



## Scottish Natural Heritage Dualchas Nàdair na h-Alba

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CNS REN OSWF Beatrice

For the attention of: Alexander Ford

9 September 2015

### **BEATRICE OFFSHORE WIND FARM**

#### **SNH COMMENTS ON BOWL'S PILING STRATEGY**

Thank you for this consultation on the draft piling strategy for BOWL offshore wind farm in the Moray Firth. This draft plan sets out the process for installing turbine foundations, including pile-driving, and the key staff in BOWL's project and contractor teams who have responsibility for managing this work, including mitigation measures relating to natural heritage interests.

SNH and JNCC are responding separately to this consultation, so this letter provides SNH's advice on the piling risk to key environmental receptors, updating the advice we provided at application stage. Our headline comments are given below, supported by further detail in **Appendix A** on proposed piling management and marine mammal mitigation measures. We would welcome further dialogue with Marine Scotland, BOWL and JNCC as there are a number of technical and practical aspects that would benefit from further discussion in order to finalise the piling strategy for 'sign off'.

Importantly, SNH accepts and understands that the piling strategy is based on modelled information: the range of hammer energies are estimated from a sample of sediment types across the site (27 borehole locations). We consider that the information provided in chapter 6 (construction overview) and chapter 7 (anticipated pile-driving energies / durations) is sufficient to allow us to consider the piling risk to key environmental receptors, discussed below.

#### **SNH advice on piling risks to key environmental receptors**

- **SAC fish interests**

In the response of 8 July 2013, SNH indicated that we would give further consideration to underwater noise impacts on Atlantic salmon and other SAC fish interests following consent of the wind farm, once better information was available on construction timings and planned piling activity (see Appendix Ci and Appendix Cii of the response letter).

SNH has now been able to give further consideration to these SAC interests on the basis of BOWL's draft piling strategy. The plan provides more realistic piling parameters, refined from the "worst case" modelled at application stage. Particularly important is the information on the range of maximum blow forces likely to be required to install the foundations (Table 7.2, p42; Table 9.1, p61), and the reductions in time estimated for individual pile-driving events and cumulatively over the whole construction period (section 7.4, p48-49; Table 9.1, p61).

Based on the information now submitted, we consider that there is no significant risk of any barrier effects resulting from underwater piling noise to Atlantic salmon on migration, or to sea lamprey. We do not consider that underwater piling noise will give rise to significant disturbance of these species, and so there is no significant risk of population level effects at any SACs. Nor do we consider there would be any indirect impacts on freshwater pearl mussel populations.

SNH therefore confirms that underwater piling noise will not result in any adverse impacts on site integrity for Berriedale & Langwell Waters SAC, River Evelix SAC, River Moriston SAC, River Oykel SAC, River Spey SAC or River Thurso SAC. **So we do not require any mitigation measures for underwater piling noise in respect of Atlantic salmon, lamprey species or freshwater pearl mussel. Nor do we require that BOWL undertake any impact monitoring or long-term monitoring for these species as SAC qualifying interests.**

We will give further consideration to possible impacts from the BOWL export cable on Spey Bay SAC once further detail is submitted as part of cable plan.

- **Marine fish species**

Although we provided advice on marine fish species in our response of 8 July 2013, SNH does not currently have capacity to provide advice in this regard. Marine Scotland Science (MSS) are therefore the primary contact and, this being the case, we recommend that BOWL progresses discussion in direct liaison with them and MS-LOT.

**Therefore SNH has no comments to provide on the BOWL piling strategy in relation to cod, herring or sandeel.**

- **Marine mammals**

SNH's main advice on the piling strategy is in relation to marine mammal interests, where we have been discussing piling management and possible mitigation measures via the Moray Firth Regional Advisory Group (MFRAG), particularly at the sub-group meeting on 19 June 2015. BOWL and MORL together commissioned a risk assessment of piling impacts to marine mammal species with, and without, pile-driving mitigation. This assessment was discussed at MFRAG and forms part of the mitigation protocol submitted as Appendix C of BOWL's piling strategy.

SNH considers that it will be helpful to develop this risk-based approach for licensing offshore wind farm piling in respect of European Protected Species. In this regard we would welcome further dialogue with Marine Scotland and JNCC to agree the steps in the process and the information required from developers, for which we think it will be necessary to assess the risk of injury to marine mammals as well as disturbance. We do not consider it safe to assume (and it is not proven) that any mitigation measures are 100% effective, therefore no matter the choice of mitigation, we advise that piling activity at offshore wind farm sites is a licensable activity in respect of EPS legislation.

Through MFRAG, we have agreed that the key marine mammal species at potential risk of injury from underwater piling noise are **harbour seal** and **harbour porpoise**, so that piling mitigation focuses on these two species. There is no significant risk of injury predicted to other marine mammals such as bottlenose dolphin, grey seal or minke whale, therefore we do not require mitigation specifically for these interests.

We note that possible marine mammal disturbance from offshore wind farm pile-driving was assessed at application stage for all relevant combinations of development on the Scottish east coast. The impacts of BOWL and MORL were assessed together in respect of harbour seal and grey seal populations in the Moray Firth management unit (and relevant SACs); the Moray Firth wind farms were assessed alongside those in Forth & Tay for more wide-ranging species such as bottlenose dolphin (an SAC interest and European protected species), harbour porpoise (EPS) and minke whale (EPS).

Assessment was based on the “worst case” piling scenarios for each wind farm so we recognise that the risk of disturbance impacts to marine mammals are likely to have been over-estimated. Post-consent, these estimates will be reduced on a case-by-case basis as developers refine their project envelopes and adopt more realistic piling parameters and piling schedules. This is the case for the draft piling strategy from BOWL where a comparison is made between the “worst case” submitted at application stage and the refined project envelope now being taken forward (see Table 9.1, p61).

Further to discussion at MFRAG, SNH considers that the risk-based approach being developed for BOWL and MORL is a sensible way forward to consider possible piling impacts on marine mammals (within relevant licensing frameworks) and the resulting requirements for mitigation. We consider that BOWL and MORL’s piling mitigation protocol, as discussed on 19 June 2015, gives us a meaningful framework under which we can progress the project-specific discussions, namely to:

**1. Optimise hammer energies to balance environmental risk & engineering requirements.**

We consider that the draft BOWL piling strategy demonstrates how this has been done in respect of marine mammal interests. SNH recognises the “embedded mitigation” that has taken place in refining the piling parameters from the “worst case” modelled at application stage to the current estimates of blow energy presented in Table 7.2 and Table 9.1.

**2. Identify impact zones.**

This is a key area for agreement, including to inform EPS licence applications, and we would welcome further discussion on the calculation of impact zones – please see our comments in **Appendix A**.

**3. Develop a site specific protocol for initiating the sequence of piling at each turbine.**

**4. Develop a site specific protocol to be used in planned or unplanned breaks.**

As indicated at the MFRAG meeting, 19 June 2015, and in our subsequent email of 7 August 2015, SNH agrees to the principles of the piling mitigation protocol in relation to these two wind farms (Appendix C of the BOWL piling strategy). We are satisfied with the proposed use of acoustic deterrent devices in combination with soft start piling at the BOWL wind farm site and advise that this will provide adequate mitigation for the key species of concern here: harbour seal and harbour porpoise. There are some technical and practical aspects which will require further discussion in order to finalise the approach – please see **Appendix A**.

In order to finalise the approach, **we recommend** that a sufficiently detailed protocol is drawn up for the deployment of the acoustic deterrent device(s), to be included as an appendix to the piling strategy. Please see **Appendix A** for further advice on the scope of this protocol.

**We also recommend** that, once the technical aspects are discussed and agreed, a project-specific risk assessment is undertaken for BOWL alone. Currently the risk assessment addresses both Moray Firth developments together (Annex 3 of the piling mitigation protocol). This is helpful for a longer-term view in order to understand overall levels of risk, however, we think that project-specific assessments will be required for individual EPS licence applications.

#### **Further Advice**

We would welcome further discussion with Marine Scotland, BOWL and JNCC in order to resolve the technical issues raised in **Appendix A** and to agree the information needed in support of an EPS licence application for this wind farm construction.

Yours sincerely,

#### **Catriona Gall**

Marine Renewables Casework Adviser (Offshore Wind)  
SNH Policy & Advice

cc. Karen Hall, JNCC

## APPENDIX A

### SNH ADVICE ON BOWL DRAFT PILING STRATEGY & MARINE MAMMAL MITIGATION

We consider that the draft piling strategy has been prepared to a high standard and provides a clear overview of the sequence of foundation installation, including piling, and the mitigation that is proposed to avoid injury to marine mammal species of concern. We provide our comments below, and would welcome further discussion of these matters with Marine Scotland, BOWL and JNCC in order to finalise the piling strategy ready for 'sign off'.

#### Communications

Project roles and responsibilities for implementing the piling strategy are set out in section 3.1 (p19-21) with an organisational chart provided in Figure 3.1 (p22). This section notes that there will be a specific operator of the acoustic deterrent device(s), ADD(s), to be used as marine mammal mitigation in combination with soft-start piling. We would welcome further detail on the expected levels of experience and / or training requirements for this role.

**We recommend that an ADD deployment protocol is drawn up** and included as an appendix to the piling strategy, to address the following matters in more detail (see 10.2.10 to 10.2.15):

- (i) **communications and role of the ADD operator** – this section should set out the on-site communications during ADD operation (probably equivalent to the “task plan” discussed in paragraph 10.2.14). Will operation of the ADD(s) be the operator’s sole responsibility?
- (ii) **type of ADD** – the specification of the device should be given. Currently it is planned to use a Lofitech ADD (paragraph 10.2.12) for which we think there is sufficient evidence on its ability to deter harbour seals and harbour porpoise. If required, it may be possible to consider other types of device, but this will need further discussion.
- (iii) **ADD deployment** – where will the ADD be deployed from? How will the appropriate depth be determined for deployment? Note that we recommend 360° coverage so there will need to be consideration of any possible acoustic shadow from the deployment vessel.
- (iv) **monitoring ADD use & reporting** – how will the ADD be tested to ensure it’s correctly functioning? (paragraph 11.2.1). How will the deployment and operation of the ADD be monitored? We are wondering from which location(s) noise measurements will be taken to produce the auditable audio file of ADD deployment? (paragraph 13.3.1). We welcome the reporting commitments (section 13.3), however, we would welcome further detail on these.

#### Plan Iteration

We note the arrangements for plan iteration set out in chapter 5 (Figure 5.1). We have agreed with MS-LOT that they will seek our advice where relevant. This should include any changes to the ADD deployment protocol that we are requesting as part of the piling strategy.

#### Vibro-piling

We note that vibro-piling forms part of the foundation installation sequence – see section 6.3 / Figure 6.4 of the draft piling strategy (and chapter 5 of the construction method statement). Although there is not a lot of data relating to the noise characteristics from vibro-piling, it is generally thought to be a lower noise source than impact piling. The noise is continuous (rather than pulsed) and is similar to vessel noise in amplitude and frequency. Evidence from recent monitoring at Nigg and Invergordon port developments suggests that if vibro-piling does give rise to any effect on marine mammal behaviour then it is very subtle in nature.

Given that there will have been 9-10 hours of vessel activity on-site prior to vibro-piling, we do not require any mitigation measures specifically in relation to it. We do, however, recommend that the proposed noise monitoring includes vibro-piling as well as impact piling.

### **Risk assessment**

It is our view that the marine mammal risk assessment (Annex 3) is a key consideration in the piling protocol. We have therefore considered the modelling of the instantaneous injury zone (Annex 1) in more detail. This zone represents the distance from piling soft-starts at which injury of marine mammals could occur, and from which to estimate the maximum numbers at risk (i.e. if no mitigation measures were adopted).

In the modelling, we have queried the use of a spherical propagation loss calculation ( $20 \cdot \log R$ ) given the depth of the development site, and we discussed this with Paul Thompson (University of Aberdeen) and Nathan Merchant (CEFAS) on 28 August 2015. Following this discussion, we agree to use of  $15 \cdot \log R$  (cylindrical propagation) for the modelling as we consider this to be sufficiently conservative as well as depth independent.

In addition, we discussed the soft start source level used in the original modelling as we considered this could be an overestimate. The original calculation was based on an estimated energy conversion of 10% of impact energy being translated to acoustic energy in the environment. In literature there are different estimates of the percentage (probably related to the seabed structure), however, consensus appears to be moving towards a conversion efficiency of 0.5%. Therefore SNH agrees to use of a 1% conversion factor (as suggested by CEFAS), which we consider should be sufficiently precautionary.

Following these updates, we estimate the instantaneous injury zone will be in the region of **60m**.

We recommend continuing discussion to resolve these technical aspects between all parties in order to agree the injury zone. Once agreed, we recommend that a project-specific risk assessment is undertaken for BOWL alone in order to give the maximum numbers of marine mammals at risk of injury from pile-driving at this site. We think that project-specific estimates of the risk of injury will be needed to inform EPS licence applications for each site.

For clarity, we advise that it is only the instantaneous injury zone which is relevant to consider: the focus of piling mitigation is to “reduce to negligible levels the potential risk of injury or death to marine mammals in close proximity to piling operations” (as given in JNCC’s piling protocol<sup>1</sup>). We do not think there is any requirement to know the number of marine mammals that could be within 500m of piling soft-starts: this is a “mitigation zone” in the JNCC protocol (over which to take visual observations) and does not equate to a zone of injury or a zone of disturbance impact (from either individual or cumulative piling events).

We note that each developer’s environmental statement (ES) provided zones of cumulative disturbance impacts to marine mammals arising from underwater piling noise (modelled on a “worst case” basis). This information underpinned the ES assessments for all relevant species at Scottish east coast wind farms and, on the basis of this work, SNH & JNCC concluded there would be no long-term effects on any marine mammal populations from cumulative disturbance during wind farm construction (responses dated 8 July 2013 for Moray Firth and 7 March 2014 for Forth & Tay).

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<sup>1</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/50006/jncc-pprotocol.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/50006/jncc-pprotocol.pdf)

SNH is satisfied that the “embedded mitigation” which results from refinement of developers’ piling methods and piling schedules will further reduce the level of possible disturbance to marine mammal species. We therefore have no requirement for any further modelling of cumulative disturbance zones. Nor do we require any population modelling for grey seal or minke whale and no further modelling for either bottlenose dolphin or harbour seal. For harbour seal we are content to rely on the work already completed for the BOWL and MORL risk assessment (as presented in Annex 3 of the piling protocol).

### **Piling mitigation**

SNH has carefully considered the BOWL and MORL piling protocol (Appendix C of the BOWL piling strategy) and sole use of ADDs as mitigation in combination with soft-start piling at these wind farm sites. Here, the key marine mammal species potentially at risk of injury are **harbour seal** and **harbour porpoise**. While there remain uncertainties about the behavioural responses of animals to noise stimuli, we feel there is sufficient evidence to support the view that Lofitech (and Airmar) devices are likely to deter both these species.

For EPS licensing requirements, we do not consider it safe to assume that any mitigation methods are 100% effective, therefore SNH advises that licences address the risk of injury as well as disturbance impacts. We note that BOWL anticipate 24 hour working, 7 days a week (paragraph 2.2.3 of the Environmental Management Plan), therefore piling mitigation will need to account for night as well as day-time working, and for possible poor weather conditions (such as fog and rain) and potentially high sea states.

SNH considers that ADDs can be used on their own to mitigate piling impacts on harbour seal and harbour porpoise at the BOWL wind farm site. We advise it should be possible to use ADDs as mitigation in the range of weather conditions likely to be encountered in the outer Moray Firth, as well as at night. We consider that the BOWL and MORL piling protocol does constitute the “best available technique” for these sites and does “demonstrate that effective mitigation can be delivered using an amended protocol” (as required in the JNCC protocol, paragraph 1.1.1 and section 4).

We note that there is no significant risk of injury predicted to any other marine mammal species including grey seal, bottlenose dolphin, minke whale and other EPS cetaceans, so that mitigation does not specifically need to address these interests.

### **Monitoring requirements**

- **Noise monitoring**

We agree that the noise monitoring would be most useful when aligned with knowledge gaps and the marine mammal monitoring programme rather than simply to assess whether the noise levels are as predicted. At the appropriate time, we would welcome further detail and discussion of noise monitoring methods, preferably via the MFRAG marine mammals sub-group. We anticipate that this information will be provided in BOWL’s project environmental monitoring programme (paragraph 13.4.1).

- **Monitoring ADD use**

Please see our comments above in relation to an ADD deployment protocol.

- **Monitoring marine mammal responses**

As indicated in section 11.4, this monitoring is under current discussion at the MFRAG marine mammals sub-group. It is intended that the finalised proposals will be set out for approval in BOWL’s project environmental monitoring programme.

## Aires C (Catarina)

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**From:** Catriona Gall <Catriona.Gall@snh.gov.uk>  
**Sent:** 16 October 2015 16:55  
**To:** Drew J (Jessica)  
**Cc:** Bain N (Nicola) (MARLAB); Holland G (Gayle); Brookes K (Kate); Karen.Hall@jncc.gov.uk; Erica Knott; Caroline Carter  
**Subject:** SNH comments on BOWL's updated piling strategy

Dear Jessica,

Thank you for sending us the updated piling strategy submitted by BOWL. We are unclear if formal advice is being requested from SNH, however, we have reviewed the plan and we have the following comments to offer.

### **BOWL's updated piling strategy**

We consider that BOWL's updated piling strategy addresses the comments we made in our response of 9 September 2015. It provides the key information we requested regarding the use of ADDs, including a clear and well-explained **ADD deployment protocol** in Appendix C.

The marine mammal **risk assessment** in Annex 3 of Appendix D has also been updated in line with our recommendations.

We are therefore satisfied that the updated piling strategy, as submitted, addresses the requirements of Section 36 condition 12 in relation to marine mammal interests, and that it will provide effective mitigation and monitoring in relation to bottlenose dolphin and harbour seal (as identified in the condition) and also to the wider range of marine mammal interests that could potentially be encountered on-site including harbour porpoise, minke whale and grey seal.

### **EPS licensing requirements**

SNH would like to clarify our advice in relation to EPS licensing requirements. On the basis of the risk assessment provided by BOWL, we advise that the "worst case" predictions of injury / fatality (Table 6 of Annex 3, p27) are **incidental** in relation to EPS cetaceans and would not result in any population level consequences. This "worst case" is further reduced by the proposed mitigation set out in BOWL's piling strategy, such that the risk of injury / fatality to EPS cetaceans is negligible (and the same is true for the seal species).

It is therefore SNH's advice that there is **no risk of deliberate or reckless injury or fatality to EPS cetaceans** from construction at the BOWL wind farm site and therefore no licence is required in this regard.

We do consider that an EPS licence will be required in relation to disturbance impacts during wind farm construction: this encompasses pile-driving as the key element giving rise to disturbance, but also the use of ADDs as a mitigation measure, and other aspects (such as vessel traffic) which could result in marine mammal disturbance. We would welcome further discussion with Marine Scotland over the relevant conditions for any EPS licence, however, we do not require either the use of marine mammal observers (MMOs) or passive acoustic monitoring (PAM) in this regard, and we are satisfied with the proposed mitigation measures (i.e. use of ADDs and piling soft-starts) that are set out in the BOWL piling strategy.

Going forward, we consider it will be helpful to maintain the dialogue between Marine Scotland, SNH and JNCC over EPS licensing requirements for offshore wind farm construction, but also more widely in respect of other marine renewables and other types of development.

Lastly, in terms of process, it remains unclear what opportunity we would have had to provide formal comment if BOWL's updated piling strategy had not sufficiently addressed our concerns. As we raised earlier in the year, it may be helpful to consider this aspect of the protocol agreement in more detail.

Please get in touch if you have any queries regarding this advice from SNH.

Yours sincerely,

**Catriona Gall**

Marine Renewables Casework Adviser - Offshore Wind

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**From:** Jessica.Drew@gov.scot [mailto:Jessica.Drew@gov.scot]  
**Sent:** 07 October 2015 13:25  
**To:** Karen.Hall@jncc.gov.uk; Erica Knott; Kate.Brookes@gov.scot; Catriona Gall; Gayle.Holland@gov.scot  
**Subject:** FW: BOWL Piling Strategy

Good afternoon

Please find attached a revised addition of the piling strategy submitted by BOWL for your consideration. This revision is designed to satisfy the requirements of S36 condition 12 and OfTH Marine Licence 3.2.2.5.

I look forward to receiving your comments.

Kind regards

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Our reference:  
BOWL Draft Piling Strategy

Date: 9<sup>th</sup> September 2015

Dear Alexander Ford,

## **BEATRICE OFFSHORE WIND FARM: JNCC COMMENTS ON BOWL'S PILING STRATEGY**

Thank you for consulting us on the draft Piling Strategy (PS) for BOWL offshore wind farm in the Moray Firth. The draft PS sets out the process for installing turbine foundations, including pile-driving, the key staff in BOWL's project and contractor teams who have responsibility for managing this work, including mitigation measures. It also sets out a mitigation proposal to use Acoustic Deterrent Devices (ADDs) as the sole mitigation measure, rather than the usual mitigation suite of a combination of Marine Mammal Observers (MMOs), Passive Acoustic Monitoring (PAM) and ADDs (as outlined in the Statutory Nature Conservation Bodies (SNCB) piling protocol).

JNCC's advice on the draft PS is in relation to the potential impacts on marine mammals from noise emitted during pile-driving and the implementation of best available mitigation measures. This response is divided into our overarching comments on the mitigation methods proposed in the PS and detailed comments on the PS in Annex A. Our advice should also be considered alongside our comments on the piling protocol (i.e. Appendix C) submitted separately to the Moray Firth Regional Advisory Group- Marine Mammal (MFRAG-MM) sub group.

### **Overview**

The standard piling mitigation<sup>1</sup> that has been routinely applied offshore for the last 5 years follows a protocol published in 2010 by three of the UK's Statutory Nature Conservation Bodies after undergoing an extensive public consultation. This protocol was adapted from the *JNCC guidelines for minimising the risk of injury and disturbance to marine mammals from seismic surveys*<sup>2</sup>, which have, over the last two decades, been widely adopted by the UK's offshore oil and gas industry, have become a best practice model and used as a benchmark in other parts of the world. The guidelines specify a range of measures to protect marine mammals, including the use of trained MMO personnel and PAM. Whilst there is no mitigation method that is 100%

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<sup>1</sup> [http://jncc.defra.gov.uk/pdf/JNCC\\_Piling%20protocol\\_August\\_2010.pdf](http://jncc.defra.gov.uk/pdf/JNCC_Piling%20protocol_August_2010.pdf)

<sup>2</sup> [http://jncc.defra.gov.uk/pdf/JNCC\\_Guidelines\\_Seismic%20Guidelines\\_August%202010.pdf](http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Seismic%20Guidelines_August%202010.pdf)

effective, the guidelines aim to promote the application of the best available mitigation measures possible under each circumstance. The criticism the guidelines have received in the past and highlighted in the BOWL documents (both the draft piling strategy and mitigation protocol) are mostly related to the inability of the guidelines to mitigate for the wider ranging effect of noise disturbance and the lack of a shut-down policy. None of the critics suggested that MMOs and PAM be dropped from the guidelines in favour of ADDs. In light of the recognised limitations of some of the mitigation measures in the guidelines, JNCC also works towards improving the standards of implementation and their effectiveness and has therefore welcomed the discussions with BOWL and other stakeholders and involvement in the Offshore Renewables Joint Industry Programme (ORJIP) ADD project<sup>3</sup>.

For seals, the combination of MMOs and PAM has indeed a low detection rate, given that current PAM systems do not detect their vocalisations and seals are difficult to detect visually. For this reason, SNCBs have in the past advised the use of ADDs as a complementary measure to that of MMO/PAM in areas where, in addition to cetaceans, seals are known to occur frequently and in large numbers. There is evidence as highlighted in Appendix C of the BOWL piling strategy that some ADDs (most notably the Lofitech device) demonstrate a certain level of efficiency in deterring seals, both generally and from foraging areas. Also, strong aversive reactions to ADDs by harbour porpoise have been observed supporting the premise that ADDs could reduce the risk of porpoises being present in the noise footprint predicted to be associated with hearing impairment (i.e. the Brandt studies described in Appendix C, Annex 2 using the Lofitech device). There may be merit in carrying out further testing of ADDs' efficacy, particularly for devices with different characteristics (e.g. frequency and loudness) from those already tested. Testing ADDs' efficacy on deterring other cetacean species would also be most useful and would inform any future proposals to use ADDs as the main mitigation measure instead of MMOs/PAM.

JNCC has reiterated throughout the MFRAG-MM sub group meetings that BOWL should employ the full suite of mitigation measures (MMOs, PAM and ADDs) as part of their marine mammal mitigation protocol and JNCC remains confident that this would provide the most comprehensive, best available mitigation package, lowering the risk of hearing impairment for animals of all species likely to occur in the area (please refer to our comments on the piling protocol submitted separately to the MFRAG-MM sub group).

The current proposal from BOWL is to not employ MMOs and PAM. JNCC recognises that there is evidence that certain ADDs provide a level of mitigation that may be comparable to that of MMO/PAM for seals and harbour porpoise (noting that this is currently under discussion in much more detail via ORJIP). Seals and harbour porpoise are the main receptors considered within the BOWL piling strategy consent condition, which was agreed via subsequent discussions at MFRAG-MM sub group. However, any mitigation devised for the PS will also need to consider how such proposals may work for other species of cetacean found within the Moray Firth, albeit likely to be in lower densities than both harbour seals and harbour porpoise, to inform their European Protected Species<sup>4</sup> (EPS) licence. The evidence base on ADD effectiveness is still lacking for these other species of cetacean (e.g. minke whale).

When there is a risk of injury to any European Protected Species that cannot be removed or sufficiently reduced by using alternatives and/or mitigation measures, then the activity may still be able to go ahead under licence, but this should be a last resort. In order for the activity to go ahead as proposed, the developer will therefore need to apply for an EPS licence to cover the risk of an injury offence and provide evidence to support the licence tests:

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<sup>3</sup> <http://www.carbontrust.com/orjip>

<sup>4</sup> Under Regulation 39(1) of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and 49(1) of the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended in 2009 and 2010), it is an offence to deliberately capture, injure, or kills any wild animal of a European protected species. All cetaceans are European Protected Species (EPS).

1) whether the activity fits one of the purposes specified in the Regulations (e.g. imperative reasons of over-riding public interest including those of a social or economic nature and beneficial consequences for the environment);

2) whether there are no satisfactory alternatives to the activity proposed (i.e. why the use of MMOs/PAM is not feasible);

and 3) that the licensing of the activity will not be detrimental to the maintenance of the species/population's Favourable Conservation Status (FCS).

Several species of marine mammals occur frequently in the Moray Firth development area, such as harbour porpoise, harbour seal, minke whale, grey seal and a couple of species of dolphin. We welcome the risk-based assessment framework in Appendix C, Annex 3 of the PS (noting our comments on the piling protocol submitted separately to the MFRAG-MM sub group) and its estimation, for the most common species, of numbers likely to be present in the standard 500m mitigation zone (Table 5 in Annex 3). Based on noise propagation modelling, the 500m range is a closer reflection of the potential 'injury zone' when taking into account cumulative sound exposure. Although there is some uncertainty in the density estimates and as the authors themselves recognise the averaging of densities could lead to an underestimation of numbers affected due to cetaceans social behaviour, it is still very unlikely that for species other than harbour porpoise and harbour seals, anything but a small number of animals will be present in the 500m mitigation zone before the start of each piling event. Whilst we note that we will be consulted separately on BOWL's EPS licence we consider the information within Appendix C helpful in providing evidence for the third EPS test. JNCC notes that for those species for which there is no evidence that ADDs would be effective deterrents (e.g. minke whale), the information provided in Appendix C demonstrates that the numbers potentially affected are very low (Table 5c in Annex 3), would constitute a very small percentage of a population (based on cetacean management units<sup>5</sup>) and would therefore be unlikely to be detrimental to FCS.

Notwithstanding our concerns and recommendations for the implementation of the full JNCC piling protocol (i.e. MMOs, PAM and ADDs), if the Regulator allows, under an EPS licence, the use of ADDs as the main mitigation measure we recommend the following additional measures should be employed to ensure the ADD deployment fulfils its potential for mitigation for seals and porpoises;

- Protocols for checking whether ADDs are working adequately, how they will be deployed and clarity over the ADD operators role, training, communication channels and reporting requirements etc (please refer to our detailed comments in Annex A)
- Clarification of ADD device to be used and how any deviations from this will be agreed with MS (please refer to our detailed comments in Annex A)
- Monitoring of harbour seal and harbour porpoise responses to ADDs (agreement over such monitoring to be reached via MFRAG-MM subgroup and noting our comments in Annex A)
- Consideration of efforts to test the effectiveness of ADDs on other species (potentially via working with ORJIP)

If you have any queries on any aspect of this advice, please do not hesitate to contact me.

Yours sincerely,

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<sup>5</sup> [http://jncc.defra.gov.uk/pdf/Report\\_547\\_webv2.pdf](http://jncc.defra.gov.uk/pdf/Report_547_webv2.pdf)



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cc, Catriona Gall, SNH

## **Annex A. JNCC comments on BOWL's Draft Piling Strategy**

JNCC considers the BOWL draft piling strategy (PS) has been written to a high standard and does provide a good overview of the piling operations to be employed. We acknowledge that the piling strategy is based on modelled information, i.e. the range of hammer energies are estimated from a sample of sediment types across the site (27 borehole locations) as described in chapter 7 (anticipated maximum pile-driving energies and durations). However, we consider that this information, alongside the information provided, particularly in chapter 6 (wind farm construction overview) and chapter 9 (reduction in design envelope in comparison to the ES/SEIS), is sufficient to inform the piling strategy.

We provide detailed comments below that require further clarification in order to finalise the PS.

### **ADD operator, device and reporting requirements**

Paragraphs 3.1.17- 3.1.19 describes the ADD operator's role, while paragraph 10.2.13 states the ADD operator will ensure the ADD device is operating correctly and paragraphs 13.3.1 describes some of the recording mechanisms for the ADD operator, including the collection of an auditable audio file. JNCC consider that further clarification is required on the role of the ADD operator within the PS, including;

**ADD operator:** Do BOWL envisage having a single ADD operator or a number of ADD operators? Will the operation of the ADD(s) be the ADD operator's sole responsibility? If it is not their sole role then what other responsibilities may they have and how will these roles be balanced and prioritised?

How will the ADD operator be trained to fulfil their requirements, in terms of deployment, ensuring the device is operating correctly and maintenance? Paragraphs 10.2.13 and 11.2.1 relate to the ADD operator ensuring the device is operating correctly but how will this be achieved in practice?

**Type of ADD device:** The evidence presented within the PS and piling protocol to justify the use of ADDs as the sole mitigation measure for harbour porpoise and harbour seal is based predominately on the Lofitech ADD device. Paragraph 10.2.12 states that '*a Lofitech Seal Scarer is likely to be selected for use as the ADD.*' Whilst JNCC can understand why BOWL may not want to limit themselves to the use of one particular ADD device, the evidence to date and premise of the risk assessment in Appendix C is based on the responses of these species predominately to the Lofitech ADD device. The intention to deploy a different device should therefore be communicated and discussed with MS, JNCC and SNH.

In relation to this, we note the procedures outlined by BOWL in Chapter 5 for any iterations of the PS. We have agreed with MS-LOT that they will seek our advice, where relevant, on any changes to post consent plans (in our response of 28<sup>th</sup> August 2015 on BOWL's draft Construction Programme (CoP), Environmental Management Plan (EMP) and Construction Method Statement (CMS)). However, MS-LOT should clarify to all parties whether the use of an ADD device other than the Lofitech device would constitute a significant change to plan and therefore require further consideration by MS-LOT?

**ADD deployment:** It is not clear from the PS where the ADD will be deployed from and how the appropriate depth for deployment will be determined. JNCC query whether the location and deployment depths used in the Lofitech studies as part of the evidence base provided within the PS and piling protocol should be considered

further in the case of these issues. From the PS at present JNCC assume only a single ADD device will be deployed?

**Communications and reporting requirements:** Further detail on the task plan noted in paragraph 10.2.14 and the pro-formas noted in paragraph 13.3.1 should be included within the PS to clearly outline how communication channels on site will work within the ADD protocol. This could also potentially be included within/ alongside the ADD protocol outlined in Figure 10.1 to show how the ADD protocol and communication channels will work alongside each other in practice.

Reporting requirements and associated recording forms for MMO and PAM use are well established within the JNCC piling guidelines, but not for the sole use of ADDs as a mitigation measure. Whilst JNCC welcome the reporting requirements outlined in section 13.3 we would welcome further detail, in particular, on if the reporting requirements outlined in paragraph 13.3.1 are to be conducted for every pile? How will the ADD be tested to ensure it is functioning correctly (paragraph 11.2.1)? How will the deployment and operation of the ADD be monitored? From which location(s) will noise measurements be taken to produce the auditable audio file of ADD deployment (paragraph 13.3.1)?

## **Monitoring requirements**

### **Noise monitoring**

We note in Table 4.1 that it is stated that '*Agreement was reached between BOWL and SNH on the objectives and possible outline of noise monitoring to measure the noise emitted from pile-driving*'. JNCC have not been involved in these discussions therefore we are not clear what has been agreed either in principle or in detail and would welcome further clarification on this.

In paragraphs 6.4.9 and 6.4.10 the PS describes how the wind farm site has been split into five clusters on the basis of depth range and how it is anticipated that that installation of pile foundations and jackets at the cluster 1 and cluster 2 (shallower sites) will be completed in the first pile-driving 'season' in 2017, with structures in clusters 3 to 5 (deeper sites) anticipated to be completed in the second pile-driving 'season' in 2018. JNCC recommends that the choice of piling locations for noise recording be guided by how representative of the worst case noise footprint (i.e. louder, propagating further and into areas with predicted higher occurrence of marine mammals etc) the locations might be. Also, those predicted worst case events should where possible be monitored relatively early on within the piling schedule. It is not clear from the PS and noise monitoring suggestions how these considerations have been incorporated (i.e. within Chapter 6, 7 and 11). Further discussion, potentially via the MFRAG-MM subgroup would be welcomed.

### **Monitoring marine mammal responses- both to ADDs and piling operations**

As indicated in section 11.4, this aspect of monitoring is currently under discussion at the MFRAG-MM sub-group and will be set out for approval in BOWL's project environmental monitoring programme. JNCC note that some elements of this monitoring seem to have been agreed separately with SNH (i.e. paragraph 11.4.4). JNCC have not been involved in these discussions therefore it is difficult for us to comment. We would welcome further discussion and agreement on such proposals via the MFRAG-MM subgroup.

### **Other comments:**

- Figure 6.1- it should be clarified in the title of this Figure if this is the final or an indicative layout?
- Paragraph 6.3.24- If reverse circulation drilling is required it is stated that the piling mitigation set out in Section 10 will be implemented when pile-driving needs to be resumed. No duration of such operations are available for context, but JNCC assume BOWL would anticipate following the protocol outlined in Figure 10.1 for planned or unplanned breaks in operations?
- Paragraph 6.4.6 outlines examples of planned breaks, including changing of a hammer due to known wear and tear. No expected duration of such an operation is highlighted though as has been stated for other examples of such planned breaks. Such information would be useful to include for context and also so it indicates how it would fit in with the piling protocol outlined in Figure 10.1.
- Table 7.2 provides a useful overview of the estimated piling hammer energy and number of locations at which each hammer size is likely to be required. Should this type of information be updated (either in a revised/ updated PS or other reporting document) to update these summaries after information gathered from the first season of piling operations?

Marine Scotland  
Licensing Operation Team (MS-LOT)  
375 Victoria Road  
Aberdeen  
AB11 9DB

Our reference:  
BOWL Draft Piling Strategy-  
Revised version (October 2015)

Date: 2<sup>nd</sup> November 2015

Dear Jessica,

Thank you for sending JNCC the revised BOWL Piling Strategy (PS) on the 7<sup>th</sup> October. We are unclear if formal advice is being requested from JNCC and consider Marine Scotland (MS) should clarify this aspect in relation to the protocol agreements for post consent plans they currently have in place with BOWL (and for other developments).

Please note that these additional comments on the revised PS do not change our advice submitted on the 9<sup>th</sup> September 2015 on the BOWL PS to MS and on the mitigation protocol to the Moray Firth Regional Advisory Group- Marine Mammal (MFRAG MM) sub group; that we consider the full [interagency mitigation protocol](#) should be followed and include the deployment of Marine Mammal Observers (MMO), Passive Acoustic Monitoring (PAM) and Acoustic Deterrent Device (ADDs).

We have reviewed the revised PS and welcome the detailed ADD deployment protocol in Appendix C (further comments on this are provided in Annex A). We note that BOWL have now outlined that the ADD operators role will include;

- The 2 ADD operators will be trained MMOs and will record incidental observations of marine mammals with such records being submitted to MS-LOT at the end of each pile driving season for information purposes.
- Hydrophones (PAM) will be deployed to test the functioning of the ADD and will be operating prior to the ADD being turned on, during the 15 minute ADD deployment and during the 20 minute soft start with such records being submitted to MS-LOT at the end of each pile driving season for information purposes.

Whilst we welcome these additions to the role of the ADD operator we consider it interesting to note their inclusion given previous stances by BOWL (and other developers) that having such additional personnel offshore constituted a Health and Safety risk. This was one of the justifications being given for not wanting to deploy MMOs and PAM operators offshore and why ADDs alone were the preferred mitigation option.

We advise that the ADD operators (being both trained MMOs and experienced PAM operators) should, in addition to the tasks described in the PS, implement the [interagency mitigation protocol](#), in particular;

- Monitor the standard mitigation zone (500m) for 15 minutes before the ADD is switched on
- Monitor the standard mitigation zone (500m) during the 15 minute ADD deployment
- Piling should not be commenced **IF** marine mammals are detected within the standard mitigation zone (during the 30 minute pre piling search, which includes the 15 minute ADD deployment) or until 20 minutes after the last visual or acoustic detection (refer to section 2.3 of the guidelines). Full details of any such delays should be recorded and reported.
- Monitor the standard mitigation zone (500m) during the 20 minute piling soft start
- **IF** a marine mammal enters the mitigation zone during the soft-start then, whenever possible, the piling operation should cease, or at the least the power should not be further increased until the marine mammal exits the mitigation zone, and there is no further detection for 20 minutes (refer to section 2.4 of the guidelines). Full details of any such delays should be recorded and reported.

Such elements would allow for further reassurance that the ADD is working and deterring harbour porpoises and seals from the mitigation zone but also allow for best practice measures (i.e. the principles of the piling guidelines) to be used in conjunction with the ADD protocol. This should reduce the risk of auditory injury for those animals that do not move out of the mitigation zone. Such MMO and PAM data should be included in the reporting requirements (i.e. use and adapt the JNCC recording forms for all MMO, PAM and ADD data) and form part of the monthly compliance report to MS-LOT and not be submitted solely at the end of the piling season. It is also not clear exactly what information the monthly compliance reports to MS-LOT will contain given the wealth of information being collected during these operations. Whilst not specifically stated we consider from the description of the role that the ADD operators will be *dedicated* to this role alone (i.e. this will be their sole role whilst offshore) but it would be helpful for the PS to confirm this.

We also note the risk assessment in Annex 3 of Appendix D has been updated, with the main change being an estimate of the number of animals likely to occur within a 60m zone now separated for BOWL and MORL developments. As previously stated JNCC will be basing their advice on a 500m mitigation zone.

JNCC advise that if the interagency mitigation protocol and the specific mitigation measures recommended above are followed by the developer, the risk of injury to any European Protected Species (EPS) is considered as minimised by the use of best practice<sup>1</sup> and therefore there would not be a legal requirement to undertake the activity under licence<sup>2</sup>.

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<sup>1</sup> JNCC et al (2010). The protection of marine European Protected Species from injury and disturbance. Draft guidance for the marine area in England and Wales and the UK offshore marine area. 118pp.

<sup>2</sup> Under Regulation 39(1) of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and 49(1) of the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended in 2009 and 2010), it is an offence to deliberately capture, injure, or kills any wild animal of a European protected species. All cetaceans are European Protected Species (EPS).



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We would welcome further discussion regarding noise recordings/ monitoring, both for piling operations and ADD operations via the MFRAG-MM sub group.

JNCC advise that the PS is reviewed at the end of the first piling season in order to ensure it is working adequately (e.g. process, communication, reporting etc) and in order to inform the second season of piling.

We note that we will be consulted separately on BOWL's EPS licence and that there have been recent discussions on EPS licensing between MS-LOT, MSS, SNH and JNCC (6<sup>th</sup> October 2015).

Yours sincerely,



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cc, Catriona Gall, SNH

## Annex A. JNCC comments on BOWL's Revised Draft Piling Strategy (October 2015)

- Paragraph 3.1.18 and Appendix C section D1.10 make reference to SHL vessel personnel being trained *in situ* to assist with the mitigation procedures. Clarification of what this would entail would be helpful, i.e. does this solely relate to help with deploying equipment or fulfilling elements of the ADD operator role?
- We welcome the clarification in paragraph 5.1.4 that any change to the proposed ADD device (i.e. from a Lofitech device) would constitute a significant change to the PS and as such will be communicated and agreed with MS, after consultation with the relevant statutory consultees. The statutory consultee element of this is not explicit in Figure 5.1.
- Figure 10.1- as advised in our response to the mitigation protocol to the MFRAG-MM sub group on the 9th Sept 2015 we consider it may be better to specify a set time rather than a range within Figure 1, Box 3a, and Figure 2, Box 4b(i), i.e. instead of deploy ADD for 10-15 minutes specify a deployment time of 15 minutes, as this would provide greater clarity for the ADD operator.

This appears to have been amended in Appendix D in Figure 1, Box 3a, and Figure 2, Box 4b(i) to reflect the change to 15 minutes, but not in Figure 10.1 Box 3 b(i) for planned and unplanned breaks in operations as this still states 10 minutes. A 10 minute ADD deployment for planned and unplanned breaks in operations is also incorrectly stated in Appendix C, section D1.22.

- Section D1.4 states that '*The length of the cable required will be determined in situ depending on the water depth such that the transducer is well below the maximum draft of the vessel (to ensure 360° coverage), and at a depth approximately mid-way between the draft of the vessel and the seabed.*' Depending on the weight of the transducer, consideration may need to be given to attaching a rope alongside the umbilical with weights on the end, as otherwise potentially the current could push the unit back up to the surface down tide. This would also reduce any risk of entanglement, particularly if longer cable lengths are required.
- We welcome that '*The most suitable depth of deployment will be agreed with MS-LOT following discussion through the MFRAG-MM subgroup, once the details of the HLV have been confirmed.*'
- Section D1.11 and 1.12 discusses testing the functioning of the ADD. How long will such testing potentially last, given that full ADD deployment is only for 15 minutes?
- Section D1.12 How long will PAM be deployed for in order for the baseline to be established?
- Section 5 and Figure D4 outlines the task plan for undertaking mitigation using ADDs. We consider the ADD operator is likely to need more than 30 minutes notice

of piling operations in order to deploy the hydrophones and ADD, test everything appropriately and potentially deal with technical issues. Previous work of a similar manner that we are aware of has involved a notice period of around 2 hours prior to piling operations and then a further notice at 30 minutes.

- Section D1.12; in the event of loss of an ADD what procedures are in place to retrieve this device and if it cannot be retrieved what battery life do these devices have in order to determine how long such a device could be active for in the area as a worst case estimate?
- Section D1.25 should also include the date of operations and how any issues have been resolved if they have occurred.

**Ali Ford**  
**Marine Scotland Licensing Operations Team,**  
**Aberdeen**



Dear Ali,

**BOWL s36 Consent Condition 12 and Marine Licence (Offshore Transmission Works)  
Condition 3.2.2.5 – Piling Strategy (PS):**

Thank you for providing Marine Scotland Science (MSS) with the opportunity to comment on the BOWL PS.

MSS welcome the submission of the PS and the extra information provided within it. MSS also note the considerable refinements of the project envelope that have been made, which will reduce the overall impact of the development from that assessed in the ES and for the consent decision. As taken from table 9.1 the number of piles for the site has reduced from WCS of 1120 to 352. MSS now understand that the piling operations have reduced from the worst case scenario of 33.4 weeks over a period of 3 years to a predicted 6.8 (max) weeks in total for the entire development over a programmed 36 months (split into two phases of 8 and 6 months). Of the piling period the anticipated hammer energy is reduced from 2,300kJ at all locations to 1,200kJ at 72 locations, 1,800kJ at 11 locations and 2,300kJ at 5 locations.

The above reduction from the original 'Worst Case' and what was consented in the s36 is welcomed.

While the Roles and Responsibilities have been made clear in section 3.1 MSS will want to see and comment on the exact protocols that will be in place between the ADD operator, the SHL Offshore Manager and the ECoW, this can be done once all parties are in place. These protocols must lay out how in practice each will communicate and work together to provide effective mitigation of impacts. Section 3.1.18 refers to the ADD operator being responsible for collating data regarding the duration and energy used during pile-driving operations. MSS would welcome more clarity on how will this happen in practice once all parties are in place.

In particular, MSS note that rather few of the 27 piling locations already assessed from borehole data will require the full hammer energy estimated within the ES. MSS are content with the re-analysis of the bore hole data for the revised pile and turbine sizes and we are also content to receive further information when this becomes available.

**Marine Mammals**

We understand that SNH have some questions regarding the potential zones of injury modelled as part of the risk assessment in the piling mitigation protocol. MSS support attempts to resolve these issues to ensure that the risk assessment is as robust as possible. Where changes are required to the protocol as a result of this, we would request that the documentation is updated.

Irrespective of these issues, MSS support the use of ADDs as a mitigation tool to reduce the possibility of injury to marine mammal species. This is particularly important for seals, for which the current MMO/PAM protocol offers no protection in hours of darkness. Considering that a key issue for this project is the potential for effects on the Dornoch Firth and Morrich More SAC for harbour seals, MSS welcome the introduction of mitigation options that will provide protection for this species.

The piling protocol has been discussed extensively through the MFRAG-MM subgroup and MSS have been content to sign this off. We are therefore content that this protocol is implemented at the BOWL development.

## Atlantic Salmon

This advice supplements and replaces some earlier comments made in email correspondence of August 12th.

The current plan is that there would be no mitigation measures specifically for salmon (or sea trout), such as avoiding periods when smolts will be migrating through the Moray Firth. There is therefore a need to ensure that there will be appropriate provision to allow the arrangements to be reviewed as new information relevant to risk assessment comes to hand, including on the use of the development area by salmon and sea trout or better information on the extent to which their migration and feeding behaviour will be affected by the sound levels which will occur. These provisions are set out in the conditions to the satisfaction of MSS.

The PS recognises the potential for disturbance to migrating salmon smolts and adults from pile-driving, and barrier effects between the wind farm and the Caithness coastline. These will be reduced by the reductions in both pile size and hammer energy, and the modelling carried out (9.3.3 and 9.3.4) leads to predictions that only a small proportion of the salmon habitat in the Moray Firth will be affected; that there will be no 'barrier' effects on adult migration to spawning rivers or on seaward migrating smolts (9.3.14). There is also a reduction in the duration of potential behavioural disturbance for migrating salmon and it is noted that noise emissions resulting from pile-driving will be temporary in nature and intermittent (9.2.3 and Table 9.1). As a result, specific mitigation measures for Atlantic salmon are not proposed, and BOWL indicates it would be involved in strategic research on the behaviour and biology of adult Atlantic salmon and smolts when they enter the marine environment of Moray Firth, specifically that BOWL is developing a comprehensive monitoring study for Atlantic salmon smolts in consultation with MSS (e.g. 11.5, plus 2.2.15, 10.3.7). 11.5.1 and 11.5.2 expand that (11.5.1) *"BOWL will be implementing a pre-construction monitoring programme for salmon smolts in 2016 to meet the requirements of the S36 Consent Conditions 27 (PEMP) (specifically Condition 27a5) and 31 (participation in the 'Scottish Atlantic Salmon, Sea Trout and European Eel Monitoring Strategy') and the OfTW Marine Licence Conditions 3.2.1.1 (PEMP) (specifically Condition 3.2.1.1a1) and 3.2.1.3 (participation in the 'Scottish Atlantic Salmon, Sea Trout and European Eel Monitoring Strategy')"* and that (11.5.2) *"The monitoring will be designed to provide information on smolt survival rates and migration behaviour as they enter the marine environment (i.e. the Moray Firth). Details of this monitoring will be provided, for approval, in the PEMP."* The document advises that a meeting took place on 3/7/15 at which *"MSS agreed that the lack of barrier effects means that there is no requirement for mitigation in relation to Atlantic salmon. Emphasis should instead be on monitoring."* (Table 4.1).

MSS noted in the Construction Programme, which MSS recently commented on separately, that pile foundation work for the wind farm itself is intended to be carried out April-November 2017 and April-September 2018 which includes the period when salmon smolts will migrate through the Moray Firth each year. In the case of the piling for the OTMs, the piling for the foundations is scheduled for April 2017 which would seem likely to be before the peak period of migration of salmon smolts through the Moray Firth, although some would be present. MSS would point out that there is a lack of information on the extent to which salmon and sea trout use the immediate vicinity of where pile driving will occur and how close they come to the pile driving locations. It could be that large numbers of salmon smolts and adults and sea trout use the immediate vicinity, or this may not be the case. MSS also note that work involving the Moray Firth developers and MSS is in hand or being planned to produce both direct information on use of the development area of salmon and sea trout smolts and to

develop reliable models to predict use. MSS further point out that there is still also some uncertainty over to what extent migration and feeding behaviour could be affected by the sound levels which will occur away from the immediate vicinity of pile driving.

MSS have also some other specific comments on the document

- 8.3.1 The remarks about avoidance would presumably only apply to adult salmon. Smolts would be expected to have much less ability to take avoiding action.
- 8.3.2 Although the peak runs of adult salmon may be in summer, the spring runs are considered very important and in particular need of protection
- 10.3.6 "Section 8.4" should be "Section 8.3"
- 10.3.7. MSS would suggest that "in recognition of the paucity of information on the behaviour and biology of adult Atlantic salmon and smolts when they enter the marine environment of the Moray Firth" should be rephrased to read "in recognition of the paucity of information on the behaviour and biology of adult Atlantic salmon and smolts when they pass through the marine environment of the Moray Firth" as it is not particularly entering the Moray Firth that there is a need for information. Nonetheless, information on fish entering the Moray Firth may in some situations be useful in predicting what will happen more widely in the Moray Firth.
- 11.5.2 Likewise, MSS would suggest that "The monitoring will be designed to provide information on smolt survival rates and migration behaviour as they enter the marine environment (i.e. the Moray Firth)." should read "The monitoring will be designed to provide information on smolt migration behaviour and survival rates in the marine environment (i.e. the Moray Firth)."
- There is a Youngson spring salmon reference in the References which is not referred to in the text.
- MSS wondered if more should be said about sea trout, particularly in view of their importance in the Moray Firth area.

## Herring

As already mentioned by MS-LOT and as highlighted in the minutes of your meeting on the 3<sup>rd</sup> of July, the statements in Sections 10.3.2 and 10.3.3 are not entirely accurate nor is table 4.1. Provided the second year survey results are similar to the first years' results then the statements will remain accurate. In this situation MSS will be content with the approach that no mitigation is required. As discussed, these statements should be amended to reflect this position. Should the second year results vary, further discussion with MSS would be required. Section 11.6.1 referring to the need for during and post-construction monitoring is a matter to be discussed with MS-LOT.

## Cod

The PS indicates that BOWL does not envisage piling to take place within the cod spawning period of January to April however require flexibility to do so in February and March 2018 (which are stated as peak spawning months). MSS would recommend that the spawning season, particularly peak spawning season, is avoided however if piling should occur during this time, MSS agree with the PS that this should take place at stations least likely to affect the spawning ground area. MSS would note that section 8.5.2 contains the comment "*although as a pelagic spawner cod is not spatially restricted its spawning*" and highlight that cod do move up into the water column as the male mates with the female but that spawning is most definitely spatially restricted as the grounds are specific areas. There is currently cod spawning area work being undertaken within Marine Scotland and initial indications show that sandy seabed is preferred by cod – therefore MSS also advise that, as further mitigation, piling stations selected during the spawning season should, where possible, give preference to seabed type with a muddy sediment.

The surveys mentioned in section 10.3.5 to provide data on whether pile-driving activity has any noise induced effects on actual cod spawning behaviour is not mitigation against impacts of piling on cod. MSS would however support further cod survey work, undertaken with the same methodologies and locations as the baseline study, if pile-driving is required in 2018.

In summary MSS are content with the document, subject to corrections referred to above. MSS welcome the reductions in the number of piles to be driven, the estimated power required to drive these piles and in the overall amount of time spent piling.

If you have any queries, please contact me in the first instance.

Many thanks

Rob

Robert Main

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**Ref: 003-0W-BOWL-8**

### **SSE RENEWABLES: BEATRICE, MORAY FIRTH - PILING STRATEGY (REVISED)**

Marine Scotland Science (MSS) commented on the piling strategy on 9 September 2015 and most of those comments have been addressed. However there are still several issues for MS-LOT to be aware of.

#### **Marine Mammals**

MSS note that the discrepancy in noise modelling highlighted by SNH has been resolved. This results in the maximum range injury being estimated as 60m from the pile driving source. We also note that the ADD will be now be used for 15 minutes prior to the start of soft start piling.

MSS are still content with the Piling Protocol and note that it is now the intention that the ADD operator will also be a qualified MMO. While MSS are content to use the ADD as the sole mitigation, we consider that if an MMO is to be used that a protocol for the use of the MMO should be provided, including an explanation of the role of the MMO and the monitoring and reporting undertaken by this person.

#### **Atlantic Salmon and Sea Trout**

There is still no mention of sea trout in the document. The site may be of importance to feeding sea trout and this should have been recognised.

#### **Marine Fish (Cod)**

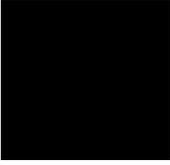
MMS would still prefer that piling avoid peak spawning times for cod. Piling in 2017 should first target the locations that would be most sensitive to cod spawning (based on the previous survey work). Should piling be required during the peak spawning period in 2018 then only those locations least sensitive to cod would remain. Should this not be possible MSS would welcome further discussion on how to mitigate the impacts. We also note that the survey proposed, should piling be required in 2018, has been removed from the mitigation section of the document. This is correct as technically it would not class as mitigation, however it has not been placed anywhere else in the document. MSS welcomed the suggestion by BOWL to undertake this survey if piling was to be undertaken in 2018. Further discussion nearer the time, should piling be required in 2018, would be welcomed.

#### **Marine Fish (Herring)**

MSS are content with the proposals for herring. We await the results of this year's Herring surveys to provide further advice.

Hopefully these comments are helpful to you. If you wish to discuss any matters further contact the MSS Renewables in-box [MS\\_Renewables@scotland.gsi.gov.uk](mailto:MS_Renewables@scotland.gsi.gov.uk).

Yours sincerely



**Paul Stainer**

Marine Scotland Science

15 October 2015

## Aires C (Catarina)

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**From:** Sarah Dolman <sarah.dolman@whales.org>  
**Sent:** 09 September 2015 16:36  
**To:** Ford A (Alexander); marineenergy@snh.gov.uk; Fiona Read; MS Marine Licensing  
**Cc:** Sarah Dolman; caroline.carter@snh.gov.uk  
**Subject:** RE: 150811 - Consultation on BOWL's Post Consent Piling Strategy - MS LOT to Consultees

Dear Ali

Thank you for the ongoing opportunity to provide input to the mitigation and monitoring plans surrounding Moray Firth offshore wind developments.

We accept the expert advice provided by Aberdeen university. In providing these brief comments, we are being pragmatic, accepting that the wind industry should be encouraged to go forward and that it has been determined that noise reduction techniques, which are our preferred option, are not yet at a stage ready for deployment in deep waters. Noise reduction continues to be our preferred approach and we would request that Marine Scotland gives it the upmost consideration.

Section 8.2.2 of BOWL's Post Consent Piling Strategy deals with the potential impacts to marine mammals. We note that Acoustic Deterrent Devices may reduce or prevent (1) instantaneous death or injury and (2) auditory damage, but that such devices may also cause these impacts cumulatively (Lepper et al., 2013). Use of ADDs will not, and is not intended to reduce (3) behavioural impacts.

WDC continue to believe that long term surveillance and impact monitoring is required to ground-truth the modelling predictions made in the assessments, including for disturbance, and that a strategy for such is required.

Section 10.2.3 (and 10.2.6: optimising hammer energies) states that "ensuring both a predictable and efficient process that balances environmental protection with commercial practicality." However, environmental requirements under the Habitats Directive must be met, it is not adequate to 'balance' environmental protection with commercial practicality. For this reason an EPS license is required. We are not familiar with any conditions that may be attached to such a license but request that consideration be given to ensuring that adequate detailed monitoring plans of local disturbance impacts for all EPS species are included.

Section 10.2.8 states that one ADD will be used, alongside 'soft-start' as mitigation "to effectively deter marine mammals from the impact zone". We are not aware of evidence that demonstrates effective deterrence using ADDs in Scottish waters and for the species of primary concern. We continue to believe that, at least until their effectiveness is demonstrated for the range of species likely to be encountered, including minke whales, to the use of ADDs should be monitored both visually and acoustically using dedicated observers for the duration, in order to assess their effectiveness to meet the legal requirements determined.

We understand that a person will be deploying and monitoring the ADD and wonder if it would be possible for them to be dedicated to the task of visual and acoustic observations also?

We hope these comments are helpful. Please feel free to get in touch should you have any questions.

Many thanks,

Sarah

**Sarah Dolman**

Senior policy manager

Telephone: +44 (0)1316 617 722

Mobile [REDACTED]

[whales.org](http://whales.org)

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**From:** Alexander.Ford@scotland.gsi.gov.uk [mailto:Alexander.Ford@scotland.gsi.gov.uk]

**Sent:** 11 August 2015 14:25

**To:** karen.hall@jncc.gov.uk; Enrique.Pardo@jncc.gov.uk; jnccadvice@jncc.gov.uk; Erica.Knott@snh.gov.uk; catriona.gall@snh.gov.uk; marineenergy@snh.gov.uk; Sarah Dolman; Fiona Read

**Cc:** Nicola.Bain@scotland.gsi.gov.uk; Paul.Smith@scotland.gsi.gov.uk

**Subject:** 150811 - Consultation on BOWL's Post Consent Piling Strategy - MS LOT to Consultees

**Importance:** High

Dear Sir/Madam,

Following my email on 11<sup>th</sup> June, please find attached a proposed 'Piling Strategy' (Revision 1 issued 05/08/2015) ("PS") post-consent plan and covering letter addressed to MS-LOT from Beatrice Offshore Windfarm Limited ("BOWL").

The purpose of the PS is to attempt to satisfy the requirement of condition 12 of the Beatrice Offshore Wind Farm section 36 consent awarded to BOWL in March 2014; and condition 3.2.2.5 of the associated BOWL Offshore Transmission Works (OfTW) marine licence issued in September 2014.

(<http://www.gov.scot/Topics/marine/Licensing/marine/scoping/Beatrice>).

The conditions state that the plan is to be submitted to the Scottish Ministers for their written approval; following a consultation with the JNCC, SNH and any such other advisors as may be required at the discretion of the Scottish Ministers. MS LOT would like to invite WDC to comment on the PS. MS LOT hereby asks each stakeholder to review the attached plan in order to determine whether it is fit for purpose for the Scottish Ministers to give it their written approval.

Please can each stakeholder review the plan by the **9<sup>th</sup> September 2015**. MS-LOT welcomes any comments each stakeholder may have. If you wish to submit comments, please reply to this email or to [ms.marinelicensing@scotland.gsi.gov.uk](mailto:ms.marinelicensing@scotland.gsi.gov.uk)

**\*\*ALL PLEASE NOTE\*\***

MS LOT is not entirely happy with revision 1 of the PS and believes an amended PS is required. Please see the attached word document with my comments and questions. To help try and achieve the date for eventual sign-off of the PS I am starting the consultation today. BOWL have agreed that I may start the consultation with my comments and questions included.

As and when BOWL address my comments and answer my questions, I will pass these to yourselves for consideration. Consultees on the PS will be the JNCC, SNH, WDC and MSS.

Please contact myself if you have any queries.

Kind regards

Ali