	-	NS	NS	-	-	-	-	-	-	NS	Medium	Negligible	Negligible
Accidental Releases	Spill to Sea	PS	PS	-	PS	PS	PS	PS	PS	-	-	High	Minor	Negligible
	Atmospheric Emissions	-	-	PS	-	-	NS	-	-	-	NS	Medium	Negligible	Negligible

PS – Potentially Significant impact,

NS – Potentially Non-Significant Impact.

*The highest sensitivity receptor is considered in this risk assessment matrix

Hazards with the potential to have a significant impact are:

- Seabed disturbance by the supporting jack-up rig and barge (positioning and use of anchors).
- Physical Presence of a supporting jack-up rig and barge (e.g. bird nesting).
- Atmospheric Emissions.
- Noise impacts from cutting the topsides.
- Spill to sea.
- Accidental releases.

Detailed Assessment

Detailed assessment of these activities begins with an assessment of the relevant receptor **sensitivity** for each planned activity. Sensitivity is a function of the value of the receptor (importance, rarity and worth), and its resilience (resistance, recoverability).

Secondly, the **significance** of effects has been evaluated by considering the sensitivity of the receptor in combination with the **magnitude** of impact that is likely to occur. The overall significance of effects is then defined as:

- **Major** or **Moderate** effects (“Significant” in EAJ terms) where mitigation measures are required to prevent, reduce or offset the effect. The overall significance is then re-evaluated, taking the mitigation measures into consideration, to determine the residual effect.
- **Minor** effects are not considered to be significant and are usually controlled through good
- **industry practice.**
- **Negligible** effects are not considered to be significant.

Seabed Disturbance

As identified above, seabed disturbance by the JUB (during both P&A and topside removal) has the potential to result in a significant environmental impact. Given the location of the 27H and 27J topsides within the North Norfolk Sandbanks and Saturn Reef SAC and Southern North Sea SAC, this sub-section assesses whether the potential impacts from the proposed removal of the 27H and 27J topsides, either alone or in-combination with other plans or projects, may cause likely significant effects to the qualifying features of the SACs, thereby affecting the integrity of the sites

Quantification of Seabed Disturbance

The selection of a JUB for the proposed operations is still to be made. For the purposes of this assessment it is assumed that the vessel will have four spud cans, each of which has a radius of 7m, impacting an area of 154 m², equating to 616 m² for all four. The vessel will be jacked down on the seabed at the both the 27H and 27J locations and may also need to deploy anchors to assist in final positioning. As a worst case, it is assumed that four anchors (approximately 4 m by 4 m in dimension) and associated chain/cable (each extending 600 m from the vessel, with the entire length laid on the seabed and subject to a lateral movement of approximately 5 m) will disturb the seabed. This equates to an impact area of 16 m² per anchor and 3,000 m² per anchor chain/cable.

Once the vessel is in position, the anchors (including the wires and chains) will be recovered for the duration of the operations. In total therefore, an area of 25,360 m² (0.025 km²) could be disturbed by the JUB at the 27H and 27J locations. Note, if separate vessels are used for the P&A and topside removal operations, where possible, they will jack down at the same location

to minimise disturbance. However, in the event that this is not possible, the total seabed disturbance area has been doubled, i.e. 50,720 m² (0.05 km²).

Potential Impacts to North Norfolk Sandbanks and Saturn Reef SAC

The qualifying Annex I features of the North Norfolk Sandbanks and Saturn Reef SAC are 'sandbanks which are slightly covered by sea water all the time' and biogenic reef constructed by *Sabellaria spinulosa*. JNCC's view on the condition of the qualifying features in the site is summarised in Table 4.3.

Table 4.3. Condition of the Qualifying Features in the North Norfolk Sandbanks and Saturn Reef SAC (JNCC, 2020)	
Protected Feature	View of Condition
Annex I Sandbanks which are slightly covered by seawater all the time	Unfavourable
Annex I Reefs	Unfavourable

The conservation objectives for the SAC are for the features to be in favourable condition thus ensuring site integrity in the long term and contribution to Favourable Conservation Status (FCS) of Annex I Sandbanks which are slightly covered by sea water all of the time and Annex I Reefs. This contribution would be achieved by maintaining or restoring, subject to natural change:

- The extent and distribution of the qualifying habitats in the site;
- The structure and function of the qualifying habitats in the site; and
- The supporting processes on which the qualifying habitats rely.

A restore objective is advised for extent and distribution of the sandbank feature. Activities must look to minimise, as far as is practicable, changes in substratum and the biological assemblages within the site to minimise further impact on feature extent and distribution (JNCC, 2017b).

A restore objective is also advised for the Annex I reef feature. Activities must look to minimise, as far as is practicable, damaging the established (i.e. high confidence) reef within the site (JNCC, 2017b).

The extent of sandbank habitat within the North Norfolk Sandbanks and Saturn Reef SAC covers an area of 360,341 ha (3,603 km²), reflecting the fact that the whole SAC is viewed as one integrated sandbank system (JNCC, 2017b).

Sediment composition of the offshore sandbanks primarily comprises circalittoral sand, as well as circalittoral coarse sediments and, to a lesser extent, circalittoral mixed sediments. Circalittoral mixed sediments and coarse sediments are found mainly in flanks and troughs and in places coincident with records of *Sabellaria spinulosa* reef (Parry et al. 2015).

The biological communities present on the sandbanks are representative of the infralittoral mobile sand biotope. Species typical of this biotope include the polychaete worm *Nephtys cirrosa* and the isopod *Eurydice pulchra* (JNCC, 2017b). Characteristic species recorded during surveys within the SAC included *Mediomastus fragilis*, *Sabellaria spinulosa*, *Scalibregma inflatum* and *Notomastus*.

There is the potential for the sandbank habitat within the SAC to be impacted by the proposed decommissioning activities due to physical impacts arising from the JUB (during both P&A and topside removal), including from the use of anchors and associated chains/wires, which will potentially disturb a total area of 0.05 km². However, seabed sediments in the SNS are routinely

subject to physical impacts from strong tidal currents and therefore the subtidal sandbanks are considered to be relatively tolerant to physical disturbance with a high capacity for recovery. The highly dynamic nature of the area will also naturally backfill any small depressions in the seabed created by the JUB. Species within infralittoral mobile sand biotopes are adapted to high levels of disturbance with recovery often within a few days or weeks. Even following severe disturbances recovery would be expected to occur within a year (Tillin et al. 2019).

As such, any physical impact to the sandbank habitat will be temporary, with the habitat and benthic communities predicted to rapidly recover once the decommissioning activities have ceased. The area which will be temporarily impacted is also relatively small compared to the extent of habitat within the SAC, equivalent to approximately 0.001% of the North Norfolk Sandbanks and Saturn Reef SAC total area. It is therefore concluded that any physical impacts on the sandbank habitat arising from the removal of the 27H and 27J topsides will not have an adverse effect on the integrity of the North Norfolk Sandbanks and Saturn Reef SAC.

The total area of Annex I reef habitat classified within the SAC at the time the site was designated was 1.08 km² (JNCC, 2017c); however, since then additional areas of reef habitat have been identified. The extent and distribution of Annex I *S. spinulosa* biogenic reef features within the SAC, based on JNCC's 2019 dataset, is illustrated in Figure 4.2, although it is noted that *S. spinulosa* reefs are naturally ephemeral and shift in spatial distribution (Hendrick et al. 2011; Benson et al. 2013; Roberts et al. 2016). It is therefore important to conserve both established reef areas and areas of potential reef within the SAC. Reefs formed by *S. spinulosa* allow the settlement of other species not found in adjacent habitats leading to a diverse community of epifaunal and infaunal species.

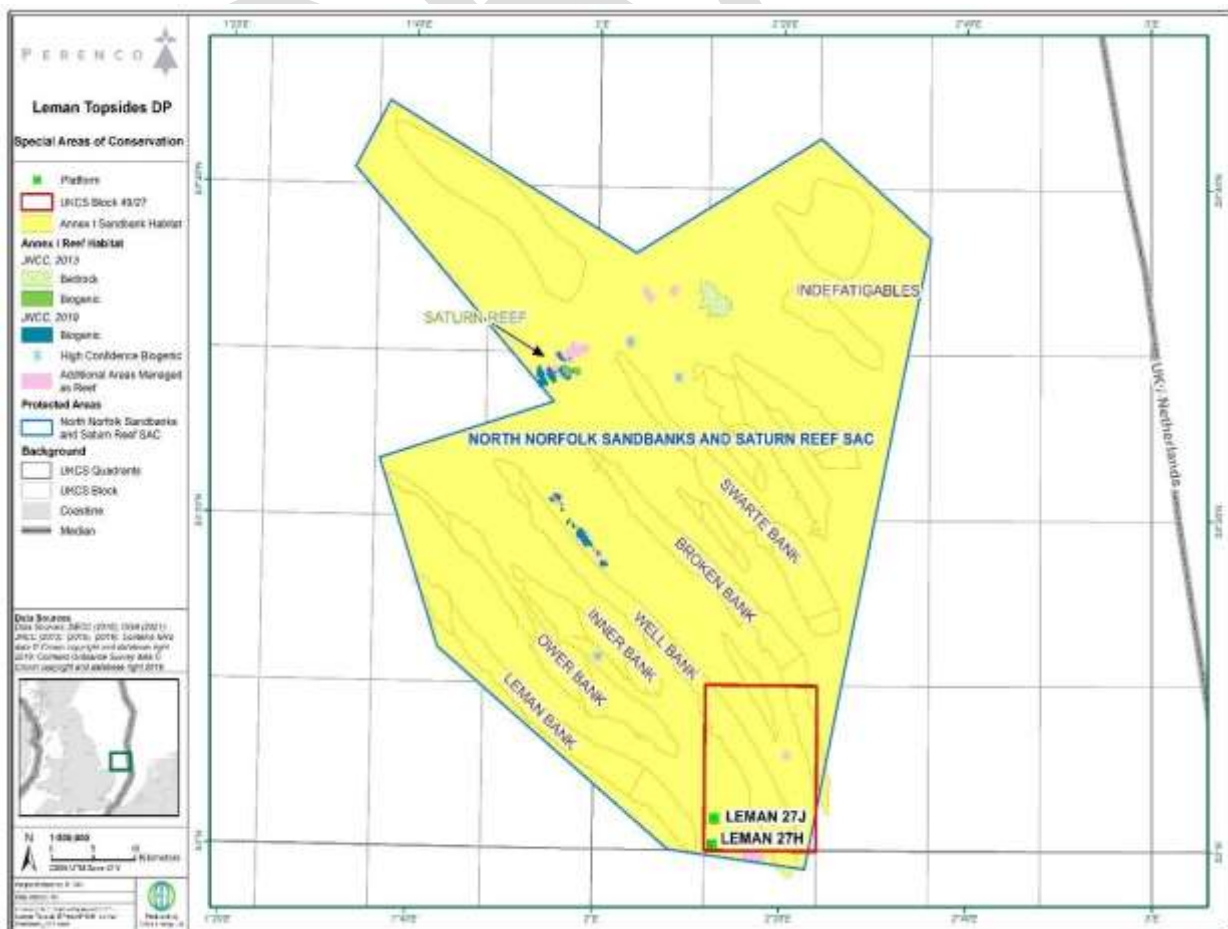


Figure 4.2: Annex I Features within the North Sandbanks and Saturn Reef SAC

Abrasion at the surface of *S. spinulosa* reefs is known to damage the tubes and result in sub-lethal and lethal damage to the worms (Gibb et al. 2014). In contrast, Jackson and Hiscock (2008) indicates that evidence points towards *S. spinulosa* having very little sensitivity to smothering or to increases in sedimentation rates, and that its recoverability potential from such impacts is very high.

Given the potential for Annex I *S. spinulosa* biogenic reef features to be present within the vicinity of the 27H and 27J installations, prior to the commencement of any decommissioning activities an as-found survey and site specific assessment will be carried out to establish the presence of any reef structures in the vicinity of the installations. The location of the JUB will then be selected to avoid areas identified as having reef structures. As such, it is considered that removal of the 27H and 27J topsides will not have a likely significant effect on Annex I biogenic reef features of the North Norfolk Sandbanks and Saturn Reef SAC.

It is considered that the following activities, in-combination with removal of the 27H and 27J topsides, could result in-combination effects on the qualifying features of the North Norfolk Sandbanks and Saturn Reef SAC:

- Oil and gas activity;
- Offshore renewable activity;
- Aggregate extraction;
- Commercial fishing.

Figure 4.3 illustrates that there is a high level of existing oil and gas infrastructure located within the North Norfolk Sandbanks and Saturn Reef SAC. The majority of this infrastructure was installed over 10 years ago, prior to the area being designated as a SAC and is therefore considered to be part of the baseline environment. Perenco is not currently aware of any proposed oil and gas field developments planned within the North Norfolk Sandbanks and Saturn Reef SAC. However, the Perenco SHARP Project has recently installed a new 'jack-up' platform jacket (Leman BC) to the 27B platform, which required rock deposits, disturbing an area of 1,782 m² within the North Norfolk Sandbanks and Saturn Reef SAC.

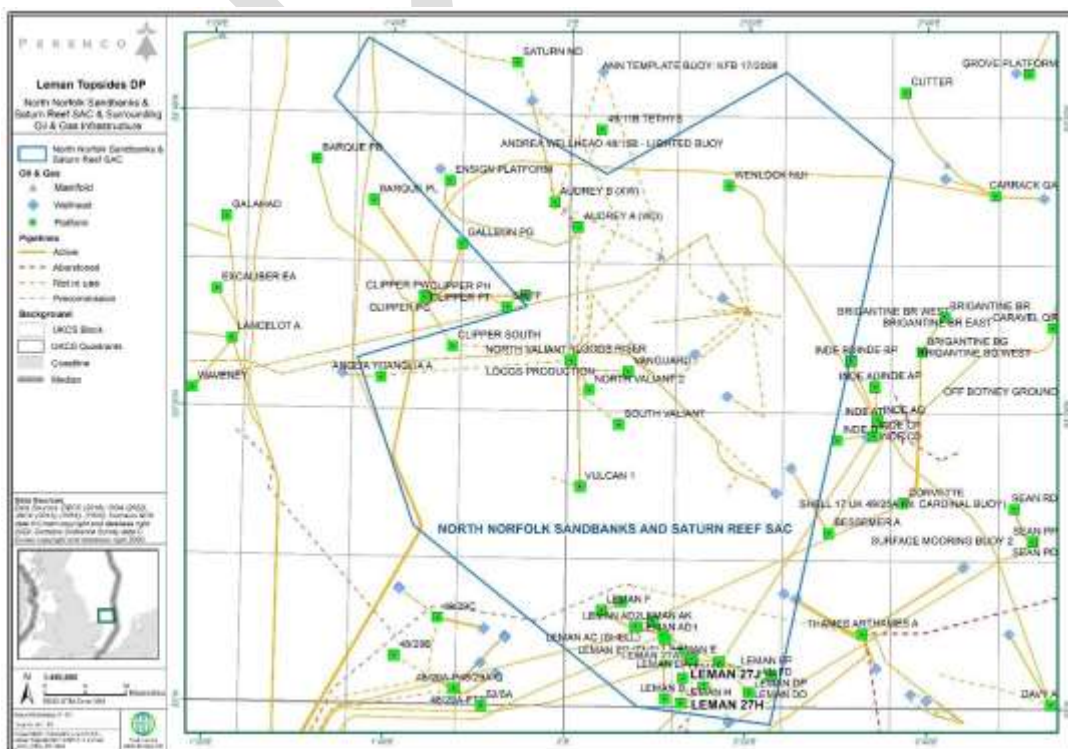


Figure 4.3: Existing Oil and Gas Infrastructure within the North Norfolk Sandbanks and Saturn Reef SAC



In addition, Perenco are undertaking the following pipeline deposit campaigns / overtrawl survey within the North Norfolk Sandbanks and Saturn Reef SAC:

PL22

- Concrete mattress and rock filter units (RFU) deposits (June 2021 – September 2021) impacting an area of 0.000684 km² within the North Norfolk Sandbanks and Saturn Reef SAC (refer to MAT Ref: PLA/837; SAT Ref: PL/2113/0).
- Concrete mattress and rock filter units (RFU) deposits (August 2022) impacting an area of 0.004878 km² within the North Norfolk Sandbanks and Saturn Reef SAC (refer to MAT Ref: PLA/936; SAT Ref: PL/2276/0).

PL23

- RFU and mattress deposits (December 2021) impacting an area of 0.002534 km² within the North Norfolk Sandbanks and Saturn Reef SAC (refer to MAT Ref: PLA/880; SAT Ref: PL/2211/1).
- Rock deposits (May 2022) impacting an area 0.007202 km² within the North Norfolk Sandbanks and Saturn Reef SAC (refer to MAT Ref: PLA/880; SAT Ref: PL/2220/1).
- Concrete mattress & rock filter units (RFU) deposits (August 2022) impacting an area of 0.000582 km² within the North Norfolk Sandbanks and Saturn Reef SAC (refer to MAT Ref: PLA/935; SAT Ref: PL/2277/0).

Thames Field (Bure Oscar, Bure West, Yare Charlie and Deben/Thurne)

- Overtrawl Survey (January 2022 – March 2022) impacting an area of 0.0045 km² within the North Norfolk Sandbanks and Saturn Reef SAC (Refer to MAT Ref: SA/1541; SAT Ref: ML/780).

Of note, a number of other oil and gas infrastructure located within the North Norfolk Sandbanks and Saturn Reef SAC is also in the process of being decommissioned or is scheduled to be decommissioned in the next year and therefore these projects could potentially result in an in-combination impact with the removal of the 27H and 27J topsides:

- Shell U.K. Limited undertaking rock deposit on PL25 and PL121 between 6th December 2021 and 30th April 2022 (SAT Ref PL/2204/0);
- Spirit Energy is planning to decommission the Ensign platform and pipelines and the 'A-fields' comprising the Ann, Alison, Saturn (Annabel) subsea installations and the Audrey platforms;
- Ithaca Energy is in the process of decommissioning the Anglia facilities;
- Chrysaor has an extensive decommissioning campaign in the area, which includes the LOGGS LDP2 – LDP5 decommissioning projects (5 manned platforms, 9 satellite platforms,
- 26 pipelines and 9 subsea structures). In addition, the Viking AR and the Viking Transportation System (VTS) Complex (BA, BC, BP and BD) are in cold suspension awaiting removal and Victor JM is awaiting plugging and abandonment.
- Alpha Petroleum is planning to decommission the Wenlock field.

There will be a physical impact on the sandbank features and their communities within the SAC from the above listed decommissioning projects, but as previously discussed, evidence from existing studies indicates that any physical impacts will be temporary. In addition, although the pipelines associated with these projects will primarily be decommissioned in situ, it is predicted that they will remain largely buried and will not affect the structure and function of the Annex I sandbank habitat.

There are no operational wind farm developments within the North Norfolk Sandbanks and Saturn Reef SAC. However, an estimated 45.8 km section of the planned export cable corridor associated with Ørsted's proposed Hornsea Three offshore wind farm lies within the site (refer to Figure 4.4). Construction activities associated with Hornsea Project Three are targeted to take

place from 2022 to 2025 and therefore could potentially coincide with the removal of the 27H and 27J topsides.

Two aggregate extraction areas are located within the SAC boundary, namely Humber 5 (Area no.: 483) and Humber 3 (Area no.: 484) as shown in Figure 4.4. The site consents allow up to 9 million Te of material to be extracted at each site over a period of 15 years. Assuming as a worst-case the total area of both sites is disturbed, 45.4 km² could be directly impacted by aggregate extraction from both sites, which equates to 1.2% of the SAC area.

As part of their consent, all aggregate extraction within the North Norfolk Sandbanks and Saturn Reef SAC is required to avoid impacting areas of reef where the feature is known to occur, therefore there is no evidence that *S. spinulosa* reef is adversely impacted by this activity (JNCC, 2017d). In addition, subtidal sandbanks are judged to be relatively tolerant to physical disturbance with a high capacity for recovery, therefore they are not considered to be highly sensitive to physical disturbance from aggregate extraction.

Beam trawling is the most popular type of fishing activity in the North Norfolk Sandbanks and Saturn Reef SAC, targeting species such as plaice, Nephrops and sole (Marine Scotland, 2021b). It is estimated that the extent of seabed potentially disturbed by beam trawling within the SAC is 1,312 km² per year, equivalent to 36.4% of the SAC (ABPMer and Ichthys Marine, 2015). Sandbank habitats may experience disturbance of the substrate on the surface of the seabed and abrasion as a result of demersal fishing, however these impacts are anticipated to be relatively short-lived. Demersal fishing can damage reef habitat through abrasion, disturbance of the substrate on the surface of the seabed and siltation rate changes, including smothering (JNCC, 2017d). It is therefore possible for in-combination impacts on *S. spinulosa* reef habitats to occur.

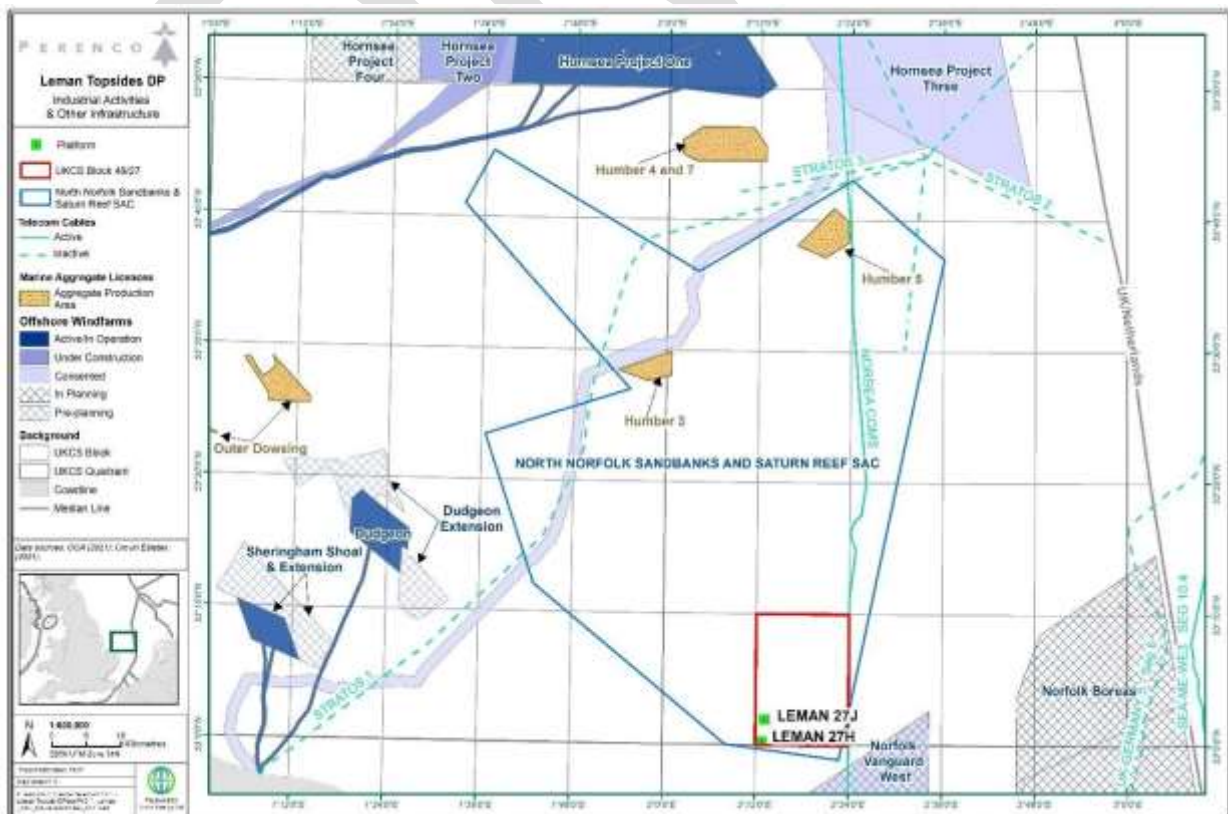


Figure 4.4: Offshore Windfarms and Aggregate Areas within the North Norfolk Sandbanks and Saturn Reef SAC.

The overall area of seabed estimated to be impacted by the above listed activities, in combination with the proposed 27H and 27J topsides removal activities is summarised in Table 4.4.

Table 4.4: Total Estimated In-combination Seabed Impacts within North Norfolk Sandbanks and Saturn Reef North Norfolk Sandbanks and Saturn Reef SAC			
Activity	Company	Temporary Impacted Area (km²)	Permanently Impacted Area (km²)
Leman 27H and 27J Topsides Removal	Perenco	0.05	-
Thames Overtrawl Survey	Perenco	0.0045	-
Wenlock Decommissioning	Alpha	0.075	0.286
PL22 Deposits 2021-2022	Perenco	-	0.005562
PL23 Deposits 2021-2022	Perenco	-	0.010318
Leman 27BC Jacket Installation	Perenco	-	0.001782
Leman 27C P&A	Perenco	<0.0001	<0.0001
PL25 and PL121 Stabilisation	Shell	-	0.01048
Ensign Decommissioning	Spirit Energy	3.92	0.0242
Anglia Decommissioning	Ithaca Energy	0.038	0.002
'A-fields' Decommissioning	Spirit Energy	27.0707	0.1062
LDP2 – LDP5 Infrastructure Decommissioning	Chrysaor	30.3	2.98
Aggregate Extraction (Humber 3 and 5 Areas)	DEME Building Materials Ltd	-	45.4
Hornsea Project Three Cable Installation Activities	Ørsted	9.3	0.4
Beam Trawling (per year)		1,312 (per year)	
Total:		1,382.76	49.22
Percentage of SAC impacted:		<38.4%	<1.37%

It can be seen from Table 4.4 that a relatively large percentage of the North Norfolk Sandbanks and Saturn Reef SAC will be temporary impacted, although the main contributor is the disturbance caused by beam trawling activity within the SAC. However, the disturbance to the seabed will be temporary in nature, and rapid recovery is expected following cessation of the activities that cause the physical impacts to the seabed. Some of the activities will overlap in time but many, particularly the oil and gas decommissioning activities, will occur over a more prolonged time period, such that only small areas of the total temporary disturbance will occur at any one time. In addition, once the decommissioning activities are completed no additional ongoing physical impact will occur.

As previously noted prior to the commencement of any decommissioning activities an as-found survey and site specific assessment will be carried out to establish the presence of any reef structures in the vicinity of the installations. The location of the JUB will then be selected to avoid areas identified as having reef structures. Consequently, no in-combination impact on Annex I reef habitats will occur within the North Norfolk Sandbanks and Saturn Reef SAC.

Given the above, it is therefore considered that in-combination impacts will not have a likely significant effect on the qualifying features of the North Norfolk Sandbanks and Saturn Reef SAC.

In summary, based on the predicted scale of impacts and proposed mitigation measures, along with evidence from existing studies of the likely potential effects on the qualifying features, it is concluded that removal of the 27H and 27J topsides, either alone or in-combination with other plans or projects, will not have an adverse effect on the integrity of the North Norfolk Sandbanks and Saturn Reef.

Potential Impacts to Southern North Sea SAC

The Southern North Sea SAC is designated for the protection of Annex II species harbour porpoise. The site covers an area of 36,951 km² and supports an estimated 17.5% of the UK North Sea management unit population of harbour porpoises. The northern two thirds of the site, covering an area of 27,000 km², is recognised as important for harbour porpoises during the summer season (April – September), whilst the southern part, covering an area of 12,687 km² as there is some overlap with the northern part, supports persistently higher densities during the winter (October – March) (JNCC and NE, 2019).

The conservation objectives of the Southern North Sea SAC are to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining FCS for harbour porpoise in UK waters. In the context of natural change, this will be achieved by ensuring that:

- Harbour porpoise is a viable component of the site;
- There is no significant disturbance of the species; and
- The condition of supporting habitats and processes, and the availability of prey is maintained.

Disturbance to the seabed as a result of the removal of the 27H and 27J topsides has the potential to impact supporting habitats and processes relevant to harbour porpoises and their prey within the SAC. Fish species such as sandeels, herring, mackerel, cod and whiting that form part of the harbour porpoise diet are known to be present in the vicinity of the 27H and 27J platforms. However, fish spawning and nurse grounds are not predicted to be significantly impacted by seabed disturbance activities resulting from the proposed decommissioning activities. Any disturbance to the seabed habitat that could affect the prey of the harbour porpoise or their prey within the SAC will be localised and temporary. It is estimated that removal of the 27H and 27J topsides will temporarily disturb an area of seabed totalling approximately 0.05 km² within the SAC, which equates to only approximately 0.0001% of the Southern North Sea SAC total area. Given the above, it is therefore considered that removal of the 27H and 27J topsides will not have a likely significant effect on the supporting habitats and processes relevant to harbour porpoises and their prey.

Perenco is aware that construction activities associated with a number of offshore wind farm projects could be ongoing within the Southern North Sea SAC during the period when the proposed decommissioning work will be taking place (H2 2022 - H2 2023), including:

- Hornsea Two offshore wind farm (status: under construction) (summer area): construction is ongoing during 2022;
- Hornsea Four offshore wind farm (status: pre-application) (summer area): construction could be ongoing during 2023-2027;
- Dogger Bank Creyke Beck A and B Offshore Wind Farms (status: under construction) (summer area) construction could be ongoing during 2022-2024;
- East Anglia Three offshore wind farm (status: consented) (summer and winter area): construction could be ongoing during 2022-2024.

However, as any disturbance caused by the removal of the 27H and 27J topsides will result in a very small, temporary reduction in available habitat it is considered that this in-combination with the wind farm projects is unlikely to prevent the site from contributing in the best possible way to species FCS.

In summary, based on the predicted scale of impacts and proposed mitigation measures, along with evidence from existing studies of the likely potential effects on the qualifying features, it is concluded that removal of the 27H and 27J topsides, either alone or in-combination with other plans or projects, will not have an adverse effect on the integrity of the Southern North Sea SAC.

Physical Presence

The physical presence of the 27H and 27J platforms, particularly during the Lighthouse Mode phase, has the potential to provide nesting habitat to breeding seabirds, which forage in the SNS. Perenco's routine bird inspections, completed throughout the nesting period in 2021, has recorded the 27H installation as a "high risk" for nesting kittiwakes on account of the inspections reporting a large colony of birds nesting underneath the platform. However, for the 27J there is no evidence of nesting or roosting birds from the inspections; therefore, the 27J installation is considered "low risk", although the presence of nesting birds in future years cannot be ruled out.

The removal of the topsides therefore has the potential to result in significant impacts to seabirds nesting on the platform, if present at the time of decommissioning, through disturbance by operational movement and noise. Once the chicks start hatching in June they are particularly vulnerable to human disturbance that may spook them from the nest, resulting in them falling or being pushed to sea.

All wild birds are protected under the Wild Birds Directive, which is transposed for the UK offshore area by The Conservation of Offshore Marine Habitats and Species Regulations 2017. Under Part 3 (40) of the 2017 Regulations it is an offence to deliberately:

- Capture, injure, or kill any wild bird;
- Take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- Take or destroy an egg of any wild bird.

The sensitivity of nesting birds is considered to be **High** due to the conservation status of kittiwake and their limited tolerance to accommodate pressure. The magnitude of any disturbance is considered to be **Moderate** with nesting potentially abandoned for the year/season or chicks being spooked from the nest. Effects on nesting birds from the removal of the 27H and 27J topsides, if their presence is recorded and removal activities are undertaken during the breeding bird season, are therefore predicted to be significant before mitigation measures are applied.

As such, Perenco proposes to implement a number of mitigation measures, as detailed in Table 4.5, to ensure the residual risk is Negligible. This includes, avoiding the breeding bird season when removing the topsides, where possible.

Impact Summary

Key sensitivities identified above include impact to seabirds, air quality, the seabed, water column noise and discharges to sea (both operational and accidental), while the impact of solid wastes are a potential risk later during the disposal of the topsides and jacket. A summary of the mitigation measures in place for these impacts is given in Table 4.5. This mitigation is reflected in the Mitigated Risk outcome in Table 4.2.

4.7 Environmental Management

The focus of environmental issues will be on the completion of activities associated with the topsides removal process. Performance management and internal assurance systems will ensure activities take place in a safe, compliant and acceptable manner, and according to agreed plans.

The Perenco UK Environmental Policy and ISO14001:2015 accredited Environmental Management System are in place to ensure this happens.

A Perenco Project Management team will be appointed to manage suitable sub-contractors for the removal of the 27H and 27J topsides. Perenco will monitor and track the progress of consents

and the consultations required as part of this process. Performance monitoring will be used to ensure regulatory requirements are met, as well as to assess fulfilment of wider project objectives and commitments. Any major changes to the DP will be discussed and agreed with OPRED.

A summary of the mitigation measures in place for these impacts is given in Table 4.5. This mitigation is reflected in the Mitigated Risk outcome in Table 4.2.

Table 4.5: Environmental Appraisal Impacts - Topsides Removal Campaign	
Main Impacts	Mitigation Factors
Seabed Disturbance	As-found survey and Site Specific Assessment to determine location of any potential reef structures. Location selected will avoid areas identified as having reef structures.
	All operations will occur within the 27H and 27J platform 500 m exclusion zone.
	Disturbance is limited to approach, anchoring and leg positioning of the supporting jack- up rigs and barges.
	Rig move procedures will be developed utilising information from Subsea surveys/Site Specific Assessments. Repositioning of JUB to be minimised to avoid additional seabed disturbance.
Physical presence risk (especially disturbance of birds)	There is evidence of nesting birds on the 27H installation but no evidence of roosting or nesting birds on the 27J installation. Perenco intend to avoid the breeding bird season when removing the topsides. However, if this is not possible, the platforms will be checked for nesting birds by a qualified ornithologist prior to commencing work. If nesting birds are observed, OPRED will be consulted to ascertain if it is possible for a Wild Birds Licence to be granted to allow the works to go ahead. If any preparatory work is to be undertaken on the topsides during the breeding bird season, Perenco will implement environmental management best practice, potentially through a bird management plan which is comprised of periodical nesting bird survey reports, seabird DRAs and nesting bird monitoring plans. Mitigation measures will include displaying signage and advising offshore personnel of the nests and briefing personnel on instructions to minimise possible disturbance to the juveniles and attending adults. The nests will also be monitored to record bird presence and activity.
	Installation of nesting bird deterrents (e.g. gel/spikes/nets) will be considered to discourage birds from nesting on the topsides once the platforms enter the Lighthouse Mode phase.
	Data and information relating to the ornithological baseline will be included within the EAJs. These will provide the Seabird Oil Sensitivity Index data and protected site information and will also include current and relevant data on species of seabirds typically expected in the vicinity of the installation.

Main Impacts	Mitigation Factors
Atmospheric Emissions	The remote location (54 km from Netherlands transboundary line and 53 km from nearest UK Coast (Bacton)) combined with open space and weather atmospheric mixing, minimises the exposure pathway for any acute emissions, beyond receptors in the immediate vicinity.
	Vessel operations will be minimised where practical, with work programmes planned to optimise vessel time in the field.
	All engines, generators on the vessel will be well maintained to minimise energy use and gaseous emissions.
	Vessels will be audited as part of selection and pre-mobilisation.
	Once quantified, emissions from decommissioning vessel operations are likely to be negligible in comparison to the operational life of the platform.
	As the 27H and 27J topsides will be rendered HCF prior to removal, the accidental release of gas is only applicable to the proposed P&A operations as the result of a well blowout incident. Perenco shall ensure the P&A crew is adequately experienced, trained in well control techniques and supervised. Emergency drills will be held regularly and details of relief well planning will be included in the OPEP.
Submarine noise	Cutting of topsides will be above the waterline, avoiding noise propagation in the water column and avoiding the disturbance of marine mammals.
	All other noise sources (e.g. welding and cutting within the modules, load transfer operations, vessel repositioning etc) will be within the normal scope for operation of the platform.
Solid Waste	Waste Management Plan will be implemented. Adherence to Waste Management Hierarchy - materials will be reused and recycled where possible.
	Compliance with legislation. Permits and traceable chain of custody for waste management, shipment, treatment and onshore disposal.
Discharges to sea	A chemical risk assessment will be undertaken to identify the risk profile of chemicals being used and / or discharged in accordance with the requirements of the Offshore Chemicals Regulations 2002 (as amended). Where practicable, chemicals with a higher risk profile will be substituted out in favour of those with an improved environmental profile.
	Appropriate design and maintenance of drains and drain management system, segregation of light and heavily contaminated runoff from deck working areas, including signage and user awareness.
	All operational discharges to be treated to ensure compliance with relevant discharge limits or stored for onshore disposal or disposal well reinjection where relevant.
	Compliance with legislation. Permits and traceable chain of custody for discharge, treatment, analysis and disposal.

Main Impacts	Mitigation Factors
Accidental Releases	As-found survey and Site Specific Assessment to determine location of any potential reef structures. Location selected will avoid areas identified as having reef structures.
	Hydrocarbon inventories will be removed from the topsides prior to commencing removal operations. Residual volumes will be contained before transfer. Overstock of chemicals will be avoided.
	Operational procedures (e.g. chemical storage, equipment placement, equipment maintenance, and loading or refuelling procedures) will be followed to prioritise avoiding discharge or accidental release to sea.
	A Decommissioning OPEP and CIP will be in place, taking into consideration the largest volumes within the campaign (e.g., fuel tanks of a supporting jack-up rig and barge).
	Perenco have UKCS membership with Oil Spill Response (OSRL) for Tier 2/3 incidents.
	Chemicals used will be Centre for Environment, Fisheries and Aquaculture Science (CEFAS) registered, and risk assessed for their potential impact in the water column.

5.0 Interested Party Consultations

Perenco, as part of the Topsides DP consultation process, plan to include the following statutory stakeholders of the DP:

- National Federation of Fishermen's Organisations (NFFO)
- The Scottish Fishermen's Federation (SFF)
- Northern Ireland Fish Producers' Organisation (NIFPO)
- Global Marine Systems
- Public

Table 5.1: Summary of Consultee Comments (Informal Consultations)

Who	Comment	Response
NSTA	A PWA will be submitted to the NSTA for the pipeline works carried out prior to and during the HCF campaign.	
OPRED EMT	The Environmental Appraisal section for the Topsides DP will be provided to the OPRED EMT for review and guidance.	
HSE	HSE will be informed of the HCF activities and topsides removal activities via the Combined Operation Notifications (CON), Dismantlement Safety Case, and Schedule 9 notifications.	

Table 5.2 Summary of Consultee Comments (Statutory Consultations)

Who	Comment	Response
NFFO		
SFF		
NIFPO		
Global Marine Systems		
Public		

6.0 Programme Management

6.1 Project Management and Verification

A Perenco Project Management team will be appointed to manage suitable sub-contractors for the removal of the 27H and 27J topsides. Perenco standard procedures for operational control and hazard identification and management will be used. Where possible the work will be coordinated with other operations in the SNS. Perenco will monitor and track the progress of consents and the consultations required as part of this process. Any major changes to the DP will be discussed and agreed with OPRED.

6.2 Post-Decommissioning Debris Clearance and Verification

This DP only covers topsides removal. Post-decommissioning surveys will be dealt with in the subsequent Jacket DP.

6.3 Schedule

The Topsides DP approach may vary between platforms and is dependent on vessel availability.

Approach A – HCF followed by Lighthouse Mode: If a JUB is not readily available to remove the Topsides, the topsides for 27H and 27J will remain in-situ on completion of the HCF campaign and enter into Lighthouse Mode. Prior to the departure of the JUB, self-contained solar powered AtoNs will be installed on the helideck and will be commissioned.

The work carried out during the various phases of the Topsides DP is described below:

- 1. Hydrocarbon Free (HCF) Campaign:** Debris surveys will be completed prior to commencement of the campaign. A structural survey will be completed to ensure that the structural integrity of the installation will be maintained throughout the DP. The JUB will interface with the platform and carry out well plugging and abandonment, removing all hydrocarbons from topside pipework / vessels, pipeline severance, and possible removal of obstructions in preparation for the platform dismantlement.
- 2. Preparation for Lighthouse Mode:** Prior to the departure of the JUB, self-contained solar powered AtoNs are installed on the topsides and are commissioned. The AtoNs provide marine coverage for the duration of the lighthouse mode and are monitored remotely from a Perenco Gas Terminal by Perenco Operators to ensure the AtoNs remain functional.



Approach B – HCF followed by Topsides Removal: currently it is anticipated that the topsides for 27H and 27J will be removed immediately after the completion of the HCF campaign. The installation will then go into a 'Dismantlement Interval Phase' prior to the jacket being finally removed. Prior to the departure of the JUB, self-contained solar powered AtoNs will be installed on a grillage on one of the jacket legs and will be commissioned.

3. **Topsides Removal Campaign:** Successful tenderer(s) remove the topsides and transport the module to an onshore dismantlement yard, for reuse, recycling or disposal.
4. **Dismantlement Interval Phase:** Prior to the departure of the decommissioning JUB, self-contained solar powered AtoNs are installed on a grillage on one of the jacket legs and are commissioned. The AtoNs provide marine coverage for the duration of the dismantlement interval phase and will be monitored remotely from a Perenco Gas Terminal by Perenco Operators to ensure the AtoNs remain functional.

During the Dismantlement Interval Phase the 500m Safety Zones will remain in place.

The following phases are excluded from the Topsides DP and will be part of the Jacket DP and Pipeline DP:

5. **Jacket Removal Campaign:** Successful tenderer(s) remove the jacket and transport the module to an onshore dismantlement yard, for reuse, recycling or disposal.
6. **Seabed clearance and verification:** Post-decommissioning environmental surveys undertaken following platform removal.

The schedule presented below in Figure 6.1 indicates the earliest dates the dismantlement of the topsides is estimated to take place. The completion dates for the DP are driven by the availability of vessels, bird nesting periods, favourable weather windows, and market opportunities.

It is anticipated we will use 'Approach B' (i.e. HCF followed by topsides removal); the HCF campaign and removal of the 27J topsides will be conducted first and will then be immediately followed by the HCF campaign and removal of the 27H topsides using the same JUB. This work is scheduled to commence in H1 2023 and be completed by H2 2025.

The topside Close Out Reports will be submitted by H2 2025.

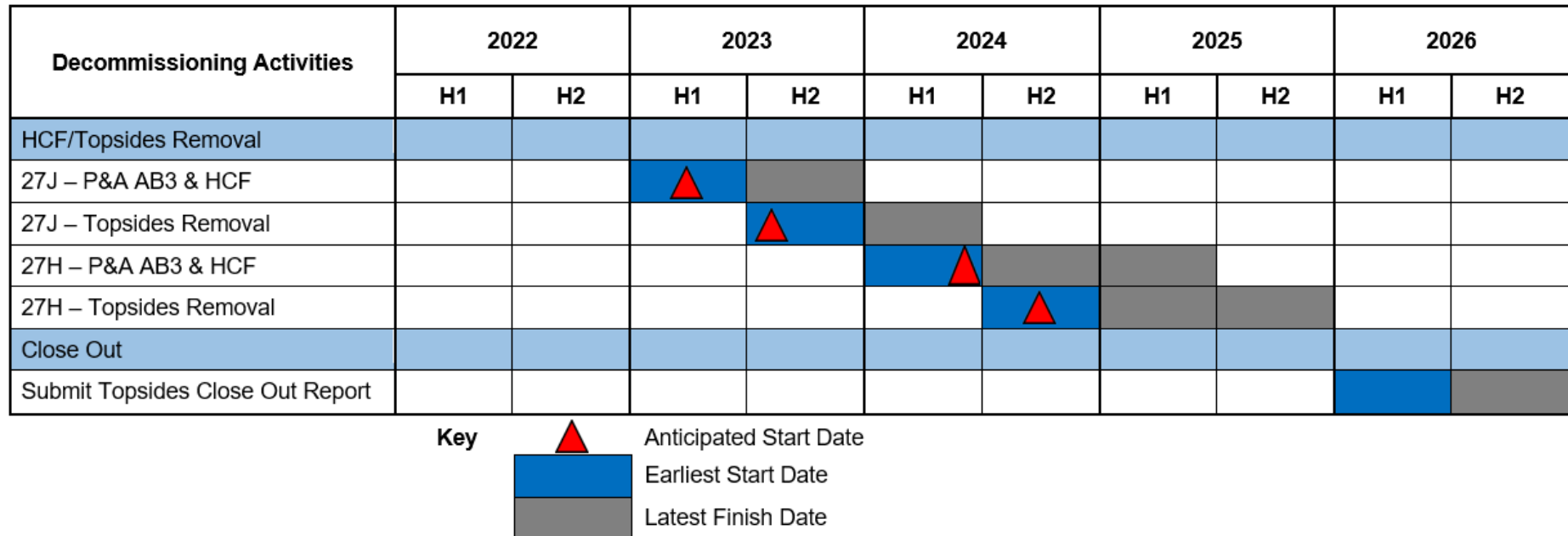


Figure 6.1: High-level Schedule

6.4 Costs

The decommissioning costs detailed within this Topsides DP have been provided to OPRED. The costs provided covered the scope of work associated with the HCF campaigns, dismantlement preparation, and removal of the topsides.

Table 6.1 Provisional Decommissioning Programme Costs			
Activity	27H £m	27J £m	Total Estimated Cost (£m)
Project Management			
Facility Running Costs			
Platform Well P&A			
Conductor Removal			
Making Safe Topsides			
Making Safe Pipeline			
Topsides Preparation			
Topsides Removal			
Monopod Jacket Removal			
Subsea Infrastructure			
Onshore disposal and recycling			
Site Remediation			
Monitoring			
TOTAL			

7.0 Public Notifications

In accordance with the Petroleum Act 1998, Perenco UK Limited will announce the decommissioning proposal for the 27H and 27J topsides by placing a public notice in the Eastern Daily Press and the London Gazette in due course. In addition, details of where copies of the draft DP can be found will be placed on the company website.

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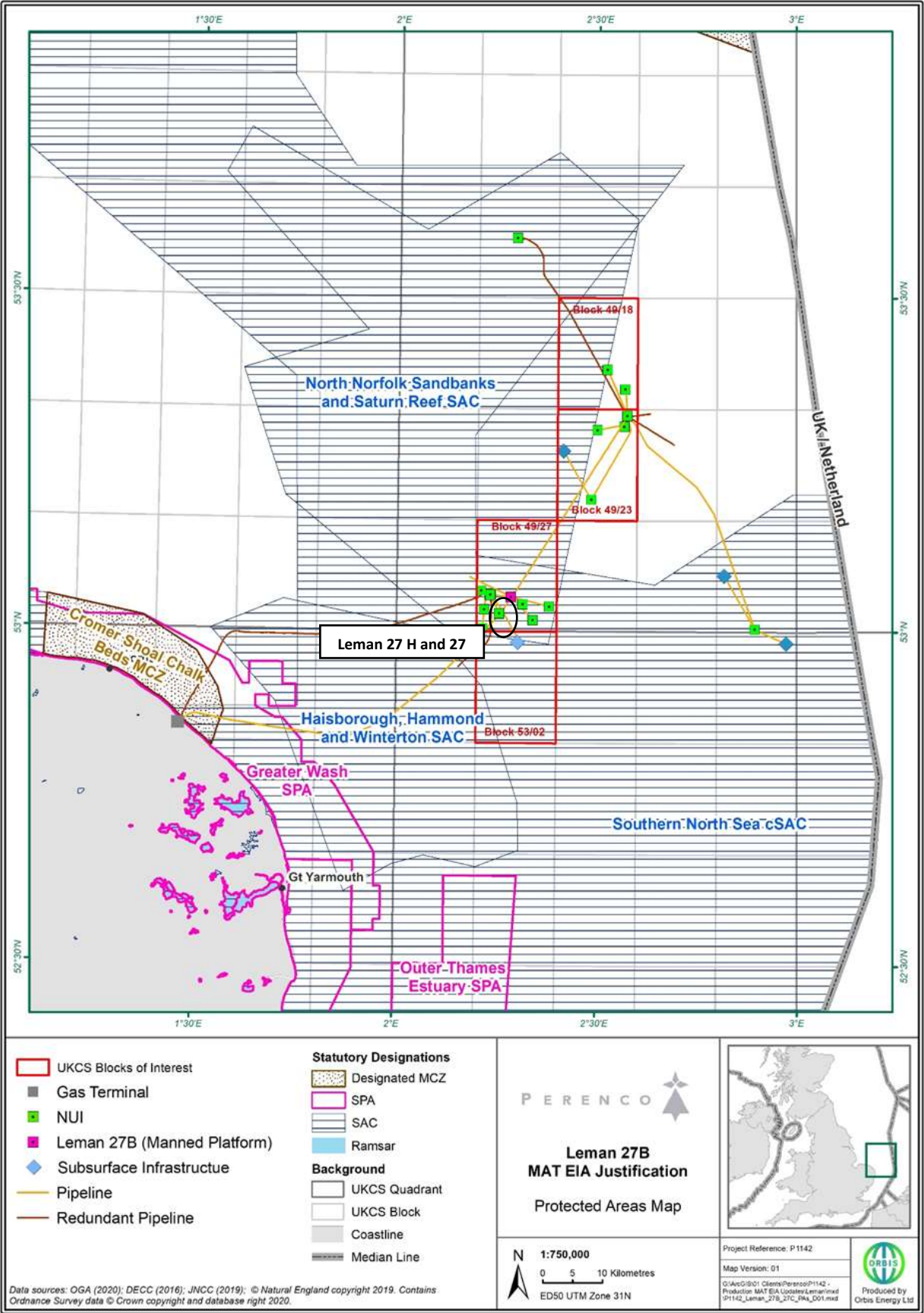
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Appendix 1 – Protected Areas



Protected Areas in the Vicinity of Leman and Inde Field

Appendix 2 – Response from Statutory Consultees

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Appendix 3 – Press Notices

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