



RISK ASSESSMENT FOR ANNEX IV SPECIES

GREATER DUBLIN DRAINAGE PROJECT

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1 INTRODUCTION

1.1 Overview

The Greater Dublin Drainage (GDD) project is the development of a new regional wastewater treatment facility and associated infrastructure to serve the population of Dublin and parts of Kildare and Meath.

The proposed scheme involves a new 14.6km orbital sewer running from Blanchardstown to a proposed new wastewater treatment plant (WwTP) in Clonshagh located to the east of Dublin Airport. From the WwTP, a further 5.4km length of outfall pipeline connects to a 6km length of marine outfall to transport the treated wastewater offshore.

Core elements of the project, indicated in **Figure 1.1** below, comprise the following:

- **1km Orbital Sewer** – Gravity Main 1 from Blanchardstown to Abbotstown Pumping Station (PS);
- **Abbotstown PS** – to be located in the grounds of the Sport Ireland Campus;
- **5.3km Orbital Sewer** – Rising Main from the PS to Dubber Odour Control Facility;
- **9.3km Orbital Sewer** – Gravity Main 2 from Dubber to WWTP;
- **500,000 PE Wastewater Treatment Plant (WwTP)** and **Sludge Hub Centre (SHC)** to be located at Clonshagh;
- **5km Land-Based Outfall Pipeline** linking the proposed Regional WwTP to the marine outfall;
- **6km Marine Outfall** pipeline to a discharge point located approx. 1km north-east of Ireland's Eye; and,
- **North Fringe Sewer (NFS) Diversion** – diversion of an existing trunk sewer to the WwTP site.

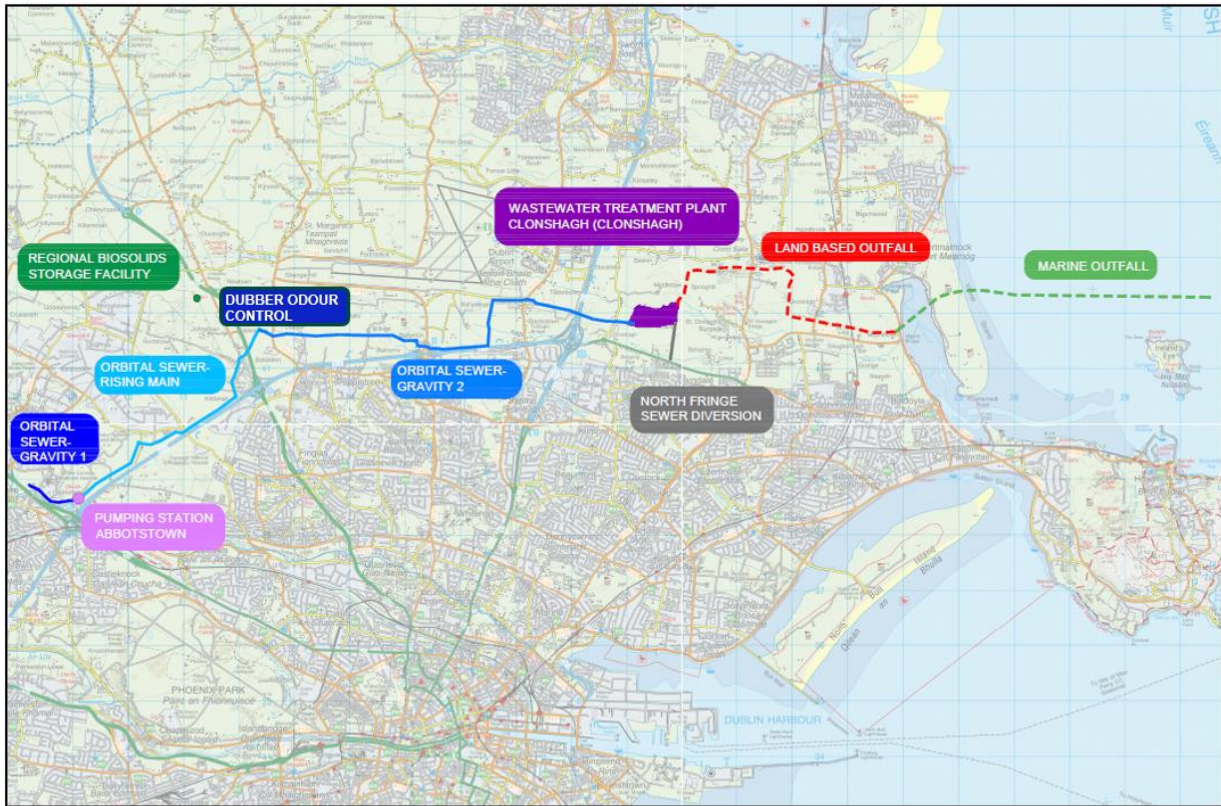


Figure 1.1 Core elements of GDD project.

Construction methods for the GDD project pipeline consist of a combination of both tunnelled and open cut for terrestrial sections of pipeline and tunnelled and dredged methods for marine based sections of pipeline.

This Maritime Usage Licence Application (MULA) is required to undertake site investigations (hereafter referred to as the SI works) within Baldoyle Bay and the Irish Sea. These SI works, which are discussed in more detail in Section 2 below, are required to inform the construction stage, the detailed engineering design of the marine elements of the GDD project and to provide baseline data for any preconstruction and monitoring assessments. Information collected by the SI works will support the overall GDD project in its aim to upgrade and provide additional wastewater infrastructure for the Greater Dublin Area.

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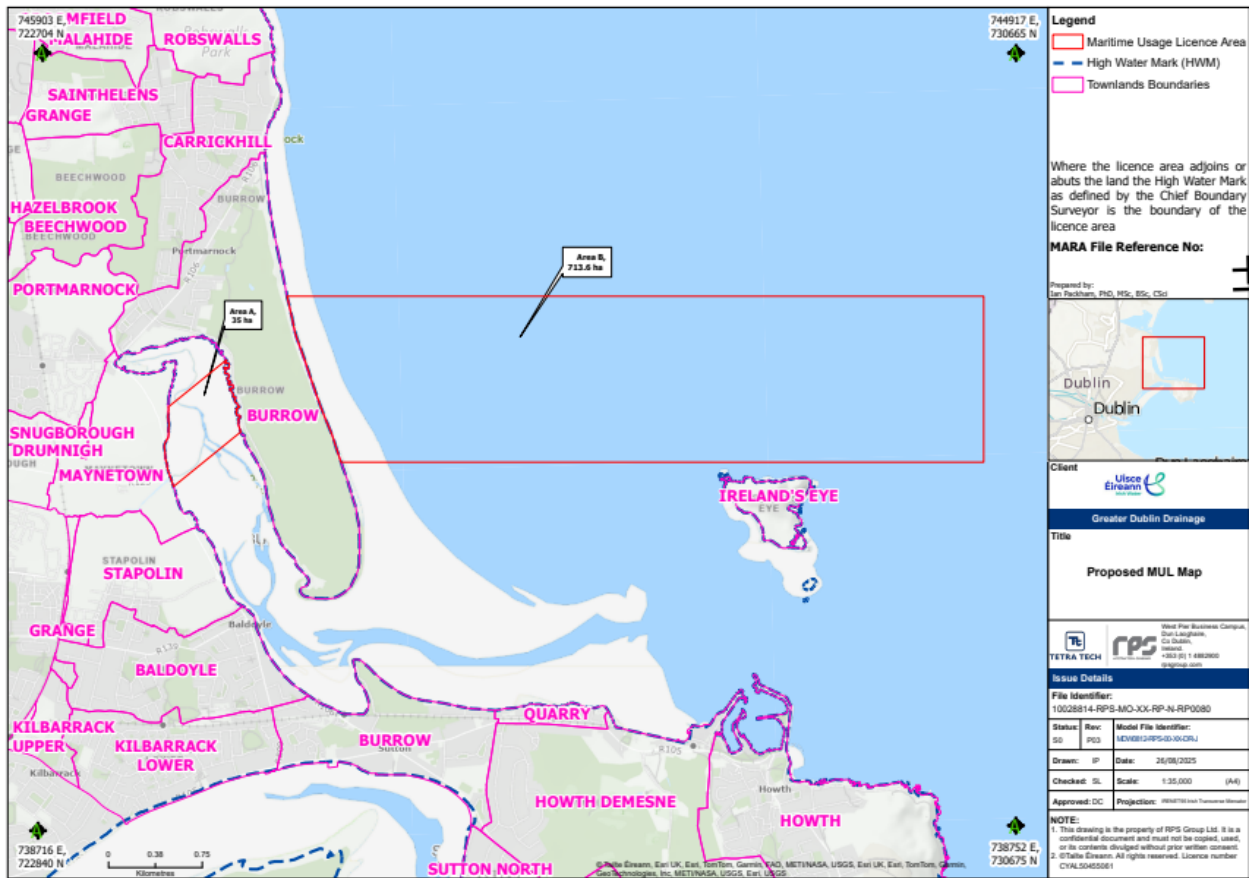


Figure 1.2 MUL Area for proposed SI works

1.2 Accompanying Report

The MULA consists of the following documents and reports:

- Maritime Usage Licence Application Form;
- Project Description including drawings;
- Assessment of Impact on the Maritime Usage (AIMU);
- Supporting Information for Screening for Appropriate Assessment (SISAA);
- Risk Assessment for Annex IV Species;
- Subsea Noise Technical Report;
- Natura Impact Statement (NIS).

In order to avoid repetition, this report makes reference to these other reports and drawings throughout.

1.3 Purpose of this Report

This report has been prepared by MMRPS, on behalf of Uisce Éireann, to provide information on the SI Works proposed to be undertaken for the GDD project in support of the MULA to MARA. This Risk Assessment for Annex IV Species report provides the required level of detail to the MARA for them to complete a risk assessment of the effects of the SI works on Annex IV species.

This report provides a brief description of the SI works, consisting of land-based (below the high-water mark) and marine geophysical, bathymetric, geotechnical and environmental surveys and investigations that are proposed to be undertaken. A more detailed description is provided in the separate 'Project Description' document (Report ref: 10028814-RPS-MO-XX-RP-N-RP0080). The Project Description includes details of the methods, equipment and quantities for proposed activities. The results of the SI works will be used to inform the construction stage, the engineering design for the proposed marine outfall pipeline and will also provide baseline data for preconstruction and monitoring assessments.

1.4 Statement of Authority

The technical competence of the authors is outlined below.

Aoife Edgely is a Principal Scientist in the Environmental Services Business Unit in RPS. She has over 13 years' experience in the marine science field and is a Chartered Environmentalist and a Full Member of the Institute of Environmental Sciences. Aoife holds an honours degree in Environmental Science from Trinity College Dublin and a Master's in Marine Environmental Protection from Bangor University, Wales. Aoife has delivered the environmental assessments for a wide range of marine and coastal projects, including environmental impact assessment, appropriate assessment and Annex IV species reports.

Rachael Shaw is a Project Scientist in the Environmental Services Business Unit in RPS. She holds a Bachelor's Degree in Marine Science from the University of Galway and Master's Degree in Climate Change and Managing the Marine Environment from Heriot-Watt University Edinburgh. She has three years' experience working in consultancy, assisting on a wide range of projects from offshore renewable energy projects to flood relief schemes, including marine and terrestrial surveys. She is a qualifying CIEEM member.

Róisín Murphy is a Graduate Scientist in the Environmental Services Business Unit in RPS. She holds an honours degree in Zoology (B.Sc.) and Master's degree in Marine Biology, both from University College Cork. She has a years' experience as a Project Manager at Cork Nature Network, responsible for

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marine and river surveys, and is currently involved in marine licensing and flood relief projects within RPS.

2 PROJECT DESCRIPTION

A detailed Project Description report, including drawings, has been included as a separate report to the MULA to reduce repetition in reports. Please refer to this document for the detail on each of the elements summarised in the text below.

The MUL Area comprises two areas, one within Baldoyle Bay (Area A) and the other (Area B) extending east from Portmarnock Beach into the Irish Sea. The total combined MUL Area encompasses an area of 748.6 ha. Area A is within Baldoyle Bay between the high-water mark (HWM) running adjacent to the R106 on the west of Baldoyle Bay and the HWM on the east of Baldoyle Bay adjacent to the Portmarnock Golf Club. This encompasses an area of 35 ha. Area B extends east into the Irish Sea from the HWM at Portmarnock Beach. This encompasses an area of 713.6ha. Drawings illustrating the MUL Area and the proposed locations of the SI works are included in Section 2 of the MULA Project Description.

The activities proposed to be carried out within the MUL Area are summarised in **Table 2-1** below.

Table 2-1 Proposed SI works Activities

Survey Type	Survey Elements (indicative equipment)	MUL Area Applicable to Survey Type	
		Baldoyle Bay	Irish Sea
Land-based Geophysical Surveys	Seismic Refraction, GPR or Electrical Resistivity Tomography (ERT)	Yes	N/A
(below HWM, undertaken at Baldoyle Bay at low tide)	Topographical land surveying techniques.	Yes	N/A
Marine Bathymetric Surveys	Multi Beam Echosounder (MBES)	Yes	Yes
(undertaken from survey vessel)	Side Scan Sonar (SSS)	Yes	Yes
	Vessel Positioning System: Ultra short baseline (UBSL)	Yes	Yes
Marine Geophysical Surveys	Ultra-High Resolution Seismic (UHRS), boomer or sparker	Yes	N/A
(undertaken from survey vessel)	Sub-bottom profiler (SBP)	Yes	N/A
	Vessel Positioning System: USBL	Yes	Yes
Marine Geomagnetic Surveys	Magnetometer	Yes	Yes
(undertaken from survey vessel, no acoustic signal)			
Marine Geotechnical Surveys	Rotary core boreholes	N/A	Yes
(undertaken from survey vessel(s) or jack-up barge; JUB)	Cone penetration testing (CPT) at borehole locations.	N/A	Yes
Land-based Geotechnical Surveys	Rotary core boreholes	Yes	N/A
(below HWM, accessed from land and undertaken using a rig)	Cone penetration testing (CPT) at intertidal borehole locations.	Yes	N/A

Survey Type	Survey Elements (indicative equipment)	MUL Area Applicable to Survey Type	
		Baldoyle Bay	Irish Sea
Marine Environmental Surveys (undertaken from survey vessel(s))	Drop-down video (DDV) and/or Remotely Operated Vehicles (ROV) survey.	N/A	Yes
	Grab sampling	N/A	Yes
	Water Quality Samples, including Conductivity, Temperature and Depth (CTD) Measurements.	N/A	Yes

The drawings prepared in support of the MULA are included in Appendix A of the Project Description document. As described in more detail in the Project Description document, the proposed locations shown in the figures and drawings are subject to refinement based on the results of the geophysical, bathymetric and environmental surveys. Similarly, the location may be moved due to the presence of obstructions/ refusals at individual locations, i.e. where a physical object, e.g. a subsurface boulder, prevents the borehole, CPT, etc., from going to its target depth. In such circumstances, the borehole location is moved to another nearby location away from the obstruction and drilled again to the target depth.

Uisce Éireann are seeking a MUL for a period of five years from the date of the granting of any licence. Although the majority of the SI works are expected to take 8 weeks to complete, bathymetric surveys may be repeated yearly to ensure that seabed conditions have not changed prior to construction.

3 RISK ASSESSMENT FOR ANNEX IV SPECIES

3.1 Legislative Context

Under Article 12 and 13 of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, as amended (the Habitats Directive). Member States must establish systems of strict protection for animal and plant species which are listed on Annex IV of the Habitats Directive. Article 16 provides for derogations from these legal protections under certain, specific, circumstances. Article 12, 13 and 16 of the Habitats Directive are transposed into Irish law by Regulations 51 - 52 and 54 - 55 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended (the Regulations).

Annex IV species are afforded strict protection throughout their range, both inside and outside of designated protected areas. It is an offence to:

- Deliberately capture or kill any specimen of these species in the wild;
- Deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration;
- Deliberately take or destroy eggs of these species in the wild;
- Damage or destroy a breeding or resting place of such an animal¹;
- Deliberately pick, collect, cut, uproot, or destroy any specimen of [plant] species in the wild; or
- Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of [animal or plant] species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Directive².

The granting of another statutory consent (e.g., planning permission; maritime usage licence) does not remove the obligation to obtain a derogation licence in the event that consented works are not expected to conform with the strict protections afforded to Annex IV species. As such, an application for derogation may have to be made to the Minister for Housing, Local Government & Heritage via the National Parks and Wildlife Service (NPWS) under Regulation 54, in addition to an application for statutory consent. If satisfied that an application meets the criteria for derogation, the Minister may grant a derogation licence, which may be subject to such conditions, restrictions, limitations, and requirements as the Minister considers appropriate, and these will be specified in the licence.

3.2 Methodology

This risk assessment for Annex IV species has been carried out in accordance with the following guidance:

- European Commission (2021) Guidance document on the strict protection of species of community interest under the Habitats Directive. C. (2021) 7301 final. Brussels.

¹ Including any action resulting in damage to, or destruction of, a breeding or resting place of an animal. Breeding or resting places are protected even when the animals are not using them.

² National Parks and Wildlife Service (2021) Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland.

- Mullen, E., Marnell, F. & Nelson, B. (2021) Strict Protection of Animal Species. National Parks and Wildlife Service Guidance Series, No. 2. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
- NPWS (2021) Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland. National Parks and Wildlife Service Guidance Series, No. 2. Department of Housing, Local Government and Heritage.
- NPWS (2025) Applications for Regulation 54 Derogations for Annex IV species. National Parks and Wildlife Service Guidance Series, Version 1.0, Department of Housing, Local Government and Heritage.

This risk assessment for Annex IV species follows the methodology structure outlined in NPWS (2021), as follows:

- Use existing information to determine the probability of the protected species being present in the area affected by the works.
- Ecological survey, if required.
- Examination of impacts and mitigation measures and satisfactory alternatives (if required).

For each of the relevant species discussed in Section 3.4, an assessment was made against each of the strict protections taking into account project details and the available evidence base for each species.

If the examination of impacts concludes that the SI works will not conform with the strict protections afforded to Annex IV species, then an application will be made for a derogation licence under Regulation 54 of the Regulations.

3.3 Relevant Annex IV Species

The SI works will be taking place across the MUL Area as shown in the drawings contained in Appendix A of the Project Description submitted as part of the MULA.

The Habitats Directive lists species of community interest 'in need of strict protection' within Annex IV. This list was reviewed and all species/species groups with the potential to occur within the MUL Area were considered further. Of the animal and plant species on Annex IV known to occur in Ireland, the following species were identified as having the potential to occur within the MUL Area of the proposed SI works:

- All bat species;
- Otter;
- All cetacean species; and
- All turtle species.

Other Annex IV species found in Ireland, namely the natterjack toad and the Kerry slug, do not occur in the marine environment and have not been recorded along the coast of the SI works MUL Area by the National Biodiversity Data Centre (NBDC)³. Therefore, these Annex IV species are not considered in this assessment.

³ [Maps - Biodiversity Maps](#), accessed July 2025

3.4 Evidence Base

3.4.1 Zone of Influence

The zone of influence of the SI works varies between species. The following zones of influence have been considered in this risk assessment:

- **Bats:** Evidence suggests that bat species follow prey into coastal waters if conditions are favourable (Limpens et al., 2017), however, it is considered highly unlikely they would make use of the proposed MUL Area for foraging due to its highly exposed nature. The zone of influence is considered to be confined to the above water noise and visual disturbance within the MUL Area.
- **Otters:** Otter (*Lutra lutra*) is a mobile species and maintain territories. In lowland rivers and fish-rich lakes otters only need to maintain small territories (up to 6 km), but along smaller river systems and in upland areas where prey may be less abundant, otter territories can stretch to 20 km (Mullen et al., 2021). Therefore, it is possible that otters may be present within the MUL Area. Otters have been observed to forage out to a maximum of 80m from the coast (NPWS, 2009), therefore a zone of influence for otters is considered to be the MUL Area and extending out to 80 m from the HWM.
- **Cetacean species:** For harbour porpoise, JNCC (2020) advises that fixed distances should be applied to assess behavioural disturbance, based on empirical evidence. For geophysical and bathymetric surveys, the JNCC's 'effective deterrence range' is 5 km. While the JNCC document focuses on harbour porpoise, this is precautionary for all other cetacean hearing groups, as harbour porpoise is considered to be the most sensitive. Therefore, a zone of influence of the entire MUL Area plus a 5 km buffer from the MUL Area boundary has been considered as appropriate for this risk assessment.
- **Turtle species:** Although sightings are rare, turtle species have the potential to occur anywhere in the MUL Area and therefore a zone of influence of the entire MUL Area has been considered in this risk assessment.

3.4.2 Desk Study

In order to assess the probability of the above species/species groups being present in the zone of influence of the SI works, a desk study was undertaken, in addition to application of professional judgement and knowledge of the geographical area.

The following sources were consulted during the desk study in July 2025:

- Irish Whale and Dolphin Group Sightings Log <https://iwdg.ie/browsers/sightings.php/>;
- Distribution records for Annex IV species held online by the NBDC <https://biodiversityireland.ie/>;
- NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished Report, National Parks and Wildlife Service. Department of Culture, Heritage and the Gaeltacht, Dublin;
- Giralt Paradell, O., Cañadas, A., Bennison, A., Todd, N., Jessopp, M., Rogan, E. (2024). Aerial surveys of cetaceans and seabirds in Irish waters: Occurrence, distribution and abundance in 2021-2023. Department of the Environment, Climate & Communications and Department of Housing, Local Government & Heritage, Ireland. 260pp;
- Bat Conservation Ireland (BCI) [bat distributions](#); and
- Ocean Research and Conservation Association (ORCA) [wildlife reports](#).

3.4.3 Bat Species

All native bat species in Ireland receive the same level of strict protection. The presence or otherwise of bats is typically relevant only to onshore activities; although bats are known to forage and migrate over water and along coastlines, but they will not interact with underwater works⁴. Interaction between bats and the proposed SI works, although unlikely, is still possible due to the potential for disturbance caused by the lighting and noise from SI works within Baldoyle Bay and along the nearshore areas within the Irish Sea. According to the NBDC (2025)⁵ there are numerous recordings of bat species along the east coast of Ireland within the 10 km grid squares that cover the coastline and adjacent waters of Dublin.

Eight of the nine regularly occurring species in Ireland occur within or close to the MUL Area, with only the lesser horseshoe bat *Rhinolophus hipposideros* (restricted to the western Atlantic seaboard) not occurring. Evidence suggests that bat species follow prey into coastal waters if conditions are favourable (Limpens et al., 2017). There is potential for bat species to utilise the MUL Area within Baldoyle Bay for foraging or commuting, however none have been recorded within Baldoyle Bay. Several recordings have been noted to the northwest of Portmarnock town along the River Sluice with one recorded to the south of the Baldoyle Bay at Sutton⁶. It is considered highly unlikely bat species would make use of the proposed MUL Area within the Irish Sea for foraging due to its highly exposed nature. No bats were recorded within MUL Area B at Portmarnock Beach⁶.

3.4.4 Otter

Otter occurs throughout Ireland, with populations found along rivers, lakes, riverine (streams up to major river systems), marshland, estuaries and along the coastline (NPWS, 2019) where fish and other prey are abundant, and where the bank-side habitat offers plenty of cover. Otter is an opportunistic predator with a broad and varied diet and has diverse habitat preferences. Otter is a mobile species and maintains territories. In lowland rivers and fish-rich lakes otter only needs to maintain small territories (up to 6 km), but along smaller river systems and in upland areas where prey may be less abundant, otter territories can stretch to 20 km (Mullen et al., 2021). Coastal territories tend to be between 3 km to 4 km along the coastline where freshwater is available to clean their fur after exposure to saltwater (Chanin, 2003). In general, otter exploits a narrow strip of habitat, about 10 m wide at the aquatic-terrestrial interface (Mullen et al., 2021), however, otter has been observed to forage out to a maximum of 80 m from the coast (NPWS, 2009).

Records from NBDC (2025)⁷ indicate that otters have been rarely sighted in the areas adjacent to the MUL Area within the last 10 years. These records show that otter sightings (two live animal sighting and one dead animal) have been recorded in 2017 to the south of Baldoyle Bay and in 2022 at Portmarnock. It is therefore reasonable to conclude that otters, although rare, may be present within the adjacent areas of the MUL Area. No otter holts or couches were identified within or close to the MUL Areas by the desk study.

Impacts to otters can occur as a result of permanent loss of breeding or resting sites, habitat loss, disturbance/displacement and injury or mortality. The main threats to otter include pollution, particularly organic pollution resulting in fish kills; and accidental deaths, e.g., road traffic and fishing gear (NPWS,

⁴ [Bat Conservation Ireland | Protecting Bats and Bat Habitats](#) accessed July 2025

⁵ [Maps – Biodiversity Maps - Bat](#) accessed July 2025

⁶ [Maps - Biodiversity Maps- National Bat Database of Ireland](#) accessed July 2025

⁷ [Maps - Biodiversity Maps - Otter](#) accessed July 2025

2019). The most recent Article 17 conservation assessment for otters in Ireland deemed the species as being in favourable conservation status (NPWS, 2019).

3.4.5 Cetacean Species

Twenty-five species of cetacean have been recorded in the waters around Ireland. The Irish Whale and Dolphin Group (IWDG) holds 200 records of cetacean sightings in the Irish Sea for the period of July 2024 to 2025.⁸ IWDG data show that the waters around the MUL Area are used by a wide range of cetacean species.

Species recorded were:

- Harbour porpoise (*Phocoena phocoena*)
- Common dolphin (*Delphinus delphis*)
- Bottlenose dolphin (*Tursiops truncatus*)
- Minke whale (*Balaenoptera acutorostrata*)

No other cetacean species were recorded in the Irish Sea by IWDG between July 2024 and July 2025.

There have been no live sightings of marine mammals recorded further inland than the mouth of Baldoyle estuary⁹.

Phase II of the Irish ObSERVE programme (2021-2023) was conducted to investigate the occurrence, distribution and abundance of key marine species in Ireland's offshore and coastal regions. These aerial surveys included four offshore areas and coastal waters. The MUL Area is within the coastal survey stratum 5 (Irish Sea). Common dolphin was the most sighted cetacean species across all survey seasons but were infrequently recorded in the Irish Sea as they showed a preference for continental shelf waters (Giralt Paradell et al., 2024). Bottlenose dolphin was recorded throughout the survey area with a preference for the continental shelf waters to the south and west of Ireland and only sporadically observed in the Irish Sea, however, distribution maps noted the Irish Sea as an area of importance despite the lower sightings recorded (Giralt Paradell et al., 2024). Harbour porpoise was the most frequently sighted species throughout the Phase II ObSERVE survey programme, and was primarily observed in the Irish Sea, with most sightings being of individuals. The predicted distribution of harbour porpoise in summer highlighted the northern section of stratum 5 as an area of importance while lower densities are expected throughout winter in the Irish Sea (Giralt Paradell et al., 2024). Minke whale was the most common sighted mysticete species during the Phase II ObSERVE surveys. Minke whales are a neritic species, typically favouring continental shelf waters with a potentially southward redistribution in Irish waters (Giralt Paradell et al., 2024).

Management Unit (MU) boundaries, defined by the IAMMWG (2015, 2022), refer to geographical areas in which the animals of a particular cetacean species are found, to which management of human activities is applied. These geographical areas are delineated based on the best scientific knowledge of the population structure of the species while taking into account jurisdictional boundaries or divisions which are already used for managing human activities (IAMMWG, 2023).

⁸ [Irish Whale and Dolphin Group](#) cetacean sightings July 2024 to July 2025. Accessed July 2025.

⁹ [Biodiversity Maps Baldoyle Bay marine mammal records](#) accessed July 2025

The following sections provide more detail on the most commonly recorded cetacean species within and around the MUL Area.

3.4.5.1 Harbour Porpoise

Harbour porpoise is widespread around the Irish coast (Wall et al., 2013). The Celtic and Irish Seas (CIS) MU is recognised for the management of harbour porpoise in the Celtic and Irish Seas (IAMMWG, 2022). Abundance of harbour porpoise in the CIS MU is estimated at 62,517 animals (IAMMWG, 2022).

According to Giralt Paradell et al. (2024), mean group sizes of harbour porpoise were notably higher during winter and the greatest abundance and density estimates were for the Irish Sea (stratum 5) for all seasons. A number of harbour porpoise calves were recorded during the Phase II survey, with a majority of sightings (4 out of 7) within the Irish Sea. According to (Giralt Paradell et al., 2024), the data recorded from stratum 5 (Irish Sea) during the summer 2021 and 2022 survey suggests that harbour porpoise occurs along the east coast of Ireland in densities of between 0.150 to 0.968 animals per km², in winter 2022 in stratum 5 harbour porpoise occurred in densities of 0.413 animals per km². A report by O'Brien and Berrow (2016) for the NPWS in the Irish Seas estimated a harbour porpoise density of 1.55±0.17 per km² within Rockabill to Dalkey Island SAC and a population of 424±46 individuals overall, with 95% CI of 335-536.

Potential threats to harbour porpoise include underwater noise, entanglement in fishing gear, shipping traffic, and coastal development including ORE and other forms of human disturbance (ORCA, 2025a). The most recent Article 17 conservation assessment for harbour porpoise in Ireland deemed the species as being in favourable conservation status (NPWS, 2019).

3.4.5.2 Common dolphin

Common dolphin is present all year round in Irish waters and is the most frequently observed and stranded species particularly along the west and south coast of Ireland (IWDG, 2025). Common dolphins have been assigned to a single MU, the Celtic & Greater North Seas MU (IAMMWG, 2022). Densities appear to be highest during autumn and summer off the south and southwest coasts, with high densities in the spring and autumn in the south of the Irish Sea (NBDC, 2025a). According to Giralt Paradell et al. (2024), common dolphins showed interannual variability with more sightings during the summer of 2021 than in 2022, mean group sizes were also larger in the summer (7.2) compared to winter (6.7). High densities of common dolphin were found off the south and southwest of Ireland, displaying a preference for continental shelf waters. The species is more rarely sighted in the Irish Sea (Giralt Paradell et al., 2024). According to (Giralt Paradell et al., 2024), the data recorded from stratum 5 (Irish Sea) during the summer 2022 and winter 2022 survey suggests that common dolphin occurs along the east coast of Ireland in densities of between 0.020 to 0.066 animals per km², no common dolphins were recorded in summer 2021.

Common dolphins face threats such as underwater noise, interactions with fisheries through bycatch, ship strikes, chemical and plastic pollution (ORCA, 2025b). The most recent Article 17 conservation assessment for common dolphin in Ireland deemed the species as being in favourable conservation status (NPWS, 2019).

3.4.5.3 Bottlenose dolphin

Bottlenose dolphin is found in both inshore and offshore waters and has been recorded all around the Irish coast. This species can also be found in much deeper waters off the continental shelf (NBDC,

2025b). Three distinct populations have been identified in Irish waters including an offshore group, a coastal transient group and a smaller resident population in the Shannon Estuary, Co. Clare. None of these groups are located within the Irish Sea and according to Giralt Paradell et al. (2024), bottlenose dolphins were very infrequently and sporadically recorded in the Irish Sea during the surveys. Bottlenose dolphin were only recorded during the summer 2022 surveys in stratum 5 where they occurred in densities of 0.111 animals per km² (Giralt Paradell et al., 2024). Bottlenose dolphins have been assigned to the Offshore Channel and Southwest England and Irish Sea MU (IAMMWG, 2022).

Bottlenose dolphins are exposed to several threats as they utilise coastal areas. These threats include underwater noise, interactions with fishing gear, habitat destruction and degradation (ORCA, 2025c). The most recent Article 17 conservation assessment for bottlenose dolphin in Ireland deemed the species as being in favourable conservation status (NPWS, 2019).

3.4.5.4 Minke whale

Minke whale is the most abundant of all baleen whales in Irish waters and can be seen throughout the year along the entire Irish coastline although most sightings are recorded from the south and west coasts between May and October. According to Giralt Paradell et al., (2024), minke whales were the most frequently sighted baleen whale, however, most sightings were in continental shelf waters of <200m depth, with a higher abundance during the summer. According to Giralt Paradell et al., (2024), the data recorded from stratum 5 (Irish Sea) during the summer 2021 and 2022 survey suggests that minke whale occurs along the east coast of Ireland in densities of 0.018 animals per km², no minke whales were recorded in winter 2022. Density distribution map highlights higher densities of minke whales along the south coast of Ireland, particularly in West Cork waters (Giralt Paradell et al., 2024). Minke whale have been assigned to the Celtic & Greater North Seas MU (IAMMWG, 2022). The most recent Article 17 conservation assessment for minke whale in Ireland deemed the species as being in favourable conservation status (NPWS, 2019).

3.4.6 Turtle Species

Four Annex IV species of turtle are known to occur in Ireland: leatherback turtle (*Dermochelys coriacea*), Kemp's Ridley turtle (*Lepidochelys kempii*), loggerhead turtle (*Caretta caretta*) and hawksbill turtle (*Eretmochelys imbricata*). Of these species, leatherback and loggerhead turtle have been recorded along the east coast of Ireland¹⁰. Between 2015 and 2025, 63 observations of leatherback turtle were recorded in Irish waters¹¹. There were six leatherback turtle sightings recorded along the east coast between 2015 and 2025, with one of these recorded to the south of the MUL Area at the mouth of the Baldoyle Bay in 2024. Leatherbacks are known to have an 'atypical migration pattern', as while they must return to tropical waters to breed and reach preferred nesting grounds, they are known to spend the summer months in productive temperate waters, like Ireland's, feeding on jellyfish and sea squirts (Doyle, 2007). Loggerhead turtle was most recently recorded along the east coast of Ireland was in 2021 where one animal was found stranded at Rush Beach in Co. Dublin. There is a single recording of a Hawksbill Turtle in Irish waters, in Cork Harbour in 1983.¹² The most recent sighting of Kemp's Ridley turtle in Ireland was

¹⁰ [Maps - Biodiversity Maps - Loggerhead and Leatherback Turtle](#) accessed July 2025

¹¹ [Maps - Biodiversity Maps - Leatherback Turtle](#) accessed July 2025

¹² [Maps - Biodiversity Maps- Hawksbill Turtle](#) accessed July 2025

in 2016 where the animal washed up stranded on Tramore beach in Co. Waterford¹³. The most recent Article 17 conservation assessment for the status of turtle species in Ireland only assessed leatherback turtle, deeming the species as being in favourable conservation status. No other turtle species were assessed (NPWS, 2019).

It can, therefore, be concluded that sightings of turtles within the MUL Area are possible but rare, with leatherback and loggerhead turtles being the most common species.

3.5 Examination of Impacts to Strict Protections

3.5.1 Bat Species

Based on the available evidence, the proposed SI works will not result in any direct or indirect impacts on any structure or feature which could be used by roosting bats. Therefore, there is no likelihood of the SI works resulting in any bats being captured or killed and disturbed during periods of breeding, rearing or hibernation. No breeding site or resting place of such animals will be damaged or destroyed during the SI works. Works within Baldoyle Bay will be carried out during daylight hours only and will be subject to tidal conditions. Any artificial lighting, if used, will be localised to either the vessel (or JUB) at the borehole location within Baldoyle Bay. Therefore, there is no likelihood of any significant disturbance or displacement of foraging, commuting, or migrating bats.

The proposed SI works conform with the strict protection afforded to bats under Article 12 of the Habitats Directive, and therefore, it is considered that no derogation is required.

3.5.2 Otter

Based on the available evidence gathered in the desk study, it is possible that otters may be present within Baldoyle Bay and the nearshore (<80 m) in the Irish Sea during the SI works. The land-based geophysical surveys within Baldoyle Bay will involve a small team of surveyors walking along the estuarine/intertidal zone using non-intrusive hand-held equipment or minimally intrusive equipment such as seismic refraction, GPR and Electrical Resistivity Tomography (ERT) equipment. The boat based bathymetric/geophysical surveys will involve a small nearshore vessel within Baldoyle Bay utilising non-intrusive techniques. For most survey types, no above-water noise, vibration or light will be emitted beyond baseline levels (MUL Area A is adjacent to a golf course to the east or a busy road at Portmarnock to the west). SI works within Baldoyle Bay with the potential to emit above-water noise and vibration beyond baseline levels are geotechnical sampling (boreholes). Otters are typically most active at night, although coastal dwelling individuals are generally more active during the day¹⁴. However, no sightings have been recorded within Baldoyle Bay as discussed in Section 3.4.4.

It is considered highly unlikely that intrusive sampling works will interact with otter holts or couches as these are not likely to be in the intertidal zone/on beaches where intrusive sampling will take place.

As otter tend to forage within 80 m of the shoreline (NPWS, 2009), any potential effects are likely to be associated with survey activity within Baldoyle Bay or at the nearshore area within the Irish Sea, rather than activity further offshore, however, there is, in theory, potential for interaction between foraging otters and underwater noise generated during the Irish Sea surveys. For otters foraging in the marine

¹³ [Maps - Biodiversity Maps - Kemp's Ridley Turtle](#) accessed August 2025

¹⁴ [Otter – A guide to Irelands protected habitats & species](#) accessed August 2025

environment, this has the potential to result in injury and/or disturbance. While there are no published underwater noise injury criteria for Eurasian otter, Southall et al. (2019) has provided injury criteria for the 'Other marine carnivores in water (OCW)' hearing group, which includes sea otters. The OCW criteria is extended to Eurasian otter in the current assessment in the absence of more suitable criteria. The underwater noise assessment, presented in the accompanying Subsea Noise Technical Report, undertaken to inform this Annex IV Risk Assessment has concluded the following with respect to injury and/or disturbance to OCW.

3.5.2.1 Baldoyle Bay Surveys

To assess the impacts of the geophysical and bathymetric surveys within Baldoyle Bay each scenario assumed that the vessel, SSS, MBES and USBL sources were active, with only the SBP and UHRS (sparker or boomer) active or not active between the scenarios modelled. In the absence of mitigation, geophysical and bathymetric sound sources have the potential to cause auditory injury to OCW within <10m of the sound source and temporary threshold shift (TTS) within 100 m (when SBP and UHRS are active).

It is anticipated that within Baldoyle Bay, boreholes will be taken from a land-based drilling rig during low tide, however, as a precautionary measure, underwater noise from borehole drilling within the Bay has also been assessed. To assess the impacts of the geotechnical surveys within Baldoyle Bay, the scenario assumed a rotary and/or sonic drilling rig and use of a small vessel up to 25m in length. In the absence of mitigation, geotechnical sound sources have the potential to cause auditory injury to OCW within <10 m of the sound source and TTS within 40 m.

Ranges for behavioural disturbance for both survey scenarios in Baldoyle Bay are 1.2 km. These ranges are limited by the underwater line-of-sight within Baldoyle Bay.

In summary, the proposed SI works within Baldoyle Bay will be conducted during daylight hours, when otters are not typically active, although coastal dwelling species may be active. However, as stated in Section 3.4.4, given the lack of sightings and the small risk ranges for auditory injury (<10 m) and TTS (within 100 m), and the likelihood that the presence of the vessel will act as a visual deterrent, it is considered that there will be no killing or displacement of breeding, resting or commuting otters due to the proposed SI works in Baldoyle Bay.

3.5.2.2 Irish Sea Surveys

To assess the impacts of the bathymetric surveys within the Irish Sea, the scenario assumed that the vessel, SSS, MBES and USBL sources were active (with no SBP or UHRS in use). In the absence of mitigation, bathymetric sound sources have the potential to cause auditory injury to OCW within <10m of the sound source and TTS within 250 m.

To assess the impacts of the geotechnical surveys within the Irish Sea, the scenario assumed a difference in vessel size i.e., small or large vessel (<25 m and < 85 m respectively). In the absence of mitigation, geotechnical sound sources have the potential to cause auditory injury to OCW within <10 m of the sound source and TTS within 600 m (large survey vessel <85m, i.e. worst case scenario).

Ranges for behavioural disturbance for all survey scenarios in the Irish Sea are >20 km, however, it should be noted that this has not been weighted for hearing groups. Depending on the presence of other vessels in the area and the habituation of the animals, the actual ranges for disturbance are likely to be significantly smaller. It is also expected that the physical presence of the vessel will cause otter to avoid the area.

In summary, as stated above, otters typically forage within 80 m of the shore. The closest SI location within the Irish Sea is a borehole location 80 m from shore at Portmarnock beach. For the geotechnical SI works, TTS risk ranges can be within 600 m, however, this is for the larger vessel within the Irish Sea which would typically be used further offshore. The presence of the vessel is likely to act as a visual deterrent to any otters foraging within the intertidal zone. Given the lack of otter sightings within MUL Area B, that no otter couches or holts would be located on beaches, there will be no killing or displacement of breeding, resting or commuting otters due to the proposed SI works.

The proposed SI works conform with the strict protection afforded to otters under Article 12 of the Habitats Directive.

3.5.3 Cetacean Species

With respect to cetaceans, the following potential routes to impacts to Strict Protections are associated with the SI works:

- Underwater noise generated during the geophysical, bathymetric and geotechnical surveys resulting in injury and/or disturbance; and
- Collision risk with survey vessels.

3.5.3.1 Underwater Noise

An underwater (subsea) noise assessment was carried out using indicative noise sources for the marine SI works. The assessment and results are presented in the accompanying Subsea Noise Technical Report (ref: 10028814-RPS-MO-XX-RP-E-RP0085).

When assessing the potential impact of underwater noise sources on the marine environment a range of variables such as source level, frequency, duration, and directivity were considered. Increasing the distance from the sound source usually results in attenuation with distance. The factors that affect the way noise propagates underwater include: water column depth, pressure, temperature gradients, salinity, as well as water surface and seabed type and thickness. When sound encounters the seabed the amount of noise/sound reflected back depends on the composition of the seabed, i.e., mud or other soft sediment will reflect less than rock. The SI works area and nearby surroundings are characterised by water depths of 0-25 m with a relatively gentle increase in depth with distance from the shore. The sediment properties are varied, from fine and intertidal within Baldoyle Bay to coarser sediment (sand to gravel) within the Irish Sea.

The active acoustic instruments, such as those proposed for this survey, operate by emitting extremely short pulses and are highly directional with narrow beams (Ruppell et al., 2022). While the swathe of the sonars and echosounders will have a maximum range of 6 to 60 m in diameter, many of the sources used for this survey, such as multibeam, side-scan sonar, sub-bottom profilers (SBP), Ultra Short Base-Line positioning system (USBL), chirper/pinger, sparker and boomer operate at high frequency and attenuate quickly as they spread from the source. Coupled with the narrow beam angle and short duty cycles ('on' for microseconds or milliseconds per second) means that surveying sonars have relatively low acoustic impact.

3.5.3.1.1 Assessment Methodology

The DAHG "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters" 2014 (Department of Arts, Heritage and the Gaeltacht, 2014) contains the following statement:

“It is therefore considered that anthropogenic sound sources with the potential to induce Temporary Threshold Shift (TTS) in a receiving marine mammal contain the potential for both (a) disturbance, and (b) injury to the animal.”

This states that TTS constitutes an injury and should thus be the main assessment criteria¹⁵. However, the guidance goes on to specify the use of thresholds from a 2007 publication (Southall et al., 2007) which has since been superseded (Southall, et al., 2019; National Oceanic and Atmospheric Administration, 2024) and no longer represents best available science, nor reflects best practice internationally. Thus, the following excerpt from the guidance is relevant:

“The document will be subject to periodic review to allow its efficacy to be reassessed, to consider new scientific findings and incorporate further developments in best practice.”

As there has been no such update to date, but the guidance clearly states its intention to consider new scientific findings, we have applied the latest guidance (NMFS,2024) reflecting the current best available method for assessing impact from noise on marine mammals. This means that it is auditory injury “AUD INJ” (previously “PTS”) that is the criteria for injury, not “TTS”.

Auditory injury in cetaceans can be defined as AUD INJ leading to non-reversible auditory injury, or as a TTS in hearing sensitivity, which can have negative effects on the ability to use natural sounds (e.g., to communicate, navigate, locate prey) for a period of minutes, hours, or days. With increasing distance from the sound source, where it is audible to the animal, the effect is expected to diminish through identifiable stages (i.e., AUD INJ or TTS in hearing, avoidance, masking, reduced vocalisation) to a point where no significant response occurs. Factors such as local propagation and individual hearing ability can influence the actual effect (DAHG, 2014).

A summary of the equipment likely to be used in the SI Works is presented in Table 4.1 of the accompanying Subsea Noise Technical Report.

Should the noise levels from sources provided in the accompanying Subsea Noise Technical Report exceed the thresholds (**Table 3-2**), there is the potential for underwater noise generated during the geophysical and bathymetric surveys to result in injury and/or disturbance to Annex IV marine mammal species in the vicinity of the SI works.

Marine mammal species can be split into functional hearing groupings, according to their frequency-specific hearing sensitivity (Southall et al., 2019). Minke, fin and humpback whales are considered low frequency cetaceans (LF), common, bottlenose and Risso’s dolphin are considered high frequency cetaceans (HF), harbour porpoise a very high frequency cetacean (VHF) and otters are included as Other Marine Carnivores in Water (OCW). See **Table 3-1** below for a list of species contained within each functional hearing group.

¹⁵ Injury being the qualifying limit in the Irish Wildlife Act 1976, section 23, 5c : <https://www.irishstatutebook.ie/eli/1976/act/39/enacted/en/print#sec23>

Table 3-1 Functional Marine Mammal Hearing Groups for Marine Mammal Species

Southall <i>et al.</i> (2019) Hearing Group Name	Species Included in Group
Low-frequency cetaceans (LF)	Baleen whales (minke, fin and humpback whale).
High-frequency cetaceans (HF)	Most toothed whales and dolphins (bottlenose, common and Risso's dolphin, killer, and pilot whales).
Very high-frequency cetaceans (VHF)	Certain toothed whales and porpoises (harbour porpoise).
Other marine carnivores in water (OCW)	Includes sea lions, walrus, otters.
Phocid carnivores in water (PCW)	Earless seals (including harbour and grey seal).

Both the criteria for impulsive and non-impulsive sound are relevant given the nature of the sound sources used during the SI Works. The relevant AUD INJ and TTS criteria proposed by NMFS (2024) are summarised in **Table 3-2** which addresses peak pressure levels (L_p) and sound exposure levels (SEL).

Table 3-2 AUD INJ and TTS thresholds (NMFS, 2024)

Hearing Group	Parameter	Impulsive [dB]		Non-impulsive [dB]	
		AUD INJ	TTS	AUD INJ	TTS
Low frequency (LF) cetaceans	L_{pk} , (unweighted)	222	216	-	-
	SEL, (weighted)	183	168	197	177
High frequency (HF) cetaceans	L_{pk} , (unweighted)	230	224	-	-
	SEL, (weighted)	193	178	201	181
Very high frequency (VHF) cetaceans	L_{pk} , (unweighted)	202	196	-	-
	SEL, (weighted)	159	144	181	161
Phocid carnivores in water (PCW)	L_{pk} , (unweighted)	223	217	-	-
	SEL, (weighted)	183	168	195	175
Other marine carnivores in water (OCW)	L_{pk} , (unweighted)	230	224	-	-
	SEL, (weighted)	185	170	199	179
Sirenians (SI)	L_{pk} , (unweighted)	225	219	-	-
	SEL, (weighted)	186	171	186	180

3.5.3.1.2 Baldoye Bay Survey

The following presents the results of an underwater noise assessment of the proposed SI works within Baldoye Bay (MUL Area A). It should be noted, however, that it is extremely unlikely that cetacean species will be present within Baldoye Bay due to geographical constraints (shallow, tidal environment and the protection of the estuarine bay by a sand dune system at the mouth). The following therefore represents a highly precautionary assessment.

To assess the impacts of the geophysical and bathymetric surveys within Baldoye Bay each scenario assumed that the vessel, SSS, MBES and USBL sources were active, with only the SBP and UHRS (sparker or boomer) active or not active between the scenarios modelled. It is anticipated that within

Baldoyle Bay, boreholes will be taken from a land-based drilling rig during low tide, however, as a precautionary measure, underwater noise from borehole drilling within the Bay has also been assessed. To assess the impacts of the geotechnical surveys within Baldoyle Bay, the scenario assumed a rotary and/or sonic drilling rig and use of a small vessel up to 25m in length. The results have been summarised below to present the 'worst-case scenario', and it should be noted that no mitigation (i.e. soft-start measures, or marine mammal observers) has been applied at this stage.

Bathymetric Surveys not including SBP and UHRS, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury could occur within <10 m of the sound source, and TTS could occur within 40 m.
- HF group (bottlenose/common dolphin), auditory injury could occur within <10 m of the sound source, and TTS could occur within 60 m.
- VHF group (harbour porpoise), auditory injury could occur within 50 m of the sound source, while TTS could occur within 1.1 km.
- For all cetaceans, behavioural disturbance could occur out to 1.2 km when applying the criterion strictly (unweighted for hearing groups).

Geophysical Surveys including SBP and UHRS, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury could occur within <10 m of the sound source, and TTS could occur within 120 m.
- HF group (bottlenose/common dolphin), auditory injury could occur within <10 m of the sound source, and TTS could occur within 190 m.
- VHF group (harbour porpoise), auditory injury could occur within 270 m of the sound source, while TTS could occur within 1.1 km.
- For all marine mammals, behavioural disturbance could occur out to 1.3 km when applying the criterion strictly (unweighted for hearing groups).

Geotechnical Survey, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury could occur within <10 m of the sound source, and TTS could occur within 160 m.
- HF group (bottlenose/common dolphin), auditory injury could occur within <10 m of the sound source, and TTS could occur within 24 m.
- VHF group (harbour porpoise), auditory injury could occur less than 10 m of the sound source, while TTS could occur within 600 m.
- For all marine mammals, behavioural disturbance could occur out to 1.2 km when applying the criterion strictly (unweighted for hearing groups).

In summary, the worst-case assessment concludes that there is a potential risk of inducing auditory injury (AUD INJ) within 270 m to the VHF group (i.e. harbour porpoise) during the geophysical surveys including SBP and UHRS in Baldoyle Bay. The risk range for inducing auditory injury is <10 m from the sound source for all other hearing groups. The same geophysical surveys have the potential to cause TTS within 1.1 km for VHF group while this is below 190 m for all other hearing groups. This is mainly the result of activities being assumed to continue for up to 24 hours (meaning long duration of sound exposure accumulation, whereas in reality activities will not be undertaken for this long within Baldoyle Bay, where boat-based surveys will be entirely dependent on high tide, and therefore will not be undertaken for longer

than one high tide (six hours), and the assumption that the activities from this study are the main contributors to the sound exposure of an animal – at ranges of a few kilometres from the source, any other larger vessel nearer an animal will be the primary contributor to its sound exposure, not these surveys.

Additionally, as stated above in Section 3.4.5, no harbour porpoise or any other cetacean species have been recorded utilising Baldoyle Bay. Given more suitable habitat and prey opportunities within the Irish Sea, it is unlikely the proposed SI works within Baldoyle Bay would overlap with important habitats or foraging areas for marine mammal species. Therefore, it is considered extremely unlikely that cetacean species would be impacted by the temporary underwater noise within Baldoyle Bay.

3.5.3.1.3 Irish Sea Survey

The following presents the results of an underwater noise assessment of the proposed SI works within the Irish Sea (MUL Area B). To assess the impacts of the bathymetric surveys within the Irish Sea, the scenario assumed that the vessel, SSS, MBES and USBL sources were active with no SBP or UHRS in use. To assess the impacts of the geotechnical surveys within the Irish Sea, the scenario assumed a difference in vessel size i.e., small or large vessel (<25 m and < 85 m respectively). The results have been summarised below to present the 'worst-case scenario', and it should be noted that no mitigation (i.e. soft-start measures, or marine mammal observers) has been applied at this stage.

Bathymetric survey, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury could occur within <10 m of the sound source, and TTS could occur within 150 m.
- HF group (bottlenose/common dolphin), auditory injury could occur within <10 m of the sound source, and TTS could occur within 180 m.
- VHF group (harbour porpoise), auditory injury could occur within 150 m of the sound source, while TTS could occur within 11 km.
- For all marine mammals, behavioural disturbance could occur > 20 km when applying the criterion strictly (unweighted for hearing groups).

Geotechnical surveys: Small Vessel < 25 m, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury could occur within <10 m of the sound source, and TTS could occur within 5 km.
- HF group (bottlenose/common dolphin), auditory injury could occur within <10 m of the sound source, and TTS could occur within 120 m.
- VHF group (harbour porpoise), auditory injury could occur within <10 m of the sound source, while TTS could occur within 11 km.
- For all marine mammals, behavioural disturbance could occur > 20 km when applying the criterion strictly (unweighted for hearing groups).

Geotechnical surveys: Large Vessel < 85 m, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury could occur within <10 m of the sound source, and TTS could occur within 13 km.
- HF group (bottlenose/common dolphin), auditory injury could occur within <10 m of the sound source, and TTS could occur within 270 m.

- VHF group (harbour porpoise), auditory injury could occur within <10 m of the sound source, while TTS could occur within 13 km.
- For all marine mammals, behavioural disturbance could occur > 20 km when applying the criterion strictly (unweighted for hearing groups).

In summary, this assessment concludes that there is risk of inducing hearing injury (AUD INJ) within 150 m to VHF group (i.e. harbour porpoise) during the bathymetric surveys in the Irish Sea. The risk range for inducing auditory injury is <10 m for all other hearing groups. The geotechnical survey utilising the larger vessel (>85m) has the potential to cause auditory injury within <10M of the sound source for all hearing groups, while the risk range for TTS is out to 13 km for the VHF and LF group, and out to 5 km for all other hearing groups. This is mainly the result of activities being assumed to continue for 6-24 hours meaning long duration of sound exposure accumulation (in reality activities are unlikely to be undertaken for this long), and the assumption that the activities from this study are the main contributors to the sound exposure of an animal – at ranges of a few kilometres from the source, any other larger vessel nearer an animal will be the primary contributor to its sound exposure, not these surveys.

This assessment concludes that there is risk of inducing hearing injury (AUD INJ) and TTS following noise from the SI works, but with the implementation of suitable mitigation as outlined below, these can be mitigated effectively to make the risks of auditory injury and TTS low for all hearing groups assessed.

3.5.3.1.4 Mitigation

The mitigation measures proposed will reduce the impact of auditory injury on cetaceans from the proposed SI works.

Baldoyle Bay Surveys

As stated above, cetacean species have not been recorded within Baldoyle Bay, preferring the deeper waters of the Irish Sea and MUL Area B for foraging and commuting. Therefore potential underwater noise produced by the SI works within Baldoyle Bay will not have an impact on cetacean species which would lead to implications on their strict protections under Article 12 of the Habitats Directive.

The risk of injury to all cetacean hearing groups is limited to a range of <10 m from the noise sources, with the exception of harbour porpoise during the bathymetric surveys including the use of SBPs or UHRS equipment, where the risk of injury was conservatively estimated to be 270 m from the noise source. In the extremely unlikely event that a cetacean is present within Baldoyle Bay, or at the mouth of the Bay, it is considered that the presence of the vessel and noise associated with the vessel in the area for 20 minutes prior to survey will act as a soft start to deter cetaceans.

Although cetaceans are not expected within Baldoyle Bay, as a precautionary measure, should boat-based geophysical, bathymetric or geotechnical surveys take place, a qualified and experienced marine mammal observer will be appointed to monitor for marine mammals prior to the soft-start, i.e. presence of the vessel within MUL Area A, in line with DAHG (2014) Guidelines.

Irish Sea Surveys

Similarly, in the Irish Sea, modest injury ranges are predicted. Even without the application of a soft-start, the risk of injury to all cetacean groups is <10 m for all hearing groups, except for harbour porpoise, for which a 150 m auditory injury risk range is predicted. The presence and noise associated with the vessel itself for 20 minutes prior to survey commencing will act as a soft start to the noise expected from the geophysical, bathymetric and geotechnical surveys.

TTS risk ranges are up to 13 km for VHF and LF group with the vessel noise driving this range due to the modelled output of a 24-hour potential active survey duration assuming a quiet sea. It is expected that depending on the actual activity pattern (vessel speed, and use of thrusters) and presence of other vessels within the MUL Area that this will likely be reduced.

For the marine geophysical, bathymetric and geotechnical SI works, a qualified and experienced MMO will be appointed to monitor for marine mammals in line with DAHG (2014) Guidance. A pre-start-up survey within the monitored zone (i.e. 500 m radial distance of the sound source intended for use) will be conducted at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the monitored zone (500 m) by the MMO. In commencing sound producing activities using the equipment listed above, a “Ramp Up” procedure (i.e. 30 or 20-minute soft-start depending on the activity) must be used. Once the Ramp-Up procedure commences, there is no requirement to halt or discontinue the procedure at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500 m radial distance, of the sound source. If there is a break in sound output for a period greater than 30 minutes (e.g., due to equipment failure, shut-down, survey line or station change) then all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) must be undertaken (DAHG Guidance, 2014). These measures will ensure that impacts on marine mammals will be reduced to the lowest possible risk to ensure there is no significant risk to marine mammals from impulsive noise.

3.5.3.1.5 Conclusion

Based on the current evidence base, it is considered that with the implementation of appropriate and precautionary mitigation measures as outlined above, the proposed SI works will conform with the system of strict protection of cetaceans under Article 12 of the Habitats Directive.

3.5.3.2 Risk of collision

Vessel strikes are a known cause of mortality in marine mammals (Laist et al., 2001). Non-lethal collisions have also been documented (Laist et al., 2001; Van Waerebeek et al., 2007). Injuries from such collisions can be divided into two broad categories: blunt trauma from impact and lacerations from propellers. Injuries may result in individuals becoming vulnerable to secondary infections or predation.

It has been calculated that a maximum of one vessel and one jack-up barge could be operating at any one time within the Irish Sea area of the MUL Area. For the geophysical and bathymetric surveys, the vessels will be travelling in a predefined trajectory. It is considered that this will allow animals to predict the movement of the vessels and therefore avoid collisions. It is likely that the other survey vessels (i.e. benthic survey and/or geotechnical survey vessel) will be stationary for extended periods throughout their operations which will reduce the potential for collision with these vessels.

As documented in the accompanying Assessment of Impact on the Maritime Usage (AIMU) Report, the area supports reasonably high levels of baseline marine traffic, with cargo vessels, fishing boats and pleasure craft traversing the MUL Area to access commercial and fishing ports and harbours in the region. It is, therefore, reasonable to assume that marine mammals in the area are exposed to vessel traffic on a regular basis and may exhibit some habituation. In addition, based on review of available specification sheets from prospective contractors, it is noted that the typical speed of the survey vessel while on survey is between 3.5 - 6 knots, and it will be travelling in a predefined trajectory, allowing marine mammals to predict movements and avoid collisions. The increase in vessel traffic at any one

time is considered to be very low, given the location of the MUL Area. It can be excluded on the basis of objective evidence that there is potential for collision risk with cetacean species by the SI works.

Therefore, it is considered the proposed SI works do not present a collision risk and therefore conform with the system of strict protection of cetaceans under Article 12 of the Habitats Directive in this regard.

3.5.4 Turtle Species

Data on turtle hearing is limited, however, turtles are adapted to detect sound in water and are known to detect sound at less than 1,000 Hz (Popper et al., 2014). While the majority of the survey equipment to be used operates across higher frequency range (see Table 4-1 in the Subsea Noise Technical Report), injury and disturbance to turtles due to noise impacts is unlikely given the rarity of turtle occurrence. Due to the rarity of turtles within the MUL Area, the limited scale and duration of the survey activities, it is concluded that there will be no significant disturbance, injury, or death of turtle species as a result of the SI works. There will be no deterioration or destruction of breeding sites or resting places. Therefore, in view of the current evidence base, it is considered that no derogation is required, and the proposed SI works will conform with the system of strict protection of turtles under Article 12 of the Habitats Directive.

4 SUMMARY & CONCLUSION

It is concluded that the SI works will not deliberately capture or kill any species listed under Annex IV of the Habitats Directive. The breeding or resting places of Annex IV species will not be damaged or destroyed. Limited disturbance of Annex IV cetacean species as a result of the SI works is considered possible due to the introduction of underwater noise. Due the potential for underwater noise disturbance to cetacean species in the absence of mitigation, an application for derogation for Annex IV species will be made under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. The risk of injury/disturbance will be further reduced by the implementation of the mitigation measures outlined in this document and the *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* (DAHG, 2014). The conservation status of the Annex IV species will not be impacted by the proposed SI works. The habitat available to Annex IV species will also continue to be sufficiently large to maintain their populations on a long-term basis.

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