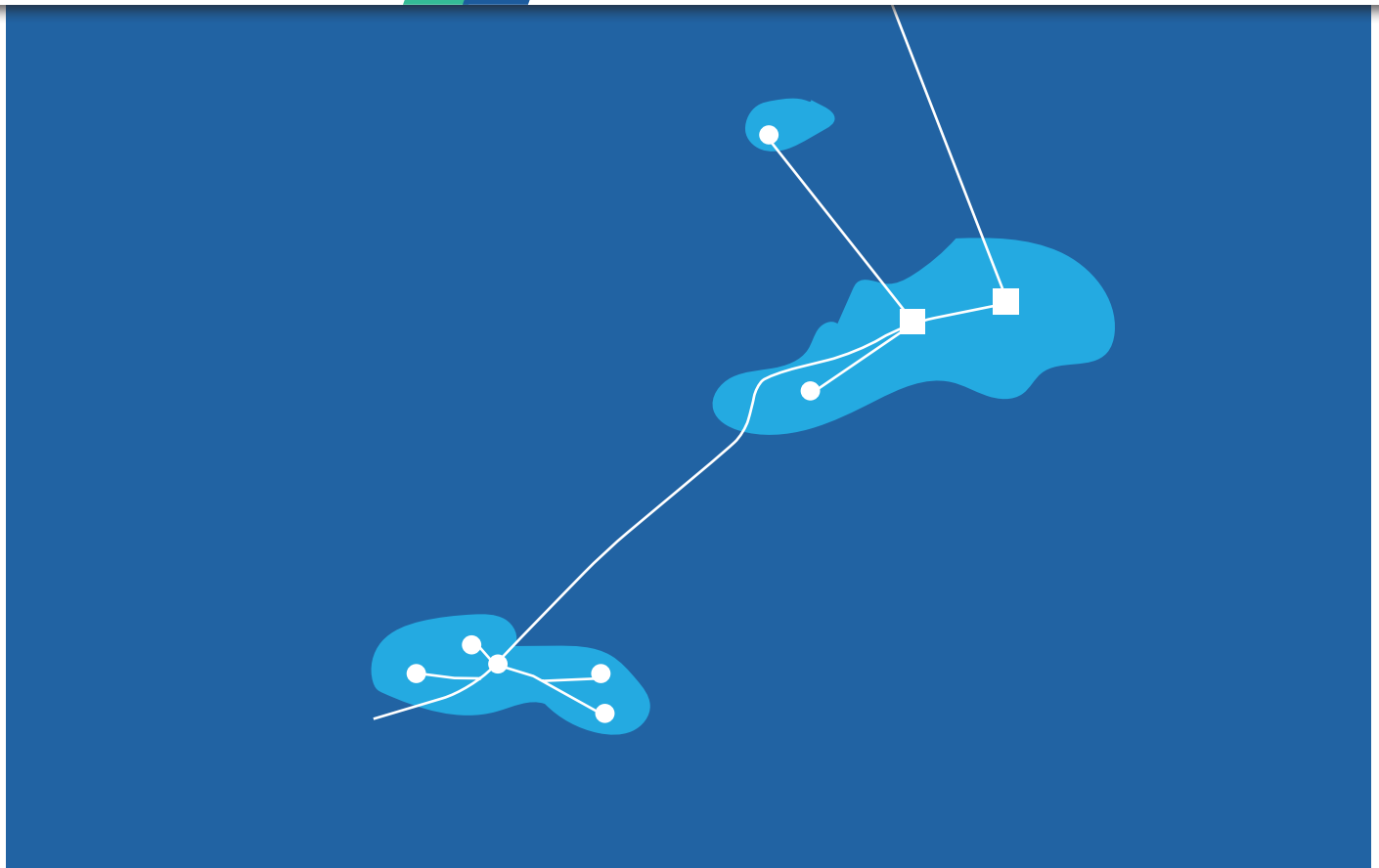
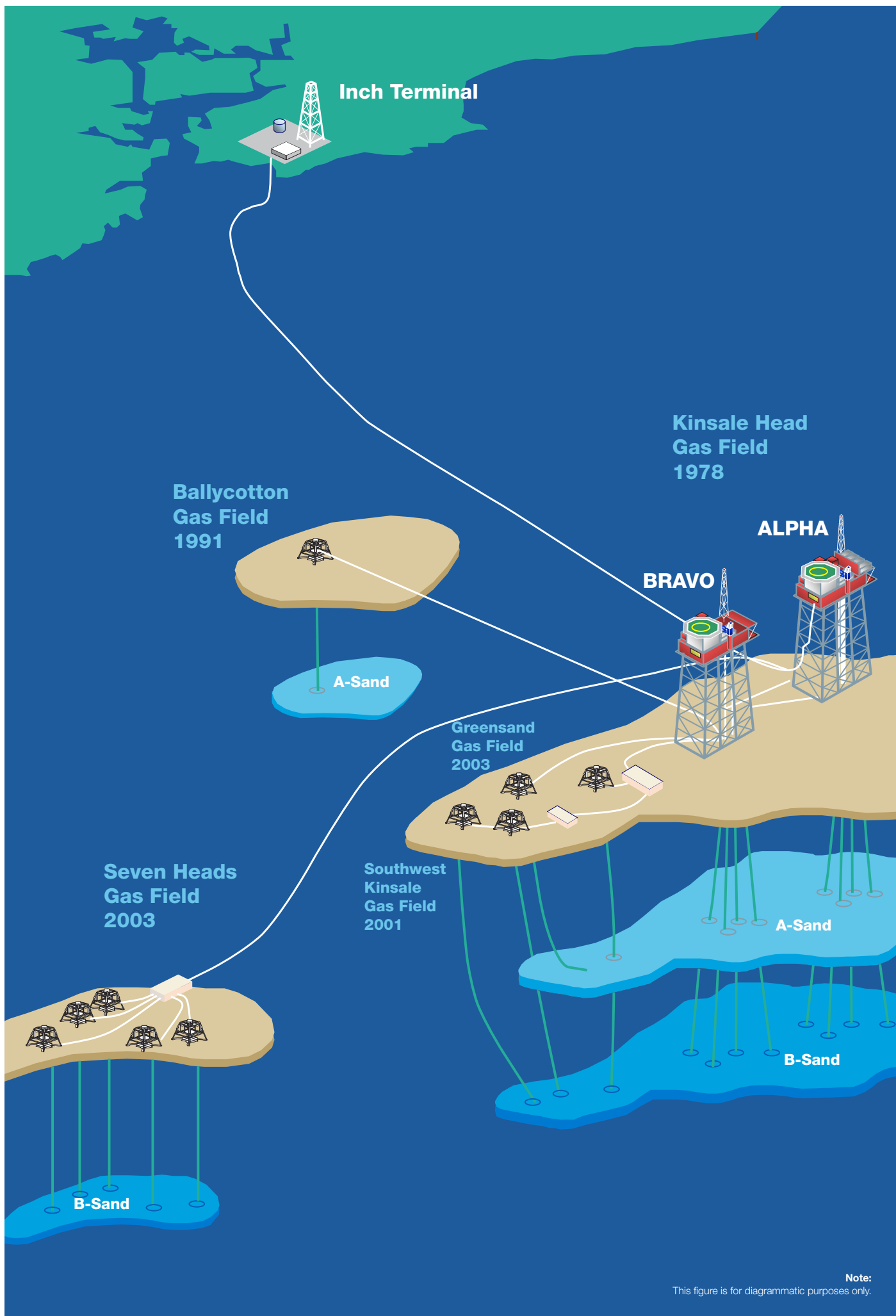




**KINSALE
ENERGY** 

Kinsale Area Decommissioning Project
**Report for the purposes of
Appropriate Assessment Screening
and Article 12 Assessment Screening**





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Appendices

Appendix A

Natura 2000 Site Synopsis Reports

Glossary of Terms

Glossary of Terms

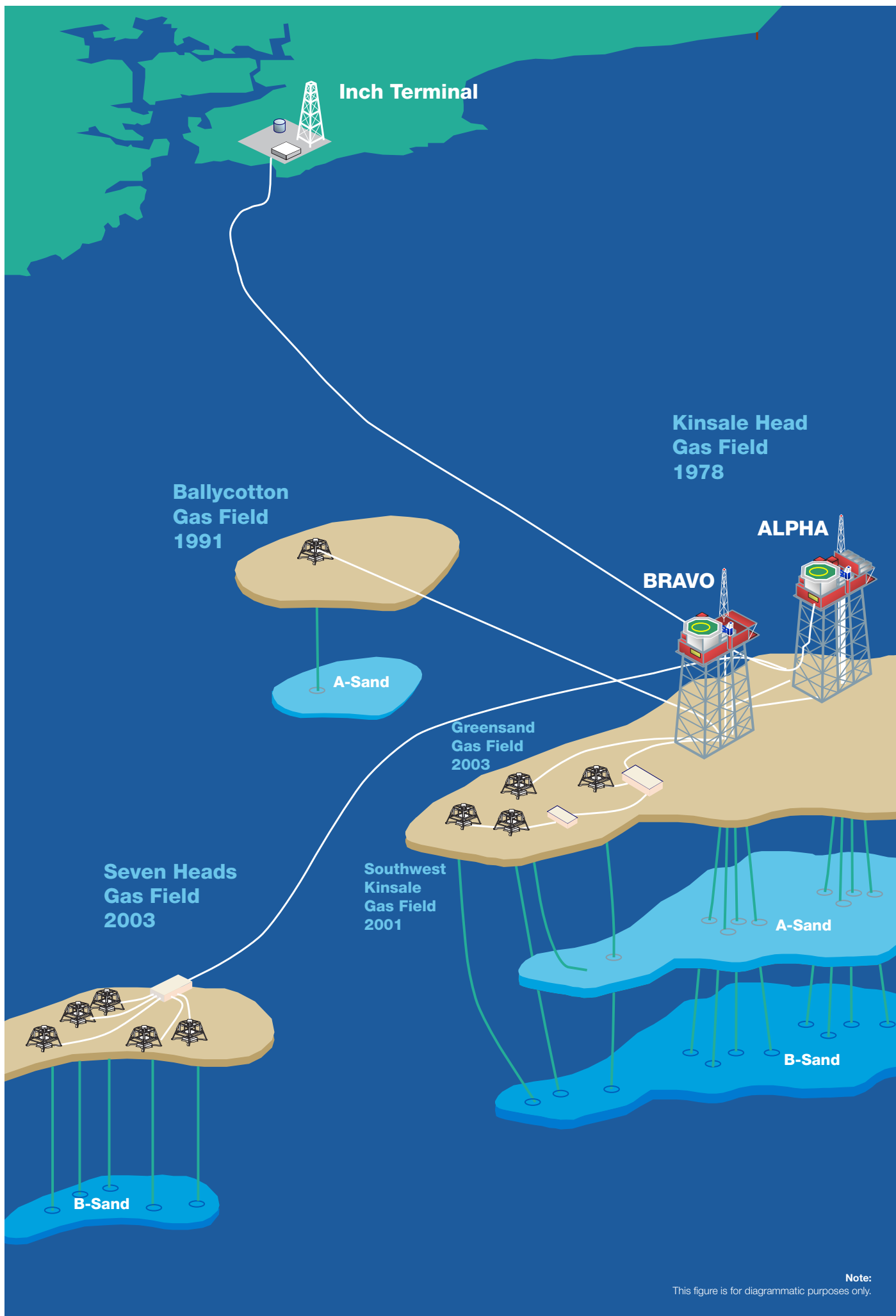
Term	Explanation
AA	Appropriate Assessment
AA Screening Report	This Appropriate Assessment Screening Report
Bathymetry	Measurement of depth of water in oceans, seas, or lakes
Benthic sampling	Sampling taken from ecological region at the lowest level of a body of water such as an ocean or a lake, including the sediment surface and some sub-surface layers
Biotope	Region of a habitat associated with a particular ecological community
Buoyancy cassettes	Enclosed air-filled tanks designed to keep the vessel/equipment they are attached to afloat and prevent it from sinking
CA	Comparative Assessment
CRU	Commission for Regulation of Utilities Water and Energy
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO	Conservation objectives
Concrete mattress	A series of concrete blocks usually connected by polypropylene ropes resembling a rectangular mattress, used for the weighting and/or protection of seabed structures including pipelines
CoP	Cessation of Production: the stage at which, after all economic development opportunities have been pursued, hydrocarbon production ceases.
CSV	Construction Support Vessel
DCCAE	Department of Communications, Climate Action and Environment
DCENR	Department of Communications, Energy and Natural Resources
DECC	Department of Energy & Climate Change (UK)
Decommissioning	Planned shut-down or removal of a building, equipment, plant, offshore installation etc., from operation or usage offshore.
Diesel	A low viscosity distillate fuel
DP	Dynamic Positioning: the use of thrusters and real time positional information to maintain the location of a vessel
DSV	Diving Support Vessel
Flowline	Pipeline carrying unprocessed oil/gas within the oil or gas field area
Freespan	A free span on a pipeline is where the seabed sediments have been eroded, or scoured away leaving a void under the pipeline so that the pipeline is no longer supported on the seabed
GHG	Greenhouse gas
Grout	Particularly fluid form of concrete used to fill gaps, generally a mixture of water, cement, and sand
HGV	Heavy Goods Vehicle
HLV	Heavy-Lift Vessel
ICES	International Council for the Exploration of the Sea

Term	Explanation
IMO	International Maritime Organisation
<i>In situ</i>	In the original place.
Interconnector	Structure which enables energy to flow between networks, refers to international connections between electricity and natural gas networks
IOSEA	Irish Offshore Strategic Environmental Assessment
Jacket	The structure comprising the “legs” of the offshore platform connected together by horizontal and diagonal trusses and usually made of welded tubular steel. The jacket is typically secured to the seabed by piles
KA	Kinsale Alpha platform
KADP	Kinsale Area Decommissioning Project
KB	Kinsale Bravo platform
Kinsale Energy	PSE Kinsale Energy Limited
km	Kilometre: 1,000m, equivalent to 0.54 nautical miles
L _{Aeq}	Sound levels that vary over time which results in a single decibel value which takes into account the total sound energy over the period of time of interest
LPP	Layer polypropylene
LWIV	Light Well Intervention Vessel
Manifold	A pipe or chamber branching into several openings.
Minister	Minister for Communications, Climate Action and the Environment
MODU	Mobile Offshore Drilling Unit
Natura 2000 sites	Natura 2000 is a network of nature protection areas in the territory of the European Union. It is made up of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) designated respectively under the Habitats Directive and Birds Directive.
NIS	Natura Impact Statement
nm	Nautical Mile (1852m = 1 minute of latitude = 1/60 degree of latitude)
NPWS	National Parks and Wildlife Service
NUI	Normally Unmanned Installation: an installation with minimal facilities which is not permanently crewed and is controlled from a remote location (e.g. other platform or shore)
OCNS	Offshore Chemical Notification Scheme
OSPAR	Oslo and Paris Convention
P&A	Plug and Abandon (wells)
Pelagic (fish)	Fish which live in the pelagic zone. The pelagic zone is any water in sea or lake which is neither close to the bottom nor near the shore.
Piece Medium	Method of decommissioning the topside structures which involves the separating of the topsides into a number of medium size pieces for removal with a heavy lift vessel and transported to shore for further dismantling. Also known as ‘reverse installation’.
Plankton	Small and microscopic organisms drifting or floating in the sea or fresh water
PLEM	Pipeline End Manifold
PLONOR	Pose Little or No Risk

Term	Explanation
PSV	Platform supply vessel
PUDAC	Permit to Use or Discharge Added Chemicals
Rigless	A well-intervention operation conducted with equipment and support facilities that precludes the requirement for a rig over the wellbore
ROV	Remotely Operated Vehicle: a small, unmanned submersible used for inspection and the carrying out of some activities such as valve manipulation
SAC	Special Area of Conservation: established under the Habitats Directive
SCANS	Small Cetaceans in European Atlantic waters and the North Sea
SEA	Strategic Environmental Assessment
Seafastened	Action of fastening/securing cargoes on ship with the aim of preventing them from movement while the ship is in transit
Semi-submersible rig	A floating mobile drilling rig supported on a number of pontoons, and typically anchored to the seabed while on station
Shears	Cutting instrument in which two blades move past each other
Shelter	Place giving temporary protection from bad weather or danger
Shut-in	to close off a well so that it stops producing
SOSI	Seabird Oil Sensitivity Index
SPA	Special Protection Area: established under the Birds Directive
Steel jackets	Structural sections made of tubular steel members, and are usually attached to the seabed using piles
Subsea manifold	Large metal piece of equipment made up of pipes and valves, designed to transfer oil or gas
SWK	South West Kinsale
TEG	Triethylene Glycol
Tidal Channel	Portion of a stream that is affected by ebb and flow of ocean tides, in the case that the subject stream discharges to an ocean, sea or strait
Tie-backs	Link between a satellite field and an existing production facility
Topsides	The collective name for the many drilling, processing, accommodation and other modules which when connected together make up the upper section of the platform which rests on the installation jacket
UKCS	United Kingdom Continental Shelf
Umbilical	Cable and/or hose which supplies required consumables to an apparatus
WDC	Western Drill Centre

Section 1

Introduction and Background



1 Introduction and Background

1.1 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, having been in production since 1978. 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 at Inch, Co. Cork (**Figure 1.1**).

Pursuant to section 13 of the Petroleum and Other Minerals Development Act 1960 as amended (1960 Act), two petroleum leases were granted in respect of the Kinsale Area gas fields and facilities: one for the Kinsale Head Field dated 7 May 1970 and one for the Seven Heads Gas Field dated 13 November 2002. Pursuant to the terms of these Petroleum Leases, a plan of development was submitted and agreed with the then Minister in respect of each of Kinsale Head and Seven Heads.

The Kinsale Area gas fields and facilities are coming to the end of their productive life and Kinsale Energy is now preparing Decommissioning Plans setting out the proposals for the decommissioning of the Kinsale Area facilities (the Kinsale Area Decommissioning Project, "**KADP**"). Pursuant to Section 13 of the 1960 Act Kinsale Energy intends to submit the Decommissioning Plans as addendums to the existing plans of development, which were submitted to and agreed with the then Minister under the terms of the Petroleum Leases under Section 13 of the 1960 Act. In accordance with Section 13A of the 1960 Act, this Appropriate Assessment Screening Report ("**AA Screening Report**") has been prepared to accompany the Decommissioning Plans.

This AA Screening Report has been prepared in accordance with the provisions of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) (the "**2011 Regulations**") and in accordance with the requirements of Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the "**Birds Directive**"), Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive).

Sections 4, 5, 6 and 7 of this AA Screening Report consider the implications of the KADP, on its own and in combination with other plans or projects, for European sites in view of the conservation objectives of those sites. It includes a scientific examination of available evidence and data to identify and assess the implications of the KADP for any European sites in view of the conservation objectives of those sites. It considers whether the KADP, by itself and in combination with other plans or projects, is likely to have a significant impact on any European Site.

This AA Screening Report will inform and assist the competent authority, the Minister for Communications, Climate Action and the Environment (the "**Minister**"), in carrying out its screening for Appropriate Assessment as to whether or not the Project is likely to have any significant impacts on any European sites, either alone or in combination with other plans and projects, taking into account their conservation objectives in light of the best scientific knowledge in the field.

The facilities subject to the Decommissioning Plans are:

- The Kinsale Alpha (KA) and Kinsale Bravo (KB) platforms, which includes both their topsides and jackets,
- All subsea and platform wells including the wellhead structures,
- All infield subsea infrastructure associated with the wider Kinsale Area fields (Kinsale Head, South West Kinsale, Greensand, Ballycotton and Seven Heads), including manifolds
- All infield subsea pipelines, umbilicals and protection materials,
- The main export pipeline between KA and the Inch Terminal on the Co. Cork coastline, and

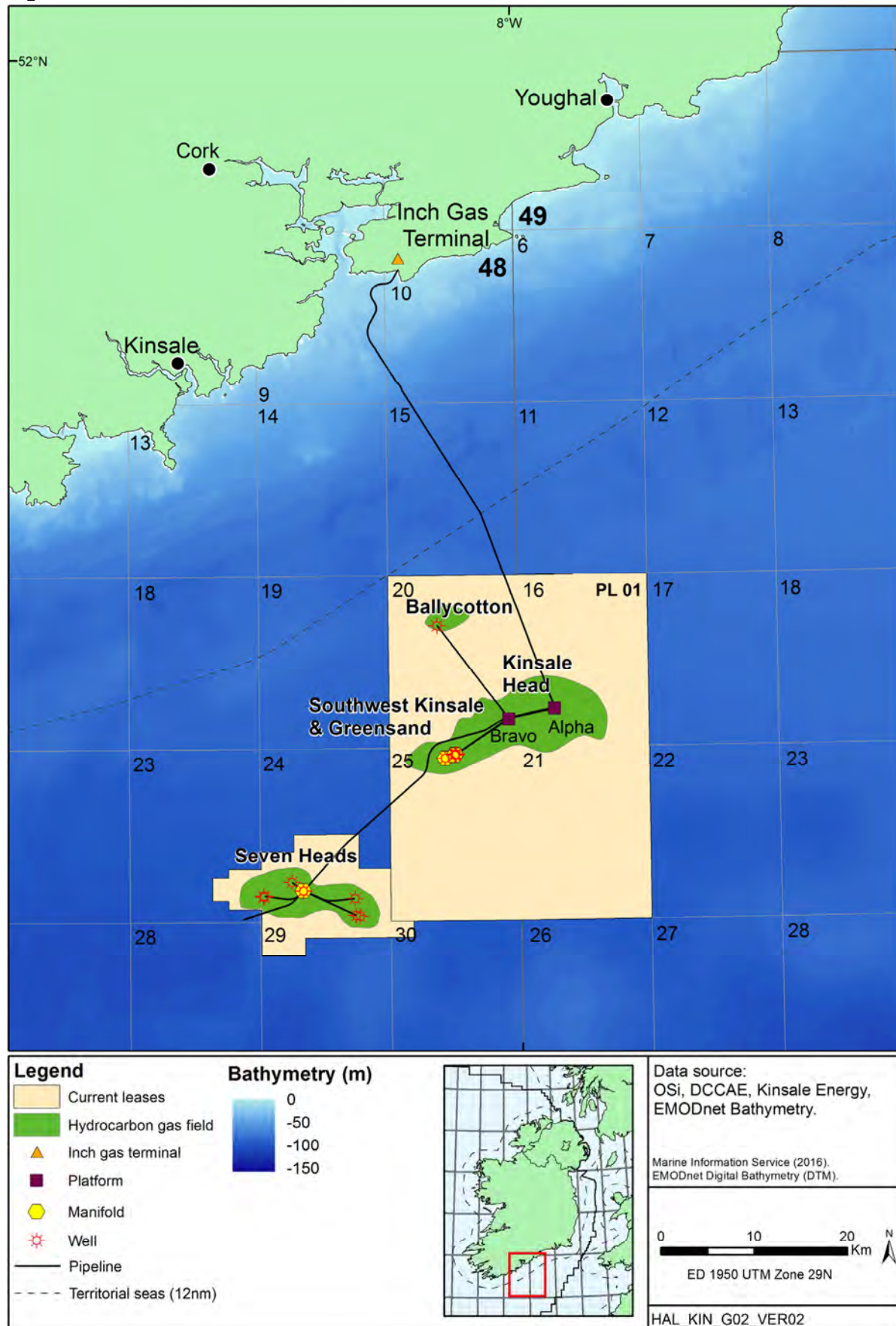
- The 18" export pipeline from Seven Heads to KA.

The Decommissioning Plans do not include the Kinsale Area onshore gas terminal at Inch, Co. Cork, the decommissioning of which is covered by planning permission granted by Cork County Council (planning reference no. 2929/76).

However, this AA Screening Report assesses the impact on Natura 2000 sites of the entirety of the proposed Kinsale Area facilities decommissioning project, including the decommissioning of the onshore gas terminal at Inch.

It is the considered view of the authors of this AA Screening Report (ARUP and Hartley Anderson, on behalf of Kinsale Energy) that the KADP is not likely, by itself or in combination with other plans or projects, to have a significant impact on any European sites in view of their conservation objectives and that there is no reasonable scientific doubt as to this conclusion.

In addition to the requirement to consider potential effects on Natura 2000 Sites under Article 6 of the Habitats Directive, the Directive requires consideration of the potential effects on species listed under Annex IV of the Directive (termed Annex IV species). Under Article 12, Annex IV species are afforded strict protection throughout their range, both inside and outside of designated protected areas. **Sections 7 and 8** of this Report, include an assessment of potential impacts of proposed decommissioning activities on populations of Annex IV species.

Figure 1.1: Location of the Kinsale Area fields and facilities

1.2 Consent Application Process

A two stage consent application process is proposed for both the Kinsale Head gas fields and Seven Heads gas field Decommissioning Plans. 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. It is anticipated that both staged consent applications, for the Kinsale Head gas fields and Seven Heads gas field, will be submitted before cessation of production. The scope of work involved in decommissioning the Kinsale Area facilities, covered by each consent application, is outlined as follows:

- **Works covered in consent application 1:**
 - Facilities preparation: disconnect and degas process plant and pipelines (Pipelines displaced with seawater, and inhibited seawater in the case of the 24" export pipeline and the 18" Seven Heads pipeline).
 - Wells: plug and abandon all platform and subsea wells and removal of any surface component of these wells, including wellhead structures and platform conductors.
 - Platform topsides: complete removal in accordance with OSPAR Decision 98/3.
 - Subsea structures: (e.g. manifolds, wellhead protection structures): full removal in accordance with OSPAR Decision 98/3 including the removal of connecting spool pieces, umbilical jumpers and protection materials.
- **Works covered in consent application 2:**
 - **Platform jackets:** complete removal in accordance with OSPAR Decision 98/3.
 - **Offshore pipelines and umbilicals:** rock cover of freespans only or all exposed sections, and rock cover remaining *in situ* protection materials.
 - **Export pipeline (offshore and onshore section):** fill onshore section with grout (if a viable re-use option is not identified) and rock cover of freespans only or all exposed sections in offshore section.

Decommissioning the Inch Terminal will involve full removal and reinstatement to agricultural use, as per the terms of the site planning permission (Cork County Council planning reference 2929/76). As noted above, this scope of work will not be included in the Decommissioning Plan consent applications.

This AA Screening Report is prepared to cover both staged consent applications, for both the Kinsale Head gas fields and Seven Heads gas field.

1.3 Report Structure

This report contains the information required by the consenting authority, the Minister, to undertake screening to determine if a full Appropriate Assessment (AA) of the KADP is required. This report is based on a desk study.

The Appropriate Assessment screening information presented in this report is as follows:

- Legislative background, guidance and data sources (**Section 2**)
- Description of the project (**Section 3**)
- Identification of relevant Natura 2000 sites (**Section 4**)
- Screening for likely significant effects (**Section 5**) and
- Appropriate Assessment Screening Statement (**Section 6**)

As detailed in **Section 1.1**, in addition to the requirement to consider potential effects on Natura 2000 Sites under Article 6 of the Habitats Directive, the Directive requires consideration of the potential effects on species

listed under Annex IV of the Directive (termed Annex IV species). The Annex IV Species screening information presented in this report is as follows:

- Screening for effects on Annex IV Species (**Section 7**) and
- Article 12 Screening Conclusions (**Section 8**).

The screening assessments will consider the potential for significant effects to be caused by activities associated with the KADP in relation to both relevant Natura 2000 sites and Annex IV species. If, based upon best scientific knowledge, there are aspects of the project that are likely to have a significant effect on any Natura 2000 site or Annex IV species, then further analysis in the form of an Appropriate Assessment or Annex IV Species (European Protected Species) Impact Assessment will be required. The conclusions to each screening assessment are provided in **Sections 6 and 8**, such that the Minister can make a final determination with regard to the outcome of the screening process.

Section 2

Legislative Background, Guidance and Data Sources



2 Legislative Background, Guidance and Data Sources

2.1 Article 6 of the Habitats Directive

According to the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (1979/409/EEC and 2009/147/EC), member states are required to establish a Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites includes Special Areas of Conservation (SACs, including candidate SACs) and Special Protection Areas (SPAs, including proposed SPAs).

SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex II birds and other regularly occurring migratory birds and their habitats. The habitats and species, for which each site is selected, are the *qualifying interests* of the site.

Conservation objectives for the site are defined for these qualifying interests. Site-specific conservation objectives aim to define favourable conservation conditions for a particular habitat or species at that site.

A key requirement of the Habitats Directive is that the effects of any plan or project, alone, or in combination with other plans or projects, on the Natura 2000 site network, should be assessed before any decision is made to allow that plan or project to proceed. This process is known as appropriate assessment (AA).

Article 6(3) of the Habitats Directive states that:

“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”

This provision is transposed into Irish law by Part 5 of the *European Communities (Birds and Natural Habitats) Regulations, 2011* (S.I. No. 477 of 2011), (as amended). Regulation 42(1) of the 2011 Regulations provides for screening for Appropriate Assessment as follows:

“A screening for Appropriate Assessment of a plan or project for which an application for consent is received, or which a public authority wishes to undertake or adopt, and which is not directly connected with or necessary to the management of the site as a European Site, shall be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that plan or project, individually or in combination with other plans or projects is likely to have a significant effect on the European site.”

Regulations 42(6) and 42(7) provide for the outcome of screening for Appropriate Assessment as follows: *The public authority shall determine that an Appropriate Assessment of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site. Alternatively, a public authority shall determine that an Appropriate Assessment of a plan or project is not required where: the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it can be excluded on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site.*

2.1.1 EU Guidance and Approach to Article 6 Assessment

The European Commission Guidance *Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* prescribes a staged process, as set out below, the need for each stage being dependent on the outcomes of the preceding stage. The sequence is designed to test the potential effects of plans and projects on European sites:

- a) Screening for Appropriate Assessment
- b) Appropriate Assessment
- c) Assessment of Alternative Solutions
- d) Assessment where no alternative solutions exist and adverse impacts remain, i.e. the Imperative Reasons of Overriding Public Interest test, and compensatory measures.

Stage 1 of the process is referred to as screening for Appropriate Assessment and identifies whether the proposed plan or project, either on its own or in combination with other plans or projects, would be “*likely to have a significant effect*” upon any European site. A likely effect is one that cannot be ruled out on the basis of objective information. The test is a ‘possibility’ of effects rather than a ‘certainty’ of effects. The test of significance is whether a plan or project could undermine the site’s conservation objectives.

If effects are considered likely to be significant, potentially significant or uncertain, or if the screening process becomes overly complicated, the process must proceed to Stage 2: Appropriate Assessment, with the preparation of a Natura Impact Statement to inform the Appropriate Assessment that is to be conducted by the competent authority.

2.2 Article 12 of the Habitats Directive

Article 12 of the Habitats Directive is aimed at the establishment and implementation of a strict protection regime for species listed in Annex IV within the whole territory of Member States (i.e. in locations outside protected areas as well as inside their boundaries).

Article 12 of the Directive states:

1. “Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range, prohibiting:
 - (a) all forms of deliberate capture or killing of specimens of these species in the wild;
 - (b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;
 - (c) deliberate destruction or taking of eggs from the wild;
 - (d) deterioration or destruction of breeding sites or resting places.
2. For these species, Member States shall prohibit the keeping, transport and sale or exchange, and offering for sale or exchange, of specimens taken from the wild, except for those taken legally before this Directive is implemented.
3. The prohibition referred to in paragraph 1 (a) and (b) and paragraph 2 shall apply to all stages of life of the animals to which this Article applies.
4. Member States shall establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a). In the light of the information gathered, Member States shall take further research

or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.”

Under Article 12 of the Habitats Directive, all species listed in Annex IV are afforded strict protection, prohibiting deliberate capture, disturbance and destruction of all life stages and deterioration or destruction of breeding sites or resting places. In addition, species listed in Annex II are afforded the same protection, even when not present in numbers which result in the designation of a Natura 2000 site.

As required by Article 12 of the Habitats Directive, the potential impact to species listed on Annex IV of the Directive must be assessed prior to a project receiving consent.

The Article 12 assessment presented in **Section 7** has been prepared with reference to the European Communities (Birds and Natural Habitats) Regulations 2011 and also to the ‘*Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC*’ (EC, 2007b), which states that:

‘The interpretation of Article 12 has to take into consideration the objective of Directive 92/43/EEC set out in Article 2, which applies, without distinction, to all Annexes. Consequently, strict protection measures adopted under Article 12 should aim to fulfil the main objective of the Directive by contributing to the maintenance or restoration, at favourable conservation status, of Annex IV (a) species of Community interest, while taking into account economic, social and cultural requirements and regional and local characteristics’ (EC, 2007b)’.

This report considers whether or not the proposed decommissioning works will result in the deliberate disturbance or destruction of any of the species listed in Annex IV (a) of the Habitats Directive that may be present in the study area. The assessment takes into account the status and sensitivities of relevant Annex IV species to potential impacts associated with decommissioning activities.

Sections 7 and 8 of this report provide information relevant to the screening for potential effects on Annex IV species, in accordance with Article 12 of the Habitats Directive

2.3 Legislative Guidance and Data Sources

This report has been compiled with regard to the following guidance documents where relevant:

- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001). European Commission, 2001;
- Communication from the Commission on the Precautionary Principle, Office for Official Publications of the European Communities, Luxembourg (EC, 2000);
- Marine Natura Impact Statements in Irish Special Areas of Conservation A Working Document April 2012. The National Parks & Wildlife Service of the Department of Arts, Heritage & the Gaeltacht;
- Managing Natura 2000 Sites: The Provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg (EC, 2015);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010). Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodical Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate-General, 2001);
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPW 1/10 and PSSP 2/10;

- Guidelines for Good Practice Appropriate Assessment of Plans under Article 6(3) Habitats Directive (International Workshop on Assessment of Plans under the Habitats Directive, 2011);
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC; and
- The Status of EU Protected Habitats and Species in Ireland 2013 (Department of Arts, Heritage and the Gaeltacht, 2013).

Sources of information from government bodies that were used to collect relevant data are listed below:

- Ordnance Survey of Ireland mapping from www.osi.ie;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
 - The Natura 2000 network Data Forms;
 - Site Synopses; and,
 - Site Specific Conservation Objective data.

Refer to **Section 9** *References* for details on any papers or surveys that were consulted while carrying out this assessment.

There were also a number of bird surveys and on-site inspections undertaken for the purpose of the AA Screening Report.

The preparation of the AA Screening Report was undertaken with reference to European and national case law.

Section 3

Description of the Project

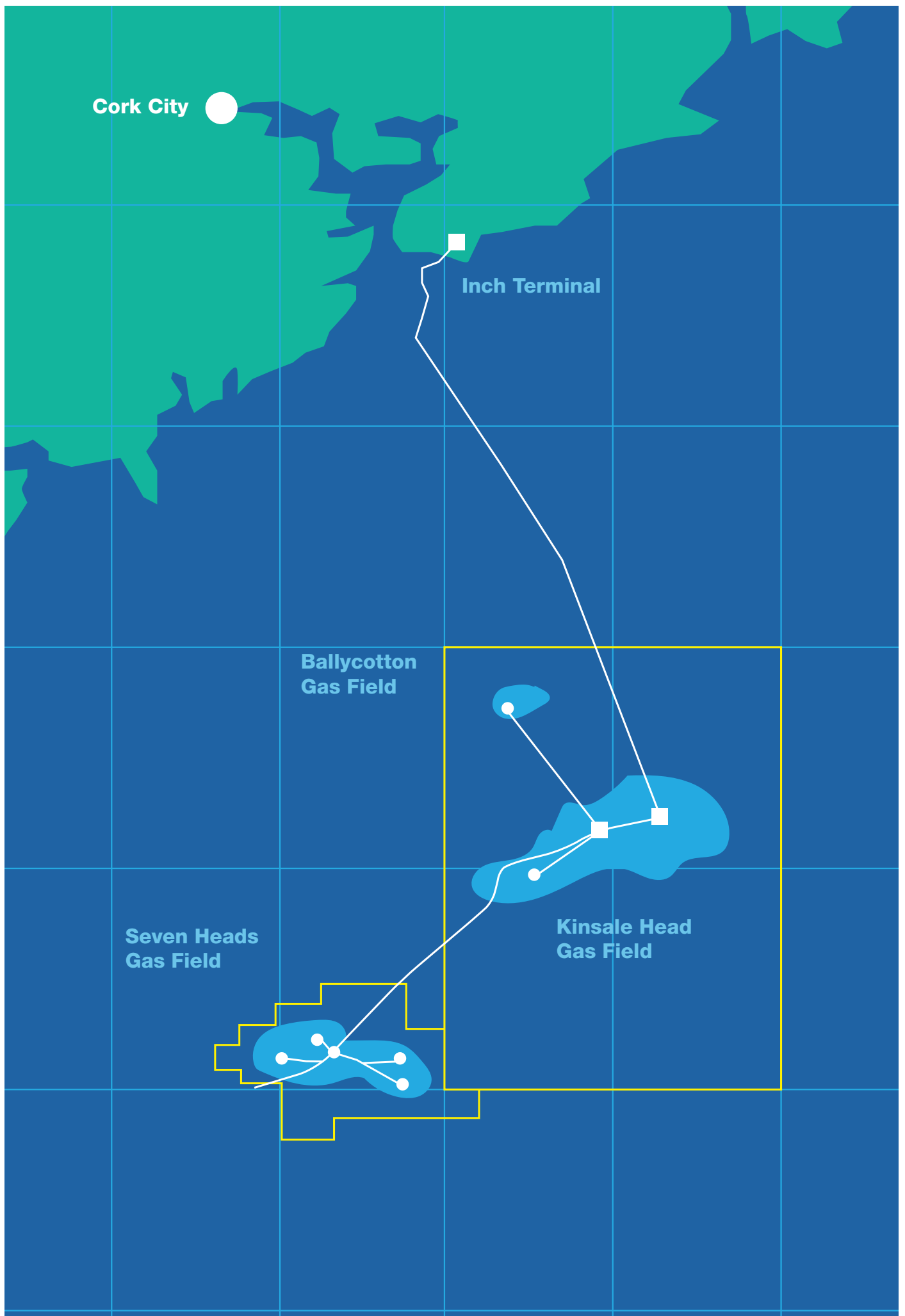
Cork City

Inch Terminal

**Ballycotton
Gas Field**

**Seven Heads
Gas Field**

**Kinsale Head
Gas Field**



3 Description of the Project

3.1 Introduction

This section provides an inventory and description of the Kinsale Area infrastructure and the decommissioning options identified.

3.2 Project Background

PSE Kinsale Energy Limited (Kinsale Energy) is preparing for the decommissioning of the Kinsale Area gas facilities, which are coming to the end of their productive life, some having been in production since 1978. The Kinsale Area gas fields and facilities are located in the Celtic Sea, between some 40 and 70km off the County Cork coast and are connected to an onshore terminal at Inch, Co. Cork by a 24" main export pipeline. The offshore Kinsale Area facilities to be decommissioned are detailed in **Table 3.1** and all facilities to be decommissioned, including the pipelines and Inch terminal are shown on **Figure 3.1**.

The Kinsale Head gas field was discovered in 1971 and was brought on-stream in 1978 under a Plan of Development approved by the then Department of Industry and Commerce. 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 discovery of the field was the basis for the development of the natural gas industry in Ireland and Kinsale Head was Ireland's only source of gas until the installation of an interconnector pipeline from Scotland in 1993.

Following the Kinsale Head discovery, there was extensive exploration of the Celtic Sea with ~90 wells drilled, the last was the Middleton well in Block 49/11 drilled by Kinsale Energy in 2015. However, despite the intensive exploration effort, no other large fields have been discovered, although a number of smaller gas fields have been commercially exploited as subsea tie-backs to Kinsale Head.

The development of the smaller gas fields, which would not have been economic on a stand-alone basis, and technical modifications to the Kinsale Head facilities (e.g. installation of compression), have prolonged the life of the main field which is currently expected to remain viable for a further 2-3 years even at current low production rates and pressures.

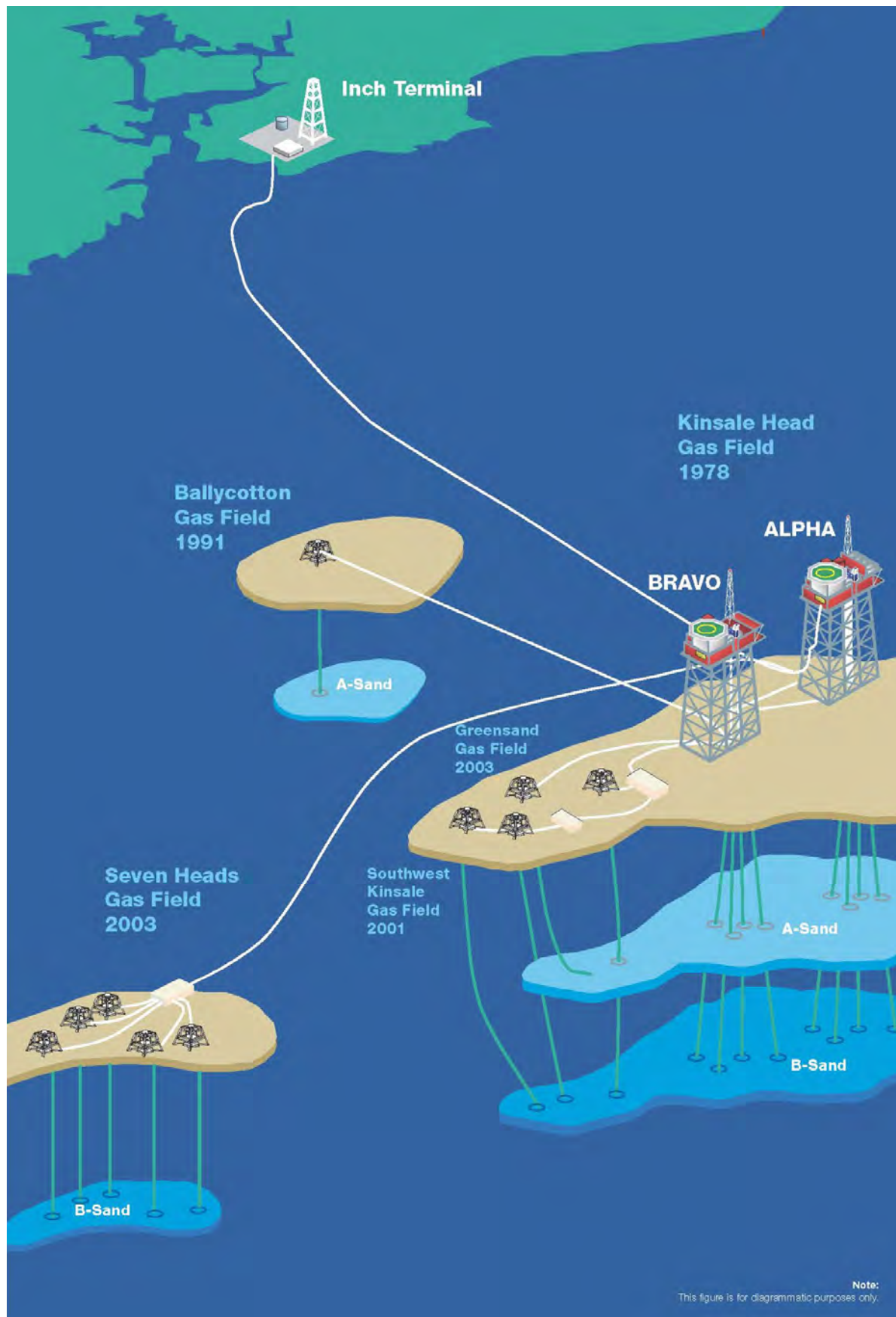
Table 3.1: Summary of Development History for the Kinsale Area Fields

Lease	Field	No. of Wells	Facilities	Date/First Production	Status (2017)
OPL-01	Kinsale Head	14	<u>Kinsale Alpha</u> (Manned Platform with production, drilling & accommodation) 7 x Platform Wells	1978	Producing
			Compression added	1992	
			<u>Kinsale Bravo</u> (Manned Platform with production, drilling & accommodation) 7 x Platform Wells	1979	Producing (1 Well Shut-In)
			Compression added	1993	
			Kinsale Bravo Converted to Normally Unmanned Installation	2001	
	Ballycotton	1	1 x Subsea Well	1991	Shut-In
	Southwest Kinsale *	3	3 x Subsea Wells	1999 – 2001	Producing
	Greensand	1	1 x Subsea Well	2003	Producing
Seven Heads	Seven Heads	5	1 x Subsea Manifold 5 x Subsea Wells	2003	Producing (1 Well Shut-In)

*Note: * In 2001 Southwest Kinsale was redeveloped to enable gas from the adjacent offshore gas fields to be stored in the reservoir. In 2006, further modifications were made to convert the field into an offshore storage facility for gas from the onshore network.*

*All associated pipelines and umbilicals are detailed in **Section 3.3***

In addition to those wells numbered above, there are four previously abandoned Exploration & Appraisal wells which require removal of their redundant wellheads as part of the KADP.

Figure 3.1: The Kinsale Area gas fields and facilities

3.3 Description of Existing Facilities

The Kinsale Area facilities to be decommissioned are detailed below in **Section 3.3.1** to **Section 3.3.4**.

3.3.1 Kinsale Area Platforms

There are two Kinsale Area platforms, namely Kinsale Alpha and Kinsale Bravo.

The Kinsale Alpha (KA) platform was installed in 1977 and incorporated drilling, production and accommodation facilities (**Figure 3.2**). KA comprises an eight-leg piled steel jacket with a total weight in air of approximately 8,100 tonnes. The platform jacket supports the platform topsides of approximately 4,700 tonnes. Maximum accommodation is 43 persons, with present routine manning levels around 15-20 persons. Processing of gas for all of the fields in the Kinsale Area is undertaken at KA. The gas is exported from KA to the Inch terminal on the Co. Cork coastline, approximately 50km to the north.

The Kinsale Bravo (KB) platform was also installed in 1977 and was originally almost identical to KA. An eight-leg piled steel jacket with a total weight in air of some 7,600 tonnes supports the platform topsides of approximately 3,700 tonnes. Production from KB, which includes produced gas from the Kinsale Head, Southwest Kinsale, Greensand and Ballycotton fields, is routed to KA for processing and export. Accommodation on KB was originally for 46 persons but it was converted to a Normally Unmanned Installation (NUI) in 2001, with emergency accommodation for 9 persons.

There is an exclusion zone (ref S.I. No. 285/1977), for other sea users, bounded by a line which is 500 metres at all points from a straight line joining the KA and KB platforms. This results in an elongated 500 metre exclusion zone around the KA, KB platforms and the entire stretch between them.

Figure 3.2: Kinsale Alpha



3.3.2 Platform and Subsea Wells

There are a total of 28 wells to be decommissioned, 14 associated with the KA and KB platforms and the remaining 14 made up of 10 subsea development wells in satellite fields and 4 previously abandoned exploration wells in the Kinsale Area which require their wellheads to be removed.

All development wells are completed with a Xmas Tree steel frame structure, located on the seabed for the subsea development wells and on the platform cellar deck for the platform wells.

3.3.3 Subsea Infrastructure

Export pipeline

The main export pipeline from KA to the Inch Terminal consists of a 55.57km, 24" concrete coated pipeline installed in 1977. The pipeline is mainly surface laid but with some buried sections and rock placement at strategic locations. The pipeline is buried from 2km seaward of the landfall to the landfall and for the 1.2km inland from the landfall as far as the Inch Terminal.

KA to KB pipelines

Two pipelines connect the KA and KB platforms, a 24" concrete coated pipeline (4.96km) and a 12" three layer polypropylene (LPP) coated pipeline (5.11km). The pipelines were installed in 1977 and 2001 respectively and are both surface laid, with rock having been placed at strategic locations along the 24" pipeline.

Satellite gas field pipelines and umbilicals

There are numerous pipelines and umbilicals (control cables) connecting each well in the satellite gas fields back to KA or KB. These include:

- Southwest Kinsale pipeline and umbilical – 6.96km 12" pipeline, partially trenched and buried, with rock cover where trenching depths could not be reached, and concrete mattresses on its approach to the subsea structures
- Extension pipeline and umbilical to Western Drill Centre – 1.16km 12" pipeline, rock covered along the entire length
- Greensand pipeline and umbilical jumper – 7.02km 10" pipeline, rock covered along the entire length except its approach to the subsea structure where it is mattress protected
- Ballycotton pipeline and umbilical – 12.69km 10" pipeline, buried throughout most of its length with some exposed sections and mattress protection, and 13.00km umbilical trenched separately to the pipeline
- Seven Heads export pipeline and umbilical – 35.00km 18" pipeline, variously buried, exposed, rock covered or mattress protected
- 6no. Seven Heads flow lines and umbilicals – 0.06-7.45km 8" pipelines, all rock covered or concrete mattress protected

Subsea Structures

There are 9 subsea structures in the Kinsale Area which are to be decommissioned. These include:

- South West Kinsale valve skid (10.5Te steel structure with 220Te concrete protection blocks),
- South West Kinsale intermediary tee (8.4Te steel structure with 176Te concrete protection blocks),

- Greensand Pipeline End Manifold (PLEM) (9.2Te steel structure with 220Te concrete protection blocks),
- Western Drill Centre PLEM (9.2Te steel structure with 220Te concrete protection blocks),
- Seven Heads manifold (190Te steel structure), and
- 4 well head protection structures (each 25Te steel structure with 133Te concrete protection blocks).

3.3.4 Onshore Pipeline and Terminal

The onshore Inch Terminal comprises a site area of 2.3 Ha, some 220m² (9.7%) of which is occupied by buildings, a 20m high vent stack, a 98m high communications tower with concrete foundations, and access road. **Figure 3.3** illustrates an aerial view of the terminal site area. The onshore Inch Terminal is a small sized onshore terminal used for metering and does not include any gas processing as all gas leaving KA platform already meets the Commission for Regulation of Utilities (CRU) Gas Quality Specification for export to the Gas Networks Ireland onshore grid.

Figure 3.3: Aerial Photo of Inch Terminal

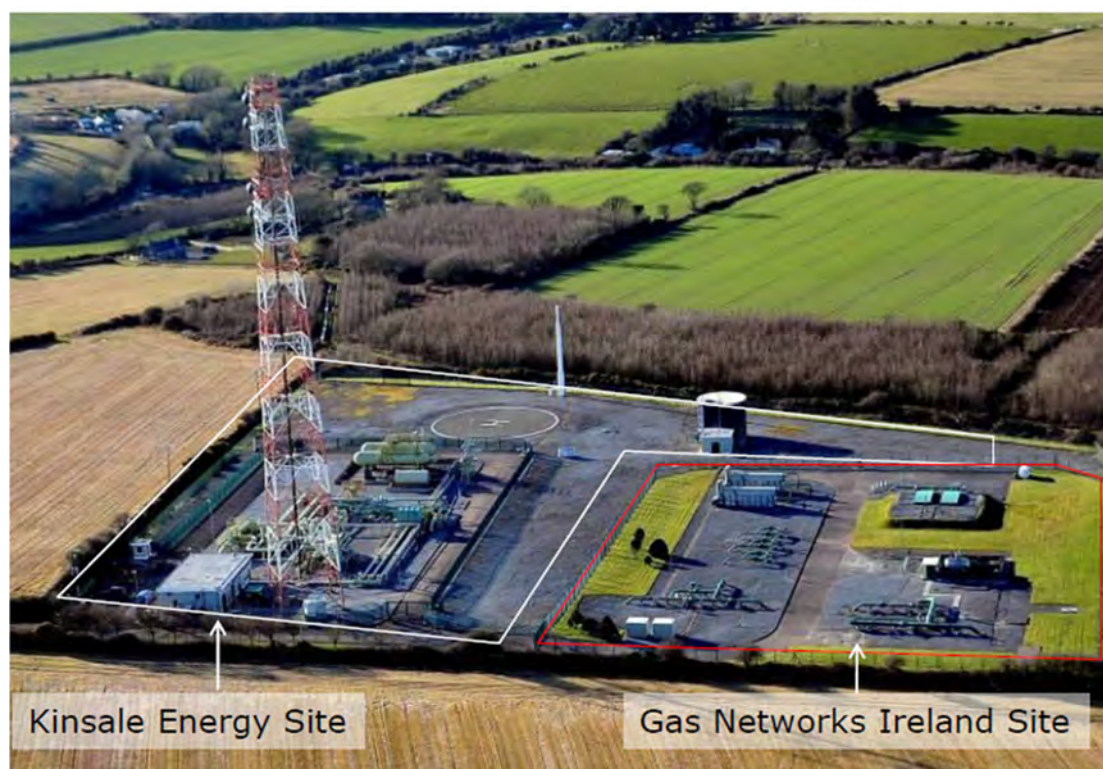


Table 3.2 below outlines the detailed description of the relevant components and dimensions of the Inch Terminal.

Table 3.2: Inch Terminal Detail

Terminal	Description	Dimensions
Inch Terminal	Onshore gas terminal equipment: <ul style="list-style-type: none"> • Gas lines, vessels & associated equipment, pipework, instrumentation & cabling • Tri-Ethylene (TEG) Storage Tanks 	Site area: 1.66ha (excluding main access road – 0.64ha)

Terminal	Description	Dimensions
	Buildings: <ul style="list-style-type: none"> Terminal Building; a single storey concrete building with precast concrete roof, containing rooms including a battery room, gas chromatograph room, control room, canteen and toilet Firewater Pump house Other <ul style="list-style-type: none"> Internal Roadways Communications Tower Helipad (not used) Cold Vent Stack Firewater Tank Foul sewer drain and septic tank Surface water drains and soakaways Site well Three phase mains (ESB) supply 	Terminal building: 215m ² Firewater Pump House – 8m ² Communications Tower – 98m high with concrete foundations Vent Stack – 20m high 16" vent

The onshore pipeline is the onshore section of the main export pipeline which connects KA to the Inch Terminal. It is a 24" steel, concrete coated pipeline buried at a depth of approximately 1.2m for a distance of 1.2km from Inch beach where it comes ashore to the terminal.

3.4 Approach to Decommissioning

It is expected that the economic extraction of gas will no longer be viable by approximately 2020/2021 (i.e. the point of Cessation of Production, CoP¹), whereupon the fields will be shut-in, the wells plugged and abandoned and the associated facilities decommissioned as described below.

There are certain limitations to the potential options for the decommissioning of the Kinsale Area facilities (e.g. OSPAR Decision 98/3 which precludes decommissioning of platforms of this type and size *in situ*), though within the options proposed, a number of decommissioning methods are available. The options for pipeline and umbilical decommissioning were subject to a number of technical and environmental studies, including a Comparative Assessment (Kinsale Area Decommissioning Project Comparative Assessment Report 253993-00-REP-08). The chosen options considered for the facilities are:

- Facilities preparation: disconnect and degas process plant and pipelines (pipelines displaced with seawater, and inhibited seawater in the case of the 24" export pipeline and the 18" Seven Heads pipeline).
- Wells: plug and abandon all platform and subsea wells and removal of any surface component of these wells, including wellhead protection structures and platform conductors.
- Platform topsides: complete removal of topsides either by single lift using a conventional or specialist heavy-lift vessel (HLV), or multiple lifts using a smaller HLV after cutting the topsides into sections, in accordance with OSPAR decision 98/3.
- Subsea structures: (e.g. manifolds, wellhead protection structures): full removal in accordance with OSPAR decision 98/3 including the removal of connecting spool pieces and umbilical jumpers, and associated protection measures, for recycling/disposal.

¹ Cessation of Production: the stage at which, after all economic development opportunities have been pursued, hydrocarbon production ceases

- Platform jackets: complete removal by single lift using a conventional or specialist HLV, flotation, or multiple lift by smaller HLV by cutting the jacket into sections, in accordance with OSPAR decision 98/3.
- Offshore pipelines, umbilicals and protection materials: leave *in situ*, rock cover of freespans only or all exposed sections, and rock cover remaining *in situ* protection materials.
- Export pipeline (offshore and onshore section): leave *in situ*, fill onshore section with grout (if a viable re-use option is not identified) and rock cover of freespans only or all exposed sections in offshore section.
- Inch terminal: full removal of facilities and reinstatement of the site to the original contours and to agricultural use, as per the terms of the site planning permission (Cork County Council planning reference 2929/76).
- Post-decommissioning survey: A debris clearance and pipeline route survey will be undertaken to confirm the completion of the decommissioning operations.

The proposed decommissioning activities associated with each of the above facilities is outlined below and summarised in **Table 3.3**.

Table 3.3: Summary of proposed decommissioning options for the KADP infrastructure

Facility	Decommissioning Option Assessed	Method	Vessel Type ²
Platform Wells	Plug & Abandon	“Thru-tubing”	n/a – wells abandoned “rigless”
Subsea Wells			a. Semi-submersible rig b. Light well intervention vessel / semi-submersible rig
Platform Topsides	Full Removal	1. Single Lift	a. Specialist HLV b. Conventional HLV
		2. Piece-medium (reverse installation)	Conventional HLV
Platform Jackets	Full Removal	1. Single Lift	a. Specialist HLV b. Conventional HLV c. Flotation
		2. Multiple Lift	Conventional HLV
Pipelines, Umbilicals and protection materials	Leave <i>in situ</i>	Offshore: 1. Rock cover pipe ends and free spans 2. Rock cover pipe ends and all exposed sections • Note export pipeline will be filled with inhibited water if re-use identified Onshore: Fill with inhibited water, followed by grout if no re-use option identified	Rock placement vessel with remotely operated vehicle (ROV) supervision n/a

² 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 below.

Facility	Decommissioning Option Assessed	Method	Vessel Type ²
Subsea structures	Full Removal	Single Lift	DSV
Inch Terminal	Full Removal	Demolition and removal of all above facilities on site and reinstatement of the site to original ground condition	

The final disposal route and destination for items removed from the field, whether for recycling or disposal, is yet to be confirmed. A number of licensed sites within Ireland, UK, Norway and the Netherlands (up to a distance of 700nm from the Kinsale Area, considered a worst case distance from the disposal site) have currently been identified for recycling or disposal of the various items removed from the off-shore infrastructure. Material removed from the Inch terminal site will be disposed of locally, where possible. The selection of the licensed recycling and disposal sites will be made when the decommissioning contractor is appointed.

3.4.1 Wells

The 14 platform wells (7 on KA / 7 on KB) and 10 subsea wells will be decommissioned as follows –

Platform Well Abandonment Main Steps

- Re-enter well and displace wellbore to sea water;
- Install cement plugs downhole;
- Cut and recover 7" tubing ~ 150ft below seabed;
- Remove Xmas Tree;
- Recover conductor and casings.

Subsea Well Abandonment Main Steps

- Re-enter well and displace well bore to seawater;
- Slickline thru-tubing cementing and cutting and recovery of tubing ~400-600ft below seabed;
- Recover 4½" tubing and remedial cementing of 9⅝" section (well 48/24-8 only);
- Remove Xmas Tree;
- Recover conductor and casings.

The well abandonment activities to be carried out will be covered in a specific Well Work Safety Case to be submitted to the Commission for Regulation of Utilities (CRU) in accordance with Safety Case Guidelines.

The platform wells will be decommissioned using a modular rigless solution, all subsea wells will be decommissioned from a semi-submersible mobile offshore drilling unit (MODU) and/or a light well intervention vessel (LWIV). Well decommissioning will take 155 days for the platform wells and up to 159 days for the subsea wells (including a 25% contingency).

The four gravity-based well head protection structures at South West Kinsale and Greensand will need to be removed prior to the subsea well abandonment.

3.4.2 Kinsale Area Platforms

3.4.2.1 Offshore Facilities Preparatory Works

Prior to decommissioning of the platforms, preparation works, such as cleaning and topsides preparation and disconnecting and degassing all process plant and pipelines is required. All of these works will be undertaken from the Kinsale Area platforms.

Topsides Preparatory Works

Following Cessation of Production (CoP) the KA and KB platform topsides will be purged and hydrocarbon free.

Cleaning and topsides preparation, following Cessation of Production (CoP), is the work required on all systems, plant and equipment to ensure that, the platform is free of hydrocarbon fuels, gases and removable hazardous materials. This ensures that during preparations and final removal of the topsides, no hazards from the production, operating or cleaning elements remain and that the topsides are handed over in a clearly defined and documented condition to facilitate topsides removal.

Initially, pipework and vessels on the topsides will be isolated from the wells, purged with nitrogen gas and vented to the atmosphere to ensure they are free of any residual natural gas.

Volumes of waste (water and corrosion debris (iron)) from the topsides cleaning are expected to be small as the hydrocarbons produced are dry natural gas (e.g. no sludges or solid naturally occurring radioactive materials (NORM) are present). These wastes will not be discharged to sea and along with any residual inventories of diesel, chemicals, condensate or aviation fuel, will be collected for onshore disposal under Kinsale Energy's existing waste management procedures.

Asbestos identified on the platforms (mainly building cladding material) will remain on the topsides and be taken away during the topsides removal. Asbestos and other hazardous waste will be handled and disposed of at appropriately licensed facilities in accordance with all relevant legislation. Contractors will be required to strictly adhere to all relevant legislation and guidelines in this regard.

An overview of the waste generated in cleaning the topsides, prior to the overall removal of the topsides to shore, is summarised in **Table 3.4**.

Table 3.4: Overview of topside cleaning waste generated

Waste Type	Composition of Waste	Disposal Route
On-board hydrocarbons	Fuels and lubricants: <ul style="list-style-type: none">• Diesel• Heli-fuel (Jet A1)• Lubricating Oils	Fuels and lubricants will be transported onshore for re-use/ disposal within Ireland

Waste Type	Composition of Waste	Disposal Route
Other hazardous materials & Waste Chemicals	Hazardous waste such as: <ul style="list-style-type: none"> Batteries Fluorescent tubes (Mercury) Fire Detectors (radioactive waste) Fire extinguishants Refrigerant gases TEG Hydraulic Fluid HW540 v2 BOP fluid (Erifon HD856) (1% concentration).	Waste chemicals, and other hazardous materials will be transported ashore for re-use/disposal within Ireland or Europe Inventories of spare operating chemicals used e.g. (Tri-Ethylene Glycol (TEG) will be run down to minimum levels prior to Cessation of Production)
Original paint coating	The potential presence of lead based paints.	May give off toxic fumes / dust if cutting is used so appropriate safety measures will be taken. Painted items will be disposed of appropriately onshore with consideration given to any toxic components.

Pipelines Degassing and Umbilicals Contents Displacement

It is planned to remove gas from the pipelines shortly after CoP by displacing the contents of the pipelines into the subsea wells using seawater from the platforms. Surfactants may also be used to clean the pipelines prior to the final displacement to seawater (excluding the export pipeline) and ensure there are no residual hydrocarbons in the pipelines (not expected since the process fluids were dry gas). All infield pipeline contents will be displaced into the subsea wells and there will be no marine discharges from this activity.

The 24" export pipeline between Kinsale Alpha and the Inch Terminal (offshore and onshore sections) will be displaced from Kinsale Alpha into the terminal site where the seawater will be collected and stored in sealed containers. The seawater will then be disposed during the Inch Terminal decommissioning works (approximately 425m³ of seawater transported for waste disposal to an appropriately licensed facility via 22HGV movements over 2 days). During the displacement of the export pipeline the majority of gas will be displaced into the gas network but small volumes of gas will be vented at the terminal site intermittently over a period of 2.5 days.

Following the initial displacement of the 24" export pipeline and the Seven Heads 18" export pipeline with seawater, inhibited seawater (approximately 15,800m³ and 5,700m³ respectively) will be placed into both export pipelines with both ends of the pipeline mechanically capped. This will allow for the preservation of the export pipeline for a possible re-use, with a decision being made on the fate of the pipeline when the pipeline decommissioning works are undertaken (i.e. if no re-use option is identified at that time, the onshore section of the 24" export pipeline will be grout filled, and the inhibited water will be discharged at the seaward end.

Similarly to the offshore pipelines the umbilical chemical line contents will also be displaced by seawater into the subsea wells. The umbilical hydraulic line contents will not be displaced prior to decommissioning of the subsea facilities. These hydraulic lines consist of water based hydraulic fluid (approximately 29.5m³ in total across all umbilicals) and will be released to sea during the umbilical jumper cutting for the jackets and subsea structures decommissioning or during degradation of the umbilicals over the following decades/centuries.

3.4.2.2 Topsides Removal

Removal - Single lift

The removal of the KA and KB topsides in a single lift may be undertaken by a specialist lift vessel such as a twin hulled ship shape heavy-lift vessel (HLV), or alternatively using a more conventional semi submersible HLV, and barge transport to a suitable disposal yard.

Main Stages of the topsides single lift using a specialist HLV

Engineering work required in advance of the lifting procedure may include the addition of module reinforcement and sea fastenings, estimated to be between 22t and 43t (based on an assumed 0.5-1.0 % of topside weight). The topsides will be separated from the jacket at a suitable point above sea level, using diamond wire or hydraulic cutting tools, and transferred to a barge using support tools and a skid system. A combination of ballasting the HGV and deballasting the cargo barge will bring the topside and stools together in a controlled manner. Once all of the topside weight has been transferred to the barge, the lifting system will be disconnected, allowing the barge to be unmoored and towed away.

On arrival at the disposal yard, the barge will be moored and ballasted to match the height of the quayside, and link beams run and connected to the barge to allow for the topsides to skid from the barge, during which the ballasting of the barge will maintain its level with the quay.

The overall schedule for the single lift using a specialist HLV of both topsides and their transport to the disposal yard is approximately 88 days (including a 25% contingency).

A more conventional HLV, a semi-submersible crane vessel or similar could also be used to lift the topsides. The removal would be analogous to that outlined above, preparatory works e.g. module strengthening and cutting of the topsides from the jackets. The topsides would then be lifted onto a barge and transported to shore for recycling/disposal. A conventional HLV may require to be moored, using anchors. For example, a 12 anchor mooring system analogous to that of a semi-submersible drilling rig would be required.

The overall schedule for the single lift using conventional HLV of both topsides and their transport to the disposal yard is approximately 88 days (including a 25% contingency).

Removal - Piece-medium (reverse installation)

The reverse installation approach as a potential methodology option for topsides removal incorporates a combination of piece small and piece medium in which the equipment, secondary structures, modules and module support frame are removed in separate lifting operations.

It is assumed that the existing accommodation on KA will be used to support the preparatory and piece small work until arrival of the HLV, on which the workforce could be accommodated. On the KB platform, temporary accommodation would be installed to facilitate the piece medium and preparation works.

The overall schedule for the lift of both topsides and their transport to the disposal yard using the piece medium approach is estimated to be approximately 169 days (including a 25% contingency). There is the opportunity for simultaneous operations and resource sharing with the KA facility activities, which has been taken into account when estimating the total vessel durations to complete both KA and KB topsides decommissioning by reverse installation. As with all decommissioning options the ultimate lift strategy will depend on vessel availability, technical assessment, safety and commercial factors.

3.4.2.3 Jackets Removal

Cutting and Removal of Spools, Umbilical Jumpers and protection materials

The separation of the jacket structures from pipelines and umbilicals on the seabed will be undertaken by ROV tooling wherever possible, or using divers and a DSV where required. It will not be necessary to uncouple at flanges as the pipelines and jackets have no future use, and so they will be cut using an external cutting tool, e.g. hydraulic shears. Spool pieces will be cut into recoverable sections of approximately 24m in length and lifted by a suitably equipped support vessel and transported to shore for recycling or disposal.

For a conservative assessment of the associated impact it is assumed that approximately 100m of spool pieces will be recovered at all platform tie-ins. In total, it is estimated that some 0.85km of spool pieces will be recovered during the jacket decommissioning, taking into account all pipeline connection points to the KA and KB jackets.

Protection materials covering these spool pieces will also be removed where required for access (134no. mattresses with each mattress assumed to be approximately 10Te). Once removed, the concrete mattresses will be returned to shore, where they will either be recycled or disposed of in landfill if recycling is not possible.

In keeping with a waste-hierarchy approach, where possible, this material will be recycled as aggregate, but it may be necessary for some/all to be disposed of in landfill. For the purposes of this assessment it is assumed that all concrete mattresses returned to shore will be disposed of in landfill as this represents the worst case scenario for assessment purposes.

The removal of protection materials and the cutting and lifting of spool pieces will involve the use of a number of vessels including a construction support vessel (CSV) and platform support vessel (PSV). The overall schedule for the removal of spool pieces and protection material and their transport to the disposal yard is estimated at 71 days (including a 25% contingency).

Regardless of the lift technique to be employed the jackets would be cut from the pile foundations at, or close to, seabed level using either an internal or external pile cutting tool. Internal leg surveys have been undertaken to confirm access for an internal pile cutting tool if they are to be cut internally.

External cuts of the legs and piles could be made using diamond wire cutting tools, using remote tooling as far as possible, or diver intervention only if necessary.

The cutting tool would cut the legs at seabed level, as future exposure is not expected due to the hard strata at seabed level. In the worst case, it may not be possible to cut a leg at seabed level. If this situation arises, a short (~1 meter) section may be left exposed, and rock cover would be applied as part of the wider seabed remediation campaign.

Removal Methods

Three options are potentially available to remove the jackets in a single lift. Two involve the use of specialist heavy lift vessels such as a twin hulled ship shape heavy-lift vessel (HLV) or a more conventional semi submersible HLV to lift the jackets, in a manner similar to topside removal, and transport them to a barge in sheltered water, prior to onward transport to a disposal yard. The third option is the use of a system involving attaching buoyancy caissons to the jacket, such that it can be floated and towed away using tugs.

If a multiple lift approach is to be used, the KA and KB jackets would be cut into approximately 3 sections and removed in separate lifts, using a HLV, onto a waiting barge before being transferred to shore. Jacket members (legs and braces) will be cut using a combination of hydraulic shears for smaller cuts and abrasive water jet or diamond wire cutting for larger cuts. Preparatory work to lift the jackets will involve the same steps as for the single lift (above) with the drilling of holes into flooded members to minimise weight, plus the installation of lifting points on the upper jacket section and the internal cutting of the jacket legs. The upper

section would then be cut from the lower jacket sections, prior to these being separated and lifted using an internal lifting tool, which will be deployed into the jacket legs and secured.

Each jacket section will be backloaded onto the HLV before being transferred to a barge where it will be seafastened for transport to the disposal yard.

Jacket removal would take up to approximately 118 days or 149 days (including a 25% contingency) for the single lift and multiple lift methods respectively.

Due to the high recyclability of steel, which is the dominant jacket material, the jackets will be recycled. The jackets will be removed to a North Sea dismantling yard.

The dismantling yard and recycling and waste facilities, which will be fully licensed for the relevant activities, will be selected by the removal contractor. In order to ensure a conservative assessment of likely impacts, with respect to the Habitats and Environmental Impact Assessment Directives, a distance of 700nm between the Kinsale gas field and the dismantling yard has been assessed.

Marine growth comprising of a variety of hard- and soft-bodied organisms are present on the platform jackets, and it is proposed that the marine growth will be 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.

Following removal of the jackets, all significant debris on the seabed, which has accumulated around the jackets following years of operations, will be confirmed by the post-decommissioning survey and will be removed using an ROV and grab. Larger items will be removed using a crane on a construction support vessel. Existing items known to be on the seabed include such items as scaffolding boards and tubes, deck grating and miscellaneous construction debris, with no hazardous materials.

Jacket Removal Deferral

As shown in **Figure 3.4**, the platform removal campaign may be scheduled over a number of years (1-10 years), depending on vessel availability and cost efficiency and company strategy. It is possible that jacket removal may not take place immediately after topsides removal, in which case the jacket structures will be equipped with additional navigation aids and markers to ensure they do not form a hazard to other marine users and that the surface safety zones will remain in place. Offshore platform jackets left in this way are commonly referred to as being in “lighthouse mode”.

If jacket removal is scheduled to occur significantly later than the other facilities decommissioning, this would allow further consideration of possible other uses for the jacket structure(s) for example, for hydrocarbon exploitation (with new topsides), carbon sequestration and storage or as part of a renewables development e.g. as a power hub.

If however, no re-use has been identified within this time period, the jackets will then be removed.

Lighting and Marking of the Platforms

Throughout the operational phase the Kinsale platforms have been marked with Aids to Navigation (AtoN) as agreed with the Commissioners of Irish Lights.

Kinsale Energy will provide continuity of navigational safety from CoP through the extended removal of the topsides and jackets, although this will require changes to the specific Navigation Aids used. Before the start of decommissioning of the platform topsides Kinsale Energy will agree a lighting and marking plan as directed by the Commissioners for Irish Lights for the decommissioning phase of the project. This applies to establishment of new AtoN as well as disestablishment or changes to existing AtoN.

- All applications will be accompanied by an up to date Navigational Risk Assessment, with traffic analysis to inform the Commissioners of Irish Lights to set the Aids to Navigation requirements

- All Lighting and Marking proposals will comply with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendation O-139 on the Marking of Man-Made Offshore Structures (2013)
- Notices to Mariners will be issued highlighting the new marking arrangements

Kinsale Energy will provide solar powered interim Aids to Navigation (AtoN) marking on the jacket structures, after topsides removal, during the extended decommissioning phase (units will be self-contained with the ability to be monitored by satellite, if required).

3.4.3 Subsea Infrastructure

Removal of Protection Materials

The concrete mattress and grout bag materials will be removed only when necessary to allow access to the tie-in facilities underneath, as indicated for the jacket removal. The method of removal for these items may include speed loaders or cargo nets. A number of other novel methods are also emerging in the market, as decommissioning activity increases (see Jee Ltd. 2015).

It is estimated that 311no. mattresses with each mattress assumed to be approximately 10Te will be removed at the subsea structure tie-ins.

Cutting and Removal of Spools and Umbilical Jumpers

Similar to the jacket removal, the separation of subsea structures from pipelines and umbilicals will be undertaken by ROV tooling wherever possible, or using divers and a DSV where required.

For a conservative assessment of the associated impact it is assumed that approximately 50m of spool pieces will be recovered at all subsea structure tie-ins. In total, this amounts to an estimated 0.7km of spool pieces, taking into account all pipeline connection points.

Removal of Wellhead protection structures

The well head protection structures need to be removed to allow access to the subsea trees and well head, for decommissioning. The steel structures will need to be cut/disconnected from the concrete foundation blocks, which anchor them to the seabed, and then the structures can be lifted to a vessel for onshore recycling/disposal. The foundation blocks will also be recovered individually, with each block having 2 lifting points. It is anticipated that existing lifting eyes will not be used and new lifting straps will be used for lifting structures to the vessel. An (ROV) will be used where possible, but a Diving Support Vessel (DSV) with divers may also be used. The DSV methodology is included as a worst case scenario for the decommissioning of the subsea structures.

Removal of Valve skid intermediary tee, Pipeline End Manifolds and Seven Heads Manifold

Initially all tie-ins (spool pieces and umbilical jumpers), that are in the way of the lift, will be disconnected and removed as detailed above. The concrete protection blocks, surrounding each structure will also be removed and recovered.

Once all disconnections are made, the structures will be recovered to a vessel for onshore recycling/disposal.

Similar to the wellhead protection structures, lifting straps will be used for lifting to the vessel. The lifting straps will be put in place using an ROV, where possible, but a DSV with divers may be used.

The overall schedule for the removal of the subsea structures, and their connection spool pieces, umbilical jumpers and protection materials and their transport to the disposal yard is estimated at 110 days (including a 25% contingency).

3.4.4 Pipelines and Umbilicals

As part of the overall facilities preparatory works the pipeline contents, and umbilical chemical line contents, will be displaced with seawater in preparation for the pipeline decommissioning. The chosen decommissioning options for pipelines and umbilicals are as detailed below.

3.4.4.1 Offshore Pipeline and Umbilicals

Two *in situ* decommissioning options involve pipe ends and rock cover of either freespans only, or the full length of pipelines, which are currently not buried or under protective material are being assessed as decommissioning options.

Additionally, some mattresses or grout bags may be retained in place, where they are associated with sections of pipeline ends beyond the tie-in spools which are proposed to be recovered as part of the subsea structures removal. These will also be subject to rock placement.

For the purposes of this assessment, it is assumed that rock cover, on exposed pipe (including pipe ends), mattresses remaining *in situ* and freespans, will be placed such that at least 0.2m cover will be provided at all points. The rock berm is calculated with a 1m wide berm over the pipe and mattresses (where present) and 1:2.5 slopes of either side.

Similarly, rock cover at identified freespans will be placed with a 1m wide berm and 1:2.5 slopes on either side. These rock cover dimensions have been considered in order to provide a conservative yet reasonable assessment of the potential associated impact.

Table 3.5 provides estimates of the rock placement required for the two *in situ* options and the vessel days required to complete the required rock placement operations.

The rock placement vessel used for this assessment is assumed to have an approximate rock carrying capacity of 9,260m³ (25,000Te), with the capability of placing approximately 1,666m³ (4,500Te) of rock per day.

Table 3.5: Estimated rock placement requirements for *in situ* decommissioning options

Pipeline	Pipe ends & freespans		Pipe ends & all exposed sections	
	Length of rock placement	Quantity	Length of rock placement	Quantity
Inch Beach landfall to Kinsale Alpha 24" pipeline	2,288m	3,790m ³ / 21,784Te	38,234m	56,542m ³ / 152,662Te
24" KA to KB Pipeline & 12" KA to KB Pipeline	573m	910m ³ / 2,456Te	9,344m	12,947m ³ / 34,958Te
12" SW Kinsale Pipeline & 12" western drill centre & 10" Greensand & 10" Ballycotton & all associated umbilicals	627m	714m ³ / 1,927Te	2,450m	1,866m ³ / 5,037Te
Seven Heads 18" export pipeline and main control umbilical	350m	626m ³ / 1,691Te	13,830	12,243m ³ / 33,057Te
Seven Heads 8" flowlines & umbilicals to wells	1,360m	1,247m ³ / 3,368Te	1,402m	1,282m ³ / 3,461Te
Total		19,676Te		229,175Te

Source: Based on CA method statements (modified after Ramboll 2017a, b), as used in the Comparative Assessment process, and length of pipeline exposure in Xodus (2016c)

Graded rock will be used similar to existing rock material specifications (1"-5"), with all rock being placed in a controlled manner using a dedicated dynamically positioned fall pipe vessel and monitored by an ROV during placement. The rock will be sourced onshore, most likely from a UK or Norwegian quarry, because currently there are no Irish quarries with high capacity facilities for loading ships.

The overall estimated vessel times for the pipeline, umbilical and protective material decommissioning is between 16 and 104 days (including a 25% contingency) depending on the selected option.

3.4.5 Onshore pipeline

The onshore pipeline section will be filled with inhibited seawater pumped through the pipeline from Kinsale Alpha as part of the facilities preparatory works (See **Section 3.4.2.1**). In the event that no re-use option is identified, the onshore pipeline is to be filled with grout. A plug will be inserted to the pipeline and run down the pipe internally to the required location, and the onshore pipeline will then be filled within the terminal site, with the grout transported in via road. The inhibited seawater within the offshore pipeline would also be discharged at its seaward end at this time. It is estimated that approximately 500m³ of grout will be required to fill 2km of pipe. At no stage will intrusive or disturbance works occur along the length of the onshore pipeline, as all activities will either occur from the platform or the onshore terminal.

3.4.6 Post-Decommissioning Survey

A completion survey will be carried out to confirm the completion of the decommissioning work scope and enable debris clearance (existing operational debris or debris deemed to have arisen from the decommissioning operations) to be undertaken.

The pipelines and umbilicals decommissioned *in situ* will be surveyed post-decommissioning to accurately record their location and status. This information will be included in navigational charts and also passed on to representatives of the fishing community.

As a minimum, the area covered for debris clearance will include a 500m radius around any installation and up to a 100m wide corridor along the length of any pipelines and umbilicals (50m either side of pipelines). The offshore survey will be undertaken over approximately 5 days. Identification of debris would normally be conducted by side scan sonar and/or multi-beam echo sounder (MBES) with an ROV deployed to investigate and recover any potential hazards. Larger items of debris would be recovered by crane from a construction support vessel. A seabed clearance certificate will be issued by the survey contractor to confirm completion of the works.

Standard overtrawling surveys will also be undertaken where wellheads, spoolpieces etc., are removed to confirm the area is clear of debris and snagging hazards.

The offshore survey of the export pipeline will end at some 3km offshore of the landfall at Powerhead. A separate inshore survey involving a smaller vessel will also be undertaken.

3.4.7 Inch Terminal

The scope of work for the Inch terminal decommissioning comprises the demolition and removal of all above facilities on site and reinstatement of the site to original ground condition (grassland), in accordance with the extant planning permission.

Prior to demolition and following cessation of production (CoP), Kinsale Energy will disconnect the terminal from the gas grid, purge the plant to render it hydrocarbon free, and all chemicals will be removed from site. Similar to the offshore topsides, volumes of waste (water and corrosion debris (iron)) are expected to be small as the hydrocarbons produced are dry natural gas (e.g. no sludges or solid NORM material are present).

These wastes, along with any residual inventories of chemicals (TEG) will be collected for onshore disposal under Kinsale Energy's existing waste management procedures.

The terminal facility will be disconnected from the power grid (three-phase ESB mains supply) and the telecommunications network (EIR telecommunications cable) prior to mobilisation of the demolition contractor.

All buildings, above ground structures, roads and services (excluding the main access road which serves the adjacent Gas Networks Ireland above ground installation), vessels and above and below ground pipework (excluding the main export pipeline) will be fully demolished and the site reinstated to original ground condition (grassland).

The demolition methodology will be as described below in **Table 3.6**.

Table 3.6: Proposed methodology for demolition of Inch Terminal

Area of work	Demolition methodology
Pipe and Vessels	<ol style="list-style-type: none"> 1. Cut all above ground pipework into sizes which can easily be handled and transported off site. 2. Remove all vessels/tanks/vent stack (cut from foundations) using a mobile crane and transport off site. 3. Excavate and remove all below ground pipework and transport off site (except for the main export pipeline – refer to Section 3.5.4.2 for decommissioning options). 4. Excavate/break out all pipework and vessel bases and remove off site. 5. Backfill all trenches with excavated material. 6. The materials will be removed from site using light and heavy goods vehicles.
Terminal Building	<ol style="list-style-type: none"> 1. Soft Strip: strip out and removal of non-structural elements such as internal fittings and fixtures will be undertaken using small plant. 2. Any identified hazardous materials, such as asbestos will be removed in accordance with the relevant legislation and disposed of by specialist contractors to an appropriately licensed facility. 3. Deconstruct the concrete building walls, roof and floor 4. The materials will be removed from site using light and heavy goods vehicles. 5. Remove foundations down to concrete footings.
Site Services	<ol style="list-style-type: none"> 1. Excavate and remove all underground utilities, including foul drains, firewater and electricity. 2. Road drains will be removed. 3. Plug and cap site water well approximately 1m below finished ground level.
Telecommunication mast	<ol style="list-style-type: none"> 1. The removal of the telecommunication mast will require a mobile crane on site. 2. The mast will be cut in sections and removed from site. 3. Excavate/break out the foundations of the mast and break on site. 4. Remove the foundation material down to concrete footings.
Access roads/hardstanding	<ol style="list-style-type: none"> 1. The main access road (connecting to the local road network) will remain in situ for use as the Gas Networks Ireland installation site access. 2. The internal access roads and hardstanding areas will be excavated and removed off site. 3. The helipad tarmac area will be excavated and transported off site.
Fences	<ol style="list-style-type: none"> 1. Remove all fences and associated foundations.

Area of work	Demolition methodology
Reinstatement	<ol style="list-style-type: none"> 1. On completion of the demolition, it is likely that subsoil and topsoil will need to be imported to site (estimated at approximately 12,000Te). 2. The subsoil/topsoil will be spread and seeded.

It is estimated that an average of approximately 11 HGV movements per day (over 16 weeks) will be generated by the demolition works based on the waste quantities to be removed, and the subsoil and topsoil to be imported to reinstate the site.

The terminal demolition works will take place after Cessation of Production, with demolition activities having a duration of approximately 16 weeks.

3.5 Summary, Activity Timing and Phasing

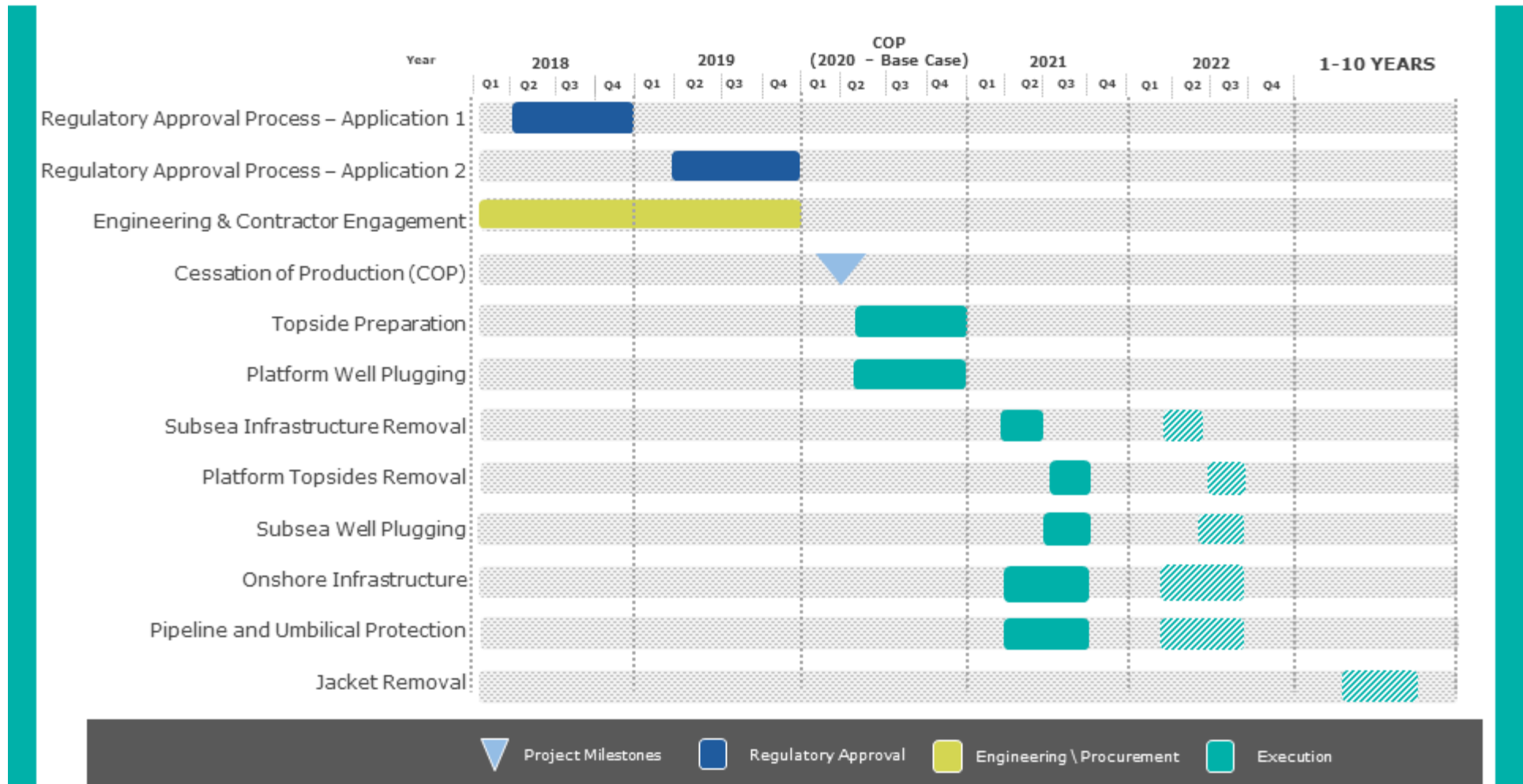
An indicative project programme is shown in **Figure 3.4** of this report. The final decommissioning project removal schedule will be completed once all decommissioning contracts have been awarded. The timing of platform removal and subsea well abandonments may vary depending on availability of specialised marine construction and drilling vessels (crane barges, MODUs etc.).

Post Cessation of Production (CoP), the platform well plug and abandonment (P&A) will be commenced and the pipelines connecting the platforms to the subsea wells will be displaced with seawater into the wells, in order to achieve hydrocarbon free status on the Kinsale Alpha and Bravo platforms. The 24" pipeline from KA to Inch Terminal, including the onshore section, and the 18" Seven Heads pipeline will also be filled with inhibited seawater at the start of the decommissioning programme. All of these offshore project activities up to the point where the platforms are hydrocarbon free will be carried out within the existing Kinsale Energy operations framework.

Upon completion of platform well P&A and subsea pipeline displacement activities, both Kinsale Alpha and Bravo platforms will be de-manned and are then available for removal operations. The platform topsides will be removed within 1-2 years depending on vessel scheduling, and the jackets will be left *in situ* for a period of up to 10 years (see **Section 3.4.3**).

A subsea programme of works to remove subsea structures and protection materials and to disconnect spool pieces and umbilical jumpers will be completed in advance of subsea well plug and abandonment activities, which may be carried out by a rig or an intervention vessel, or a combination thereof. The pipeline, umbilical and protective material rock placement works will be undertaken following the removal of the spool pieces and the umbilical jumpers.

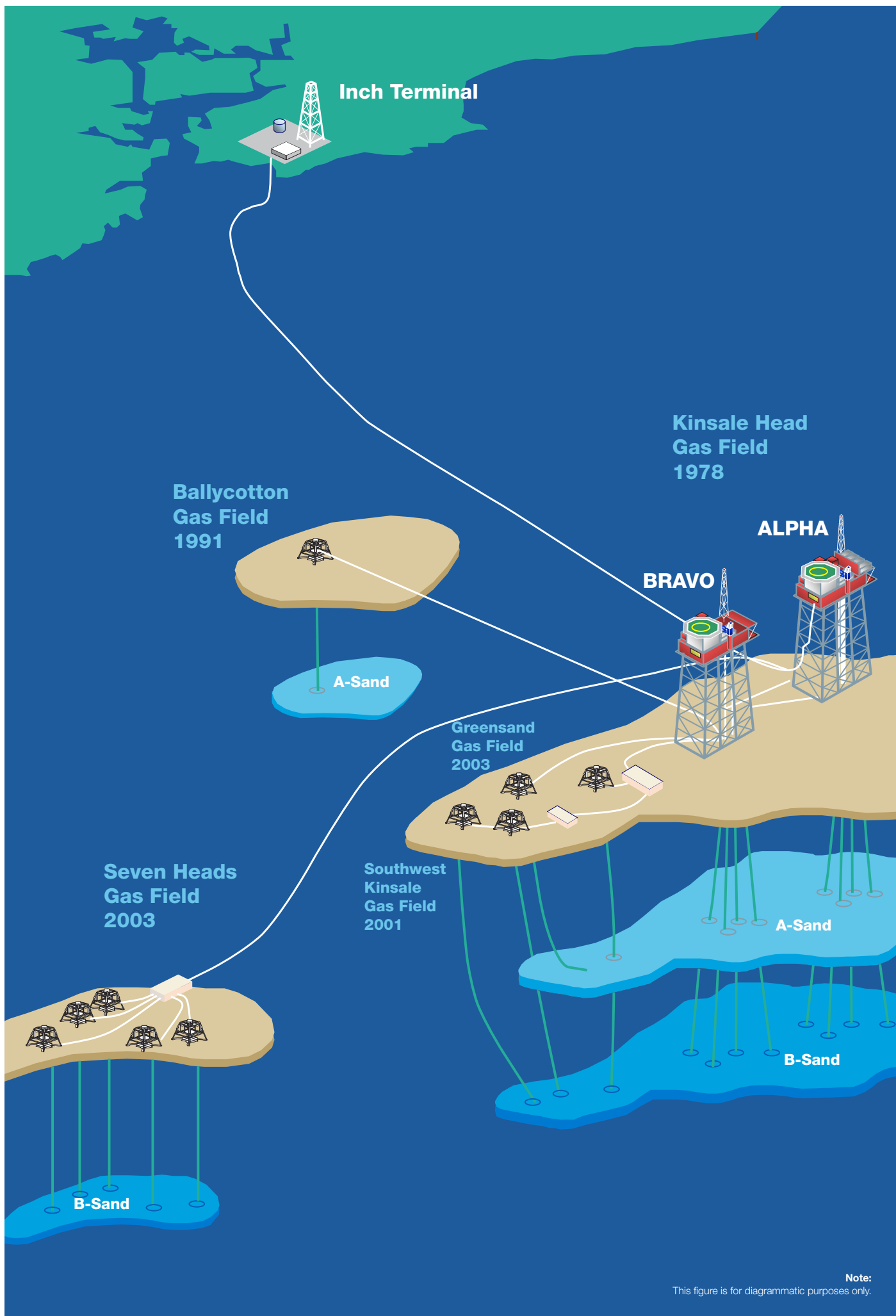
The onshore terminal decommissioning which is of relatively short duration will be carried out at a suitable time within the overall project schedule. The onshore pipeline section will be grout filled at this stage, if no further use of the pipeline is anticipated.

Figure 3.4: Indicative Project Schedule

Note: The actual timing of Cessation of Production will depend on field economics (gas prices) and facilities performance, currently anticipated between 2020 and 2021. The timing of activities may also vary depending on company strategy and availability of specialised marine vessels.

Section 4

Identification of Relevant Natura 2000 Sites



Note:
This figure is for diagrammatic purposes only.

4 Identification of Relevant Natura 2000 Sites

4.1 Overview

Identification of relevant Natura 2000 Sites that may interact with the KADP was based on the presence of Qualifying Interests occurring within the Kinsale Area, its potential Zone of Influence and potential source-pathway-receptor links, and takes into account species foraging distances and migration routes, the proximity of the decommissioning activities to foraging and breeding areas, and change in species behaviour.

4.2 Definition of the Zone of Influence (Zol) of the proposed project

The zone of influence comprises the area within which the proposed project may potentially affect the conservation objectives or qualifying interests of a Natura 2000 site. While there is no recommended distance, the zone of influence is generally relative to the scale of the proposed project. The zone of influence for the offshore element of this proposed project is 100km, while the zone of influence for the onshore element is 15km. Given the relatively localised nature of the onsite works and the inclusion of a wider zone of influence in respect of the offshore element, the exclusion zone of 15km for the onshore element will be sufficient as there are no scientifically appropriate reasons to reduce or extend the exclusion zone and there are no additional pathways which would require the 15km exclusion zone to be extended. Guidance from the National Parks and Wildlife Service- *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities* (DoEHLG, 2010) recommends that the distance should be evaluated on a case-by-case basis and that the appropriate assessment process should include the following Natura 2000 sites:

1. Any Natura 2000 sites within or adjacent to the plan or project area.
2. Any Natura 2000 sites within the likely zone of impact of the plan or project. A distance of 15km is currently recommended in the case of plans, and derives from UK guidance (Scott Wilson et al., 2006). For projects, the distance could be much less than 15km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects.
3. Natura 2000 sites that are more than 15km from the plan or project area depending on the likely impacts of the plan or project, and the sensitivities of the ecological receptors, bearing in mind the precautionary principle. In the case of sites with water dependent habitats or species, and a plan or project that could affect water quality or quantity, for example, it may be necessary to consider the full extent of the upstream and/or downstream catchment.

Because the nature of the project is such that it could affect water quality (see **Section 3** for project description), Natura 2000 sites along the south coast of Ireland could fall within category 3 above (i.e. greater than 15km from the project area but with water dependent habitats or species).

Thus, in relation to the offshore facilities to be decommissioned, and on the basis of the maximum expected footprint of any impact associated with the project and the low likelihood of any hydrocarbon spill (i.e. diesel) reaching coastal Natura 2000 sites (source reference: stochastic oil spill modelling based on loss of diesel inventory from a drilling rig was recently completed for the Midleton Exploration Well 49/11-3, approximately 20km north-east of the Kinsale Head area (RPS 2015)), it is considered that sites located along the south coast of Ireland between Mizen Head and Hook Head, within approximately 100km of each of the facilities, can be considered to be within the potential Zone of Influence (Zol).

In considering the size and scale of the existing terminal, the short-term and localised nature of the demolition works and in accordance with the guidance document, *Appropriate Assessment of Plans and Projects in*

Ireland - Guidance for Planning Authorities (DoEHLG, 2010), Natura 2000 sites located within 15km of the site are considered within the potential Zol of the onshore Inch Terminal.

The onshore section of the main export pipeline is being left *in situ* and filled with inhibited water or grout from within the terminal site. There will be no external physical disturbance resulting from the filling of the onshore pipeline along the length of the pipeline. On this basis, no significant impact on Natura 2000 sites or species is considered to be likely, and as such the Natura 2000 sites located within 15km of the terminal site are considered within the potential Zol for all onshore works.

Therefore, the zone of influence for the offshore element of this decommissioning project is 100km. Given the relatively localised and limited nature of the onshore works, a 15km zone of influence for the onshore element is considered appropriate.

4.3 Designated sites within the Zone of Influence of the Proposed Project

The Kinsale Area fields and facilities are not directly connected with or necessary to the management of any Natura 2000 sites and no habitat loss will occur within any Natura 2000 site as a result of this proposed project.

The relevant Natura 2000 sites which are within the potential 'Zol' of the KADP are listed in **Table 4.1** and illustrated in **Figure 4.1**. **Table 4.1** summarises the features (qualifying interests) of each site. Specific conservation objectives (CO) for each of the relevant sites have also been consulted (refer to NPWS website for full details of CO of each particular site <https://www.npws.ie/protected-sites/conservation-management-planning/conservation-objectives>).

Site Synopses for each Natura 2000 site were accessed on the NPWS metadata site (NPWS, 2018). An extract from each Site Synopsis is appended in **Appendix A**.

Table 4.1: Relevant SACs and SPAs within the potential ZOI, their features and the closest distance to any Kinsale Area facilities

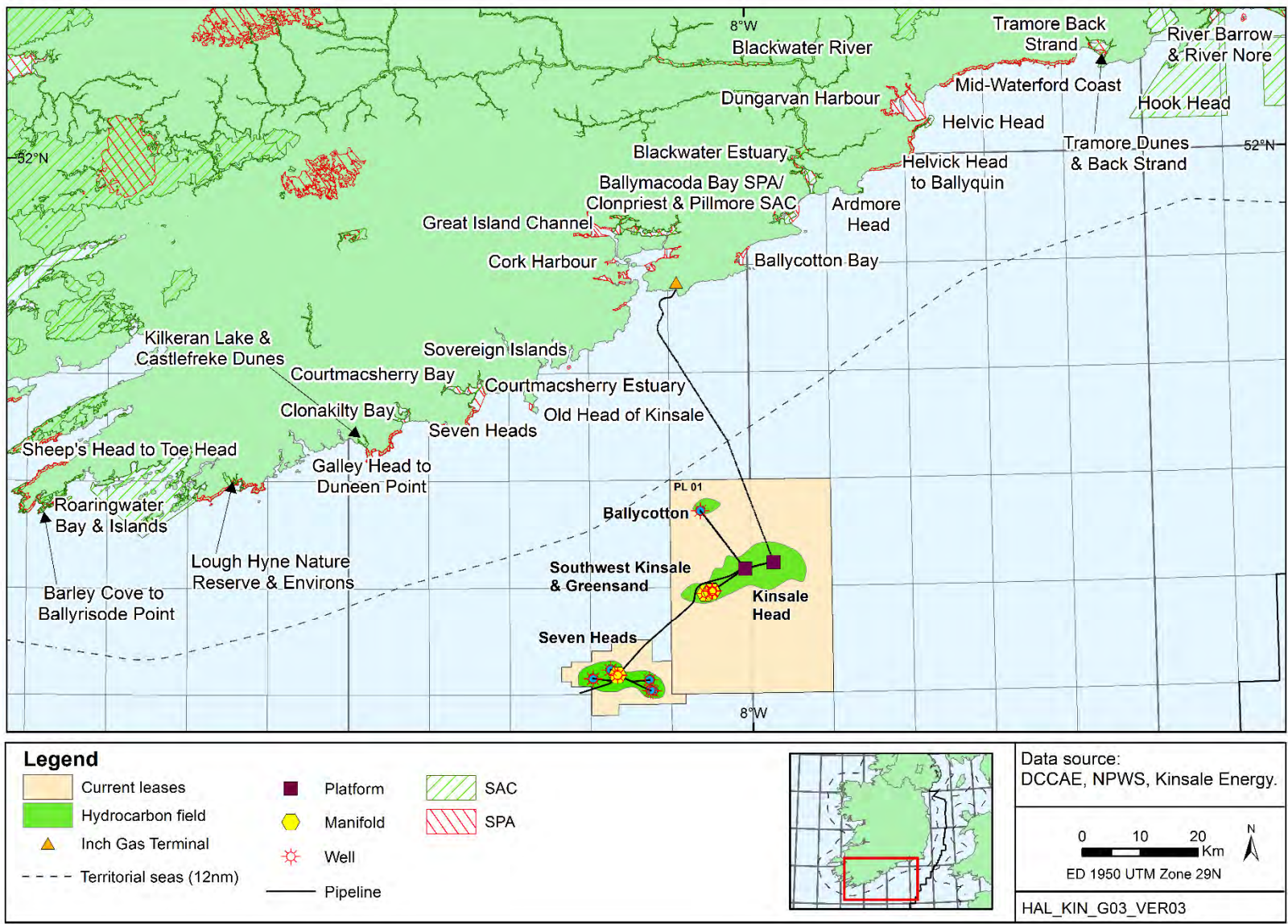
Site code	Site name	Closest distance (km)				Summary of features
		Subsea wells & other subsea structures	Offshore pipelines	Offshore platforms	Onshore Terminal (within 15km Zol)	
SACs						
002123	Ardmore Head	61	40	65	-	Annex I Habitats: Vegetated sea cliffs; Dry heaths
000077	Ballymacoda (Clonpriest & Pillmore)	84	17	58	-	Annex I Habitats: Estuaries; Tidal mudflats and sandflats; <i>Salicornia</i> mud and sand; Atlantic salt meadows; Mediterranean salt meadows
001040	Barley Cove to Ballyrisode Point	95	95	118	-	Annex I Habitats: Tidal mudflats and sandflats; Perennial vegetation of stony banks
002170	Blackwater River	58	26	64	-	Annex I Habitats: Estuaries; Tidal mudflats and sandflats; Perennial vegetation of stony banks; <i>Salicornia</i> mud; Atlantic salt meadows; Mediterranean salt meadows; Floating river vegetation; Old oak woodlands; Alluvial forests Annex II Species: Freshwater pearl mussel (<i>Margaritifera margaritifera</i>); White-clawed crayfish (<i>Austropotamobius pallipes</i>); Sea lamprey; Brook lamprey (<i>Lampetra planeri</i>); River lamprey; Twaite shad; Atlantic salmon; Otter (<i>Lutra lutra</i>); Killarney fern (<i>Trichomanes speciosum</i>)
000091	Clonakilty Bay	54	45	63	-	Annex I Habitats: Tidal mudflats and sandflats; Annual vegetation of drift lines; Embryonic shifting dunes; Shifting white dunes; Fixed grey dunes; Decalcified fixed dunes
001230	Courtmacsherry Estuary	51	32	55	-	Annex I Habitats: Estuaries; Tidal mudflats and sandflats; Annual vegetation of drift lines; Perennial vegetation of stony banks; <i>Salicornia</i> mud and sand; Atlantic salt meadows; Mediterranean salt meadows; Embryonic shifting dunes; Shifting white dunes; Fixed grey dunes
001058	Great Island Channel	48	8	59	8	Annex I Habitats: Tidal mudflats and sandflats; Atlantic salt meadows
000665	Helvick Head	76	57	79	-	Annex I Habitats: Vegetated sea cliffs; Dry heaths
000764	Hook Head	100	82	98	-	Annex I Habitats: Large shallow inlets and bays; Reefs; Vegetated sea cliffs

Site code	Site name	Closest distance (km)				Summary of features
		Subsea wells & other subsea structures	Offshore pipelines	Offshore platforms	Onshore Terminal (within 15km ZoI)	
001061	Kilkeran Lake and Castlefreke Dunes	56	56	58	-	Annex I Habitats: Coastal lagoons; Embryonic shifting dunes; Shifting white dunes; Fixed grey dunes
000097	Lough Hyne Nature Reserve and Environs	69	78	79	-	Annex I Habitats: Reefs; Large shallow inlets and bays; Sea caves
002162	River Barrow & River Nore	115	91	114	-	Annex I Habitats: Estuaries; Tidal mudflats and sandflats; Reefs; <i>Salicornia</i> mud and sand; Atlantic salt meadows; Mediterranean salt meadows; Floating river vegetation; Dry heaths; Halophilus scrubs; Petrifying springs; Old oak woodlands Annex II: Desmoulin's whorl snail (<i>Vertigo moulinsiana</i>); Freshwater pearl mussel; White-clawed crayfish; Sea lamprey; Brook lamprey; River lamprey; Twaite shad; Atlantic salmon; Otter; Killarney fern; Nore pearl mussel (<i>Margaritifera durrovensis</i>)
000101	Roaringwater Bay and Islands	74	74	94	-	Annex I Habitats: Large shallow inlets and bays; Reefs; Vegetated sea cliffs; Dry heath; Sea caves Annex II Species: Harbour porpoise; Otter; Grey seal
000671	Tramore Dunes and Backstrand	104	80	104	-	Annex I Habitats: Tidal mudflats and sandflats; Annual vegetation of drift lines; Perennial vegetation of stony banks; <i>Salicornia</i> mud and sand; Atlantic salt meadows; Mediterranean salt meadows; Embryonic shifting dunes; Shifting white dunes; Fixed grey dunes
002171	Bandon River cSAC	71	58	83	-	Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation; Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>); <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel); <i>Lampetra planeri</i> (Brook Lamprey)
					SPAs	
004022	Ballycotton Bay	43	9	51	9	Article 4 Species: Teal (<i>Anas creca</i>); Ringed plover (<i>Charadrius hiaticula</i>); Golden plover (<i>Pluvialis apricaria</i>); Grey plover (<i>Pluvialis squatarola</i>); Lapwing (<i>Vanellus vanellus</i>); Black-tailed godwit (<i>Limosa limosa</i>); Bar-tailed godwit (<i>Limosa lapponica</i>); Curlew (<i>Numenius arquata</i>); Turnstone (<i>Arenaria interpres</i>); Common gull; Lesser black-backed gull; Wetland & Waterbirds

Site code	Site name	Closest distance (km)				Summary of features
		Subsea wells & other subsea structures	Offshore pipelines	Offshore platforms	Onshore Terminal (within 15km ZoI)	
004023	Ballymacoda Bay	51	19	51	-	Article 4 Species: Wigeon (<i>Anas penelope</i>); Teal; Ringed plover; Golden plover; Grey plover; Lapwing; Sanderling (<i>Calidris alba</i>); Dunlin (<i>Calidris alpina</i>); Black-tailed godwit; Bar-tailed godwit; Curlew; Redshank (<i>Tringa totanus</i>); Turnstone; Black-headed gull; Common gull; Lesser black-backed gull; Wetland & Waterbirds
004028	Blackwater Estuary	59	34	65	-	Article 4 Species: Wigeon; Golden plover; Grey plover; Lapwing; Dunlin; Black-tailed godwit; Bar-tailed godwit; Curlew; Redshank; Wetland & Waterbirds
004081	Clonakilty Bay	53	46	63	-	Article 4 Species: Shelduck; Dunlin; Black-tailed godwit; Curlew; Wetland & Waterbirds
004030	Cork Harbour	37	4	50	4	Article 4 Species: Little grebe (<i>Tachybaptus ruficollis</i>); Great crested grebe (<i>Podiceps cristatus</i>); Cormorant; grey heron (<i>Ardea cinerea</i>); Shelduck; Wigeon; Pintail; Shoveler (<i>Anas clypeata</i>); Red-breasted merganser (<i>Mergus serrator</i>); Oystercatcher; Golden plover; Grey plover; Lapwing; Dunlin; Black-tailed godwit; Bar-tailed godwit; Curlew; Redshank; Black-headed gull; Common gull; Lesser black-backed gull; Common tern; Wetland & Waterbirds
004219	Courtmacsherry Bay	42	32	53	-	Article 4 Species: Great northern diver (<i>Gavia immer</i>); Shelduck; Wigeon; Red-breasted merganser; Golden plover; Lapwing; Dunlin; Black-tailed godwit; Bar-tailed godwit; Curlew; Black-headed gull; Common gull; Wetland & Waterbirds
004032	Dungarvan Harbour	75	51	80	-	Article 4 Species: Great crested grebe; Light-bellied brent goose; Shelduck; Red-breasted merganser; Oystercatcher; Golden plover; Grey plover; Lapwing; Knot; Dunlin; Black-tailed godwit; Bar-tailed godwit; Curlew; Redshank; Turnstone; Wetland & Waterbirds
004190	Galley Head to Duneen Point	53	48	64	-	Article 4 Species: Chough
004192	Helvick Head to Ballyquin	65	37	69	-	Article 4 Species: Cormorant; Puffin; Herring gull; Kittiwake; Chough
004193	Mid-Waterford Coast	84	55	87	-	Article 4 Species: Cormorant; Peregrine; Herring gull; Chough

Site code	Site name	Closest distance (km)				Summary of features
		Subsea wells & other subsea structures	Offshore pipelines	Offshore platforms	Onshore Terminal (within 15km ZOI)	
004021	Old Head of Kinsale	34	25	46	-	Article 4 Species: Razorbill; Fulmar; Herring gull; Shag; Kittiwake; Guillemot
004191	Seven Heads	42	32	53	-	Article 4 Species: Chough
004156	Sheep's Head to Toe Head	65	65	84	-	Article 4 Species: Peregrine (<i>Falco peregrinus</i>); Chough
004124	Sovereign Islands	33	16	46	-	Article 4 Species: Cormorant
004027	Tramore Back Strand	104	87	103	-	Article 4 Species: Light-bellied brent goose; Golden plover; Grey plover; Lapwing; Dunlin; Black-tailed godwit; Bar-tailed godwit; Curlew; Wetland & Waterbirds

Figure 4.1: Special Areas of Conservation and Special Protection Areas within the potential Zol



4.4 Assessment Criteria

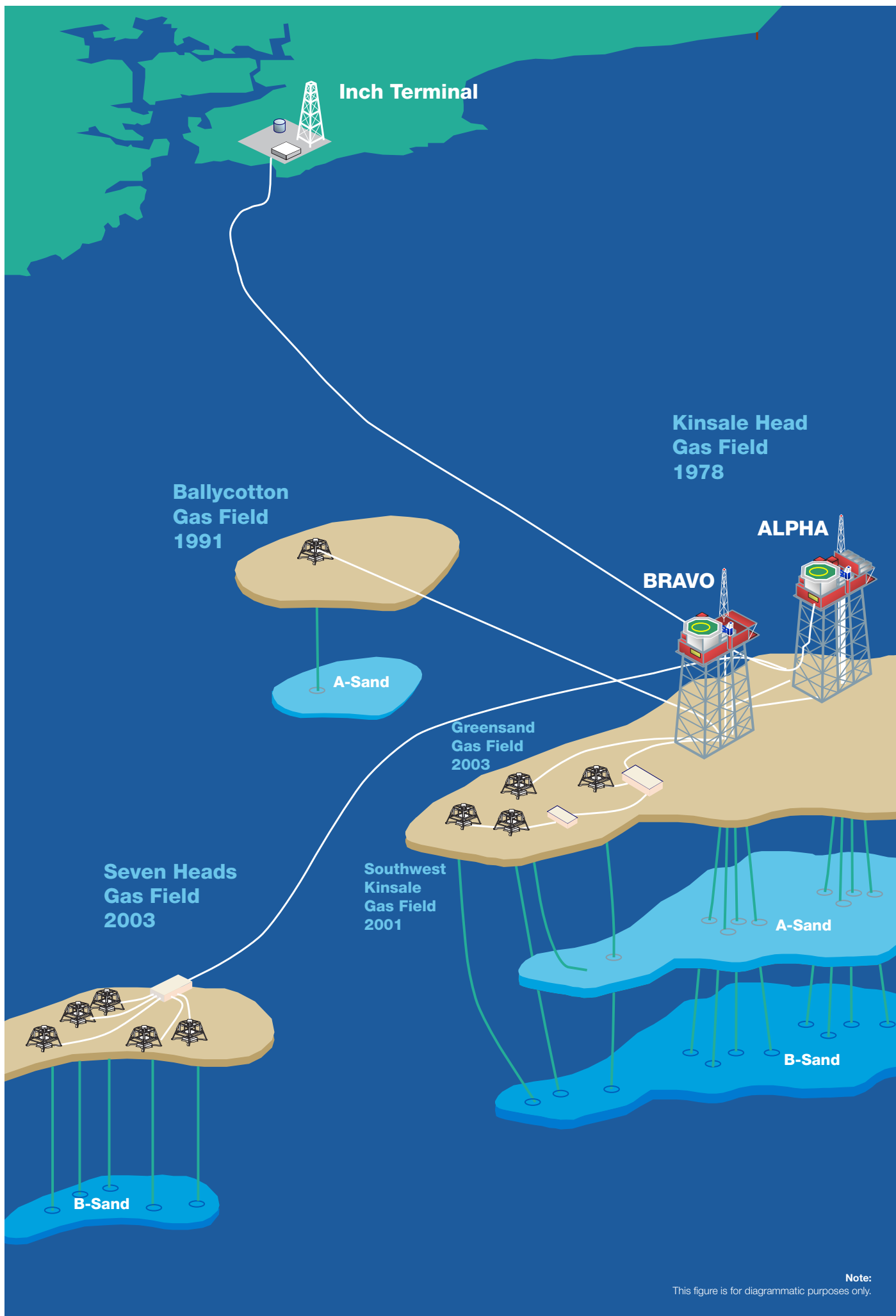
Natura 2000 sites are considered relevant where a source-pathway-receptor link exists between a project and the Natura 2000 site. In order for an impact to occur there must be a risk enabled by having a 'source' (e.g. construction works at a proposed development site), a 'receptor' (e.g. a SAC/SPA or other ecologically sensitive feature), and a pathway between the source and the receptor (e.g. a watercourse which connects the development site to the SAC/SPA).

The identification of risk of the impact does not automatically mean it will occur, nor that it will be significant. However, identification of the risk does mean that there is a possibility of ecological or environmental damage occurring, with the level and significance of the impact depending upon the nature and exposure to the risk, and the characteristics of the receptor.

It is considered that all of the above identified Natura 2000 sites are of relevance to the decommissioning works due to a potential connectivity/pathway via marine waters.

Section 5

AA Screening for likely significant effects



Note:
This figure is for diagrammatic purposes only.

5 AA Screening for likely significant effects

5.1 Identification of Potential Sources of Effects

This section assesses the likelihood for significant negative direct, indirect and in-combination effects to the qualifying interests of the relevant Natura 2000 sites listed in **Table 4.1** as a result of the proposed decommissioning activities.

In respect of the proposed decommissioning works described in **Section 3**, the main potential sources of potential effect relevant to Natura 2000 sites and their qualifying interests arise from:

- the physical presence of vessels in field and in transit;
- underwater noise from vessels, cutting, rock placement and post-decommissioning survey (note that no explosive cutting is proposed);
- physical disturbance from rig placement, rig and vessel anchoring, and infrastructure removal and rock placement;
- discharges to sea;
- accidental events;
- waste recycling, reuse and disposal;
- atmospheric emissions;
- noise associated with the demolition of Inch terminal; and
- dust emissions associated with the terminal demolition works.

However, the following potential sources of effect were discounted and not considered in further detail in this screening report as they will not cause a significant impact on Natura 2000 sites:

- Physical Disturbance:
 - The collective direct physical disturbance which could result from the decommissioning activities is estimated to be small (between 0.46-0.75km²)³, and confined to locations relating to rig and HLV anchoring, and platform and other subsea infrastructure removal or remediation. Given the fact that these activities do not take place within any Natura 2000 sites, and are ~8km distance from the nearest site designated for Annex I seabed habitat (Great Island Channel SAC), it is considered that any interaction can be discounted, and it is not considered likely that the physical disturbance will result in a likely significant effect.
 - Moreover, it should be noted that all recent benthic sampling and photographic surveys in the Kinsale Area have been consistent in reporting no indication of sensitive species or habitats which would be subject to protection under the EU Habitats Directive (92/43/EEC) i.e. Annex I habitats. Thus, potential impacts from the physical disturbance of the seabed are not considered further in this assessment.
- Waste Recycling, Reuse and Disposal:
 - Wastes generated by the KADP will be managed in accordance with the relevant waste legislation requirements and recovered or disposed of in appropriated licensed waste facilities, and will not cause a significant impact on Natura 2000 sites.

³ This figure is based on the range of potential decommissioning options, and includes physical disturbance resulting from rig and HLV anchoring, platform removal, pipeline end and spool removal, removal of protection materials and subsea structures, and that from rock placement – refer to the accompanying KADP Environmental Report for more information.

- Atmospheric Emissions:
 - Activities associated with the KADP will lead to emissions of gases which contribute both to localised and short-term increases in atmospheric pollutants, and to atmospheric GHG concentrations. However, the overall significance of the impact of atmospheric emissions from the project is considered to be low and will not cause a significant impact on Natura 2000 sites.
- Accidental Events arising from the terminal demolition:
 - Prior to the commencement of demolition works, the terminal will be rendered hydrocarbon and chemical free and the facility will be disconnected from the power grid. Accidental events arising from the terminal demolition works are therefore not envisaged. The likelihood that an uncontrolled release of contaminated surface water during the terminal demolition works could cause a significant impact on Natura 2000 sites is considered not feasible given that the activities proposed are standard in nature and well understood, the volumes are small, and given the distance to the closest Natura 2000 site.

The remaining sources of potential effect are considered in turn below against the major groups of qualifying interests for which there is considered to be a potential interaction, which are primarily marine mammals and birds associated with relevant SACs and SPAs respectively. Refer to **Table 5.1**.

5.2 Consideration of Potential Effects

Potential sources of effects are outlined in **Table 5.1** and discussed in the following sections in the context of potential receptors (qualifying interests of SPAs and SACs) for which interactions could not be discounted.

Table 5.1: Source of Potential Effects and Receptors

Facility	Decommissioning Option Assessed	Activity/Source of Potential Impact	Receptors relevant to Irish Natura 2000 Sites and the Identified Source of Potential Impact	Closest relevant Natura 2000 sites	Assessed in:
Consent Application 1					
Offshore facilities preparation	Topsides preparation, pipeline degassing and displacement of umbilical contents	Physical presence: decommissioning operations Platform surface noise and light Physical presence in field and in transit of vessels	Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.1
			Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.1
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.1
		Discharges to sea Flushing and cleaning of topsides Discharges associated with displacement of contents pipelines and umbilicals	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.3
			Birds	Cork Harbour SPA (approx.. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.3
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.3
		Accidental events Dropped objects Vessel collision Accidental spills of fuel/lubricants	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.4
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.4
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.4

Facility	Decommissioning Option Assessed	Activity/Source of Potential Impact	Receptors relevant to Irish Natura 2000 Sites and the Identified Source of Potential Impact	Closest relevant Natura 2000 sites	Assessed in:
Platform wells	Plug & Abandon	Physical presence: decommissioning operations Platform surface noise and light	Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.1
			Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.1
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.1
		Underwater Noise and vibration Underwater noise associated with cutting and removal of well tubulars	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.2
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.2
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.2
		Discharges to sea Discharges associated with well decommissioning	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.3
			Birds	Cork Harbour SPA (approx.. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.3
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.3
		Accidental Events Dropped objects Accidental releases to atmosphere (including natural gas from well blowout) Chemical spills	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.4
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.4
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.4

Facility	Decommissioning Option Assessed	Activity/Source of Potential Impact	Receptors relevant to Irish Natura 2000 Sites and the Identified Source of Potential Impact	Closest relevant Natura 2000 sites	Assessed in:
Subsea Wells		Physical presence: decommissioning operations Physical presence of the drilling rig Rig surface noise and light	Birds	Cork Harbour SPA (approx. 4km away) Old Head Kinsale SPA (approx. 25km away)	Section 5.2.1
			Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away) Blackwater River SAC (approx. 26km away)	Section 5.2.1
			Fish		Section 5.2.1
		Accidental Events Dropped objects Accidental releases to atmosphere (including natural gas from well blowout) Accidental spills of fuel/lubricants Chemical spills	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.4
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.4
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.4
		Underwater Noise and vibration Underwater noise associated with cutting and removal of well tubulars	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.2
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.2
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.2

Facility	Decommissioning Option Assessed	Activity/Source of Potential Impact	Receptors relevant to Irish Natura 2000 Sites and the Identified Source of Potential Impact	Closest relevant Natura 2000 sites	Assessed in:
Topsides		Discharges to sea Discharges associated with well decommissioning	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.3
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.3
			Fish	Blackwater River SAC (approx.. 26km away)	Section 5.2.3
	Full Removal	Physical presence: decommissioning operations Presence in field of supply vessels, barge/accommodation and HLV Transit of supply vessels, barge/ accommodation or heavy lift vessels, and transport to shore Airborne noise and lighting	Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.1
			Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.1
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.1
		Accidental Events Dropped objects Vessel collision Accidental spills of fuel/lubricants	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.4
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.4
			Fish	Blackwater River SPA (approx. 26km away)	Section 5.2.4

Facility	Decommissioning Option Assessed	Activity/Source of Potential Impact	Receptors relevant to Irish Natura 2000 Sites and the Identified Source of Potential Impact	Closest relevant Natura 2000 sites	Assessed in:
		Underwater Noise and vibration Underwater noise from vessels including DP	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.2
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.2
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.2
		Discharges to sea Drainage, sewage & other discharges Potential for introduction of alien species in ballast, or as external fouling growth Litter	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.3
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.3
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.3
Subsea structures	Full Removal	Physical presence: decommissioning operations Physical presence in field and in transit of vessels, and transport to shore of protection materials, spool pieces, umbilical jumpers and subsea structures Airborne noise and lighting	Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.1
			Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.1
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.1
		Underwater Noise and vibration Underwater noise from vessels including DP	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.2
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.2
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.2

Facility	Decommissioning Option Assessed	Activity/Source of Potential Impact	Receptors relevant to Irish Natura 2000 Sites and the Identified Source of Potential Impact	Closest relevant Natura 2000 sites	Assessed in:		
		Discharges to sea Minor discharge of surfactants possible on removal of pipeline spoolpieces from pipeline cleaning during preparatory works. Release of hydraulic fluid from umbilicals on removal of jumpers. Litter Potential for introduction of alien species in ballast, or as external fouling growth	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.3		
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.3		
			Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.3		
		Accidental events Dropped objects Vessel collision Accidental spills of fuel/lubricants Hydraulic fluid loss from subsea tools and equipment	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.4		
			Birds	Cork Harbour SPA (approx. 4km away) Old Head Kinsale SPA (approx. 25km away)	Section 5.2.4 Section 5.2.4		
				Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.4	
			Consent Application 2				
		Jackets	Full Removal	Physical presence: decommissioning operations Presence in field of supply vessels, barge and HLV	Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.1
Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)				Section 5.2.1		
						Section 5.2.1	

Facility	Decommissioning Option Assessed	Activity/Source of Potential Impact	Receptors relevant to Irish Natura 2000 Sites and the Identified Source of Potential Impact	Closest relevant Natura 2000 sites	Assessed in:
		Transit of supply vessels, barge or heavy lift vessels, and transport to shore	Fish	Blackwater River SAC (approx. 26km away)	
		Airborne noise and lighting (vessels)			
		Physical presence of jackets in "lighthouse mode"			
		Surface lighting, radar beacons, transponders and foghorns for duration of "lighthouse mode"			
		Accidental Events	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.4
		Dropped objects	Birds	Cork Harbour SPA (approx. 4km away)	Section 5.2.4
		Vessel collision		Old Head Kinsale SPA (approx. 25km away)	Section 5.2.4
		Hydraulic fluid loss from subsea tools and equipment		Blackwater River SAC (approx. 26km away)	Section 5.2.4
		Accidental spills of fuel/lubricants	Fish		
		Underwater Noise and vibration	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.2
		Underwater noise from abrasive, high pressure water jet and other cutting (internal and external cuts)	Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.2
		Underwater noise from vessels including DP	Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.2

Facility	Decommissioning Option Assessed	Activity/Source of Potential Impact	Receptors relevant to Irish Natura 2000 Sites and the Identified Source of Potential Impact	Closest relevant Natura 2000 sites	Assessed in:
		Discharges to sea Discharges relating to marine growth removal (offshore) Drainage, sewage & other discharges Litter Potential for introduction of alien species in ballast, or as external fouling growth	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.3
			Birds	Cork Harbour SPA (approx. 4km away) Old Head Kinsale SPA (approx. 25km away)	Section 5.2.3
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.3
Pipelines, Umbilicals and protection materials	Leave <i>In-situ</i>	Physical presence: decommissioning operations Physical presence in field and in transit of vessel, Airborne noise and lighting	Birds	Cork Harbour SPA (approx. 4km away) Old Head Kinsale SPA (approx.. 25km away)	Section 5.2.1
			Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.1
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.1
		Underwater Noise and vibration Underwater noise associated with post-decommissioning survey Underwater noise from vessels including DP and rock placement	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.2
			Birds	Cork Harbour SPA (approx. 4km away) Old Head Kinsale SPA (approx. 25km away)	Section 5.2.2
			Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.2

Facility	Decommissioning Option Assessed	Activity/Source of Potential Impact	Receptors relevant to Irish Natura 2000 Sites and the Identified Source of Potential Impact	Closest relevant Natura 2000 sites	Assessed in:
		Discharges to sea Drainage, sewage & other discharges	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.3
		Litter	Birds	Cork Harbour SPA (approx. 4km away) Old Head Kinsale SPA (approx. 25km away)	Section 5.2.3
		Potential for introduction of alien species in ballast, or as external fouling growth	Fish	Blackwater River SAC (approx. 26km away)	Section 5.2.3
		Accidental events Dropped objects	Marine Mammals	Roaringwater Bay and Islands SAC (approx. 74km away)	Section 5.2.4
		Vessel collision			Section 5.2.4
		Accidental spills of fuel/lubricants	Birds	Cork Harbour SPA (approx. 4km away) Old Head Kinsale SPA (approx. 25km away)	Section 5.2.4
		Hydraulic fluid loss from subsea tools and equipment	Fish	Blackwater River SAC (approx. 26km away)	
Planning Permission Consent					
Inch Terminal	Full Removal	Onshore Noise	Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.5
		Onshore Dust	Birds	Cork Harbour SPA (approx. 4km away), Old Head Kinsale SPA (approx. 25km away)	Section 5.2.5
			Habitats	Great Island Channel SAC (approx.8 km away)	Section 5.2.6

5.2.1 Physical presence

The number and type of vessels which will be used during the proposed decommissioning project, along with an indicative timing of the overall programme of work, is provided in **Section 3**.

Regardless of the alternative methodologies selected to decommission the Kinsale Area offshore facilities, there will be rig, supply and other vessel presence/movements (e.g. HLV, barge, tugs, AHV, CSV, guard vessel), including when in transit and when operating within the Kinsale Area. The decommissioning programme of works is expected to take 12-18 months to complete, however operations may not be continuous, and overall it may take up to 10 years for the work to be completed.

Birds

The physical presence of vessels associated with the decommissioning activities may potentially cause displacement and/or other behavioural responses in birds. Most species from relevant SPAs within foraging range of the Kinsale Area have been judged to have a low to moderate sensitivity to disturbance by shipping traffic (e.g. gannet, fulmar, kittiwake, gulls, auks which are qualifying interests of the Old Head of Kinsale SPA which is located approximately 28km from the nearest point on the offshore pipelines for which decommissioning activities are proposed i.e. rock placement; see Garthe & Hüppop 2004). Few SPAs designated for more sensitive species, e.g. divers, scoters which generally forage in coastal waters of ≤ 20 m depth (Fox et al. 2003) are located near the Kinsale Area (e.g. Cork Harbour SPA and Courtmacsherry Bay SPA are between 37km and 42km distant from the KADP offshore works). Cork Harbour SPA is ~4km from the offshore export pipeline and contains cormorant, a coastal species judged to be highly sensitive to disturbance by shipping (Garthe & Hüppop 2004). However, the KADP will result in only a small increase in vessel traffic within the Cork harbour and wider Kinsale Area and is anticipated to cause no more than temporary and localised disturbance, which is not predicted to result in significant effects on any Natura 2000 site. While rafting birds which are qualifying interests of sites may move in response to vessels in transit, such effects are of low magnitude and short duration, and will represent negligible additional disturbance over routine vessel movements. Significant effects on bird species are therefore not considered to be likely.

Fish and Marine Mammals

In addition to potential disturbance to birds, the physical presence of the vessels may influence the distribution and movements of sensitive species in the water column, namely protected migratory fish and marine mammals. Any displacement of marine mammals is most likely associated with acoustic disturbance. There may also be responses from marine mammals and fish to the general physical presence of infrastructure and vessels (Sparling et al. 2015), along with the risk of collisions from vessels in transit.

Activities covered in the consent applications for the KADP will result in a small increase in vessel traffic within the wider Kinsale Area (typically 3-6 vessels), being present during the entire programme of works over a 12-18 month period, though not necessarily continuously. The Kinsale Area is known to be frequented by several marine mammal species and its adjacent coast supports important habitat for migratory fish species. However, the physical presence of the decommissioning activities, including large, slow-moving vessels around areas of existing activity, and the temporary presence of anchored barges/rigs, are anticipated to cause no more than temporary and localised low-level behavioural responses similar to those from normal operations, such that significant effects will not occur.

5.2.2 Underwater Noise and Vibration

The key sources of noise and vibration associated with the decommissioning operations are shown in **Table 5.2** below.

Table 5.2: Sources of noise and vibration

Facility	Activity/Source of Potential Effect
Consent Application 1	
Platform wells	Underwater noise associated with cutting and removal of casings
Subsea wells	Underwater noise from vessels, including DP
Topsides removal	Underwater noise from vessels, including DP
Subsea structures	Underwater noise from vessels, including DP
Consent Application 2	
Jackets	Underwater noise from abrasive, high pressure water jet and other cutting (internal and external cuts) Underwater noise from vessels including DP
Pipelines and umbilicals	Underwater noise from vessels including DP and rock placement
Post-decommissioning survey	Underwater noise from survey equipment

Underwater sound radiates from a vessel as the combined effect of multiple sources and paths; the main sources are propeller/thruster cavitation and machinery noise, with additional sound generated as the hull moves through the water (hydrodynamic noise) or by sea-connected systems (e.g. pumps) (Spence *et al.* 2007, Abrahamsen 2012). While the sources and paths of sound from vessels are well understood, predicting sound exposure on the basis of vessel information is complex; it depends on the design of the vessel, how it operates, its age (or time since regular maintenance), and also the characteristics of the environment in which it operates (OSPAR 2009).

The bulk of the decommissioning activity will be carried out by medium-sized (80-100m length) support vessels, in addition to a rock-placement vessel(s); these will generate source levels of 165-180 dB re 1µPa@1m, with slightly increased levels expected during operations requiring dynamic positioning (DP). In the absence of vessel-specific or directly comparable data, it is assumed that as a precautionary approach the average broadband source levels of the HLV and drilling rig in transit would be taken as those of the loudest recorded container ship, in the region of 185-195 dB re 1µPa@1m (McKenna *et al.* 2012, Veirs *et al.* 2016).

Cutting (e.g. of well casings or jacket legs) and rock placement activities will periodically generate underwater noise of short duration, with source levels of up to 170 dB re 1µPa@1m which are unlikely to be readily discernible over the noise generated by associated vessels in the area (e.g. see Nedwell & Edwards 2004, Pangerc *et al.* 2016, Molvaer & Gjestland 1981). Similarly, Doppler Velocity Logs (DVL) or Ultra Short Baseline (USBL) sonar systems for use in positioning rock placement ROVs, which produce high frequency noise comparable to that of a ship's single-beam echo-sounder, are not expected to be discernible from the broadband noise of associated vessels in the area. DVL systems generally emit noise at frequencies which are beyond the hearing range of relevant marine mammals (300-1,200kHz). While USBL systems operate at frequencies (20-40kHz⁴) which are audible to mid- and high-frequency cetaceans (see **Table 5.3**), they are designed for close-range transmission between features close to the seabed; source sound levels (e.g. indicative 187-196dB re 1µPa at 1m⁵) are less than those of Multi Beam Echo Sounders, significantly less than seismic survey, and will be rapidly attenuated to low levels within a few tens of metres of the source.

Side scan sonar and MBES equipment are used routinely in surface geophysical surveys, and are proposed to be used in the post-decommissioning survey. There are a number of different systems on the market resulting in a variety of outputs in terms of power, frequency and directionality, but for those most commonly

⁴ Based on indicative manufacturers' specifications (e.g. Triton MicroNav, SonarDyne ROVNav 6).

deployed on site surveys the expectation is that generated sound levels drop off very quickly with distance due to a combination of high frequency and high directionality (DECC 2016).

Characteristics of sound generation are commonly modelled from estimated source levels based on manufacturers' specifications (Zykov 2013) but efforts are ongoing to obtain direct measurements of operating equipment in testing facilities and in the field (Crocker & Fratantonio 2016).

The specific survey equipment to be used in the post-decommissioning survey are yet to be selected and so for the purposes of assessment it has been assumed that the equipment will operate at dual frequency of 114 or 410kHz with a source sound level of ~223dB re 1µPa@1m⁵ and that the MBES equipment will operate at a frequency of 200-400kHz (300kHz normal operation) with a source sound level of ~210dB re1µPa@1m.

A high level summary of the main noise source types is given in **Table 5.3**.

Table 5.3: Summary of indicative noise sources associated with the KADP

Noise source (relevant activities)	Approximate indicative broadband source level (dB re 1µPa@1m)	Indicative dominant frequency	Source	Relevant Consent Application	
				1	2
Vessels of 50-100m length (PSV, AHV, CSV, DSV; rock placement vessel)	165-180 ^{a,b}	< 1,000Hz	OSPAR (2009)	✓	✓
Vessels of 100-300m length (HLV)	175-195 ^{a,b}	< 200Hz	OSPAR 2009, McKenna <i>et al.</i> (2012) ; Veirs <i>et al.</i> (2016)	✓	✓
Diamond wire cutting tool (topside/jacket separation, jacket structural members)	na; at 100m from source: ≤ 130dB re 1 µPa ² per 1/3 octave band for all recorded frequencies from 5,000-40,000Hz ^c	> 10,000Hz	Pangerc <i>et al.</i> (2016)	✓	✓
Water jet lance tool (broadly indicative of abrasive water jet cutting e.g. jacket structural member cutting)	160.1-170.5	> 200Hz	Molvaer & Gjestland 1981	✓	✓
Side scan sonar (post-decommissioning survey)	223	114 or 440kHz	Based on Kongsberg dual frequency side scan sonar ⁶	-	✓
Multibeam echosounder (post-decommissioning survey)	210	200-400kHz (300kHz normal operation)	Based on Kongsberg Maritime EM2040	-	✓

Notes: a Within the ranges provided, broadband source levels are generally higher for larger vessels of these categories.

⁵ Based on representative Kongsberg dual frequency side scan sonar:
<https://www.km.kongsberg.com/ks/web/nokbg0240.nsf/AllWeb/2D0C8EA035ABC7C6C12574C500512571?OpenDocument>

⁶ Based on representative Kongsberg dual frequency side scan sonar:
<https://www.km.kongsberg.com/ks/web/nokbg0240.nsf/AllWeb/2D0C8EA035ABC7C6C12574C500512571?OpenDocument>

b Slight increases in broadband source levels anticipated during use of DP thrusters. c Generally indistinguishable above background noise at low frequencies; ca. 4 and up to 15dB re 1 μ Pa² per 1/3 octave band above background between 10,000-40,000Hz.

Marine Mammals

Marine mammals, for which sound is fundamental across a wide range of critical natural functions, show high sensitivity to underwater sound.

In terms of impact, anthropogenic sound sources have been categorised based on acoustic and operational features (Southall *et al.* 2007); the main distinction is between pulsed and non-pulsed sounds due to differences in the auditory fatigue and acoustic trauma they induce, with the brief, rapid-rise of impulsive sounds being potentially more damaging. Generally, the severity of effects tends to increase with increasing exposure to noise with both sound intensity and duration of exposure being important. A distinction can be drawn between effects associated with physical (including auditory) injury and effects associated with behavioural disturbance. With respect to injury, risk from an activity can be assessed using threshold criteria based on sound levels (e.g. Southall *et al.* 2007, Lucke *et al.* 2009, NMFS 2016). With respect to disturbance however, it has proved much more difficult to establish broadly applicable threshold criteria based on exposure alone (NPWS 2014).

In addition, auditory capabilities are frequency dependent and vary between species (Southall *et al.* 2007). Several species of marine mammals which are also qualifying interests of Roaringwater Bay & Islands SAC may be present in the Kinsale Area. **Table 5.4** provides details of the relevant Annex II species listed by functional hearing group, the relevant auditory bandwidth as defined by Southall *et al.* (2007) and NMFS (2016), and the broadband injury threshold sound pressure levels proposed by Southall *et al.* (2007) and Lucke *et al.* (2009).

Table 5.4: Relevant qualifying interests of relevant sites and their auditory capabilities

Annex II species which are qualifying interests of relevant sites	Natura 2000 site of which feature of interest	Hearing range	Proposed injury threshold criteria to non-pulsed sounds (SPL)
High-frequency cetaceans			
Harbour porpoise <i>Phocoena phocoena</i>	Roaringwater Bay & Islands SAC	200Hz to 180kHz ^a 275Hz to 160kHz ^b	200 dB re 1 μ Pa ^c
Pinnipeds in water			
Grey seal <i>Halichoerus grypus</i>	Roaringwater Bay & Islands SAC	75Hz to 75kHz ^a 50Hz to 86kHz ^b	218 dB re 1 μ Pa ^a

*Notes: Injury is defined as the level at which a single exposure is likely to cause onset of permanent hearing loss¹. SPL = Sound Pressure Level. Sources: ^a Southall *et al.* (2007); ^b NMFS (2016); ^c Lucke *et al.* (2009).*

Sound from vessels has a wide frequency spectrum, but the dominant and most widely propagated frequency tends to be low (<200Hz). Therefore, while relevant marine mammal species which may occur in the Kinsale Area are expected in principle to be able to detect these sounds, it is low-frequency cetaceans (e.g. fin whale, minke whale, humpback whale and sei whale – see **Section 7** for Annex IV Species screening) and pinnipeds whose hearing ranges show the greatest overlap with noise generated by the KADP.

With respect to injury thresholds and disturbance considerations, continuous underwater sound generated from vessels and cutting tools is understood to be relatively minor in comparison to impulsive sounds derived from high amplitude sources such as airguns during seismic surveys, impact piling or explosives (DECC,

2016). Moreover, the estimated source levels of the decommissioning activities are below the proposed thresholds for injury to all functional hearing groups of marine mammals.

In terms of behavioural disturbance, it cannot be excluded that sound from vessels will in the short-term influence the behaviour of individual marine mammals within the vicinity of the operations. Given the very low occurrence of harbour or grey seals in the Kinsale area and the $\geq 74\text{km}$ distance from the nearest subsea well for which decommissioning activities are proposed to the nearest designated conservation site for seals (Roaringwater Bay and Islands SAC: grey seal), the potential for disturbance to these species from underwater noise generated during the KADP is considered highly unlikely. The closest site for harbour porpoise is similarly Roaringwater Bay and Islands SAC at the $\geq 74\text{km}$ distance as described above, though harbour porpoise may be present across the Kinsale Area at some distance from the site boundaries. However, overall, the likelihood that behavioural disturbance effects could become significant at the population level is considered to be extremely low due to a combination of source level characteristics, duration of activity, and the current understanding of marine mammals movement and behaviour in the relevant offshore area.

The hearing range of marine mammals has the potential to overlap with the high frequency sound generated by the multibeam system and by the proposed side scan sonar (particularly the lower frequency of 114kHz). Because of the high frequency, attenuation of sound intensity occurs efficiently in the water column. Thus based on the characteristics of the sound source, the hearing capabilities of marine mammals, and the overall duration and location of the survey, any risk of injury or disturbance is assessed as highly unlikely.

Fish

Many species of fish are highly sensitive to sound and vibration and broadly applicable sound exposure criteria have recently been published (Popper *et al.* 2014). While it is recognised that vessel and other continuous noise may influence several aspects of fish behaviour including inducing avoidance and altering swimming speed, direction and schooling behaviour (e.g. De Robertis & Handegard, 2013), there is no evidence of mortality or potential mortal injury to fish from ship noise (Popper *et al.* 2014). The closest site for which there are relevant migratory/anadromous fish species (sea and river lamprey, and Atlantic salmon) which are also qualifying interests, is Blackwater River SAC, located approximately 28km from the nearest point on the offshore pipelines for which decommissioning activities are proposed i.e. rock placement.

Studies of fish mortality or behavioural response to noise have tended to focus on geological seismic survey, and while the proposed post-decommissioning survey will generate significantly less noise than these (the methods deployed will involve seabed mapping using side scan sonar and/or MBES), these studies have relevance to the consideration of potential noise effects on fish and are therefore described here. Studies investigating fish mortality and organ damage from noise generated during seismic surveys are very limited and results are highly variable, from no effect to long-term auditory damage (reviewed in Popper *et al.* 2014). On the other hand, behavioural responses and potential effects on fishing success ("catchability") have been reported following seismic surveys (Pearson *et al.* 1992, Skalski *et al.* 1992, Engås *et al.* 1996, Wardle *et al.* 2001). Potential effects on migratory diadromous fish is an area of significant interest for which empirical evidence is still limited, especially as salmonids and eels are sensitive to particle motion (not sound pressure) (Gill & Bartlett 2010). Atlantic salmon *Salmo salar* have been shown through physiological studies to respond to low frequency sounds (below 380Hz), with best hearing at 160Hz (threshold 95 dB re 1 μPa). Hence, their ability to respond to sound pressure is regarded as relatively poor with a narrow frequency span, a limited ability to discriminate between sounds, and a low overall sensitivity (Hawkins & Johnstone 1978, cited by Gill & Bartlett 2010).

Given the source level characteristics and the context of similar contributions (shipping and fishing) to the ambient anthropogenic noise spectrum of the area over several decades, no injury or significant behavioural disturbance to fish populations will occur.

Birds

Direct effects from impulsive noise on seabirds could occur through physical damage, or through disturbance of normal behaviour. Diving seabirds (e.g. auks) may be most at risk of acute trauma but while this is theoretically possible, evidence is limited.

Hearing sensitivity for species measured so far peaks between 1 and 3kHz, with a steep roll-off after 4kHz (Crowell *et al.* 2015). Mortality of seabirds has not been observed during extensive seismic operations in the North Sea and elsewhere.

While very high amplitude low frequency underwater noise may result in acute trauma to diving seabirds (i.e. within 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.

Summary and Conclusions

It should be noted that anthropogenic noise sources of greatest concern with regard to potential effects on marine species are those which generate high-amplitude pulsed sounds, including underwater explosions, seismic surveys, and percussive pile-driving, none of which are being proposed within the current applications. Seismic surveys have the potential to generate sound that exceeds thresholds of injury for marine mammals only within a limited range from source, i.e. tens to hundreds of metres. The noise sources associated with the proposed activities are substantially smaller than that used in seismic surveys relevant to most of those studies referred to above; therefore the scale and likelihood of any potential effect is much smaller.

Specific mitigation is not required, as the anticipated source level characteristics from vessels are low, and the post-decommissioning survey has a minor source of effect and is temporary (5 days). Wherever possible, through careful activity phasing, the KADP will seek vessel synergies to minimise vessel days and associated noise emissions, and the post-decommissioning survey will be carried out in accordance with established guidelines (including NPWS 2014) as appropriate. It is important to note that there will be no significant impact even if the phasing approach is not taken.

The primary contributor to underwater noise from the KADP will be vessel activity (consent application 1 and 2), as subsea activities such as cutting and rock placement are not discernible above their associated vessel noise source. The increased vessel activity associated with the KADP will add to the overall ambient noise in the Kinsale Area; however, source level characteristics are well-below proposed injury criteria for marine mammals (NMFS, 2016), and the continuous noise from vessels is not reported to result in injury to fish or marine turtles. Similarly, noise associated with the post-decommissioning survey is not regarded to result in likely significant effects for marine mammals, birds and fish.

The noise sources will be temporary and minimised by a phased approach to decommissioning such that vessel time in the field is minimised. While sound from vessels may result in some temporary influence on the behaviour of individual marine mammals within the vicinity of the operations, significant effects at the population level are not considered to be likely. It is important to note that there will be no significant impact even if there are no synergies.

5.2.3 Discharges to sea

A range of discharges from operational and legacy sources were identified as requiring further consideration, as outlined in **Table 5.5**.

Table 5.5: Potential discharges

Facility	Activity/Source of Potential Effect
Consent Application 1	
Platform wells	Discharges associated with well decommissioning: cementing and other chemicals.
Subsea wells	
Topsides removal	n/a – none considered significant.
Offshore facilities preparation	Displacement of contents of pipelines and umbilicals (hydraulic fluid from umbilical hydraulic lines)
Subsea structures	n/a – none considered significant
Consent Application 2	
Pipelines and umbilicals	Discharges associated with displacement of contents of export pipeline (including inhibited seawater) and legacy discharges

Each of these discharge sources is discussed below.

Operational discharges

While the operations include the decommissioning of multiple wells and use of a mobile drilling rig, no well related drilling is planned (although some milling of concrete or steel casing may be necessary) and therefore, discharges will be limited to excess made cement (though only likely for contingency) and potentially treated seawater used to ensure a good bonding of the cement plugs in the wells. A filtration package will be used to treat any well returns to meet required legal standards to allow discharge to sea. If these cannot be met the returns will be contained and shipped to shore for treatment and disposal. Any discharges associated with well decommissioning will be made under a Permit to Use or Discharge Added Chemicals (PUDAC)⁷.

Significant effects on water quality and related water column biota (e.g. plankton, fish and shellfish, marine mammals) are not considered to be likely.

The 24" (and potentially the 18" Seven Heads) export pipeline will be filled with ~15,800m³ and 5,700m³ inhibited seawater respectively from Kinsale Alpha to maintain the pipelines, including the onshore section to Inch Terminal. The seawater will be treated with a combination of corrosion inhibitor, oxygen scavenger and microbicide⁸. In the event that no reuse option is identified within the overall decommissioning programme timeframe, the pipeline end would be opened, and the inhibited seawater would be gradually discharged at the seaward end of the pipeline. If a reuse option is identified, the inhibited water would also need to be discharged to accommodate that use at a suitable time. Additionally, surfactants may be used during the displacement of the other pipelines to seawater in order to maximise the removal of any residual hydrocarbons in these pipelines. Though this would be contained as part of the displacement to wells, a small quantity may be locally released on removal of spool pieces during subsea structure removal and jacket removal scope of works. Final chemical selection would be made at the time of decommissioning and this would follow the principle of using the least harmful chemicals for technical function, and all chemicals would be subject to permitting via a PUDAC. The water depths at the discharge point (Kinsale Alpha) are ~90m, and

⁷ A number of OSPAR measures cover the use and discharge of chemicals offshore, including the Harmonised Mandatory Control Scheme (HMCS) and the ranking of chemicals according to a hazard quotient. The most harmful chemicals are identified for substitution under OSPAR, with these being phased out except where no functionally equivalent chemicals have been identified. The use and discharge of chemicals offshore under OSPAR requires a permit, implemented in Ireland through the PUDAC process.

⁸ Note that total chemical usage and discharge for this operation has been estimated using representative chemicals and concentrations (100-500ppm) to be in the order of 13.5m³.

dispersion of this discharge will be rapid. Likely significant effects on water quality and related water column fauna are not predicted from pipeline related discharges.

For context, annual average operational discharges to sea from the Kinsale Area facilities (2010-2016) have been minor and include 1,313m³ water of condensation (no connate water is produced with the gas), 21kg of oil associated with produced water, 7,471kg of triethylene glycol (TEG) and methanol and 3,911kg of hydraulic fluid losses. These discharges will cease following decommissioning.

Legacy discharges

Legacy discharges represent those which may take place gradually sometime after decommissioning, resulting from losses from the open ends of pipelines/umbilicals, or as pipeline/umbilicals degrade. Other than the 24" export pipeline, all pipelines will be displaced to seawater and no discharge of residual hydrocarbons is expected, noting the nature of the produced gas. This seawater, and a small quantity of surfactants used in pipeline cleaning, will eventually be released as the pipelines degrade.

Prior to decommissioning, all of the chemical lines within the umbilicals will have been displaced with seawater, eliminating discharges to sea from this source during or after decommissioning activities. These lines contain methanol and triethylene glycol (TEG) used for the prevention of hydrate formation.

Both of these chemicals are in the Offshore Chemical Notification Scheme (OCNS)⁹ group E (those considered to have the least potential environmental hazard), methanol is categorised to Pose Little or No Risk to the environment (PLONOR).

It is proposed that the water based hydraulic fluid used in the subsea hydraulic control system will remain in the lines, all or part of which may be lost during decommissioning (removal of umbilical jumpers) and/or over time due to degradation of the umbilical, depending on the chosen options. The total volume of hydraulic fluid in all the Kinsale Area umbilicals is approximately 29.5m³. Any release would, under the influence of local currents, rapidly disperse and dilute and is not considered likely to result in significant effects.

Marine growth removal

The jackets of the two Kinsale Head platforms are each covered with an estimated 1,450 tonnes of marine growth. The growth comprises of a variety of hard- and soft-bodied organisms which commonly colonise hard structures in the temperate north-east Atlantic, including: various species of algae, bivalves (primarily *Mytilus edulis*), barnacles, hydroids, plumose anemones, and soft corals (e.g. *Alcyonium digitatum*). These species have a minor influence on the surrounding water column and seabed through the release of solid and dissolved metabolic products, of larvae, and detached biota.

The presence of the jackets and subsea structures and their associated marine growth also provide shelter and food for larger animals such as fish and marine mammals. As these structures are required to be removed under OSPAR Decision 98/3, the assessment only considers the effects of the removal of marine growth as structures are removed. BMT Cordah (2013) reviewed the relative performance of options for marine growth removal during the decommissioning of offshore facilities. Two approaches were considered: (1) removal at the onshore disposal yard and (2) removal offshore at the field location.

An advantage of offshore removal is the avoidance of two sources of potential impact associated with onshore marine growth removal: odour and waste disposal (BMT Cordah 2013). An identified disadvantage of offshore removal is longer vessel operations, resulting in extended physical presence, additional atmospheric emissions and increased costs. However, it is noted that BMT Cordah (2013) only considered removal of marine growth from the jacket *in situ* by ROV; removal of marine growth from a jacket already loaded on to an HLV or barge and/or as it is being removed, is anticipated to be more efficient.

⁹ The OCNS is a management system used in the UK and Netherlands, in accordance with the OSPAR Harmonised Offshore Chemical Notification system.

Marine growth removal at an onshore disposal yard has the advantage of not adding time to offshore operations. Some marine growth will still be removed offshore in this scenario, for example to gain access to cut jacket members or legs, and a proportion will also fall off on transport to shore through desiccation (BMT Cordah 2013). While the discharge of marine growth can cause temporary turbidity, nutrient enhancement and an increase in biological oxygen demand within a plume of dispersed material and area of seabed deposition, natural processes, including microbial decomposition, consumption by other organisms, sediment mixing and dispersion by currents, will result in the breakdown of discharged marine growth. Given the productive and dynamic nature of the surrounding environment, dispersion and breakdown of marine growth is predicted to be rapid, particularly in view of the preferred option, which will see the bulk of marine growth returned to shore. Likely significant effects on the qualifying features of any of the relevant sites identified are not predicted.

Onshore removal of marine growth results in odours associated with decaying organisms, which may pose a nuisance to local settlements depending on their proximity to the yard and environmental conditions at the time. Yard operators implement odour management plans and can apply various measures to minimise the issue (e.g. applying odour suppressants; storing in covered skips), which is generally successfully mitigated. Removed marine growth is typically disposed of at a landfill; composting or land (agricultural) spreading present alternative methods of disposal, but their availability may be limited.

It is assumed that all marine growth is to be removed onshore, as described, with the material being transported along with the jackets to a licensed disposal yard. Any negative effects predicted are minor and temporary in nature with no significant negative effects predicted.

5.2.3.1 Potential impacts on receptors relevant to Natura 2000 sites

As all of the above potential discharges associated with decommissioning activities would take place some distance from the nearest Natura 2000 site (Cork Harbour SPA being the closest designated for sea birds, located approx. 6km away; Roaringwater Bay and Islands SAC designated for marine mammals, located approx. 74km away and Blackwater River SAC designated for fish species, located approx. 28km away), are temporally and spatially restricted, and are considered to disperse rapidly on release, no likely significant impacts are anticipated from marine discharges associated with the KADP on Natura 2000 sites.

5.2.4 Accidental events

Risk assessment of accidental events, including the risk of major accidents (i.e. as required under Article 3(2) of Directive 2011/92/EU, as amended), involves the identification of credible accident scenarios, evaluation of the probability of incidents and assessment of their ecological and socio-economic consequences. Evaluating spill risk requires consideration of the probability of an incident occurring and the consequences of the impact. Given the nature of the activities which could take place as a result of decommissioning, the potential sources of accidental events have been identified for each project consent application as shown below in **Table 5.6**.

Table 5.6: Potential sources of accidental events

Facility	Activity/Source of Potential Effect
Consent Application 1	
Platform wells	Dropped objects
Subsea wells	Accidental releases to atmosphere (including refrigerants and natural gas from well blowout) Accidental spills of fuel/lubricants Chemical spills
Topsides removal	Dropped objects Vessel collision Accidental spills of fuel/lubricants
Subsea structures	Dropped objects Vessel collision Accidental spills of fuel/lubricants
Consent Application 2	
Jackets	Dropped objects
Pipelines and umbilicals	Vessel collision Accidental spills of fuel/lubricants

All of the platform topsides and pipelines will be cleaned prior to decommissioning work commencing, and due to the nature of the produced hydrocarbons (dry gas), there is not considered to be any risk from residual hydrocarbons which could lead to pollution. In advance of well abandonment, each well bore will be displaced to seawater. Extremely low reservoir pressures (~50-100 psia at decommissioning) and well control procedures make the risk of a well blowout remote.

The loss of the diesel fuel inventory from the semi-submersible rig or HLV (estimated to be ca. 1,000-1,500m³) represents the main source of an accidental spill of oil associated with the decommissioning operations. The complete loss of rig or HLV inventory is only likely to occur following a severe accident such as a major collision, explosion or capsizes. Accident statistics for mobile drilling units on the UKCS estimated annual average frequencies for these events of between 1.4×10^{-2} and 9.0×10^{-4} per unit year for the period 1990-2007 (Oil and Gas UK 2009).

Of relevance to the KADP, stochastic oil spill modelling based on loss of diesel inventory from a drilling rig was recently completed for the Middleton Exploration Well 49/11-3, approximately 20km north-east of the Kinsale Head area (RPS 2015). The modelling indicated that in a worst case event of loss of the entire rig fuel inventory (800 tonnes/ca. 900m³), there was <10% chance of any residue reaching coastal waters or crossing the Ireland/UK median line.

The model indicated that due to the relatively strong winds in the area and the chemical properties of the diesel (e.g. low viscosity, no emulsion formation), any fuel spilt either evaporated or was entrained in the water column within 24 hours, leaving very little on the surface and below levels to be of risk to wildlife or habitats, or detectable by visual inspection. From the modelling it was concluded that in the highly unlikely event of the loss of the entire rig fuel inventory there was zero percent probability of beaching. It is expected that the worst case scenario of a large diesel spill from a rig or HLV employed during decommissioning operations of the platforms would result in a similar outcome to that modelled for the Middleton Prospect given the similar environmental conditions and fuel properties, though noting that when operating, the HLV would be at a greater distance from the coast (ca. 45km from the coast to the platforms compared to 36km for the Middleton Prospect).

Marine Mammals

Generally, marine mammals (which rely on blubber for insulation) are less vulnerable than seabirds to fouling by oil, but they are at risk from hydrocarbons and other chemicals that may evaporate from the surface of an oil slick at sea within the first few days.

For a diesel spill this evaporation happens largely within the first 24 hours. In contrast to seabirds there is relatively little evidence of direct mortality associated with oil spills (Geraci & St. Aubin 1990, Hammond *et al.* 2003), although the aggregated distribution of some species (especially dolphins) may expose large numbers of individuals to localised oiling.

As previously outlined, two Annex II species (grey seal, harbour porpoise) which are qualifying interests of the Roaringwater Bay and Islands SAC could potentially occur within the wider Kinsale Area, noting that the site is some distance away (≥ 74 km from the nearest subsea well for which decommissioning activities are proposed). The potential for a significant effect to be generated for these species from accidental spills in the Kinsale Area is considered highly unlikely in view of the remote likelihood of such an accident occurring and the relative vulnerability of relevant species.

Fish

Hydrocarbon spills have the potential to affect fish and shellfish populations by tainting (defined as the ability of a substance to impart a foreign flavour or odour to the flesh of fish and shellfish following prolonged and regular discharges of tainting substances) caused by ingestion of hydrocarbon residues in the water column and on the sea bed, though the risk of such taint is low in deeper (>10 m), open waters (Law *et al.* 2011). Possible effects on human consumers of seafood are also an issue of concern in relation to accidental spills and industrial discharges, and actual or perceived contamination may therefore result in economic effects on fishing and associated industries. There will be no significant impact on fish as a result of the proposed decommissioning.

Birds

Seabirds and marine mammals are generally considered the most vulnerable components of the ecosystem to oil spills in offshore and coastal environments, because of their close association with the sea surface.

The effect of oil pollution on seabirds depends (amongst other factors) on the numbers of seabirds at sea around the site of the incident (Webb *et al.* 2016) and this is particularly true given the likely localised and transient nature of a diesel spill. A number of seabird species may be present in the Kinsale Area. Of these, guillemot, razorbill, black guillemot, puffin and shag are the most sensitive to oil pollution as judged by their seabird oil sensitivity index (SOSI) (Webb *et al.* 2016). However, the majority of these species have a primarily coastal distribution.

Those species that may be present in offshore areas relevant to where most of the decommissioning activities will take place have a moderate SOSI (e.g. fulmar, gannet, lesser black-backed gull and kittiwake). The distance from the nearest point on the offshore pipelines for which decommissioning activities are proposed i.e. rock placement to the nearest designated sites for the lesser black-backed gull is 6km from the KADP (Cork Harbour SPA), and the distance to the nearest designated sites for the Fulmar and Kittiwake is 28km (Old Head of Kinsale). Designated conservation sites for the other sensitive species listed are considered to be outside of the ZOI of the KADP.

Given the low probability of significant accidental fuel spills, no significant impact on relevant qualifying bird species is considered to be likely.

5.2.5 Noise Associated with the Demolition of the Inch Terminal

Birds

No Annex I bird species were recorded during previous bird surveys undertaken on the terminal site; the most recent bird survey having taken place in June 2017.

Overall, the terminal site is of minimal value for birds. The landownership area is of local value for terrestrial bird species that are relatively common in the Irish countryside. A number of these species were recorded breeding in the area; however none were recorded breeding within the terminal site or in its immediate vicinity. The closest Natura 2000 site to the terminal is the Cork Harbour SPA located approximately 4km away. Ballycotton Bay SPA is located approximately 9 km from the terminal site.

Noise generated by plant and machinery and other human activities during the demolition of the terminal could potentially disturb bird species.

The terminal demolition and reinstatement works will take place after Cessation of Production, with demolition activities having a duration of approximately 16 weeks. The site will be reinstated to original ground condition on completion of the works. In considering the size and scale of the existing terminal, the subsequent localised and temporary nature of the demolition works, the habitats present within the terminal site, and the distance to the nearest SPA and species for which the site is designated, no significant impact on the relevant qualifying bird species is considered likely.

5.2.6 Dust emissions associated with the terminal demolition works

Birds

As outlined above, the closest SPA to the Inch terminal site is located approximately 4km from the Inch terminal (Cork Harbour SPA).

Statutory controls and industry best practices, including a dust minimisation plan will be implemented during the demolition works. Taking into consideration the size and scale of the existing terminal and subsequent localised and temporary nature of the demolition works, the best legally required measures which will be implemented and the distance of the site from Cork Harbour SPA, no significant impacts on the relevant qualifying bird species are predicted as a result of the demolition of the Inch Terminal.

Habitats - SACs

The closest SAC to the terminal site is Great Island Channel SAC, located approximately 8km away. The qualifying interests of the Great Island Channel SAC are tidal mudflats and sandflats and Atlantic salt meadows.

Given the size and scale of the existing terminal and subsequent localised and temporary nature of the demolition works, the control measures which will be implemented and the distance of the site from Great Island Channel SAC, no significant impact on the relevant qualifying interests is considered likely.

5.3 Consideration of Potential In-Combination Effects

Few existing or approved projects take place in the Kinsale Area, and no relevant projects were identified which were considered to be a source for potential cumulative effects in relation to Inch Terminal decommissioning. Those for which there is a possible interaction with the KADP include:

- Existing oil and gas lease areas and potential offshore oil & gas related exploration activity
- The Hibernia Atlantic "D" and Hibernia Express subsea cables

- Marine dredge disposal authorisations relating to the Port of Cork and Department of Defence
- Commercial shipping
- Fisheries

In addition to those existing/approved projects/activities, two proposed projects were identified which are yet to be formally approved:

- Ireland France subsea cable
- Eirgrid Celtic interconnector

These projects/activities are considered below against the broad sources of potential effect identified for the KADP in **Section 5.2**. No potential incombination effects have been identified.

5.3.1 Physical Presence

The presence of the decommissioning vessels associated with the KADP will be of a temporary nature, and signify a small and transient incremental increase in the level of shipping in the Celtic Sea. Additionally, the jackets would continue to be present in the short-term should they be placed in “lighthouse mode”, however this does not represent any increment to levels of physical presence with any other project. No other controls on access (e.g. strategic exclusions such as from International Maritime Organisation (IMO) routing) are present in the area.

There are a number of current authorisations for oil and gas exploration in the Celtic Sea which abut the Kinsale lease areas, or overlap these. While activity including the drilling of a well or seismic survey could take place within the terms of these licences, no activity is presently planned¹⁰, and any activity would be likely to take place some distance from those involving the KADP. Any exploratory drilling would be subject to controls including the placement of a temporary exclusion zone, guard vessel and publication of activities through Notices to Mariners, and be subject to its own assessment. Such activity is also temporary in nature (perhaps lasting a few months). Significant cumulative effects with offshore exploration activities are therefore not considered to be likely. The Barryroe oil discovery is located within the EL 1/11 exploration licence area, with an associated appraisal well (48/24-10z) located ~3km from the nearest Kinsale Area facilities (Seven Heads manifold). The discovery has the potential to be developed in the future, but further appraisal is to take place and no firm development proposals have been made. Therefore the nature and scale of any development and its potential interaction with the KADP is uncertain.

Interactions with commercial fishing and shipping (which would include those involved in dredge disposal, and survey or installation activities associated with the proposed subsea cables) have already been considered in Section 7.2. In view of the minor and temporary increment to vessel presence that the KADP would represent, the significant potential for temporal separation of activities (e.g. there is uncertainty in timescales for any exploration activity, and installation activity associated with the potential Celtic interconnector is proposed for between 2021 and 2025), significant cumulative effects are not considered to be likely.

The KADP is not considered likely to lead to significant inter-project cumulative effects by the physical presence of the drilling rig (consent application 1) or other vessels (consent applications 1 and 2), when taken together with the above projects.

5.3.2 Underwater Noise and Vibration

Noise sources associated with those existing projects/activities listed above are likely to be associated with vessels (e.g. shipping, fishing, oil and gas support and rig noise), or possibly seismic survey (i.e. associated

¹⁰ <https://www.dccae.gov.ie/en-ie/natural-resources/topics/Oil-Gas-Exploration-Production/environment/statutory-consents/Pages/2017-Statutory-Assessments.aspx>

with oil and gas exploration). Similarly, vessel noise and potentially surveys to provide seabed mapping (e.g. using side scan sonar and/or MBES) and seabed preparation for cable laying would be a feature of any work associated with the proposed projects identified, however a lack of firm project proposals or approvals limits their consideration here. **Section 5.2.2** indicated that while it cannot be excluded that sound from decommissioning will in the short-term influence the behaviour of individual marine mammals within the vicinity of the operations, the risk that any effect could become significant at the population level, when taking into account other relevant projects/activities, is deemed to be extremely low due to a combination of sound characteristics, duration of activity, and current understanding of marine mammal movements and behaviour in the Kinsale Area. The underwater noise associated with the KADP will represent a small and highly temporary increment to an area exposed to moderate levels of shipping and following decommissioning, shipping associated with the Kinsale Area facilities (~one supply round trip every 28 days), permanent presence of standby vessel and any noise generated from platform operations (e.g. including helicopter traffic, ~2 flights per day), will cease.

As noted above, while there are a number of exploration licence areas in the vicinity of the Kinsale Area, project plans for additional exploration are not known or are uncertain, and therefore no cumulative effects are predicted at this time.

The KADP is not considered likely to lead to significant inter-project cumulative effects by the underwater noise generated by the vessels, cutting or post-decommissioning survey, when taken together with the above projects.

5.3.3 Discharges to Sea

No significant impacts are anticipated from marine discharges associated with the KADP in-combination with other users such as wider shipping (which also includes that associated with the proposed subsea cable projects), discharges from other potential offshore oil & gas exploration activities (e.g. chemical discharges (which would be subject to a PUDAC (see **Section 5.2.3**)), or of cuttings), and marine disposal of dredged material at the Roche's Point dredge disposal site. Decommissioning will also result in the cessation of small permitted discharges associated with the Kinsale platforms and related support operations.

The nature of the decommissioning activities are such that marine discharges will be minor (e.g. from well decommissioning, subject to a PUDAC) and largely those associated with normal shipping operations for which there are adequate existing regulatory standards and controls. The KADP activities are temporary, have no long-term implications, and are not considered to be a source of potentially significant cumulative effect.

5.3.4 Accidental events

The type of accidental events described in **Section 5.2.4** are not planned events and are considered to be highly unlikely. In the context of historical and ongoing leak reporting on the UKCS, including of major accidents (as reported in Dixon (2015)) the incremental risk of additional diesel and chemical spills from other vessels in the region are considered small.

Section 6

AA Screening Statement and Conclusion



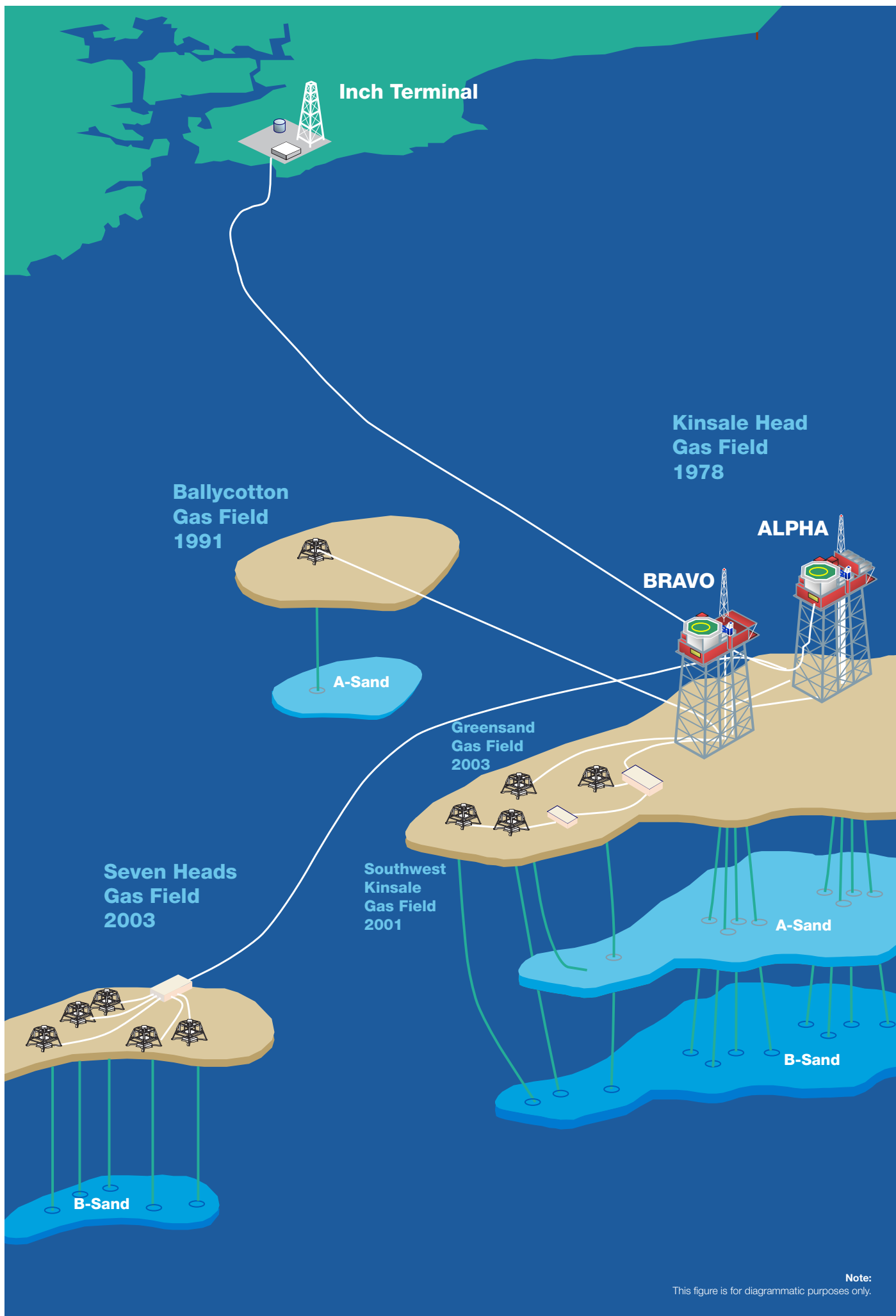
6 AA Screening Statement and Conclusion

In view of best scientific knowledge, the activities associated with the proposed KADP (see **Section 3**) are not considered to result in likely significant effects (alone or in-combination) on the Conservation Objectives of any relevant Natura 2000 site within the Zones of Influence considered.

In light of the findings of this AA Screening Report (see **Section 5**) it can be concluded by the competent authority that it is not considered necessary to undertake any further stage of the Appropriate Assessment process.

Section 7

Annex IV Species Screening for Likely Effects



7 Annex IV Species Screening for likely effects

7.1 Introduction

Outside of designated Natura 2000 sites, the waters over the continental shelf are a suitable habitat for a number of species that are protected under Annex IV of the Habitats Directive.

This assessment considers whether or not the proposed decommissioning works will result in the deliberate disturbance or destruction of any of the species listed in Annex IV of the Habitats Directive which may be present in the study area. The assessment took into account the status (e.g. as indicated in the latest Article 17 reporting for Ireland, NPWS 2013) and sensitivities of relevant Annex IV species to potential impacts associated with the decommissioning activities.

7.2 Species

Habitats Directive Annex IV species that could potentially occur in the KADP study area are listed in **Table 7.1** and discussed in **Section 7.2.1 to 7.2.5** below.

Table 7.1: Relevant Annex IV species

Group	Common Name	Scientific Name	Habitats Directive Annex (es)
Cetaceans	Harbour porpoise	<i>Phocoena</i>	II and IV
	Common dolphin	<i>Delphinus delphis</i>	IV
	Bottlenose dolphin	<i>Tursiops truncatus</i>	II and IV
	Risso's dolphin	<i>Grampus griseus</i>	IV
	Killer whale	<i>Orcinus orca</i>	IV
	Striped dolphin	<i>Stenella coeruleoalba</i>	IV
	Northern right whale	<i>Eubalaena glacialis</i>	IV
	Blue whale	<i>Balaenoptera musculus</i>	IV
	Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	IV
	White-beaked dolphin	<i>Lagenorhynchus albirostris</i>	IV
	Long-finned pilot whale	<i>Globicephala melas</i>	IV

Group	Common Name	Scientific Name	Habitats Directive Annex (es)
	Northern bottlenose whale	<i>Hyperoodon ampullatus</i>	IV
	Minke whale	<i>Balaenoptera acutorostrata</i>	IV
	Humpback whale	<i>Megaptera novaeangliae</i>	IV
	Fin whale	<i>Balaenoptera physalus</i>	IV
	Sei whale	<i>Balaenoptera borealis</i>	IV
Marine Reptiles - Turtles	Leatherback turtle	<i>Dermochelys coriacea</i>	IV
	Loggerhead turtle	<i>Caretta caretta</i>	IV
	Kemp's Ridley turtle	<i>Lepidochelys kempii</i>	IV
	Hawksbill turtle	<i>Eretmochelys imbricata</i>	IV
	Green turtle	<i>Chelonia mydas</i>	IV
Amphibians	Natterjack toad	<i>Bufo calamita</i>	IV
Bats	Lesser Horseshoe	<i>Rhinolophus hipposideros</i>	II and IV
	Daubenton's bat	<i>Myotis daubentoni</i>	IV
	Common pipistrelle	<i>Pipistrellus pipistrellus</i>	IV
	Brown long-eared bat	<i>Plecotus auritus</i>	IV
	Whiskered bat	<i>Myotis mystacinus</i>	IV
	Brandt's bat	<i>Myotis brandtii</i>	IV
	Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	IV
	Natterer's bat	<i>Myotis nattereri</i>	IV
	Leisler's bat	<i>Nyctalus leisleri</i>	IV

Group	Common Name	Scientific Name	Habitats Directive Annex (es)
	Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	IV
Mammals	Otter	<i>Lutra lutra</i>	IV

7.2.1 Cetaceans

Irish waters are among the most important in Europe for cetacean species, with 25 species having been recorded in the region, and in 1991, the government declared Irish waters a whale and dolphin sanctuary¹¹. Eighteen of these species are regularly observed, while the remaining seven might be classed as vagrant species (NPWS, 2014). The combination of shallow waters, deep oceanic areas with complex bathymetry and the productive shelf edge provide a range of habitats and feeding opportunities.

There are several key data resources on the species composition and relative abundance of the marine mammal fauna in the Kinsale area and wider Celtic Sea. The annual Celtic Sea Herring Acoustic Surveys (CSHAS) cover waters off the south coast of Ireland, typically over a three week period each October and extends from 2-3km off the coast to over 100km offshore (e.g. O'Donnell *et al.* 2017). Dedicated marine mammal observers recorded sightings when light and environmental conditions permitted; combined data from 10 years of surveys from 2008-2017 were reviewed, along with data extracted from the Irish Whale and Dolphin Group's (IWDG) Casual Cetacean Sightings database, which includes sightings submitted by IWDG members, researchers and the general public and validated by the IWDG (IWDG 2018). The IWDG casual sightings data are not effort corrected, and are biased towards busier and more accessible coastal waters, and areas subject to research (e.g. Ryan *et al.* 2010, Whooley *et al.* 2011); but provide useful information on the composition and relative abundance of cetacean species of the area. Data from the IWDG casual database and other sources over the period 2005-2011 were synthesised by Wall *et al.* (2013), which includes an assessment of the seasonal occurrence of the most commonly sighted species.

The harbour porpoise (*Phocoena phocoena*), common dolphin (*Delphinus delphis*) and bottlenose dolphin (*Tursiops truncatus*) are the most common toothed cetaceans off the south coast of Ireland where they are sighted year-round (**Table 7.2**). Risso's dolphin (*Grampus griseus*) are occasionally seen in this region, primarily in summer, while a small number of killer whale (*Orcinus orca*) sightings have occurred close to the coast. Fin whales (*Balaenoptera physalus*) are the most commonly sighted baleen whale, most frequently and in the greatest numbers in late summer and autumn. Minke whale are also most frequently observed during late summer to autumn, albeit in apparently lower abundance. Small numbers of humpback whales also occur in this area, with sightings peaking from late summer through to January. All cetaceans are listed on Annex IV of the Habitats Directive. **Table 7.2** shows the seasonal distribution of Cetaceans in Irish Waters.

Table 7.2: Seasonal occurrence of cetaceans in the Kinsale Area

Species	J	F	M	A	M	J	J	A	S	O	N	D
Harbour porpoise	2	2	2	3	3	2	2	2	2	2	2	2
Common dolphin	2	2	2	2	2	2	2	2	1	1	1	1

¹¹ The Irish whale and dolphin sanctuary is not a legal entity, rather a statement of political will which has resulted in considerable public awareness and interest towards cetaceans in Irish waters. They are protected by national legislation (Whale Fisheries Act 1937 & 1982; Wildlife Act 1976), the EC Habitats Directive and several international conventions.

Species	J	F	M	A	M	J	J	A	S	O	N	D
Bottlenose dolphin	3	3	3	3	3	3	3	3	3	3	3	3
Risso's dolphin	-	-	-	4	4	3	3	3	4	4	4	-
Minke whale	-	-	4	3	3	3	3	3	2	2	2	4
Humpback whale	3	4	-	4	4	4	3	3	3	3	2	3
Fin whale	4	4	-	-	4	4	3	3	3	2	2	3

Source: Wall *et al.* (2013) and S. Berrow, IWDG (pers. comm. May 2018) (see additional references provided in text below for additional information)

Notes: Information on seasonal abundance of cetaceans is limited, so this table should be regarded as indicative of general trends. Abundance has been ranked from 1-4, where 1 is "very abundant" and 4 is "low abundance". '-' means no sightings were recorded in that month and/or abundance is considered likely to be extremely low.

Harbour porpoise

The harbour porpoise is the most abundant and widespread species occurring around the Irish coast, commonly seen in shallow coastal waters in the summer, although surveys suggest highest densities along the south coast occur in autumn (Marine Institute, 2013). They move further offshore in the spring; although the details of this migration are uncertain, it may be linked to calving (DCENR, 2015). Harbour porpoise are generally less often encountered in the Celtic Sea than in the Irish Sea, although it may be that this is a result of lower survey effort and higher sea states off the south coast (Wall *et al.* 2013). In both the CSHAS and selected IWDG casual sightings data, harbour porpoise are the second most frequently sighted toothed cetacean, seen both close to shore and in offshore waters. A comparison of the results of the broad-scale SCANS and SCANS-II surveys (SCANS-II 2008) indicate there has been a general shift to the southwest and an increase in the harbour porpoise population in the region over the period between the surveys. As noted above, harbour porpoise are a designated feature within the Roaringwater Bay and Islands SAC, 76km to the west of the Kinsale Area, with a population that has been consistently estimated at between 150-160 individuals (Berrow *et al.* 2014).

Common dolphin

The common dolphin is Ireland's most common dolphin species and it is most abundant off the south and southwest coasts, where they are often seen in very large groups. They tend to move east over the winter, with sightings off County Cork at their greatest between September and January (Berrow *et al.* 2010). Common dolphins were, by a large margin, the most frequently observed and numerous species during the recent CSHAS and in the IWDG casual sightings data extract. Sightings were widely distributed throughout the waters off the south coast of Ireland. Common dolphins typically move further offshore in the summer and are seen in large groups, moving to inshore waters in autumn, probably linked to the presence of large numbers of schooling pelagic fish (Marine Institute, 2013).

Bottlenose dolphin

Bottlenose dolphins are present in the Celtic Sea and there is a small semi-resident population present at Cork Harbour, where six individuals have been repeatedly sighted (Ryan *et al.* 2010), with larger numbers visiting the area during the summer. The species is more commonly seen off the west coasts of the country, with sightings peaking in summer (Berrow *et al.* 2010). There are few CSHAS records of bottlenose dolphins in offshore waters off the south coast, although there are occasional opportunistic sightings of the species offshore, including around the Kinsale field (Wall *et al.* 2013, IWDG 2018). Photo-identification data from groups of bottlenose dolphins at several locations around the coast of Ireland have revealed movement of

animals between sites separated by 130-650km over durations of 26-760 days, providing evidence that many individuals should be considered highly mobile and transient (O'Brien *et al.* 2009).

Other dolphins

Risso's dolphin are occasionally observed in the wider area, most commonly in the summer months and within a few kilometres of the coast (Wall *et al.* 2013). One Risso's dolphin was recorded outside Cork Harbour during the 2014 CSHAS (Nolan *et al.* 2014), while none were seen off the south coast of Ireland in 2016 or 2017. A small number of killer whales have been recorded off the south coast, primarily during summer (Wall *et al.* 2013). Records of other toothed cetacean species off the south coast (i.e. white-beaked dolphin *Lagenorhynchus albirostris* and long-finned pilot whale *Globicephala melas*) are very rare and these species would be highly unlikely to be present in the Kinsale area.

Baleen whales

Baleen whales are sighted along the south coast of Ireland primarily from late summer through autumn. Minke whales are observed in most months of the year, but is most frequently seen from April to November (Berrow *et al.* 2010). The larger fin and humpback whales are regularly observed in small numbers both close to the coast and further offshore, primarily in autumn and winter when these waters are a known foraging ground (Marine Institute 2013). Fin whales sightings peak in November (Berrow *et al.* 2010, Whooley *et al.* 2011), and they were the most frequently sighted and most numerous baleen whale in the CSHAS and IWDG casual sightings data. Photo-identification data were collected from whale-watching vessels over 79 trips from 2003-2008, which resulted in the identification of 62 individual fin whales, of which 11 were sighted across multiple years (Whooley *et al.* 2011). Ryan *et al.* (2016) analysed several hundred humpback whale sightings from the IWDG casual database collected from 1999-2013, revealing an annual easterly movement along the southern coast; most sightings in the wider Kinsale Area occurred from October-December.

7.2.2 Marine Reptiles

There are seven species of marine turtle, of which five species have been recorded in the seas around Ireland and the UK: leatherback turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), green turtle (*Chelonia mydas*) and hawksbill turtle (*Eretmochelys imbricata*). The leatherback turtle is the largest of the marine turtles and is the only species of turtle to have developed adaptations to cold water (Goff & Stenson 1988). The species is covered under Annex IV of the Habitats Directive.

A significant majority of turtle sightings recorded in Irish waters are of the leatherback turtle (King & Berrow 2009), which migrates into the waters of the Celtic and Irish Seas in response to the distribution of the gelatinous zooplankton which make up their favoured diet (Doyle *et al.* 2008, Fossette *et al.* 2010). Tagging studies show that they migrate across the Atlantic from the eastern American mainland and the Caribbean (Hays *et al.* 2004, Doyle *et al.* 2008). Sightings in the wider region are concentrated off the south and west of Ireland, the southwest of England and the west coast of Wales. Most sightings occur in the summer, peaking in August (Penrose & Gander 2016). The 2014 Celtic Sea Herring Acoustic Survey (Cronin & Barton 2014) made four sightings of leatherback turtle, three of them approximately 70km south of Cork Harbour, although none were recorded in the 2016 survey (O'Donnell *et al.* 2016).

7.2.3 Bats

Bats are protected under the EU Habitats Directive (92/43/EEC) with all bat species being listed in Annex IV of the Directive. Lesser Horseshoe Bats are also listed on Annex 2 of the Habitats Directive. For all bats it is an offence to disturb, injure or kill bats or disturb or destroy their roosts.

The external walls of the buildings within the Inch Terminal were inspected for any signs of bats. Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains,

scratch marks and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures.

Upon inspection, no signs of bats were recorded nor were any potential roost sites identified within the concrete and metal structures within the terminal site.

7.2.4 Amphibians

The Natterjack toad is protected under Annex IV of the EU Habitats Directive (92/43/EEC). No evidence of the species was observed on the site of the Inch Terminal.

7.2.5 Mammals

Otter

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I. 94 of 1997), as amended. Otters are also listed as requiring strict protection in Appendix II of the Bern Convention and are included in the Convention on International Trade of Endangered species (CITES).

No evidence of otters was found in the Inch Terminal site and it was determined that no suitable habitat exists within the landownership boundary. For the purposes of assessment, using the precautionary principle, it is assumed that suitable habitat for otter exists in streams to the east and west of the site and/or in the coastal habitats to the south.

7.3 Screening for Effects on Annex IV Species

7.3.1 Identification of Potential Effects

The purpose of this section is to examine the possibility that the proposed KADP either individually or in combination with other plans and projects, may result in the deliberate disturbance or destruction of any of the species listed in Annex IV of the Habitats Directive which may be present in the study area. Those potential sources of effect relating to the KADP identified in **Section 5.1** and considered against Natura 2000 sites (namely physical presence, noise and accidental spills), are also regarded to be relevant to Annex IV species, and therefore considered below in relation to these features.

7.4 Consideration of Potential Effects

Potential sources of effects are discussed in the following sections in the context of Annex IV species for which interactions could not be discounted.

7.4.1 Physical presence

The potential impact on Annex IV marine mammal species of the physical presence of vessels and equipment during the decommissioning operations on marine mammals is analogous to that presented in **Section 5.2.1** above in relation to relevant Natura 2000 sites with qualifying Annex II marine mammal species. Any displacement to marine mammals is most likely associated with acoustic disturbance (see **Section 7.4.3**).

The physical presence of vessels and equipment during the decommissioning activities are anticipated to cause no more than temporary and localised low-level behavioural responses in Annex IV species, similar to those induced by normal operations.

7.4.2 Discharges to Sea

Operational discharges

As outlined in **Section 5.2.3** above, there is some potential for a local deterioration in water quality as a result of operational discharges. These will be subject to a Permit to Use or Discharge Added Chemicals (PUDAC) based on final chemical selection, however the available dispersion volume is very large and ecological effects are predicted to be negligible. Significant disturbance of Annex IV species from operational discharges will not occur.

7.4.3 Underwater Noise and vibration

Marine Mammals

As outlined in **Section 5.2.2** above, the increased vessel activity associated with the KADP will add to the overall ambient noise in the Kinsale Area; however, source level characteristics are well-below proposed injury criteria for marine mammals. Annex IV species relevant to the Kinsale Head Area and their auditory capabilities are outlined in **Table 7.3** below.

Table 7.3: Relevant Annex IV species and their auditory capabilities

Annex IV which may be present in the Kinsale Area (by functional hearing group)	Hearing range	Proposed injury threshold criteria to non-pulsed sounds (SPL)
Low-frequency cetaceans		
Humpback whale	7Hz to 22kHz ¹ 7Hz to 35kHz ²	230 dB re 1µPa ¹
Fin whale		
Sei whale		
Minke whale		
Mid-frequency cetaceans		
Bottlenose dolphin	150Hz to 160kHz ^{a,b}	230 dB re 1µPa ^a
Common dolphin		
White-beaked dolphin		
Atlantic white sided dolphin		
Risso’s dolphin		
Striped dolphin		
Long-finned pilot whales		
Northern bottlenose whale		
Killer whale		
High-frequency cetaceans		

Harbour porpoise	200Hz to 180kHz ^a 275Hz to 160kHz ^b	200 dB re 1µPa ^c
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Notes: Injury is defined as the level at which a single exposure is likely to cause onset of permanent hearing loss¹. SPL = Sound Pressure Level. Sources: ^a Southall *et al.* (2007); ^b NMFS (2016); ^c Lucke *et al.* (2009).

As noted in **Section 5.2.2**, as the dominant and most widely propagated frequency from vessels tends to be low (<200Hz), low-frequency cetaceans (see **Table 7.3**) hearing ranges show the greatest overlap with noise generated by the KADP, though all marine mammal species which may occur in the Kinsale Area are expected in principle to be able to detect these sounds. Of those low-frequency cetaceans listed in **Table 7.3**, minke whale (summer) and fin whales (autumn/winter) are those most likely to be present in the Kinsale Area.

The occurrence of these highly mobile species in this open, offshore habitat is likely to be of only limited duration as they traverse the wider Celtic Sea in search of foraging opportunities; as such, any disturbance associated with the KADP will not cause prolonged displacement from key habitat.

In terms of behavioural disturbance, it cannot be excluded that sound from vessels will in the short-term influence the behaviour of individual marine mammals within the vicinity of the operations. Overall, however, the likelihood that behavioural disturbance effects could become significant at the marine mammal population level is considered to be extremely low due to a combination of source level characteristics, duration of activity, and the current understanding of marine mammals movement and behaviour in the Kinsale Area.

Potential noise related impacts of the post-decommissioning survey are addressed above in **Section 5.2.2**.

Marine reptiles

Available information on potential effects of underwater sound on marine turtles is very limited (Nelms *et al.* 2016). The hearing range of cheloniid species has been estimated as between 50-2000Hz, with highest sensitivity below 400Hz (Popper *et al.* 2014). For leatherback turtles, measurements made on hatchlings suggested a similar low frequency sensitivity, with sound detection ranging between 50 and 1200Hz when in water and between 50 and 1600Hz in air (Dow Piniak *et al.* 2012).

A variety of potential functions of hearing have been proposed for marine turtles, although the issue is poorly understood; they do not appear to vocalize or use sound for communication, but may use sound for navigation, locating prey, avoiding predators, and general environmental awareness (see Dow Piniak *et al.* 2012, Nelms *et al.* 2016 and references therein). While some authors have raised concerns over the potential for physical injury (including hearing damage) to marine turtles from seismic surveys (Nelms *et al.* 2016) and disturbance from increasing anthropogenic noise generally (Samuel *et al.* 2005), such potential impacts remain to be investigated, as do any subsequent ecological effects (Nelms *et al.* 2016).

Underwater noise generated by vessels during the decommissioning activities is likely to be detectable by leatherback turtles, although their low density and limited seasonal presence in the area dictates that very few individuals are likely to be exposed to noise levels beyond that of the background for the region.

Considering this low likelihood of exposure, the perceived limited sensitivity of the receptor, and the moderate intensity and non-impulsive nature of the noise source, significant impacts on marine turtles are considered highly unlikely.

7.4.4 Accidental Events

The potential impact of accidental events on marine mammals outlined in **Section 5.2.4** above (AA Screening for likely significant effects), is also considered to be applicable to Annex IV species relevant to the Kinsale Area. Given the low probability of an accident involving a major loss of diesel occurring, significant disturbance of Annex IV species is considered unlikely.

7.4.5 Noise Associated with the Demolition of the Inch Terminal

Otters

Potential habitat for otter may exist in the streams to the east and west of the site and in the coastal habitats to the south.

In considering the distance from the Inch Terminal site to the streams and coastal areas with potential otter habitats, the localised, temporary nature and scale of the proposed terminal demolition works, no significant impact on otters is considered likely.

7.4.6 Dust emissions associated with the terminal demolition works

Otters

As outlined in **Section 7.4.5**, potential habitat for otter may exist in the streams to the east and west of the site and in the coastal habitats to the south.

In considering the distance from the Inch Terminal site to the streams and coastal areas with potential otter habitats, the localised, temporary nature and scale of the proposed terminal demolition works, no significant impact on otters is considered likely.

7.5 Consideration of Potential In-Combination Effects with Other Plans and Projects in the Area

No further projects to those listed in **Section 5.3** which were identified to consider in relation to Annex IV species, and in keeping with the conclusions of **Section 5.3**, no in-combination effects with other plans and projects in the area have been identified for Annex IV species.

Section 8

Annex IV Species Screening Conclusions

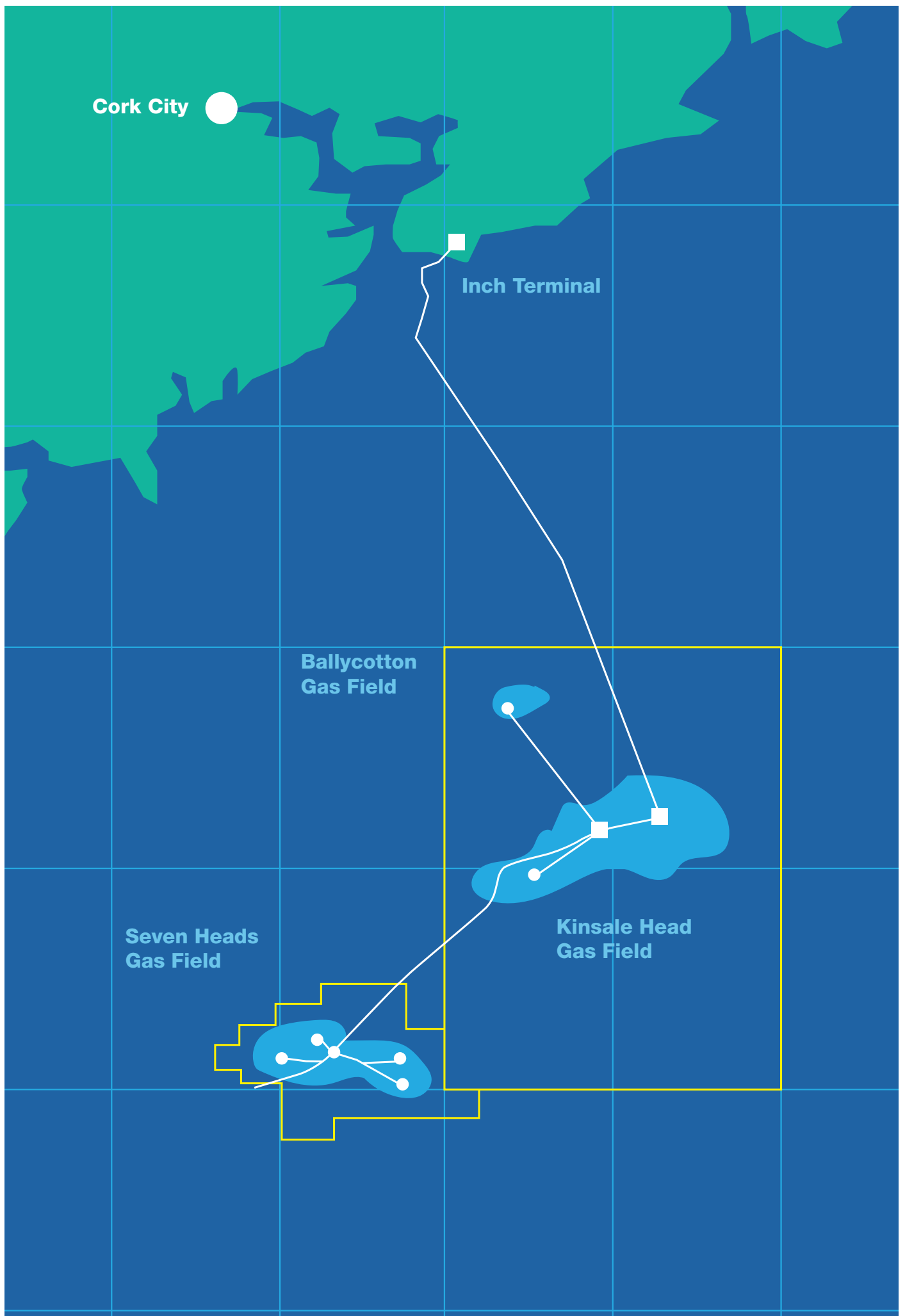
Cork City

Inch Terminal

**Ballycotton
Gas Field**

**Seven Heads
Gas Field**

**Kinsale Head
Gas Field**



8 Annex IV Species Screening Conclusions

Whilst Annex IV species may be present in the vicinity of the proposed KADP, the localised scale and duration of the works will not result in the deliberate disturbance or destruction of any of the species listed in Annex IV of the Habitats Directive which may be present in the study area.

In light of the findings of this report (see **Section 7**) it can be concluded by the competent authority that it is not considered necessary to undertake any further Annex IV Species (European Protected Species) Impact Assessment.

Section 9

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9 References

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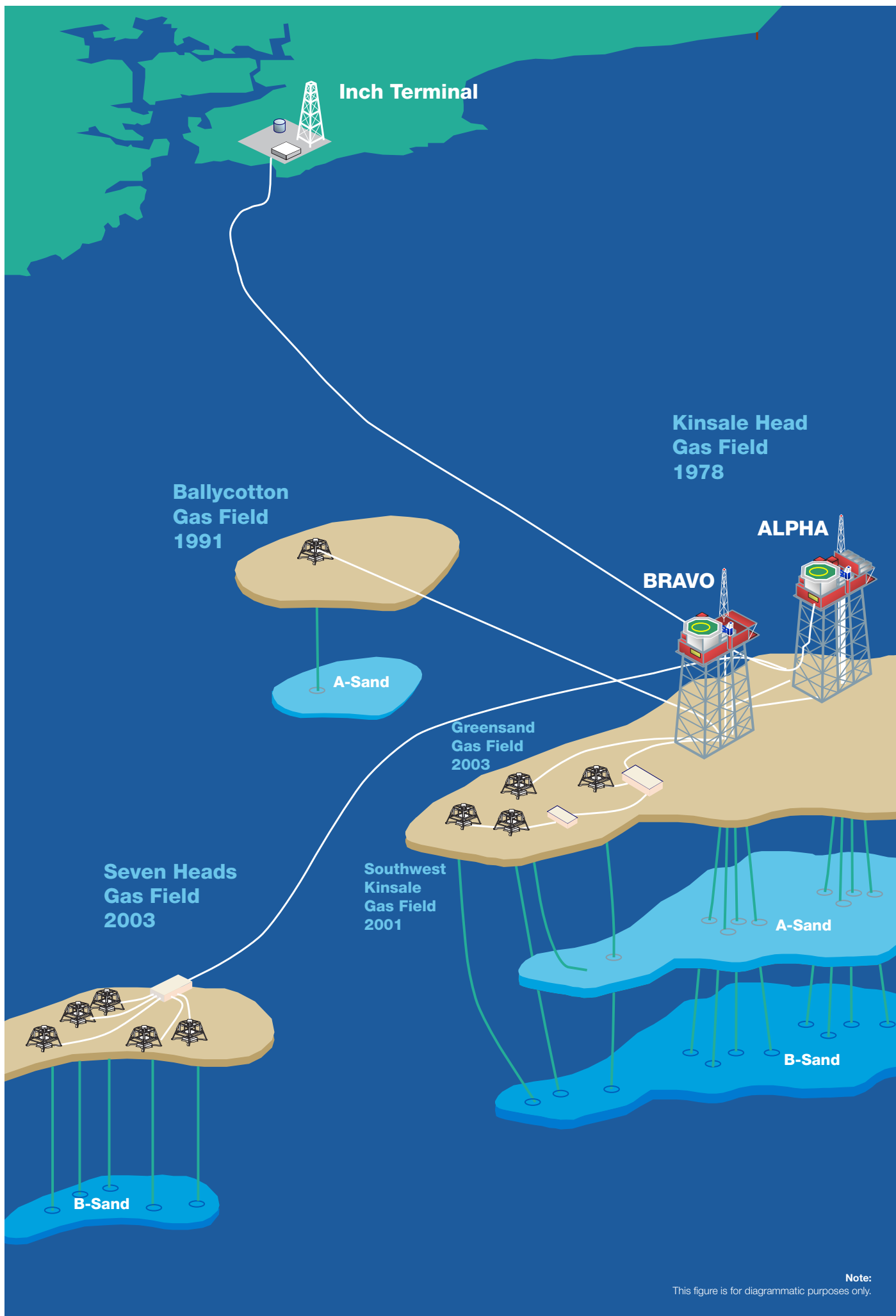
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Appendix A

Natura 2000 Site Synopsis Reports





Site Name: Ardmore Head SAC

Site Code: 002123

This site is situated on a small headland to the east of the village of Ardmore on the west Waterford coastline. The site consists of sea cliffs and associated coastal habitats. The cliffs, which form part of the Ardmore Syncline, are of moderate height (up to 40 m), continuous and precipitous. They are also well indented, and have numerous small ledges which support breeding seabirds. The aspect of the cliffs is mostly east and south facing, but there is a small section facing north.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1230] Vegetated Sea Cliffs
[4030] Dry Heath

Cliff vegetation consists of sea-spurrey (*Spergularia* spp.), Sea Campion (*Silene vulgaris* subsp. *maritima*), Thrift (*Armeria maritima*), Buck's-horn Plantain (*Plantago coronopus*) and scurvygrass (*Cochlearia* spp.). Other flora includes Sea Beet (*Beta vulgaris* subsp. *maritima*), Yarrow (*Achillea millefolium*) and Wild Carrot (*Daucus carota*). In places below the cliffs there are boulder and some shingle shorelines. Small rocky islets, which are continuously washed over, also occur. An area of open marine water is included within the site, partly to give some protection to the seabirds which nest on the ledges above.

The dominant habitat within the site is dry coastal heath (which is best viewed west of Ram's Head). Species present include an abundance of Heather (*Calluna vulgaris*), with Bell Heather (*Erica cinerea*), Western Gorse (*Ulex gallii*), Wood Sage (*Teucrium scorodonia*) and bent grasses (*Agrostis* spp.). In the eastern part of the site, the heath is dominated by Burnet Rose (*Rosa pimpinellifolia*) and grasses. The heath merges into the cliff vegetation but also into dry grassland, especially at Ardmore Head. Here the grassland vegetation is dominated by Cocksfoot (*Dactylis glomerata*), bent grasses, Bramble (*Rubus fruticosus* agg.), Common Knapweed (*Centaurea nigra*) and Wild Thyme (*Thymus praecox*).

At the north of the site are small patches of scrub with species such as Hawthorn (*Crataegus monogyna*), Sycamore (*Acer pseudoplatanus*), Bramble and Bracken (*Pteridium aquilinum*). The understorey consists of Ramsons (*Allium ursinum*), Wild Celery (*Apium graveolens*) and Common Nettle (*Urtica dioica*).

Six species of seabirds were recorded breeding on the ledges during a survey from 1985 to 1987. The most numerous bird is the Kittiwake. This species has declined somewhat in recent years (1989-1993), though approximately 800 pairs still nest, a population of national importance. Other species include Fulmar (38 pairs), Shag (6 pairs), Herring Gull (78 pairs), Great Black-backed Gull (2 pairs), Razorbill (7 individuals) and Guillemot (6 individuals). The site is noted for the presence of Chough, with 1-2 pairs recorded. Chough is listed under Annex I of the E.U. Birds Directive.

Land use at the site consists of tourism/recreational activities. A path is located along the cliff for much of the site. In addition there is St. Declan's holy well and old ruined church at the north of the site. The grass around the church is mown regularly. Drift net fishing is carried out in the sea surrounding the site.

Although small, this site is of conservation value as it displays good examples of the type of sea cliff and dry heath characteristic of the south coast. Both of these habitats are listed on Annex I of the E.U. Habitats Directive. The breeding seabirds and Chough add to the ecological interest.

Site Name: Ballymacoda (Clonpriest and Pillmore) SAC

Site Code: 000077

This coastal site stretches north-east from Ballymacoda to within about 6 km of Youghal, Co. Cork. Though moderate in size, it has a good diversity of coastal habitats, including several listed on Annex I of the E.U. Habitats Directive.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1310] *Salicornia* Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean salt meadows (*Juncetalia maritimi*)

The site comprises the estuary of the Womanagh River, a substantial river which drains a large agricultural catchment. Part of the tidal section of the river is included in the site and on the seaward side the boundary extends to the low tide mark. The inner part of the estuary is well sheltered by a stabilised sandy peninsula (Ring peninsula). Intertidal mudflats and sandflats, which form part of the overall estuarine habitat, are well represented. The sediment types vary from muds to muddy sands in the inner part, to fine rippled sands in the outer exposed part. The macro-invertebrate fauna of the intertidal flats is well-developed, with the following species occurring: *Corophium volutator*, *Hediste diversicolor*, *Arenicola marina*, *Macoma balthica*, *Scrobicularia plana*, *Cerastoderma edule* and *Lanice conchilega*. In the more sheltered areas the intertidal flats are colonised by mats of green algae (mostly *Enteromorpha* spp.), with brown seaweeds occurring on the rocky shores of the shingle spits.

The main channel is flanked by saltmarshes and wet fields, much of the latter being improved for agriculture. The saltmarshes are mainly classified as Atlantic salt meadows, with such species as Sea Purslane (*Halimione portulacoides*), Lax-flowered Sea Lavender (*Limonium humile*) and Sea Milkwort (*Glaux maritima*). A large area of Mediterranean salt meadows is found on the island at Clonpriest East. This saltmarsh is well-established and has a well-developed topography with a highly representative vegetation cover. There is some saltmarsh dominated by dense Sea Rush (*Juncus maritimus*). This is a typical grassy upper Mediterranean salt meadow community and is located along the terrestrial grassy ridge and represents one of the upper saltmarsh communities in the overall saltmarsh zonation. The habitat is not

grazed and a generally tall sward height is present. Other species present include frequent Red Fescue (*Festuca rubra*) and smaller amounts of Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardii*), Common Scurvy-grass (*Cochlearia officinalis*), Sea Milkwort, Sea Plantain (*Plantago maritima*) and Sea Arrowgrass (*Triglochin maritima*). Curled Dock (*Rumex crispus*) is also present on some mounds.

A similar community is also found in the established saltmarsh along the west side of The Duck. This community also contains Parsley Water-dropwort (*Oenanthe lachenalii*) and Distant Sedge (*Carex distans*). Sea Rush occasionally extends its distribution into a transitional zone landward of the Mediterranean salt meadow that is dominated by Common Couch (*Elymus repens*). There is also some mosaic type vegetation present with less frequent cover of Sea Rush inter-mixed with a mid-marsh *Armeria-Plantago* sward. The Sea Rush clumps are present on small grassy tussocks with Red Fescue and Sea Milkwort. Other species present in this vegetation community include Sea Aster (*Aster tripolium*), Lax-flowered Sea Lavender, Saltmarsh Rush and Sea Purslane (*Atriplex portulacoides*). This community has a well-developed salt pan topography. Small amounts of Common Cordgrass (*Spartina townsendii*) are found within this community within some of the pans.

A rarer sub-type of Mediterranean salt meadow with Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) as an indicator species is present at this site. This is a very notable population of this rare species, which is listed on the Flora (Protection) Order, 2015 and is also listed in the Red Data book. The species is only found from seven 10km² squares along the Barrow Estuary, Wexford and Dublin shorelines since 1960. The Borrer's Saltmarsh-grass is present in a narrow band of saltmarsh developing along the upper extent of tidal inundation in the area behind the embankment.

Part of the site is also a Special Protection Area (SPA) for birds; the main interest of the area lies in its waterfowl, with flocks of up to 20,000 regularly present during winter (e.g. 5 year mean peak, 1995/96-1999/00 = 24,784). A total of 107 wetland species have been recorded from this site. Of particular note is that the site supports an internationally important population of Black-tailed Godwit (899, average peak 1995/96–1999/00). In addition, it supports nationally important populations of a further 15 species (all figures are average peaks for the 5 winters 1995/96 to 1999/2000): Shelduck (150), Wigeon (1,232), Teal (1,170), Ringed Plover (236), Golden Plover (14,480), Grey Plover (688), Lapwing (5,893), Knot (378), Sanderling (147), Dunlin (4,410), Bar-tailed Godwit (792), Curlew (1,621), Redshank (511), Greenshank (24) and Turnstone (191). The presence of large flocks of Golden Plover and Bar-tailed Godwit is of particular note as these species are listed on Annex I of the E.U. Birds Directive. A range of other species have populations of regional or local importance, including Brent Goose (100), Shoveler (29) and Oystercatcher (682). The site is also notable for supporting large concentrations of gulls in autumn and winter. Principal species are Black-headed Gull (2,320), Common Gull (1,220), Lesser Black-backed Gull (6,285), Herring Gull (128) and Great Black-backed Gull (455).

Much of the land adjacent to the estuary has been reclaimed and is subject to intensive agriculture, with cattle grazing and silage being the most common land uses. However, many of these fields remain marshy and are important feeding and roosting areas for wildfowl, Golden Plover and Lapwing. The most serious threat to the site is water pollution, primarily from slurry spreading.

Ballymacoda is a fine example of an estuarine complex, with intertidal flats well represented. The site is of high conservation importance because several of the habitats present are listed on Annex I of the E.U. Habitats Directive. However, there is also considerable ornithological interest; Ballymacoda is one of the most important bird sites in the country and supports a higher number of waders than any other Co. Cork estuary of its size. It also contains important numbers of Golden Plover and Bar-tailed Godwit, two E.U. Birds Directive Annex I species, an internationally important population of Black-tailed Godwit, and nationally important numbers of a further 13 bird species.

Site Name: Barley Cove to Ballyrisode Point SAC

Site Code: 001040

This site is situated on the Mizen Head peninsula in the extreme south-west of Co. Cork. It straddles a 10 km stretch of coastline from the Barley Cove inlet to Ballyrisode Point at Toormore Bay. The rock type is Old Red Sandstone, and this displays a north-east/south-west folding which is especially visible at Crookhaven and Brow Head.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1140] Tidal Mudflats and Sandflats
[1220] Perennial Vegetation of Stony Banks
[1310] <i>Salicornia</i> Mud
[1330] Atlantic Salt Meadows
[1410] Mediterranean Salt Meadows
[2120] Marram Dunes (White Dunes)
[2130] Fixed Dunes (Grey Dunes)*
[4030] Dry Heath
[1395] Petalwort (<i>Petalophyllum ralfsii</i>)

While rocky heath is the dominant habitat, the site is most important for the sand dunes and related habitats which occur at Barley Cove. A fine gradation of habitat is shown, from the outer sandy beach, through dunes and saltmarshes, and then brackish lagoon. Of particular importance is the fixed dune habitat, and this is one of the few examples of this habitat type in Co. Cork and south Co. Kerry.

The dune system at Barley Cove is of moderate size and relatively intact. It grades from an outer ridge of white Marram (*Ammophila arenaria*) dunes, through fixed dune hills and into an extensive area of dune grassland. A characteristic flora is displayed, with species such as Lady's Bedstraw (*Galium verum*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Wild Pansy (*Viola tricolor* subsp. *curtisii*) and Red Fescue (*Festuca rubra*). The moss and lichen component is well developed in places and includes *Tortula ruraliformis* and *Peltigera canina*. The rare bryophyte Petalwort (*Petalophyllum ralfsii*), which is listed on Annex II of the E.U. Habitats Directive, has been recorded in this dune system. Long-term erosion by the tidal river has reduced the size of the dune system, though sand has been deposited elsewhere in the area.

The dunes merge with a substantial area of saltmarsh which displays characters of both Atlantic and Mediterranean salt meadows. Sea Rush (*Juncus maritimus*) is a dominant species, while other saltmarsh species include Common Saltmarsh-grass (*Puccinellia maritima*), Sea-milkwort (*Glaux maritima*) and Sea Plantain (*Plantago maritima*). A fringe of glasswort (*Salicornia* spp.) occurs at the lowermost part of the saltmarsh and above the tidal river.

Lissagriffin Lake, while of artificial origin, displays characteristics of a brackish lagoon, with such species as Sea Club-rush (*Scirpus maritimus*) and Tasselweed (*Ruppia* sp.). Common Reed (*Phragmites australis*) occurs along the eastern and northern margins of the lagoon.

Fine sandy beaches, with associated intertidal sandflats, occur at Barley Cove and White Strand. The intertidal flats at White Strand are well sheltered and have a typical invertebrate macrofauna. Molluscs are well represented in the mid shore zone, including the Common Cockle (*Cerastoderma edule*) and the Thin Tellin (*Tellina tenuis*). The low shore is characterised by an abundance of polychaetes, especially the Sand Mason (*Lanice conchilega*). The razorshells *Ensis arcuatus* and *Solen marginatus* are also typical low shore species, as is the Sand Gaper (*Mya arenaria*).

The site has extensive lengths of rocky shoreline, which develop into low cliffs in places. Shingle, another important type of coastal habitat, occurs mostly in sheltered coves. At one location Sea-kale (*Crambe maritima*), a Red Data Book species, occurs commonly on the shingle.

The dominant habitat over much of the remainder of the site is coastal heath, which is of high conservation value. This occurs from the maritime shoreline to the highest point of the site (164 m). It is varied in character, ranging from shallow dry soils to wet peaty pockets. The heath is primarily made up of woody species, including Western Gorse (*Ulex gallii*), Bell Heather (*Erica cinerea*) and Heather (*Calluna vulgaris*). Purple Moor-grass (*Molinia caerulea*) is ubiquitous, with other character species such as Tormentil (*Potentilla erecta*), Lousewort (*Pedicularis sylvatica*) and Heath Milkwort (*Polygala serpyllifolia*).

A notable feature of the site is the concentration of rare plants associated with the heath habitat. There are three species which are legally protected under the Flora (Protection) Order, 1999: Hairy Bird's-foot-trefoil (*Lotus subbiflorus*), Pale Dog-violet (*Viola lactea*) and Lanceolate Spleenwort (*Asplenium billotii*); and three Red Data Book species: Green-winged Orchid (*Orchis morio*), Bird's-foot (*Ornithopus perpusillus*) and Spotted Rock-rose (*Tuberaria guttata*), occur in places. A further scarce plant which occurs at the site is the Strawberry Tree (*Arbutus unedo*).

The site is of notable ornithological importance for Chough (listed on Annex I of E.U. Birds Directive), with 9 breeding pairs in 1992. In addition to nesting, substantial numbers of Choughs utilise the heath and sandy habitats for feeding and socialising. Lissagriffin Lake is of some local importance for wintering waterfowl, including Whooper Swans (up to 16 at times) and Mute Swans (up to 40). Small numbers of

seabirds breed on the cliffs, including Fulmar (41 pairs), Lesser Black-backed Gull (9 pairs), Herring Gull (133 pairs), Shag (39 pairs), and Black Guillemot (1-5 pairs) (all counts in 1985).

The main land uses at this site are grazing and tourism related activities. Most of the site is grazed by livestock, though not intensively. Rabbits, however, are frequent at the sand dunes and have caused serious damage. The beach and dunes at Barley Cove are utilised by day-trippers and campers during the summer months and parts of the dune system has been damaged by heavy usage.

This site is of conservation importance for the presence of a number of good examples of coastal habitats. Of particular significance are the areas of dry heath and fixed dune (the latter, a priority habitat listed on Annex I of the E.U. Habitats Directive). The concentration of rare plants is of special note, as is the high density of Choughs.

Site Name: Blackwater River (Cork/Waterford) SAC

Site Code: 002170

The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and five ranges of mountains. In times of heavy rainfall the levels can fluctuate widely by more than 12 feet on the gauge at Careysville. The peaty nature of the terrain in the upper reaches and of some of the tributaries gives the water a pronounced dark colour. The site consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond, the tidal stretches as far as Youghal Harbour and many tributaries, the larger of which include the Licky, Bride, Flesk, Chimneyfield, Finisk, Araglin, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, Owentaraglin and Awnaskirtaun. The portions of the Blackwater and its tributaries that fall within this SAC flow through the counties of Kerry, Cork, Limerick, Tipperary and Waterford. Nearby towns include Rathmore, Millstreet, Kanturk, Banteer, Mallow, Buttevant, Doneraile, Castletownroche, Fermoy, Ballyduff, Rathcormac, Tallow, Lismore, Cappoquin and Youghal.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1220] Perennial Vegetation of Stony Banks
- [1310] *Salicornia* Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [3260] Floating River Vegetation
- [91A0] Old Oak Woodlands
- [91E0] Alluvial Forests*
- [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
- [1092] White-clawed Crayfish (*Austropotamobius pallipes*)
- [1095] Sea Lamprey (*Petromyzon marinus*)
- [1096] Brook Lamprey (*Lampetra planeri*)
- [1099] River Lamprey (*Lampetra fluviatilis*)
- [1103] Twaite Shad (*Alosa fallax*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1355] Otter (*Lutra lutra*)
- [1421] Killarney Fern (*Trichomanes speciosum*)

The Blackwater rises in boggy land in east Kerry, where Namurian grits and shales build the low heather-covered plateaux. Near Kanturk the plateaux enclose a basin of productive Coal Measures. On leaving the Namurian rocks the Blackwater turns eastwards along the northern slopes of the Boggeragh Mountains before entering the narrow limestone strike vale at Mallow. The valley deepens as first the Nagles Mountains and then the Knockmealdowns impinge upon it. Interesting geological features along this stretch of the Blackwater Valley include limestone cliffs and caves near the villages and small towns of Killavullen and Ballyhooly; the Killavullen caves contain fossil material from the end of the glacial period. The associated basic soils in this area support the growth of plant communities which are rare in Cork because in general the county's rocks are acidic. At Cappoquin the river suddenly turns south and cuts through high ridges of Old Red Sandstone. The Araglin valley is predominantly underlain by sandstone, with limestone occurring in the lower reaches near Fermoy.

Wet woodlands are found where river embankments have broken down and channel edges are subject to daily inundation. This is particularly evident in the steep-sided valley of the River Bride, between Cappoquin and Youghal. The river side of the embankments was often used for willow growing in the past (most recently at Cappoquin) so that the channel is lined by narrow woods of White and Almond-leaved Willow (*Salix alba* and *S. triandra*), with isolated Crack Willow (*S. fragilis*) and Osier (*S. viminalis*). Rusty Willow (*S. cinerea* subsp. *oleifolia*) spreads naturally into the sites and occasionally, as at Villierstown on the Blackwater and Sapperton on the Bride, forms woods with a distinctive mix of woodland and marsh plants, including Gypsywort (*Lycopus europaeus*), Guelder-rose (*Viburnum opulus*), Bittersweet (*Solanum dulcamara*) and various mosses and algae. These wet woodlands form one of the most extensive tracts of the wet woodland habitat in the country.

A small stand of Yew (*Taxus baccata*) woodland occurs within the site. This is on a limestone ridge at Dromana, near Villierstown. While there are some patches of the wood with a canopy of Yew and some very old trees, the quality is generally poor due to the dominance of non-native and invasive species such as Sycamore (*Acer pseudoplatanus*), Beech (*Fagus sylvatica*) and Douglas Fir (*Pseudotsuga menziesii*). However, it does have the potential to develop into a Yew dominated stand in the long term and the site should continue to be monitored.

Marshes and reedbeds cover most of the flat areas beside the rivers and often occur in mosaic with the wet woodland. Common Reed (*Phragmites australis*) is ubiquitous and is harvested for thatching. There is also much Marsh-marigold (*Caltha palustris*) and, at the edges of the reeds, the Greater and Lesser Pond-sedge (*Carex riparia* and *C. acutiformis*). Hemlock Water-dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Reed Canary-grass (*Phalaris arundinacea*), Meadowsweet (*Filipendula ulmaria*), Common Nettle (*Urtica dioica*), Purple Loosestrife (*Lythrum salicaria*), Common Valerian (*Valeriana officinalis*), Water Mint (*Mentha aquatica*) and Water Forget-me-not (*Myosotis scorpioides*) are all also found.

At Banteer there are a number of hollows in the sediments of the floodplain where subsidence and subterranean drainage have created isolated wetlands, sunk below the level of the surrounding fields. The water rises and falls in these holes depending on the water table and several different communities have developed on the acidic or neutral sediments. Many of the ponds are ringed with Rusty Willow, rooted in the mineral soils but sometimes collapsed into the water. Beneath the densest stands are woodland herbs like Yellow Pimpernel (*Lysimachia nemorum*), with locally abundant Common Water-starwort (*Callitriche stagnalis*) and Marsh Ragwort (*Senecio aquaticus*). One of the depressions has Silver Birch (*Betula pendula*), Ash (*Fraxinus excelsior*), Crab Apple (*Malus sylvestris*) and a little Pedunculate Oak (*Quercus robur*) in addition to the willows.

Floating river vegetation is found along much of the freshwater stretches within the site. The species list is quite extensive, with species such as water-crowfoots, including Pond Water-crowfoot (*Ranunculus peltatus*), Canadian Pondweed (*Elodea canadensis*), pondweed species, including Broad-leaved Pondweed (*Potamogeton natans*), water-milfoil species (*Myriophyllum* spp.), Common Club-rush (*Scirpus lacustris*), water-starwort species (*Callitriche* spp.), Lesser Water-parsnip (*Berula erecta*) particularly on the Awbeg, Water-cress (*Nasturtium officinale*), Hemlock Water-dropwort, Fine-leaved Water-dropwort (*O. aquatica*), Common Duckweed (*Lemna minor*), Yellow Water-lily (*Nuphar lutea*), Unbranched Bur-reed (*Sparganium emersum*) and the moss *Fontinalis antipyretica* all occurring.

The grasslands adjacent to the rivers of the site are generally heavily improved, although liable to flooding in many places. However, fields of more species-rich wet grassland with species such as Yellow Iris (*Iris pseudacorus*), Meadowsweet, Meadow Buttercup (*Ranunculus acris*) and rushes (*Juncus* spp.) occur occasionally. Extensive fields of wet grassland also occur at Annagh Bog on the Awbeg. These fields are dominated by Tufted Hair-grass (*Deschampsia cespitosa*) and rushes.

The Blackwater Valley has a number of dry woodlands; these have mostly been managed by the estates in which they occur, frequently with the introduction of Beech and a few conifers, and sometimes of the invasive species Rhododendron (*Rhododendron ponticum*) and Cherry Laurel (*Prunus laurocerasus*). Oak woodland is well developed on sandstone about Ballinatray, with the acid oak woodland community of Holly (*Ilex aquifolium*), Bilberry (*Vaccinium myrtillus*), Great Wood-rush (*Luzula sylvatica*) and the ferns *Dryopteris affinis* and *D. aemula* occurring in one place. Irish Spurge (*Euphorbia hyberna*) continues eastwards on acid rocks from its headquarters to the west, but there are also many plants of richer soils, for example Wood Violet (*Viola reichenbachiana*), Goldilocks Buttercup (*Ranunculus auricomus*), Broad-leaved Helleborine (*Epipactis helleborine*) and Red Campion (*Silene dioica*). Oak woodland is also found in Rincrew, Carrigane, Glendine, Newport and Dromana. The spread of Rhododendron is locally a problem, as is over-grazing. A few limestone rocks stand over the river in places showing traces of a less acidic woodland type with Ash, False Brome (*Brachypodium sylvaticum*) and Early-purple Orchid (*Orchis mascula*).

In the vicinity of Lismore, two deep valleys cut in Old Red Sandstone join to form the Owenashad River before flowing into the Blackwater at Lismore. These valleys retain something close to their original cover of oak with Downy Birch (*Betula pubescens*), Holly and Hazel (*Corylus avellana*) also occurring. There has been much planting of Beech (as well as some of coniferous species) among the oak on the shallower slopes and here both Rhododendron and Cherry Laurel have invaded the woodland.

The oak wood community in the Lismore and Glenmore valleys is of the classic upland type, in which some Rowan (*Sorbus aucuparia*) and Downy Birch occur. Honeysuckle (*Lonicera periclymenum*) and Ivy (*Hedera helix*) cover many of the trees while Great Wood-rush, Bluebell (*Hyacinthoides non-scripta*), Wood-sorrel (*Oxalis acetosella*) and, locally, Bilberry dominate the ground flora. Ferns present on the site include Hard Fern (*Blechnum spicant*), Male Fern (*Dryopteris filix-mas*), the buckler-ferns *D. dilatata* and *D. aemula*, and Lady Fern (*Athyrium filix-femina*). There are many mosses present and large species such as *Rhytidiadelphus* spp., *Polytrichum formosum*, *Mnium hornum* and *Dicranum* spp. are noticeable. The lichen flora is important and includes 'old forest' species which imply a continuity of woodland here since ancient times. Tree Lungwort (*Lobaria* spp.) is the most conspicuous and is widespread.

The Araglin valley consists predominantly of broadleaved woodland. Oak and Beech are joined by Hazel, Wild Cherry (*Prunus avium*) and Goat Willow (*Salix caprea*). The ground flora is relatively rich, with Pignut (*Conopodium majus*), Ramsons (*Allium ursinum*), Garlic Mustard (*Alliaria petiolata*) and Wild Strawberry (*Fragaria vesca*). The presence of Ivy Broomrape (*Orobanche hederæ*), a local species within Ireland, suggests that the woodland, along with its attendant Ivy, is long established.

Along the lower reaches of the Awbeg River, the valley sides are generally cloaked with mixed deciduous woodland of estate origin. The dominant species is Beech, although a range of other species are also present, e.g. Sycamore, Ash and Horse-chestnut (*Aesculus hippocastanum*). In places the alien invasive species Cherry Laurel dominates the understorey. Parts of the woodlands are more semi-natural in composition, being dominated by Ash, with Hawthorn (*Crataegus monogyna*) and Spindle (*Euonymus europæa*) also present. However, the most natural areas of woodland appear to be the wet areas dominated by Alder and willows (*Salix* spp.). The ground flora of the dry woodland areas features species such as Pignut, Wood Avens (*Geum urbanum*), Ivy and Soft Shield-fern (*Polystichum setiferum*), while the ground flora of the wet woodland areas contains characteristic species such as Remote Sedge (*Carex remota*) and Opposite-leaved Golden-saxifrage (*Chrysosplenium oppositifolium*).

In places along the upper Bride, scrubby, semi-natural deciduous woodland of willow, oak and Rowan occurs, with abundant Great Wood-rush in the ground flora.

The Bunaglanna River passes down a very steep valley, flowing in a north-south direction to meet the Bride River. It flows through blanket bog to heath and then scattered woodland. The higher levels of moisture here enable a vigorous moss and

fern community to flourish, along with a well-developed epiphyte community on the tree trunks and branches.

At Banteer a type of wetland occurs near the railway line which offers a complete contrast to the others. Old turf banks are colonised by Royal Fern (*Osmunda regalis*) and Eared Willow (*Salix aurita*), and between them there is a sheet of Bottle Sedge (*Carex rostrata*), Marsh Cinquefoil (*Potentilla palustris*), Bogbean (*Menyanthes trifoliata*), Marsh St. John's-wort (*Hypericum elodes*) and the mosses *Sphagnum auriculatum* and *Aulacomnium palustre*. The cover is a scraw (i.e. floating vegetation) with characteristic species like Marsh Willowherb (*Epilobium palustre*) and Early Marsh-orchid (*Dactylorhiza incarnata*).

The soil high up the Lismore valleys and in rocky places is poor in nutrients but it becomes richer where streams enter and also along the valley bottoms. In such sites Wood Speedwell (*Veronica montana*), Wood Anemone (*Anemone nemorosa*), Enchanter's-nightshade (*Circaea lutetiana*), Barren Strawberry (*Potentilla sterilis*) and shield-fern (*Polystichum* sp.) occur. There is some Ramsons, Three-nerved Sandwort (*Moehringia trinervia*) and Early-purple Orchid (*Orchis mascula*) locally, with Opposite-leaved Golden-saxifrage, Meadowsweet and Bugle (*Ajuga reptans*) in wet places. A stand of Hazel woodland at the base of the Glenakeeffe valley shows this community well.

The area has been subject to much tree felling in the recent past and re-sprouting stumps have given rise to areas of bushy Hazel, Holly, Rusty Willow and Downy Birch. The ground in the clearings is heathy with Heather (*Calluna vulgaris*), Slender St John's-wort (*Hypericum pulchrum*) and the occasional Broom (*Cytisus scoparius*) occurring.

The estuary and the habitats within and associated with it form a large component of the site. Very extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. The main expanses occur at the southern end of the site, with the best examples at Kinsalebeg in Co. Waterford, and between Youghal and the main bridge north of it across the river in Co. Cork. Other areas occur along the tributaries of the Licky in east Co. Waterford, and Glendine, Newport, Bride and Killahaly Rivers in Waterford west of the Blackwater. There are also large tracts along the Tourig River in Co. Cork. There are narrow bands of intertidal flats along the main river as far north as Camphire Island. Patches of green filamentous algae (*Ulva* sp. and *Enteromorpha* sp.) occur in places, while fucoid algae are common on the more stony flats, even as high upstream as Glenassy or Coneen.

The area of saltmarsh within the site is small. The best examples occur at the mouths of the tributaries and in the townlands of Foxhole and Blackbog. Those found are generally characteristic of Atlantic salt meadows. The species list at Foxhole consists of Common Saltmarsh-grass (*Puccinellia maritima*), small amounts of Greater Sea-spurrey (*Spergularia media*), glasswort (*Salicornia* sp.), Sea Arrowgrass (*Triglochin maritima*), Annual Sea-blite (*Suaeda maritima*) and Sea Purslane (*Halimione*

portulacoides) - the latter a very recent coloniser. Some Sea Aster (*Aster tripolium*) occurs, generally with Creeping Bent (*Agrostis stolonifera*). Sea Couch (*Elymus pycnanthus*) and small isolated clumps of Sea Club-rush (*Scirpus maritimus*) are also seen. On the Tourig River additional saltmarsh species found include sea-lavenders (*Limonium* spp.), Thrift (*Armeria maritima*), Red Fescue (*Festuca rubra*), Common Scurvygrass (*Cochlearia officinalis*) and Sea Plantain (*Plantago maritima*). Oraches (*Atriplex* spp.) are found on channel edges. Species such as Saltmarsh Rush (*Juncus gerardi*) and Sea Rush (*J. maritimus*) are found in places in this site also, and are indicative of Mediterranean salt meadows. Areas of *Salicornia* mud are found at the eastern side of the townland of Foxbole above Youghal, at Blackbog, along the Tourig and Kinsalebeg estuaries.

The shingle spit at Ferrypoint supports a good example of perennial vegetation of stony banks. The spit is composed of small stones and cobbles and has a well developed and diverse flora. At the lowest part, Sea Beet (*Beta vulgaris* subsp. *maritima*), Curled Dock (*Rumex crispus*) and Yellow Horned-poppy (*Glaucium flavum*) occur, while at a slightly higher level Sea Mayweed (*Matricaria maritima*), Cleavers (*Galium aparine*), Rock Samphire (*Crithmum maritimum*), Sea Sandwort (*Honkenya peploides*), Spear-leaved Orache (*Atriplex prostrata*) and Babington's Orache (*A. glabriuscula*). Other species present include Sea Rocket (*Cakile maritima*), Herb-Robert (*Geranium robertianum*), Red Fescue and Kidney Vetch (*Anthyllis vulneraria*). The top of the spit is more vegetated and supports lichens and bryophytes, including *Tortula ruraliformis* and *Rhytidiadelphus squarrosus*.

The site supports several Red Data Book plant species, i.e. Starved Wood-sedge (*Carex depauperata*), Killarney Fern (*Trichomanes speciosum*), Pennyroyal (*Mentha pulegium*), Bird's-nest Orchid (*Neottia nidus-avis*), Golden Dock (*Rumex maritimus*) and Bird Cherry (*Prunus padus*). The first three of these are also protected under the Flora (Protection) Order, 2015, while the Killarney Fern is also listed on Annex II of the E.U. Habitats Directive. The following plants, relatively rare nationally, are also found within the site: Toothwort (*Lathraea squamaria*) - associated with woodlands on the Awbeg and Blackwater; Summer Snowflake (*Leucojum aestivum*) and Flowering Rush (*Butomus umbellatus*) on the Blackwater; Common Calamint (*Calamintha ascendens*), Red Campion, Sand Leek (*Allium scorodoprasum*) and Wood Club-rush (*Scirpus sylvaticus*) on the Awbeg.

The site is also important for the presence of several E.U. Habitats Directive Annex II animal species, including Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*L. fluviatilis*), Twaite Shad (*Alosa fallax fallax*), Freshwater Pearl Mussel (*Margaritifera margaritifera*), Otter (*Lutra lutra*) and Salmon (*Salmo salar*). The Awbeg supports a population of White-clawed Crayfish (*Austropotamobius pallipes*). This threatened species has been recorded from a number of locations and its remains are also frequently found in Otter spraints, particularly in the lower reaches of the river. The freshwater stretches of the Blackwater and Bride Rivers are designated salmonid rivers. The Blackwater is noted for its enormous run of salmon over the years. The river is characterised by significant pools, streams, glides, and generally, a good push of water coming through except in

very low water. Spring salmon fishing can be carried out as far upstream as Fermoy and is highly regarded especially at Careysville. The Bride, main Blackwater upstream of Fermoy, and some of the tributaries are more associated with grilse fishing.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger and Irish Hare. The bat species Natterer's Bat, Daubenton's Bat, Whiskered Bat, Brown Long-eared Bat and Pipistrelle, can be seen feeding along the river, roosting under the old bridges and in old buildings.

Common Frog, a Red Data Book species that is also legally protected (Wildlife Act, 1976), occurs throughout the site. The rare bush cricket *Metrioptera roselii* (Order Orthoptera) has been recorded in the reed/willow vegetation of the river embankment on the Lower Blackwater River. The Swan Mussel (*Anodonta cygnea*), a scarce species nationally, occurs at a few sites along the freshwater stretches of the Blackwater.

Several bird species listed on Annex I of the E.U. Birds Directive are found on the site. Some use it as a staging area, others are vagrants, while others use it more regularly. Internationally important numbers of Whooper Swan (average peak 174, 1994/95-95/96) and nationally important numbers Bewick's Swan (average peak 5, 1996/97-2000/01) use the Blackwater Callows. Golden Plover occur in regionally important numbers on the Blackwater estuary (average peak 885, 1984/85-86/87) and on the River Bride (absolute maximum 2,141, 1994/95). Staging Terns visit the site annually, with >300 Sandwich Tern and >200 Arctic/Common Tern (average peak 1974-1994). The site also supports populations of the following: Red Throated Diver, Great Northern Diver, Barnacle Goose, Ruff, Wood Sandpiper and Greenland White-fronted Goose. Three breeding territories for Peregrine Falcon are known along the Blackwater Valley. This, the Awbeg and the Bride River are also thought to support at least 30 pairs of Kingfisher. Little Egret breed at the site (12 pairs in 1997, 19 pairs in 1998).

The site holds important numbers of wintering waterfowl. Both the Blackwater Callows and the Blackwater Estuary Special Protection Areas (SPAs) hold internationally important numbers of Black-tailed Godwit (average peak 847, 1994/95-95/96 on the callows, average peak 845, 1974/75-93/94 in the estuary). The Blackwater Callows also hold Wigeon (average peak 2,752), Teal (average peak 1,316), Mallard (average peak 427), Shoveler (average peak 28), Lapwing (average peak 880), Curlew (average peak 416) and Black-headed Gull (average peak 396) (counts from 1994/95-95/96). Numbers of birds using the Blackwater Estuary, given as the mean of the highest monthly maxima over 20 years (1974-94), are Shelduck (137 +10 breeding pairs), Wigeon (780), Teal (280), Mallard (320 + 10 breeding pairs), Goldeneye (11-97), Oystercatcher (340), Ringed Plover (50 + 4 breeding pairs), Grey Plover (36), Lapwing (1,680), Knot (150), Dunlin (2,293), Snipe (272), Black-tailed Godwit (845), Bar-tailed Godwit (130), Curlew (920), Redshank (340), Turnstone (130), Black-headed Gull (4,000) and Lesser Black-backed Gull (172). The greatest

numbers (75%) of the wintering waterfowl of the estuary are located in the Kinsalebeg area on the east of the estuary in Co. Waterford. The remainder are concentrated along the Tourig estuary on the Co. Cork side.

The river and river margins also support many Heron, non-breeding Cormorant and Mute Swan (average peak 53, 1994/95-95/96 in the Blackwater Callows). Heron occurs all along the Bride and Blackwater Rivers: 2 or 3 pairs at Dromana Rock; approximately 25 pairs in the woodland opposite; 8 pairs at Ardsallagh Wood and around 20 pairs at Rincrew Wood have been recorded. Some of these are quite large and significant heronries. Significant numbers of Cormorant are found north of the bridge at Youghal and there are some important roosts present at Ardsallagh Wood, downstream of Strancally Castle and at the mouth of the Newport River. Of note are the high numbers of wintering Pochard (e.g. 275 individuals in 1997) found at Ballyhay quarry on the Awbeg, the best site for Pochard in Co. Cork.

Other important species found within the site include Long-eared Owl, which occurs all along the Blackwater River, and Barn Owl, a Red Data Book species, which is found in some old buildings and in Castlehyde, west of Fermoy. Reed Warbler, a scarce breeding species in Ireland, was found for the first time in the site in 1998 at two locations. It is not known whether or not this species breeds on the site, although it breeds nearby to the south of Youghal. Dipper occurs on the rivers.

Land use at the site is mainly centred on agricultural activities. The banks of much of the site and the callows, which extend almost from Fermoy to Cappoquin, are dominated by improved grasslands which are drained and heavily fertilised. These areas are grazed and used for silage production. Slurry is spread over much of this area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the populations of E.U. Habitats Directive Annex II animal species within it. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the Blackwater and its tributaries, and there are a number of angler associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. Other recreational activities such as boating, golfing and walking are also popular. Water skiing is carried out at Villierstown. Parts of Doneraile Park and Anne's Grove are included in the site: both areas are primarily managed for amenity purposes. There is some hunting of game birds and Mink within the site. Ballyhay quarry is still actively quarried for sand and gravel. Several industrial developments, which discharge into the river, border the site.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, dredging of the upper reaches of the Awbeg, over-grazing within the woodland areas, and invasion by non-native species, for example Rhododendron and Cherry Laurel.

Overall, the River Blackwater is of considerable conservation significance for the occurrence of good examples of habitats and populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively. Furthermore it is of high conservation value for the populations of bird species that use it. Two Special Protection Areas, designated under the E.U. Birds Directive, are also located within the site - Blackwater Callows and Blackwater Estuary. Additionally, the importance of the site is enhanced by the presence of a suite of uncommon plant species.

Site Name: Clonakilty Bay SAC

Site Code: 000091

Clonakilty Bay in west Cork is an intertidal expanse that stretches from Clonakilty to the open sea, and comprises two small estuaries separated by Inchydoney Island. The site also includes adjacent sand dunes and inland marshes, and therefore is a coastal complex with a good diversity of habitats.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1140] Tidal Mudflats and Sandflats
[1210] Annual Vegetation of Drift Lines
[2110] Embryonic Shifting Dunes
[2120] Marram Dunes (White Dunes)
[2130] Fixed Dunes (Grey Dunes)*
[2150] Decalcified Dune Heath*

Sand flats dominate the intertidal area, although mudflats occur at the sheltered upper end of the inlets. The vegetation consists of algal mats (*Enteromorpha* spp.), with brown seaweeds (*Fucus* spp.) occurring where the coast is rocky. The invasive Cord-grass (*Spartina* sp.) occurs in places. The intertidal flats have a typical diversity of macro-invertebrates, including *Arenicola marina*, *Scrobicularia plana*, *Hediste diversicolor*, *Nephtys hombergii*, *N. cirrosa*, *Hydrobia ulvae* and *Cerastoderma edule*.

Sand dunes grade from a strandline, colonised by Frosted Orache (*Atriplex laciniata*), Sea Sandwort (*Honkenya peploides*) and Sea Rocket (*Cakile maritima*), through to fixed dunes vegetated by grasses, small herbs and several species of orchid. They support an interesting array of plants, amongst which Great Mullein (*Verbascum thapsus*), Viper's-bugloss (*Echium vulgare*) and Teasel (*Dipsacus fullonum*) are some of the most noticeable. Embryonic shifting dunes and white Marram (*Ammophila arenaria*) dunes are also represented. Of particular interest is a small area of decalcified dune heath with some Gorse (*Ulex europaeus*).

Inland of the western estuary, an extensive area of wetland occurs, which in itself contains a fine range of habitats from saline lagoons, to brackish grasslands, open freshwater marsh and Alder (*Alnus glutinosa*) scrub. Species found here are characteristic of marshy areas and include Creeping Bent (*Agrostis stolonifera*), Water Horsetail (*Equisetum fluviatile*), Marsh Cinquefoil (*Potentilla palustris*) and Marsh

Willowherb (*Epilobium palustre*). The saline influence is evident by the occurrence of species such as Saltmarsh Rush (*Juncus gerardi*) and Sea Rush (*J. maritimus*).

The site contains a good diversity and density of waterfowl, with over 7,000 waders and wildfowl occurring regularly. Seven species have populations of national importance: Shelduck (168), Grey Plover (76), Lapwing (2,509), Dunlin (1,508) Curlew (1,231), Redshank (263) and Greenshank (27). The site is most noted, however, for its population of Black-tailed Godwit (866), which is of international importance and comprises over 10% of the national total. Amongst the other species which occur, there are notable populations of Golden Plover and Bar-tailed Godwit, both of which are listed on Annex I of the E.U. Birds Directive. All counts given are average winter peaks over either two or three seasons from 1994/95 to 1996/97. Herons commonly use the site and a heronry exists in the trees near Clonakilty.

Otter spraints were found frequently during a recent survey of the marsh area. This species is listed on Annex II of the E.U. Habitats Directive.

The site is under pressure from a number of sources, notably recreation and tourism developments and agricultural improvements, including drainage and fertiliser application.

This site is of considerable scientific interest because it contains a good diversity of coastal habitats. These habitats show a succession from salt to freshwater influences and include six which are listed on Annex I of the E.U. Habitats Directive. Its value is enhanced considerably by the birdlife it supports. The occurrence of Black-tailed Godwit in internationally important numbers is particularly significant. The site also supports nationally important numbers of seven other species of waterfowl as well as two species listed on Annex I of the E.U. Birds Directive.

Site Name: Courtmacsherry Estuary SAC

Site Code: 001230

This site is located in west Cork, some 12 km south of Bandon and immediately east of the village of Timoleague. The estuary consists of the drowned valley of the Argideen River, which is now filled with sediments, resulting in an extensive area of mudflats. The site contains a complex of coastal habitats, including ten which are listed in the E.U. Habitats Directive.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1130] Estuaries
[1140] Tidal Mudflats and Sandflats
[1210] Annual Vegetation of Drift Lines
[1220] Perennial Vegetation of Stony Banks
[1310] <i>Salicornia</i> Mud
[1330] Atlantic Salt Meadows
[1410] Mediterranean Salt Meadows
[2110] Embryonic Shifting Dunes
[2120] Marram Dunes (White Dunes)
[2130] Fixed Dunes (Grey Dunes)*

The greater part of this estuary site is mudflat and tidal channels, but three rivers flow into the site and areas of fresh- and saltmarsh are found. Most of the mudflat at Courtmacsherry is unvegetated, although in places cord-grass (*Spartina* sp.) occurs.

Saltmarsh has developed in a number of areas, with the most abundant species being Sea Club-rush (*Scirpus maritimus*), Common Scurvygrass (*Cochlearia officinalis*), Sea Arrowgrass (*Triglochin maritima*), Sea Plantain (*Plantago maritima*), Thrift (*Armeria maritima*) and Saltmarsh Rush (*Juncus gerardi*). On the outer edges such species as Greater Sea-spurrey (*Spergularia media*), Lesser Sea-spurrey (*S. marina*) and Lax-flowered Sea-lavender (*Limonium humile*) occur, while on their landward edge the saltmarshes frequently support Creeping Bent (*Agrostis stolonifera*), Red Fescue (*Festuca rubra*), Silverweed (*Potentilla anserina*), Soft Rush (*Juncus effusus*), Common Sorrel (*Rumex acetosa*) and others. A particularly well-developed and intact saltmarsh occurs at Garranefeen Strand.

Tideline communities of Sea Rocket (*Cakile maritima*) and oraches (*Atriplex* spp.), including Grass-leaved Orache (*A. littoralis*), are noted from this site. In stony areas

east of Courtmacsherry the uncommon Sea-kale (*Crambe maritima*) occurs, and Yellow Horned-poppy (*Glaucium flavum*) has also been recorded. Glasswort (*Salicornia* spp.) communities have been recorded from Garranefeen inlet.

The site also supports small but interesting sand dune systems. Embryonic dunes occur in a number of places, including Garranefeen, Flaxford Strand and near Courtmacsherry, and the species Sand Couch (*Elymus farctus*) occurs. Marram dunes are well developed on the eastern spit at Garranefeen inlet. Species present include Sea Bindweed (*Calystegia soldanella*), Sea-spurge (*Euphorbia paralias*) and Sand Couch. Fixed dunes are not particularly well developed at this site, but where present, support species such as Red Fescue, Common Restharrow (*Ononis repens*), Kidney Vetch (*Anthyllis vulneraria*), Pyramidal Orchid (*Anacamptis pyramidalis*) and Lady's Bedstraw (*Galium verum*).

The site also includes small areas of sand dune, sandy and shingle beaches, reedbeds of Common Reed (*Phragmites australis*), scrub, dry grassland, and areas of both wet and dry semi-natural broadleaved woodland, parts of which are dominated by oak (*Quercus* sp.).

The presence of some rare and scarce plant species at the site is noteworthy. The rare Red Data Book species Sea-kale occurs on shingle and the scarce grass, Tor-grass (*Brachypodium pinnatum*), has been recorded on cliffs between Broadstrand and Wood Point.

The site is of ornithological importance for the many waders and wildfowl that feed on the mud- and sandflats. The winter flocks of Golden Plover (2,600) and Black-Tailed Godwit (110) constitute nationally important numbers, and at least nine other species occur in numbers which are significant for the region - Wigeon (58), Mallard (69), Red-breasted Merganser (18), Oystercatcher (162), Lapwing (629), Dunlin (215), Bar-tailed Godwit (178), Curlew (731) and Redshank (139). Although these figures are the average peaks of 4 counts between 1984/85 and 1986/87, at times the numbers present far exceed those given. For example, in January 1992, 5,800 Golden Plover, 671 Wigeon, 731 Dunlin and 456 Oystercatchers were present.

The spread of cord-grass on parts of the mudflats poses a threat to the quality of the area for feeding birds, and pollution is an ever-present threat in such a wetland.

Courtmacsherry Estuary is an important site for the complex of coastal habitats found there, including ten listed on Annex I of the E.U. Habitats Directive, and for the large numbers of birds that use the area. The presence of rare and scarce plant species adds further interest and value to the site.

Site Name: Great Island Channel SAC

Site Code: 001058

The Great Island Channel stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. Geologically, Cork Harbour consists of two large areas of open water in a limestone basin, separated from each other and the open sea by ridges of Old Red Sandstone. Within this system, Great Island Channel forms the eastern stretch of the river basin and, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owennacurra and Dungourney Rivers. These rivers, which flow through Midleton, provide the main source of freshwater to the North Channel.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1140] Tidal Mudflats and Sandflats [1330] Atlantic Salt Meadows

The main habitats of conservation interest in Great Island Channel SAC are the sheltered tidal sand and mudflats and the Atlantic salt meadows. Owing to the sheltered conditions, the intertidal flats are composed mainly of soft muds. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nephtys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algal species occur on the flats, especially *Ulva lactuca* and *Enteromorpha* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially at Rossleague and Belvelly.

The saltmarshes are scattered through the site and are all of the estuarine type on mud substrate. Species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Greater Sea-spurrey (*Spergularia media*), Lax-flowered Sea-lavender (*Limonium humile*), Sea Arrowgrass (*Triglochin maritimum*), Sea Mayweed (*Matricaria maritima*) and Red Fescue (*Festuca rubra*).

The site is extremely important for wintering waterfowl and is considered to contain three of the top five areas within Cork Harbour, namely North Channel, Harper's Island and Belvelly-Marino Point. Shelduck is the most frequent duck species with 800-1,000 birds centred on the Fota/Marino Point area. There are also large flocks of Teal and Wigeon, especially at the eastern end. Waders occur in the greatest density

north of Rosslare, with Dunlin, Godwit, Curlew and Golden Plover the commonest species. A population of about 80 Grey Plover is a notable feature of the area. All the mudflats support feeding birds; the main roost sites are at Weir Island and Brown Island, and to the north of Fota at Killacloyne and Harper's Island. Ahanesk supports a roost also but is subject to disturbance. The numbers of Grey Plover and Shelduck, as given above, are of national importance.

The site is an integral part of Cork Harbour which is a wetland of international importance for the birds it supports. Overall, Cork Harbour regularly holds over 20,000 waterfowl and contains internationally important numbers of Black-tailed Godwit (1,181) and Redshank (1,896), along with nationally important numbers of nineteen other species. Furthermore, it contains large Dunlin (12,019) and Lapwing (12,528) flocks. All counts are average peaks, 1994/95 – 1996/97. Much of the site falls within Cork Harbour Special Protection Area, an important bird area designated under the E.U. Birds Directive.

While the main land use within the site is aquaculture (oyster farming), the greatest threats to its conservation significance come from road works, infilling, sewage outflows and possible marina developments.

The site is of major importance for the two habitats listed on Annex I of the E.U. Habitats Directive, as well as for its important numbers of wintering waders and wildfowl. It also supports a good invertebrate fauna.

Site Name: Helvick Head SAC

Site Code: 000665

Helvick Head is situated on the southern side of Dungarvan Harbour in Co. Waterford. It forms the eastern extremity of a broad Old Red Sandstone ridge which extends as far west as Cork City, and is the most northern of the (Hercynian) parallel folds in the rocks of the south-west of Ireland. The beds of rock dip quite steeply at this point so that the cliffs, which rise to about 60 m, are formed of a series of semi-vertical ribs with small gullies between them, especially at the eastern end. The site extends from Helvick Head south-westward to include Muggort's Bay and comprises sea cliffs, cliff top vegetation and an area of marine waters off Helvick Head.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1230] Vegetated Sea Cliffs [4030] Dry Heath

The cliff top supports coastal heath of a type characteristic of shallow soils on acid rocks. Western Gorse (*Ulex gallii*), Bell Heather (*Erica cinerea*) and Heather (*Calluna vulgaris*) are the most common species. Associated species include Wood Sage (*Teucrium scorodonia*), Sheep's-bit (*Jasione montana*), Devil's-bit Scabious (*Succisa pratensis*), Slender St. John's-wort (*Hypericum pulchrum*), Mouse-ear Hawkweed (*Hieracium pilosella*), Heath Bedstraw (*Galium saxatile*), English Stonecrop (*Sedum anglicum*), Common Dog-violet (*Viola riviniana*), Goldenrod (*Solidago virgaurea*), Burnet Rose (*Rosa pimpinellifolia*) and a variety of bryophyte and lichen species. Common grass species are Common Bent (*Agrostis capillaris*) and Sweet Vernal-grass (*Anthoxanthum odoratum*). The presence of Wild Madder (*Rubia peregrina*) is indicative of the southern location of the site.

Where heath has returned to formerly-reclaimed fields, Gorse (*Ulex europaeus*), Bracken (*Pteridium aquilinum*) and Bramble (*Rubus fruticosus* agg.) occur more commonly. Coastal grassland with Red Fescue (*Festuca rubra*), Creeping Bent (*A. stolonifera*), Yarrow (*Achillea millifolium*), Buck's-horn Plantain (*Plantago coronopus*), Daisy (*Bellis perennis*), Sea Mayweed (*Matricaria maritima*), Common Sorrel (*Rumex acetosa*), Wild Carrot (*Daucus carota*), Thrift (*Armeria maritima*) and Kidney Vetch (*Anthyllis vulneraria*), amongst others, also occurs in places on the cliff top, where heath has not developed.

Sea cliffs are particularly well developed at the eastern end of the site and are well vegetated with Thrift, Ivy (*Hedera helix*), Common Scurvygrass (*Cochlearia officinalis*), Sea Campion (*Silene vulgaris* subsp. *maritima*), Rock Sea-spurrey (*Spergularia rupicola*), Buck's-horn Plantain, lichens, and a variety of other species.

Helvick Head has important breeding seabird populations. A census in 1999 recorded the following: Fulmar 42 pairs, Shag 6 pairs, Herring Gull 44 pairs, Great Black-backed Gull 2 pairs, Kittiwake 934 pairs, Guillemot 990 individuals and Razorbill 41 individuals. In April 1998, 10 individual Black Guillemots were recorded. The population of Kittiwakes is of national importance. The site also supports Chough, a species listed on Annex I of the E.U. Birds Directive. The low heath vegetation on the cliff tops provides good foraging habitat for Chough and in 1992 a breeding pair was recorded, as well as three flock birds. Another Annex I species, Peregrine, also occurs at the site. Raven breed on the cliffs and there is a cliff-nesting colony of House Martins. Other species which breed within the site include Rock Pipit and Stonechat. The seabird colony at Helvick Head has been monitored at intervals since the Operation Seafarer project in 1969/70. In addition, more detailed population studies have been carried out on the Kittiwake colony.

Helvick Head is a site of considerable conservation importance, including good examples of coastal dry heath and vegetated sea cliffs, both habitats that are listed on Annex I of the E.U. Habitats Directive. It is also of high ornithological importance, with one seabird species having a population of national importance. The presence of breeding Chough and Peregrine is also of note.

Site Name: Hook Head SAC

Site Code: 000764

The areas of conservation interest at Hook Head comprise marine subtidal reefs to the south and east of the Hook Head Peninsula, and also sea cliffs from Hook Head to Baginbun and Ingard Point. The peninsula forms the eastern side of Waterford Harbour, while to the east it adjoins the estuary mouth of Bannow Bay. Hook Head itself is composed of Carboniferous limestone overlain by Devonian Old Red Sandstone and is palaeontologically of international importance.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1160] Large Shallow Inlets and Bays
[1170] Reefs
[1230] Vegetated Sea Cliffs

An exposed to moderately exposed intertidal reef community complex occurs around Hook Head. Subtidally the reefs are aligned in a north-east/south-west orientation and are typically strewn with boulders, cobbles and patches of sand and gravel. They are exposed to prevailing winds and swells from the west and tidal streams tend to be moderate but are strong in some areas. There are also a number of isolated reefs that project from a sand plain. The reefs around Hook Head have excellent examples of tide-swept communities and species richness is high in both the shallow and deep-water communities. A *Laminaria*-dominated community is recorded from the shallow waters around Hook Head. Deeper waters consist of Echinoderm and sponge-dominated community complex types, characterised by cushion sponges, with branching sponges and the rose 'coral' *Pentapora foliacea*. In addition, the sponge *Stryphnus ponderosa*, the sea squirts *Sidnyum elegans*, *Distomus variolosus* and *Stolonica socialis*, and the brittlestar *Amphiura securigera* are present. These species have a limited distribution in Ireland. The rare red algae *Schizymenia dubyi* also occurs.

The sublittoral sediments within this area consist of exposed, tide-swept patches of duned gravel and moderately exposed silty sand with only weak tidal streams. The duned gravel is characterised by the burrowing sea cucumber *Neopendactyla mixta* and the burrowing brittlestar *Amphiura securigera*, whilst the silty sand is relatively barren. *A. securigera* has only been recorded from the south-east of Ireland (the Kenmare River) and in Northern Ireland, where it is considered rare. The coarse sediments consist of a community complex distinguished by *Pisidia longicornis* and mobile and epibenthic species.

The sea cliffs, which extend for a distance of approximately 15 km, are mostly low, usually not more than 10 m, though they extend up to 30 m high near Baginbun Head. Both clay and rock cliffs are represented. The vegetation of the cliffs, as well as the underlying rocky shoreline, is characterised by species such as Thrift (*Armeria maritima*), Rock Samphire (*Crithmum maritimum*), Rock Sea-lavender (*Limonium binervosum*), Sea Plantain (*Plantago maritima*), Buck's-horn Plantain (*Plantago coronopus*), Rock Sea-spurrey (*Spergularia rupicola*) and Sea Mayweed (*Matricaria maritima*).

The cliffs at this site are of ornithological interest for breeding Chough, Raven) and Peregrine, and there is a small seabird colony, mainly of Guillemots, near Baginbun. The headland is a noted landfall point for migrants.

The waters off Hook Head are rich in marine life and are a popular diver site for SCUBA enthusiasts. Rock pools on the shore support a diverse flora and fauna.

In summary, this site is of conservation importance for its subtidal reef and shallow bay communities, and their diversity of species, as well as for the vegetated sea cliffs. These habitats are listed under the E.U. Habitats Directive. The rocky coastline is also important for a number of breeding birds, two of which are listed on Annex I of the E.U. Birds Directive.

Site Name: Kilkeran Lake and Castlefreke Dunes SAC

Site Code: 001061

Kilkeran Lake and Castlefreke Dunes are situated about 6 km south-east of Rosscarbery in Co. Cork. It is coastal site in which well-developed sand dunes have impounded two streams to create wetland areas of open water, freshwater marsh and swamp. The site also contains an area of mixed woodland.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1150] Coastal Lagoons*
[2110] Embryonic Shifting Dunes
[2120] Marram Dunes (White Dunes)
[2130] Fixed Dunes (Grey Dunes)*

In the Castlefreke system the sand dune flora is rich for this area of west Cork. Embryonic shifting dunes occur along the seaward side of the dune system where there is some movement of sand. Marram (*Ammophila arenaria*) occurs thinly, along with Sea Couch (*Elymus pycnanthus*), Frosted Orache (*Atriplex laciniata*) and Sea Sandwort (*Honkenya peploides*). Marram dunes, dominated by Marram, are the principal dune type at the site. Over much of the system Marram is dense due to the absence of grazing in recent years. The system is undulating, with some dunes at least 15 m high. Other species present include Sea Bindweed (*Calystegia soldanella*) and Sea Couch. Bramble (*Rubus fruticosus* agg.) and Bracken (*Pteridium aquilinum*) are invading in parts.

Owing to the dominance of Marram across much of the dune system, fixed dune vegetation is rather limited. However, there are open areas, including a dune slack with standing water and Creeping Willow (*Salix repens*). Much of the area is dominated by Bracken, and some parts have a heathy character. A small stand of Monterey Pine (*Pinus radiata*) occurs.

There are two main waterbodies on the site. Kilkeran Lake is a natural sedimentary lagoon, connected to the sea by a narrow, intermittently blocked channel. The lagoon has a sandy bed with some stones and is fringed by Common Reed (*Phragmites australis*) and the club-rushes *Scirpus maritimus* and *S. lacustris*. The aquatic flora includes Fennel Pondweed (*Potamogeton pectinatus*) and Tasselweed (*Ruppia* sp.). Kilkeran Lake is brackish and receives freshwater from one main stream, and saltwater during breaches of the outlet channel by the sea. Saltwater probably also enters the lagoon through seepage. The lagoon is prone to algal blooms and the once

thriving trout fishery has now disappeared. The invertebrate fauna of the lagoon has been well-studied and several rare and lagoon-indicator species have been recorded. North-west of Kilkeran Lake areas of freshwater marsh, swamp and wet grassland are found, following the stream which enters the lagoon.

Lough Rahavarrig is largely overgrown, having been colonised by fen-type vegetation, including Greater Pond-sedge (*Carex riparia*) and Water Dock (*Rumex hydrolapathum*). Areas of willows (*Salix* spp.) and reedbeds occur on the margins of the lake, where Skullcap (*Scutellaria galericulata*) is also found.

Sharp-leaved Fluellen (*Kickxia elatine*), a rare Red Data Book species, has been recorded from arable fields in the site. The uncommon sedge hybrid, *Carex paniculata* x *C. remota* (*C. x boenninghausiana*) has also been recorded from the site, north-west of Kilkeran Lake.

Kilkeran Lake was formerly used by large numbers of diving duck (Pochard and Tufted Duck) but these no longer occur, possibly due to poor water visibility as a result of eutrophication. The site is now visited by only very low numbers of waterfowl in winter. It has breeding Little Grebe and Mute Swan, and there is a sizeable heronry nearby.

This site contains two priority habitats listed on Annex I of the E.U. Habitats Directive, lagoon and fixed dune. The presence of a lagoon on the site is of particular significance as these are becoming increasingly rare in Ireland as well as in Europe, and Kilkeran Lake is the best example of a sedimentary lagoon in south-west Ireland. The wide range of habitat types and high diversity of plant and animal species found adds considerably to the importance of the site. Part of the site is State-owned and managed for conservation purposes.



Site Name: Lough Hyne Nature Reserve and Environs SAC

Site Code: 000097

This is a large coastal site (>400 ha) situated just east of Roaringwater Bay some 5 km south-west of Skibbereen, Co. Cork. It includes Lough Hyne Nature Reserve on its western end, Ballyally Lough, the adjacent marshland area along the Bealariree stream and the coastline eastwards to Gokane Point, including Tragumna Bay. The site therefore encompasses a range of both marine and terrestrial habitats.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1160] Large Shallow Inlets and Bays [1170] Reefs [8330] Sea Caves
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Lough Hyne is a deep landlocked bay joined by a narrow channel (Barloge Creek) to the sea. It is situated on alternating bands of lower Old Red Sandstone and Carboniferous slates. Approximately 4,000 years ago this was a freshwater lake, but due to the post-glacial rise in sea-level it is now saline. The narrowness of the connecting sea channel means that the tidal fluctuations are reduced to approximately 1 m and consequently the zonation of the intertidal communities is confined to a narrow band along the shore. Another unusual feature of the site is the rapids created in the narrow channel when the tidal levels inside and outside the Lough differ.

The site contains reefs which are very exposed to wave action on the open coast, as well as extremely sheltered reefs within the Lough itself. The latter is a very rare habitat in Ireland. Many of the communities found on the reefs are more characteristic of the exposed open coast and in Lough Hyne the sponge-dominated communities occur at much shallower depths than on the open coast. Lough Hyne has been extensively studied and is known to have a very high species diversity and very high species richness for such a small area.

On the open coast and within the Lough the rocky shores are renowned for the presence of the Purple Sea Urchin *Paracentrotus lividus*. This is the most easterly limit for this species in Ireland. Dense stands of the kelp *Laminaria saccorhiza* are found in the rapids with a species-rich faunal community under the boulders. Within the Lough the shallow subtidal reefs are in some areas characterised by a mixed kelp forest of *L. saccharina* and *Sacchariza polyschides* with some *Laminaria digitata* and

foliose red algae, while in other areas *L. saccharina* and *Cystoseira* species are the characterising algae.

At the entrance to the Lough where there is strong water movement the brown algae *Halydris siliquosa* and mixed kelp species are characteristic, a community that is typical of moderately exposed tide-swept areas. With increasing depth at this area communities more characteristic of areas exposed to wave action on the open coast are found; sponges hydroids, cup-corals, solitary sea squirts and red algae dominate the boulders. The vertical surfaces are colonised by the jewel anemone, the sponge *Esperiopsis fucorum* and solitary sea squirts; a bryozoan turf of *Crisia* species may also be present. Cobbles, pebbles and gravel support a community of keel worm *Pomatoceros triqueter*, the barnacle *Balanus crenatus* and bryozoan crusts.

In sheltered areas away from the turbulent water entering the Lough much of the rock is covered by solitary sea squirts and sponges. The cliffs within the Lough support a wide variety of sponges, the cup coral and a community characterised by the rare soft coral *Paraerythropodium coralloides*, which is more characteristic of open water. Rare sponges that are known to occur within the Lough includes *Plakortis simplex* and *Halicnemis patera*. Two rare gobies are found in Lough Hyne: Couche's Goby *Gobius couchi* and the Red-mouthed Goby *Gobius cruenatatus*. Two sea-slugs more commonly found in the Mediterranean occur in Lough Hyne: *Dicata odhneri* and *Facelina dubia*. The Southern Cup Coral *Caryophyllia inornatus* occurs close to the rapids and is the only known site in Ireland for this species. 75% of the marine algae on the national species list have been recorded in the area. These include the rare species *Osmundea truncata*, *Gymnogongrus devoniensis* and *Notastoma canariensis*. Large mats of the red algae *Trailliella* also occur.

Much of the floor of Lough Hyne is soft mud, but areas of pebbles, gravel and muddy sand also occur in shallow water around the edges of the Lough. In sheltered areas the pebbles and gravel are colonised by solitary sea squirts, while the sand and mud are colonised by burrowing anemones. The scallop *Pecten maximus* may also be present and in some areas the Dublin Bay prawn *Nephrops norvegicus* is common. Outside the Lough in Southern Bay and Barloge Bay dense stands of Eelgrass (*Zostera marina*) occur growing on coarse sand.

There is a large cave on the south-western side of Bullock Island. The brown alga *Laminaria hyperborea* occurs at the entrance and a short distance into the cave due to good light penetration. The red alga *Cryptopleura ramosa* occurs on the sides of the cave and into the intertidal areas within the cave. Rockpools within the cave are characterised by sheets of the jewel anemone *Corynactis viridis*, a species found in areas subject to wave action.

To the north of Lough Hyne is the mixed woodland of Knockomagh, whose species include Sessile Oak (*Quercus petraea*), Beech (*Fagus sylvatica*) and Sycamore (*Acer pseudoplatanus*), with some Holly (*Ilex aquifolium*) and Yew (*Taxus baccata*). However, there has been much planting of coniferous species such as Sitka Spruce (*Picea*

sitchensis), Lodgepole Pine (*Pinus contorta*) and larch (*Larix* spp.) in the wood over the last 30 years.

Surrounding the Lough are areas of heathland with Western Gorse (*Ulex gallii*) and Bracken (*Pteridium aquilinum*), scrub woodland and some improved agricultural grassland. The land to the east includes Ballyally Lough and Bealariree Marsh. The northern end of the marsh supports some wet woodland with Willow (*Salix* spp.) and Alder (*Alnus glutinosa*); the marsh itself is dominated by the Common Reed (*Phragmites australis*), with much Wild Celery (*Apium graveolens*) in the upper reaches of Bealariree stream.

Fields to the north-east of Gokane Point contain the rare Red Data Book species, Sharp-leaved Fluellen (*Kickxia elatine*).

The remainder of the site follows the rocky coastline, whose physical features include marine caves, cliffs and a blow-hole.

The cliffs on the eastern edge of Tragumna Bay are used by small numbers of breeding seabirds, as well as breeding Raven, Peregrine and Chough. The last two species are listed on Annex I of the E.U. Birds Directive.

Due to the fact that it is nearly land-locked, with relatively little tidal exchange of water, Lough Hyne is vulnerable to the effects of eutrophication. Polluting operations around the lake (including heavy fertilization of agricultural land), and pollution of the streams and drains which feed into the Lough, should be prevented where possible. The Lough is also used by scuba-divers and field studies groups, and disturbance of the habitats and the removal of biological material, especially of shellfish (e.g. Scallop, Sea Urchins and Lobster) is a potential threat.

Lough Hyne has been recognised as an internationally important ecological site, with both botanical and zoological interest. The surrounding coastland area also supports a range of habitats which are both scientifically interesting and very scenic. This site contains important examples of three habitats listed on Annex I of the E.U. Habitats Directive, with the habitat 'large shallow inlets and bays' making up over 60% of the site. The high species diversity and the presence of a number of rare and unusual species adds further interest to the area.

Site Name: River Barrow and River Nore SAC

Site Code: 002162

This site consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. Major towns along the edge of the site include Mountmellick, Portarlinton, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow, and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore.

Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains before passing through a band of Carboniferous shales and sandstones. The Nore, for a large part of its course, traverses limestone plains and then Old Red Sandstone for a short stretch below Thomastown. Before joining the Barrow it runs over intrusive rocks poor in silica. The upper reaches of the Barrow also run through limestone. The middle reaches and many of the eastern tributaries, sourced in the Blackstairs Mountains, run through Leinster Granite. The southern end, like the Nore runs over intrusive rocks poor in silica. Waterford Harbour is a deep valley excavated by glacial floodwaters when the sea level was lower than today. The coast shelves quite rapidly along much of the shore.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1170] Reefs
- [1310] *Salicornia* Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [3260] Floating River Vegetation
- [4030] Dry Heath
- [6430] Hydrophilous Tall Herb Communities
- [7220] Petrifying Springs*
- [91A0] Old Oak Woodlands

[91E0] Alluvial Forests*

- [1016] Desmoulin's Whorl Snail (*Vertigo moulinsiana*)
- [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
- [1092] White-clawed Crayfish (*Austropotamobius pallipes*)
- [1095] Sea Lamprey (*Petromyzon marinus*)
- [1096] Brook Lamprey (*Lampetra planeri*)
- [1099] River Lamprey (*Lampetra fluviatilis*)
- [1103] Twaite Shad (*Alosa fallax*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1355] Otter (*Lutra lutra*)
- [1421] Killarney Fern (*Trichomanes speciosum*)
- [1990] Nore Freshwater Pearl Mussel (*Margaritifera durrovensis*)

Good examples of alluvial forest (a priority habitat on Annex I of the E.U. Habitats Directive) are seen at Rathsnagadan, Murphy's of the River, in Abbeyleix estate and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species seen include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Rusty Willow (*S. cinerea* subsp. *oleifolia*), Crack Willow (*S. fragilis*) and Osier (*S. viminalis*), along with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Thin-spiked Wood-sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*), Common Valerian (*Valeriana officinalis*) and the Red Data Book species Nettle-leaved Bellflower (*Campanula trachelium*).

A good example of petrifying springs with tufa formations occurs at Dysart Wood along the Nore. This is a rare habitat in Ireland and one listed with priority status on Annex I of the E.U. Habitats Directive. These hard water springs are characterised by lime encrustations, often associated with small waterfalls. A rich bryophyte flora is typical of the habitat and two diagnostic species, *Palustriella commutata* and *Eucladium verticillatum*, have been recorded.

The best examples of old oak woodlands are seen in the ancient Park Hill woodland in the estate at Abbeyleix; at Kyleadohir, on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods on the Nore; and at Cloghristic Wood, Drummond Wood and Borris Demesne on the Barrow, though other patches occur throughout the site. Abbeyleix Woods is a large tract of mixed deciduous woodland which is one of the only remaining true ancient woodlands in Ireland. Historical records show that Park Hill has been continuously wooded since the 16th century and has the most complete written record of any woodland in the country. It supports a variety of woodland habitats and an exceptional diversity of species including 22 native trees, 44 bryophytes and 92 lichens. It also contains eight indicator species of ancient woodlands. Park Hill is also the site of two rare plants, Nettle-leaved

Bellflower and the moss *Leucodon sciuroides*. The rare Myxomycete fungus, *Licea minima* has been recorded from woodland at Abbeyleix.

Oak woodland covers parts of the valley side south of Woodstock and is well developed at Brownsford where the Nore takes several sharp bends. The steep valley side is covered by oak (*Quercus* spp.), Holly (*Ilex aquifolium*), Hazel (*Corylus avellana*) and Downy Birch (*Betula pubescens*), with some Beech (*Fagus sylvatica*) and Ash (*Fraxinus excelsior*). All the trees are regenerating through a cover of Bramble (*Rubus fruticosus* agg.), Foxglove (*Digitalis purpurea*), Great Wood-rush (*Luzula sylvatica*) and Broad Buckler-fern (*Dryopteris dilatata*).

On the steeply sloping banks of the River Nore, about 5 km west of New Ross, in Co. Kilkenny, Kylecorragh Woods form a prominent feature in the landscape. This is an excellent example of relatively undisturbed, relict oak woodland with a very good tree canopy. The wood is quite damp and there is a rich and varied ground flora. At Brownstown, a small, mature oak dominated woodland occurs on a steep slope. There is younger woodland to the north and east of it. Regeneration throughout is evident. The understorey is similar to the woods at Brownsford. The ground flora of this woodland is developed on acidic, brown earth type soil and comprises a thick carpet of Bilberry (*Vaccinium myrtillus*), Heather (*Calluna vulgaris*), Hard Fern (*Blechnum spicant*), Common Cow-wheat (*Melampyrum pratense*) and Bracken (*Pteridium aquilinum*).

Borris Demesne contains a very good example of a semi-natural broadleaved woodland in very good condition. There is quite a high degree of natural regeneration of oak and Ash through the woodland. At the northern end of the estate oak species predominate. Drummond Wood, also on the Barrow, consists of three blocks of deciduous woods situated on steep slopes above the river. The deciduous trees are mostly oak species. The woods have a well-established understorey of Holly, and the herb layer is varied, with Bramble abundant. The whitebeam *Sorbus devoniensis* has also been recorded here.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the floodplain of the river is intact. Characteristic species of the habitat include Meadowsweet, Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed (*Calystegia sepium*). Indian Balsam (*Impatiens glandulifera*), an introduced and invasive species, is abundant in places.

Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include water-starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*), Bulbous Rush (*Juncus bulbosus*), water-milfoils (*Myriophyllum* spp.), the pondweed *Potamogeton x nitens*, Broad-leaved Pondweed (*P. natans*), Fennel Pondweed (*P. pectinatus*), Perfoliated Pondweed (*P. perfoliatus*) and crowfoots (*Ranunculus* spp.). The water quality of the Barrow has improved since the vegetation survey was carried out (EPA, 1996).

Dry heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. The dry heath vegetation along the slopes of the river bank consists of Bracken and Gorse (*Ulex europaeus*) with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw (*Galium saxatile*), Foxglove, Common Sorrel (*Rumex acetosa*) and Creeping Bent (*Agrostis stolonifera*). On the steep slopes above New Ross the Red Data Book species Greater Broomrape (*Orobancha rapum-genistae*) has been recorded. Where rocky outcrops are shown on the maps Bilberry and Great Wood-rush are present. At Ballyhack a small area of dry heath is interspersed with patches of lowland dry grassland. These support a number of clover species, including the legally protected Clustered Clover (*Trifolium glomeratum*) - a species known from only one other site in Ireland. This grassland community is especially well developed on the west side of the mud-capped walls by the road. On the east of the cliffs a group of rock-dwelling species occur, i.e. English Stonecrop (*Sedum anglicum*), Sheep's-bit (*Jasione montana*) and Wild Madger (*Rubia perigrina*). These rocks also support good lichen and moss assemblages with *Ramalina subfarinacea* and *Hedwigia ciliata*.

Dry heath at the site generally grades into wet woodland or wet swamp vegetation lower down the slopes on the river bank. Close to the Blackstairs Mountains, in the foothills associated with the Aughnabriskey, Aughavaud and Mountain Rivers there are small patches of wet heath dominated by Purple Moor-grass (*Molinia caerulea*) with Heather, Tormentil (*Potentilla erecta*), Carnation Sedge (*Carex panicea*) and Bell Heather (*Erica cinerea*).

Salt meadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House, in a narrow band on the channel side of Common Reed (*Phragmites australis*) beds and in narrow fragmented strips along the open shoreline. In the larger areas of salt meadow, notably at Carrickloney, Ballinlaw Ferry and Rochestown on the west bank; Fisherstown, Alderton and Great Island to Dunbrody on the east bank, the Atlantic and Mediterranean sub types are generally intermixed. At the upper edge of the salt meadow in the narrow ecotonal areas bordering the grasslands where there is significant percolation of salt water, the legally protected species Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) and Meadow Barley (*Hordeum secalinum*) are found. The very rare and also legally protected Divided Sedge (*Carex divisa*) is also found. Sea Rush (*Juncus maritimus*) is also present. Other plants recorded and associated with salt meadows include Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea Couch (*Elymus pycnanthus*), Spear-leaved Orache (*Atriplex prostrata*), Lesser Sea-spurrey (*Spergularia marina*), Sea Arrowgrass (*Triglochin maritima*) and Sea Plantain (*Plantago maritima*).

Glassworts (*Salicornia* spp.) and other annuals colonising mud and sand are found in the creeks of the saltmarshes and at the seaward edges of them. The habitat also occurs in small amounts on some stretches of the shore free of stones.

The estuary and the other E.U. Habitats Directive Annex I habitats within it form a large component of the site. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6 km from north to south between Passage East and Creadaun Head, and in places are over 1 km wide. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. They have a typical macro-invertebrate fauna, characterised by polychaetes and bivalves. Common species include *Arenicola marina*, *Nephtys hombergii*, *Scoloplos armiger*, *Lanice conchilega* and *Cerastoderma edule*. An extensive area of honey-comb worm biogenic reef occurs adjacent to Duncannon, Co. Wexford on the eastern shore of the estuary. It is formed by the polychaete worm *Sabellaria alveolata*. This intertidal *Sabellaria alveolata* reef is formed as a sheet of interlocking tubes over a considerable area of exposed bedrock. This polychaete species constructs tubes, composed of aggregated sand grains, in tightly packed masses with a distinctive honeycomb-like appearance. These can be up to 25cm proud of the substrate and form hummocks, sheets or more massive formations. A range of species are reported from these reefs including: *Enteromorpha* sp.; *Ulva* sp.; *Fucus vesiculosus*; *Fucus serratus*; *Polysiphonia* sp.; *Chondrus crispus*; *Palmaria palmate*; *Coralinus officinalis*; *Nemertea* sp.; *Actinia equine*; *Patella vulgate*; *Littorina littorea*; *Littorina obtusata* and *Mytilus edulis*.

The western shore of the harbour is generally stony and backed by low cliffs of glacial drift. At Woodstown there is a sandy beach, now much influenced by recreation pressure and erosion. Behind it a lagoonal marsh has been impounded which runs westwards from Gaultiere Lodge along the course of a slow stream. An extensive reedbed occurs here. At the edges is a tall fen dominated by sedges (*Carex* spp.), Meadowsweet, willowherbs (*Epilobium* spp.) and rushes (*Juncus* spp.). Wet woodland also occurs.

The dunes which fringe the strand at Duncannon are dominated by Marram (*Ammophila arenaria*) towards the sea. Other species present include Wild Clary/Sage (*Salvia verbenaca*), a rare Red Data Book species. The rocks around Duncannon ford have a rich flora of seaweeds typical of a moderately exposed shore and the cliffs themselves support a number of coastal species on ledges, including Thrift, Rock Samphire (*Crithmum maritimum*) and Buck's-horn Plantain (*Plantago coronopus*).

Other habitats which occur throughout the site include wet grassland, marsh, reedswamp, improved grassland, arable land, quarries, coniferous plantations, deciduous woodland, scrub and ponds.

Seventeen Red Data Book plant species have been recorded within the site, most in the recent past. These are Killarney Fern (*Trichomanes speciosum*), Divided Sedge, Clustered Clover, Basil Thyme (*Acinos arvensis*), Red Hemp-nettle (*Galeopsis angustifolia*), Borrer's Saltmarsh-grass, Meadow Barley, Opposite-leaved Pondweed (*Groenlandia densa*), Meadow Saffron/Autumn Crocus (*Colchicum autumnale*), Wild Clary/Sage, Nettle-leaved Bellflower, Saw-wort (*Serratula tinctoria*), Bird Cherry

(*Prunus padus*), Blue Fleabane (*Erigeron acer*), Fly Orchid (*Ophrys insectifera*), Ivy Broomrape (*Orobanche hederæ*) and Greater Broomrape. Of these, the first nine are protected under the Flora (Protection) Order, 2015. Divided Sedge was thought to be extinct but has been found in a few locations in the site since 1990. In addition plants which do not have a very wide distribution in the country are found in the site including Thin-spiked Wood-sedge, Field Garlic (*Allium oleraceum*) and Summer Snowflake. Six rare lichens, indicators of ancient woodland, are found including *Lobaria laetevirens* and *L. pulmonaria*. The rare moss *Leucodon sciuroides* also occurs.

The site is very important for the presence of a number of E.U. Habitats Directive Annex II animal species including Freshwater Pearl Mussel (both *Margaritifera margaritifera* and *M. m. durrovensis*), White-clawed Crayfish, Salmon, Twaite Shad, three lamprey species – Sea Lamprey, Brook Lamprey and River Lamprey, the tiny whorl snail *Vertigo moulinsiana* and Otter. This is the only site in the world for the hard water form of the Freshwater Pearl Mussel, *M. m. durrovensis*, and one of only a handful of spawning grounds in the country for Twaite Shad. The freshwater stretches of the River Nore main channel is a designated salmonid river. The Barrow/Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning.

The site supports many other important animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat, Badger, Irish Hare and Common Frog. The rare Red Data Book fish species Smelt (*Osmerus eperlanus*) occurs in estuarine stretches of the site. In addition to the Freshwater Pearl Mussel, the site also supports two other freshwater mussel species, *Anodonta anatina* and *A. cygnea*.

Three rare invertebrates have been recorded in alluvial woodland at Murphy's of the River. These are: *Neoascia obliqua* (Order Diptera: Syrphidae), *Tetanocera freyi* (Order Diptera: Sciomyzidae) and *Dictya umbrarum* (Order Diptera: Sciomyzidae). The rare invertebrate, *Mitostoma chrysomelas* (Order Arachnida), occurs in the old oak woodland at Abbeyleix and only two other sites in the country. Two flies (Order Diptera) *Chrysogaster virescens* and *Hybomitra muhlfeldi* also occur at this woodland.

The site is of ornithological importance for a number of E.U. Birds Directive Annex I species, including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bar-tailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the winter. Wintering flocks of migratory birds are seen in Shanahoe Marsh and the Curragh and Goul Marsh, both in Co. Laois, and also along the Barrow Estuary in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country. The old oak woodland at Abbeyleix has a typical bird fauna including Jay, Long-eared Owl and Raven. The reedbed at Woodstown supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail.

Land use at the site consists mainly of agricultural activities – mostly intensive in nature and principally grazing and silage production. Slurry is spread over much of the area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of the salmonid river and to the populations of E.U. Habitats Directive Annex II animal species within the site. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. There is net fishing in the estuary and a mussel bed also. Other recreational activities such as boating, golfing and walking, particularly along the Barrow towpath, are also popular. There is a golf course on the banks of the Nore at Mount Juliet and GAA pitches on the banks at Inistioge and Thomastown. There are active and disused sand and gravel pits throughout the site. Several industrial developments, which discharge into the river, border the site. New Ross is an important shipping port. Shipping to and from Waterford and Belview ports also passes through the estuary.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, over-grazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel (*Prunus laurocerasus*) and Rhododendron (*Rhododendron ponticum*). The water quality of the site remains vulnerable. Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Good quality is dependent on controlling fertilisation of the grasslands, particularly along the Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein.

Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive. Furthermore it is of high conservation value for the populations of bird species that use it. The occurrence of several Red Data Book plant species including three rare plants in the salt meadows and the population of the hard water form of the Freshwater Pearl Mussel, which is limited to a 10 km stretch of the Nore, add further interest to this site.

Site Name: Roaringwater Bay and Islands SAC

Site Code: 000101

Roaringwater Bay, Co. Cork, is a wide, shallow bay located on the south-west coast of Ireland. The SAC includes the immediate coastline on the mainland from Long Island to Baltimore, together with the whole bay and most of the islands. Some of the larger islands included are Sherkin Island, Cape Clear Island, Heir Island, Horse Island, Castle Island and Long Island. The bedrock in the area is composed of a series of Devonian Old Red Sandstone reefs that run parallel to troughs of Devonian Carboniferous marine clastics in a north-east/south-west direction. These reefs emerge to form the islands on the south side of the bay and within the bay. Generally the coast is low-lying but the southern edge rises, in line with the hills behind Baltimore, to culminate in a summit of 160 m on Cape Clear.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- | |
|--|
| [1160] Large Shallow Inlets and Bays |
| [1170] Reefs |
| [1230] Vegetated Sea Cliffs |
| [4030] Dry Heath |
| [8330] Sea Caves |
| [1351] Harbour Porpoise (<i>Phocoena phocoena</i>) |
| [1355] Otter (<i>Lutra lutra</i>) |
| [1364] Grey Seal (<i>Halichoerus grypus</i>) |

The bay itself has a wide variety of reef and sediment habitats, subject to a range of wave exposures and tidal currents. Within the habitat 'large shallow inlets and bays' are found the following communities: muddy sand with bivalves and polychaetes complex, mixed sediment community complex, and shallow sand-mud community complex. Also found are marine caves and reefs. The shores of the bay range from the exposed, rocky shores of South Sherkin Island, to the sheltered rock, sand and mud communities of the Inner Bay and estuarine communities where the rivers enter the bay. The shallow subtidal reefs have good examples of kelp forest community grazed by the sea urchin *Echinus esculentus*. The animal dominated reefs includes the feather star *Antedon bifida* community, the hydroid *Sertularia argentia* and *Hydrallmania falcata* community, and sponge and ascidian communities. Some of these are species-rich and at least two rare species occur; the sponge *Tethyspira spinosa* and the rare red alga *Phyllophora sicula*. The scarce hydroid *Tamarisca tamarisca* occurs at a number of sites within the bay. These communities are typical of very sheltered areas

with some current present. The cave community on Sherkin Island is home to the rare filamentous red alga, *Pterosiphonia pennata*. The sedimentary communities in Roaringwater Bay are exceptional. Of particular interest is the extensive bed of the calcareous free living red alga *Lithophyllum dentatum*, (generally termed maerl, but may be locally known as 'coral'), which is the largest in the country for this species. This bed typically contains specimens that are very large and uniquely flattened in form, with the rare filamentous red alga *Spyridia filimentosa*. *Lithophyllum dentatum* is only known from two other sites. There are also other maerl communities and several Eelgrass (*Zostera marina*) beds which may co-occur with a particularly good example in Horseshoe Bay, Sherkin Island.

The terrestrial habitats at this site are also of conservation interest and include good examples of two habitats listed under the E.U. Habitats Directive, i.e. dry heath and sea cliffs. The coastal heath vegetation is typified by an abundance of Western Gorse (*Ulex gallii*), Heather (*Calluna vulgaris*) and Bell Heather (*Erica cinerea*). This is regularly burnt in most places so that there are clearings where grasses and herbs such as Wood Sage (*Teucrium scorodonia*), Common Dog-violet (*Viola riviniana*) and Tormential (*Potentilla erecta*) have a temporary rise to prominence before the shrubs grow again. Outcrops of rock bring variety into the heath and these areas are sometimes host to interesting species. These include many plants of southern distribution, for example the rare Red Data Book species Bird's-foot (*Ornithopus perpusillus*), Spotted Rock-rose (*Tuberaria guttata*), Hairy Bird's-foot-trefoil (*Lotus subbiflorus*), Pale Dog-violet (*Viola lactea*) and Lanceolate Spleenwort (*Asplenium billotii*). The latter three on this list are also protected under the Flora (Protection) Order, 1999. In addition there is a small amount of Deptford Pink (*Dianthus armeria*), one of only a very small number of places it grows in Ireland, though it may have been introduced here, as at other sites. Flushes and damp places through this vegetation support some interesting liverworts, as well as Bird's-foot Clover (*Trifolium ornithopodioides*) and the special annual plants of the south-west, Chaffweed (*Anagallis minima*), Yellow Centaury (*Cicendia filiformis*) and Allseed (*Radiola linoides*). Chamomile (*Chamaemelum nobile*) is also common, with Yellow Bartsia (*Parentucellia viscosa*) somewhat less so. Most of the species mentioned above have restricted distributions in Ireland.

High rocky sea cliffs are confined to the southern and south-eastern sides of Clear Island and Sherkin Island. The steep areas of rocky cliffs are generally between 30 and 60 m in height, but more sloping ground with a heath covering extends to 120 m on Clear Island and to 100 m on Sherkin Island. Low, gently sloping cliffs occur elsewhere on some of the islands and on coastal sections of the mainland (mostly less than 30 m). The cliffs have typical maritime vegetation, with Thrift (*Armeria maritima*), scurvygrass (*Cochlearia* spp.), Red Fescue (*Festuca rubra*), Sea Campion (*Silene vulgaris* subsp. *maritima*), plantains (*Plantago maritima* and *P. coronopus*), Rock Samphire (*Crithmum maritimum*), Tree-mallow (*Lavatera arborea*) and, locally, Dotted Sedge (*Carex punctata*) and the Slender Spike-rush (*Eleocharis uniglumis*).

Two Red Data Book plants, Little-Robin (*Geranium purpureum*) and Sea Pea (*Lathyrus japonicus* subsp. *maritimus*), occur rarely on shingle beaches within the site, while

Ray's Knotgrass (*Polygonum oxyspermum* subsp. *raii*) is more widespread. Sea Pea is listed in the Flora (Protection) Order, 1999. Several streams have been ponded by such beaches to create marshes of Common Reed (*Phragmites australis*) where Marsh Pennywort (*Hydrocotyle vulgaris*), Marsh Cinquefoil (*Potentilla palustris*) and marsh-orchids (*Dactylorhiza majalis* and *D. incarnata*) are frequent, together with some Creeping Willow (*Salix repens*) and Gypsywort (*Lycopus europaeus*). On Clear Island a similar marsh has developed into a bog with abundant bog mosses (*Sphagnum* spp.), Bogbean (*Menyanthes trifoliata*) and Marsh St John's-wort (*Hypericum elodes*). Sand is a notable feature of Sherkin Island and occurs to a small extent elsewhere. Wild Radish (*Raphanus raphanistrum*), Crested Hair-grass (*Koeleria macrantha*) and Sea Stork's-bill (*Erodium maritimum*) grow in this habitat, with a little Hare's-foot Clover (*Trifolium arvense*), Knotted Clover (*T. striatum*) and the Red Data Book species Lesser Centaury (*Centaureum pulchellum*). The last species is also listed under the Flora (Protection) Order, 1999.

Otter, Grey Seal and Harbour Porpoise, all mammal species listed on Annex II of the E.U. Habitats Directive, occur within the site. Grey Seal is present at the site throughout the year during all aspects of its annual life cycle which includes breeding, moulting, non-breeding, foraging and resting phases. A minimum population for all ages was estimated at 116-149 in 2005. Roaringwater Bay may be one of the most important sites in Ireland for Harbour Porpoise. Harbour Porpoise in Irish waters are largely resident and observations have shown that they are regular in the waters of Roaringwater Bay. Most observations are in the autumn, when more than 100 individuals have been recorded in a day. The population has been estimated (in 2008) to be 117-201 individuals. The main threat to Harbour Porpoise is incidental capture in fishery gear, especially set gillnets but also drift nets.

Seabirds breed on some of the islands in the bay. A survey on Clear Island in 1995 reported the following species: Fulmar - 716 pairs, Shag - 59 pairs, Lesser Black-backed Gull - 160 pairs, Herring Gull - 51 pairs, Great Black-backed Gull - 50 pairs, Guillemot - 42 individuals and Razorbill - 31 individuals. Cormorants breed on Calf Island, Carrigmore and The Catalogues (approx. 100 pairs in mid 1980s), and there is a scattering of gulls on several other islands. Roaringwater Bay has a nationally important population of Black Guillemot, with 198 individuals counted in 1999. Terns (Arctic/Common) bred within the site in the 1980s, with a large colony of 122 pairs on Carrigvigliash Rock in 1984. Such large numbers, however, have not been seen since and there have been no records of breeding in recent years. The site holds a very important concentration of Chough (33 pairs in 1992), as well as several pairs of Peregrine Falcon. Both of these species are listed on Annex I of the E.U. Birds Directive. Clear Island has Ireland's only manned bird observatory (established in 1959) and there is a marine research station on Sherkin Island.

In conclusion, Roaringwater Bay and Islands is a site of exceptional conservation importance, supporting diverse marine and terrestrial habitats, five of which are listed under the E.U. Habitats Directive. The site is also notable for the presence of Otter, Grey Seal and Harbour Porpoise, and supports important sea bird colonies.

Further, the site supports a large number of plants which are rare or scarce in Ireland, a number of which are listed under the Flora (Protection) Order, 1999.

Site Name: Tramore Dunes and Backstrand SAC

Site Code: 000671

This composite coastal site lies at the head of Tramore Bay, east of Tramore town in Co. Waterford. The Tramore dunes (Burrow) are the result of a classic inshore process - the growth of a spit of shingle and sand across a shallow bay. Behind the spit lies the Back Strand which dries out at low tide and is connected to the open sea by narrows at Rinneshark. The Burrow has a narrow neck and expands eastwards. Longshore drift is from the west so any loose material accumulates at the tip, which is hooked, and on the opposing spit at Bass Point.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1140] Tidal Mudflats and Sandflats
- [1210] Annual Vegetation of Drift Lines
- [1220] Perennial Vegetation of Stony Banks
- [1310] *Salicornia* Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [2110] Embryonic Shifting Dunes
- [2120] Marram Dunes (White Dunes)
- [2130] Fixed Dunes (Grey Dunes)*

The dunes at this site are well developed and contain several important habitats including the priority habitat fixed dunes. Within the dune system there are high ridges and valleys, old stabilised surfaces and new foredunes at shore level. Consequently all the major vegetation types are found, from the strand flora, through mobile embryonic and marram dunes to stable fixed dunes, with saltmarsh on the northern fringe and slacks at Bass Point.

The flora of the fixed dunes is not as species-rich as at other systems, due mainly to the absence of grazing. This has led to the development of a tall, rank dune grassland and in places the development of dune scrub. Nevertheless, most of the characteristic dune species of the south-east are found, including Marram (*Ammophila arenaria*), which is dominant over much of the system, Wild Thyme (*Thymus praecox*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Lady's Bedstraw (*Galium verum*), Rest Harrow (*Ononis repens*), Fairy Flax (*Linum catharticum*) and Red Fescue (*Festuca rubra*). The moss *Tortula ruraliformis*, which is characteristic of fixed dune areas, is common in the dune turf. In some areas there is a shrubby community, with Wild Privet

(*Ligustrum vulgare*) and Dewberry (*Rubus caesius*) being dominant. Bee Orchid (*Ophrys apifera*), a Red Data Book species, has been recorded recently from the fixed dune grassland, and there are isolated patches of Wild Asparagus (*Asparagus officinalis* subsp. *prostratus*), a species which is protected under the Flora (Protection) Order, 1999.

The embryonic dunes at the site occur in mosaic with mobile Marram (*Ammophila arenaria*) dunes. They form a narrow band along the seaward face of Tramore Burrow and make up a small area at Bass Point. At Tramore Burrow they become more developed towards the tip, away from much of the recreational pressure. While Sand Couch (*Elymus farctus*) is a characteristic species for this habitat, Sea Rocket (*Cakile maritima*), Sea-holly (*Eryngium maritimum*), Sea Bindweed (*Calystegia soldanella*) and Marram also occur. Mobile marram dunes are present for most of the length of Tramore strand and also at Bass Point. They are particularly well represented at the tip of Tramore Burrow sand spit. Dune ridges can reach heights of around 25 m. The flora includes Sea-holly, Sea Bindweed, Colt's-foot (*Tussilago farfara*), Smooth Sow-thistle (*Sonchus oleraceus*), Groundsel (*Senecio vulgaris*) and Sea Beet (*Beta vulgaris* subsp. *maritima*).

Saltmarsh is well developed and fairly extensive in the sheltered inner part of the site. It is the lagoon type of saltmarsh, the rarest type found in Ireland. The communities found are characteristic of both Atlantic and Mediterranean saltmarshes. The main species include Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Lax-flowered Sea-lavender (*Limonium humile*), Sea Plantain (*Plantago maritima*), Sea Aster (*Aster trifolium*), Sea Purslane (*Halimione portulacoides*) and Sea Rush (*Juncus maritimus*). The scarce species Hard-grass (*Parapholis strigosa*) occurs, and a feature of this saltmarsh is the presence of Golden Samphire (*Inula crithmoides*), a species rarely found on saltmarshes in Ireland. Glassworts (*Salicornia* spp.) and other annuals such as Annual Sea-blite (*Suaeda maritima*) occur in channels and pans, and also onto the mudflats. Common Cord-grass (*Spartina anglica*) is frequent on parts of the saltmarshes and on the mudflats.

The intertidal mudflats and sandflats are another important habitat type found here. The macrofauna is well developed, with lugworm (*Arenicola marina*), furrow shell (*Scrobicularia plana*), ragworm (*Hediste diversicolor*) and common cockle (*Cerastoderma edule*) being common, and large patches of mussel (*Mytilus edulis*) and periwinkles (*Littorina littorea*) also present. A feature of this habitat is the presence of Eelgrass (*Zostera noltii* and *Z. angustifolia*).

The habitat type 'annual vegetation of driftlines' is represented at the site and the following strandline species occur: Sea Rocket, Prickly Saltwort (*Salsola kali*), oraches (*Atriplex* spp.), Sea-holly and Sea Mayweed (*Matricaria maritima*). The rare species Sea Knotgrass (*Polygonum maritimum*) has been recorded from this habitat.

The beaches at the site are sandy shingle in character and species characteristic of this habitat type, such as Sea Sandwort (*Honkenya peploides*) and Lyme-grass (*Leymus arenarius*), are common. Species which have been recorded from this site and which

are characteristic, but rare or scarce, include Sea-kale (*Crambe maritima*), Danish Scurvygrass (*Cochlearia danica*), Sea Knotgrass and Cottonweed (*Otanthus maritimus*).

Several rare plants have been recorded from Tramore, and some have already been mentioned above. It is the only site in the country where the Red Data Book plant Sea Knotgrass is known, though it is sporadic in appearance. Other Red Data Book species which have been reported include Lesser Centaury (*Centaureum pulchellum*) and Cottonweed (both of which are listed on the Flora (Protection) Order, 1999), Sharp-leaved Fluellen (*Kickxia elatine*), Sea-kale and Spring Vetch (*Vicia lathyroides*).

The Back Strand is an area of great importance for waterfowl on the south coast and is a designated SPA. The following figures are the average counts obtained during three seasons between 1994/95 and 1996/97. Brent Goose (482) occur in numbers which are of international significance. Six further species occur in nationally important numbers: Golden Plover (3,100), Grey Plover (261), Dunlin (1,970), Sanderling (53), Black-tailed Godwit (271) and Bar-tailed Godwit (405). Both Golden Plover and Bar-tailed Godwit are listed on Annex I of the E.U. Birds Directive.

The main threat to the stability of the dune habitats is from recreational pressures, with heavy usage of the site due to its proximity to Tramore, a popular holiday town. Already some large blow-outs and areas of bare sand are present. Driftline and shingle vegetation is also under pressure from heavy usage of the beach area. The intertidal and saltmarsh habitats are not under significant threat, though possible seepage from the nearby landfill site is a potential threat.

Tramore Dunes and Back Strand is a site of major ecological importance for the range of good quality coastal habitats which occur, including fixed dunes, which are listed as a priority habitat on Annex I of the E.U. Habitats Directive. The site has a remarkably rich flora, featuring a number of rare and protected species, and the intertidal area is important for wintering waterfowl.

Site Name: Bandon River SAC

Site Code: 002171

The Bandon River SAC consists of relatively short adjoining stretches of the Bandon and Caha Rivers. These rivers flow in a southerly direction to the east of Dunmanway, Co. Cork. Towards the southern end of the site the Bandon River takes an easterly course. The predominant rock formations are Old Red Sandstone to the north and Carboniferous slate stretching south of Dunmanway. Soils in the northern section consist of peats, podzols and skeletal soils. The southern section consists of alluvial soils and Brown Podzolics.

The east-west exposure of Old Red Sandstone to the north of Dunmanway displays distinct ridgelines of bare rock with poor pasture and scrub. In this area around Lovers Leap the Bandon River cuts a narrow channel southwards, cascading over a series of rock steps through a narrow valley. Below this and above Long Bridge the river widens and meanders through a fertile floodplain. Immediately south of Long Bridge the reduced flow gradient and broad, flat valley permit the main channel to split and extend into a network of braided streams forming islands.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3260] Floating River Vegetation
[91E0] Alluvial Forests*
[1029] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)
[1096] Brook Lamprey (<i>Lampetra planeri</i>)

Wet broadleaved semi-natural woodland is found in an undisturbed area of braided river channels and islands below Dunmanway. The river channels are well defined and the islands appear solid. Canopy dominants are Hazel (*Corylus avellana*) and Sessile Oak (*Quercus petraea*), with scattered Downy Birch (*Betula pubescens*), Ash (*Fraxinus excelsior*), Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Alder (*Alnus glutinosa*). There is a very sparse understorey composed of Hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*) and saplings of Hazel and Sessile Oak. Epiphytes are abundant on trees, including species such as Ivy (*Hedera helix*), Honeysuckle (*Lonicera periclymenum*) and bryophytes such as *Isoetes macrospora*. The ground flora is dominated by Ramsons (*Allium ursinum*), Wood Anemone (*Anemone nemorosa*) and Ivy, along with Lesser Celandine (*Ranunculus ficaria*) and Irish Spurge (*Euphorbia hyberna*). Goldilocks Buttercup (*Ranunculus auricomus*), a very rare plant in Co. Cork, has been recorded from this woodland.

Floating river vegetation is found along the length of the river and is dominated by water-crowfoots (*Ranunculus* spp). Other aquatic plants found include Alternate Water-milfoil (*Myriophyllum alterniflorum*), Broad-leaved Pondweed (*Potamogeton natans*) and at least four water-starwort species (*Callitriche* spp.). Mosses present on rocks and attached to tree roots include *Fontinalis antipyretica* in slack flow areas, and *Fontinalis squamosa*, *Rhynchostegium riparioides* and *Amblystegium riparium* in moderate flows. The landward fringe of deep pools supports Yellow Water-lily (*Nuphar lutea*), Bogbean (*Menyanthes trifoliata*), Marsh-marigold (*Caltha palustris*), Water Mint (*Mentha aquatica*) and Fool's Water-cress (*Apium nodiflorum*). Shoreweed (*Littorella uniflora*) and Six-stamened Waterwort (*Elatine hexandra*) are two species of local importance which are found in the river. In moderate current flow below the Long Bridge, the larger stones are covered by the moss *Brachythecium rivulare* and the liverwort *Chiloscyphus polyanthos* var. *polyanthos*. Boulders covered in *Nostoc* algae are probably of local occurrence in Ireland. The liverwort *Riccardia chamaedryfolia* and the moss *Fissidens crassipes* found under the Long Bridge are considered to be rare in Ireland.

Heath in mosaic with wet grassland, exposed rock, scrub and improved grassland covers up to 30% of the site north of Long Bridge. Typical heath plants growing in association with the rocks are abundant Western Gorse (*Ulex gallii*), Heather (*Calluna vulgaris*), Bell Heather (*Erica cinerea*), Cross-leaved Heath (*Erica tetralix*), Tormentil (*Potentilla erecta*), Heath-grass (*Danthonia decumbens*), stonecrops (*Sedum* spp.), small amounts of St Patrick's-cabbage (*Saxifraga spathularis*) and many lichen species.

Some small areas of woodland occur within the site north of Long Bridge. Tree species such as Sessile Oak, Beech (*Fagus sylvatica*), Scots Pine (*Pinus sylvestris*) and Downy Birch are found with an understorey of Holly, Hazel, Rowan and Rusty Willow.

Two Red Data Book plant species have been recorded in the past from within or close to the site - Greater Broomrape (*Orobanche rapum-genistae*), a species that grows on the roots of legumes, and Small-white Orchid (*Pseudorchis albida*), a species of upland pastures and heaths that is protected under the Flora (Protection) Order, 1999.

The river below Long Bridge is an important inland site in Cork for Mute Swan and approximately 20 individuals are present throughout the year along this stretch. Several hundred Snipe use the site during the winter. Other birds seen regularly within the site are Grey Heron, Cormorant and Mallard, while low numbers of Lapwing and Teal visit during the winter. The Kingfisher, listed under Annex I of the E.U. Birds Directive, breeds along the river.

A population of Freshwater Pearl Mussel is found in the river. This species is listed on Annex II of the E.U. Habitats Directive. The river also supports populations of protected fish species, notably Brook Lamprey and Salmon (*Salmo salar*), both of which are also listed on Annex II of the E.U. Habitats Directive.

The site also supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Badger, Irish Hare, Daubenton's Bat and Pipistrelle bat. The two bat species can be seen feeding along the river and roosting under the old bridges. Otter, another species listed on Annex II of the E.U. Habitats Directive, is also found within the site.

Land use at the site consists mainly of sheep grazing in the northern section and cattle grazing on improved grasslands below Lovers Leap and further south. In the area between Milleenanannig and Bealaboy Bridge land reclamation and drainage is taking place. In the area of exposed rock on the higher terrain above Ardcahan Bridge some land reclamation and forestry is carried out.

This site contains good examples of two habitats listed on Annex I of the E.U. Habitats Directive - alluvial forest and floating river vegetation - and supports populations of four Annex II species - Otter, Salmon, Brook Lamprey and Freshwater Pearl Mussel. The presence of a number of Red Data Book plant and animal species adds further interest to the site.

SITE SYNOPSIS

SITE NAME: BALLYCOTTON BAY SPA

SITE CODE: 004022

Situated on the south coast of Co. Cork, Ballycotton Bay is an east-facing coastal complex, which stretches northwards from Ballycotton to Ballynamona, a distance of *c.* 2 km. The site comprises two sheltered inlets which receive the flows of several small rivers. The southern inlet had formerly been lagoonal (Ballycotton Lake) but breaching of the shingle barrier in recent times has resulted in the area reverting to an estuarine system.

The principal habitat within the site is inter-tidal sand and mudflats. These are mostly well-exposed and the sediments are predominantly firm sands. In the more sheltered conditions of the inlets, sediments contain a higher silt fraction. The inter-tidal flats provide the main feeding habitat for the wintering birds. Sandy beaches are well represented. Salt marshes fringe the flats in the sheltered inlets and these provide high tides roosts. A small area of shallow marine water is also included.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Teal, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Turnstone, Common Gull and Lesser Black-backed Gull. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Ballycotton Bay supports an excellent diversity of wintering waterbird species. The site supports nationally important populations of the following species: Teal (903), Ringed Plover (167), Golden Plover (2,383), Grey Plover (124), Lapwing (2,782), Black-tailed Godwit (136), Bar-tailed Godwit (175), Curlew (853), Turnstone (179), Common Gull (584) and Lesser Black-backed Gull (1,293) - all figures are five year mean peaks for the period 1995/96 to 1999/2000. Other species which occur include Shelduck (99), Wigeon (522), Mallard (232), Oystercatcher (255), Dunlin (575), Sanderling (56), Redshank (117), Greenshank (12) and Great Black-backed Gull (324). Ballycotton Bay was formerly utilised by Bewick's Swan but the birds have abandoned the site since the reversion of the lagoonal habitat to estuarine conditions.

The site is a well-known location for passage waders, especially in autumn. Species such as Ruff, Little Stint, Curlew Sandpiper, Green Sandpiper and Spotted Redshank occur annually though in variable numbers. Small numbers of Ruff may also be seen in late winter and spring. Rarer waders, such as Wood Sandpiper and Pectoral Sandpiper, have also been recorded.

While relatively small in area, Ballycotton Bay supports an excellent diversity of wintering waterbirds and has nationally important populations of eleven species, of which two, Golden Plover and Bar-tailed Godwit, are listed on Annex I of the E.U.

Birds Directive. Ballycotton Bay is also a Ramsar Convention site and part of the Ballycotton Bay SPA is a Wildfowl Sanctuary.

30.5.2015

SITE SYNOPSIS

SITE NAME: BALLYMACODA BAY SPA

SITE CODE: 004023

This coastal site stretches north-east from Ballymacoda to within several kilometres of Youghal, Co. Cork. It comprises the estuary of the Womanagh River, a substantial river which drains a large agricultural catchment. Part of the tidal section of the river is included in the site and on the seaward side the boundary extends to, and includes, Bog Rock, Barrel Rocks and Black Rock. The inner part of the estuary is well sheltered by the Ring peninsula, a stabilised sand spit with sand dunes at its northern end and salt marshes on the landward side. Sediment types vary from muds to muddy sands in the inner part to fine rippled sands in the outer exposed part. The macro-invertebrate fauna of the intertidal flats is well-developed, with the following species occurring: Ragworm (*Hediste diversicolor*), the crustacean *Corophium volutator*, Lugworm (*Arenicola marina*), Baltic Tellin (*Macoma balthica*), Peppery Furrow-shell (*Scrobicularia plana*), Common Cockle (*Cerastoderma edule*) and the tubeworm *Lanice conchilega*. In the more sheltered areas the intertidal flats are colonised by mats of green algae (mostly *Ulva* spp.), with brown seaweeds occurring on the rocky shores of the shingle spits. Common Cord-grass (*Spartina anglica*) has spread within the estuary since the late 1970s. The main channel is flanked by salt marshes and wet fields, much of the latter being improved for agriculture.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Wigeon, Teal, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull, Common Gull and Lesser Black-backed Gull. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Ballymacoda Bay is of high ornithological importance for supporting an excellent diversity and large number of wintering waterbirds – it is of international importance because it regularly supports an assemblage of over 20,000 birds. The site provides both feeding and roosting areas for the birds. Furthermore, both Golden Plover (10,920) and Black-tailed Godwit (765) occur here in internationally important numbers (all counts given are mean peaks for the five year period 1995/96-1999/2000). A further eleven species of waders and ducks occur here in nationally important numbers, i.e. Wigeon (907), Teal (887), Ringed Plover (153), Grey Plover (535), Lapwing (4,063), Sanderling (98), Dunlin (3,192), Bar-tailed Godwit (581), Curlew (1,145), Redshank (357) and Turnstone (137). The site is also notable for supporting nationally important populations of some gull species in autumn and winter: Black-headed Gull (1,560), Common Gull (1,120) and Lesser Black-backed Gull (5,051). A total of 107 species were recorded from the site between 1971 and 1988.

Ballymacoda Bay SPA is one of the most important sites in the country for wintering waterfowl. It qualifies for international importance on the basis of regularly exceeding 20,000 wintering birds but also for its Golden Plover and Black-tailed Godwit populations. In addition, it supports nationally important populations of a further fourteen species. Two of the species which occur, Golden Plover and Bar-tailed Godwit, are listed on Annex I of the E.U. Birds Directive. Ballymacoda Bay is also a Ramsar Convention site.

7.7.2014

SITE SYNOPSIS

SITE NAME: BLACKWATER ESTUARY SPA

SITE CODE: 004028

The Blackwater Estuary SPA is a moderately-sized, sheltered south-facing estuary, which extends from Youghal New Bridge to the Ferry Point peninsula, close to where the river enters the sea. It comprises a section of the main channel of the River Blackwater to Ballynaclash Quay. At low tide, intertidal flats are exposed on both sides of the channel. On the eastern side the intertidal channel as far as Kinsalebeg and Moord Cross Roads is included, while on the west side the site includes part of the estuary of the Tourig River as far as Kilmagner.

The intertidal sediments are mostly muds or sandy muds, reflecting the sheltered conditions of the estuary. Green algae (*Ulva* spp.) are frequent on the mudflats during summer, and Bladder Wrack (*Fucus vesiculosus*) occurs on the upper more stony shorelines. The sediments have a macrofauna typical of muddy sands, with polychaete worms such as Lugworm (*Arenicola marina*), Ragworm (*Hediste diversicolor*) and the marine bristle worm *Nephtys hombergii* being common. Salt marshes fringe the estuarine channels, especially in the sheltered creeks.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Wigeon, Golden Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew and Redshank. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The Blackwater Estuary is of high ornithological importance for wintering waterfowl, providing good quality feeding areas for an excellent diversity of waterfowl species. At high tide, the birds roost along the shoreline and salt marsh fringe, especially in the Kinsalebeg area. The site supports an internationally important population of Black-tailed Godwit (620) and has a further seven species with nationally important populations: Wigeon (953), Golden Plover (2,628), Lapwing (3,054), Dunlin (1,807), Bar-tailed Godwit (161), Curlew (1,007) and Redshank (520) - all figures are mean peaks for the five winters 1995/96 to 1999/2000.

Other species which occur include Light-bellied Brent Goose (19), Shelduck (123), Teal (407), Mallard (105), Shoveler (21), Red-breasted Merganser (7), Cormorant (43), Little Egret (12), Grey Heron (17), Oystercatcher (401), Ringed Plover (28), Grey Plover (49), Knot (43), Greenshank (25) and Turnstone (52). The site is also notable for the large concentrations of gulls that occur in autumn and winter, including Lesser Black-backed Gull (390), Black-headed Gull (345), Common Gull (253), Great Black-backed Gull (227) and Herring Gull (64).

The Blackwater Estuary SPA is an internationally important wetland site on account of the population of Black-tailed Godwit it supports. It is also of high importance in a national context, with seven species having populations which exceed the thresholds for national importance. The occurrence of Little Egret, Golden Plover and Bar-tailed Godwit is of particular note as these species are listed on Annex I of the E.U. Birds Directive. The Blackwater Estuary is also a Ramsar Convention site.

SITE SYNOPSIS

SITE NAME: CLONAKILTY BAY SPA

SITE CODE: 004081

Clonakilty Bay, which is located in west County Cork, is a wetland complex that stretches from the town of Clonakilty to the open sea. It comprises two small estuarine bays, Clonakilty Harbour and Muckcross Strand, separated by Inchydoney Island and its empoldered isthmus. Several small rivers flow into the site, notably the Fealge River. At low tide, substantial areas of sand and mud flats are exposed. The construction of a causeway across the inner part of Muckcross Strand created an extensive wetland complex known as Cloheen Strand Intake.

Intertidal sand and mud flats occupy the majority of the site area and these provide the main food resource for the wintering waterfowl. Sand flats dominate the intertidal area, although mud flats occur at the sheltered upper end of the inlets. The vegetation consists of algal mats (*Ulva* spp.), with brown seaweeds (*Fucus* spp.) occurring where the shore is rocky. The invasive Common Cord-grass (*Spartina anglica*) occurs in places. The intertidal flats have a typical diversity of macro-invertebrates, including Lugworm (*Arenicola marina*), Peppery Furrow-shell (*Scrobicularia plana*), Ragworm (*Hediste diversicolor*), the marine bristle worms *Nephtys hombergii* and *N. cirrosa*, Laver Spire-shell (*Hydrobia ulvae*) and Common Cockle (*Cerastoderma edule*).

The Cloheen Strand Intake wetland contains a fine range of habitats from saline lagoons, to brackish grasslands, open freshwater marsh and wet grassland. This area provides the main roosting area for birds at high tide. Birds also roost elsewhere above the shoreline and on the sandy beach associated with the dune system at Inchydoney Island.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Shelduck, Dunlin, Black-tailed Godwit and Curlew. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site contains a good diversity of wintering waterbirds, with over 8,000 birds occurring regularly. The site is noted for its internationally important population of Black-tailed Godwit (874) - all count data refers to the 4-year mean peak 1995/96 to 1998/99. The ecology of this population has been studied in detail in recent years. Three species occur in nationally important numbers: Shelduck (156), Dunlin (1,172), and Curlew (599). Other species that occur at the site include Mute Swan (53), Wigeon (487), Teal (216), Mallard (93), Red-breasted Merganser (10), Cormorant (13), Oystercatcher (316), Ringed Plover (103), Golden Plover (857), Grey Plover (61), Lapwing (1,658), Knot (168), Bar-tailed Godwit (79) Redshank (252), Greenshank (33) and Turnstone (38).

Little Egret, a species that has recently colonised Ireland, has been recorded in small numbers (4 year mean peak of 5, maximum 7). Grey Heron (14) commonly uses the site and a heronry is located in the trees near Clonakilty. Cloheen Strand Inlet is also a regular wintering site for usually up to 3, but occasionally 7, Short-eared Owl.

The site is a regular staging post for scarce autumn migrants, especially Little Stint, Curlew Sandpiper and Spotted Redshank. In most years it is also visited by vagrant waders from North America.

Clonakilty Bay SPA is of high ornithological importance, particularly for its internationally important population of Black-tailed Godwit. In addition, there are three species with populations of national importance. The presence of the E.U. Birds Directive Annex I species, Golden Plover, Bar-tailed Godwit, Little Egret and Short-eared Owl, is of note.

8.7.2014

SITE SYNOPSIS

SITE NAME: CORK HARBOUR SPA

SITE CODE: 004030

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay, Ringabella Creek and the Rostellan and Poul nabibe inlets.

Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nephtys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algae species occur on the flats, especially *Ulva* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Some shallow bay water is included in the site. Rostellan Lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Little Grebe, Great Crested Grebe, Cormorant, Grey Heron, Shelduck, Wigeon, Teal, Mallard, Pintail, Shoveler, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank, Black-headed Gull, Common Gull, Lesser Black-backed Gull and Common Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl. Of particular note is that the site supports internationally important populations of Black-tailed Godwit (1,896) and Redshank (2,149) - all figures given are five year mean peaks for the period 1995/96 to 1999/2000. Nationally important populations of the following 19 species occur: Little Grebe (57), Great Crested Grebe (253), Cormorant (521), Grey Heron (80), Shelduck (2,009), Wigeon (1,791), Teal (1,065), Mallard (513), Pintail (57), Shoveler (103), Red-breasted Merganser (121), Oystercatcher (1,809), Golden Plover (3,342), Grey Plover (95), Lapwing (7,569), Dunlin (9,621), Bar-tailed Godwit (233), Curlew (2,237) and Greenshank (46). The Shelduck population is the largest in the country (over 10% of national total). Other species using the site include Mute Swan (38), Whooper Swan (5), Pochard (72), Gadwall

(6), Tufted Duck (64), Goldeneye (21), Coot (53), Ringed Plover (73), Knot (26) and Turnstone (113). Cork Harbour is an important site for gulls in winter and autumn, especially Black-headed Gull (3,640), Common Gull (1,562) and Lesser Black-backed Gull (783), all of which occur in numbers of national importance. Little Egret and Mediterranean Gull, two species which have recently colonised Ireland, also occur at this site.

A range of passage waders occurs regularly in autumn, including such species as Ruff (5-10), Spotted Redshank (1-5) and Green Sandpiper (1-5). Numbers vary between years and usually a few of each of these species over-winter.

Cork Harbour has a nationally important breeding colony of Common Tern (102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed.

Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Little Egret, Golden Plover, Bar-tailed Godwit, Ruff, Mediterranean Gull and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it. Cork Harbour is also a Ramsar Convention site and part of Cork Harbour SPA is a Wildfowl Sanctuary.

SITE SYNOPSIS

SITE NAME: COURTMACSHERRY BAY SPA

SITE CODE: 004219

Courtmacsherry Bay SPA is located approximately 12 km south of Bandon and immediately east of the village of Timoleague in west Co. Cork. The site, which is largely estuarine in nature, consists of the drowned valley of the Argideen River which is now filled with sediments, resulting in extensive mudflats and areas of saltmarsh. The estuary of the Kilbrittain River in the north-east of the site holds an area of well-developed saltmarsh. The seaward boundary for the site stretches from Coolmain Point to Barry Point, and includes Coolmain Bay and Broadstrand Bay.

Most of the mudflats are unvegetated, although in places Cord-grass (*Spartina anglica*) occurs. Saltmarsh has developed in a number of areas, the abundant species mostly being Sea Club-rush (*Scirpus maritimus*), Common Scurvygrass (*Cochlearia officinalis*), Sea Arrowgrass (*Triglochin maritima*), Sea Plantain (*Plantago maritima*), Thrift (*Armeria maritima*) and Saltmarsh Rush (*Juncus gerardi*).

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Great Northern Diver, Shelduck, Wigeon, Red-breasted Merganser, Golden Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Black-headed Gull and Common Gull. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site is of ornithological importance for the wintering waders and wildfowl that feed on the mudflats. It supports internationally important numbers of Black-tailed Godwit (506 - figures given here and below are mean peaks for the five winters in the period 1995/96 to 1999/00), as well as nationally important numbers of a further eleven species, i.e. Great Northern Diver (27), Shelduck (175), Wigeon (934), Red-breasted Merganser (63), Golden Plover (5,759), Lapwing (2,713), Dunlin (1,353), Bar-tailed Godwit (182), Curlew (1,357), Black-headed Gull (2,727) and Common Gull (2,226). Other species which occur include Oystercatcher (610), Redshank (227) and Greenshank (26).

Courtmacsherry Bay SPA is an important site for wintering birds. It holds internationally important numbers of Black-tailed Godwit and nationally important numbers of a further eleven species, including three that are listed on Annex I of the E.U. Birds Directive, i.e. Great Northern Diver, Golden Plover and Bar-tailed Godwit.

9.9.2010

SITE SYNOPSIS

SITE NAME: DUNGARVAN HARBOUR SPA

SITE CODE: 004032

Dungarvan Harbour SPA is located in south-west Co. Waterford and lies at the eastern end of the former valley of the River Blackwater - this river now turns south at Cappoquin, vacating its original course. The site includes Dungarvan Harbour as far east as Ballynacourty Point and west to include the tidal sections of the River Brickey. Three rivers flow into Dungarvan Harbour - the Colligan River, which runs south from the Comeragh Mountains, enters the bay by Dungarvan town, the River Brickey, which flows into the harbour from the west, and the Glendine River which enters from the north. The absence of a large river entering the site means that the bay is essentially a marine habitat, although it dries out at low tide to give extensive mud and sand flats. The inner bay is extremely sheltered, being almost closed off by the linear Cunnigar spit to the east.

Limestone underlies most of the area though this is only exposed as flat rocks at Ballynacourty. Elsewhere, saltmarsh, glacial drift and sand form the shore with a narrow stony beach occurring in places. The most natural areas of saltmarsh occur at Kilminnin on the north shore and west of the Cunnigar in the south. In several places the saltmarshes that were reclaimed in the past have been flooded again and are reverting to their natural vegetation. There is an abundance of Sea Rush (*Juncus maritimus*) in such places, often mixed with grasses, and with Common Reed (*Phragmites australis*) or Sea Club-rush (*Scirpus maritimus*) occurring in the drains.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Great Crested Grebe, Light-bellied Brent Goose, Shelduck, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank and Turnstone. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

A major part of the ecological importance of Dungarvan Harbour is the wintering waterbirds which are present in large numbers. The site is of international importance because it regularly supports an assemblage of over 20,000 wintering waterbirds. Furthermore, both Light-bellied Brent Goose (723) and Black-tailed Godwit (779) occur here in internationally important numbers (all counts given are mean peaks for the five year period 1995/96-1999/2000). A further thirteen species occur here in nationally important numbers - Great Crested Grebe (53), Shelduck (538), Red-breasted Merganser (52), Oystercatcher (767), Golden Plover (4,980), Grey Plover (444), Lapwing (3,233), Knot (698), Dunlin (4,984), Bar-tailed Godwit (1,068), Curlew (766), Redshank (731) and Turnstone (177). Little Egret, a species which has recently colonised Ireland, also occurs at this site.

Dungarvan Harbour SPA is an important site for wintering waterfowl, providing good quality feeding areas and roost sites for an excellent diversity of waterfowl species. The site is of high conservation importance, for supporting internationally important populations of Light-bellied Brent Goose and Black-tailed Godwit and because it regularly supports in excess of 20,000 wintering waterbirds. In addition, it holds nationally important populations of a further thirteen species, including Golden Plover and Bar-tailed Godwit, two species that are listed on Annex I of the E.U. Birds Directive. Dungarvan Harbour is a Ramsar Convention site.

SITE SYNOPSIS

SITE NAME: GALLEY HEAD TO DUNEEN POINT SPA

SITE CODE: 004190

The Galley Point to Duneen Point SPA is situated to the south-west of the town of Clonakilty, Co. Cork. It encompasses the sea cliffs south of Castlefreke dunes to Galley Head, north-eastwards along the coast to Dunowen Head and Ringlea Point as far as the north side of Duneen Point. The site includes the sea cliffs and the land adjacent to the cliff edge. The high water mark forms the seaward boundary. Most of the site is underlain by Devonian sandstones, siltstones and mudstones, but similar rocks of Carboniferous age also occur.

Sea cliffs are the predominant habitat of the site; these occur along its length and are generally well-vegetated by a suite of typical sea cliff species. Above the cliffs areas of heath, improved grassland, unimproved wet and dry grassland, and arable land occur

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for Chough.

The site supports a nationally important population of breeding Chough, a Red Data Book species that is listed on Annex I of the E.U. Birds Directive; 11 breeding pairs were recorded from the site in the 1992 survey and 11 in the 2002/03 survey. In addition, flocks of 4-6 birds have been noted.

The site also supports a variety of breeding seabirds, i.e. Fulmar (106 pairs), Herring Gull (62 pairs), Cormorant (5 pairs), Shag (1 pair), Great Black-backed Gull (3 pairs) and Lesser Black-backed Gull (1 pair) – all seabird data from 1985. The site is also used by Peregrine (2 pairs in 2002).

The Galley Point to Duneen Point SPA is of particular importance for Chough; it also supports a population of Peregrine and a suite of breeding seabird species. The presence of Chough and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive, is of particular significance

SITE SYNOPSIS

SITE NAME: HELVICK HEAD TO BALLYQUIN SPA

SITE CODE: 004192

Helvick Head to Ballyquin SPA is a linear site situated on the south-west coast of Co. Waterford. It includes the sea cliffs and land adjacent to the cliff edge between Helvick Head in the east and Ballyquin townland in the south-west. The high water mark forms the seaward boundary, except around Helvick Head where the adjacent sea area to a distance of 500 m from the cliff base is included.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Chough, Peregrine, Cormorant, Herring Gull and Kittiwake.

The site supports a nationally important population of breeding Chough, a Red Data Book species that is listed on Annex I of the E.U. Birds Directive; 11 breeding pairs were recorded from the site in the 1992 survey and 11 pairs in the 2002/03 survey. The low heath and agricultural farmland on the cliff tops provides good foraging habitat for this species. The site is also of importance for its Peregrine population (5 pairs in 2002).

In addition, the site has important breeding seabird populations, centered around Helvick Head. Nationally important populations of Cormorant (65 pairs), Herring Gull (117 pairs) and Kittiwake (1,037 pairs) occur, as well as smaller populations of other breeding seabirds: Razorbill (28 pairs), Fulmar (135 pairs), Shag (6 pairs), Guillemot (664 pairs), Great Black-backed Gull (8 pairs) and Black Guillemot (10 individuals) – all seabird data from 1999. Raven breed on the cliffs and there is a cliff-nesting colony of House Martins. Other species which breed within the site include Rock Pipit and Stonechat. The seabird colony at Helvick Head has been monitored at intervals since the Operation Seafarer project in 1969/70. In addition, more detailed population studies have been carried out on the Kittiwake colony.

The Helvick Head to Ballyquin SPA is an important site for Chough and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive. It also supports a range of breeding seabirds, including populations of Cormorant, Herring Gull and Kittiwake of national importance.

SITE SYNOPSIS

SITE NAME: MID-WATERFORD COAST SPA

SITE CODE: 004193

The Mid-Waterford Coast SPA encompasses the areas of high coast and sea cliffs in Co. Waterford between Newtown Cove to the east and Ballyvoyle to the west. The site includes the sea cliffs and the land adjacent to the cliff edge. The high water mark forms the seaward boundary. The site is underlain by Devonian sandstones, siltstones, mudstones and conglomerates as well as a variety of volcanic rocks of Ordovician age. Sea cliffs are the predominant habitat of the site; these occur along its length and are generally well-vegetated by a suite of typical sea cliff species. Above the cliffs areas of heath, improved grassland, unimproved wet and dry grassland, and woodland occur.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Chough, Peregrine, Cormorant and Herring Gull.

The site supports an internationally important population of breeding Chough, a Red Data Book species that is listed on Annex I of the E.U. Birds Directive; 24 breeding pairs were recorded from the site in the 1992 survey and 20 pairs in the 2002/03 survey. In addition, five flocks totalling 59 birds were noted in the 1992 survey and a flock of 24 birds in the 2002/03 survey. Along this coast flocks occur between Annestown and Stradbally.

The site supports a nationally important Peregrine population (10 pairs in 2002). The site also holds nationally important populations of Cormorant (79 pairs) and Herring Gull (147 pairs), as well as smaller populations of other breeding seabirds: Fulmar (246 pairs), Shag (14 pairs), Guillemot (27 pairs), Razorbill (4 pairs) and Black Guillemot (15 individuals) – all seabird data from 1999-2000.

The Mid-Waterford Coast SPA is an important site for Chough and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive. It also supports a range of breeding seabirds, including nationally important populations of Cormorant and Herring Gull.

SITE SYNOPSIS

SITE NAME: OLD HEAD OF KINSALE SPA

SITE CODE: 004021

The Old Head lies approximately 10 km south of the town of Kinsale in Co. Cork, and is a 5 km long headland formed of steeply inclined beds of rock. These show a cross section of the transition between the Devonian and Carboniferous periods and so have considerable interest from a geological point of view. The site comprises a section of the cliffs on the western side of the narrow isthmus leading to the Head and a 500 m seaward extension. These are vertical rock cliffs providing optimum habitat for ledge nesting seabirds. Maritime grassland and heath occurs above the steep cliffs. The cliff-top vegetation is characterised by such species as Autumn Gorse (*Ulex gallii*), Bell Heather (*Erica cinerea*), Bent Grasses (*Agrostis* spp.) and Heath Bedstraw (*Galium saxatile*), with Sea Campion (*Silene maritima*), Thrift (*Ameria maritima*), Wood Sage (*Teucrium scorodonia*) and Burnet Rose (*Rosa pimpinellifolia*) also present.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Kittiwake and Guillemot.

The Old Head is the largest seabird colony on the south coast between the Bull Rock and the Saltee Islands. In 2001 the Seabird 2000 Survey recorded nationally important populations of Kittiwake (951 pairs) and Guillemot (2,330 pairs), as well as smaller numbers of Fulmar (37 pairs), Shag (26 pairs), Herring Gull (11 pairs) and Razorbill (59 pairs). Chough and Peregrine, which breed elsewhere on the Head, are regularly seen within the site.

Old Head of Kinsale SPA is of high ornithological importance for its breeding seabird populations, two species of which occur in nationally important numbers. The presence of Chough and Peregrine, two species listed on Annex I of the E.U. Birds Directive, is also of note. Owing to the importance of the bird populations, the site was designated as a Refuge for Fauna in 1989.

SITE SYNOPSIS

SITE NAME: SEVEN HEADS SPA

SITE CODE: 004191

Seven Heads SPA is situated to the south-west of the town of Courtmacsherry, Co. Cork. It encompasses the sea cliffs of the Seven Heads peninsula north-east to Barry's Point and also the cliffs of Dunworly Bay and Barry's Cove. The site includes the sea cliffs, which rise to over 50 m, notably south of Barry's Point, and the land adjacent to the cliff edge. The high water mark forms the seaward boundary. Most of the site is underlain by Devonian sandstones, siltstones and mudstones; similar rocks of Carboniferous age also occur at the eastern and western ends of the site.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for Chough.

Sea cliffs are the predominant habitat of the site; these occur along its length and are generally well-vegetated by a suite of typical sea cliff species. Above the cliffs areas of heath, improved grassland, unimproved wet and dry grassland, freshwater marsh and arable land occur.

The site supports an internationally important population of breeding Chough, a Red Data Book species that is listed on Annex I of the E.U. Birds Directive; 11 breeding pairs were recorded from the site in the 1992 survey and 15 in the 2002/03 survey. In addition, flocks of up to 47 birds were noted in the 1992 survey and up to 25 in the 2002/03 survey.

A survey in 2002 recorded a number of breeding seabirds at the site, including Fulmar (18 pairs), Herring Gull (23 pairs), Great Black-backed Gull (12 pairs) and Cormorant (45 pairs). The site is also used by Peregrine (2 pairs in 2002).

Seven Heads SPA is of particular importance for Chough; it also supports a population of Peregrine and a suite of breeding seabird species. The presence of Chough and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive, is of particular significance

SITE SYNOPSIS

SITE NAME: SHEEP'S HEAD TO TOE HEAD SPA

SITE CODE: 004156

The Sheep's Head to Toe Head SPA is large site situated on the south-west coast of Co. Cork. It encompasses the high coast and sea cliffs from Sheep's Head to Mizen Head, Brow Head and Crookhaven in the west and from Baltimore to Tragumna Bay, Gokane Point and the Toe Head peninsula in the east. The site includes the sea cliffs, the land adjacent to the cliff edge, an area further inland to the east of Dunlough Bay, and also areas of sand dunes at Barley Cove and Crookhaven. The high water mark forms the seaward boundary. Most of the site is underlain by Devonian sandstones and mudstones, though Carboniferous rocks are also found on the Sheep's Head and Toe Head peninsulas.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Chough and Peregrine.

The Sheep's Head peninsula is the narrowest of the large peninsulas in the south-west of the county. Tall cliffs, *c.* 100 m high, occur at its end and hills rise up from much of the coast; pastures are concentrated along the southern side. Much of the land is of marginal agricultural value, with coarse grassland and heath predominating. The Mizen Head Peninsula, on the other hand, has a quantity of semi-improved agricultural grasslands and heath, as well as a sand dune system at Barley Cove. At Mizen Head, large areas of closely bedded sandstones and shales occur, and erosion of their joints has produced a spectacular array of red-brown and pink cliffs up to 130 m high. The cliffs at Three Castle Head to the north are almost 100 m high. Further south and east, a convoluted stretch of coast with sheltered bays, estuaries and exposed headlands extends from Baltimore to Toe Head. The habitats present range from sea cliff, Gorse-dominated heath and rough grassland to good agricultural grassland.

The site supports an internationally important population of breeding Chough, a Red Data Book species that is listed on Annex I of the E.U. Birds Directive; 82 breeding pairs were recorded from the site in the 1992 survey and 73 in the 2002/03 survey. The birds are found in pairs and flocks along the coast from Sheep's Head in the north to beyond Toe Head in the south. The Mizen Head cliffs hold some of the highest concentrations of breeding pairs in Ireland.

At Sheep's Head, Chough are concentrated at the tip of the peninsula. An estimated 18 pairs bred in 1992, with 17 recorded in 2002, from Dooneen in the south to Glanroon in the north. Flocking and roosting activity is limited. During the winter of 2003/04, flocks of up to 27 birds were feeding on improved pastures around Caher. Roosting is confined to the southern side of the very extremity of the peninsula, with small numbers, of up to 8 birds, gathering occasionally. At Mizen Head, an estimated 46 pairs bred in 1992 and 32 in 2002, from Crookhaven in the south to Dunkelly in

the north. The highest densities of breeding Chough are on and around Mizen Head itself.

Studies have shown that Chough forage mainly within 300 m inland of the cliff tops used for breeding and these areas have been included in the site. Flocking activity centres on the dunes at Barley Cove and around Dunlough Bay. Twenty-six birds were recorded in the dunes in October 2002, 52 in September 2003 and 26 in June 2004. A flock of 30-40 birds were recorded feeding during the winter of 2003/04, inland from Dunlough Bay on improved pastures and Gorse-dominated areas. Two roosts were identified in 2002 on the Mizen Head Peninsula, one at Brow Head (up to 25 birds), and one north of Mizen Head (up to 55 birds). The remainder of the breeding pairs in the site are scattered along the cliffs between Baltimore Head in the west and Toe Head in the east. A roost at Baltimore Head holds up to 15 birds (winter 2003/04).

The site supports a nationally important Peregrine population (7 pairs in 2002) and a range of other breeding seabirds including Fulmar (57 pairs), Herring Gull (30 pairs), Shag (17 pairs), Kittiwake (20 pairs), Black Guillemot (137 individuals) and Great Black-backed Gull (1 pair) – all seabird data from 1999, 2001 and 2002.

The Sheep's Head to Toe Head SPA is one of the most important sites in the country for Chough, with a breeding population of international importance occurring. It also supports a nationally important Peregrine population. The presence of Chough and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive, is of particular significance.

30.5.2015

SITE SYNOPSIS

SITE NAME: SOVEREIGN ISLANDS SPA

SITE CODE: 004124

The Sovereign Islands are two very small marine islands located approximately 1 km off the coastline at the entrance to Oysterhaven Bay in Co. Cork. The islands are rocky stacks separated by a narrow sound of about 20 m width. The eastern island is flat-topped and rises to 24 m above sea level; the western one is more peaked and rises to 30 m. The geology is Lower Carboniferous limestones and shales. Both islands are largely devoid of soil apart from small amounts of organic matter trapped in cracks. Vegetation is sparse, with plants such as Sea Beet (*Beta vulgaris*), Spurrey (*Spergularia* spp.) and Orache (*Atriplex* spp.) recorded. The surrounding sea, to a distance of 200 m, is included.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant.

The islands are important for breeding seabirds, with most occurring on the eastern stack. A Cormorant colony has been known since the late 1960s and 156 pairs were recorded here in 1999. A more recent survey in 2008 recorded 89 pairs. Herring Gull and Great Black-backed Gull also breed, with 10 and 75 pairs respectively in 1999.

Sovereign Islands SPA is of ornithological importance mainly for the breeding colony of Cormorant, which is both the largest in Co. Cork and of national importance. The non-migratory population of Great Black-backed Gull is also of national importance.

SITE SYNOPSIS

SITE NAME: TRAMORE BACK STRAND SPA

SITE CODE: 004027

Tramore Back Strand SPA is located approximately 2 km east of Tramore town in County Waterford. It comprises a medium-sized estuary sheltered from the open sea by a long shingle spit, with high dunes. The area known as the Back Strand empties almost completely at low tide; it is connected to the outer bay and sea by narrows at Rinnashark.

The intertidal mud flats and sand flats are an important habitat and the macrofauna is well-developed, with Lugworm (*Arenicola marina*), Furrow Shell (*Scrobicularia plana*), Ragworm (*Hediste diversicolor*) and Common Cockle (*Cerastoderma edule*) occurring commonly, and with large patches of Common Mussel (*Mytilus edulis*) and Edible Periwinkle (*Littorina littoralis*) also present. A feature of this habitat is the presence of Eelgrass (*Zostera noltii* and *Z. angustifolia*), an important food item for herbivorous wildfowl. Salt marsh is well-developed and fairly extensive in the sheltered inner part of the site.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Light-bellied Brent Goose, Golden Plover, Grey Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit and Curlew. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Tramore Back Strand is an important site for wintering waterfowl, providing both feeding and roosting areas. The site supports an internationally important population of Light-bellied Brent Goose (398) - all figures are mean peaks for the 5 winters 1995/96-1999/2000. A further seven species occur in nationally important numbers: Golden Plover (2,924), Grey Plover (299), Lapwing (3,308), Dunlin (1,723), Black-tailed Godwit (297), Bar-tailed Godwit (367) and Curlew (620). A number of other species also occur, including Wigeon (77), Teal (135), Red-breasted Merganser (18), Oystercatcher (348), Ringed Plover (55), Knot (75), Sanderling (46), Snipe (83), Redshank (223), Greenshank (12) and Turnstone (24). Little Egret, a species that has recently colonised Ireland, is a regular visitor (6).

Tramore Back Strand SPA is of high ornithological importance for wintering waterfowl, with one species occurring in internationally important numbers and a further seven species having populations of national importance. The regular occurrence of Little Egret, Golden Plover and Bar-tailed Godwit is of particular note as these three species are listed on Annex I of the E.U. Birds Directive. Tramore Back Strand is also a Ramsar Convention site.

7.7.2014