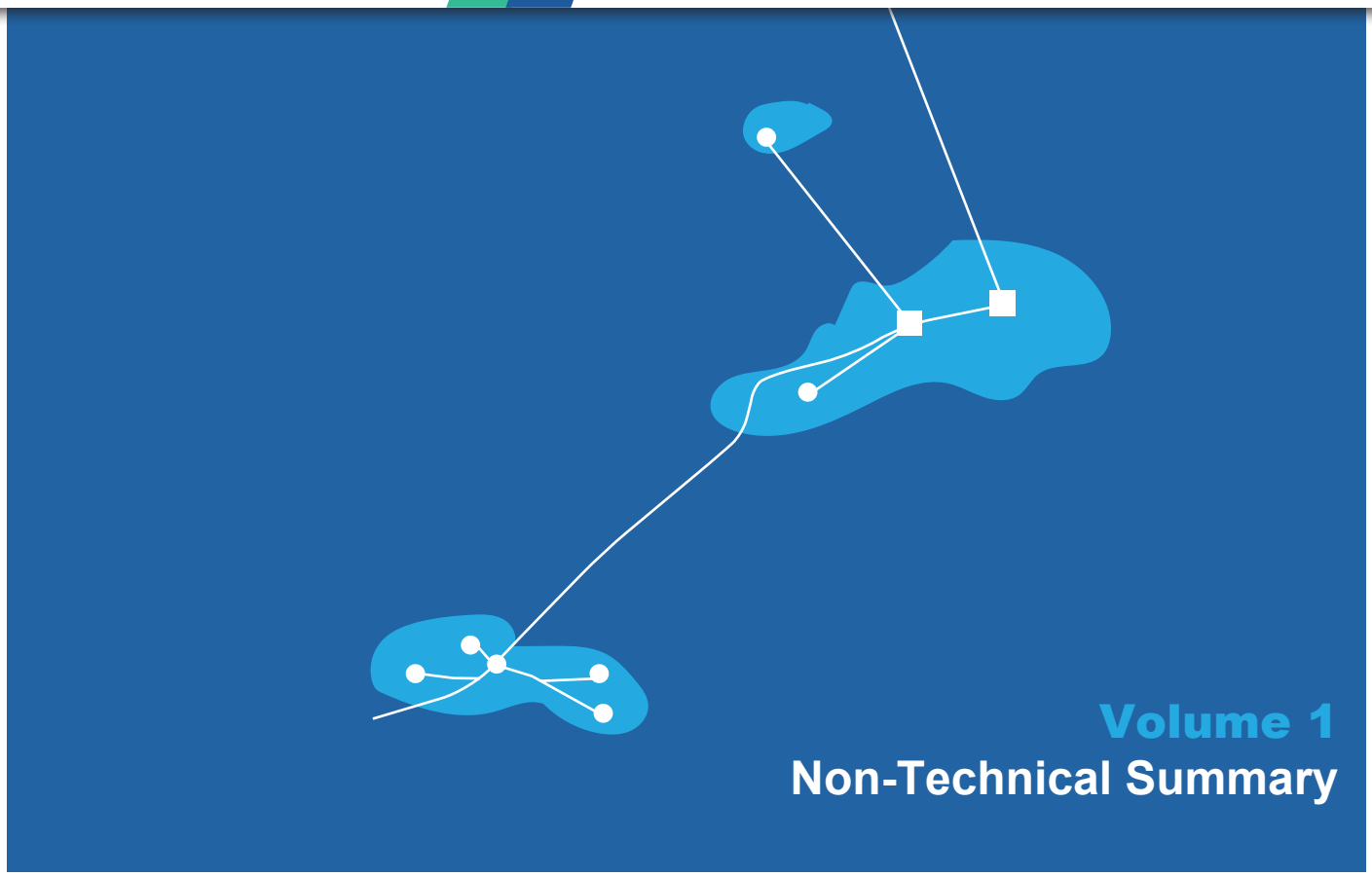
KINSALE ENERGY

Kinsale Area Decommissioning Project

Environmental Impact Assessment Report



Volume 1
Non-Technical Summary

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Hartley Anderson
FOR ENVIRONMENTAL MANAGEMENT & SCIENCE

ARUP

Non-Technical Summary

1 Introduction

PSE Kinsale Energy Limited (Kinsale Energy) is preparing for the decommissioning of the Kinsale Area gas fields and facilities, which are coming to the end of their productive life. The Kinsale Area gas fields and facilities are located in the Celtic Sea, between approximately 40 and 70km off the County Cork coast as well as onshore facilities at Inch, Co. Cork, see **Figure A**.

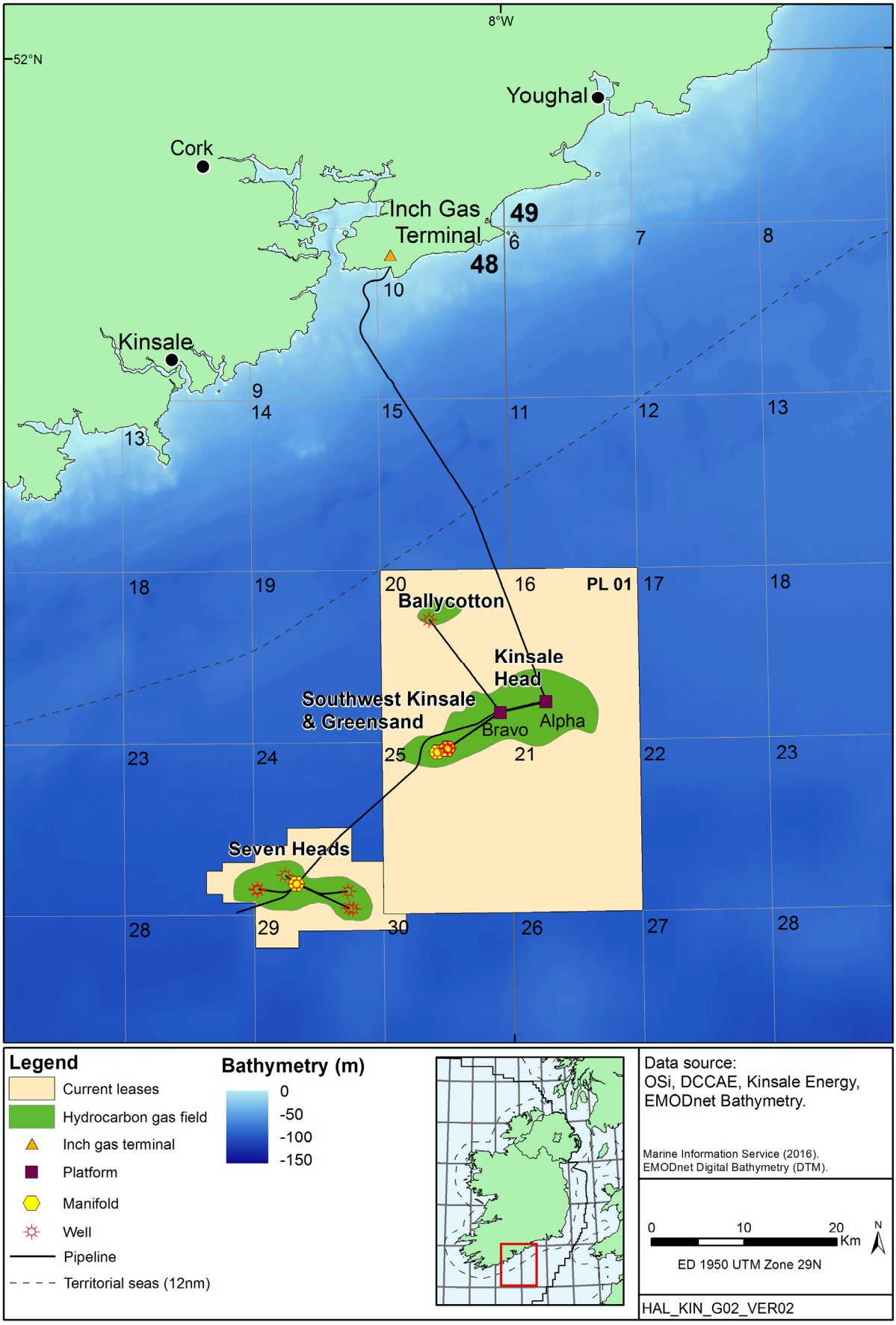
The Environmental Impact Assessment Report (EIAR) presents the findings of the environmental assessment undertaken on behalf of Kinsale Energy, for the decommissioning of the offshore and onshore facilities associated with the Kinsale Area gas fields. The EIAR is intended to fulfil the requirements of the EIA Directive (2011/92/EU as amended by 2014/52/EU), providing an environmental assessment of potentially significant effects of the proposed activities. The report provides the relevant information to allow the Competent Authority (the Minister for Communications, Climate Action and Environment) to undertake an Environmental Impact Assessment and make a reasoned decision about approval of the decommissioning of the offshore and onshore facilities associated with the Kinsale Area gas fields.

The EIAR supports Kinsale Energy's application for an amendment to their Plans of Development under Section 13 and 13(A) of the Petroleum and Other Minerals Development Act 1960, as amended, as well as any applications required under the Continental Shelf Act 1968. A two stage consent application process is proposed for the amendment to Kinsale Energy's Plans of Development. The reasoning for this approach is to reflect project scheduling requirements and to facilitate studies on the potential for any re-use options for the Kinsale Area facilities. The EIAR assesses the impact of the entirety of the proposed Kinsale Area facilities decommissioning project and therefore will be submitted along with both applications.

The project to decommission all of the Kinsale Area facilities is hereinafter referred to as the Kinsale Area Decommissioning Project, abbreviated to KADP.

This is the Non-Technical Summary (NTS) of the EIAR prepared for the proposed KADP. This provides a summary, in a non-technical language, of the environmental assessment undertaken on behalf of Kinsale Energy (by Arup and Hartley Anderson Limited), for the decommissioning of the offshore and onshore facilities associated with the Kinsale Area fields.

Figure A: Site Location



2 Legal and Policy Framework

Kinsale Energy is committed to ensuring that the KADP is conducted within the criteria set by company policy and the relevant legislation, and that operations will be carried out in compliance with the required permits and consents. Various international conventions, and European and national legislation form the legal framework under which the KADP will be undertaken, these are summarised below and detailed in Section 2 of the EIAR.

Petroleum and Other Minerals Development Act, 1960

The Petroleum and Other Minerals Development Act, no 7 of 1960, as amended, ("1960 Act as amended") regulates offshore petroleum (including gas) exploration and production activities in Ireland. A petroleum lease is the authorisation, issued under Section 13 of the 1960 Act, as amended, to allow the exploitation of a commercial petroleum discovery. The Kinsale Area facilities operate under two petroleum leases.

- Petroleum Lease No 1 (OPL 1 - 1970): Kinsale Head, Southwest Kinsale, Greensand and Ballycotton Gasfields, and
- Seven Heads Petroleum Lease (2002): Seven Heads Gasfield.

The Petroleum Affairs Division (PAD) published a licensing terms document in 1992, which sets out the terms, conditions and environmental provisions attached to the various authorisations issued by the PAD under Section 13(1) of the 1960 Act, including for the surrender of a petroleum lease, the abandonment of wells and the decommissioning of fixed facilities.

Continental Shelf Act, 1968

The Continental Shelf Act no 14 of 1968 (as amended) is the legislative regime applying to the Irish Continental Shelf, the offshore area of sea and seabed between the 12 nautical mile limit and the 200 nautical mile limit. Section 2 of the 1968 Act, as amended, imposes the requirement to obtain consent from the Minister for the Marine to "construct, alter or improve any structure or works in or remove any object or material from a designated area."

OSPAR Convention 1992

Under paragraph 2 of the OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations, the dumping, and leaving wholly or partly in place, of disused offshore installations is prohibited within the OSPAR maritime area (the north-east Atlantic).

KEL Environmental and Risk Management

Kinsale Energy (as a wholly owned subsidiary of PETRONAS) operates a Health, Safety and Environment Management System (HSEMS) based on the requirements of internationally accepted standards for Environmental Management (ISO14001) and for Occupational Health and Safety (OHSAS18001).

Kinsale Energy's Health, Environment and Safety (HES) policy commits the company to taking all reasonable and practical steps to prevent and eliminate risks of injuries, occupational illness, damage to property or the environment. This policy is applicable to all Kinsale Energy's activities and those of its contractors.

3 Project Description

A summary of the existing Kinsale Area operations and the rationale and options identified for decommissioning the facilities is given below:

3.1 Existing Operations and Rationale for Decommissioning

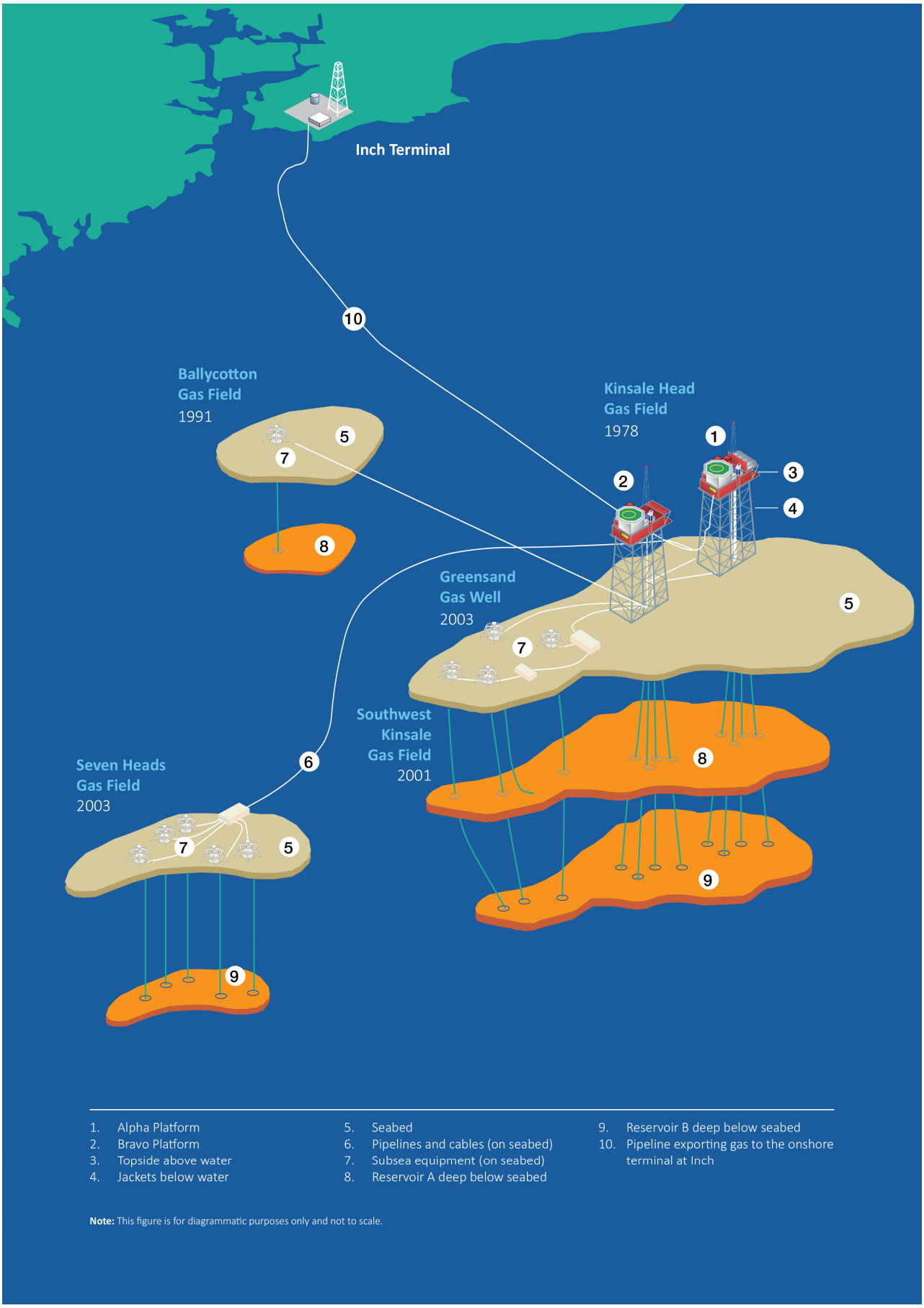
The Kinsale Head field was developed with two fixed steel platforms (Kinsale Alpha and Kinsale Bravo) with gas exported by pipeline from Kinsale Alpha to the onshore Inch Terminal. The development of smaller satellite gas fields and technical modifications to the Kinsale Head facilities (e.g. installation of compression) have prolonged the life of operations in the Kinsale Area which continues to be economically viable even at current low production rates and pressures.

The facilities were installed between 1977 and 2003 with gas production commencing in 1978 and seasonal gas storage operations taking place between 2001 and 2017. However, it is expected that the extraction of gas from the Kinsale Area gas fields will no longer be economically viable by approximately 2020/2021, whereupon the wells will be plugged and the associated facilities decommissioned.

The scope of the KADP includes the decommissioning of all physical assets within Kinsale Energy's two leasehold areas, pipelines and umbilicals (control cables) outside the leasehold areas, as well as the onshore gas metering terminal at Inch, Co. Cork. These are summarised below and illustrated in **Figure B**:

- Two fixed steel platforms, the Kinsale Alpha (KA) and Kinsale Bravo (KB) platforms
- All subsea and platform wells
- All infield subsea infrastructure associated with the wider Kinsale Area fields (Kinsale Head, South West Kinsale, Greensand, Ballycotton and Seven Heads) including manifolds and wellhead protection structures.
- All subsea pipelines, umbilicals and protection materials (graded rock, concrete mattresses etc.)
- The 24 inch diameter export pipeline between KA and the Inch Terminal on the Co. Cork coastline
- The onshore Inch Terminal

Figure B: KADP physical assets



3.2 Approach to Decommissioning

As part of project planning, a number of alternative decommissioning options have been evaluated for the facilities to provide reasonable estimates of their technical feasibility, associated impact including on safety and the environment, project cost and scheduling.

3.2.1 Consideration of Potential Alternative Uses

The Kinsale Area facilities have been designed for dry gas production and processing, and the majority of the facilities are close to or beyond their original design lives. Despite this, parts of the facilities may be suitable for re-use, depending on the service, particularly the main Kinsale and Seven Heads export pipelines and the platform jackets.

Three potential re-uses for the Kinsale Area facilities were considered at a high level. These are: hydrocarbon production, offshore transport and storage aspects of carbon dioxide capture and storage (CCS) from onshore emitters, and offshore wind energy production.

None of these alternative uses for the Kinsale Area facilities were considered feasible currently for the following reasons:

- The Kinsale Area facilities are not designed for liquid hydrocarbon or wet gas production and are unlikely to be suitable for such use. Some of the facilities could potentially be re-used for a future dry gas development as host infrastructure. However, there are no known commercial dry gas discoveries in the vicinity.
- There is currently no commercial case for a merchant CCS service as carbon dioxide (CO_2) prices are far too low to justify the required investment. However, it is also noted that there is a proposal in Ireland's National Mitigation Plan for DCCAE to explore the feasibility of utilising suitable reservoirs for CO_2 storage within the next 5 years. A feasibility study into the use of the Kinsale Head reservoir for CCS is being undertaken by Ervia.
- The main 24" export pipeline and landfall may have a use as a cable conduit, for either fibre optic or electricity cables (for example as part of a windfarm). Kinsale Energy is not aware of any wind farm development being considered for the vicinity of any the Kinsale Area facilities.

As none of these alternative uses are considered feasible currently, it is proposed that the facilities will be decommissioned. Should future circumstances change with respect to the potential for any of the re-use options, then a leave *in situ* option, particularly with regard to the main 24" export pipeline and landfall, and the Seven Heads 18" export pipeline, could facilitate the re-use of that infrastructure in the future. Additionally, the platform jacket removal campaign may be scheduled over a number of years (1-10 years), depending on vessel availability, cost efficiency and company strategy, which could extend the period over which an alternative use may be identified.

3.2.2 Decommissioning Alternatives Considered

Do nothing alternative: The do nothing scenario should be considered in the assessment of alternatives, in accordance with the EIA Directive. However, it is a requirement of both petroleum leases covering the Kinsale Area facilities, that the facilities are decommissioned. In the context of the KADP therefore, the do nothing alternative is not an alternative which can be brought forward for assessment

Platform and subsea wells decommissioning alternatives: Plugging of all wells is the only technically recognised alternative for decommissioning offshore wells.

Platform topsides decommissioning alternatives: No re-use options have currently been identified for the Kinsale Area platforms such that the platform topsides could be left *in situ,* and to ensure compliance with

OSPAR Decision 98/3, both platform topsides will be completely removed and returned to shore for re-use, recycling and/or disposal.

Platform jackets decommissioning alternatives: A number of alternatives were initially considered including full removal, partial removal, toppling *in situ* or leave *in situ.* However, most of these options would not be in accordance with OSPAR Decision 98/3, and the jackets will be completely removed and returned to shore for re-use, recycling and/or disposal.

Subsea structures decommissioning alternatives: As with the Kinsale Area platforms, all subsea structures will be removed, to ensure compliance with OSPAR Decision 98/3.

Pipelines and control cables decommissioning alternatives: Full removal, partial removal and leave *in situ* were initially considered as alternatives for pipelines, control cables and protection materials. A comparative assessment was undertaken which considered the safety, environmental, technical and societal aspects and cost of the various alternatives and identified leave *in situ* as the optimal option (more detail is provided in **Section 3.4.6** of **Appendix E** of the EIAR).

Inch Terminal decommissioning alternatives: In accordance with the conditions imposed by the original planning permission for the Inch Terminal, it is required to fully remove the facilities and reinstate the land to agricultural use, and therefore no alternative options have been considered.

3.2.3 Decommissioning Scope of Work

The broad scope of work involved in decommissioning the facilities, using each chosen decommissioning alternative noted above, is outlined as follows and illustrated in **Figure C1-C6**:

- The plugging of all wells, including removal of above seabed components such as wellhead protection structures.
- The disconnection and degassing of the platform topsides and all pipelines followed by the removal of the platform topsides (including any special wastes which require further onshore treatment), and the recycling/disposal of topside structures.
- The removal of jacket structures to shore for recycling/disposal.
- The removal of all subsea structures including the removal of connecting pipe spool pieces and control cables, and associated protection measures, with all recovered materials returned to shore for recycling/disposal.
- The decommissioning of all pipelines, control cables and their protection materials involving rock placement of freespans and/or remaining exposed sections of pipe and all remaining *in situ* protection materials.
- The filling of the export pipeline onshore section with grout (if a viable re-use option is not identified before decommissioning)
- The recovery of large items of debris and completion of a post-decommissioning survey to confirm success of the decommissioning operations.
- The decommissioning of the Inch Terminal and the return of the site to the original contours and agricultural use, in accordance with the planning consent.

A range of alternative methodologies (options) for each selected decommissioning alternative have been assessed as part of this environmental assessment. These options are summarised below in **Table 1**.

The final decommissioning methodology for each facility will be determined in conjunction with the selected removal contractor, however, where alternative methodologies are available, these have been included for the purposes of environmental assessment to provide an assessment of the reasonable worst case scenario of the potential associated impact.

Figure C1-C5: KADP Decommissioning Scope of Work

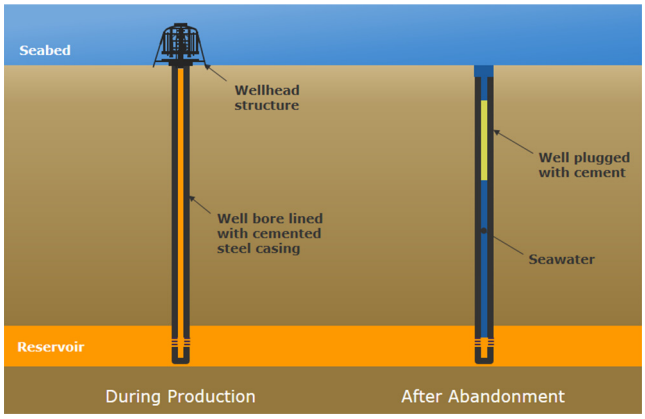


Figure C1 - Typical Well Plugging

Figure C2 - Removal of platform topsides using multiple lifts (option using conventional heavy lift vessel (HLV) – courtesy of Saipem)

Figure C3 - Removal of platform topsides in single lift (option using specialist HLV – courtesy of Allseas)

Figure C4 - Removal of platform jacket onto barge for transport to shore

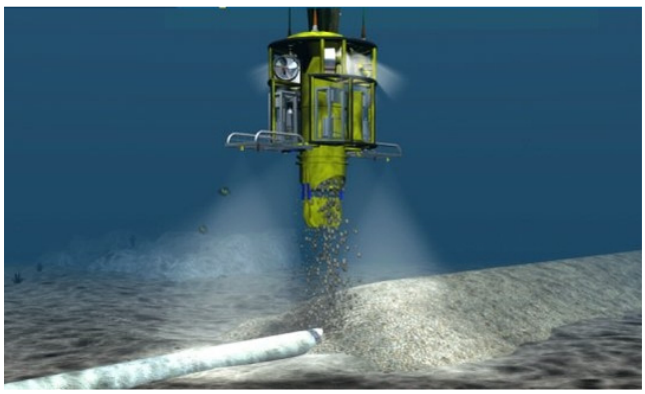


Figure C5 – Rock placement along exposed pipeline

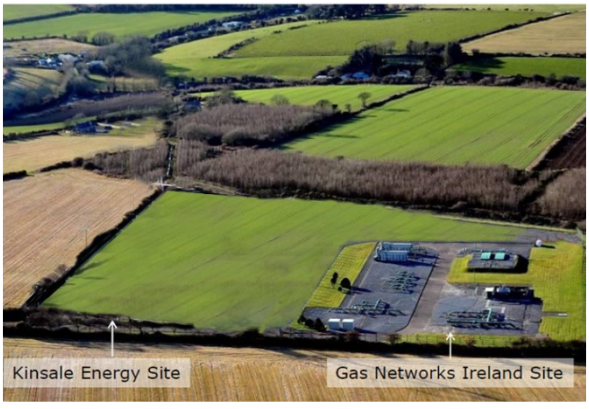


Figure C6 – Return of the onshore terminal site to the original contours and agricultural use

Table 1: Summary of proposed decommissioning alternatives for the KADP facilities progressed to full environmental assessment

Facility	Chosen Decommissioning Alternative	Alternative Methodologies identified and considered for each chosen Decommissioning Alternative	
		Method	Vessel Type[1]
Platform Wells	Plug & Abandon	"Thru-tubing"	n/a – wells abandoned "rigless"
Subsea Wells			a. Semi-submersible rig b. Light weight intervention vessel / semi-submersible rig
Topsides	Full Removal	1. Single Lift	a. Specialist HLV
			b. Conventional HLV
		2. Piece-medium (reverse installation)	Conventional HLV
Jackets	Full Removal	1. Single Lift	a. Specialist HLV
			b. Conventional HLV
			c. Flotation
		2. Multiple Lift	Conventional HLV
Pipelines, control cables and protection materials	Leave *in situ*	Offshore: 1. Rock cover pipe ends and free spans 2. Rock cover pipe ends and all exposed sections • Note the main 24" export pipeline and Seven Heads 18" export pipeline will be filled with inhibited water if re-use identified	Rock placement vessel with remotely operated vehicle (ROV) supervision
		Onshore: Fill with inhibited water, followed by grout if no re-use option identified (see **Section 3.3** of the EIAR)	n/a
Other subsea structures	Full Removal	Single Lift	Diving Support Vessel (DSV)
Inch Terminal	Full Removal	Demolition and removal of all above facilities on site and reinstatement of the site to original ground condition	

3.2.4 Waste Generated

All wastes returned to shore (summarised in **Table 2**) will be handled, recycled and disposed of in accordance with relevant waste legislation and the waste hierarchy such that the reuse and recycling of materials will be considered before disposal (e.g. to landfill). The final destinations and disposal routes and for material removed from the fields, whether for recycling or disposal, is yet to be decided.

For the purposes of assessment, the final destinations are assumed to be sites within Europe up to 700 nautical miles from the Kinsale Area.

[1] Note that only the principal vessels involved are listed in this table, however other vessels, for example construction support (CSV), anchor handling (AHV), platform support (PSV) and guard vessels will also be used and are listed in full in relevant sections of the EIAR.

Table 2: Summary of waste associated with the KADP infrastructure in tonnes (Te)

Waste Type	Total Weight	Source
Steel	19,269Te	Platforms (contributing 88% of the total) Subsea Structures (including connecting spool pieces, control cables and protection materials) Inch Terminal
Concrete	14,193Te	Subsea Structures (including connecting spool pieces, control cables and protection materials) Inch Terminal (contributing 38% of the total)
Non-ferrous Metals in Anodes	216Te	Platforms Subsea Structures
Asbestos	316Te	Platforms
Other Hazardous Waste	Small quantities	Platforms Inch Terminal
Other Non-hazardous Wastes: copper and plastics from cabling	398Te	Platforms Subsea Structures (including connecting spool pieces, control cables and protection materials)
Other Non-hazardous Wastes: marine growth	2,900Te	Platforms
Total	37,283Te	

3.2.5 Project Schedule and Activity Timing

A two stage consent application process is proposed for the Decommissioning Plan. This approach reflects project scheduling requirements and will facilitate further exploration of the potential for any re-use options for the Kinsale Area facilities (as detailed above). The first application will cover the platform topsides, the wells and seabed structures. The second application will cover the platform jackets, pipelines, control cables and associated protection materials. Both applications are anticipated to be submitted before cessation of production.

As noted above the timing of cessation of production is anticipated between 2020 and 2021. The final decommissioning project works schedule, to commence following cessation of production, will be determined by Kinsale Energy together with the decommissioning contractor, and taking account of regulator inputs. It is estimated that the decommissioning works will take between 12 and 18 months, with the following project phasing:

- After production has ceased, the subsea pipelines, which connect the subsea wells to the platforms and the platforms to the Inch terminal onshore, will be filled with seawater, and inhibited seawater in the case of the 24" export pipeline and 18" Seven Heads pipeline, with any contents being displaced into the wells (that is into the reservoirs below the seabed which had contained natural gas).
- Following this, the platform wells will be made safe (by setting a cement plug or plugs to seal the well bore and then recovering the top section of the well steel tubing) and the Kinsale Alpha and Bravo platforms topsides facilities and pipework will be degassed to achieve hydrocarbon free status.
- Upon completion of platform well decommissioning and the degassing of the platform topsides and pipework, both Alpha and Bravo platforms topsides can then be removed.
- A programme of works to remove the subsea structures and their protection materials, and disconnect the spool pieces and control cable connections, will be completed in advance of the subsea well plug and abandonment activities.

- The pipeline, control cables and protective material rock placement works will be undertaken following the removal of the subsea structures.
- The onshore terminal decommissioning will be carried out at a suitable time within the overall project schedule. The onshore pipeline section will be grout filled at this stage, if no further use of the pipeline is anticipated.
- The platform jackets will be removed at a later date, which may take place up to 10 years after topsides removal. During this period the structures would be fitted with navigational aids (the precise details of which will be agreed with the Commissioners of Irish Lights and clearly marked on navigation charts).

4 Characteristics of the Marine Environment

Since 2002 there have been a series of seabed baseline and monitoring surveys undertaken in the Kinsale Area associated with exploration wells, field and pipeline developments and operations. Together with geophysical mapping undertaken as part of rig site and pipeline route surveys, these surveys provide a good understanding of the seabed topography, sediments, fauna and contaminant status (see EIAR **Section 4** for further detail). This section provides an overview of the characteristics of the Marine Environment of the Kinsale Area:

- The Kinsale Area is located in the Celtic Sea, some 40-70km off the County Cork coast and approximately 75km to the west of the Ireland/UK median line. The seafloor is generally flat with gentle slopes across the region, with water depths extending from the intertidal at the pipeline landfall, to approximately 90-100m across the Kinsale area fields.
- The Celtic Sea is particularly susceptible to rough seas due to strong to gale force south-westerly winds. Swell distributions are dominated by swells from a south-west and west direction throughout the year. Surface water temperatures range from 8-10°C in winter to 15-16°C in summer, while bottom temperatures show less variation and remain at around 8-10°C throughout the year.
- Seabed sediments range from clays to coarse gravels, with areas of underlying chalk bedrock exposed. Seabed bedforms are characterised by a range of relatively impoverished heterogeneous benthic habitats. No habitats listed in Annex 1 of the Habitats Directive have been revealed by surveys undertaken in the area. Results from the 2017 pre-decommissioning survey of the Kinsale Area indicate that for most samples the concentrations of hydrocarbons and metals are at or below background assessment concentrations as defined by OSPAR.
- The area has a mild maritime climate with mean air temperatures varying between approximately 6-9°C in winter to 15-16°C in summer. The predominant winds over the open waters south and west of Ireland are from the west and southwest and sea fog is most frequent in summer.
- Ambient air quality monitoring at Monkstown, Cork Harbour between August 2007 and March 2008 indicated that air quality metrics were generally below their respective lower assessment thresholds. With the exception of the export pipeline which is 4km from the closest conservation site (Cork Harbour), the Kinsale Area facilities are at least 46km from the closest conservation site (Old Head of Kinsale and Sovereign Islands).
- The Kinsale Area overlaps or abuts reported spawning grounds of eleven commercially important fish and shellfish species (herring, sprat, cod, whiting, plaice, lemon sole, haddock, megrim, mackerel, horse mackerel and Nephrops). Mackerel, cod, whiting, lemon sole, blue whiting, ling, hake and *Nephrops* use the area as a nursery area at low intensity, while it is a high intensity nursery area for monkfish
- Gulls commonly found in coastal areas include herring gull, lesser black-backed gull, great black-backed gull, black-headed gull and kittiwake. Other residents include guillemot, razorbill, puffin and black guillemot. The Old Head of Kinsale (25km from the export pipeline) is the largest seabird colony on the south coast. Seasonal visitors to the area include various terns, skuas and shearwaters. Highest densities of gannets occur off the south coast in spring and summer.
- The common dolphin and harbour porpoise are frequently recorded off the south coast, both close to shore and further out to sea; common dolphin are often observed in large groups and are by far the most abundant marine mammal in the region. Small groups of bottlenose dolphins are occasionally observed in the region, mostly closer to shore, with regular sightings of a small community of individuals in the Cork Harbour reported until recent years.

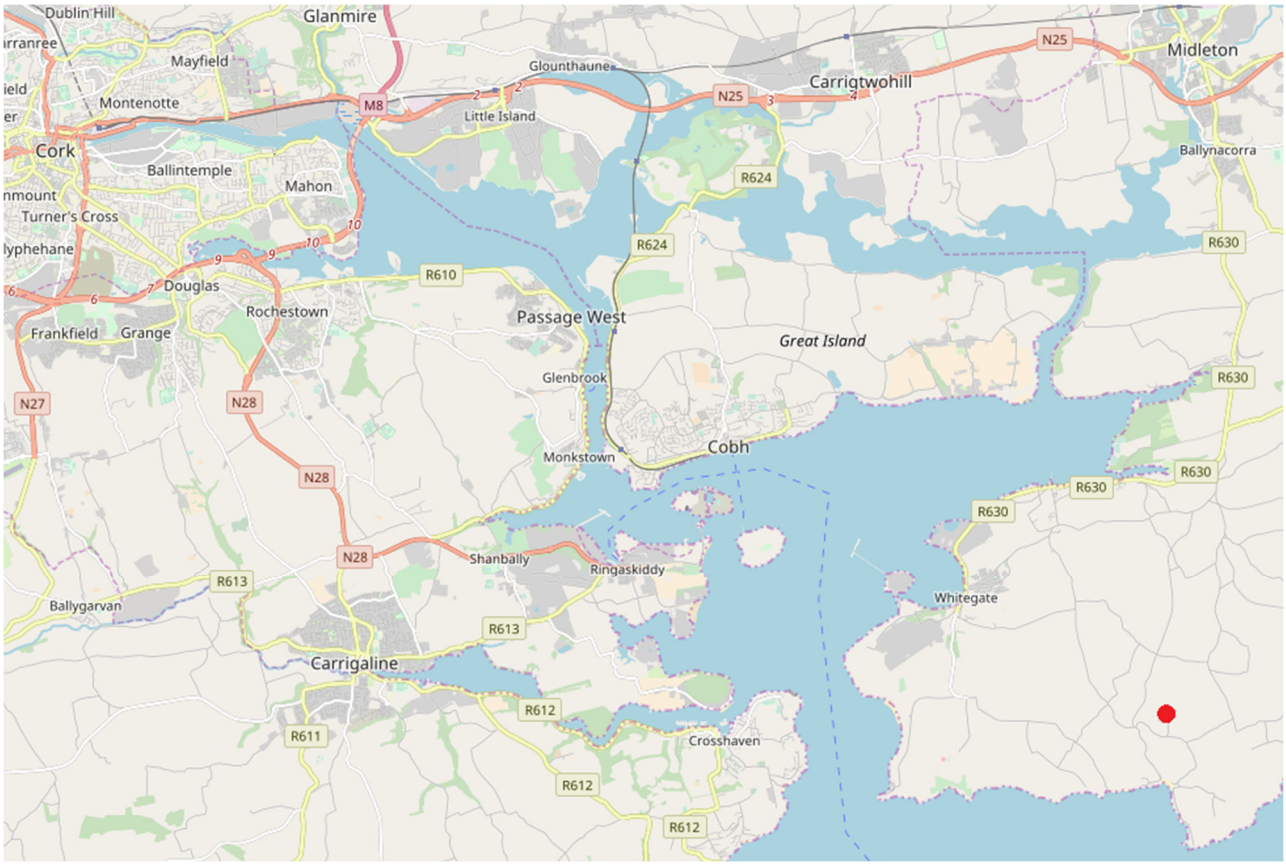
All three of these species occur year-round in the region.
Minke whale are seasonal visitors, appearing in spring and observed in increasing numbers throughout the summer to a peak in autumn. Fin whales and, to a lesser extent, humpback whales are also seasonally present from late summer to winter and feed on aggregations of small pelagic fish off the south coast; sightings peak in autumn. Small groups of Risso's dolphins are occasionally observed off the south coast of Ireland, mostly commonly in summer months and near to the coast, while there are also a few records of small groups of killer whales.
While grey and harbour seals are found around the coast of Ireland, their occurrence offshore of the south coast and in the Kinsale Area is very low. The closest conservation site for marine mammals is Roaringwater Bay and Islands SAC, 76km to the west of the Kinsale Area, where both harbour porpoise and grey seal are designated features. Both these species are protected under the Habitats Directive and are listed on Annex II, and all cetaceans are listed on Annex IV.

- Five species of marine reptile have been recorded in the seas around Ireland; the leatherback turtle making up a significant majority of the sightings.
- Wrecks over 100 years old and archaeological objects are present underwater in the study area, however, all decommissioning works will be undertaken in previously disturbed work areas. Other uses of the area include fisheries, offshore energy, ports and shipping, military activity, subsea cables, aggregates and marine disposal and recreation and tourism.
- Moderate levels of ambient underwater noise are to be expected in the Kinsale Area from commercial shipping and fishing vessels. Operations on the Kinsale platforms will also contribute to the ambient noise, generally emitting continuous wide-spectrum and tonal sounds that are qualitatively similar to those from ships.

5 Characteristics of the Terrestrial Environment

This section describes the characteristics of the terrestrial environment in the vicinity of the on-shore element of the proposed project- The Inch Terminal. The terminal is located at Inch, a small townland located in the East Cork Municipal District, approximately 4.3km southeast of the village of Whitegate and 22km southeast of Cork City Centre (**Figure D**).

Figure D: Site location of Inch Terminal



- The Cork County Draft Landscape Strategy (2007) identifies the 'Landscape Character Type' (LCT) of the Inch Terminal site as being LCT 2: Broad Bay Coast. LTC 2 is classified as 'Very High Value Landscape', and is also classified as being of 'County Importance.' There is also one 'Scenic Route' located in close proximity to the Inch Terminal site- 'S50 Road between Inch and Aghada.' Scenic routes are defined important and valued views and prospects
- The Inch Terminal is located in a rural area of large farms in pasture and tillage, with dispersed farms and dwellings. Inch has a population of approximately 530 persons. Agriculture is a key economic activity in the area, along with tourism, other services and more traditional manufacturing.
- The area has a mild, maritime climate with mean air temperatures varying between approximately 6 - 7°C in winter and 15 - 16°C in summer.
- In terms of relevant aspects of human health, air quality metrics for 2015 were within EU limit values. The ecological status of water bodies in the area are generally good, or high, and three Blue Flag beaches are present in the area. The Inch Terminal is located in a very rural area, with low ambient noise levels.
- The land underlying the terminal site is classified as 'Made Ground'- soil which has either been altered or placed by man.

The surrounding land is predominantly Acid Brown Earths/ Brown Podzolics. Inch is underlain by Old Red Sandstones which is comprised of sandstone, conglomerate & mudstone.

- The terminal site is part of the South-Western River Basin District, and is located east of the West Ballintra River, and north west of the Lahard Stream. These water bodies are classed as “not at risk” of not achieving “good status” by 2015 under the Water Framework Directive (WFD).
- The area is underlain by a bedrock aquifer which is classified by the Geological Survey of Ireland (GSI) as a ‘locally important’ aquifer, which is ‘moderately productive only in local zones.’ Groundwater quality in the aquifer is of ‘good status.’ Groundwater vulnerability in the study area is classified as being of ‘extreme’ vulnerability.
- The habitats within the terminal site are predominately man-made artificial habitats which are of negligible ecological value. No invasive species have been recorded on-site. Mammals identified in the study area include badgers, bats and otters. Evidence of Irish Hare was recorded during previous surveys. The terminal site is of minimal value for birds.
- The terminal site and onshore pipeline is located in an area of high archaeological significance, with a number of features listed in the Records of Monuments and Places in the area. There are no protected structures in the immediate vicinity of the terminal site.

6 Environmental Assessment Methodology and Identification of Potentially Significant Effects

Effects which could arise from the activities associated with the KADP were identified on the basis of the nature of the project (including its location, physical and operational characteristics, residues, emissions and wastes), considered against the description of the offshore and terrestrial environment, and the understanding of impact pathways from a range of sources, including:

- Regional and site specific environmental data, including a pre-decommissioning environmental survey carried out in May 2017, and a site walkover at the Inch terminal site in June 2017
- Typical vessel specifications (e.g. for support, heavy lifts and rock placement)
- Estimates of materials and wastes arising from the decommissioning work
- Decommissioning planning studies and indicative information provided by decommissioning contractors and engineering consultants
- Typical drilling rig and vessel specifications
- Experience of relevant aspects and operations of analogous projects in the Celtic Sea, Irish Sea, North Sea and elsewhere
- Peer reviewed scientific papers describing the effects of specific and analogous interactions
- Other publicly available “grey” literature
- The Irish Offshore Strategic Environmental Assessment (IOSEA) 4 Environmental Report and Irish Offshore Strategic Environmental Assessment (IOSEA) 5 Environmental Report
- Conservation site designations, potential designations, and site advice etc. where relevant
- Applicable legislation, guidance and policies
- A number of EIAR workshops involving Kinsale Energy and the report authors
- Input to the EIA process through consultation with relevant stakeholders.

Potential effects of the KADP were identified on the basis of defined severity criteria, and allow for the consideration of effect likelihood, scale and frequency. The identification of potential effects (positive or negative) also considered those which are direct and indirect, which could lead to cumulative or transboundary effects, as well as their likely duration.

Potential effects were identified against a range of relevant environmental receptors within the broad environmental factors which must be considered under the EIA Directive, namely: population and human health; biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; land, soil, water, air and climate; material assets, cultural heritage and the landscape; and interaction between the factors. Additionally, effects from the vulnerability of the project to risks of major accidents and/or disasters were also considered.

Potentially Significant Environmental Effects to be Considered Further

A number of environmental effects were identified as being of potential significance and/or with potentially moderate or more severe impacts. Those decommissioning activities identified to likely, directly or indirectly, affect one or more relevant environmental factors have been grouped together by major source of effect as summarised in **Table 5** and further described and assessed in **Section 7**.

Table 5: Summary of potential significant environmental effects identified

Source of Potential Significant Effect	Activity	Relevant Environmental Factor				
		Population and human health	Biodiversity	Land, soil, water, air and climate;	Material assets, cultural heritage and the landscape;	interaction between the factors r
Consent Application 1						
Physical presence: decommissioning operations	Physical presence in field and in transit of supply vessels, barge/or heavy lift vessels and drilling rig	✓	✓		✓	
Physical disturbance	Drill rig positioning and vessel anchoring. Mattress removal, cutting of spool pieces and umbilical jumpers and their subsequent removal. Removal of manifolds and wellheads.		✓	✓	✓	✓
Underwater noise	Mechanical cutting well conductors and removal of well surface casings. Rig and vessel noise.		✓			✓
Discharges to sea	Cementing and other chemicals associated with well abandonment operations. Hydraulic fluid release during umbilical cutting.		✓	✓		
Energy use and atmospheric emissions	Power generation (rig and vessel) Materials recycling			✓	✓	✓
Waste: materials recycling, reuse and disposal	Solid and liquid wastes to shore Removal of hazardous materials Materials recycling Onshore waste treatment, landfill of residual waste/materials Offloading and storage/dismantling of offshore structures onshore Road transport Hazardous material handling.	✓		✓	✓	
Accidental events	Dropped objects Vessel collision risk Accidental spills of fuel/lubricants.	✓	✓	✓	✓	✓
Consent Application 2						
Physical presence: decommissioning operations	Physical presence in field and in transit of supply vessels, barge/ or heavy lift vessels.	✓	✓		✓	
Physical presence: legacy materials (left *in situ*)	Presence of pipeline, umbilicals and protection materials post decommissioning	✓			✓	

Source of Potential Significant Effect	Activity	Relevant Environmental Factor				
		Population and human health	Biodiversity	Land, soil, water, air and climate;	Material assets, cultural heritage and the landscape;	interaction between the factors r
Physical disturbance	Vessel anchoring. Excavation of jacket piles/leg stump remediation and removal of jacket. Recovery of large items of debris from the seabed. Remedial rock placement at jacket and pipelines.		✓	✓	✓	✓
Underwater noise	Mechanical cutting of jacket legs and structural members. Vessels, including rock placement. Post-decommissioning survey.		✓			✓
Discharges to sea	Release of inhibited water from export pipelines.			✓		
Energy use and atmospheric emissions	Materials recycling			✓	✓	✓
Waste: materials recycling, reuse and disposal	Offloading and storage/dismantling of offshore structures onshore Road transport. Materials recycling Onshore waste treatment Landfill of residual waste/materials.	✓			✓	
Accidental events	Dropped objects Accidental spills of fuel/lubricants and chemical spills.	✓	✓	✓	✓	✓

A brief consideration of KADP activities or issues judged to have positive, minor or negligible environmental effects is given in **Appendix D of the EIAR**. This includes all of those impacts identified for the Inch Terminal decommissioning.

7 Consideration of Potential Significant Effects

7.1 Introduction

A summary of the description and assessment of those potentially significant environmental effects identified in **Table 5** above is given below. The assessment has been undertaken on the basis of the chosen decommissioning alternatives, including a worst case assessment, such that those effects described below will not be exceeded, regardless of the final methodology selected.

7.2 Physical Presence: Decommissioning Operations

Irrespective of the alternative methodologies (options) selected to decommission the Kinsale Area offshore facilities, there will be vessel presence/movements. The physical presence of vessels has the potential to disrupt other users of the sea, including shipping, fishing and recreational boating. However, the majority of the decommissioning works will take place within established fisheries exclusion zones around the Kinsale Area facilities. Therefore, the potential effect on shipping, fishing and other users of the sea will be limited to when the vessels are in transit and where vessels are involved in pipeline rock placement works and post decommissioning survey work outside of the existing exclusion zones. The assessment concluded that, in view of the existing moderate shipping traffic in the area, the limited increase in vessel traffic associated with the decommissioning operations (3-6 vessels per operation) could only cause minor and temporary disruption to other vessels.

The offshore decommissioning operations will be undertaken in accordance with relevant regulatory and policy controls including the issuing of Notices to Mariners and radio navigation warnings to cover all phases of the decommissioning work to communicate the nature and timing of the activities. All vessels used in the decommissioning operations will meet applicable national and international standards (e.g. in terms of pollution control, and safety) and will follow established routes to ports. No additional project specific mitigation above that required in legislation or policy has been identified.

As the demolition of the Inch terminal will take place within the confines of the terminal facility, the associated works will not interfere with other land users in the area e.g. farmers. The closest human receptor is located approximately 200m from main site, and noise levels at this receptor are predicted to be in compliance with relevant noise limits during demolition works. However, any increase in noise and disturbance could in turn cause disturbance/displacement of fauna within the terminal site and in adjacent habitats. This will be a localised, short-term impact of up to 6 months in duration with significant effect not considered likely.

7.3 Physical Presence: Legacy Materials Left *In Situ*

The proposed approach to the decommissioning operations will result in some legacy materials being left *in situ* including pipelines, control cables, protective materials (concrete mattresses and rock cover) and potentially jacket leg stumps.

No cuttings drilled with Oil Based Muds (OBMs) have been discharged to sea in the drilling of any Kinsale Area well, and therefore there are no legacy effects associated with oil contaminated discharged cuttings. The 2017 pre-decommissioning seabed survey has confirmed that accumulations of drill cuttings are not present around any of the Kinsale Area facilities.

The preferred decommissioning alternative for the pipelines and control cables involves leaving the facilities *in situ* and applying rock cover to the ends, any remaining protection materials, and any pipeline freespans. For the purposes of assessment, a worst case scenario involving the rock cover of all exposed pipeline sections has also been considered.

The platform jacket legs will be cut from their pile foundations at seabed level using either an internal or external pile cutting tool. The seabed geology is such that excavation of the piles could be challenging, and if external cutting is undertaken a short exposure (up to 1m) of the legs may remain which would then be covered with rock to mitigate a snagging risk to towed fishing gear. While this event is considered unlikely, it is representative of a worst-case scenario and as such has been considered in this assessment.

All other subsea infrastructure, including manifolds associated with satellite fields, wellhead protection structures and also the upper portions of the wells (to 3m below seabed) will be entirely removed with no materials left *in situ*.

Potential legacy effects of leaving materials *in situ* include alteration of seabed habitats (e.g. through the leaving/addition of hard substrates), and the risk to other users (primarily fisheries) through the snagging of pipelines by trawl boards or anchors. Bottom trawling close to subsea facilities carries the risk of fishing gear snagging, with consequent loss of gear, or in the worst case, the vessel. The risk to fisheries of existing pipeline arrangements on the seabed is considered very low, and the pipeline decommissioning methods assessed, identify risks being reduced with the application of rock cover to freespans or all exposed sections. The potential for buried or rock covered pipelines in the Kinsale area to become exposed and to pose a risk to, for example towed fishing gear, is deemed minimal given that the degree of exposure of such pipelines has not changed significantly since their initial burial or rock covering.

The risk associated with the small sections of the platform legs that might remain under a worst case platform removal scenario were not assessed as part of the study of project risk to fisheries. However, should these be left, given their location, appropriate rock cover remediation and small seabed footprint they are considered to represent a low level of risk and effects are not considered to be significant.

The pipelines will gradually degrade over time, which is expected to be in the order of several hundred years with no foreseeable significant effect to seabed habitats.

The 24” export pipeline (and potentially 18” Seven Heads export pipeline) will be filled with inhibited seawater (seawater containing corrosion inhibiting chemicals) to maintain it in potentially serviceable condition should an alternative use be identified for it. If an alternative use is not identified, the onshore pipeline to the shoreline will be left *in situ* and filled with grout. The filling with grout will be undertaken from within the terminal facility site and no disturbance of the ground or pipeline will take place, with the displaced inhibited seawater discharged from the offshore pipeline(s) at the Kinsale Alpha platform location. Any release would, under the influence of local water currents, rapidly disperse and dilute and is not considered likely to result in significant environmental effects.

A range of measures are incorporated into the project scope of works to mitigate the potential damage to or loss of fishing gear as a result of decommissioning offshore pipelines *in situ*. This includes: the use of a fall pipe on the rock-placement vessel and ROV supervision during rock-placement operations to ensure accurate deployment; the rock protection will be designed to be overtrawlable; consultation with fisheries representatives will mitigate against potential snagging; and all infrastructure decommissioned *in situ* will be marked on navigation charts following a post-decommissioning survey. While all risk cannot be eliminated from leaving material *in situ*, the potential for significant negative effects on fisheries from legacy materials on the seabed following the proposed decommissioning options, including incorporated mitigation works, is assessed to be remote, and significant residual effects are not predicted.

7.4 Physical Disturbance

Physical disturbance of the seabed will be generated by any anchoring of vessels (including a rig and heavy lift vessels), the removal of protection materials (concrete mattresses), connecting spool pieces and control cables around platforms and subsea structures, the removal of subsea structures and platform jackets (including excavation of jacket piles and recovery of large items of debris post removal), remedial rock placement and the removal of onshore terminal foundations.

Physical effects of seabed disturbance may include mortality to benthic fauna as a result of physical trauma, smothering by re-suspended sediment, and habitat modification, including from the introduction and removal of hard substrates (e.g. concrete mattresses and rock). The duration of effects on benthic community structure are related to individual species' biology and to successional development of community structure. The majority of seabed species recorded from the European continental shelf are known or believed to have short lifespans (a few years or less) and relatively high reproductive rates, indicating the potential for rapid population recovery, typically between 1 to 5 years.

Other effects from physical disturbance include that on features of the historic environment. A number of historic wrecks are known in the vicinity of the Kinsale area, but other prehistoric or archaeological remains are not known to be present. The decommissioning works will take place largely within the original footprint of disturbance of the wider Kinsale area field developments, and therefore significant effects on cultural heritage are not considered likely.

Mitigation proposed to reduce the potential for significant effects include: the minimisation of rig and vessel movements which require anchoring, the use of dynamic positioning (DP) on most vessels to reduce anchor deployment, and the selection of decommissioning options which minimise interaction with the seabed (subject to wider environmental, safety, technical and economic considerations). Additionally, for each option/activity involving rock placement, efforts will be made to minimise the volume of rock deployed, subject to technical function.

In view of the potential impacts in the context of the proposed mitigation, recovery potential of the seabed, and scale of impact in the context of the wider Celtic Sea area, significant effects are not considered to be likely.

7.5 Noise and Vibration

The key sources of noise and vibration associated with the decommissioning operations are from vessel operations, and cutting activities (e.g. associated with jacket and subsea structure disconnections prior to removal).

It cannot be excluded that sound from vessels will in the short-term influence the behaviour of individual marine mammals in the immediate vicinity of the operations. However, the risk that any effect could become significant at the population level is deemed not possible due to a combination of sound characteristics, duration of activity, current understanding of marine mammal movements and behaviour in the Kinsale Area and wider Celtic Sea, and distance to the closest marine protected areas with relevant qualifying features (Roaringwater Bay and Islands SAC, harbour porpoise and grey seal, 74km to the west, and Saltee Islands SAC, grey seal, 109km to the northeast).

While very high amplitude low frequency underwater noise may result in acute trauma to diving seabirds (i.e. with tens of metres of underwater explosions; Danil & St Leger 2011), their region of greatest hearing sensitivity suggests a low potential for disturbance due to vessel noise. As such, and given the short-term duration of vessel presence, including rock placement activities, in the context of many decades of shipping and fishing activity in the region, significant disturbance to diving seabirds is assessed as highly unlikely.

While it is recognised that vessel noise may influence several aspects of fish behaviour including inducing avoidance and altering swimming speed, direction and schooling behaviour, there is no evidence of mortality or potential mortal injury to fish from ship noise.

The sound generated by vessels during decommissioning activities is likely to be detectable by marine turtles. However, in comparison to marine mammals, available information on potential effects of underwater sound on marine turtles is very limited (Nelms *et al.* 2016).

The cutting tools proposed to be used to remove the Kinsale platform jackets are considered to be less noisy than diver/ROV-operated tools in the water column, and are not likely to be discernible above the associated vessel noise source.

Any increase in vessel activity will add to the overall ambient noise in the Kinsale Area, but the noise sources will be transient and minimised by a phased approach to decommissioning and maximising vessel synergies such that vessel time in the field is minimised. On completion of decommissioning, noise from the present Kinsale field operations (e.g. platform and support vessels) will be eliminated.

Overall the noise and vibration sources identified from the offshore decommissioning operations will be temporary with no foreseeable significant effects. No specific mitigation measures were identified.

Onshore noise and vibration are predicted to be in compliance with relevant noise and vibration limits during demolition works with no foreseeable significant effects to human health or fauna and habitats.

7.6 Discharges to Sea

During decommissioning, discharges will be limited to excess liquid cement and potentially treated seawater used to ensure a good bonding of the cement plugs in the wells. These chemicals (in the seawater and cement) will be subject to risk assessment, with chemical selection being made on the basis of those having the lowest hazard quotient for the required technical function.

Other discharges resulting from well decommissioning and wider vessel operations will include treated domestic effluents (comprising grey water and comminuted sewage and food waste) and surface drainage from decks. The rig, HLV and other vessels associated with the KADP will also generate a range of solid domestic and operational wastes, as are normally associated with shipping activities, which will be returned for onshore disposal.

The contents of all pipelines will be displaced by seawater in to the wells prior to decommissioning and no discharge of residual gas will occur. This seawater (including the inhibited seawater in the 24” export pipeline, and possibly the 18” Seven Heads export pipeline) will eventually be released as the pipelines degrade over time. Any release would, under the influence of local currents, rapidly disperse and dilute and is not considered likely to result in significant environmental effects.

Marine growth comprising of a variety of hard- and soft-bodied organisms are present on the platform jackets, and it is proposed that these are removed onshore following the removal and transport of the jackets to the disposal yard. A proportion of the marine growth will be removed offshore at cut locations, or will fall off in transit. While generating waste and odour, onshore removal will minimise offshore working time, and measures are available to yards to minimise odour.

Standard operational controls will be in place for the management of routine marine discharges from the decommissioning activities, and Kinsale Energy will ensure that any vessel used as part of the KADP will meet MARPOL[2] standards as part of contractor management. All other potential discharges associated with decommissioning the Kinsale Area facilities (e.g. from pipelines) are considered to be minor and will not result in significant effects.

The assessment concludes that the impacts from discharges associated with the KADP will be minor and spatially and temporally restricted. Discharges associated with present Kinsale Area operations (e.g. chemicals and negligible quantities of hydraulic fluid losses) will be eliminated on cessation of production and removal of the facilities. No specific mitigation measures were identified.

[2] The International Convention for the Prevention of Pollution from Ships. The main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.

7.7 Waste: Materials Recycling, Reuse and Disposal

All wastes returned to shore will be handled, recycled and disposed of in accordance with relevant waste legislation and the waste hierarchy. Topsides will be cleaned and all wastes including residual inventories will be collected for onshore disposal or use as appropriate.

All regulatory and company procedures for segregation, transport and disposal of waste will be strictly adhered to and only fully permitted and licensed waste facilities will be used for recycling or disposal. A detailed Resource and Waste Management Plan will be prepared by the decommissioning contractor on appointment. Disposal of certain wastes may take place outside Ireland in accordance with the relevant legislation and requirements.

The overall significance of the impact of waste as a result of the decommissioning project is considered to be low. It is expected that there will be a minor positive effect from material reuse, offsetting use of primary raw material.

7.8 Energy Use and Atmospheric Emissions

Sources of atmospheric emissions from the KADP include those from the rig and vessels associated with well abandonment, and platform and pipeline/umbilical decommissioning, those associated with the recycling of materials returned to shore, and the lost benefit of recyclable materials being left in situ and thus not recycled. Small volumes of hydrocarbons are expected to be vented during the offshore facilities preparation works and well abandonment.

Gaseous emissions associated with activities to be undertaken during the decommissioning of the Kinsale facilities will contribute to atmospheric greenhouse gas (GHG) concentrations. Conversely it will eliminate continuing emissions from gas production and export, and further offset some emissions from the production life cycle of future products through the recycling of materials (primarily steel).

Emissions associated with the KADP range from 67,600tCO_2eq. to 95,600tCO_2eq. depending on the selected options. Emissions estimated to be generated from the recycling of materials associated with the KADP are approximately 28,400tCO_2eq. Whilst there is an additional recycling benefit of removing the pipeline in full, emissions estimated to remove the material exceed those required to produce the materials left in place from primary sources. The benefit of recovering this material is therefore considered to be limited.

There is the potential to minimise time in the field and associated vessel days and related emissions by making using of vessel synergies and careful activity phasing, and to make further emissions reductions through contractor selection (e.g. those using modern efficient vessels).

In view of the selected approaches to decommissioning the Kinsale Area facilities, emissions from materials will be minimised by using a waste hierarchy approach; establishing where there may be scope for equipment and material re-use and recycling, with disposal only taking place where no feasible alternative is available.

The assessment concludes that activities associated with the KADP will lead to emissions of gases which may contribute both to localised and short-term increases in atmospheric pollutants, and to atmospheric GHG concentrations. In the context of wider Irish emissions, these effects are considered to be negligible, and there will be a small benefit from the return of recyclable materials to shore which will have a future use and offset the extraction and transport of primary raw materials. On completion of the KADP, all emissions from the Kinsale Area will be eliminated. No specific mitigation measures were identified.

7.9 Conservation Sites and Species

With the exception of the export pipeline, the Kinsale Area facilities to be decommissioned are at least 25km from the closest Natura 2000 site (Old Kinsale Head SPA), though the qualifying interests of certain sites (e.g.

seals, harbour porpoise (both on Annex II of the Habitats Directive) and seabirds) may be present across the Kinsale Area at some distance from site boundaries.

Relevant sites include Roaringwater Bay and Islands SAC (74km) for harbour porpoise and grey seal, Saltee Islands SAC (109km) for grey seal, and Old Head of Kinsale SPA (25km) and Saltee Islands SPA (116km) for seabirds including gannet, fulmar, kittiwake, gulls and auks (see **Section 4.4.8** of the EIAR for more details). Additionally, protected species such as those listed on Annex II and IV of the Habitats Directive may also be present across the Kinsale Area. Annex IV species include all cetaceans (e.g. harbour porpoise, common dolphin, bottlenose dolphin, minke whale, fin whale and humpback whale) and the leatherback turtle.

As noted above, noise from vessel activity associated with the decommissioning activities has the potential to contribute to existing noise levels in the area, and the physical presence, light and noise generated by rigs and vessels associated with decommissioning activities has the potential to cause displacement and/or other behavioural responses in birds. Significant effects from these impacts are not considered to be likely.

Kinsale Energy has prepared a separate Appropriate Assessment screening report for the KADP (reference, 253993-00-REP-14). This screening report provides the information required to allow the competent authority to conclude, on the basis of the best scientific knowledge and in view of the conservation objectives of the relevant Natura 2000 sites, that the KADP, individually or in combination with other plans or projects, is not likely to have a significant effect on any Natura 2000 site.

7.10 Accidental Events

Given the nature of the activities which could take place as a result of decommissioning, accidental events could include spills of fuel/lubricants (including as a result of collision), accidental discharge of chemicals from the platforms and vessels, and dropped objects.

Legal requirements and Kinsale Energy risk management measures provide mitigation to minimise the risk that an accidental event could occur, and therefore minimise the likelihood of any resultant significant effect.

Other users of the Kinsale Area will be alerted to the decommissioning activities via publication of Notices to Mariners and radio navigation warnings detailing vessel positions, activities and timing, and by full navigation lighting on the vessels. Guard vessels will minimise the potential for interaction between decommissioning vessels and other users and much of the decommissioning activity will be within existing safety zones thereby further reducing the potential for interaction. All vessels to be used during decommissioning will be subject to audit.

During the removal of topsides, jackets, wellheads, and subsea structures, every care will be taken to minimise dropped objects and the generation of debris. Any dropped objects (where they pose a hazard to navigation or fisheries) will be recovered during decommissioning operations and an independent seabed debris clearance survey will be conducted once decommissioning operations have been completed to verify that debris clearance has been completed.

Overall, given control mechanisms that will be in place, the predicted behaviour of a potential diesel spill and the distance of the offshore field of operations to sensitive receptors, there is a low risk of significant effects from accidental events associated with the KADP. Bunkering will be undertaken in favourable sea states and during daylight hours so far as practicable in adherence with DTTAS permitting requirements.

7.11 Cumulative and Transboundary Impacts

There are two main sources of cumulative effects:

- Intra-project effects, those that occur between different environmental topics within the same proposal
- Inter-project effects, those that occur as a result of the likely effects of a proposal interacting with the impacts of other developments

No significant intra- or inter-project cumulative effects have been identified.

The likely nature and footprint of the effects described above, for atmospheric emissions, physical presence, seabed disturbance, noise and discharges to sea, are considered to be minor in a regional context, and are not considered to pose a significant risk of transboundary effects.

8 Management of Residual Effects and Conclusions

Through a systematic evaluation of the activities relating to the proposed KADP and their interactions with the environment, a variety of environmental effects were identified, the majority of which were of limited extent and duration and considered minor. Those activities identified as being of potentially greater concern were described and assessed further in the EIAR.

A number of potential effects are mitigated through mandatory requirements (e.g. as required by legislation) and project scope of works (e.g. rock placement on pipelines remaining *in situ*). Such mandatory control measures and additional mitigation measures identified are listed in **Table 6**, and will be included in detailed design and final project planning and execution.

Table 6: Summary of commitments and actions

Issue	Action
Environmental Management Commitments	
Compliance assurance	Ensure management of the applications for and monitoring of compliance with the requirements of project environmental permits and consents.
Procurement	Ensure requirement to meet MARPOL standards for special areas included in procurement of vessels and rigs used in decommissioning operations.
Contractor management	All vessels and the rig to be used during decommissioning will be subject to audit. Contractor performance will be monitored throughout the decommissioning operations
Activity planning	Wherever possible, seek to minimise vessel days by making using of vessel synergies and careful activity phasing.
Interaction with other users: decommissioning operations	Notices to Mariners will be issued to cover all phases of decommissioning work to communicate the nature and timing of the activities. All vessels used in the decommissioning operations will meet applicable national and international standards (e.g. in terms of signals and lighting) and would follow established routes to ports. Should the jackets be placed in “lighthouse mode” for a period of time following topside removal, navigational aids of a type agreed with the Commissioner of Irish Lights will be deployed. Consult will take place with fisheries organisations and relevant marine authorities in accordance with legislation.
Discharges to sea:	Ensure chemical risk assessment is undertaken as part of final well decommissioning chemical selection and apply for relevant chemical permits (Permit for Use and Discharge of Added Chemicals – PUDAC).
Waste production	Implement a detailed Resource and Waste Management Plan which maximises the potential for reuse and recycling, including source segregating waste where appropriate. Management of all waste will be undertaken in accordance with the relevant waste legislation and only permitted and licensed waste facilities will be used.
Atmospheric emissions	As part of the decommissioning waste management plan (above), the benefit of materials returned to shore will be maximized through preferential reuse and recycling wherever possible.
Accidental events: Seabed debris from dropped objects	All lifting operations will be risk assessed.
Accidental events: loss of diesel inventories	Undertake audit of vessel bunkering procedures. Bunkering to be conducted in favourable sea states and during daylight hours so far as practicable. Procedure to be agreed with DTTAS.

Issue	Action
Mitigation measures and residual effects	
Interaction with other users: decommissioning operations	Guard vessels will be used to minimise the potential for interaction between decommissioning vessels and other users.
	Residual effect: *The use of guard vessels would reduce the risk of other user interaction with certain activities associated with the decommissioning project (e.g. heavy lifts). Noting that these would take place in existing and charted surface exclusion zones, with all vessels subject to mandatory lighting and marking controls, the addition of a guard vessel will result in a minor risk reduction to other users. The residual impact from interactions with other users is temporary and minor.*
Interaction with other users: legacy materials left *in situ*	Rock cover remediation will be used to mitigate the potential snagging risk associated with decommissioning pipelines and umbilicals *in situ*, and the rock will be designed to be overtrawlable.
	Residual effect: *On application of rock cover following removal of exclusion zones around relevant infrastructure, there remains a low risk to other users (primarily fishing) from interactions with pipelines and umbilicals. The option to rock cover all exposed pipeline sections would further reduce risks to third parties.*
	Pipelines and umbilicals will be surveyed post-decommissioning to establish their exact position and this information will be included into navigational charts
	Residual effect: *The post-decommissioning survey will confirm/update the position of the pipelines and umbilicals and inform any update to their charted location to ensure other users are aware of their accurate position, and therefore contribute to risk reduction from interaction.*
Physical disturbance: sensitive seabed features	The minimisation of rig and vessel movements which require anchoring, and the use of dynamic positioning (DP) on most vessels, where practicable (note that sensitive features (e.g. wrecks, Annex I habitats) have not been recorded in previous surveys within the working area). Pipeline decommissioning options (rock placement) which minimise physical disturbance will be selected subject to wider environmental, safety, technical and economic considerations. For each option involving rock placement, efforts will be made to minimise the volume of rock deployed.
	Residual effect: *The measures have the potential to reduce the significance of effect by minimising seabed footprint of activities. The predicted effect of seabed disturbance is negligible and short-term.*

8.1 Conclusion

The overall conclusion of the Environmental Impact Assessment Report is that, in view of the predicted scale, intensity and duration of the activities, with the implementation of the proposed mitigation and risk reduction measures and commitments in **Table 6**, the KADP will not result in significant adverse effects on the environment, other users, or population and human health.