Maritime Usage Licence Application for Marine Site Investigation Surveys at Port of Cork, Ringaskiddy, County Cork

Risk Assessment for Annex IV Species

Report No. CORE2-AYE-ZZ-XX-RP-ENV-0002

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[1] Introduction

[1.1] Preamble

Ayesa has been commissioned to undertake an Annex IV Species Risk Assessment Report for Port of Cork Company (PoCC) (the 'Applicant'), who wishes to submit a Maritime Usage Licence (MUL) application to the Maritime Area Regulatory Authority (MARA) for marine site investigation (SI) surveys (thereafter referred to as the 'proposed works') at the Port of Cork, Ringaskiddy, Co. Cork.

This assessment has been prepared in accordance with the requirements of the EU Habitats Directive (92/43/EEC) and the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended). It evaluates the potential for the proposed works to result in disturbance, injury or mortality to species listed under Annex IV of the Directive, which are afforded strict protection throughout their natural range, both within and outside Natura 2000 sites.

This report supplements, but remains separate from, the Supporting Information for Screening for Appropriate Assessment prepared for the project under Article 6(3) of the Habitats Directive, which considers potential effects on designated European sites. The present document is specifically concerned with compliance under Article 12, relating to the strict protection of Annex IV species, irrespective of site designation.

[1.2] Project Overview

This Maritime Usage Licence (MUL) application from the Port of Cork Company is for marine environmental surveys for the purposes of site investigations (SIs) at Ringaskiddy, Co. Cork. The site investigations are associated with the future port infrastructure identified in the Port of Cork Masterplan 2050.

The proposed marine SIs (geotechnical survey, environmental surveys (including sub-tidal benthic and subtidal video surveys), intertidal benthic survey and marine mammals survey) will enable:

- Detailed mapping of nearshore shallow geological and seabed character;
- Reconnaissance level mapping of seabed relief and features (e.g. archaeology);
- Greater understanding of the seabed and sub-seabed conditions;
- Evaluation of the nature and mechanical properties of the superficial seabed sediments along the survey corridor;
- Aid in the classification of submerged habitats;
- Greater understanding of species distribution and abundance; and
- Baseline environmental mapping (i.e. habitats and species).

The knowledge gained from the proposed SI surveys will be used to minimise uncertainty in ground conditions at an early design stage.

Data acquired during the proposed SIs will be used to inform the design and assessment of any future projects in the area by providing information on the baseline environment and allowing impacts to be predicted, and subsequently appropriate mitigation to be developed, as applicable. The results of the proposed SIs may also be used at a later date to provide a baseline against which to monitor effects of construction, operation and decommissioning of marine infrastructure.

[1.3] Project Setting

Cork Harbour is a mid-sized water body approximately 28km^2 in area, and takes in the areas of Ringaskiddy, Monkstown, Cobh, Rostellan and Whitegate in County Cork. The Port of Cork Ringaskiddy is located adjacent to the village of Ringaskiddy. Ringaskiddy village has a population of 570 people. Large industry and existing Port of Cork activities have a dominate role within the village. The location of the proposed redevelopment lies within Cork Harbour coastal water body (IE_SW_060_000) in the South-Western River Basin District (SWRBD). The harbour is fed by Lough Mahon (IE_SW_060_0750), Owenboy Estuary (IE_SW_060_1200) and North Channel Great Island (IE_SW_060_0300) transitional water bodies before feeding into the Outer Cork Harbour coastal water body (IE_SW_050_000).

The site location can be seen below in Figure 1.1.The approximate outline of the proposed MUL area is shown in Figure 1-2. Drill cuttings will be brought up to surface level in a casing to prevent contact with the seawater. Once aboard the survey vessel, the sediment will be bagged and taken off site to be disposed of at a suitable licenced facility.

[1.4] Preparation of Report

Table 1-1. Ayesa Team

Title	Name	Role	Qualifications	Years' experience
Senior Ecologist	Joe Butler	Survey, Report Preparation	BSc (Zoology) MSc (Wildlife Conservation & Management)	6
Principal Consultant	Lynn Morrissey	Report checking and review	MSc Env Res Mgt IES Membership	20+
Technical Director	Barry Sheridan	Report Review and Sign-off	MSc Environmental Management. IES Chartership	20+

This report was prepared by Joe Butler BSc (Hons) Zoology, MSc Conservation & Management. Joe Butler has worked as a Consultant Ecologist since 2018. Joe has six years' experience working as a consultant ecologist in the private sector for engineering consultancies and is currently working as a freelance ecologist providing ecological services various clients. He has conducted numerous ecological and environmental assessments, including Appropriate Assessment (AA) Screening Reports, Natura Impact Statements (NIS) and Ecological Impact Assessment Reports (EcIA) for submission to various regulatory bodies across Ireland. Joe has significant experience in carrying out ecological surveying and reporting for proposed soil recovery sites throughout Ireland.

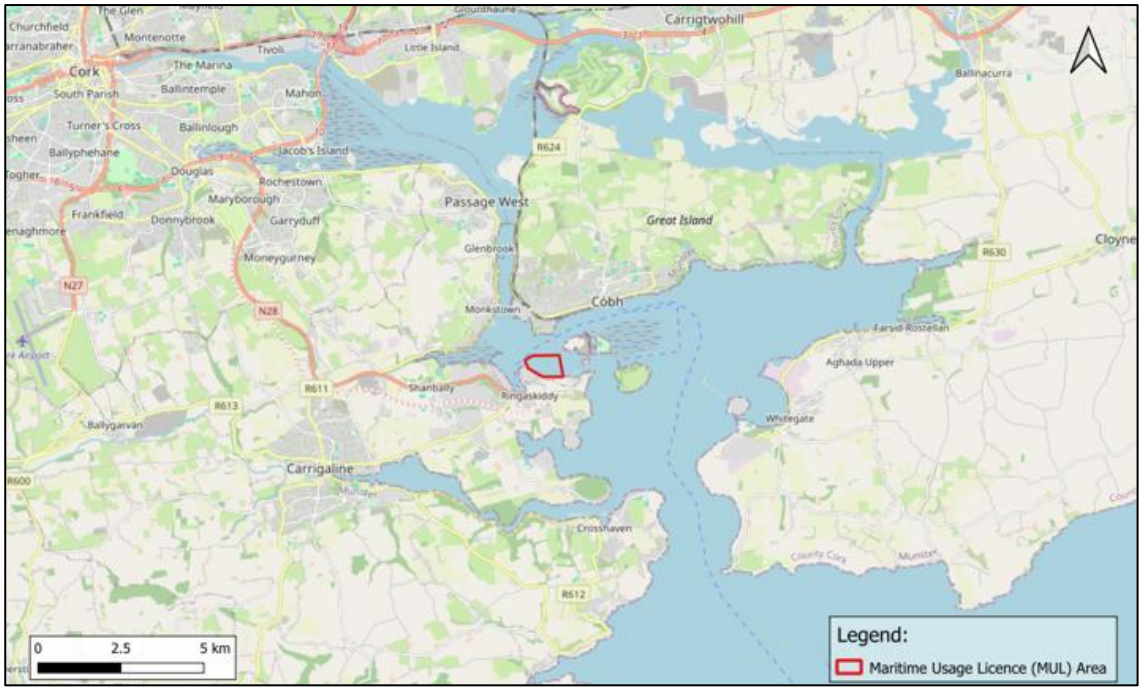

Figure 1-1. Map of Site Location.

Figure 1-2. Approximate location of the proposed MUL area

[1.5] Purpose of Report

The purpose of this report is to assess the potential for the SI works within Cork Harbour to result in disturbance, injury or mortality to species listed under Annex IV of the EU Habitats Directive

(92/43/EEC). These species include harbour porpoise (*Phocoena phocoena*), common dolphin (*Delphinus delphis*), minke whale (*Balaenoptera acutorostrata*), grey seal (*Halichoerus grypus*), harbour seal (*Phoca vitulina*) and otter (*Lutra lutra*).

This report specifically addresses compliance with Article 12 of the Habitats Directive, which requires Member States to ensure the strict protection of European Protected Species (EPS) throughout their natural range, irrespective of whether they occur within or outside designated Natura 2000 sites.

Accordingly, this Annex IV assessment has been prepared to:

- Identify Annex IV species that may occur within or near the proposed works location.
- Evaluate the potential for the proposed activities to cause disturbance, injury or destruction of breeding, resting or foraging areas used by these species.
- Set out the mitigation, monitoring and management measures required to ensure compliance with the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

[1.6] Legislative Context

Under Articles 12 and 13 of the Habitats Directive (92/43/EEC), Member States are required to establish systems of strict protection for animal and plant species listed under Annex IV, which are of Community interest and in need of protection throughout their natural range.

Article 12 requires that Member States take appropriate measures to prohibit the deliberate capture, killing, disturbance, or destruction of breeding or resting sites of Annex IV species. Article 16 of the Directive provides for derogations from these prohibitions only under specific, strictly controlled circumstances.

These provisions are transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended. Regulations 51, 52, and 54 make it an offence to deliberately capture, injure, or disturb protected species, or to damage or destroy their breeding or resting places.

Annex IV species are afforded protection throughout their entire range, both within and outside Natura 2000 sites. It is therefore an offence to deliberately kill, injure, or disturb a specimen in the wild, or to damage or destroy a breeding site or resting place of such an animal.

In addition to the Habitats Directive and associated Irish legislation, Annex IV species - including cetaceans, otters, and seals - are also protected under several international conventions and national legal instruments. These provide a complementary framework ensuring the conservation and management of marine mammals in Irish waters.

Table 1-2Table 1-2 below summarises the key legislative and policy instruments relevant to the protection of Annex IV species in the study area.

Table 1-2. Summary of Legislation, Conventions, and Guidance Relevant to Annex IV Species Protection

Legislation / Convention	Annex IV Species Receptor(s)
Habitats Directive (European Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora)	All cetaceans, grey and harbour seals, marine turtles, otter

European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)	All cetaceans, grey and harbour seals, marine turtles, otter
Marine Strategy Framework Directive (2008/56/EC)	All cetaceans, grey and harbour seals, marine turtles
Wildlife Acts (1976–2018)	All cetaceans, grey and harbour seals, otter
OSPAR Convention (1998) – Convention for the Protection of the Marine Environment of the North-East Atlantic	Bowhead whale, northern right whale, blue whale, harbour porpoise
Convention on the Conservation of Migratory Species of Wild Animals (CMS / Bonn Convention, 1979)	All cetaceans, marine turtles
Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention, 1979)	All cetaceans, grey and harbour seals, marine turtles, otter
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)	All cetaceans, marine turtles
DAHG (2014) Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters	Marine mammals (all cetaceans and seals)
NPWS (2007) Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters	Marine mammals (all cetaceans and seals)

[2] Relevant Annex IV Species

A number of Annex IV species listed under the EU Habitats Directive (92/43/EEC) are known to occur within Irish coastal and marine waters, including cetaceans (whales, dolphins, and porpoises), pinnipeds (seals), marine turtles, and otter. These species are afforded strict protection throughout their range, both within and outside designated Natura 2000 sites.

Irish coastal waters, support a diverse assemblage of cetacean species, with at least 25 species recorded in national waters (Berrow et al., 2010; IWDG, 2025). Of these, harbour porpoise, bottlenose dolphin (*Tursiops truncatus*), and common dolphin are the most frequently observed and are considered resident or regularly occurring along the south coast. Other species such as minke whale (*Balaenoptera acutorostrata*), Risso's dolphin (*Grampus griseus*), and white-beaked dolphin (*Lagenorhynchus albirostris*) are occasionally recorded further offshore.

This risk assessment was based on original data collected by the Irish Whale and Dolphin Group (IWDG) and a review of the available literature. The IWDG Sightings dataset, which is validated and updated daily, was accessed (on 24 November 2025). These sightings are available to see mapped out on the National Biodiversity Data Centre (NBDC) website: https://maps.biodiversityireland.ie/Dataset/216.

[2.1.1] Cetaceans

[2.1.1.1] Bottlenose dolphin (*Tursiops truncatus*)

Bottlenose dolphins occur off the Cork coast (Figure 2-1. Dolphin sightings recorded in the Cork Harbour Area (IWDG, NBDC maps)) but at relatively lower frequency than along the west coast (Berrow *et al.* 2010). Animals encountered inshore are likely to derive from a coastal population

which range around the entire Irish coastline and to adjacent UK and mainland Europe coasts (O'Brien *et al.* 2009; Robinson *et al.* 2012).

Many historic bottlenose dolphin sightings in the vicinity of Cork Harbour relate to a small pod of 6-7 bottlenose dolphins which were resident at the mouth of Harbour (Ryan *et al.* 2010). Although bottlenose dolphins are frequently recorded, no sightings of this "resident" group have been reported since May 2013. Sightings of small groups of non-resident dolphins throughout the year but data from land-based effort watches indicate a peak in late autumn / early winter which may coincide with the presence of pelagic schooling fish in the area. Bottlenose dolphins are typically encountered in group sizes of 5 but up to 30 animals. Larger group sizes have been recorded but predominantly in offshore areas. Inshore animals will readily approach vessels but are less likely to engage in extended periods of bow riding than common dolphins.

[2.1.1.2] Common dolphin (*Dephinus delphis*)

Common dolphins occur frequently and at high densities off the Cork coast (Wall *et al.* 2013). They are frequently encountered in the area for most of the year (Figure 2-1) including in the inner harbour near the city, though these individuals frequently live, strand and die. Abundance typically falls to a minimum during April and May but peaks in the vicinity of Cork Harbour during autumn and winter, coinciding with the presence of pelagic schooling fish in the area (Wall *et al.* 2013). Common dolphins are regularly recorded in the harbour (Figure 2-1Figure 2-1). They are gregarious and commonly occur in group sizes of tens of animals. During the autumn and winter, group sizes numbering many tens or even hundreds of animals are not uncommon off the Cork coast. They readily approach vessels and may bow ride for extended periods.

[2.1.1.3] Risso's dolphin (*Grampus griseus*)

Risso's dolphins are sighted occasionally at the entrance to Cork Harbour and adjacent waters (Figure 2-1). Risso's dolphins are not abundant in Irish waters but tend to be patchily distributed (Wall *et al.* 2013).

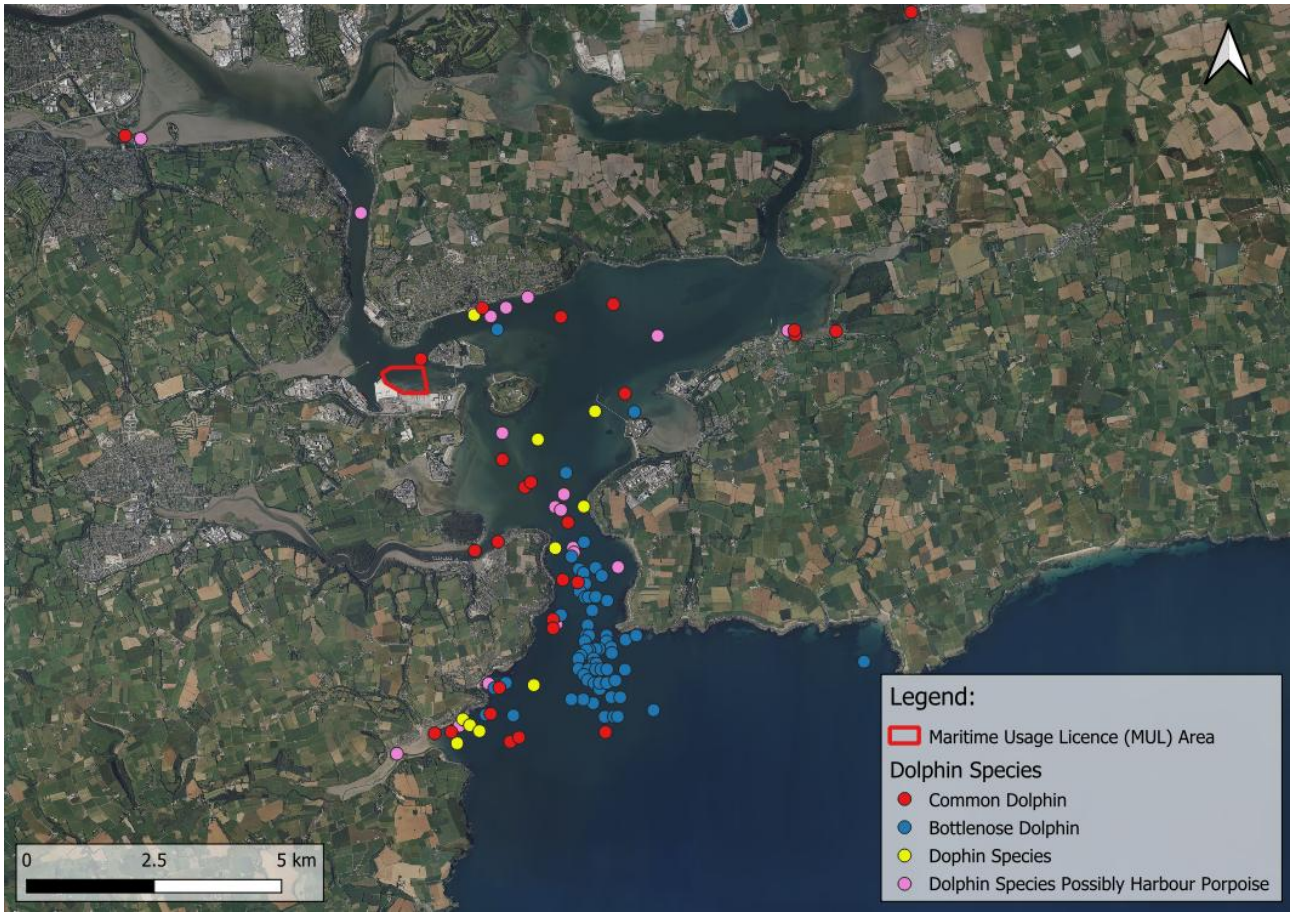

Figure 2-1. Dolphin sightings recorded in the Cork Harbour Area (IWDG, NBDC maps)

[2.1.1.4] Harbour porpoise (*Phocoena Phocoena*)

Harbour porpoise is the most widespread and abundant cetacean in inshore Irish waters, with highest abundances in the Irish Sea (Berrow *et al.* 2010). Harbour porpoise was one the most frequently recorded cetacean species during maintenance dredging operations in 2014 and 2017 for the Port of Cork over the September-October period (Russell and Levesque, 2014; O'Dwyer, 2017). Sightings were outside of Cork Harbour, during transit to and at the licenced disposal site south of Roches Point. Harbour porpoises are widespread and have been sighted within Cork Harbour (Figure 2-2). Harbour porpoises are typically encountered as individuals or in small groups of 2-3 animals throughout the year, but with a peak in group size during the autumn off the Cork coast. They normally will avoid medium and large vessels.

Figure 2-2. Harbour porpoise sightings recorded in the Cork Harbour Area (IWDG, NBDC maps)

[2.1.1.5] Minke whale (*Balaenoptera acutorostrata*)

Minke whales occur frequently off the Cork coast and at the entrance to Cork Harbour. (Fig. 2-3). They occur from late spring to early winter but are largely absent during winter and early spring (Berrow et al. 2010). Minke whale abundance in the vicinity of Cork Harbour peak in late summer and autumn and coincide with the presence of pelagic schooling fish in the area (Wall et al. 2013). Minke whales were recorded off Roches Point during dredging operations for the Port of Cork in 2014 and 2017 (Russell and Levesque, 2014; O'Dwyer 2017). Minke whales are typically encountered as individuals. In the late summer and autumn loose feeding aggregations of two to five animals may be encountered. They do not typically approach large vessels but can be quite inquisitive and may approach slow moving or static vessels.

[2.1.1.6] Fin whale (*Balaenoptera physalus*)

Fin whales regularly occur off the Cork coast (Whooley et al. 2011) and have been recorded at the entrance to Cork Harbour (Figure 2-3). They occur from June to January but are largely absent from February to May (Berrow et al. 2010). Fin whale abundance in the vicinity of Cork Harbour coincides with the presence of pelagic schooling fish (Wall et al. 2013). Fin whales were observed during dredging operations in 2014 (Russell and Levesque, 2014). Photo-identification studies indicate a significant degree of site fidelity by fin whales using these foraging grounds (Whooley et al. 2011). Fin whales are typically encountered as individuals or in small groups of 2-3 animals but during

autumn and early winter loose feeding aggregations of up to 10 - 12 animals may be encountered. They do not typically approach large vessels.

[2.1.1.7] Humpback whale (*Megaptera novaengliae*)

Humpback whales occur regularly but in smaller numbers than fin whales off the Cork coast. They are recorded from June to January but are largely absent from February to May. Humpback whales occur in the vicinity of Cork Harbour peak in autumn and early winter (Figure 2-3), which coincides with the presence of pelagic schooling fish in the area (Wall et al., 2013). Photo-identification studies indicate a significant degree of site fidelity by humpback whales using these foraging grounds (Ryan et al. 2015). Humpback whales are typically encountered as individuals or in pairs off the Cork coast. They do not readily approach large vessels but can be quite inquisitive and may approach slow moving or static vessels.

Figure 2-3. Whale species recordings in the Cork Harbour Area (IWDG, NBDC maps)

[2.1.2] Other Annex IV Species

Other Annex IV species of interest include marine turtles, otters and rare seal species. Data from the National Biodiversity Data Centre was also accessed to help inform this Annex IV assessment.

[2.1.2.1] Leatherback turtle (*Dermochelys coriacea*)

Leatherback turtles are the largest extant sea turtle and have many unique anatomical and physiological adaptations. These include the absence of a hard shell, possession of an extensive layer of peripheral blubber (Doyle 2007) and a rete-like arrangement of blood vessels at the proximal end of each fore flipper (counter-current heat exchangers) (Doyle 2007). Leatherback turtles have been frequently recorded off Cork Harbour (Figure 2-4), with records throughout the year but most between July and September (King and Berrow 2009). Loggerhead turtle (Caretta caretta) has also been recorded off Cork Harbour but only very rarely (King and Berrow 2009) (Ref Figure 2-4).

Figure 2-4. Leatherback turtle sightings recorded in the Cork Harbour area (IWDG, NBDC maps)

[2.1.2.2] Otter (*Lutra lutra*)

Otters are widespread around Cork Harbour (see Figure 2-5). Smiddy (1993) surveyed the east side of Cork Harbour and suggested it provided good habitat for otters. Reid et al. (2013) categorised Co Cork as having intermediate densities (0.10/0.15 females per km^2) compared to other parts of Ireland. Otters were present in all 10km^2 blocks around Cork Harbour between 2007-2011 (Reid et al. 2013).

Coastal dwelling otters require access to a freshwater source as they must regularly cleanse their fur of salt as this can affect its insulating properties and therefore their territorial range will be directed by access to freshwater. In Ireland, the territory of female otters is 6.5 ± 1.0km in coastal environments (de Jongh et al. 2010) and for males it may be a larger extent, where for both females and males a total width of coastal water body would be 80m (NPWS, *Lutra lutra* (1355) Conservation

Status Assessment Report). Underwater, hearing sensitivity is significantly reduced compared to pinniped species, demonstrating that otter hearing is primarily adapted to receive airborne sounds (Ghoul et al. 2014).

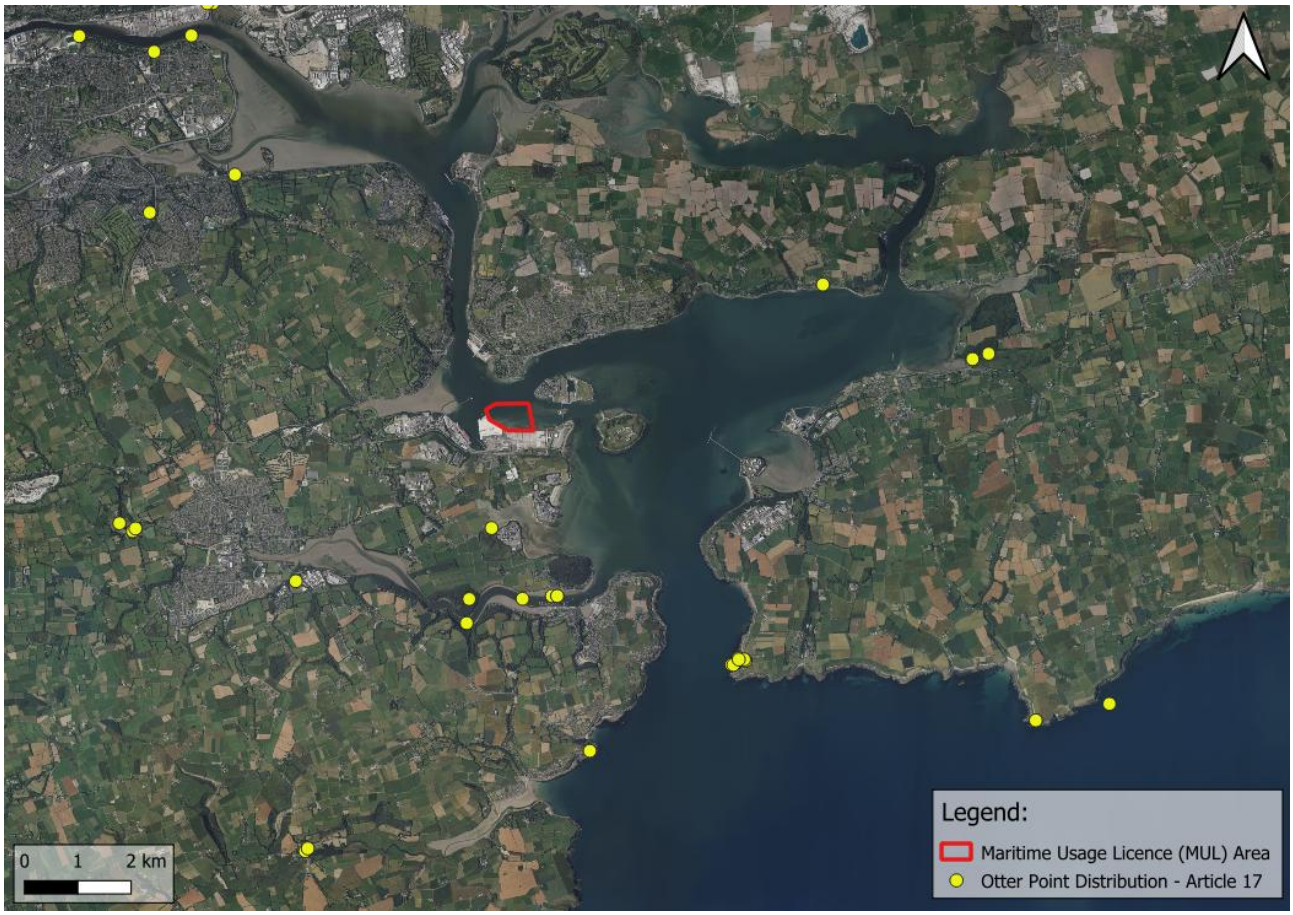

Figure 2-5. Otter point distribution in the Cork Harbour area (Article 17, NBDC)

[2.1.3] Bats

Bats are also protected under the EU Habitats Directive (92/43/EEC). The lesser horseshoe bat which is found in the Republic of Ireland only is listed in Annex II of the EU Habitats Directive, while all bat species are listed in Annex IV of the Directive. This Annex IV Species Risk Assessment has also considered the potential for any impacts from the proposed activities at the site on any of the ten species of bat that are confirmed as resident in Ireland (Kelleher and Marnell, 2006). In the Ringaskiddy Redevelopment EIAR 2024, a review of existing bat records within a 10km radius of the study site (sourced from BCIreland's National Bat Records Database) showed that six Irish bat species have been recorded locally. The most frequently recorded was the common pipistrelle bat (*Pipistrellus pipistrellus sensu lato*) according to data supplied by the National Biodiversity Data Centre.

The NBDC was consulted to obtain records of bats within the vicinity of the proposed works

The Bat Conservation Ireland Landscape Suitability Model (Lundy et al., 2011), which is a predictive tool designed to assess the suitability of landscapes for supporting bat populations across Ireland, was consulted during the desk study. This model divides the country into grid squares and ranks habitat suitability within these squares based on various environmental factors such as land cover, climate, topography, and proximity to waterbodies, as well as historical and current bat occurrence

records. The model assigns scores to these grid squares, which are categorised into five qualitative levels of suitability:

- Low (0.0000000-13.000000)
- Low-Medium (13.000001-21.333300)
- Medium (21.333301-28.111099)
- Medium-High (28.111100-36.444401)
- High (36.444402-58.555599)

[2.1.3.1] Grid W76

The proposed works site 67 falls within a region with an overall 'Medium-High' level of suitability for all bats, scoring 29.33 on the suitability index. Table 2-1 details the suitability index for individual bat species. Six species have a ‘High’ suitability index, one species has a ‘Low-Medium’ suitability index, two species are rated ‘Medium’, two species are rated ‘Low’.

Table 2-1. Landscape suitability indices for bats in Grid W76

Scientific Name	Common Name	Suitability Index
All bats		29.33
Pipistrellus pygmaeus	Soprano pipistrelle	49
Plecotus auritus	Brown long-eared bat	41
Pipistrellus pipistrellus	Common pipistrelle	43
Rhinolophus hipposideros	Lesser horseshoe bat	0
Nyctalus leisleri	Leisler’s bat	43
Myotis mystacinus	Whiskered bat	26
Myotis daubentonii	Daubenton’s bat	23
Pipistrellus nathusii	Nathusius’ pipistrelle	6
Myotis nattereri	Natterer’s bat	33

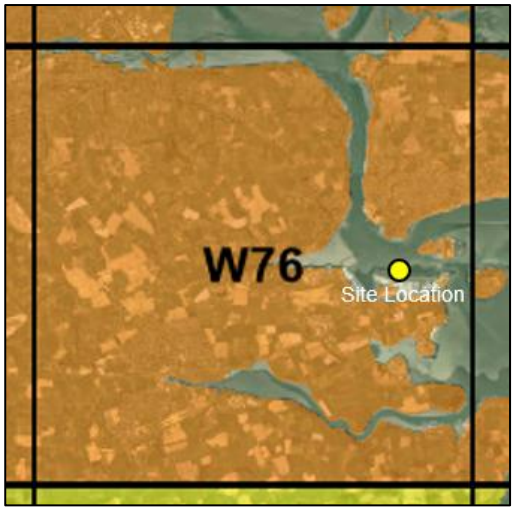

Figure 2-6. Grid W76 showing site location (NBDC)

[2.1.4] Non-Annex IV Species of Conservation Interest (ETP)

[2.1.4.1] Basking Shark (Cetorhinus maximus)

Basking sharks were observed by Irish Whale and Dolphin Group (IWDG) along the coast and off the Old Head of Kinsale, including at the mouth of the harbour (Figure 2-7). Basking sharks are

seasonally abundant on the surface during early spring and summer but may occur in continental shelf Irish waters throughout the year.

Figure 2-7. Basking shark sightings in the Cork Harbour area (IWDG, NBDC maps)

[2.1.5] Pinnipeds

Grey and harbour seals are distributed around the entire Irish coast with grey seals being more abundant along the western seaboard (Cronin et al. 2004; O'Cadhla et al. 2007; O'Cadhla and Strong 2007).

[2.1.5.1] Grey Seal (*Halichoerus grypus*)

There are no recorded grey seal breeding sites in Cork Harbour (O'Cadhla et al. 2007; Morris and Duck 2019), however grey seals have been noted hauled out in Cork Harbour. Grey seals range long distances while foraging (Cronin et al. 2016) and may be expected to be encountered regularly within the harbour and at the disposal site. They were the most frequently recorded marine mammal during dredging operations in 2014 and 2017 with between 57 and 70% of all sightings being of grey seals, usually single individuals (Russell and Levesque 2014; O'Dwyer 2017).

[2.1.5.2] Harbour or Common Seal (*Phoca vitulina*)

There were no harbour seal haul-out sites or breeding sites recorded within Cork Harbour during National Parks and Wildlife Service (NPWS) surveys (Cronin et al. 2004; Morris and Duck 2019). A small number of harbour seals (six) were recorded hauled out at Kinsale Harbour, to the west (Cronin

et al. 2004). Harbour seals are much less frequently recorded within Cork Harbour but have been recorded along the shipping channel. Harbour seals pup in June-July and the moulting period occurs after breeding, starting in June and ending in November, with a peak in mid-September (Cronin et al. 2014).

The potential effects of geophysical and geotechnical on Annex IV species was addressed by assessing the likelihood that these species would be exposed, or interact, with marine activities. Impacts assessed include likelihood of occurrence, and disturbance especially from noise emitted during surveys and drilling and dredging and from additional marine vessels. Acoustic disturbance includes the ability of the individual to detect increased noise levels over ambient levels, masking, Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS) and behavioural impacts, i.e. resulting in a behavioural change by individuals. The potential effects on turbidity and indirect impacts on preferred prey are also considered.

[3] Outline of Scope of Works

[3.1] Description of Proposed Works

The following sections outline the proposed SI works needed for to submit a Maritime Usage Licence (MUL) application to the Maritime Area Regulatory Authority (MARA) for marine site investigation (SI) surveys at the Port of Cork, Ringaskiddy, Co. Cork. Figure 3-1 shows a map of the locations of the proposed works mentioned below.

[3.1.1] Borehole Investigation

[3.1.1.1] Structural Boreholes

The Proposed SI works include the following main components to inform preliminary and detailed design.

The 25 proposed marine borehole locations are shown in Figure 3-1.

Each borehole will begin as a cable percussive boreholes bored to “refusal”. Boreholes in the area typically encounter “refusal” at depths ranging from 0.4m to 12.5m below seabed. Where refusal is encountered, rotary core drilling will follow at the same location. These follow-on boreholes are then generally drilled to a maximum depth of 25m below the seabed with a casing diameter of 200mm.

The total impacted seabed area is 0.8m^2 and the total volume of seabed material extracted is 20m^3.

[3.1.1.2] Sediment Testing Borehole

Sediment samples will be obtained through vibrocore drilling (use of high frequency vibrations to drive a hollow tube into soft unconsolidated sediments) through soft estuarine overburden for recovery of soft soil and sediments. Sediment samples can also be obtained using surface samples (Van Veen grab) as required by the Marine Institute; however, vibrocore drilling is more intrusive. In total, 4 vibrocores and 3 surface grab samples will be collected within the dredging area.

The vibrocore machinery to be used is approximately 4.5m tall when it is in transit and approximately 7m tall when the borehole is being driven. The machinery will be supported by a suitable vessel.

For each vibrocore the footprint of the works on the foreshore will be four approximately 1 m^2. legs of the jack-up barge and the 105 mm temporary steel casing. The 106 mm steel casing is the diameter of the borehole. The vibrocore will be drilled up to 3m below the existing seabed.

There will be no permanent structures, all site investigation will be facilitated by temporary works. The moving marine plant will remain on site for the duration of the works. Associated sampling and testing (both in-situ and geotechnical/geo-environmental laboratory testing).

Proposed marine SI works will be conducted entirely from vessels within the marine environment.

The soil arisings from each vibrocore will be minimal based on the diameter of the casing and these will be brought on land for laboratory analysis.

[3.1.2] Radiological Testing

A sample will be taken anywhere within the proposed dredge area for radiological testing. The sample will be 1.5kg in wet weight and stored in a leak proof container clearly labelled with location and sampling date. These will be delivered to the EPA radiation Monitoring Laboratory for testing.

[3.1.3] Benthic Grab Samples

It is proposed to collect surface subtidal grab samples from 8 locations within the immediate footprint of the proposed development. Additionally, 4 intertidal transects will be surveyed (Phase 1 walkover survey and Phase 2 quantitative surveys with cores collected at upper, mid and lower shore locations). The walkover survey will be undertaken on the hard-benthos intertidal areas within and immediately adjacent to the footprint of the hardstand area.

It is expected that 8 drop down video locations will be surveyed prior to grab sampling to assess the benthic community and determine suitability for grab sampling.

At each of the 8 subtidal stations within the vicinity of the proposed CORE development area, benthic faunal samples will be collected. Additionally, sediment samples will be collected for particle size analysis and organic carbon content. Similar samples (faunal and sediment) will be collected by core along the intertidal transects.

Subtidal sampling will involve the following:

- Single 0.1m^2 grab samples collected at each of the subtidal sampling stations;
- An additional grab will be collected for Grainsize and Loss on Ignition;
- Ancillary information will be recorded on pre-prepared data record sheets;
- Samples will be positioned using the vessel's GPS.
- Sample positions will be recorded when on site;
- Photographs will be taken of each sample; and
- Drop down video footage will be collected from each of the 8 locations. Additional DDV transects will be conducted around 5-10 stations within and adjacent to an extensive reef area

Intertidal sampling will include the following:

- Single stove-pipe core (0.028m^2) will be collected at each intertidal sample station;
- A surface scrape will be collected at each site for Grain size and Loss on Ignition;
- Ancillary information will be recorded on pre-prepared data record sheets;
- Samples will be positioned using a hand-held GPS. Sample positions will be recorded when on site; and
- Photographs of the site will be collected at each location.

Grab samplers are used to recover samples from approximately the top 0.2 - 0.5m of seafloor. These samples may be used to classify the seabed, or for biological analyses. These samples are generally deployed overboard using a crane from a vessel.

There are various grab sampler types to include but not limited to Van Veen, Hamon and Day Grab samplers. Generally, some variants may come either as single or double, and in a variety of different sizes. Grab samplers generally comprise of steel buckets that are deployed open and which trigger shut when the sampler is in contact with the seafloor. As the buckets close, sediment and biological material are retained inside the sampler.

The grab sampler is then recovered to deck and place on a trestle or table. The retained material is then visually inspected for acceptance and then transferred to adequate container or on to a designated mat for further offshore processing and logging.

Single Van Veen Grab is ideal for the collection of sediment samples for biological and environmental sampling. In a range of sizes (0.025m^2, 0.1m^2, 0.2m^2, 0.3m^2) each model has a marine grade stainless steel bucket with hinged access flaps on the top allowing sub sampling of the collected sediment before it is emptied from the grab. The standard for this type of benthic faunal survey is 0.1m^2. The bucket is operated with a pair of stainless-steel lever arms that increase the tension to secure the sample securely in the grab as it is retrieved to the surface. Additional lead weights can be added to the back of the bucket to improve stability in strong currents and to the lever arms to increase the equipment's ability to perform in harder conditions.

Generally, any grab sampling will be carried out by deploying sampling gear from the vessel, as per standard operation procedure for deck works involving this kind of equipment considering the technical specification of the grab in use. Various grabs will be available for the benthic survey provision to ensure adequate sampling equipment for various sediment types. From the grab samples a small amount of sediment can be retained for Particle Size Analysis and Loss on Ignition Analysis.

Van Veen/other suitable methods will be used for soft sediments for quantitative benthic infauna analysis and for physio–chemical analysis. Colonial and epifaunal species will be recorded qualitatively. Sediment samples for physio–chemical analysis will be acquired for later laboratory analysis.

Mini and Standard Hamon Grabs (0.1m^2 and 0.2 m^2 respectively are particularly used for the collection of samples generally from coarse (sand and gravel) sediment substrates and used for benthic macrofauna and particle size measurement. The grab is relatively simple to operate in almost any water depth.

A 0.1m² sample area is a standard practice used in many benthic sampling applications. The Hamon Grab is a box shaped sampling scoop mounted in a triangular frame. Upon contact with the seabed, tensioned wires are released, which causes the sampling bucket to pivot through 90º pushing seabed sediment into the bucket. On completion of its travel the open end of the bucket comes against a rubber sealed steel plate which stops the sediment escaping during recovery. 0.1m² Hamon Grab refers to 0.1m² area of seabed sampled. The depth of scoop penetration is up to 20cm. On recovery the grab is landed onto a rectangular base from where access can be gained to the inside of the bucket via an inspection window. Whilst in the stand the grab sample can then be easily emptied into a sampling container located under the bucket.

In any case where benthic sampling is not possible, sufficient video and stills will be taken from the sample location to identify existing habitats (to include Annex I habitats) and the habitat boundaries.

This survey provides camera footage to aid in the classification of submerged habitats and is a non-invasive survey for habitats and fauna. The survey period for benthic habitats is year-round.

[3.1.4] Intertidal Survey

This survey involves a series of cores to be taken in the soft sediment intertidal sections of the proposed CORE redevelopment.

At each site typically

1. a single stove-pipe core (19cm Ø) is taken for macrofaunal analysis.
2. A single sediment scrape is taken from the sediment surface for Particle Size Analysis (PSA) and Loss on Ignition (LOI).
3. A photographic record is taken. Notes of sediment type and obvious epibenthos are recorded.

[3.1.5] Drop Down Video Survey

The drop-down camera to be used is the STR SeaSpyder Nano, an ultra-compact system offering high-resolution digital imaging and photographic-quality illumination. The system featured the latest generation STR SeaCam Mini IP camera and two ultra-efficient STR SeaLight LED lights, installed on a lightweight deployment frame with a 50m Kevlar-reinforced umbilical. Real-time HD video was captured using the supplied STR VidOverlay software. Laser scaling is integrated into the camera system, which was essential for conducting an assessment and for accurately measuring percentage cover.

Short drifts will be used at each drop-down video station, with video recorded along each transects, with the camera positioned approximately 50cm to 1m above the seabed. The camera was landed on the seabed along each transect, enabling an assessment of spatial variability.

At each station, the immediate survey area was checked for obstructions, such as static gear. Notes will be made in-situ on visible sediment conditions, seabed features, flora and fauna, and notable sensitive and protected species, along with the DGPS position, water depth, date, and time.

The camera will be lowered to the seafloor and a recording made of the bottom type and flora and fauna encountered. Once the camera was recording, the boat is allowed to drift with the current during filming (for approximately two minutes) to get representative footage along each camera deployment. All captured video footage is reviewed, and substrate type and characterising species noted and used to assess any changes in the environment.

The survey sites are in the sublittoral zone, in areas of low to medium energy, exposed to tidal action. There will be 18 locations studied. Stations will cover the entire expanse of Ringaskiddy CORE2, and depths ranging from 1 m to 16 m.

[3.1.6] Beam Trawl Methodology

The survey utilises a two-metre-wide beam trawl equipped with a tickler chain and an 11 mm mesh, which is towed at a speed of 1.5 to 2.5 knots from the A-frame at the stern of the vessel. The beam trawl will be deployed from the Denis Murphy, a vessel kindly provided by the Port of Cork or similar vessel.

For this survey in the Ringaskiddy area, five beam trawl transects (T1 to T5) will be conducted. The track of each trawl was recorded using a handheld GPS and will be plotted. After each transect, the beam trawl will be recovered, the cod end sack opened, and the catch will be deposited into a fish box. If a trawl contained a significant amount of mud, staff will use a deck hose and a 1 mm sieve to clean the catch upon retrieval. Most of the catch from each trawl will be processed on deck by consultancy staff, with some species retained for identification upon return to the AQUAFACT laboratory. Brown shrimp (*Crangon crangon*) and green crab (*Carcinus maenas*) species will be identified and measured on board.

For this survey the catch of organisms will be separated, identified, counted and the total length (the tip of the snout to the tip of the longer lobe of the caudal fin) of selected fish specimens measured to the nearest millimetre. Every attempt will be made to return them alive to the water after processing. The size distribution of organisms such as green crabs (*Carcinus maenas*) and brown shrimp (*Crangon crangon*) will also be assessed.

[3.1.7] Embedded Mitigation

The following environmental controls are incorporated into the project design and form part of standard working practice. These measures are embedded, not “additional mitigation”:

- Refuelling and waste handling carried out in accordance with MARPOL Annex I & V – no fuelling in open water unless fully controlled.
- Spill prevention measures and certified bunkering procedures in place for all vessels.
- Onboard containment available for all operational oils, lubricants, and waste materials.
- Navigation safety maintained through Harbour Master coordination and Notices to Mariners.

These embedded measures are inherent to the works and apply irrespective of any additional mitigation for Annex IV species, Natura 2000 compliance, or licence conditions.

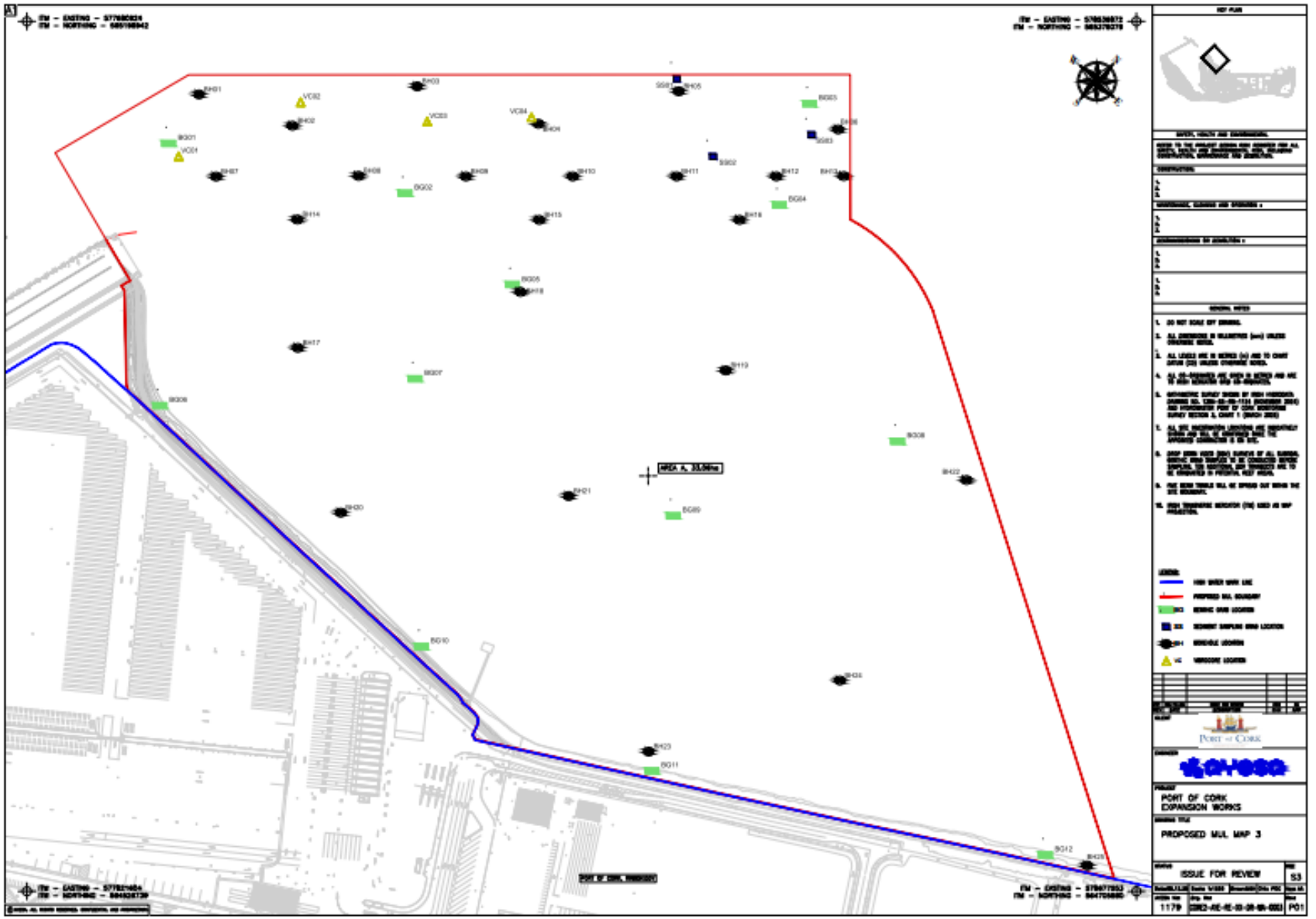

Figure 3-1. Map of survey requirements

[4] Source of Impacts

Potential impacts on Annex IV species may arise from a range of construction and operational activities associated with the proposed SI works at Cork Harbour

The primary sources of potential impact include:

- Sediment disturbance and increased turbidity during survey operations.
- Underwater noise and vibration generated by drilling and support vessels.
- Potential accidental release of pollutants, such as hydrocarbons or suspended sediments.

Each identified source has been assessed within a SPR framework, considering the following parameters:

- Source: The activity or process generating potential disturbance.
- Pathway: The environmental medium or mechanism by which effects may be transmitted (e.g. water column, underwater noise, vessel movement); and
- Receptor: The Annex IV species likely to be exposed, based on distribution, behaviour, and habitat use.

For each pathway, the magnitude, duration, and spatial extent of the potential effect have been evaluated alongside the sensitivity and mobility of relevant Annex IV species.

The subsequent sections present the assessment of these interactions, organised by impact type.

[4.1] Underwater Noise and Vibration

[4.1.1] Source

Underwater noise and vibration are key potential stressors for marine fauna, particularly cetaceans and pinnipeds, which depend heavily on acoustic cues for communication, navigation, and foraging. Anthropogenic underwater sound can cause masking of communication signals, temporary behavioural shifts, or, at very high intensities, auditory injury. The degree of potential effect depends on factors such as frequency, intensity, duration, and repetition rate of the sound source, as well as receptor proximity and local propagation conditions (Southall et al., 2019).

During the SI works, the primary sources of underwater noise will emanate from borehole drilling activities, particularly rotary coring borehole drilling activities and the associated machinery:

- Borehole drilling machinery can produce high levels of noise that can cause significant disturbance to local fauna such as seabirds, fish, marine turtles, and marine mammals. Vibration emissions from borehole drilling can similarly impart negative effects to marine fauna, as well as the disturbance of prey items such as fish, crustaceans and benthic invertebrates.

The de facto daytime noise limit, as recommended by most local authorities in Ireland, is a sound pressure level (SPL) of 55 decibels (dB) (see British Standard BS 5228:2009+A1:2014). Although

the Cork Harbour berths commercial and recreational vessels, elevated noise and vibration emissions emanating from construction works have the potential to affect marine fauna.

[4.1.2] Pathway

Noise propagation within the harbour environment is influenced by shallow bathymetry, sediment type, and the presence of harbour structures, which tend to reflect or attenuate sound energy and limit transmission beyond the immediate dredging area. The acoustic profile of TSHD operations differs markedly from continuous high-energy sources (e.g. pile driving or seismic activity), being of lower amplitude, irregular pattern, and short duration. Sound emissions are therefore spatially and temporally variable and expected to dissipate rapidly with distance.

Substrate-borne vibration from borehole drilling plant may propagate locally through the seabed, depending on sediment type and compaction. However, vibration energy attenuates rapidly and is not expected to extend beyond the harbour limits or interact significantly with mobile marine fauna.

Overall, noise and vibration represent limited but detectable pathways for potential short-term behavioural disturbance to marine mammals using or passing through Cork Harbour and adjacent coastal waters.

[4.1.3] Receptors

Behavioural responses of marine mammals to underwater noise vary by species, context, and received sound level.

Some marine mammals may exhibit short-term avoidance or displacement from active SI works areas.

Behavioural reactions are typically temporary and reversible, not indicative of injury but representative of short-term disturbance.

[4.2] Siltation and Turbidity

[4.2.1] Source

SI works can result in sediment influx into adjacent areas, which can have various negative environmental effects. This is particularly concerning when rivers, streams or marine habitats are the potential receptors of sediment run-off influxes. Although sedimentation is a natural process that forms a key component of nutrient transfer between terrestrial and marine habitats, excessive sedimentation can result in is the alteration of water quality, as sediment can reduce water clarity, affect water quality through nutrient influx, disrupt algal growth, and result in the deterioration of habitats for marine mammals, fish and other marine fauna.

The benthic ecology and geotechnical surveys will result in disturbance to the seabed, which will cause an increase in suspended sediment concentrations resulting in an increase in turbidity in the water column. Drill cuttings have the potential to carry contaminants if left in situ.

[4.2.2] Pathway

Once suspended, fine sediments are dispersed through the water column and may alter water clarity, light penetration, and localised sediment deposition patterns. These effects are typically temporary and spatially limited, but vary between the inner harbour and offshore environments:

- Within Cork Harbour, suspended material may remain in the water column until flushed during subsequent tidal exchange due to the confined basin morphology.

Sediment deposition may locally modify seabed characteristics where finer particles settle over coarser substrates. Such effects are typically transient in high-energy environments like the western Irish Sea.

[4.2.3] Receptor

Suspended sediments and elevated turbidity do not pose a direct physiological risk to marine mammals, but may temporarily affect foraging efficiency by:

- Reducing prey visibility for echolocating species such as harbour porpoise and common dolphin.
- Altering benthic prey availability due to short-term sediment deposition or displacement of benthic invertebrates; and
- Modifying fish distribution in response to turbidity gradients, influencing prey density.

In Cork Harbour, where suspended sediment is dominated by fine sands and silts, turbidity effects are expected to be short-term (<1–2 tidal cycles) and confined to the immediate SI works footprint.

[4.2.4] Summary

Overall, siltation and turbidity effects represent a temporary and localised pathway by which drilling activities could indirectly influence marine mammals through short-lived alterations in prey availability or foraging visibility. These effects are not expected to result in physical harm or displacement beyond the immediate works areas.

[4.3] Hydrocarbon or Contaminant Spills

[4.3.1] Source

Vessels and equipment involved in the proposed surveys have the potential for pollution from spills or leaks of fuel and oil. There will be no use of surrounding waters for mechanical cooling, lubrication or similar, and there will be no discharge from the vessels.

Potential accidental releases of hydrocarbons or other chemical contaminants during SI works represent a possible source of environmental degradation.
Such releases may occur from:

- **Minor spills** during fuel storage or transfer,
- **Machinery leaks** or handling of hydraulic oils and lubricants, or

- **Surface residues** from vessel operations.

In addition, the disturbance of sediment-bound contaminants (e.g., trace metals or legacy hydrocarbons) may reintroduce pollutants that were previously deposited in the seabed. These substances can become temporarily bioavailable in the water column during resuspension events.

[4.3.2] Pathway

Contaminants can enter the marine environment via:

- **Surface Vessels** and localised residues reducing water quality, altering surface tension, and affecting gas exchange at the water–air interface.
- **Suspension of fine sediments** containing bound trace metals (e.g., copper, lead, zinc, mercury), which may increase contaminant mobility.
- **Weathering and dispersion processes** (e.g., evaporation, emulsification, dilution), which determine contaminant persistence; and
- **Trophic transfer**, where bioavailable contaminants are taken up by plankton, filter feeders, or benthic invertebrates.

The risk of hydrocarbon release is inherently limited due to the use of modern SI works plant, adherence to MARPOL Annex I and V protocols, and strict refuelling and waste handling procedures. The SI works involve borehole drilling and grab sampling that covers small areas of the seabed. It is not anticipated that large amounts of potential contaminants will be reintroduced into the water column given the small-scale nature of the works.

[4.3.3] Receptor

Marine mammals and otters are indirectly sensitive to hydrocarbon and contaminant inputs through effects on prey abundance and water quality.

- Acute toxic effects from small-scale spills are unlikely due to rapid containment and natural attenuation.
- Chronic or sub-lethal impacts could theoretically occur if contaminants enter the food web; however, the limited scale and duration of SI works substantially reduce exposure risk.
- Annex IV species may only be indirectly affected through short-term reductions in prey quality or availability.

[4.3.4] Summary

Hydrocarbon or contaminant pathways are considered low risk due to the robust operational controls, and the short-term, intermittent nature of site investigation activities. Contaminant mobilisation is not expected, but if it does occur, will likely be localised and transient, with no measurable risk of physiological harm or population-level effects on Annex IV species.

[5] Impact Assessment

In accordance with the Habitats Directive (European Council Directive 92/43/EEC) and the Marine Strategy Framework Directive (2008/56/EC), this section evaluates the potential for disturbance, injury, or mortality to occur to Annex IV species arising from the proposed SI works at Port of Cork, Ringaskiddy. The assessment follows a SPR approach, considering the causal mechanisms through which project activities may interact with sensitive receptors.

The principal sources of potential impact (as identified in Section 3) are:

- Sediment disturbance and turbidity resulting from drilling operations.
- Underwater noise and vibration generated by drilling equipment and support vessels.
- Accidental release of hydrocarbons or sediment-bound contaminants.

Each source is evaluated in relation to its intensity, duration, frequency, and spatial extent, together with the behavioural and ecological sensitivity of Annex IV receptors known or likely to occur in the project area (harbour porpoise, common dolphin, bottlenose dolphin, turtles, basking shark and otter). Gey seal and Harbour seal are also mentioned in this section as sensitive receptors although not Annex IV species.

Rather than defining a single fixed ZoI, the assessment considers the specific influence zone for each impact pathway, based on the nature of the stressor and local environmental conditions (e.g. sound propagation, hydrodynamic dispersion, vessel activity envelope).

This chapter identifies the potential interaction pathways and their relative likelihood of occurrence to inform subsequent evaluation of mitigation and residual risk under Article 12 compliance. No conclusions on significance are assigned at this stage; these are addressed within the mitigation and conclusion sections of the report.

[5.1] Siltation and Turbidity

Cork Harbour is an active commercial and leisure port subject to regular vessel movements, tidal exchange, and natural sediment transport associated with coastal currents along the County Cork shoreline.

During borehole drilling and grab sampling, temporary increases in turbidity and the localised suspension of fine sediments are expected to occur within the immediate area. These effects represent the primary pathway by which sediment disturbance may interact with the marine environment. Within the Harbour however, given the confined spatial extent of the SI footprint, the low-energy nature of the SI works, and the rapid tidal dispersion of suspended material, these effects are predicted to be short-lived and limited to the immediate vicinity of the works.

The wider coastal environment is already subject to natural variability in turbidity arising from tidal currents, storm events, and regular vessel traffic. The resuspended sediments from the works will rapidly disperse and settle under tidal influence.

Seabed disturbance drilling could result in a local increase in turbidity. Marine mammals often inhabit turbid environments, and many utilize acoustic techniques to communicate and navigate.

Any increases in turbidity are unlikely to affect Annex IV species. Marine mammals often inhabit turbid environments, and many utilise sophisticated sonar systems to sense the environment around them (Au et al. 2000). Pinnipeds do not produce sonar for prey detection purposes, however Newby et al. (1970) reported apparent blindness in three harbour seals on Gertrude Island, Puget Sound, Washington and found them to appear healthy suggesting their ability to forage was unaffected by blindness. McConnell et al. (1999) tracked grey seals in the North Sea and included one blind seal in their study. No significant difference in foraging behaviour was found indicating vision is not essential to pinnipeds' survival or ability to forage.

Given the limited duration of the SI works campaign, the high tidal dispersion capacity of the Celtic Sea, and the rapid settlement of suspended material, indirect effects on Annex IV species such as dolphin species (common dolphin, bottlenose dolphin), harbour porpoise, turtles and other mammals such as otters and seals are expected to be minor, temporary, and localised. Such effects may occur through short-term reductions in prey visibility or availability, but no long-term effects on prey distribution or habitat suitability for marine mammals or other protected species are anticipated once the works have ceased.

Whale species located around the mouth of Cork Harbour are highly unlikely to be impacted on the SI works via siltation/turbidity given how far they are removed from the localised small-scale works.

Therefore, the potential for siltation and turbidity to result in adverse effects on Annex IV species is assessed as **low to negligible.** On this basis a derogation licence is not deemed required in order to carry out the works.

[5.2] Hydrocarbon or Contaminant Spills

The primary potential source of hydrocarbon or contaminant release during the SI works is associated with the operation of support vessels and equipment.

These risks are typical of marine construction and maintenance activities and relate mainly to fuel transfer, hydraulic system leaks, or accidental minor spills from machinery operating within the harbour.

All vessels engaged in the works will comply with standard marine safety and environmental management procedures, including MARPOL (1973/78) and the Project Environmental Management Plan (PEMP) requirements. These controls include implementation of pollution prevention measures such as:

- Availability of spill response kits on all vessels.
- Refuelling only at designated locations under controlled conditions; and
- Immediate containment and clean-up procedures in the event of accidental release.

Given these measures, the likelihood of any significant hydrocarbon release is considered very low. Any minor spill that might occur would be localised and short-lived, with rapid natural dispersion facilitated by tidal flushing within Cork Harbour. Environmental persistence is therefore expected to be minimal.

Potential effects on Annex IV species — including harbour porpoise, common dolphin, bottlenose dolphin, turtles, otters and seals are limited to potential short-term avoidance behaviour in the immediate vicinity of a spill event. No injury, mortality, or lasting disturbance is anticipated, as affected areas would rapidly recover through natural dispersion and dilution.

Whale species located around the mouth of Cork Harbour are highly unlikely to be impacted on the SI works via hydrocarbon/contamination spills given how far they are removed from the localised small-scale works.

Therefore, the potential for hydrocarbon or contaminant release to result in adverse effects on Annex IV species is assessed as **low to negligible.**

Any interaction would be localised, temporary, and fully mitigated through the embedded pollution-prevention measures described above. On this basis a derogation licence is not deemed required to carry out these works.

[5.3] Noise and Vibration Disturbance

The operation of SI plant and support vessels within Cork Harbour will generate underwater noise and vibration, primarily from engine and propeller activity and the drilling equipment itself.

Sound produced by drilling at 145 dB re: 1 mPa@1m will not elicit a behavioural response, temporary threshold shift (TTS) or permanent threshold shift (PTS) in marine mammals within the survey area according to the behavioural response criteria proposed by Southall et al. (2007). Sound from penetration testing although higher did not exceed thresholds likely to cause a significant effect even at close range not lead to TTS. In addition, the sound produced is intermittent and generated for short durations, resulting in minimal exposure periods.

Anderwald et al. (2013) found that grey seals showed some level of avoidance to high construction vessel traffic in Ireland, but this study was in a relatively pristine environment compared to the already heavily impact Dublin Harbour. Pinnipeds may exhibit much tolerance and often haul out on man-made structures where there is considerable human activity. This exposure may lead to some chronic exposure to man-made noise, with which they tolerate. Ecological or physiological requirements may leave some marine mammals with no choice but to remain in these areas and continue to become chronically exposed to the effects of noise. In areas with repeated exposure, mammals may become habituated with a decline in avoidance responses and thus become less sensitive to noise and disturbance (Richardson et al. 1995). Reactions, when measured, have only occurred when received sound levels are well above ambient levels.

Otters are also quite sensitive to the low frequency range but less sensitive than marine mammals. They can therefore hear and are susceptible to the noise of shipping, geotechnical drilling, SBP and HESS. However, only those individuals within the water will be exposed and then only when very close to the activities. The area has low suitability for otter as it occurs offshore. Otters could potentially forage offshore but the site is considered to be of negligible value for otter. Based on these findings in relation to otter it is concluded that the proposed works will have no impact on the Annex IV species otter. The likelihood of otters or marine turtles being in the area geophysical or geotechnical surveys is extremely low. If they did occur, they could be impacted by the geophysical survey if they were very close to the sound source. The presence of small vessels and a jack-up barge and the associated noise produced, could lead to a very localised increase in vessel traffic and associated noise, but is very unlikely to have a significant impact on any Annex IV species.

The area has low suitability for bats as it occurs offshore. Bats could forage at or transit the site however no linear features which could function as significant commuting routes and/or feeding areas will be affected. Considering its offshore nature, the site is considered to be of negligible value for bats. Based on these findings in relation to bats as it is concluded that the proposed works will have no impact on the terrestrial Annex IV bat species.

Whale species located around the mouth of Cork Harbour are highly unlikely to be impacted on the SI works via noise impacts given the small-scale localised nature of the proposed survey works.

The semi-enclosed nature of Cork Harbour, combined with the deeper entrance channel, will facilitate attenuation and rapid dispersion of underwater sound. Sound propagation will also be reduced by reflections from harbour structures and shallow bathymetry. As a result, noise energy is expected to dissipate rapidly, and the risk of amplification or prolonged exposure is low. Any temporary behavioural reactions from harbour porpoise, common dolphin, bottlenose dolphin, otters or seals are therefore anticipated to be localised and short-term, limited to minor avoidance of the immediate works area.

Vibration transmitted through the seabed during SI works is expected to be highly localised. Vibration levels are unlikely to be perceptible to marine fauna beyond the active works footprint.

Noise and vibration effects will be temporary, occurring only during active surveying operations. Sound levels will revert to baseline conditions immediately after drilling/grab sampling ceases, consistent with those associated with normal harbour vessel activity.

Taking into account the low intensity, intermittent nature, and short duration of noise emissions, the potential risk of disturbance to Annex IV species from underwater noise or vibration is assessed as **low to negligible.** On this basis a derogation licence is not deemed required to carry out these works.

[5.4] Vessel Collision Risk

The risk of injury or mortality is considered extremely low as marine mammals are exposed to considerable vessel traffic on a daily basis and would be aware of their presence. The geophysical vessel is small and slow thus any animals in the area would have sufficient time to avoid any collisions and thus injury or mortality.

The risk to Annex IV marine mammals from vehicle collision is assessed as **low to negligible.**

[5.5] Summary of Potential Impacts

To reflect the differing environmental conditions and receptor sensitivities within the project footprints, potential effects on Annex IV species have been evaluated for the Cork Harbour Area.

This approach recognises that each location presents distinct SPR linkages, hydrodynamic regimes, and ecological usage patterns. Table 5-1 to **Error! Reference source not found.** summarise the potential interactions identified for each site, together with their corresponding overall risk ratings.

Table 5-1: Summary of Potential Impacts to Annex IV species and seals

Impact Source	Summary of Potential Effect and Overall Risk Rating
Siltation and Turbidity	Temporary resuspension of fine sediments within the surveying footprint. Elevated suspended solids confined to harbour basin. rapid dispersion/dilution will occur. within 1–2 tidal cycles. No direct risk to Annex IV species. **Risk: Low to Negligible.**
Underwater Noise and Vibration	Intermittent low-frequency noise from surveying plant and support vessels. Levels below auditory injury thresholds; may cause brief avoidance by dolphin species or seals within the harbour. **Risk: Low to Negligible.**

Vessel Movement and Collision Risk	The geophysical vessel is small and slow thus any animals in the area would have sufficient time to avoid any collisions and thus injury or mortality. **Risk: Low to Negligible.**
Hydrocarbon or Contaminant Spills	Small accidental release risk from refuelling or machinery leaks. Strict MARPOL and Project Environmental Management Plan (PEMP) pollution prevention controls in place. Rapid dilution under tidal flushing. **Risk: Negligible.**

[5.5.1] Cetaceans

As previously shown in this report, several cetacean species are abundant in Cork Harbour. This includes common dolphin, bottlenose dolphin and harbour porpoise within the harbour and several whale species including minke whale, fin whale and humpback whale at the mouth of the harbour.

The proposed SI activities will take place within an active working harbour and along established offshore navigation routes that already experience regular commercial vessel traffic, fishing activity, and associated underwater noise. Given the industrial nature of the harbour environment and the transient use of the wider area by cetaceans, the likelihood of these species entering the immediate SI works area operations is considered low.

Site investigations will be temporary, intermittent, and short in duration, generating low-frequency underwater noise levels that are well below auditory injury thresholds for cetaceans (Southall et al., 2019). Any behavioural responses by harbour porpoise, common dolphin, bottlenose dolphin or other cetaceans are therefore expected to be limited to short-term displacement or avoidance within the immediate footprint of vessel or drilling activity. No injury, mortality, or long-term displacement is anticipated.

No significant changes in prey availability or habitat quality are expected as a result of short-term increases in suspended sediment during drilling and grab sampling. The works footprint does not overlap with known feeding or breeding habitats for Annex IV cetacean species.

Given the limited spatial extent, controlled nature, and short duration of activity, together with the embedded environmental controls described in Section 3-1-7, it is highly unlikely that the proposed the site investigation works will result in injury, mortality, or significant disturbance to any Annex IV cetacean species.

Accordingly, the potential risk of impact to cetaceans is assessed as **negligible**. On this basis a derogation licence is not deemed required to carry out these works.

[5.5.2] Pinnipeds

Grey seal and harbour (common) seal are known to occur along the Cork coastline, where they regularly forage within nearshore waters and occasionally haul out on exposed coastal rocks or sandbanks.

Individual seals may opportunistically forage within the harbour entrance or adjacent coastal waters, particularly along tidal channels where fish may temporarily concentrate.
Such use is transient, and no regular resting or breeding behaviour has been recorded within the harbour or along the vessel routes to the disposal sites.

Seal species are tolerant of short-term environmental disturbance and are frequently recorded in estuarine and harbour environments where busy vessel activities occur.
The proposed SI operations will be temporary, localised, and of short duration.
Underwater noise generated will be low-frequency and intermittent, and is not expected to result in behavioural disturbance beyond the immediate works area.

There are no pupping, moulting, or haul-out sites within the Cork Harbour footprint. It is therefore highly unlikely that the proposed works will cause disturbance, displacement, or barrier effects to resident or breeding seal populations.

Temporary and indirect effects—such as brief, localised changes in foraging efficiency due to minor sediment disturbance—are expected to be short-term, with normal conditions re-establishing rapidly once site investigation ceases.

On this basis, it is concluded that the proposed site investigation works are unlikely to cause injury, mortality, or significant disturbance to grey or harbour seals.
No long-term alteration of foraging or haul-out behaviour is anticipated.

Accordingly, the overall potential risk of impact to pinnipeds is assessed as **low to negligible**. On this basis a derogation licence is not deemed required to carry out these works.

[5.5.3] Otter (*Lutra lutra*)

The otter (*Lutra lutra*) is listed under Annex IV of the EU Habitats Directive (92/43/EEC) and occurs along freshwater, estuarine and coastal habitats throughout County Cork.

The harbour environment at Cork is highly modified, characterised by hard quay walls, commercial berths, paved surfaces, and frequent vessel activity. These conditions provide limited opportunity for resting, foraging, or holt establishment.

Otters are wide-ranging and may occasionally transit or forage within sheltered harbour areas, particularly at night when fish or crustaceans are available. While an individual otter could potentially forage briefly along the works area, regular use of the SI footprint for breeding, resting, or holt use is considered highly unlikely. No suitable otter habitat occurs within the proposed works area.

Potential effects from the proposed SI works are limited to temporary disturbance arising from vessel movements, lighting, or underwater noise. Any otter using nearby coastal waters would be expected to avoid the immediate works area during active work and return once activity ceases. There is no direct loss or degradation of breeding or resting habitat anticipated, as none is present within or adjacent to the works footprint.

Given the absence of holts, resting areas, or core foraging habitat within the project area and the transient nature of potential otter presence, the risk of disturbance or injury to otter is considered very low.

Accordingly, the potential impact of the proposed works and offshore disposal works on otter (*Lutra lutra*) is assessed as **low to negligible**. On this basis a derogation licence is not deemed required to carry out these works.

[5.5.4] Leatherback Turtle

Geotechnical surveys can impact marine turtles through acoustic disturbance, leading to behavioural changes like avoiding critical habitats, and potential physical damage. While direct physical harm is less studied, the noise from surveys can disrupt normal behaviours such as feeding and breeding.

However, given the small, localised nature of the proposed work, and limited disturbance from the boreholes and grab sampling and lack of potential breeding habitat in the Cork Harbour area, the potential impact of the proposed works on marine turtles such as Leatherback turtles is assessed as **low to negligible**. On this basis a derogation licence is not deemed required to carry out these works.

[5.5.5] Basking shark (*Cetorhinus maximus*)

As previously shown in this report, basking shark sightings were recorded out by the mouth of Cork Harbour. Given the small-scale nature of the proposed work and the distance between the proposed site and basking shark activity, the potential impact of the proposed works on marine turtles such as Leatherback turtles is assessed as **low to negligible.** On this basis a derogation licence is not deemed required to carry out these works.

[6] Conclusion

Considering the nature, scale, and location of the proposed works and based on the findings of this Annex IV Species Risk Assessment, it is concluded that the works are not expected to result in any injury, mortality, or significant disturbance to Annex IV species.

Potential effects from the works, including short-term increases in suspended sediment, low-level underwater noise, and temporary vessel movements, will be intermittent, localised, and of low intensity. No breeding, resting, or haul-out sites for cetaceans, pinnipeds, or otter occur within, or immediately adjacent to, the works footprint.

Embedded environmental controls (Section 2.3) and standard marine operational procedures will further minimise the risk of accidental pollution, sediment release, or vessel strike.

Accordingly, the Project is not expected to cause the deliberate capture, killing, injury, or significant disturbance of any Annex IV species, nor to result in the deterioration or destruction of any breeding or resting site protected under Article 12 of the Habitats Directive. On this basis a derogation licence is not deemed required to carry out these works.

Accordingly, the project is assessed as being fully compliant with Article 12 of the Habitats Directive (92/43/EEC), with the overall residual risk to Annex IV species considered **negligible**.

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