

[REDACTED]
Foreshore Unit,
Department of Housing, Local Government and Heritage,
Newtown Road,
Co. Wexford
26th September 2022

Marine Adviser Environment Screening Stage Report

Re: FS007404 DP ENERGY INIS EALGA ARRAY CABLE ROUTE – SITE INVESTIGATIONS OFF THE COAST OF COUNTY CORK

Applicant: DP ENERGY INIS EALGA ARRAY CABLE ROUTE

I have reviewed the foreshore licence application FS007404 and all the environmental documents associated with it. As the Department's Marine Environment Advisor I conducted independent assessments of the information provided by the Applicant, having regard to the Habitats, Birds and EIA Directives. My comments on and recommendations for this application are as follows:

Independent Environmental Consultant (IEC):

The Department engaged Arups along with Hartley Anderson as an IEC to provide assistance with regard to the statutory and non-statutory environmental assessments of this foreshore licence application. The IEC has conducted independent assessments of the information provided by the Applicant, having regard to the Habitats Directive, EIA Directive, and the public and prescribed bodies' consultations.

The IEC's Request for Further Information (RFI) and the Applicant's responses to the RFI are included as below.

Risk Assessment of Annex IV Species:

A review of the applicant's environmental reports provided sufficient relevant information in order for a Risk Assessment of Annex IV species to be carried out by the IEC. With strict adherence to the DAHG 2014 guidance on underwater noise as outlined in the IEC's report it is very unlikely that any Annex IV species will be disturbed, injured or killed as a result of the proposed site investigation works. Having considered the application by DP Energy and the IEC's Risk Assessment of Annex IV species report I agree with and accept this report and its conclusions. It should be noted that this risk assessment is not part of the Article 6.3 assessment and therefore identification and inclusion of mitigation measures within the risk assessment is appropriated at this stage.

Article 6(3) of Directive (92/43/EEC) (as amended) (Habitats Directive):

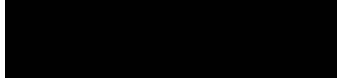
Having considered the application by DP Energy and the IEC's Screening for Appropriate Assessment Report I agree with and accept the Screening for Appropriate Assessment Report and its conclusions.

My signed Recommending Officer's **Screening for Appropriate Assessment Determination** which requires the signature of the Minister as part of the decision-makers obligations under the Habitats Directive is attached.

On completion of the Public and Prescribed Bodies Consultation and the work of the IEC, I will furnish my final environment assessment with Appropriate Assessment Determination.

This report may include any case specific conditions having regard to the information obtained during consultation phase.

Signature and Date of Recommending Officer - Marine Advisor Environment:

A solid black rectangular box used to redact the signature of the Recommending Officer.

26th September 2022

From: [REDACTED]
Sent: Tuesday 17 May 2022 18:35
To: [REDACTED]
Cc: [REDACTED]
Subject: FS00704 Inis Ealga Marine Energy Park (IEMEP) - queries to inform AA Screening

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Afternoon [REDACTED]

I was speaking with our specialist sub-consultant [REDACTED] (Hartley Anderson HA) earlier – as you are aware he is delivering the AA aspects of our scope.

Having reviewed the information from the Applicant for Inis Ealga, HA have a number of queries listed below which they would like to get the Applicants feedback on so as to inform the AA Screening report.

On previous projects, in order to expedite these types of requests in a time efficient way, the Dept has arranged a virtual meeting with Arup/HA, and the Applicant and the Dept (including the Marine Advisor where necessary) to discuss the information required. HA and Arup are happy to attend such a meeting if the Department deems it necessary.

- Teague & Clough (2011) reported that shad may be able to detect ultrasound at frequencies of up to 180kHz, with a preliminary exposure trial of twaite shad eliciting significant reactions at sound frequencies of between 30 and 60kHz. In light of this and the potential overlap with frequencies produced primarily by the MBES and SBP equipment, can the applicant provide further consideration of the potential for LSE with respect to impulsive underwater noise and the twaite shad feature of the Blackwater River (Cork/Waterford) SAC given that twaite shad are likely to be found in coastal areas of the FLAA all year round, with the greatest density likely to be observed during the May-July migration which may overlap with the survey? (Teague N & Clough SC (2011). Investigations into the response of 0+ twaite shad (*Alosa fallax*) to ultrasound and its potential as an entrainment deterrent. International Fish Screening Techniques 71: 153-163.)
- The applicant should describe and provide consideration of other potential noise sources associated with survey operations (e.g. vibrocoring, CPT). Will there be any underwater noise associated with the drilling of the boreholes at the landfall location?
- The applicant should consider the potential for diving birds (e.g. cormorant, a breeding feature of a number of sites) to be affected by underwater noise generated from survey activities.
- The applicant indicates that the extent to which a seabird responds to disturbance is dependent upon a number of factors including: period of breeding cycle during which disturbance occurs; duration, type and intensity of the disturbance; presence of opportunistic predators; and the degree of habituation with the disturbance (Showler et al. 2010). It is noted that Showler et al. (2010) focuses on the impact of public access on foot and associated activities (i.e. dog-walking, picnicking, bird-watching, cross-country running, climbing, angling, mountain-biking and horse riding) on breeding success of ground-nesting and cliff-nesting birds. A number of more relevant sources with respect to the disturbance of seabirds could have been used (e.g. Garthe & Hüppop 2004, Fliessbach et al. 2019).

- The applicant should consider the potential for visual disturbance of breeding birds (e.g. cormorant, herring gull, kittiwake) from a number of the sites (e.g. Helvick Head to Ballyquin SPA, Mid-Waterford Coast SPA, Sovereign Islands SPA) whilst foraging within the FLAA (rather than just nesting birds).
- The applicant should consider the potential for accidental pollution associated with the survey activities given the proximity of the FLAA to a number of sites with potentially sensitive qualifying interests.
- From Section A.3 of applicant's supporting info (pA-8) - For all QIs / SCIs where it is determined that there is a potential pressure receptor pathway, the likely significance of the effect has been assessed in light of the sites conservation objectives. Information that informed this assessment has been provided in Section A.2.5. The report doesn't have a Section A.2.5?

Best wishes

[Redacted]

[Redacted]

Associate | Environmental Consultant



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Explanatory Note – Response to queries raised by the Independent Environmental Consultant

INIS EALGA MARINE ENERGY PARK LTD.

Foreshore Licence Application FS007404 for Inis Ealga Marine Energy Park

Explanatory Note – Response to queries raised by the Independent Environmental Consultant

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DOCUMENT RELEASE FORM

Inis Ealga Marine Energy Park Ltd

P2369_R5671_Rev0

Foreshore Licence Application FS007404 for Inis Ealga Marine Energy Park

Explanatory Note – Response to queries raised by the Independent Environmental Consultant

Author/s

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Project Manager

Authoriser

[REDACTED]

[REDACTED]

Rev No	Date	Reason	Author	Checker	Authoriser
Rev 0	01/06/2022	Original Document	[REDACTED]	[REDACTED]	[REDACTED]
Rev 1	10/06/2022	Approved Document	[REDACTED]	[REDACTED]	[REDACTED]

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1. INTRODUCTION

1.1 Project Background

Inis Ealga Marine Energy Park (IEMEP) Ltd., a subsidiary project company of DP Energy Ireland (DPEI), is investigating the feasibility of developing an offshore floating wind farm off the south coast of Ireland. IEMEP Ltd. is a key part of a wider strategic development of a portfolio of wind (and wave) sites that DPEI is planning.

IEMEP Ltd. submitted a Foreshore Licence Application (FLA) (Reference: FS006859) in December 2019 to the Department of Housing, Local Government and Heritage (DoHLGH) for site investigation works across the proposed turbine area (Array Investigation Area) and export cable corridors. Public consultation was conducted on the FLA between 11 March 2020 and 4 June 2020. That FLA is currently awaiting a licence decision from the Department of Housing, Planning and Local Government (DoHPLG).

A subsequent and separate application for a Foreshore Licence for site investigation works was submitted July 2021 for an additional potential export cable corridor connecting the Array Investigation Area with a landfall between Clonard and Ballymacoda, Co. Cork. That Foreshore Licence Application Area (FLAA) covers 6,492 hectares (ha). IEMEP Ltd. intends to carry out the proposed site investigations within this new investigation area for suitability for cable routing and other electrical infrastructure associated with Inis Ealga Marine Energy Park. The results of these surveys will also provide baseline data for environmental appraisal, preparation of Environmental Impact Assessment Report (EIAR) and subsequent Environmental Impact Assessment (EIA) by the Competent Authority. This cable corridor has been identified for site investigation due to the precedence established by the Celtic Interconnector development (ABP ref. A04.310798) and feedback to DPEI from stakeholders requesting greater consideration of those areas already under development for other projects such as the Celtic Interconnector.

On the 26th May 2022 a meeting was held between the Department of Housing, Local Government and Heritage (DoHLGH), the Applicant (Inis Ealga Marine Energy Park Ltd.) and the Independent Environmental Consultant (IEC) appointed by DoHLGH to appraise FLA FS007404 to discuss points for consideration as raised by the IEC.

1.2 Objective of this Explanatory Note

This Explanatory Note seeks to provide a full and detailed response to each of the seven queries discussed with the IEC on the 26 May 2022.

2. RESPONSE TO IEC QUERIES

2.1 IEC Query 1 - Potential for Likely Significant Effect (LSE) with respect to impulsive underwater noise and the twaite shad feature of the Blackwater River (Cork/Waterford) SAC.

" Teague & Clough (2011) reported that shad may be able to detect ultrasound at frequencies of up to 180kHz, with a preliminary exposure trial of twaite shad eliciting significant reactions at sound frequencies of between 30 and 60kHz. In light of this and the potential overlap with frequencies produced primarily by the MultiBeam Echo-Sounder (MBES) and Sub-Bottom Profiler (SBP) equipment, can the applicant provide further consideration of the potential for LSE with respect to impulsive underwater noise and the twaite shad feature of the Blackwater River (Cork/Waterford) SAC given that twaite shad are likely to be found in coastal areas of the Foreshore Licence Application Area (FLAA) all year round, with the greatest density likely to be observed during the May-July migration which may overlap with the survey? (Teague N & Clough SC (2011). Investigations into the response of 0+ twaite shad (*Alosa fallax*) to ultrasound and its potential as an entrainment deterrent. International Fish Screening Techniques 71: 153-163.)

2.2 Applicant Response to IEC Query 1

The potential for Likely Significant Effect (LSE) with respect to impulsive underwater noise and the twaite shad feature of the Blackwater River SAC was considered in the Environmental Supporting Information report Section 3.3.1.1 'Underwater Sound Changes,' and the Environmental Supporting Information Report Appendix A Section A.3.2.1 'Underwater sound changes – Annex II fish species' (Intertek, July 2021). Blackwater River SAC is the only Natura 2000 site within the proposed site investigations zone of influence with twaite shad as a qualifying feature.

The potential of the proposed site investigations to have a negative effect upon high sensitivity hearing species such as twaite shad was acknowledged in the Environmental Supporting Information report Section 3.3.1.1 'Underwater Sound Changes, as underwater sound has the potential to result in disruptions to behavioural patterns, including, but not limited to, migration. Proposed site investigations may overlap with periods of the greatest density of twaite shad (May-July).

Shad and herring are members of the Clupeiformes family. Herring have a hearing range between 30Hz and 4kHz, with a peak frequency of between 30Hz and 1kHz (Nedwell et al., 2004). Teague & Clough (2011) observed that young-of-year twaite shad showed significant reactions at frequencies between 30 and 60kHz, peaking at 45kHz.

Table 2-1 Impulsive sound sources

Geophysical Survey Method	Frequency (kHz)	Source level SPL (peak) in dB re 1 μ Pa	Source
Multi-beam Echosounder (MBES)	12 – 400	210 - 245	Danson 2005, Hopkins 2007, Genesis 2011; Lurton and DeReutier 2011; BEIS 2020
Side Scan Sonar (SSS)	100 - 500	200 – 240	BOEM 2019; BEIS 2020
Sub-Bottom Profiler (SBP)	0.5 - 300	196 - 225	Danson 2005; King 2013; BOEM 2016; BEIS 2020

Based on these sensitivities, shad are not sensitive to the very high frequencies associated with MBES (albeit with some overlap at low frequency operation) and SSS surveys. It is likely however, they will hear the low frequency noise from SBP, Ultra High Resolution Seismic (UHRS) surveys, drilling and vibrocoring. All

proposed surveys will operate at frequencies outside of the range of young shad and, therefore, they will not be impacted by them. It has been suggested that the ability of the Alosids, including shad, to detect ultrasound evolved to assist in avoiding predation by echo-locating predators, e.g., toothed whales (Popper et al., 2004; Teague & Clough, 2011). As such, underwater sound may act as an acoustic deterrent for shad and suggests that shad exhibit avoidance behaviour in response to underwater noise. It is, therefore, expected that twaite shad may avoid the sound source.

Based on the hearing capabilities of shad and the survey sound sources, the shad hearing range has the potential to overlap with the MBES, SBP and UHRS, however the mortality/injury threshold will only be exceeded within close proximity of the sound source. Popper et. al. (2014) states the maximum distance for a lethal effect or physical injury on a fish with a swim bladder (such as twaite shad) at a SPL level of 207 dB re 1 μ Pa is 12 metres. For the MBES, SBP and UHRS survey work, the vessel will be transiting slowly along survey lines and fish will also be in motion, therefore, the zone of injury will be transient, and it is unlikely that any fish will stay close to the sound source. Typical behavioural responses suggest that twaite shad will move away from the sound source (Popper et al., 2004; Teague & Clough, 2011) and the slow vessel speed will facilitate this behavioural response. Additionally, underwater sound from the geophysical survey equipment is targeted in relatively narrow beams towards the seabed, therefore, fish are only at risk of injury if immediately within the zone of ensonification (area filled with sound) below the sound source.

Section 3.3.1.1 of the Environmental Supporting Information report (Intertek, July 2021), therefore, concluded that both impulsive noise and continuous noise would have an insignificant effect on twaite shad due to the localised nature of the proposed site investigations, the short-term nature of the work and the behavioural response of this species.

2.3 IEC Query 2 - Will there be any underwater noise associated with the drilling of the boreholes at the landfall location?

The applicant should describe and provide consideration of other potential noise sources associated with survey operations (e.g. vibrocoring, CPT). Will there be any underwater noise associated with the drilling of the boreholes at the landfall location?

2.4 Applicant Response to IEC Query 2

The potential for underwater sound changes resulting from the penetration and/or disturbance of the substrate was considered in the Environmental Supporting Information report Section 3.2. 'Intertidal and Benthic Communities' (Intertek, July 2021).

Underwater noise levels associated with drilling of boreholes onshore is dependent on substrate types and distance of the borehole location to the marine environment; however, studies of marine boreholes can be taken as a worst-case scenario.

Underwater noise measurements were recorded from a jack-up barge (JUB) undertaking geotechnical boreholes in Swansea Bay, Wales (Willis et al. 2010). This activity involved a percussion corer used to take soft sediment samples and rotary coring used for hard rock samples. Sediment varied through the site from soft muds to coarse sand. Sediments were typically 20m thick overlying sedimentary mud rock or shale. These conditions are similar to those identified in the EMODnet 2021 data within the area subject to the application for Foreshore Licence (FS006859) and therefore, the noise measurements provided below have been used as an analogy.

During soft sediment coring, in the Swansea survey, the highest sound pressure level recorded (at 23m from the JUB) was 107dB re 1 μ Pa (peak) at 10Hz. For hard rock drilling the highest sound pressure level was also 107dB re 1 μ Pa (peak) at 10Hz but it was recorded at 7.5m from the JUB (Willis et al. 2010).

Noise measurements during geotechnical site investigations involving shallow core drilling to 16-17m in sand and mudstone, recorded source levels of 142–145 dB re 1 μ Pa rms @ 1 m (30–2000 Hz) (Erbe and McPherson 2017).

Borehole drilling operations emit low levels of noise, with a frequency of between 30Hz and 50Hz, and a Sound Pressure Level (SPL) of 188dB (rms) re 1 μ Pa @ 1m (Chorney et al., 2011). It should be noted that approximately two boreholes are proposed as part of the site investigations.

The screening for Appropriate Assessment (AA) (Appendix A) (Intertek, July 2021) concluded that given that there are no SACs within the direct footprint of the FLAA, there is no potential for Likely Significant Effect from the drilling of boreholes on the qualifying features of any Natura 2000 sites.

The frequencies at which the peak sound pressure levels of the proposed vibrocore surveys are within the audible bandwidth for low-frequency cetaceans. As the frequency is outside of the auditory bandwidth for mid-frequency cetaceans, high frequency cetaceans and pinnipeds, there is unlikely to be a significant impact from continuous noise to these species. Southall et al., 2019 determined that the SEL (24 hr weighted) for continuous noise to cause a Temporary Threshold Shift (TTS) in low-frequency cetaceans is 178dB re 1 μ Pa²s or 199dB re 1 μ Pa²s for a Permanent Threshold Shift (PTS). Vibrocores are only used for short durations, typically around 10 minutes until the vibrocore is submerged and a sample can be taken.

As the noise generated by the proposed site investigations will be short in duration and intermittent, and distant from any designated sites with noise-sensitive qualifying features, it can be concluded that there is no potential for likely significant effect from vibrocore surveys.

Investigations should also be considered in the context of the existing baseline sound environment. The application area is adjacent to Cork Harbour, which has high density shipping and cargo traffic routing to/from Cork Harbour. Therefore, the change in underwater sound caused by the addition of low frequency noise associated with vibrocores and borehole drilling for the proposed site investigations will not be distinct above natural and anthropogenic noise in the region.

Based on the above discussion, any disturbance effects from noise associated with operations will be localised, temporary and transient. There will be no long-term effect on the distribution of the species and migration to and from rivers will not be impeded.

2.5 IEC Query 3 - Consider the potential for diving birds to be affected by underwater noise generated from survey activities.

The applicant should consider the potential for diving birds (e.g. cormorant, a breeding feature of a number of sites) to be affected by underwater noise generated from survey activities.

2.6 Applicants Response to IEC Query 3

The nearest Natura 2000 site with diving birds, namely cormorant and chough, as a qualifying feature is MidWaterford Coast SPA, 11km distant from the FLAA. Whilst Woodward et al. (2019) set the foraging range of these species at 25.6km, the proposed site investigations only affect a small percentage of the total available foraging area.

Most diving species have a hearing range of approximately 500Hz to 4kHz (Crowell, 2014; Crowell et al. 2015; Hansen et al. 2017) and as a result, the very high frequency survey activities (multibeam and side scan) and very low frequency activities (vibrocoring, Dynamic Positioning (DP) vessel) would be inaudible to these species. The low frequency (0.5 – 300kHz) sub-bottom profiler (pinger/sparker) noise would be within the hearing range of diving species, while the noise from the borehole drilling (1-600Hz) would be towards their lower hearing limit.

Underwater noise generated by pile driving can also be used to study the impacts of underwater noise on diving seabirds. One such study carried out at an offshore windfarm development in Dutch North Sea waters

concluded that, due to the large amount of surface activity associated with construction of an offshore wind farm, any birds present in the area would have been disturbed and fled the area before piling operations commenced (Leopold & Camphuysen, 2009).

The likelihood of a noise sensitive diving bird being in the vicinity of a noise generating operation is very low due to the surface activity associated with such operations disturbing the birds prior to commencement of noise generation (BEIS, 2019; Fliessbach et al. 2019, Garthe & Hüppop, 2004; Leopold & Camphuysen, 2009).

Given the very low likelihood of interaction between the sound source and a diving bird due to the intervening distances, relatively short exposure time, the temporary and short-term nature of the survey work, the mobile nature of the surveys and the displacement of most diving species due to flushing disturbance, it can be determined that underwater noise would have no conceivable effect on diving seabirds in the vicinity including those which may forage in the area.

In addition, the Environmental Supporting Information report (Intertek, July 2021) considered in detail the potential for underwater noise to have a Likely Significant Effect (LSE) on species more noise sensitive and more likely to be in the vicinity of site investigations than diving birds and concluded that underwater noise associated with the proposed site investigations would have no LSE on these species.

2.7 IEC Query 4 - A number of more relevant sources with respect to the disturbance of seabirds could have been used.

The applicant indicates that the extent to which a seabird responds to disturbance is dependent upon a number of factors including: period of breeding cycle during which disturbance occurs; duration, type and intensity of the disturbance; presence of opportunistic predators; and the degree of habituation with the disturbance (Showler et al. 2010). It is noted that Showler et al. (2010) focuses on the impact of public access on foot and associated activities (i.e. dog-walking, picnicking, bird-watching, cross-country running, climbing, angling, mountain-biking and horse riding) on breeding success of ground-nesting and cliff-nesting birds. A number of more relevant sources with respect to the disturbance of seabirds could have been used (e.g. Garthe & Hüppop 2004, Fliessbach et al. 2019).

2.8 Applicants Response to IEC Query 4

The sources used were relevant and provide a good standard of assessment. Having reviewed the suggested sources (e.g. Garthe & Hüppop 2004, Fliessbach et al. 2019) it is noted that these sources further strengthen the position held by the Environmental Supporting Information report (Intertek, July 2021). These suggested sources will be used in all future environmental appraisals associated with Inis Ealga Marine Energy Park.

2.9 IEC Query 5 - Consider the potential for visual disturbance of breeding birds whilst foraging within the FLAA, rather than just nesting birds.

The applicant should consider the potential for visual disturbance of breeding birds (e.g. cormorant, herring gull, kittiwake) from a number of the sites (e.g. Helvick Head to Ballyquin SPA, Mid-Waterford Coast SPA, Sovereign Islands SPA) whilst foraging within the FLAA (rather than just nesting birds).

2.10 Applicants Response to IEC Query 5

The potential for visual disturbance to cause a Likely Significant Effect (LSE) on qualifying bird species of Natura 2000 sites, including breeding birds, is addressed in Section 3.4.1.1 of the Environmental Supporting Information report (Intertek, July 2021) submitted in support of FLA FS007404.

The Environmental Supporting Information report (Intertek, July 2021) concluded that the proposed site investigations (both at the beach and in the foreshore area) may disturb birds which use the area for feeding, loafing and breeding. However, given the short duration of the proposed site investigations with the vessel moving steadily forward along the survey route, any visual disturbance at a given location will be minimal and given the level of vessel activity in the region, disturbance is unlikely to be felt against background levels. Therefore, the significance of effects on birds in the offshore environment from the proposed site investigations, including due to visual disturbance, will be temporary and has been assessed as Imperceptible.

The breeding birds which will be most vulnerable to disturbance would be any nesting breeding birds in the immediate vicinity of the proposed site investigation works during the breeding season. Therefore, all SPAs within this 2km distance were screened for nesting birds as part of the screening for AA (Appendix A) (Intertek, July 2021). The closest Natura 2000 site, designated for breeding birds, is located 11km from the FLAA.

2.11 IEC Query 6 - Consider the potential for accidental pollution associated with the survey activities.

The applicant should consider the potential for accidental pollution associated with the survey activities given the proximity of the FLAA to a number of sites with potentially sensitive qualifying interests.

2.12 Applicants Response to IEC Query 6

Survey vessels will operate under international standards; including, The International Convention for the Prevention of Pollution from Ships (The MARPOL Convention) with respect to black and grey wastewater and food waste discharges, which are designed to eliminate impacts to coastal waters, and reduce the levels of discharge in offshore waters. Therefore, no effects are expected.

The MARPOL Convention is standard practice and cannot therefore be considered to be additional or embedded mitigation.

2.13 IEC Query 7 - The report doesn't have a Section A.2.5.

From Section A.3 of applicant's supporting info (pA-8) - For all QIs / SCIs where it is determined that there is a potential pressure receptor pathway, the likely significance of the effect has been assessed in light of the site's conservation objectives. Information that informed this assessment has been provided in Section A.2.5. The report doesn't have a Section A.2.5?

2.14 Applicants Response to IEC Query 7

All Natura 2000 sites were screened out during the stage one screening assessment Screening of European Sites (Supporting Document Environmental Supporting Information, Reference: P2369-R5337-Rev0). As no viable pressure receptor pathways were identified, an assessment of Likely Significant Effect (LSE) was not required for this application. The sentence regarding information on LSE assessment in Section A.2.5 of the Environmental Supporting Information report (Intertek, July 2021) was an erroneous inclusion in the document.

REFERENCES

- 1 BEIS (2019). The Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (as amended) – A Guide. Revision 5, 81pp.
- 2 Chorney, N.E., Warner, G., MacDonnell, J., McCrodan, A., Deveau, T., McPherson, C., O'Neill, C., Hannay, D. and Rideout, B. (2011). Underwater Sound Measurements. Chapter 3. In Reiser CM, Funk DW, Rodrigues R, and Hannay D. (eds.) 2011. Marine mammal monitoring and mitigation during marine geophysical surveys by Shell Offshore, Inc. in the Alaskan Chukchi and Beaufort seas, July–October 2010: 90-day report. LGL Rep. P1171E–1. 240 pp.
- 3 Crowell S (2014). In-air and underwater hearing in ducks. Doctoral dissertation, University of Maryland.
- 4 Crowell SE, Wells-Berlin AM, Carr CE, Olsen GH, Therrien RE, Yannuzzi SE & Ketten DR (2015). A comparison of auditory brainstem responses across diving bird species. *Journal of Comparative Physiology A* 201: 803-815.
- 5 Fliessbach, K.L., K. Borkenhagen, N. Guse, N. Markones, P. Schwemmer, S. Garthe, 2019. A ship traffic disturbance vulnerability index for Northwest European seabirds as a tool for marine spatial planning. *Front. Mar. Sci.* 6, 1–15.
- 6 Garthe S & Hüppop O (2004). Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. *Journal of Applied Ecology* 41: 724-734.
- 7 Hansen KA, Maxwell A, Siebert U Larsen ON & Wahlberg M (2017). Great cormorants (*Phalacrocorax carbo*) can detect auditory cues while diving. *The Science of Nature* 104: 45.
- 8 Intertek (March 2022) Foreshore Licence Application FS006859 for Inis Ealga Marine Energy Park: Applicant Response to Request for Further Information Dated 23 December 2021
- 9 Intertek (July 2021) Foreshore Licence Application for Site Investigations at Inis Ealga - Clonard and Ballymacoda: Environmental Supporting Information
- 10 Leopold M.F., Camphuysen C.J., Verdaat H., Dijkman E.M., Meesters H.W.G., Aarts G.M., Poot M. & Fijn R. 2009. Local birds in and around the Offshore Wind Park Egmond aan Zee (OWEZ) (T-0 & T-1). NoordzeeWind Rapport OWEZ R 221 T1 20090605.
- 11 Nedwell, J.R., Edwards, B., Turnpenny, A.W.H., and Gordon, J (2004) Fish and Marine Mammal Audiograms: A summary of available information. [online] Available online: https://www.jstor.org/stable/41811925?seq=3#metadata_info_tab_contents [Accessed May 2022].
- 12 Popper, E. N. and Hastings M. C. (2009) The effects of human-generated sound on fish. *Integrative Zoology*. (4) 43-52. Available at: <https://tethys.pnnl.gov/sites/default/files/publications/Nedwell-2004-Audiograms.pdf> [Accessed May 2022].
- 13 Popper, A. N., Hawkins, A. D., Fay, R. R., Mann, D. A., Bartol, S., Carlson, T. J., Coombs, S., Ellison, W. T., Gentry, R. L., Halvorsen, M. B., Løkkebø, S., Rogers, P. H., Southall, B. L., Zeddes, D. G., and Tavolga, W. N. (2014). Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI Accredited Standards Committee S3/SC1 and registered with ANSI.
- 14 Showler, & Stewart, Gavin & Sutherland, William & Pullin, Andrew. (2010). What is the impact of public access on the breeding success of ground-nesting and cliff-nesting birds?. Collaboration for Environmental Evidence. 2010.
- 15 Southall, B. L., Finneran, J. J., Reichmuth, C., Nachtigall, P. E., Ketten, D. R., Bowles, A. E., Ellison, W. T., Nowacek, D. P and Tyack, P. L. (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific

Recommendations for Residual Hearing Effects.

[Online]. Available at:
https://sea-inc.net/wpcontent/uploads/2019/10/Southall-et-al_2019_MMNoise-criteria-update-with-errata_Aq-Mammals.pdf [Accessed May 2022].

16 Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Greene Jr, C.R., Kastak, Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A. and Tyack, P.L. (2007). Marine Mammal Noise Inis Ealga Marine Energy Park Ltd

Exposure Criteria: Initial Scientific Recommendations. Aquatic Mammals, 33: Number 4. [online] Available at: http://sea-inc.net/assets/pdf/mmnoise_aquaticmammals.pdf [Accessed May 2022].

17 Teague, N., and Clough, S.C., (2011) Investigations into the response of 0+ twaite shad (*Alosa fallax*) to ultrasound and its potential as an entrainment deterrent. International Fish Screening Techniques 71:153-163 [online] Available at: <https://www.witpress.com/Secure/elibrary/papers/9781845648497/9781845648497013FU1.pdf> [Accessed May 2022].

18 Willis, M.R., Broudie, M., Bhurosah, M and Masters, I.(2010). Noise Associated with Small Scale Drilling Operations. 3rd International Conference on Ocean Energy, 6 October, Bilbao. [Online]. Available at: <https://www.icoeconference.com/documents/WlptdE9OSFAzOEpaRFYrLzdreGZ2c2ZXUzFPdUhkVWVucXIyMmVaOG5xZz18ODY4YzRiNGM5NjFhYTgzYTU2NTU4YjEjYzDE1MTRhNjM/> [Accessed March 2022]

19 Woodward I, Thaxter CB, Owen E & Cook ASCP (2019). Desk-based revision of seabird foraging ranges used for HRA screening. Report of work carried out by the British Trust for Ornithology on behalf of NIRAS and The Crown Estate. BTO Research Report No. 724,139pp.