MERC Consultants
environmental and conservation services

Supporting Information for Screening for Appropriate Assessment Report

Uisce Éireann South Cork Strategic Model

MERC Consultants Ltd, [redacted]
www.mercenvironmental.ie

Client name	[redacted]
Address	[redacted]

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1. Introduction

Uisce Éireann wish to conduct a strategic modelling study of water currents along a section of the South Cork coast. The study requires the deployment of static Acoustic Doppler Current Profilers (ADCPs) within the study area (see figure 1) to provide the required modelling data. Ancillary instruments, to collect salinity and temperature data, may also be contained within the trawl resistant frames in which the ADCPs will be deployed. The project also includes vessel based assessments of water currents and bathymetry using a combination of vessel mounted ADCPs, single-beam, multibeam and LiDAR surveys, and potentially, the deployment of tidal gauges.

The screening exercise aims to assess, in view of the best scientific knowledge, if the proposed development, individually or in combination with other plans or projects, is likely to significantly affect European sites, considering their conservation objectives. This document constitutes Supporting Information for Screening for Appropriate Assessment (SISAA) of the proposed project to assist the competent authority to undertake Appropriate Assessment Screening.

2. Statement of authority

This report was prepared by MERC Consultants. MERC are a specialist marine ecological survey and consultancy firm. Core staff have more than 60 years of combined experience and specialist knowledge in relation to Irish aquatic habitats and species in addition to the assessment and management of conservation interests. MERC were responsible for preparing the NPWS national monitoring of marine Annex I habitats for compliance under Article 17 of the EU Habitats Directive in the period 2015-2019. In this context MERC were responsible for the assessment and reporting of marine Annex I habitats in Ireland and were the authors of all Article 17 reports and overarching site monitoring reports. MERC are currently engaged in conducting surveys and preparing the relevant reports for the current (2022-2025) monitoring cycle.

In addition to their scientific expertise MERC have an in-depth knowledge of Irish and European Environmental legislation and policy. In 2011 MERC prepared the text describing Activities Requiring Consent (ARCs) for inclusion in a handbook detailing the regulatory framework for all developments within designated sites in Ireland on behalf of the National Parks and Wildlife Service. They have also produced numerous Conservation Management Plans for the same department. To-date MERC have conducted in excess of 200 ecological reports in support of Appropriate Assessment under Article 6(3) of the EU Habitats Directive.

3. Methods

3.1 Relevant guidelines and legislation

This report has been prepared with reference to the following European Directives, national legislation and guidance on the appropriate assessment of projects and plans with regard to the implementation of the provisions of Article 6(3) and (4) of the EU Habitats Directive 92/43/EEC.

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna. Official Journal of the European Communities.
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version).
- European Communities (Birds and Natural Habitats) Regulations 2011. SI No. 477 of 2011.

- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. European Commission 2018. 7621 final. Office for Official Publications of the European Communities, Luxembourg.
- Assessment of plans and projects significantly affecting Natura 2000 sites; Methodological Guidance on the provisions of Articles 6(3) and (4) of the Habits Directive 92/43/EEC. European Commission, 2002;
- Appropriate Assessment Screening for Development Management. OPR Practice Note PN01. Office of the Planning Regulator. March 2021.
- Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Department of Arts, Heritage and the Gaeltacht, 2014.
- JNCC. 2023. JNCC guidance for the use of Passive Acoustic Monitoring in UK waters for minimising the risk of injury to marine mammals from offshore activities. JNCC, Peterborough.

3.2 Description of the proposed project and its associated scope of works

A description of the proposed project was compiled and is set out in section 4. The description details all works required to carry out the proposed project.

3.3 Description of the receiving environment

To fully understand the receiving environment, relative to project related effects, the literature consulted included the available National Parks and Wildlife Service (NPWS) data sources for all Natura 2000 sites within the zone of influence (ZoI) of the proposed project (see section 3.4 for methods used to determine the ZoI). This included the individual site synopsis for European sites, conservation objectives and GIS layers (habitats and species). Further data was obtained from the following sources (non-exhaustive):

- INFOMAR bathymetric mapping
- INFOMAR sediment classification
- Water Framework Directive benthic monitoring programme
- NPWS Marine monitoring and community mapping data
- Biodiversity Data Centre species maps

3.4 Impact assessment approach

The zone of influence (ZoI) of a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. In the context of Appropriate Assessment Screening, the ZoI is the area over which a plan or project could affect the receiving environment such that it could potentially have significant effects on the conservation status of European Sites. Within the ZoI those receptors that are sensitive to change must be identified and considered.

To define the ZoI of a project the potential for project related effects on sensitive receptors must first be established. For this purpose, a **Source-Path-Receptor (SPR)** model was applied. The SPR model is a well-established model frequently applied to the analysis of project related impacts on ecosystems and is the one which we have applied to the assessment of the proposed project.

Using this approach all elements of the proposed project were reviewed to assess potential pathways and receptors which might be affected so that a ZoI could be established. This process involved the following steps:

- The identification of sources of potential impacts and their pathways from the proposed project site to European Sites.

- Consideration of sensitive receptors and their dependent ecosystems within the aforementioned European sites.
- Identifying and characterising project related impacts and their likely effects, direct, indirect and cumulative on the identified sensitive receptors.

Once the ZoI was established, the following steps were taken to assess the potential for likely significant effects on sensitive receptors:

1. The scale and scope of the project was examined.
2. A desk review of the available literature describing the habitats and species known to occur at the proposed project site and surrounding area was undertaken.
3. Any project related activities likely to affect migratory or highly mobile species was considered.
4. Any use of the proposed project site by mobile species that make regular movements to, from, or across the site was assessed.
5. An assessment was carried out of the key ecological processes and species activity periods including seasonal variations in distribution, abundance and activity.

3.5 Review of relevant European Sites

The ZoI of the proposed project was determined and European sites within it were documented. Analysis of the sensitivity of ecological receptors within these sites was then conducted. In determining the sensitivity of ecological receptors consideration was given to the scale, scope and location of the proposed project relative to the aforementioned receptors.

4. Details of the proposed project

4.1 Summary Scope of works

The project consists of the deployment of up to eighteen (18) fixed ADCPs along the South Cork coast, between Skull Harbour and Cork Harbour. The locations are given in Table 1 and shown in Figure 1. Ancillary instruments, to collect salinity and temperature data, may also be contained within the trawl resistant frames in which the ADCPs will be deployed. The project also includes vessel based assessments of water currents and bathymetry using a combination of vessel mounted ADCPs (see Table 1 for locations), single-beam, multibeam and LiDAR surveys, and potentially, the deployment of tidal gauges. For ease of reference the six survey areas are labelled A to F.

A summary of the scope of works is given in Table 2 and described in further detail, where required, in section 4.2.

Table 1. Proposed locations of ADCPs

ADCP No	Easting (ITM)	Northing (ITM)		Location	Area
1	580526.46	553781.24	Fixed	Kinsale Harbour to Roberts Head & environs	A
2	553529.713	542567.687	Fixed	Courtmacsherry Bay	B
3	552605.014	537852.397	Fixed	Courtmacsherry Bay	B
4	545653.729	536097.718	Fixed	Clonakilty Bay	C
5	533776.235	529876.514	Fixed	Glandore Bay	D
6	532321.647	532818.174	Fixed	Glandore Bay	D
7	524913.436	531617.761	Fixed	Glandore Bay	D
8	523680.546	533218.372	Fixed	Glandore Bay	D
9	523101.954	534110.604	Fixed	Glandore Bay	D
10	522707.212	534483.721	Fixed	Glandore Bay	D
11	517245.65	527362.141	Fixed	Toe Head	E
12	514378.339	525245.141	Fixed	Toe Head	E
13	509771.192	525018.054	Fixed	Toe Head	E
14	499406.264	530092.214	Fixed	Roaringwater Bay	F
15	494301.78	528135.986	Fixed	Roaringwater Bay	F
16	499297.666	523309.45	Fixed	Roaringwater Bay	F
17	503503.033	523452.205	Fixed	Roaringwater Bay	F
18	502753.418	528044.046	Fixed	Roaringwater Bay	F
19	569122.122	548189.997	Vessel mounted	Kinsale Harbour to Roberts Head & environs	A
20	569668.264	546291.979	Vessel mounted	Kinsale Harbour to Roberts Head & environs	A
21	565177.395	549391.824	Vessel mounted	Kinsale Harbour to Roberts Head & environs	A
22	565588.355	548391.443	Vessel mounted	Kinsale Harbour to Roberts Head & environs	A
23	565277.422	547286.974	Vessel mounted	Kinsale Harbour to Roberts Head & environs	A
24	564382.479	545444.391	Vessel mounted	Kinsale Harbour to Roberts Head & environs	A
25	563571.318	537592.78	Vessel mounted	Courtmacsherry Bay	B
26	559915.911	542750.154	Vessel mounted	Courtmacsherry Bay	B
27	540889.776	537760.535	Vessel mounted	Clonakilty Bay	C
28	539673.084	534872.964	Vessel mounted	Clonakilty Bay	C
29	530283.049	534629.681	Vessel mounted	Glandore Bay	D
30	511766.556	527901.564	Vessel mounted	Toe Head	E

31	511433.994	527260.783	Vessel mounted	Toe Head	E
32	508395.589	532167.718	Vessel mounted	Roaringwater Bay	F
33	505145.03	531000.148	Vessel mounted	Roaringwater Bay	F
34	502782.965	532579.09	Vessel mounted	Roaringwater Bay	F
35	500643.109	533247.511	Vessel mounted	Roaringwater Bay	F
36	494748.26	529951.443	Vessel mounted	Roaringwater Bay	F

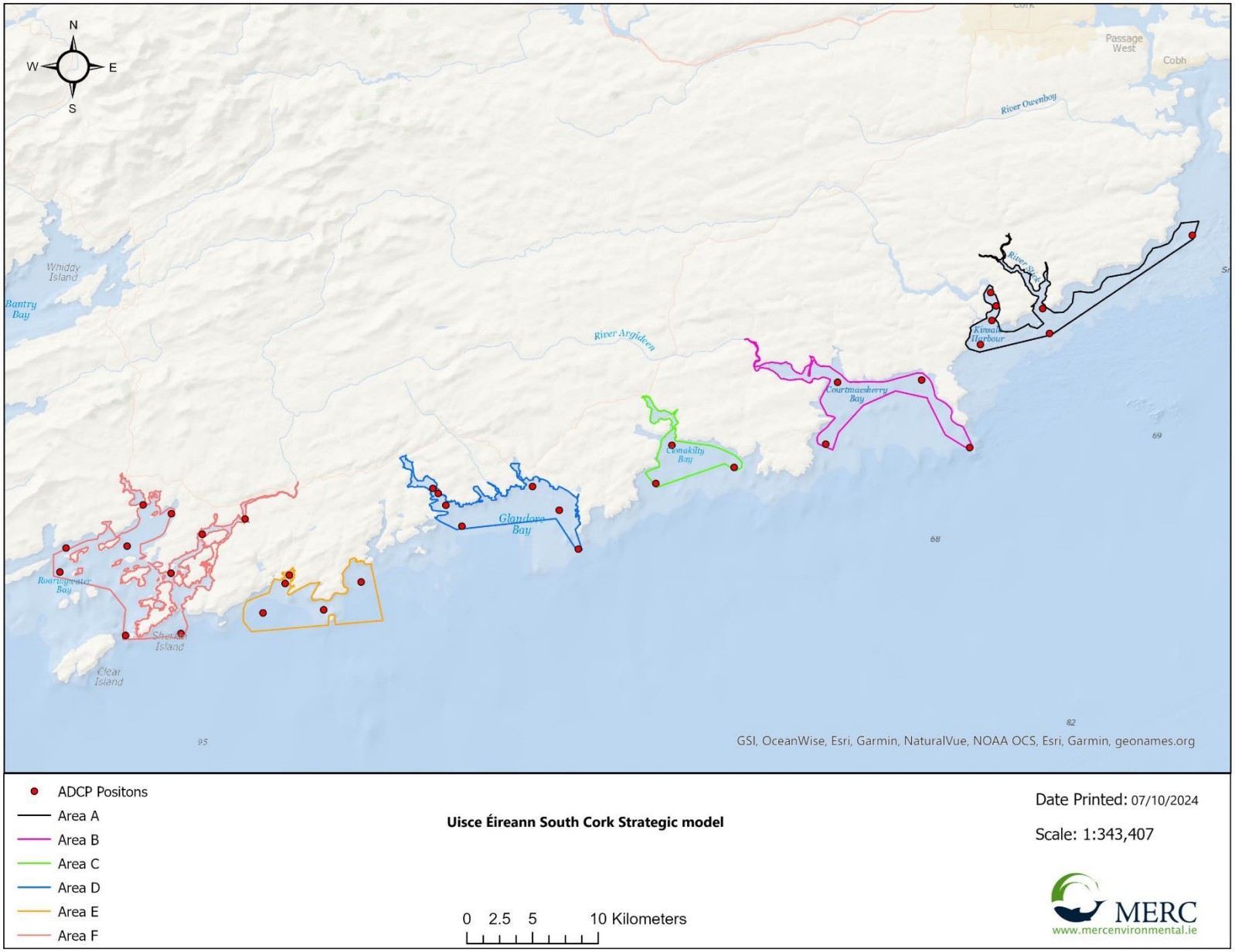

Figure 1. Survey areas and ADCP locations

Table 2. Summary of scope of works

Element	Method	Frequency	Location
Fixed ADCP	Fixed ADCP surveys will be conducted using a Nortek AWAC 600 Khz or 1 Mhz unit (or equivalent) deployed on seabed mounted frames. ADCP frames will be equipped with a recovery line attached to a small rigid buoy that is held in place by an acoustic release, which releases the buoy once triggered by a deck unit. Housed within the frame is the battery canister(s) for the ADCP along with lead ballast to prevent movement on the seabed in high energy tidal and wave environments. An acoustic pinger is mounted on the frame to aid in the recovery of the frame in the event of the acoustic release not firing.	32 days. A sampling rate of 1-minute average every 10 minutes for each ADCP sensor is required.	Indicative locations provided in figure 1
Vessel Based ADCP	The Vessel mounted ADCP (VMADCP) surveys will be conducted using a TRDI WH Monitor 600kHz ADCP (or similar) to an aluminium pole that will be mounted to the side of the vessel ensuring the ADCP is deployed below the surface of the water. Measurements will be taken periodically at set stations as part of a transect with is repeatedly transversed over a tidal cycle, or taken continuously as the vessel remains on station over a tidal cycle.	13 hours of surveying on 1no spring and 1no neap tide. A sampling rate of a minimum of 1-minute average every 10 minutes for each ADCP sensor is required.	Within MUL Area (figure 1); limited to marine navigable areas
Water Sampling	Water sampling will be undertaken concurrently with the VMADCP surveys. Periodically samples will be taken from the surface layer of the water column via bucket and telescopic arm, and collected and stored for subsequent analyses	Periodically over 13 hours of surveying on 1no spring and 1no neap tide	Within MUL Area (Figure 1); limited to marine navigable areas
Conductivity, Temperature and depth (CTD) and Dissolved Oxygen (DO) Monitoring	Concurrently with the VMADCP surveys CTD and DO surveys will take place from the vessel. This will involve deploying a Sonde at set intervals for the duration of the tidal survey at each VMADCP location. The sonde will be lowered to just below the surface of the water from the vessel, the sonde will be allowed to settle at the surface of the water before being lowered to the seabed, where the instrument will be lifted from the seabed and allow the values returned to the hand-held device to settle. Once the values from the sonde have settled it will be slowly lifted back to the sea surface and back onboard the vessel.	Periodically over 13 hours of surveying on 1no spring and 1no neap tide	Within MUL Area (figure 1); limited to marine navigable areas
Bathymetry	Surveying of intertidal areas may require a combination of methods including; Single beam & Multibeam Echosounders, LiDAR, GPS rover.	One-off	Within MUL Area limited to intertidal areas
Tide Gauge	The inshore tide gauge should be mounted on either a galvanized steel pole to the side of a suitable pier or other permanent fixed structure. Installation should take place on a very low tide so that the mountings can be attached as low as possible down the pier wall to ensure the sensor is below chart datum.	Installed for a minimum of 3 months, coinciding with all other sampling	Within MUL Area
Vessel details	Details to be confirmed however vessel likely to be no larger than 16m length, 6m beam and 2m draught.		

4.2 Description of instrumentation and operation

Current Measurements

An ADCP is a hydroacoustic current meter used to measure water current velocities over a depth range using the doppler effect of sound waves scattered back from particles within the water column. In the present case ADCPs operating in the range of 600 Khz or 1 Mhz will be used. The instrument emits "pings" of sound at a sampling rate of 1-minute average every 10 minutes.

The ADCP is contained within a trawl resistant bottom mount frame *circa* 1.8m x 1.3m x 0.6m with a weight of approximately 300kg. Figure 2 shows an image of a typical Frame within which the ADCP is contained. The frame is attached to a ground line, a clump weight and to an acoustic release system carrying a rope retrieval system. The frame also houses a recovery line attached to a small rigid buoy which is held in place by an acoustic release, which releases the buoy on command from a deck unit. Also housed within the frame is lead ballast to secure the frame to the seabed. Additional instrumentation to collect salinity and temperature data may also be contained within the frame. An acoustic pinger is also mounted on the frame to aid in the recovery of the frame in the event of the acoustic release not firing. The frame is deployed with a grapple hook and floating nylon line to serve as a backup means of recovery.

Figure 2. ADCP contained with frame

Deployment

The units will be deployed from the desk of a vessel onto the seabed, within the six areas shown in Figure 1, where they will remain fully submerged throughout the tidal range**.** Deployment is carried out by lifting the ADCP from the deck of the vessel via a deck crane or A-frame and winch.

Operation

During operation the units will emit "pings" of sound in the range of 600 Khz or 1 Mhz at a sampling rate of 1-minute average every 10 minutes. The ADCP will be left *in-situ* for the sampling duration which will be no less than 32 days.

Recovery

Recover is facilitated by a hydrostatic release which, on command, sends a ranging ping to the release mechanism which if successful releases a buoy connected to a recovery line. The vessel can then simply move into position over the buoy and recover the ADCP into the boat via the crane. On occasion hydrostatic releases fail. To overcome this issue the ADCPs are also fitted with acoustic pingers which can be activated to aid the location of the ADCP and the acoustic release then attempted again. If the release still fails to work the recovery is then attempted by a grapple recovery. This involves trawling a line with

a grapple attached across the seabed in the area where the deployment took place to snag the grapple line between the ADCP and grapple anchor.

Bathymetry assessment

A multibeam echosounder (MBES) is a type of sonar frequently used to map bathymetry. It operates by emitting an acoustic wave in a fan shape beneath the point of its transceiver attached the hull of the vessel or more typically mounted on a tow-fish. The time it takes for the sound waves to bounce off the seabed and return to the transreceiver is used to calculate the water depth within the arc of the fan. A typical multibeam echo sounder operates at a sound pressure level of between 200-220 dB re 1µPa at 1m with a peak frequency between 300-500 kHz (300,000-500,000 Hz).

Single-beam sonar operates in a similar way to multibeam but with a narrower band width in the regions of a 2-15 degree beam. They are typically used in shallow waters for smaller areas where the time required to achieve 100% insonification with a multibeam sonar is considered unnecessary depending on the purpose the bathymetry is being gathered for.

Light Detection And Ranging (LiDAR) is useful for mapping bathymetry in very shallow water. It operates by emitting two laser light beams from a sensor onboard an aircraft. One beam hits the water surface and is reflected, while the second beam hits the seabed and is reflected back. The difference in time between the two beams returning allows the water depth to be calculated. LiDAR is very useful in areas too shallow for vessels to access such as the intertidal.

In the present case, bathymetric assessment of the intertidal area only is required, as information for the subtidal area is already available. LiDAR is likely to be the method used for this assessment, but the possibility of using a shallow draft vessel over the intertidal area on a high tide to conduct multibeam or single-beam surveys is also possible.

Vessel

To facilitate the deployment and recovery of ADCP's, ancillary instrumentation and the collection of ancillary data (e.g. CTD data) a shallow draft vessel approximately 16m in length will be contracted. An appropriate vessel of this size capable of deployment of an ADCP would typically operate with an inboard diesel engine within a capacity of up to 400hp/300 kW.

5. Receiving environment

The eighteen fixed ADCPs to be deployed will be located in an area running from just east of Skull Harbour in Roaringwater Bay to just west of Robert's Head, south of Cork Harbour (Figure 1). The majority of this area is highly exposed south-south east facing section of the Irish coast with no protection from the prevailing wind or swell. However, areas of shelter are also present within a number of large and small inlets and bays which characterise this area of the coast. The sheltered areas encompass a range of EU Annex I habitats including Mudflats and sandflats not covered by seawater at low tide [1140], Large shallow inlets and Bays [1160], Reefs [1170] and Estuaries [1130].

Within this area it is proposed that ADCPs will be deployed, bathymetric surveys will be conducted and ancillary environmental data will be gathered within the six separate areas as follows:

Area A

Kinsale Harbour east to Robert's Head just south of the entrance to Cork Harbour. A small section this area overlaps with the Sovereign Islands SPA (Site coded: 004124).

Area B

Area B covers Courtmacsherry Bay from Seven Heads Bay to Old Head of Kinsale. The north western section of this area overlaps with Courtmacsherry Estuary SAC (Site code: 001230) and Courtmacsherry Bay SPA (Site code: 004219) and a small area of the western section overlaps with Old Head of Kinsale SPA (Site code: 004021). The licence area is immediately adjacent to but outside of Seven heads SPA (Site code: 004191).

Area C

Area C encompasses Clonakilty Bay and environs. The northern section of this area overlaps with Clonakilty Bay SAC (Site code: 000091) and Clonakilty Bay SPA (Site code: 004081). The proposed licence area is immediately adjacent to, but outside of, Galley Head to Duneen Point SPA (Site code: 004190).

Area D

Area D covers the area of Glandore Harbour and Rosscarbery Bay east to Galley head. The proposed licence area is immediately adjacent to, but outside of, Kilkeran Lake and Castlefreke Dunes SAC (Site code: 001061) and Galley Head to Duneen Point SPA (Site code: 004190).

Area E

Area E runs from approximately 4km east of Baltimore Harbour to Castle Haven Bay. It takes in Tragumna Bay, Toe Head Bay and the open waters approximately 2km from the coast at this location. This area overlaps with Lough Hyne Nature Reserve and Environs SAC (Site code: 000097). It is immediately adjacent to, but outside of Sheep's Head to Toe Head SPA (Site code: 004156).

Area F

Area F encompasses Roaringwater Bay, from just east of Skull Harbour west to Baltimore Harbour to include the areas surround Sherkin Island. This area overlaps with Roaringwater Bay and Islands SAC (Site code 000101). It is immediately adjacent to, but outside of Sheep's Head to Toe Head SPA (Site code: 004156).

5.1 Ecology of the receiving environment

Area A

A small section this area overlaps with the Sovereign Islands SPA. The Sovereign Islands are two very small islands located near the entrance to Oysterhaven Bay. This SPA is of ornithological importance for the breeding colony of Cormorant, which is the largest in Co. Cork and of national importance.

The Bandon River discharges into this area to the south of Inishshannon where the estuary is recorded as shallow sublittoral mixed sediment. The Belgooly River also discharges into this area to the north of Oyster haven where the same habitat is recorded. The outer/exposed marine areas are generally dominated by areas of infralittoral and circalittoral rock.

Area B

The north western section of this area overlaps with Courtmacsherry Estuary SAC and Courtmacsherry Bay SPA and a small area of the western section overlaps with Old Head of Kinsale SPA. Courtmacsherry Estuary SAC is characterised by a subtidal community of Sandy mud to mixed sediments with *Tubificoides benedii* and *Hediste diversicolor* in the area of Timoleague where the Argideen River enters the bay. The remainer of the marine area, within the intertidal sections of the site, is characterised by a Sand to mixed sediment with *oligochaetes* community and a Sand with *Nephtys cirrosa* community complex.

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.

Old Head of Kinsale SPA is of special conservation interest for Kittiwake and Guillemot. It is the largest seabird colony on the south coast between the Bull Rock and the Saltee Islands. The site supports nationally important populations of Kittiwake and Guillemot as well as smaller numbers of Fulmar, Shag, Herring Gull and Razorbill.

Area C

The northern section of this area overlaps with Clonakilty Bay SAC and Clonakilty Bay SPA. The marine sections of Clonakilty Bay SAC are dominated by large expanses of intertidal sand and mud flats characterised by a Sand to sandy mud with *Tubificoides benedii* and *Peringia ulvae* community complex. The flats are covered with algal mats (*Enteromorpha* spp.), which is likely due to nutrient enrichment of the area. The invasive Cord-grass (*Spartina* sp.) occurs in places through the flats.

Clonakilty Bay SPA is of special conservation interest for Shelduck, Dunlin, Black-tailed Godwit and Curlew. The site is noted for its internationally important population of Black-tailed Godwit and national importance for the other three species. 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.

Area D

There is no overlap between area D and any European site. INFOMAR data indicates this area to be dominated by the EUNIS habitat A5.35: Circalittoral sandy mud in mosaic with smaller areas of Circalittoral rock and other hard substrata and Circalittoral fine sand or Circalittoral muddy sand.

Area E

Area A overlaps with Lough Hyne and environs SAC. Lough Hyne has been recognised as an internationally important ecological site and has been the subject of intensive surveys over many decades. The marine sections of this site include a deep (circa 40 meters in places) land locked bay. The entrance to the sea being via a narrow channel known as “the rapids” which opens into Barloge Creek to the west of Bullock Island. The aforementioned area is arguably the most unique and sensitive area of the SAC. Within which a range of rare, usual and highly diverse species associated with the reef habitats have been recorded.

Within Barloge creek, a *Zostera*-dominated subtidal community, dominated by eelgrass (*Zostera marina*), is recorded and this eelgrass community continues into the straits at the mouth of Lough Hyne where It is recorded in depths of between 0m and 4m. The invasive seaweed *Sargassum muticum* has also been recorded at this location.

A subtidal reef community is recorded in the narrows between the north and south basins within Lough Hyne and in a small area off its south-eastern shore; outside of the lough it occurs between Bullock Island and Drishane Point, at Carrigathorna and at the southern extreme of the site to the west of Gokane Point.

The site is designated for Submerged or partially submerged sea caves (EU Habitat 8330) and a small sea cave hosting a diverse range of epifauna including a range of sponges is located on the west side of Bullock Island with its entrance opening into Barloge creek.

Area F

Area F overlaps with Roaringwater Bay and Islands SAC. The marine areas of this site are characterised by a range of Annex I habitats including sensitive subtidal communities. Extensive beds of maërl which include areas of an unusual form of the nationally rare *Lithophyllum dentatum*, together with additional areas of other species of maërl and their associated communities are present within the site. The site also supports areas of eel grass (*Zostera marina*). A number of sediment communities including muddy sand with bivalves and polychaetes community complexes, mixed sediment community complexes and shallow sand/mud community complexes are also present. Shallow reef communities are also present throughout the bay, in particular where they fringe the numerous islands.

The site is also of conservation importance for Harbour Porpoise, Otter and Grey Seal which are present year round. Haul out sites for grey seal are associated with a number of the more isolated islands in the Bay. Roaringwater Bay is considered one of the most important sites in Ireland for Harbour Porpoise where the population estimate is in the region of 200 individuals. Suitable habitat for otter is present throughout the site and otters make use of the terrestrial and marine areas within it.

Avifauna of adjacent areas

While the sections of areas B and C overlap with SPAs designated for wintering waterbirds and the wetland habitats that support them, the adjacent open marine water and cliff habitats provide nesting and foraging habitat for a range of additional seabird species.

Marine mammals

The open waters off the South Cork coast provide significant foraging habitat for a range of cetacean species. Frequent sighting of a wide range of cetacean species are recorded in the IWDG live sightings data base and records available through the Biodiversity Data centre. These waters also support Common Seal (*Phoca vitulina*) and Grey Seal (*Halichoerus grypus*).

Otters

Otters are likely to be present across the entire area of the site, particularly those areas where significant freshwater courses are present. Otter are a QI for Roaringwater Bay and Islands SAC where Otter commuting habitat is present around the entire coastline of the bay and the many islands within it.

6. Screening Assessment

6.1 Zone of influence

Based on the area of impact for the individual project components, as documented in Table 3 below, it is concluded that the proposed project has a maximum direct area of impact extending to the outermost boundary of the survey area. There is no potential for impact (no SPR link) to any SAC that does not have a direct connection to the marine. Therefore SACs designated for terrestrial and coastal habitats and species, or freshwater habitats upstream of a hydrological gradient are considered outside of the ZoI.

Following a review of the project scope of works, to include deployment and operation, the ZoI of the proposed project is taken as the direct area of the vessel operations, to include the area of insonification by the multibeam and/or single beam sonar and all European sites designated for Annex II marine mammals and deeper diving seabirds associated with European sites which have the potential to utilise the waters within the proposed six areas as shown in figure 1. With due consideration to the precautionary principle the ZoI for direct effects has been extended out to 20km from the outermost boundary of the combined (areas A to F), a conservative distance relative to the scale and scope of the project.

Table 3. Source-Path-Receptor matrix

Phase	Element	Potential Source (pressure)	Receptor	ZoI
Survey & deployment	Deployment of ADCPs	Sediment disturbance/mobilisation, benthic species damage	Benthic habitats and species, marine mammals	100m of deployment point.
	Vessel presence	Disturbance, harm or injury as a result of vessel operations	Marine mammals, Birds	Within MUL survey area
	Multibeam, single-beam or other acoustic equipment	Disturbance, harm or injury as a result of underwater noise	Marine mammals, Birds	Within MUL survey area
	Water sampling and CTD sampling	No Impact identified	N/A	N/A
	LiDAR	No Impact identified	N/A	N/A
	Tidal gauge deployment	No Impact identified	N/A	N/A
Operation	ADCP operation	No Impact identified	N/A	N/A
Recovery	ADCP recovery	Sediment disturbance, mobilisation benthic species damage due to recovery of ADCPs, particularly if grapple method is required.	Benthic habitats and species.	100m of deployment point.
	Vessel presence	Disturbance, harm or injury as a result of vessel operations	Marine mammals, Birds	Within MUL survey area

6.2 European Sites

The maximum area of direct impact is estimated to be the survey area within which all activities are proposed. However, indirect impacts may extend to greater distances in the case of European sites for which mobile species are included as a Qualifying Interest (QI).

Seabirds foraging ranges are well studied and vary widely between species (see Appendix 1). There are likely to be a range of deeper diving breeding seabird species associated with SPAs adjacent to the proposed survey areas, or within foraging range of it. Therefore, the zone of influence is extended to all those SPAs designated for breeding seabirds within foraging range of the proposed project site. We have undertaken a screening exercise using the mean max foraging distances published in Woodward *et al*. (2019). This brings in a number of SPAs for species with a wide foraging ranges.

The foraging ranges for Grey seal can be large, travelling up to several hundred kilometres from their breeding areas (Kiely *et al*, 2000, Carter *et al*, 2022) while the foraging distance travelled by Harbour seals is generally less, it can also extend for 100's of kilometres (Vance *et al,* 2021, Carter *et al*, 2022). Harbour porpoise and Bottlenose dolphin are wide ranging and highly mobile, although some populations do appear to be relatively site faithful. However, it can be assumed they travel many 100's of kilometres depending on prey availability and distribution.

It is not appropriate to give definitive foraging areas for any of the aforementioned species. However, based on the documented foraging ranges of grey seal (448km) and Harbour seal (273km) we have applied these ranges to our assessment.

In the case of Annex II cetaceans (Harbour porpoise and Bottlenose dolphin), European sites which lie within the Management Unit (MU) for that species have also been included within the ZoI to comply with current MARA policy.

Table 4 gives all European sites and their QIs and SCIs within the ZoI which have been further assessed in this report.

Table 4. European sites within the ZoI (20km) or greater distance for mobile species, which have been selected for further assessment.

European site and QIs or SCIs	Distance from proposed project area
Courtmacsherry Estuary SAC (001230)	
Estuaries [1130]	Spatial overlap
Mudflats and sandflats not covered by seawater at low tide [1140]	
Annual vegetation of drift lines [1210]	No SPR Link
Perennial vegetation of stony banks [1220]	
Salicornia and other annuals colonising mud and sand [1310]	
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	
Mediterranean salt meadows (Juncetalia maritimi) [1410]	
Embryonic shifting dunes [2110]	
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]	
Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130	
Clonakilty Bay SAC (000091)	
Mudflats and sandflats not covered by seawater at low tide [1140]	Spatial overlap
Annual vegetation of drift lines [1210]	No SPR Link
Embryonic shifting dunes [2110]	
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]	
Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	
Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150]	
Lough Hyne Nature Reserve and Environs SAC (000097)	
Large shallow inlets and bays [1160]	Spatial overlap
Reefs [1170]	
European dry heaths [4030]	No SPR Link
Submerged or partially submerged sea caves [8330]	
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	
Roaringwater Bay and Islands SAC (000101)	
Large shallow inlets and bays [1160]	Spatial overlap
Reefs [1170]	
Phocoena phocoena (Harbour Porpoise) [1351]	
Lutra lutra (Otter) [1355]	

Halichoerus grypus (Grey Seal) [1364]	
Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	No SPR Link
European dry heaths [4030]	
Submerged or partially submerged sea caves [8330]	
Great Island Channel SAC (0001058)	
Mudflats and sandflats not covered by seawater at low tide [1140]	Within 20km
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	No SPR Link
Barley Cove to Ballyrisode Point SAC (001040)	
Mudflats and sandflats not covered by seawater at low tide [1140]	Within 20km
Perennial vegetation of stony banks [1220]	No SPR Link
Salicornia and other annuals colonising mud and sand [1310]	
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	
Mediterranean salt meadows (Juncetalia maritimi) [1410]	
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]	
Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	
European dry heaths [4030]	
Petalophyllum ralfsii (Petalwort) [1395]	
Clonakilty Bay SPA (004081)	
Shelduck (*Tadorna tadorna*) [A048]	Spatial overlap
Dunlin (*Calidris alpina*) [A149]	
Black-tailed Godwit (*Limosa limosa*) [A156]	
Curlew (*Numenius arquata*) [A160]	
Wetland and Waterbirds [A999]	
Courtmacsherry Bay SPA (004219)	
Great Northern Diver (*Gavia immer*) [A003]	Spatial overlap
Shelduck (*Tadorna tadorna*) [A048]	
Wigeon (*Anas penelope*) [A050]	
Red-breasted Merganser (*Mergus serrator*) [A069]	
Golden Plover (*Pluvialis apricaria*) [A140]	
Lapwing (*Vanellus vanellus*) [A142]	
Dunlin (*Calidris alpina*) [A149]	

Black-tailed Godwit (*Limosa limosa*) [A156]	
Bar-tailed Godwit (*Limosa lapponica*) [A157]	
Curlew (*Numenius arquata*) [A160]	
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	
Common Gull (*Larus canus*) [A182]	
Wetland and Waterbirds [A999]	
Old Head of Kinsale SPA (004021)	
Kittiwake (*Rissa tridactyla*) [A188]	Spatial overlap
Guillemot (*Uria aalge*) [A199]	
Sovereign Islands SPA (004124)	
Cormorant (*Phalacrocorax carbo*) [A017]	Spatial overlap
Seas off Wexford SPA [004237]	
Mediterranean Gull (*Larus melanocephalus*) [A176]	90km (Deeper diving seabirds within foraging range)
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	
Lesser Black-backed Gull (*Larus fuscus*) [A183]	
Herring Gull (*Larus argentatus*) [A184]	
Kittiwake (*Rissa tridactyla*) [A188]	
Guillemot (*Uria aalge*) [A199]	
Sandwich Tern (*Sterna sandvicensis*) [A191]	
Roseate Tern (*Sterna dougallii*) [A192]	
Common Tern (*Sterna hirundo*) [A193]	
Arctic Tern (*Sterna paradisaea*) [A194]	
Little Tern (*Sterna albifrons*) [A195]	
Red-throated Diver (*Gavia stellata*) [A001]	
Fulmar (*Fulmarus glacialis*) [A009]	
Manx Shearwater (*Puffinus puffinus*) [A013]	
Gannet (*Morus bassanus*) [A016]	
Cormorant (*Phalacrocorax carbo*) [A017]	
Shag (*Phalacrocorax aristotelis*) [A018]	
Common Scoter (*Melanitta nigra*) [A065]	
Razorbill (*Alca torda*) [A200]	
Puffin (*Fratercula arctica*) [A204]	
Mid-Waterford Coast SPA	

Cormorant (*Phalacrocorax carbo*) [A017]	66km (Deeper diving seabirds within foraging range)
Peregrine (*Falco peregrinus*) [A103]	
Herring Gull (*Larus argentatus*) [A184]	
Chough (*Pyrrhocorax pyrrhocorax*) [A346]	
Helvick Head to Ballyquin SPA	
Cormorant (*Phalacrocorax carbo*) [A017]	47km (Deeper diving seabirds within foraging range)
Peregrine (*Falco peregrinus*) [A103]	
Herring Gull (*Larus argentatus*) [A184]	
Kittiwake (*Rissa tridactyla*) [A188]	
Chough (*Pyrrhocorax pyrrhocorax*) [A346]	

EU sites within MU for Bottlenose Dolphin or Harbour Porpoise which overlap with proposed project site or within forging range of Grey seal or Harbour Seal.

Site	Species	Distance (Km) Hydrologically
Saltee Islands SAC [Site code IE000707]	*Halichoerus grypus* (Grey Seal) [1364]	114
Slaney River Valley SAC [Site code IE 000781	*Phoca vitulina* (Harbour Seal) [1365]	160
Kenmare River SAC [Site code IE002158]	*Halichoerus grypus* (Grey Seal) [1364] *Phocoena phocoena* (Harbour Porpoise) [1351]	30
Glengarriff Harbour and Woodland SAC [Site code IE000090]	*Phoca vitulina* (Harbour Seal) [1365]	82
Blasket Islands SAC [Site code IE002172]	*Phoca vitulina* (Harbour Seal) [1365]	118
Lambay Island SAC [Site code IE000204]	*Phocoena phocoena* (Harbour Porpoise) [1351]	291
Lower River Shannon SAC [Site code IE002165]	*Halichoerus grypus* (Grey Seal) [1364]	170
West Connacht Coast SAC [Site code IE002998]	*Tursiops truncatus* (Common Bottlenose Dolphin) [1349]	272
Duvillaun Islands SAC [Site code IE000495]	*Tursiops truncatus* (Common Bottlenose Dolphin) [1349]	341
Rockabill to Dalkey Island SAC [Site code IE003000]	*Tursiops truncatus* (Common Bottlenose Dolphin) [1349]	260
Slyne Head Islands SAC [Site code IE000328]	*Phocoena phocoena* (Harbour Porpoise) [1351]	265
Inishbofin and Inishshark SAC [Site code IE000278]	*Halichoerus grypus* (Grey Seal) [1364] *Tursiops truncatus* (Common Bottlenose Dolphin) [1349]	285
Slyne Head Peninsula SAC [Site code IE002074]	*Halichoerus grypus* (Grey Seal) [1364]	281
Récifs du talus du golfe de Gascogne	Harbour porpoise, Bottlenose Dolphin	262
Côtes de Crozon	Harbour porpoise	
Ouessant-Molène	Harbour porpoise, Grey seal (416km), Bottlenose Dolphin	416
Abers - Côte des légendes	Harbour porpoise, Grey seal (425km), Bottlenose Dolphin	425
Baie de Morlaix	Harbour porpoise, Grey seal (446km)	416

Côte de Granit rose-Sept-Iles	Harbour porpoise, Grey seal, Bottlenose Dolphin	425
Tregor Goëlo	Harbour porpoise, Bottlenose Dolphin	464
Baie de Saint-Brieuc - Est	Harbour porpoise, Bottlenose Dolphin	534
Cap d'Erquy-Cap Fréhel	Harbour porpoise, Bottlenose Dolphin	535
Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard	Harbour porpoise, Bottlenose Dolphin	559
Estuaire de la Rance	Harbour porpoise	573
Côte de Cancale à Paramé	Bottlenose Dolphin	569
Chausey	Harbour porpoise, Bottlenose Dolphin	552
Baie du Mont Saint-Michel	Harbour porpoise, Bottlenose Dolphin	583
Banc et récifs de Surtainville	Harbour porpoise, Bottlenose Dolphin	539
Anse de Vauville	Harbour porpoise, Bottlenose Dolphin	534
Récifs et landes de la Hague	Harbour porpoise, Bottlenose Dolphin	533
Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire	Bottlenose Dolphin	568
Nord Bretagne DH	Harbour porpoise, Bottlenose Dolphin	380
UK areas within MU for Bottlenose Dolphin or Harbour Porpoise overlapping with proposed project site or within foraging range of grey seal or harbour seal. These sites are no longer part of the Natura 2000 network. However they have been included here to align with current MARA policy.		
North Anglesey Marine / Gogledd Môn Forol	Harbour porpoise	292
Pembrokeshire Marine/ Sir Benfro Forol	Grey Seal	175
West Wales Marine / Gorllewin Cymru Forol	Harbour porpoise	181
Bristol Channel Approaches / Dynesfeydd Môr Hafren	Harbour porpoise	222

6.3 Assessment of potential impacts and likely significant effects

This section identifies and considers potential impacts; direct and secondary, on the conservation status of the Qualifying interests (QIs) and the Special Conservation Interests (SCIs) for all sites within the ZoI. Direct and indirect impacts related to the project are discussed in section 6.3.1 to 6.3.4. Cumulative impacts are considered under section 7.

Deployment of up to 18 fixed ADCPs is proposed. The preferred locations of each of these ADCPs is shown in Table 5 and given in Table 1. It is possible that, following more detailed site surveys, the seabed at the preferred locations may not be suitable for deployment and for this reason the licence area indicated in the polygons shown in Figure 1 encompasses a larger area. Therefore, there is potential for ADCPs to be deployed at any suitable location within the licence area. Bathymetric surveys could take place across the entire intertidal range of the licence area. Vessel based ADCP surveys are also proposed in and around the additional 18 locations shown in Figure 1 and given in Table 1.

Table 5 shows the preferred location of the ADCPs relative to European sites. This assessment considers both the potential for impact of the ADCPs deployed at their preferred location and also at alternative locations within the licence area.

Table 5. Location of ADCPs and bathymetric surveys relative to European sites.*

European sites overlapping with licence area (within the ZoI)	ADCP (Fixed)	ADCP (Vessel)	Bathymetry	Licence Area Code
Sovereign Islands SPA	1	19-24	✓	A
Courtmacsherry Estuary SAC	2-3	25-26	✓	B
Courtmacsherry Bay SPA	2-3	25-26	✓	B
Clonakilty Bay SAC	4	27-28	✓	C
Clonakilty Bay SPA	4	27-28	✓	D
Lough Hyne Nature reserve and environs SAC	11-13	30-31	✓	D
Roaringwater Bay and Islands SAC	33-36	14-18	✓	F

* *The preferred location of fixed and vessel based ADCPs may be within the wider proposed licence area rather than within a European site. The wider licence area provides the buffer within which deployments may occur should the original position not be feasible.*

6.3.1.Accidental spillage of hydrocarbons

Due to the size of the required vessel the volume of hydrocarbons (fuel) carried is low. The extent of dispersal of hydrocarbons in marine waters is governed by a number of factors including spreading, drifting, evaporation, dissolution, photolysis, biodegradation and formation of both oil-in-water and water-in-oil emulsions. Diesel has a relatively narrow boiling range, meaning that, when spilled on water, most of the oil component will evaporate or naturally disperse within a few days or less. Therefore, due to the low volume of fuel and likely rapid dispersion, together with general vessel fuel management to avoid accidental spillage, no LSEs are considered possible.

No potential for Likely significant effects.

6.3.2. Deployment and recovery of ADCPs in benthic habitats.

Sediment mobilisation has the potential to lead to adverse effects on a range of benthic habitats and species. The extent to which sediments will mobilise is dependent on the nature of the sediment (coarse sediments settle out rapidly following disturbance), the exposure of the site (sediments in exposed sites will frequently be subject to natural disturbance due to wave action), the tidal regime of the area (tide swept sediments are

generally devoid of "fines"). The impact of sediment mobilisation on benthic habitats and their constituent species is dependent on the sensitivity of those species to burial and smothering resulting from sediment mobilisation and transport. The species found in exposed sediments are generally robust specialists capable of withstanding disturbance and smothering. The impacts of physical disturbance on the species associated with highly exposed coarse sediments are generally low and greatest in areas of low natural disturbance where the species present are less well adapted to withstand physical stress.

On the other hand, the epifaunal species associated with geogenic and biogenic reef habitat, while able to withstand natural exposure from wave and swell action, are generally sensitive to abrasion and damage.

The benthic habitat within each of the polygons that overlap with SACs is described below.

Within Area A
No spatial overlap of area A within any SAC.

Within Area B the proposed licence areas extends into Courtmacsherry estuary SAC. Within this SAC a mosaic of three sediment community types are present; "Sand to mixed sediment with oligochaetes community complex", "Sandy mud to mixed sediments with *Tubificoides benedii* and *Hediste diversicolor* community complex" and "Sand with *Nephtys cirrosa* community complex". These common community types would be robust to any disturbance and would recover in the short term (< 1year). Therefore, No LSEs are considered possible.

Within Area C the northern section of the area (350m north of station 27) encroaches on an area of Sand to sandy mud with *Tubificoides benedii* and *Peringia ulvae* community within Clonakilty Bay SAC. However, no rare, unusual or species sensitive to temporary disturbance or impact are recorded from this area. The constituent macroinvertebrate species at these locations are robust and easily capable of recovering from any temporary disturbance resulting from deployment, *in-situ* operation or recovery of the ADCPs in a short period of time (weeks). Even if grappling was required to recover one or more ADCPs, no significant impacts are possible due to the lack of sensitive receptor species or habitats. Any mobilised sediment would eventually settle out within a small radius (<100m) and there are no records of any species sensitive to smothering effects in the area. As such any sediment mobilisation would be short lived (within a single tidal cycle) and temporary and no LSEs are considered possible.

Within Area E three marine community types: "Subtidal reef community complex" and "*Laminaria*-dominated community complex" and "Muds to mixed sediment with polychaetes, bivalves and oligochaetes community complex" are present within the licence area. The "Subtidal reef community complex" and "*Laminaria*-dominated community complex" communities are of very high conservation importance supporting a range of rare and unusual benthic epifauna and algal species. The Purple Sea Urchin *Paracentrotus lividus* has been recorded from the reef habitats within this SAC. This species is which was once common in Ireland is now rare and Lough Hyne Nature Reserve and Environs SAC is the most easterly recorded limit for this species in Ireland. A range of additional faunal and algal species recorded as rare in Ireland are present within this SAC. Lough Hyne is recognised as an internationally important ecological site for the unique topographical features of the site which lends support to an unusual and diverse range of faunal and algal species. The currently proposed stations (Station numbers 30 and 31) are indicated for placement on the sedimentary habitat (*Muds to mixed sediment with polychaetes, bivalves and oligochaetes community complex*) in the outer, open coast, section of this SAC. Other than temporary disturbance of the sediment habitat the deployment of ADCPs on this sediment habitat would not cause any significant change to this habitat. The species associated with the MCT at this location include the polychaetes *Scalibregma inflatum* and *Capitella capitata*, the bivalves *Corbula gibba*, *Kurtiella bidentata* and *Abra nitida* and unidentified nemerteans. None of the species are rare or unusual in Ireland and would recover from any disturbance in the short term (<1 years). **Any deployment of ADCPs within the *Zostera*-dominated community could lead**

to LSEs on the conservation objectives for the Large shallow inlets and bays habitat within Lough Hyne and Environs SAC.

Within Area F a number of benthic sediment communities are present "Muddy sand with bivalves and polychaetes community complex", "Mixed sediment community complex" and "Shallow sand/mud community complex". These common community types would be robust to any disturbance and would recover in the short term (< 1year).

Zostera-dominated and maërl-dominated communities, which are classed as sensitive marine communities, are present with Roaringwater Bay. **These communities are vulnerable to physical impact and smothering and may be subjected to LSEs if fixed ADCPs where to be deployed on any locations where they are present.**

A range of reef habitats which include "Exposed to moderately exposed intertidal reef", "Exposed to moderately exposed subtidal reef below 20m" and Sheltered reef Laminaria-dominated communities are also present. The species communities with reef habitats are vulnerable to physical damage. However, they are not suitable for the deployment of ADCPs and as such would be avoided.

Deployment of ADCPs within *Zostera*-dominated and maërl-dominated communities within Roaringwater Bay and Islands SAC and the *Zostera*-dominated community of Lough Hyne Nature Reserve and Environs SAC has the potential to lead to physical damage during deployment and recovery on the Conservation objectives of the Large Shallow inlets and Bays habitat within these SACs.

6.3.3 Survey vessel presence

While vessel traffic is a constant feature of the marine environment in all of the proposed survey areas, vessel operations within close proximity (<100m of haul out sites of grey or harbour seals) or close to intertidal areas where wintering water birds are foraging could lead to disturbance of these species.

There are haul out sites for grey seal within Roaringwater Bay and Islands SAC.

Foraging habitat for wintering waterbirds is present within Courtmacsherry Bay SPA and Clonakility Bay SPA.

Temporary disturbance to seabirds, should they be foraging in the area at the same time as the proposed survey, may occur. However, given the scale of the available foraging habitat, the magnitude of the disturbance would not have the potential to impact their fitness, and therefore does not have the potential to lead to any population-level effects at the SPAs or other adjacent colonies.

Vessel strikes to marine mammals is a known risk. The risk of collision is defined as the probability that a collision occurs, combined with the probability that such a collision will lead to a serious outcome (i.e., major injury, mortality, or damage to the vessel (International whaling commission, 2011). In the present case the survey vessel will be small (no larger than 16m length, 6m beam and 2m draught) and will be very slow moving, as necessitated by the surveys being undertaken and the relative depth of the water. Therefore, the risk of collision and the potential for associated injury is considered to be negligible.

Vessel operations within 100m of haul out sites for grey seal within Roaringwater Bay and Islands SAC or close (within 50 meters) to the low water intertidal foraging habitats for wintering waterbirds, within Courtmacsherry Bay SPA and Clonakilty Bay SPA could lead to disturbance to these species.

6.3.4 Underwater noise

The effects of underwater noise on marine mammals can lead to disturbance, harm or injury depending on the type and frequency of the noise and distance of the receptor.

The proposed ADCPs will be operating in the range of 600 Khz or 1 Mhz and as such are outside of the recorded auditory range of marine mammals.

The noise level output from a vessel operating with an input diesel engine, of the size proposed, would be frequently encountered in this area, associated with other vessel traffic (fishing boats, passenger vessels and recreational craft). As such, it is considered that marine mammals using this area would be habituated to such noise levels. Furthermore, any noise disturbance would be short lived.

The proposed multibeam equipment will operate at 235dB re: 1µPa @1m. As such it is within the range of marine mammal hearing. However, in the present case as it will be via a hull mounted system within the intertidal area where sound will be directed in a relatively narrow vertical cone beneath the vessel. Noise attenuates with distance from the source and at the typical max speed of a vessel conducting multibeam surveys (of 10 -12 knots) a 50% reduction in noise would be expected at 1km from the source. In the present case it is estimated the MBES signal will have dissipated within about 200m from the source to levels below those documented to lead to TTS. This this may lead to temporary, minor behavioural changes to Harbour porpoise within Roaringwater Bay and Islands SAC should they be present during surveys.

It is recognised in the literature that the impact of underwater noise on diving seabirds is poorly known. A range of sites designated for deeper diving seabirds have been considered in this assessment. However, due to the scale and scope of the project and operation of acoustic instrumentation over the intertidal area, where such species would not be foraging, impacts on deeper diving seabirds due to acoustic operations is not considered possible.

LiDAR does not have the potential to lead to any impacts on birds or marine mammals.

With due regard to the precautionary principle, it is considered that MBES surveys may result in minor behavioural changes to Harbour Porpoise within their site at Roaringwater Bay and Islands SAC.

Impacts on the conservation objectives of birds which form a SCI for any European site as a result of underwater noise are not considered possible

6.4 Summary of potential for Likely Significant Effects on QIs or SCIs

Based on the assessment of LSEs given in section 8 it is considered that the project as proposed has the potential to lead to Likely Significant Effects on the Conservation Objectives (COs) of a number of European sites.

Table 6 presents a summary of all European Sites considered in this report and an assessment of their potential for LSEs relative to their Conservation objectives.

Table 6. Assessment of LSE on the Conservation Objectives for all sites within the ZoI

Lough Hyne Nature Reserve and Environs SAC (000097)	
Large shallow inlets and bays [1160]	
Habitat Area: The permanent habitat area is stable or increasing, subject to natural processes	**No LSEs.** The project is not capable of reducing the habitat area. Only temporary installation of ADCPs on the seabed proposed.
Community Extent: Maintain the extent of the *Zostera*-dominated community, subject to natural processes	**Potential for LSEs.** The *Zostera*-dominated community is vulnerable to damage should the area occupied by this Marine Community Type (MCT) be selected for ADCP deployment.
Community structure: shoot density; Conserve the high quality of the *Zostera*-dominated community, subject to natural processes	**No LSEs.** See above. MCT vulnerable to damage and reduction in shoot density.
Community distribution: Conserve the following community types in a natural condition: Muds to mixed sediment with polychaetes, bivalves and oligochaetes community complex; Intertidal reef community complex; Subtidal reef community complex; *Laminaria*-dominated community complex; Sea cave community complex.	**No LSEs.** ADCP deployment on the muds to mixed sediment with polychaetes, bivalves and oligochaetes community complex would cause temporary disturbance only. ADCPS will not be deployed within reef or cave habitats as they do not provide a suitable deployment substrate.
Reefs [1170]	
Habitat Area: The permanent habitat area is stable or increasing, subject to natural processes	**No LSEs.** The project is not capable of reducing the habitat area. Only temporary installation of ADCPs on the seabed proposed and not within reef habitat as it does not provide a suitable deployment substrate.
Distribution: The distribution of reefs remains stable, subject to natural processes	**No LSEs.** The project is not capable of causing reef distribution change.
Community structure: Conserve the following community types in a natural condition: Intertidal reef community complex, Subtidal reef community complex; *Laminaria*-dominated community complex.	**No LSEs.** No deployment of ADCPS will occur within reef habitats.
Submerged or partially submerged sea caves [8330]	
Habitat Area: The permanent habitat area is stable or increasing, subject to natural processes	**No LSEs.** Sea caves are not suitable for ADCP deployment for the purpose of this project.
Community Distribution: The distribution of sea caves is stable, subject to natural processes.	**No LSEs** See above.

Community structure: Conserve the following community type in a natural condition: Sea cave community complex	**No LSEs.** See above.
Community structure: Human activities should occur at levels that do not adversely affect the ecology of sea caves in this SAC	**No LSEs.** See above.
European dry heaths [4030]	
No potential for impact. Terrestrial habitat onside of the ZoI of the proposed project.	
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	
No potential for impact. Terrestrial habitat outside of the ZoI of the proposed project.	
Roaringwater Bay and Islands SAC (000101)	
Large shallow inlets and bays [1160]	
Habitat Area: The permanent habitat area is stable or increasing, subject to natural processes	**No LSEs.** The project is not capable of reducing the habitat area. Only temporary installation of ADCPs on the seabed proposed.
Community Extent: The extent of the Zostera dominated and maërl dominated communities should be conserved, subject to natural processes.	**Potential for LSEs.** The *Zostera*-dominated community is vulnerable to damage should the area occupied by this Marine Community Type (MCT) be selected for ADCP deployment.
Community structure: The quality of the Zostera-dominated community should be conserved, subject to natural processes	**Potential for LSEs.** The *Zostera*-dominated community is vulnerable to damage should the area occupied by this Marine Community Type (MCT) be selected for ADCP deployment.
Community structure: The quality of the maërl-dominated community should be conserved, subject to natural processes	**Potential for LSEs.** The maërl -dominated community is vulnerable to damage should the area occupied by this Marine Community Type (MCT) be selected for ADCP deployment.
Community distribution: Conserve the following community types in a natural condition: Muddy sand with bivalves and polychaetes community complex, Mixed sediment community complex; shallow sand/mud community complex.	**No LSEs.** ADCP deployment on the muds to mixed sediment with polychaetes, bivalves and oligochaetes community complex would cause temporary disturbance only. ADCPS will not be deployed within reef or cave habitats as they do not provide a suitable deployment substrate.
Reefs [1170]	
Habitat Distribution: The distribution of reefs should remain stable, subject to natural processes	**No LSEs.** The project is not capable of altering reef distribution

Habitat Area: The permanent habitat area is stable or increasing, subject to natural processes	**No LSEs.** The project is not capable of reducing the habitat area. Only temporary installation of ADCPs on the seabed proposed and not within reef habitat as it does not provide a suitable deployment substrate.
Community Structure: The following reef community complex should be maintained in a natural condition: Exposed to moderately exposed intertidal reef; Exposed to moderately exposed subtidal reef below 20m Sheltered reef.	**No LSEs.** No deployment of ADCPS will occur within reef habitats.
Community extent: The extent of the Laminaria dominated communities should be conserved., subject to natural processes.	**No LSEs.** No deployment of ADCPS will occur within reef habitats.
Community structure: The biology of the Laminaria dominated communities should be conserved, subject to natural processes.	**No Impact predicted.** No deployment of ADCPS will occur within reef habitats.
Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	
Habitat length: Area stable subject to natural erosion.	**No LSEs.** The project is not capable of altering reef length.
Habitat distribution: No decline, subject to natural processes	**No LSEs.** The project is not capable of altering reef distribution.
Physical structure: Functionality and hydrological regime: No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures	**No LSEs.** The project is not capable of altering hydrological regime.
Vegetation structure: Zonation: Maintain range of sea cliff habitat zonation's including transitional zones, subject to natural processes including erosion and succession.	**No LSEs.** The project is not capable of altering Zonation.
Vegetation structure: Vegetation height. Maintain structural variation within the sward.	**No LSEs.** The project is not capable of altering vegetation height
Vegetation composition: Typical species & sub-communities; Maintain range of subcommunities with typical species listed in the Irish Sea Cliff Survey (Barron et al. 2011)	**No LSEs.** The project is not capable of altering species and communities
Vegetation composition: Negative indicator species: Negative indicator species (including non-natives) to represent less than 5% cover	**No LSEs.** The project is not capable of leading to negative indicator species
V**egetation composition:** Bracken and woody species: Cover of bracken (Pteridium aquilinum) on grassland and/or heath less than 10% Cover of woody species on grassland and/or heath less than 20%.	**No LSEs.** The project is not capable of altering bracken composition

European dry heaths [4030]	
No potential for impact. Terrestrial habitat onside of the ZoI of the proposed project.	
Submerged or partially submerged sea caves [8330]	
Habitat Area: The permanent habitat area is stable or increasing, subject to natural processes	**No LSEs.** The project is not capable of altering the habitat area
Community Distribution: The distribution of sea caves is stable, subject to natural processes.	**No LSEs.** The project is not capable of altering the habitat distribution
Community structure: Conserve the following community type in a natural condition: Sea cave community complex	**No LSEs.** The project is not capable of altering sea cave community complex
Community structure: Human activities should occur at levels that do not adversely affect the ecology of sea caves in this SAC	**No LSEs.** The project is not capable of altering the ecology of sea caves
***Phocoena phocoena* (Harbour Porpoise) [1351]**	
Access to suitable habitat: Species range within the site should not be restricted by artificial barriers to site use	**Potential for LSEs.** Potential for temporary artificial barriers within the site, especially when operating within enclosed sections of the site.
Disturbance: Human activities should occur at levels that do not adversely affect the Harbour porpoise community at the site	**No LSEs.** Potential for disturbance related impacts are considered unlikely as Harbour porpoise will be habituated to vessels of this size.
***Lutra lutra* (Oter) [1355]**	
Distribution: No significant decline	**No LSEs.** Proposed project does not have the potential to impact the range of otter.
Extent of terrestrial habitat: No significant decline. Area mapped and calculated as 171ha above high water mark (HWM); 3ha along river banks/ around ponds	**No LSEs.** No potential to impact terrestrial habitat
Extent of marine habitat: No significant decline. Area mapped and calculated as 1562ha	**No LSEs.** No potential to impact extent of marine habitat
Extent of freshwater (river) habitat: No significant decline. Length mapped & calculated as 0.74km	**No LSEs.** No potential to impact extent of river habitat
Couching sites and holts: No significant decline	**No LSEs.** No potential to impact couching or holt sites
Fish biomass available: No significant decline	**No LSEs.** No potential to impact fish biomass
Barriers to connectivity: No significant increase.	**No LSEs.** No potential to create barriers
***Halichoerus grypus* (Grey Seal) [1364]**	

Access to suitable habitat: Species range within the site should not be restricted by artificial barriers to site use.	**No LSEs.** No potential to create barriers. Grey seal auditory range is outside of the range of the proposed acoustic equipment.
Breeding behaviour: The breeding sites should be maintained in a natural condition.	**No LSEs. T**he proposed project has no p potential l to impact the condition of breeding sites
Moulting behaviour: The moult haul-out sites should be maintained in a natural condition	**No LSEs. T**he proposed project has no potential to impact the condition of moulting sites.
Resting behaviour: The resting haul-out sites should be maintained in a natural condition.	**No LSEs. T**he proposed project has no potential to impact the condition of resting sites
Population composition: The Grey seal population occurring within this site should contain adult, juvenile and pop cohorts annually	**Potential for LSEs.** Disturbance related impacts could impact fitness to breed with resulting impacts on age cohorts.
Disturbance: Human activities should occur at levels that do not adversely affect the grey seal population at the site	**Potential for LSEs.** Disturbance related impacts could adversely impact grey seal at the site.
Clonakilty Bay SPA (004081)	
Conservation objective: To maintain the favourable conservation condition of Shelduck (*Tadorna tadorna*) [A048], Dunlin (*Calidris alpina*) [A149], Black-tailed Godwit (*Limosa limosa*) [A156], Curlew (*Numenius arquata*) [A160] and Wetland and Waterbirds [A999] within Clonakilty Bay SAC which is defined by the following list of attributes and targets:	
Attributes	**Screening assessment (ADCP locations and wider licence area)**
Population trend: Long term population trend stable or increasing	**No LSEs.** The proposed project does not have the potential to impact on population trends
Distribution: No significant decrease in the range, timing or intensity of use of areas by any of the SCI species (listed above), other than that occurring from natural patterns of variation	**Potential for LSEs.** Disturbance related impacts resulting from vessel activity close to (within 50 m) of intertidal foraging areas could impact the intensity of the use by foraging water birds.
Wetland habitat area: The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 508ha, other than that occurring from natural patterns of variation	**No LSEs.** The proposed project does not have the potential to impact the area of wetland habitat.
Courtmacsherry Bay SPA (004219)	
Conservation objective: To maintain the favourable conservation condition of Great Northern Diver (*Gavia immer*) [A003], Shelduck (*Tadorna tadorna*) [A048], widgeon (*Anas penelope*) [A050], Red-breasted Merganser (*Mergus serrator*) [A069], Golden Plover (*Pluvialis apricaria*) [A140], Lapwing (*Vanellus vanellus*) [A142], Dunlin (*Calidris alpina*) [A149], Black-tailed Godwit (*Limosa limosa*) [A156], Bar-tailed Godwit (*Limosa lapponica*) [A157], Curlew (*Numenius arquata*) [A160], Black-headed Gull	

(*Chroicocephalus ridibundus*) [A179], Common Gull (*Larus canus*) [A182] and Wetland and Waterbirds [A999] in Courtmacsherry Bay SPA which is defined by the following list of attributes and targets:	
Attributes	**Screening assessment (ADCP locations and wider licence area)**
Population trend: Long term population trend stable or increasing	**No Impact predicted.** The proposed project does not have the potential to impact on population trends
Distribution: No significant decrease in the range, timing or intensity of use of areas by any of the SCI species (listed above), other than that occurring from natural patterns of variation	**Potential for LSEs.** Disturbance related impacts resulting from vessel activity close to (within 50 m) of the intertidal foraging areas could impact the intensity of use by foraging water birds.
The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,299ha, other than that occurring from natural patterns of variation	**No Impact predicted.** The proposed project does not have the potential to impact the area of wetland habitat.

7. Cumulative Impacts

While a single development may not in itself cause a significant impact on the conservation objectives of a site, a combination of projects within a localised area may cause a negative impact on a site. Therefore, the cumulative impacts of a project or plan in association with other projects and plans must be taken into consideration when assessing the possible impacts of a development.

Potential project related impacts have been identified as pressures resulting from the deployment of ADCPs, noise resulting from bathymetric surveys and disturbance related to vessel presence. Additional projects identified as having potential to act in-combination with the proposed project are considered to be those projects most likely to contribute to these pressures and generate additional underwater noise, vessel disturbance and impacts on benthic habitats.

The following approach has been taken to the identification of cumulative impacts:

- The geographic boundaries of the proposed project as clearly set out in section 4 were reviewed.
- An assessment of the magnitude and extent of potential project related impacts was carried out.
- The Cumulative Effects Spatial Scope (CESS) of the project was estimated.
- As the proposed project is entirely marine based, a search for projects with a marine component or the ability to impact the marine environment through a SPR link were considered relative to the potential for cumulative effects. In this regard all additional projects within 5km of the proposed project area were considered in this review. This distance was considered appropriate based on the scale and scope of the project and magnitude of any potential project related impacts.
- The Cumulative Effects Temporal Scope (CETS) was set to 1 year as proposed for the Marine Usage Licence (MUL)
- The search was focused on applications listed on the websites of the Maritime Area Regulatory Authority (MARA) for post 17th July 2023 applications and the Foreshore unit of the Department of Housing Local Government and Heritage for applications pre 17th July 2023. Further information available through the Department of Agriculture, Food and the Marine with regard to foreshore functions relating to fishery harbour centres, aquaculture and sea-fishing and the EPA regarding Dumping at Sea (DAS) permits were examined.
- Projects with the potential to impact the structure and function of all European sites within the ZoI of the proposed project were identified.
- The significance of any impact identified was determined.

7.1 Assessment of In-combination effects

Table 6 gives a list of projects identified through searches of the aforementioned databases which are considered to have the potential to act in combination with the proposed project. This assessment indicated a total of 4 projects with potential to lead to in-combination effects.

Table 7 Search of additional projects within or adjacent to ZoI

No.	App. licence no.	Applicant	Description	Location	Potential contributory impacts	Potential for cumulative impact
					These surveys may include: geophysical, geotechnical, wind resource & metocean surveys and as such are also likely to have a requirement to: • Deploy acoustic instrumentation with the potential to contribute to underwater noise. • Conduct geophysical surveys with the potential to contribute to sediment disturbance • Deploy survey vessels with the potential to contribute to disturbance.	All of these projects include elements with similar underwater noise, benthic mobilisation and marine vessel disturbance potential impacts. Due to the scale, magnitude and specific areas of the proposed project in combination with the additional projects, it is considered that the there is no potential for combined impacts with any of these additional projects relative to benthic habitat or vessel disturbance impacts. However the potential for temporal overlap could be possible relative to underwater noise.
1	FS007616	Ruby Offshore Energy Ltd.	Application for Site Investigation Licence for Windfarm and associated cable route off the coast of Counties Wexford, Waterford, Cork	<5km east		
2	LIC240006	Department of the Environment, Climate & Communications	Deployment of the Marine Institute's R.V. to undertake a geophysical survey in the South Coast DMAP to inform future offshore renewable energy development.	Spatial overlap (Project now completed)		
3	FS007471	Floating Cork Offshore Wind Ltd.	Application for Site Investigation Licence for Windfarm and associated cable route off the coast of Cork	Spatial overlap		
4	FS007431	Tulca Offshore Array Ltd.	Foreshore Licence application to undertake surveys and site investigations to inform development and project design for an offshore windfarm off the coast of Cork.	Spatial overlap		
5	FS007575	Kinsale Offshore Wind Ltd.	Foreshore Licence application to undertake surveys and site investigations to inform development and project design for an offshore windfarm off the coast of Cork.	<5km to the east		
Plans						
1	The Climate Action Plan 2023		These plans promote sustainable development in the maritime environment, improvement of Environmental status and mitigation of climate change		No element of the proposed project has the potential to act in-combination with any of the 3 identified plans to result in any negative in-combination effects. Rather, the proposed project may contribute towards positive sustainable development in the maritime environment and improvement in environmental status without the potential to contribute towards negative impacts on any European site.	
2	River Basin Management Plans (RBMP)					
3	Designated Maritime Area Plans(DMAPs)					

8. Screening statement

Following a review of the proposed project, information to support a screening assessment, following the guidelines of *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 has been prepared.

It cannot be excluded on the basis of objective scientific information, following the preparation of this SISAA, that the proposed project, individually or in combination with other projects, will have a significant effect on a European Site.

The assessment concludes that, the proposed project may give rise to Likely Significant Effects on the Conservation Objectives of the European sites listed below. Accordingly, it is concluded that Appropriate Assessment of the proposed project is required.

- Lough Hyne Nature Reserve and Environs SAC (000097)
- Roaringwater Bay and Islands SAC (000101)
- Clonakilty Bay SPA (004081)
- Courtmacsherry Bay SPA (004219)

Additional sites in Ireland and France have been brought forward to the NIS prepared for this project as they fall within foraging range for grey seal or harbour seal or are within a management unit for Bottlenose Dolphin or Harbour Porpoise. However, no potential for LSE's on the conservation objectives of these sites was identified.

These additional sites included:

- Saltee Islands SAC
- Slaney River Valley SAC
- Kenmare River SAC
- Glengarriff Harbour and Woodland SAC
- Blasket Islands SAC
- Lambay Island SAC
- Lower River Shannon SAC
- West Connacht Coast SAC
- Duvillaun Islands SAC
- Rockabill to Dalkey Island SAC
- Slyne Head Islands SAC
- Inishbofin and Inishshark SAC
- Slyne Head Peninsula SAC
- Récifs du talus du golfe de Gascogne
- Côtes de Crozon
- Ouessant-Molène
- Abers - Côte des legends
- Baie de Morlaix
- Côte de Granit rose-Sept-Iles
- Tregor Goëlo
- Baie de Saint-Brieuc – Est
- Cap d'Erquy-Cap Fréhel

- Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard
- Estuaire de la Rance
- Côte de Cancale à Paramé
- Chausey
- Baie du Mont Saint-Michel
- Banc et récifs de Surtainville
- Anse de Vauville
- Récifs et landes de la Hague
- Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire
- Nord Bretagne DH

Four additional areas of the UK (outside of the Natura 2000 network) were further considered in this NIS, based on current MARA policy, as they were within a MU for or Harbour porpoise or within foraging range for Grey seal or Harbour seal. These include:

- North Anglesey Marine / Gogledd Môn Forol
- Pembrokeshire Marine/ Sir Benfro Forol
- West Wales Marine / Gorllewin Cymru Forol
- Bristol Channel Approaches / Dynesfeydd Môr Hafren

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Appendix 1

**After Woodward et al. (2019).*

Species	Foraging Range - Mean Max (km)*	SPAs where species is qualifying feature
Kittiwake	156.1	Wicklow Head SPA
		Saltee Islands SPA
		Ireland's Eye SPA
		Howth Head Coast SPA
		Lambay Island SPA
		Helvick Head to Ballyquin SPA
Gannet	315.2	Saltee Islands SPA
		The Bull and The Cow Rocks SPA
		Skelligs SPA
Fulmar	542.3	Saltee Islands SPA
		Lambay Island SPA
		Puffin Island SPA
		Skelligs SPA
		Deenish Island and Scariff Island SPA
		Beara Peninsula SPA
		Blasket Islands SPA
		Iveragh Peninsula SPA
		Dingle Peninsula SPA
		Kerry Head SPA
		Cliffs of Moher SPA
Cormorant	25.6	The Raven SPA
		Wexford Harbour and Slobs
Shag	13.2	NA
Guillemot	73.2	Saltee Islands SPA
		Ireland's Eye SPA
Razorbill	88.7	Saltee Islands SPA
		Ireland's Eye SPA
		Lambay Island SPA
Puffin	137.1	Saltee Islands SPA
		Lambay Island SPA
Black-headed gull	18.5	Wexford Harbour and Slobs SPA
Roseate tern	12.6	NA
Common tern	18	NA
Arctic tern	25.7	Lady's Island Lake SPA
Sandwich tern	34.3	Lady's Island Lake SPA
Red-throated diver	9	The Raven SPA
Herring gull	58.8	Saltee Islands SPA
		The Murrough SPA
Little tern	5	NA
Lesser black-backed gull	127	Ballymacoda Bay SPA
		Lambay Island SPA
		Saltee Islands SPA
		Poulaphouca Reservoir SPA
		Wexford Harbour and Slobs SPA
Manx shearwater	1346.8	Deenish Island and Scariff Island SPA
		Skelligs SPA

		Puffin Island SPA
		Blasket Islands SPA
		Cruagh Island SPA
Storm petrel	336	The Bull and The Cow Rocks SPA
		Deenish Island and Scariff Island SPA
Great black-backed gull	73	NA
Common gull	50	NA
Med gull	20	NA
Great skua	443.3	NA
Arctic skua	NA	NA