Comments on observations to the foreshore application for a marine survey and site investigation works at Ballyloughane Beach, Renmore, Co Galway. - Ref: FS007016

Obs. – Department of Culture, Heritage and the Gaeltacht – Nature Conservation Unit.

DSFN welcomes the submission from the Nature Conservation Unit of the Department of Culture, Heritage and the Gaeltacht and notes that 'The conclusion of the Natura Impact Statement document is that the proposed works are unlikely to pose a significant likely risk to nature conservation interests in the vicinity' and that 'The Department of Culture, Heritage and the Gaeltacht concur with this conclusion provided the stated mitigation is undertaken'

DSFN has no further comment on the submission from the Nature Conservation Unit.

Obs. – Department of Culture, Heritage and the Gaeltacht – Underwater Archaeology Unit.

DSFN welcomes the submission from the Underwater Archaeology Unit of the Department of Culture, Heritage and the Gaeltacht and acknowledges the recommended conditions outlined in their submission to which DSFN has no objection.

DSFN has no further comment on the submission from the UAU.

Obs. – Marine Institute.

DSFN welcomes the submission from the Marine Institute and the assessment that *'…..the Marine Institute is of the view that considering the nature, scale, location and duration of the proposed works impacts on the marine environment are not likely to be significant'* and that the Marine Institute has no objections to a licence being granted and has recommended conditions outlined in their submission to which DSFN has no objection.

DSFN has no further comment on the submission from the Marine Institute.

Obs. – Department of Agriculture, Food and the Marine.

DSFN acknowledges the comments from the Department of Agriculture, Food and the recommended conditions outlined in their submission to which DSFN has no objection.

DSFN has no further comment on the submission from the Department of Agriculture, Food and the Marine.

Obs. – Marine Survey Office.

DSFN acknowledges the comments from the Marine Survey Office and notes the recommendations therein related to navigational safety and vessel operation.

DSFN has no further comment on the submission from the Marine Survey Office.

Obs. – Water and Marine Engineering Adviser.

DSFN welcomes the detailed response from the Water and Marine Adviser and note that there is no objection to the granting of a foreshore licence for the proposed works, subject to the conditions outlined in their submission and to which DSFN has no objection.

DSFN has no further comment on the submission from the Water and Marine Adviser.

Obs. – Inland Fisheries Ireland.

DSFN acknowledges the comments from Inland Fisheries Ireland (IFI). However DSFN would like to clarify that the application submitted is for marine survey and site investigation works only and is not related to Horizontal Directional Drilling operations or the installation of fibre optic cable which will be the subject of a separate application in due course.

In relation to mitigation measures for 'noise in the aquatic environment', an extract from pages 88-89 of the Natura Impact Statement prepared by Altemar and submitted with the application is included below for completeness:

"Mitigation impacts are primarily concerned with the survey and the following mitigation measures would be enforced.

1. During the site survey a detailed video survey of the proposed cable route within the Galway Bay Complex SAC will be carried out by a marine ecologist to provide higher resolution and habitat mapping data on the species present within the survey corridor in the SAC and the proposed route optimised in discussion with NPWS. In addition, an additional video survey of the reef habitat within Inishmore Island SAC should be carried out to assist with the optimum route selection within this area. The results of these surveys should be discussed with the NPWS.

2. Under no circumstance should seals hauled out in the area be disturbed such that they enter the water. This is unlikely, as this area is not recognised as a haul out area. The Marine Survey is to be carried out outside of breeding and haul out areas, but will be carried out during haul out period. A MMO will be onboard the survey vessel at all times in Irish waters to enforce mitigation measures. "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters" (NPWS, 2014) will be applied to ensure noise introduced into the marine environment have minimum effect.

3. In order to ensure the integrity of Annex habitats and additional habitats and species of conservation importance are retained in the vicinity of the planned project a marine ecologist should be onsite during all intertidal works including the final making good of site, including back filling of trial pits and removal of machinery. The ecologist should also ensure that birds of conservation importance roosting on the shore should not be disturbed during works.

4. Mitigation measures will include the presence of a MMO onboard the survey vessel. The purpose of the MMO is to ensure that there is no disturbance of seal /cetacean populations.

5. The NPWS Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters' (NPWS, 2014) should be followed throughout the survey.

6. The MMO/ecologist should ensure that mitigation measures are carried out. Sufficient resources should be made immediately available on the survey vessel to deal with accidental oil spills including hydraulic hoses bursting etc. and reported to the on board ecologist."

DSFN note the comments made in relation to the proposed survey and site investigations and acknowledges the recommended conditions outlined in the IFI submission to which DSFN has no objection. Please see detailed response below in relation to the queries regarding the proposed survey equipment.

Response to IFI Queries:

Underwater Acoustic Noise and fish species

Best Available Techniques (BAT) have been used in the planning and implementation stages of this project and they "represent a key measure for avoiding environmental impacts" (OSPAR, 2012). Best International Practice methods are being used throughout the project and the proposed underwater acoustics are a standard and internationally accepted methodology that is used in marine surveying. The proposed survey equipment and the noise frequency emissions are seen in Table 1.

Table 1. Proposed survey equipment.

Equipment Type	**Frequency (Energy level in dB re 1 µPa)**
Dual Frequency Single Beam Echosounder – Reson Navisound 420	33 and 210kHz (168 – 174)
Dual Frequency Side Scan Sonar - Edgetech 4200 Sidescan Towfish	100 and 400kHz (226 effective)
Sub-bottom Profiler - Geoacoustics 4 x 4 Hull-mounted SBP Pinger System	3 – 7.5kHz (-225)

As outlined in Hawkins et al. (2015)[1] in their paper on Information gaps in understanding the effects of noise on fishes and invertebrates "*Sonar is widely used by fishing and other vessels. Typical sonars include depth sounders, fish-finding sonars, fishing net control sonars, side-scan sonars, multi-beam sonars, and a variety of sonars for mapping the topography of the seabed. The principles of sonar operation are described by Ainslie (2010).*

Sonars work at frequencies from 10 to 800 kHz. Although ultrasonic frequencies are attenuated over short distances by absorption, the contribution to ambient noise is significant due to the large numbers of such units. Sonars are generally operated at frequencies well above the hearing ranges of most

[1] Hawkins, A.D., Pembroke, A.E. and Popper, A.N. Popper. 2015. Information gaps in understanding the effects of noise on fishes and invertebrates. Reviews in Fish Biology and Fisheries 25:39-64

fishes and invertebrates, with the exception of some clupeid fishes, including shads and menhaden, which can detect and respond to ultrasonic frequencies (Dunning et al. 1992; Mann et al. 1997).

Some military sonars operate at low frequencies (1 kHz and less), or mid frequencies (1–10 kHz) that do fall within the hearing range of fishes. The signals projected include combinations of swept frequency (FM) and tones pulses. As these sonars operate at large ranges the signals can be very intense. Investigations using low and mid-frequency naval sonars have shown no tissue damage in fishes, although there is the potential for temporary hearing loss in some specimens of some species (Popper et al. 2007; Kane et al. 2010; Halvorsen et al. 2012c)."

In relation to anadromous fish species, sea lamprey and Atlantic salmon may be within Galway Bay at the time of survey. The survey is solely in the marine environment, vessel speeds are slow (4 knots) and impacts will be localised in nature.

Standard survey practice is to keep acoustic equipment on once the vessel is underway. Following commencement of the survey underwater noise levels would increase gradually as the vessel approaches fish species. As speeds are slow fish species would have ample opportunity and could easily avoid the vessel as noise levels increase. Minor and temporary disturbance may be caused at the mouth of the River Corrib, but at the vessel speeds proposed it would take 30 minutes to reach the 10m contour, 2nm from the LWM at Ballyloughane Beach. It should also be noted that this area is beside Galway Port and biodiversity in the area is accustomed to vessels and underwater noise. This temporary disturbance would be deemed insignificant in relation to the As-outlined mitigation measures of the submitted NIS "A MMO will be onboard the vessel at all times in Irish waters to enforce mitigation measures. "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters" will be applied to ensure that noise introduced into the marine environment will have minimum effect. The presence of a MMO will oversee compliance with mitigation and ensure that these measures are implemented, including the soft start/ramp up procedures which would allow fish to leave the immediate vicinity of the vessel prior to the survey commencing. Once the survey has commenced the sound levels will gradually increase as the vessels approaches at 4 knots so fish will have ample time to move. As a result, fish would not be expected to be near sound levels that would cause injury as the fish species can easily avoid the approaching vessel.

The proposed project has assessed the potential for impact on migratory fish species, particularly Annex II Habitats Directive species. Due to the use of internationally standard practice survey techniques, the standard operation of maintaining equipment in operation throughout the survey, the 24/7 nature of surveys and the limited amount of time that the survey will be within Galway (30min to reach the 10m contour) anadromous fish species will not be significantly impacted.

The conservation objectives of Lough Corrib SAC are in no way reliant on the "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters" to protect the features of interest of this SAC. However, these measures will be in place to protect marine mammals from underwater acoustic noise, which in turn would have a beneficial impact on underwater noise in general within the marine environment and fish species (Appendix I). In addition, due to short term scale of the project, the distance from the survey to the SAC and the low level of impact there is no possibility of significant effects populations of fish species within Galway Bay. It should be noted that a similar survey was carried out within Killala Bay, mouth of the River Moy, and there was no indication of any impact on marine fish species, or biodiversity in general.

Appendix I. Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters – Mitigation measures for Multibeam, single beam, side-scan sonar & sub-bottom profiler surveys

1. "A qualified and experienced marine mammal observer (MMO) shall be appointed to monitor for marine mammals and to log all relevant events using standardised data forms (Appendix 6).
2. Unless information specific to the location and/or plan/project is otherwise available to inform the mitigation process (e.g., specific sound propagation and/or attenuation data) and a distance modification has been agreed with the Regulatory Authority, acoustic surveying using the above equipment shall not commence if marine mammals are detected within a 500m radial distance of the sound source intended for use, i.e., within the Monitored Zone.

Pre-Start Monitoring:

1. Sound-producing activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.
2. An agreed and clear on-site communication signal must be used between the MMO and the Works Superintendent as to whether the relevant activity may or may not proceed, or resume following a break (see below). It shall only proceed on positive confirmation with the MMO.
3. In waters up to 200m deep, the MMO shall conduct pre-start-up constant effort monitoring 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 by the MMO.
4. This prescribed Pre-Start Monitoring shall subsequently be followed by a Ramp-Up Procedure which should include continued monitoring by the MMO.

Ramp-Up Procedure:

1. In commencing an acoustic survey operation using the above equipment, the following Ramp-up Procedure (i.e., "soft-start") must be used, including during any testing of acoustic sources, where the output peak sound pressure level from any source exceeds 170 dB re: 1µPa @1m:
    (a) Where it is possible according to the operational parameters of the equipment concerned, the device's acoustic energy output shall commence from a lower energy start-up (i.e., a peak sound pressure level not exceeding 170 dB re: 1µPa @1m) and thereafter be allowed to gradually build up to the necessary maximum output over a period of 20 minutes.
    (b) This controlled build-up of acoustic energy output shall occur in consistent stages to provide a steady and gradual increase over the ramp-up period.
    (c) Where the acoustic output measures outlined in steps (a) and (b) are not possible according to the operational parameters of any such equipment, the device shall be switched "on" and "off" in a consistent sequential manner over a period of 20 minutes prior to commencement of the full necessary output.
2. In all cases where a Ramp-Up Procedure is employed the delay between the end of ramp-up and the necessary full output must be minimised to prevent unnecessary high-level sound introduction into the environment.
3. 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 500m radial distance of the sound source, i.e., within the Monitored Zone.
4. Breaks in sound output

    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.
5. For higher output survey operations which have the potential to produce injurious levels of underwater sound (see sections 2.4, 3.2) as informed by the associated risk assessment, there is likely to be a regulatory requirement to adopt a shorter 5-10 minute break limit after which period all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) shall recommence as for start-up."