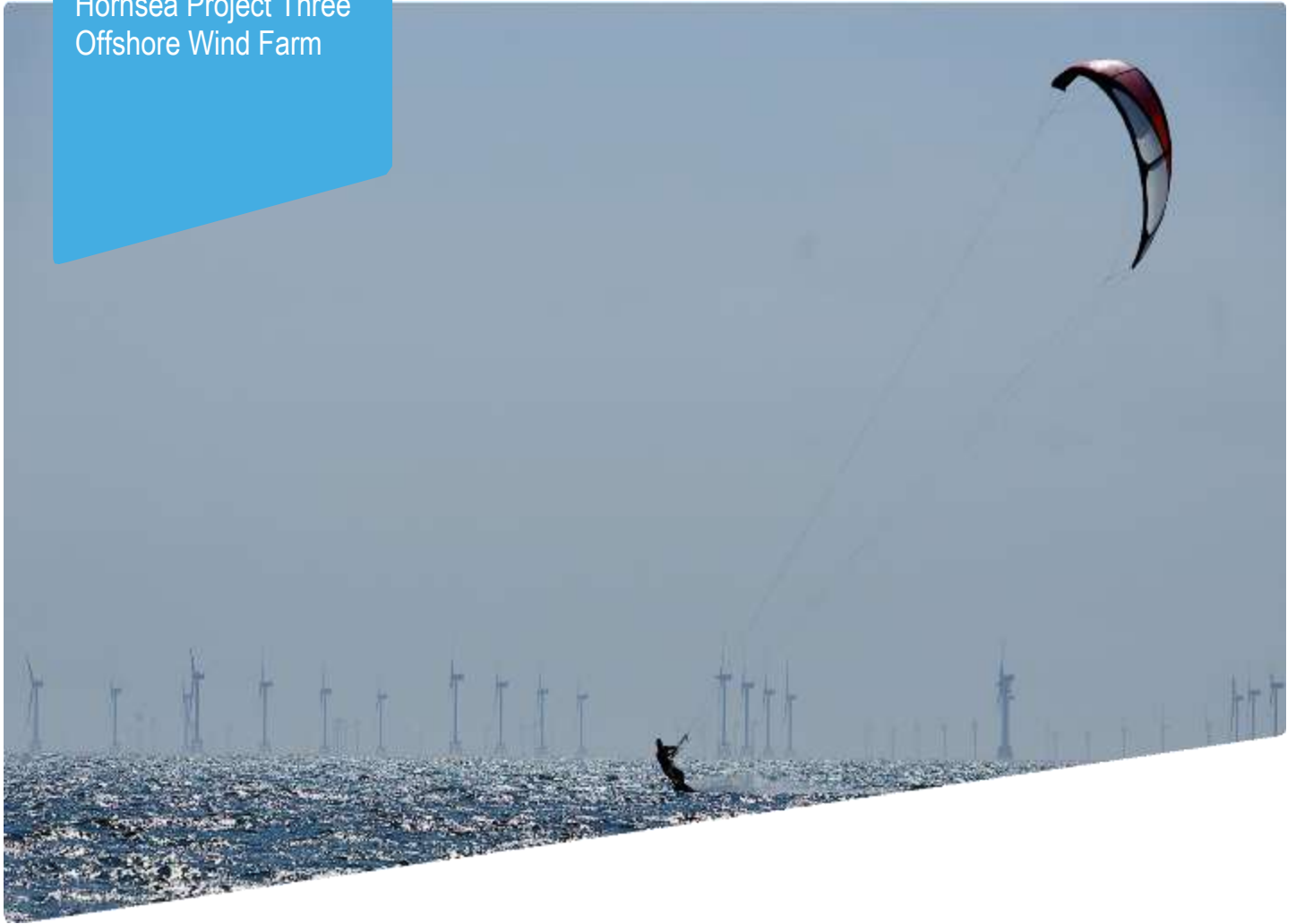


Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three Offshore Wind Farm

Appendix 6 to Deadline 4 Submission
– Moray West OWF Application

Date: 15th January 2019

Hornsea 3
Offshore Wind Farm

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Document Control			
Document Properties			
Organisation	Ørsted Hornsea Project Three		
Author	SNH		
Checked by	n/a		
Approved by	n/a		
Title	Appendix 6 to Deadline 4 Submission – Moray West OWF Application		
PINS Document Number	n/a		
Version History			
Date	Version	Status	Description / Changes
15/01/2019	A	Final	Submitted at Deadline 4 (15/01/2019)

Ørsted

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London, SW1P 1WG

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Front cover picture: Kite surfer near a UK offshore wind farm © Ørsted Hornsea Project Three (UK) Ltd., 2019.



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Your Ref:

Our Ref:
CNS/REN/OFFSHORE
WIND /MORAY WEST

Date: 7th September 2018

By email only: ms.marinerenewables@gov.scot

Dear Sir / Madam,

MORAY WEST OFFSHORE WIND FARM

Application for consent under Section 36 of the Electricity Act 1989 (as amended) and Marine Licence under part 4 of the Marine (Scotland) Act 2010

Thank you for your consultation on the 10th July 2018 for the Moray West Offshore Wind Farm (hereafter referred to as Moray West).

This application is based on a design envelope consisting of a maximum of 85 turbines up to 285m tall, two offshore substation platforms and two export cables coming ashore at a landfall point between Cullen and Portsoy on the Aberdeenshire coast. Our advice considers only those aspects seawards of the landfall, with onshore transmission works covered by a separate planning application.

SNH works in support of the government's vision for an energy sector that delivers secure, affordable and clean energy for Scotland¹. We provide advice in the spirit of Scotland's National Marine Plan² which balances the promotion of sustainable development of offshore wind whilst protecting our biodiversity and taking account of seascapes, landscapes and visual impacts.

We recognise and welcome the very significant contribution that this development would make to mitigating climate change.

Our advice considers Moray West on its own merits as well as taking account of cumulative and in combination effects with other projects, particularly the Beatrice offshore wind farm (under construction) and Moray East offshore wind farm (construction commencing in 2019). In our assessment of the landscape and visual impacts, we also raise cumulative capacity issues with onshore wind farms.

We provide advice to help Marine Scotland undertake their appropriate assessment of the impacts on Natura interests, in their role as competent authority.

¹ Scottish Government Energy Strategy 2017: <https://www.gov.scot/Publications/2017/12/5661/3>

² <https://www.gov.scot/Publications/2015/03/6517>



INVESTOR IN PEOPLE

KEY ADVICE

Natura

We have reviewed the Environmental Impact Assessment (EIA) Report, Habitats Regulations Appraisal (HRA) Report, and undertaken a preliminary appraisal of the updated Population Viability Assessment (PVA) reports. In our view, **this proposal will have an adverse effect on the site integrity for kittiwake as a qualifying interest of the East and North Caithness Cliffs SPAs in combination** with the Moray East and Beatrice offshore wind farms. Therefore, **we object to the proposal**. The key impact is collision risk.

For Moray West on its own we have **insufficient information to conclude no adverse effect on site integrity for kittiwake as a qualifying interest of the East Caithness Cliffs SPAs**. This is due to our uncertainty with the impact assessment methodology, in particular not presenting modelled outputs for combined mortality from collision risk and displacement.

For Moray West in combination with other wind farm projects we have **insufficient information to conclude no adverse effect on site integrity for common guillemot and razorbill of the East Caithness Cliffs SPA**. This is due to our uncertainty issues with the impact assessment methodology, in particular how displacement has been calculated.

Great black-backed gull is not included in the HRA. Therefore, we have **insufficient information to reach a conclusion for great black-backed gull as a qualifying feature of East Caithness Cliffs SPA**.

We present our detailed ornithological advice in **Appendix A**.

Seascape, landscape and visual impacts

The extensive cumulative scale of Moray West in addition to Beatrice and Moray East offshore wind farms contributes to widespread significant adverse effects on sensitive landscape, seascape and visual receptors, and in particular on the distinctive landscape character of the East Sutherland Coast.

Moray West cumulatively with Beatrice will introduce extensive and significant adverse effects on landscape, seascape and visual receptors almost continuously along a substantial 60km length of coastline in east Sutherland, including both daytime and night-time impacts. The open waters of the Moray Firth are a key characteristic of the landscape and coastal character of East Sutherland Coast. The extensive scale of the development running parallel to the East Sutherland Coast will cause the loss of views to open waters from most of this coast.

We present our detailed advice on seascape, landscape and visual impacts in **Appendix B**.

Construction impacts

For a number of other key natural heritage interests, including marine mammals, the greatest level of impacts will arise during the construction phase of the development. Any potential impacts, however, can be mitigated through conditions on any consent / license. We provide our detailed advice on these receptors in **Appendix C** - SNH advice on marine mammals.

In **Appendix D** we provide additional advice on the underwater noise modelling and use of the 0.5% conversion factor. We advise that the noise modelling for Moray West is not required to be repeated with a 1% conversion factor.

We have also considered other natural heritage receptors such as diadromous fish species, marine fish and shellfish as well as benthic ecology and physical processes – **Appendix E**. We advise that any potential impacts can be mitigated through conditions on any consent.

If Marine Scotland is minded to recommend approval of this application to Scottish Ministers, we request the opportunity to provide further advice on natural heritage aspects of the conditions. We wish to provide advice to mitigate impacts to natural heritage interests, particularly with regard to the need for a piling strategy, landfall construction for the export cable, and other pre-construction, construction and operation related activities.

We hope this advice is of assistance. If further information or advice is required please contact (chris.eastham@nature.scot, mobile: 07770 225154) in the first instance.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Nick Halfhide'.

Nick Halfhide
Director of Sustainable Growth

APPENDIX A

SNH ADVICE ON ORNITHOLOGY

Summary of key effects

Our assessment, based on the information in the EIA Report, HRA Report, a preliminary appraisal of the updated PVA reports, and on the worst case scenario, has concluded:

- **An adverse impact on site integrity for kittiwake as a qualifying interest of the East Caithness Cliffs SPA** from Moray West **in combination** with the Moray East and Beatrice offshore wind farms. The key impact is collision risk. There may also be an issue with the combined impact of collision and displacement, but we have been unable to fully assess this due to our inability to follow the process undertaken by the developer.
- **An adverse impact on site integrity for kittiwake as a qualifying interest of the North Caithness Cliffs SPA** from Moray West **in combination** with the Moray East and Beatrice offshore wind farms. The key impact is collision risk. There may also be an issue with the combined impact of collision and displacement, but we have been unable to fully assess this due to our inability to follow the process undertaken by the developer.
- For Moray West on its own **we are unable to conclude no adverse effect on site integrity for kittiwake as a qualifying interest of East Caithness Cliffs SPAs**. This is due to potential issues with the impact assessment methodology, in particular how the PVA was undertaken.
- For Moray West in combination with the other wind farm proposals **we are unable to conclude no adverse effect on site integrity for common guillemot and razorbill as qualifying interests of the East Caithness Cliffs SPA**. This is due to potential issues with the impact assessment methodology, in particular how displacement has been calculated.
- For Moray West on its own and in combination with other wind farm proposals **we conclude no adverse effect on the site integrity of any classified SPAs** with respect to the following qualifying interests:
 - East Caithness Cliffs SPA – fulmar and herring gull.
 - North Caithness Cliffs SPA – common guillemot, razorbill, puffin, fulmar.
 - Buchan Ness to Collieston Coast – herring gull, common guillemot, fulmar.
 - Troup, Pennan and Lion’s Head SPA – herring gull, kittiwake, common guillemot, razorbill, fulmar.
- For Moray West alone and in combination **we conclude no adverse effect on the site integrity for all of the qualifying interests of the Moray Firth pSPA**.
- **Great black-backed gull is not included in the HRA, therefore we have insufficient information to reach a conclusion for this species as a qualifying interest of East Caithness Cliffs SPA**.

Impact Assessment Methodology

We have reviewed the EIA and HRA Reports taking into account the advice contained in the Scoping Opinion and pre-application discussions. We wish to provide the following general comments, before providing more detailed comments on various aspects of the assessment work.

We recognise the importance of pre-application discussions. Our aim in this engagement is to provide advice on data collection for site characterisation, appropriate impact assessment methodologies, and help to reduce the impacts to natural heritage interests. When considering offshore wind applications, there have been multiple changes and updates to standard impact assessment methodologies, as well as the introduction of both new impact methods and the review of post consent monitoring results. All of this is occurring whilst there is very limited operational offshore wind experience in Scottish waters.

With this application, a large part of the detailed pre-application discussions concentrated on the deviation at the choice of the developer from the standard two year collection of baseline data for calculating bird densities and behaviour. This then resulted, due to the developer's timescales, in little or no time to discuss and agree the detail of the impact assessments to be taken forward and reported on in the EIA / HRA Reports.

Below, we provide detailed advice on aspects of the impact assessment process we have found to be unclear. This lack of clarity has arisen due to a lack of detailed information provided in the EIA / HRA Reports, difficulties in understanding how the assessment was undertaken, and deviations from recommended approaches used without clear explanation. We provide a number of detailed points below. We would welcome the opportunity to discuss with Marine Scotland how / if these could be addressed, and if this might alter our advice as well as whether there are implications for the assessment of other projects.

Detailed advice

1. In addition to not reaching an agreement about the suitable baseline values to take forward to impact assessment prior to submission, insufficient information has been provided to assess the validity of the values used. Notably the absence of Technical Appendix 10.1 - Annex 10.1A: Baseline Data Decision Support Flow Charts, but also the absence of clear explanations and justifications for the values taken forward. We requested this in pre-application meetings with Moray West, as noted in the minutes of the meeting held on the 13 April 2018. As a result, we have no certainty over the validity of the values underpinning the impact assessment process, which impacts our ability to be confident in the level of impact being predicted.
2. The PVA models, although following appropriate methods, calculate impacts of the proposed wind farm in 50 bird death increments. This seems to be based on theoretical scales of impact rather than being informed by the impact values predicted by displacement and collision risk modelling. As a result, the scale of impact is only broadly suitable for assessing the in combination impacts on kittiwakes from East and North Caithness Cliffs SPAs, but not for kittiwake alone or other species with lower mortality figures. This has prevented us from being able to fully assess population level impacts for these species.
3. The HRA Report to Inform Appropriate Assessment is inconsistent in the way it presents impacts for each species (with some information absent), and the document does not present the relevant information together in an accessible way. This has made the HRA report challenging to follow and assessment of impacts difficult.

Collision risk

4. At a high level, the approach to collision risk modelling (CRM) is consistent with that requested in the scoping advice and pre-application discussions. However, certain details of how the modelling has been undertaken are unclear which has led to problems being able to fully quantify species-specific impacts.
5. Moray West has used different species-specific flight speed parameters (from the ORJIP Thanet project) to those usually recommended for CRM. Although no agreement was reached in pre-application discussions about whether these flight speeds are appropriate, we are content for these updated flight speeds to be used in the CRM. This is based on the very low sample sizes (n=2-32) used to inform the recommended flight speeds (which until now have represented the best available evidence), compared to the sample sizes used to inform the more recent flight speed estimates (n=287-790). Moray West has also presented the outputs of CRM using the originally recommended flight speeds to enable comparison.
6. Moray West presents collision risk calculated using the SNCB recommended avoidance rates (ARs), in addition to estimates using a variety of other ARs. Our advice is based on outputs calculated using the agreed SNCB AR recommendations.
7. Our advice is not based on the collision outputs from Option 1 Band models, but if considered in the future it should be borne in mind that boat based survey data flight height bands do not accord with the size of the proposed turbines. This will lead to over/underestimation of collisions.
8. A correction factor has been applied to collision estimates from all developments included in the in combination assessment that intends to take account of changes in nocturnal factors applied in collision risk modeling. This is a novel approach that was not discussed or agreed prior to submission. The correction factor will act to reduce in combination collision impacts.
9. Although there are inconsistencies across documents regarding the minimum blade tip height above Highest Astronomical Tide (HAT) (between 22m and 35m), parameters given in Table 3.4 in Appendix 10.2 indicate 35m above HAT is used in CRM.
10. Standard deviations around ARs do not seem to be presented. This is contrary to agreed SNCB guidance on avoidance rates and prevents us from fully understanding the range of potential mortality resulting from collisions.
11. Non-breeding season assessments have not been calculated in an agreed way. Cumulative collision risk has been calculated for kittiwake and gannet during post-breeding and pre-breeding periods rather than as a non-breeding season total. Pre-application discussions about impact assessment methods, as advised in our scoping opinion, would have enabled us to advise Moray West on how to appropriately undertake this part of the assessment. During autumn 2017, we produced an illustrative example for Marine Scotland to assist developers in undertaking cumulative non-breeding season assessments. The current assessment does not allow us to fully quantify cumulative collision risk.

Displacement

12. As the Marine Scotland tool was not available a matrix approach has been applied. The displacement assessment broadly follows SNCB displacement guidance and provides estimates for a range of mortality and displacement rates.

13. Our advice is based on displacement rates of 60% for the auk species and 30% for kittiwake, and mortality rates of 2% for puffin and kittiwake, and 1% for guillemot and razorbill (for both adults and immatures).
14. Seasonal mean peak population estimates, including both birds on the water and in flight, have been used in the impact assessment for displacement as recommended to Marine Scotland. Population estimates have been derived from the 'decision support system' for guillemot, razorbill, puffin and kittiwake, and taken directly from the single year of aerial survey data for fulmar (Section 10.5.4.18, Chapter 10, EIA Report). It is not clear why a different approach has been taken for fulmar.
15. The breeding season definitions Moray West has used in the displacement analysis (and collision risk analysis) do not follow SNH recommended seasonal definitions. SNH has previously provided guidance to Marine Scotland on how to incorporate half months into impact assessment. The use of different seasonal definitions will reduce breeding season predicted impacts for the auk species and fulmar, and increase the impacts for kittiwake.
16. Displacement impact assessment provides population estimates for the Moray West site + 2km buffer, but does not include estimates for the Moray West site alone, as is recommended in the SNCB displacement guidance.
17. Count adjustments and corrections for survey coverage and availability bias are not fully documented, as recommended in the SNCB displacement guidance. This prevents us from assessing how the data have been processed prior to input into impact assessment.
18. SNCB displacement guidance advises that breeding season assessment should be undertaken against appropriate regional populations agreed with SNCBs but likely to cover total colony counts within mean max foraging range of the development. It is not clear what regional population Moray West has used when calculating breeding season impacts (by comparing the predicted displacement mortality to the 1% baseline mortality of the regional population). The tables in Technical Appendix 10.3 provide a breeding season regional population figure but this is labeled as a regional BDMPS figure. BDMPS is a non-breeding season tool. As it isn't clear how the breeding season regional populations have been generated, we cannot assess whether displacement impacts have been compared against the appropriate regional population. This will affect whether an impact is deemed significant or not, and whether that impact should be taken through to PVA or considered in the HRA. For example, the regional breeding population for puffin is cited as 119,600 birds (Table 4.5, Technical Appendix 10.3, and Sections 10.7.2 and 10.8.4, Chapter 10 EIA Report), whereas the North Caithness Cliffs SPA population of puffin within mean max foraging range of Moray West comprises 3,053 individuals (most recent counts). As such, the population values Moray West has used appear to underestimate the impacts of displacement on connected populations.

Apportioning of impacts to SPA populations

19. In the absence of the Marine Scotland apportioning tool being available, Moray West has broadly followed SNH apportioning guidance.
20. Despite Section 3.1.1, Appendix 4.4 of the HRA Report describing that a two-stage apportioning process was followed, it is not clear that recommendations for Stage 2 of process have been followed. HRA Appendix 4.4 Section 7, suggests that Stage 2 apportioning between SPAs has been undertaken using Seabird 2000 data rather than the most recent colony counts provided by SNH (in the Annex of the Moray West memo to Marine Scotland dated 18th December 2017). From a rough comparison of

weightings calculated using both colony counts for kittiwake, there does not seem to be much difference between the two values. However, the counts used could lead to over/underestimates of bird mortality figures attributed to each SPA.

21. SPAs considered in apportioning appear to have been included in HRA based on a mix of mean max and mean max \pm 1 SD foraging ranges as reported in Thaxter et al 2012 (See Section 3.1.1, Appendix 4.4 of the HRA Report). Mean max \pm 1 SD has been used to ensure kittiwake and razorbill from North Caithness Cliffs SPA are considered. Although SNH usually recommends mean max \pm 1 SD, using mean max foraging ranges for the other species should not alter the species and SPAs considered.
22. Colony weighting has been calculated using Seabird 2000 data in accordance with SNH guidance and using the recommended colony counts provided for kittiwake and herring gull (Annex of the Moray West memo to Marine Scotland dated 18th December 2017). However, Seabird 2000 colony counts for guillemot, razorbill and puffin do not match the recommended values provided by SNH. It is not clear which colony counts have been used in the apportioning process or why discrepancies between the figures occur. This could be related issues recently highlighted regarding the use of a 1.34 correction factor for auks but this is not clear from the information provided.
23. Sabbatical birds are taken into account in the apportioning process, using agreed rates advised for the most recent Forth and Tay offshore wind farm applications. These rates are appropriate for the Moray West application, although there is no established agreed position on how best to account for sabbatical birds in impact assessment.
24. A novel method has been used to apportion impacts between age classes for kittiwake, which was not previously discussed or agreed with SNH (HRA Report, Appendix 4.4, Section 5). It draws on an approach developed for the Hornsea II wind farm. The approach uses age-specific survival rates to calculate the proportion of different age-classes likely to be present at the Moray West site rather than using site specific or agreed proportions. This could increase or decrease the impacts attributed to SPA populations.
25. Collision mortality is apportioned to adult birds during the apportioning to SPA stage (Section 6.8, HRA Report e.g. Table 6.8.4). Apportioning to adult birds should not be done at this stage as the apportioned mortality figure is then used in PVA modeling. PVAs allocate impact mortality across all age-classes through applied survival rates. By removing immature birds at the apportioning stage, only the impact on adults is distributed across all age classes in the models (including immatures), which will underestimate the population impact on adult birds. Although the effect of this error may be small at an individual SPA level (e.g. 58 instead of 61 birds deaths attributed to East Caithness Cliffs SPA for kittiwake for Moray West alone) it is not fully known what effect this could have on in combination impacts if the same process has been followed when calculating mortality for other developments.

Population Viability Analysis Methods

26. The population models used for the PVA are described as stochastic, density Independent, age-structured Leslie matrix models. The models use matched runs between impacted and unimpacted scenarios. These models are in accordance with currently recommended methods to estimate population impacts.
27. Population models give outputs for 35 year and 50 year timespans. Models for at least one species are optimistic about the trajectories of the populations involved (kittiwake), although counterfactual/ratio outputs should be robust to this. When calculating population growth rates, the first five years of simulations are discarded, as per

scoping recommendations, to remove the influence of starting conditions. The use of 35 years rather than 25 years prevents the comparison of impacts with other developments that have routinely used a 25 year runtime.

28. Stochasticity is introduced to the population model by sampling from appropriate probability distributions for demographic rates.
29. Model parameters are derived from Horswill and Robinson (2016), as advised in our Scoping Opinion response - except for maximum number of eggs per pair, which is taken from Snow and Perrins (1998). Mean \pm SD of clutch size would have been preferred rather than a maximum clutch size, with sampled rates taken from within this distribution to reflect observed variation in clutch size.
30. PVA models appear to be based on theoretical impact levels rather than informed by predicted mortality figures, with the model outputs presented in increments of 50 bird deaths. For most species, these thresholds are uninformative as impact levels are lower. The increments used are of some use for kittiwake as the scale of estimated impact is similar to the increments presented, although it would still be useful to present population impact increments below 50 bird deaths, particularly in the case of impacts on kittiwake from Moray West alone.
31. Mortality is applied within the model immediately following chick fledging. This should result in a slightly less precautionary output than if mortality were applied at the beginning of the breeding season, as all breeding birds in the population are allowed to breed before collision/displacement mortality is applied, despite collisions occurring during the breeding season and removing some of these individuals. This should not have a large impact on the population modelling results, but is worth bearing in mind when considering the outputs.
32. Stable age structure models were used to compile age classes. Stable age structure models tend to allocate a greater proportion of non-breeding age birds to populations than is usually observed in near-shore developments sites like Moray West. This can lead to a lower impact modelled for adults, as impacts are allocated equally among adult and non-breeding age birds equally. This effect in the modelling process is greater during the breeding season, when adults are central place foragers, than during the non-breeding season, when birds of all ages tend to be more dispersed.
33. Combined impacts from collision and displacement have not been modelled for kittiwake. If combined then the level of impact increases.

Habitat Regulations Assessment

34. The impacts are not presented for all species and site combinations where it was considered that likely significant effect would exist, and as was requested in the scoping advice and subsequent advice provided to Marine Scotland on 18th December 2017.
35. Connectivity of SPAs with the development site is based on Thaxter *et al* (2012) foraging ranges that largely follow SNH recommendations.

36. HRA has been undertaken for collision risk for:

Species	SPA
Herring gull	<ul style="list-style-type: none"> • Buchan Ness to Collieston Coast SPA • East Caithness Cliffs SPA • Troup, Pennan and Lion's Head SPA
Kittiwake	<ul style="list-style-type: none"> • East Caithness Cliffs SPA • North Caithness Cliffs SPA • Troup, Pennan and Lion's Head SPA

HRA has been undertaken for displacement risk for:

Species	SPA
Guillemot	<ul style="list-style-type: none"> • Buchan Ness to Collieston Coast SPA • East Caithness Cliffs SPA • North Caithness Cliffs SPA • Troup, Pennan and Lion's Head SPA
Razorbill	<ul style="list-style-type: none"> • East Caithness Cliffs SPA • North Caithness Cliffs SPA • Troup, Pennan and Lion's Head SPA
Puffin	<ul style="list-style-type: none"> • North Caithness Cliffs SPA
Kittiwake	<ul style="list-style-type: none"> • East Caithness Cliffs SPA • North Caithness Cliffs SPA • Troup, Pennan and Lion's Head SPA
Fulmar	<ul style="list-style-type: none"> • Buchan Ness to Collieston Coast SPA • East Caithness Cliffs SPA • North Caithness Cliffs SPA • Troup, Pennan and Lion's Head SPA

37. The tables in Section 6.8 of the HRA Report that present disturbance/displacement impacts at each of the SPAs for the relevant species are difficult to understand. It is not clear where the figures presented originate from. As such, they may be affected by issues outlined in the displacement section above, which have made it difficult to come to a conclusion about the significance of displacement effects.

38. Great black-backed gull as a qualifying interest of East Caithness Cliffs SPA was not taken through to HRA despite scoping advice to do so. Breeding season collision estimations indicate an increase in baseline mortality for great black-backed gull of

over 20% (Table 10.7.10, Chapter 10 EIA Report). Potential impacts of this level warrant this species inclusion in HRA.

39. Moray West's reasons for not taking this species through to HRA are attributed to 1) results of tracking from East Caithness Cliffs SPA suggesting great black-backed gulls from that colony remain near the coast and do not enter the Moray West site, 2) the inclusion of immature and non-breeding (sabbatical) birds observed in the Moray West site in collision risk modelling population figures where only breeding pairs are considered in the colony counts against which the collision estimates are compared, and 3) that 70% of breeding season collisions occur in August when it is suggested a significant proportion of individuals in the region will be immature or passage birds (Section 10.7.2.130, Chapter 10 EIA report).
40. PVA modelling results indicate the population trajectory for great black-backed gull drops to extinction almost immediately following impact (extinct by first increment of 50 bird deaths). Collision risk mortality indicates 9-10 birds killed per annum but PVA modelling output presentation does not allow assessment of this lower level impact on the population. More detailed assessment for this species is required to establish impacts on the SPA population.

Conclusion

Impacts on populations

41. Impacts resulting in likely significant effect on qualifying interests are generally at the in combination level and at East and North Caithness Cliffs SPAs; the exception being kittiwake collision mortality at East Caithness Cliffs SPA, which is also likely significant effect for Moray West alone.
42. PVA for **kittiwake collision at East Caithness Cliffs SPA** modelled with impacts from Moray West **alone** suggest a population size after **35 years** of **96%** the unimpacted population. For **50 years** the population is predicted to be **94%** the unimpacted population. This has been calculated based on 50 bird deaths whereas the actual collision mortality figure for kittiwake alone at East Caithness Cliffs SPA is 58 birds. This will result in a slight increase in the population level impacts, although it is not possible to establish how much of an increase owing to the way the data has been presented in 50 bird death increments. Considering this assessment is based on collision alone (i.e. without combining impacts from displacement), then **we conclude insufficient information to ascertain no adverse effect on site integrity for kittiwake as a qualifying interest of East Caithness Cliffs SPA.**
43. PVA for **kittiwake collision at East Caithness Cliffs SPA** modelled with impacts from Moray West **in combination** with Moray East and Beatrice suggest a population size after **35 years** of **75%** the unimpacted population. For **50 years** the population is predicted to be **65%** the unimpacted population. We conclude that **Moray West in combination impacts for kittiwake collision will lead to an adverse effect on site integrity at the East Caithness Cliffs SPA.** This has been calculated based on 350 bird deaths whereas the actual in combination collision mortality figure for kittiwake at East Caithness Cliffs SPA is 325 birds. This will result in a slight decrease in the population level impacts, although it is not possible to establish how much of a decrease owing to the way the data has been presented in 50 bird death increments. If collision and displacement were combined, then the level of impact is likely to increase.
44. PVA for **kittiwake collision at North Caithness Cliffs SPA** modelled with impacts from Moray West **in combination** with Moray East and Beatrice suggest a population size after **35 years** of **83%** the unimpacted population. For **50 years** the population is

predicted to be **77%** the unimpacted population. We conclude that **Moray West in combination impacts for kittiwake collision will lead to an adverse effect on site integrity at the North Caithness Cliffs SPA**. This has been calculated on 50 bird deaths whereas the actual in combination collision mortality figure for kittiwake at North Caithness Cliffs SPA is 49. This should not change the population level impacts. If collision and displacement were combined, then the level of impact is likely to increase.

45. PVA for **guillemot displacement at East Caithness Cliffs SPA** modelled with impacts from Moray West **in combination** suggest a population size after **35 years** of **96%** the unimpacted population. For **50 years** the population is predicted to be **95%** the unimpacted population. Guillemot populations at East Caithness Cliffs SPA have increased since 1977 but have shown a decline of 6% since 1999³. Due to concerns about how displacement impacts have been calculated **we have insufficient information to ascertain no adverse effect on site integrity for common guillemot as qualifying interest of the East Caithness Cliffs SPA**.
46. PVA for **razorbill displacement at East Caithness Cliffs SPA** modelled with impacts from Moray West **in combination** suggest a population size after **35 years** of **95%** the unimpacted population. For **50 years** the population is predicted to be **93%** the unimpacted population. Razorbill populations at East Caithness Cliffs SPA have been increasing since 1977¹. Due to concerns about how displacement impacts have been calculated **we have insufficient information to ascertain no adverse effect on site integrity for razorbill as qualifying interest of the East Caithness Cliffs SPA**.

Moray Firth pSPA

47. Overlap with the Moray Firth pSPA occurs with the proposed cable corridor. Distribution maps indicate that this area is within or adjacent to max curvature boundaries for non-breeding divers (red-throated and great northern combined), common eider and European shag. The key potential impacts during construction are disturbance due to vessel movements and loss of supporting habitat along the cable route. Considering any disturbance during construction will be temporary in nature, and the loss of habitat along the cable route is small/reversible, **we conclude no adverse effect to the site integrity for all the qualifying interests for the Moray Firth pSPA**. We advise that mitigation to minimise further any potential impacts should be detailed in the any post consent plans, such as the Vessel Management Plan, Cable Management Plan, and the cable routing study.

Other Species

Special Protection Areas – qualifying interests

48. Great black-backed gull is not included in the HRA, therefore we have insufficient information to reach a conclusion for this species.
49. For all other species, other than those we provide advice on above, we are able to advise that there will be **no adverse effect on site integrity either from Moray West on its own or from in-combination effects with other projects**.

³ Swann, B. 2016. Seabird counts at East Caithness Cliffs SPA for marine renewable casework. Scottish Natural Heritage Commissioned Report No. 902.

Non SPA colonies

50. Similarly, for all species other than those we provide advice on above, we advise that there will be no major significant adverse impacts to species at breeding colonies, including gannets at Gamrie and Pennan Coast SSSI.

APPENDIX B

SNH ADVICE ON SEASCAPE, LANDSCAPE AND VISUAL IMPACTS

Summary

1. There are two key issues identified relating to the extensive cumulative scale of Moray West in addition to Beatrice and Moray East offshore wind farms. Cumulatively these developments contribute to widespread levels of significant adverse effects on sensitive landscape, seascape and visual receptors, and furthermore on the distinctive landscape character of the East Sutherland Coast.
2. It is considered that this level of effect on sensitive landscape, coastal and visual receptors, and distinctive landscape character which contributes to Scotland's national landscape resource raises issues of national interest for SNH.
3. Moray West in addition to Beatrice will introduce extensive and significant adverse effects on landscape, seascape and visual receptors almost continuously along a substantial 60km length of coastline in east Sutherland, including both daytime and night-time impacts.
4. The substantial extent of significant effects arising with the addition of Moray West will be introduced into the open waters of the Moray Firth, which are a key characteristic of the landscape and coastal character of East Sutherland Coast. The extensive scale of the development running parallel to the East Sutherland Coast will entail that for most of this coast the views to open waters will be lost.
5. There is a national interest in safeguarding and enhancing the distinctive character and diversity of Scotland's landscapes at the regional scale. Our aim is to ensure that Scotland's landscapes retain their distinctive regional character and features that contribute to national identity and our sense of place. Moray West is a very large proposal with extensive and significant impacts on landscape character and it will significantly erode the distinctive characteristics of the East Sutherland landscape.

Onshore / Offshore Capacity and Planning for Wind Development

6. This application has highlighted an issue with regard to the joint consideration of landscape / coastal character impacts (see paragraphs 37 & 38 below) and the need for a more holistic consideration of the siting of both onshore and offshore developments. We are unclear on how best to take this conversation forward, but would welcome further discussion with both Marine Scotland and Energy Consents Unit on this issue.

EIA Report Project scenarios

7. Following on from design development through the Rochdale Envelope approach, 4 development scenarios have been taken forward for consideration in the EIA Report (Chapter 14 14.6.1.19 and Volume 3a – Figures 14.6.1).
 - a. Model 2 – 85 turbines of up to 230m blade tip height
 - b. Model 3 – 72 turbines of up to 265m blade tip height
 - c. Model 4a – 41 turbines of up to 285m blade tip height
 - d. Model 4f – 62 turbines of up to 285m blade tip height.
8. Of these the realistic worse-case scenario (RWCS) is Model 4f – 62 turbines of up to 285m blade tip height, which has the greatest number of the tallest turbines. However

for the night-time assessment, the photomontages have been modelled using Model 2, as it has the greatest number of turbines and therefore the greatest number of lights.

9. In appraising these scenarios in terms of potential mitigation, all of them extend out to the full site boundary. As such the horizontal extent of the development does not change. Moray West is further offshore than Beatrice at 22km distance. However due to the larger turbines assessed as the RWCS for Moray West (in comparison to Beatrice) from many views they will actually appear the same size or even larger than Beatrice, and so they contribute to a similar or greater impact. This aspect of the development therefore could be mitigated by the smaller turbines suggested for Model 2 in the scenarios improving the cumulative relationship between Moray West and Beatrice in several views. Furthermore reducing turbine height would also reduce the extent of turbines visible in views from locations such as Brora, Tarbet Ness and the Moray/Aberdeenshire coasts.

Understanding the scale of Moray West and the significance of effect

10. With the addition of Moray West to the landscape baseline, there will be a substantial 'step change' in the extent of significant effects arising on landscape and visual receptors in the Moray Firth.
11. There are 3 main factors which contribute to the level of significant effects arising, these being:
 - a. The larger scale of the development.
 - b. The orientation of the development with regard to the coastline.
 - c. Sensitivity of the receiving environment (assessed in the EIA Report as Medium to High for the majority of receptors and in this advice discussed in relation to the East Sutherland Coast).
12. For all scenarios the Moray West layout is 30km in length and 10km in depth, orientated northeast to southwest. At its closest point the development sits 22km off shore (equivalent to 12nm extent of Scottish Terrestrial Waters).
13. Cumulatively and partially overlapping with the 15km length of Beatrice, (now under construction) the development would contribute to an overall wind farm 45km in length.
14. The straight line length of the East Sutherland Coastline (see point 27 for definition) runs approximately 70km from the northern shore of Loch Fleet to Sarclet. The distance by road along the A9 and A99 is collectively 85km. So for almost half this route through this area, large scale wind turbines will run in parallel to the coast and be prominent in views.
15. As such, whilst wind energy development, and in particular terrestrial wind development, is increasingly familiar in some of our landscapes, the extent of Moray West both individually and cumulatively, creates a uniform continuous array of turbines of a scale unprecedented in Scotland.
16. In contrast to terrestrial development, the Beatrice/Moray West (and Moray East) grouping is viewed at distances of a minimum of 13km to 22km within a wider seascape, which can accommodate a larger scale of wind development. However, the orientation of the development running parallel to the populated and accessible coastline entails that typically the full or a significant proportion of this 45km length wind development will be viewed by many receptors for a considerable period of time, travelling both north and south along the coast (on known tourist routes which contribute to the popular North Coast 500).

Landscape, Seascape and Visual Impact

17. Broadly speaking we agree with the nature, extent and level of significant impacts identified by the applicant within the EIA Report. As such the detailed assessment of landscape, seascape and visual effects contained within this Report, has been used as a basis to inform this advice.
18. In summary the Moray West EIA Report Chapter 14 identifies the following significant effects on sensitive receptors:

Impacts on Landscape and coastal character

19. Significant adverse effects were identified for the following landscape character types (LCTs):
- a. *Small Farms and Crofts* LCT between Sarclet Head and Berridale;
 - b. *Moorland Slopes and Hills* LCT in the vicinity of east facing slopes at Badbea and Cnoc na Croiche;
 - c. *Coastal High Cliffs and Bays* LCT
20. Reflecting the impacts on landscape character, significant adverse effects were identified on the following coastal character areas (CCAs):
- a. *Sarclet Head* CCA (from Sarclet Head south);
 - b. *Lybster Bay* CCA
 - c. *Dunbeath Bay* CCA
 - d. *Helmsdale to Berridale Coastal Shelf* CCA (to the north east of Helmsdale)

21. Contrary to the EIA Report we consider that the *Coastal Shelf* LCTs of high sensitivity (its classification is rare in a highland context⁴) and as such we appraise that there would be significant effects on this LCT and where it contributes to the coastal character of the *Brora to Helmsdale Deposition Coast* CCA.

Impacts on Visual Receptors

22. As part of the EIA Report, 24 representative viewpoints were used to assess the development (4 viewpoints had both daytime and night-time photomontages produced). Below is a summary of the key points of impacts on visual receptors:
- a. Of the 24 viewpoints, significant adverse effects were identified for 10 locations, representing potential visual impacts from Wick extending southwards to Navidale, a 50 km length of coastline.
 - b. Significant effects from lighting were identified from Dunbeath and Navidale, which can be extrapolated to represent the type of effects from visual receptors within the vicinity and between these two locations for a minimum of 20km.
 - c. Significant adverse sequential effects were assessed for the A9 on the views obtained predominantly by north bound travellers between Crackaig and Ousedale (approximately 17km); and by north and south bound travellers between Berridale and Latheron (approximately 13km) although it is considered this would be greater extent up to Whaligoe (26km).

⁴ SNH Caithness and Sutherland Landscape Character Assessment. 1998 C Stanton.

- d. Along the A99 significant adverse effects were identified between Wick and the north of Ulbster, a distance of 10km.
23. Extrapolating the results of the viewpoint and sequential assessment, we consider that significant effects on the wider visual amenity of the East Sutherland Coast will extend from Wick, down to Ballinreach just north of Brora, a distance of approximately 60km. This represents where Moray West (in isolation – see Figure 14.7.3⁵) will be viewed predominantly as an array of turbines occupying a horizontal field of view, of a minimum of 30-40 degrees up to 50-60 degrees between Berridale and Whaligoe. The exception to this is the horizontal field of view between 20-30 degrees from the north of Brora to the south of Helmsdale.
24. Whilst the analysis of the horizontal field of view of Moray West in isolation is useful, Beatrice is part of the baseline landscape. Combined cumulative impacts with Moray West are predicted almost continuously along the majority of the East Sutherland Coast (EIA Figure 14.8.2) and therefore the two developments will largely be viewed together. As such the reality is that Moray West in addition to Beatrice will contribute to turbines occurring across a much wider horizontal field of view of up to 90 degrees, as evidenced by the assessment of viewpoints (for example at Lybster and Latheron). This will contribute to an increased severity of impact and significance of effects on these receptors.
25. From viewpoints including Brora, Tarbet Ness and Lossiemouth, at over 30kms distant from the nearest Moray West turbine, significant effects are not predicted. However it is considered that the level of effect arising on these viewpoints is on the threshold for being significant. In these instances the scale of the development introduces the experience of large scale wind energy development into the more enclosed waters of the Moray Firth, where previously there was none. In particular Tarbet Ness has pronounced qualities of remoteness and seclusion, reinforced by the diminished hierarchy of travel (from A to B to minor roads, to track to footpath) as you approach the popular viewpoint.
26. In conclusion, the large scale and extent of Moray West will introduce significant adverse effects on landscape, seascape and visual receptors almost continuously along a substantial proportion of coastline in east Sutherland, including both daytime and night-time impacts and raises issues of national interest for SNH.

Impacts on the East Sutherland Coast

27. It is considered that the landscape character along the Sutherland coast can be experienced as a distinctive regional area, referred to as the East Sutherland Coast.
28. Our responses in landscape cases are based on the approach set out in the SNH Landscape Policy Framework (LPF 2005)⁶. An overarching aim of this Policy Framework is *'To safeguard and enhance the distinct identity, the diverse character and the special qualities of Scotland's landscapes as a whole'* (LPF para 9). To achieve this aim, the Policy sets out a series of four actions (Para 10), which include working with others and encouraging high standards of design of new development and upholding the *'tangible and intangible qualities that contribute to the landscapes being recognised as distinctive of Scotland through....safeguarding the diverse and distinctive regional character of different parts of Scotland'*.

⁵ EIA Report Figure 14.7.3 Horizontal Angle of View ZTV whilst useful, only models the visibility of MWOW and not the cumulative horizontal field of view of MWOW in addition to BOWL.

⁶ <https://www.nature.scot/sites/default/files/2017-06/A147583%20-%20policy%20statement%200501-%20Landscape%20Policy%20Framework.pdf>

29. This approach to landscape character remains consistent with current Scottish Planning Policy (SPP), which '*should facilitate positive change while maintaining and enhancing distinctive landscape character*' (SPP para. 194). In this context it is important to recognise that protection of distinctive landscape character as part of Scotland's landscape resource, is a separate but interrelated issue from the protection of 'scenically valued' landscapes through designations such as National Scenic Areas (NSAs) and Local Landscape Areas (LLAs). There will undoubtedly be instances where distinctive landscape character will contribute to the experience and special qualities of a NSA, so distinctive landscape character and valued landscape are not mutually exclusive, but they are both afforded protection at a national level.
30. At the broad scale, the East Sutherland Coast is comprised of three categories or combinations of landscape character:
- a. a narrow low-lying coastal shelf or strip, to the east;
 - b. contained by open sea; and
 - c. to the west, backed by extensive upland moorland slopes and hills.
31. It is considered that all of the East Sutherland Coast can be experienced as a distinctive area, the characteristics of which contribute significantly to Scotland's national landscape resource, resulting from:
- **the clarity and contrast of transition between upland, lowland coastal strip and open sea which is almost always continually displayed.** Along the East Sutherland Coast, the clarity of this transition is particularly pronounced at the transition of *Moorland Slopes and Hills* and *Coastal Shelf* LCTs. The occurrence and juxtaposition of character between these types is recognised as highly distinctive, and centrally located within the East Sutherland Coast providing a particularly intense experience of this transitional landscape.
 - **over a distance of approximately 50km the orientation of the Sutherland coastline south west to north east defines the overriding and cohesive linear character.** Within the East Sutherland Coast the relatively abrupt change in elevation between upland and lowland and coast creates a strong but simple visual composition, where the eye is drawn to the skyline (both terrestrial and marine) and the coast.
 - **the distinctiveness of character is experienced when travelling through the area.** There is a tangible sense of entering and exiting this stretch of coast and within it a distinctive rhythm comprising open wide panoramas out to sea, views focussed along the coastal strip, and enclosed views inland. This rhythm of views is distinctive to travelling north and south along the A9 through the East Sutherland Coast.
32. The experience is of the 'whole'; the combination of landscape character types which presents as views of a coastal landscape - the panoramas out to sea are combined with characteristic views along the coast which draws the eye to the backdrop of hills. Unless dictated by local screening, most views along the East Sutherland Coast will combine these three elements. Views from the A9 which, by their very nature, are typically transient and experienced sequentially combine often abrupt changes from enclosed views inland, to open panoramas along the coast and out to sea.
33. The landscape character and experience of the East Sutherland Coast is recognisable as a cohesive area which can be defined at a regional level. This distinctiveness of character makes a significant contribution to both the Highland identity and to the

national landscape resource. This formed part of SNH's evidence to the West Garty Wind Farm Public Inquiry in 2017.

34. Significant adverse effects on landscape character, coastal character, and visual amenity (including static and sequential high sensitivity receptors) have been predicted from the addition of Moray West. This is in part due to the high sensitivity of the receiving environment and the way it is experienced, and the scale of the development which contributes to an extensive wind farm.
35. The substantial extent of significant effects arising with the addition of Moray West will be introduced into the open waters of the Moray Firth, which are a key characteristic of the landscape and coastal character of the East Sutherland Coast. The extensive scale of the development running parallel to the East Sutherland Coast will entail that for most of this coast (approx. 75 %) the views to open waters will be lost.
36. Moray West is a very large proposal with extensive and significant impacts on landscape character and it will significantly erode the distinctive characteristics of the East Sutherland landscape.

Cumulative impacts – future implications for terrestrial capacity

37. Notwithstanding the significant offshore cumulative impacts with Moray West in addition to Moray East and in particular Beatrice, significant adverse cumulative landscape and visual impacts are identified with the combination of terrestrial and marine wind energy developments, both at the local and strategic level.
38. Locally from many visual receptors significant cumulative impacts are predicted for the addition of Moray West in combination with both existing and consented marine wind energy, and existing, consented and proposed terrestrial wind energy (as evidenced by the assessment of impact from viewpoints 4, 5, 6, 8, 9, 10, 11, 12). From a landscape and visual impact perspective, this leads to the conclusion that should Moray West be consented, the already limited capacity to develop further terrestrial wind energy (avoiding extensive significant cumulative effects), will be substantially curtailed.

APPENDIX C

SNH ADVICE ON MARINE MAMMALS

Appraisal of EIA and HRA Reports

We have reviewed the EIA and HRA Reports taking account of advice contained within the Scoping Opinion. We provide the following advice on our appraisal of the impact assessment for marine mammals:

1. Although we have residual concerns regarding the underwater noise modelling, with regard to the conversion factor (see Appendix D), we consider that further assessment is not required.
2. We note that the cumulative Permanent Threshold Shift (PTS) assessment has been based on the modelled maximum impact ranges, and has been estimated without mitigation included, such that once mitigation is employed, the risk of PTS is negligible. We broadly agree with this conclusion, but require clarification on the numbers of animals that are predicted to experience PTS from piling in Moray West.
3. We interpret the PTS peak threshold as a range of instantaneous auditory injury at maximum hammer energy. However the cumulative PTS is also called a range – this is confusing as it seems the cumulative range is smaller than the instant. We interpret cumulative PTS as the maximum starting distance for an individual fleeing animal in order that PTS is accrued over the piling event.
4. Figure 4-6 in Technical Appendix 9.1 – marine mammal baseline - shows the harbour seal density surface obtained from Bailey 2017 (Annex 9.1A). The maps presented in Annex 9.1A however, do not appear to match the density layer used in Technical Appendix 9.1. The Bailey analysis is at a different scale to the SMRU at-sea density maps, but appears to estimate higher densities, therefore the estimates considered in the EIA Report could be considered as more precautionary. Although this may not alter the conclusions, we require clarification on the interpretation of the Bailey paper.
5. With regard to minke whale, we require clarification as to the number of animals that are predicted to experience cumulative PTS in the concurrent scenario as the cumulative PTS range is large and at over 28.5km there is no effective mitigation. We agree that it is likely to be a low number of individuals and that this is unlikely to result in a population effect. However, the predicted number as well as range will enable us to form a view with regard to injury and the EPS licence application.
6. The iPCoD assessment for bottlenose dolphin is done twice, one including PTS and one excluding PTS. There are two aspects to consider:
 - There is only one of the developments that predicts PTS for bottlenose dolphin (Inch Cape consented). Looking at the new application (draft) the number of bottlenose dolphin predicted to suffer PTS is now zero. Therefore the inclusion of PTS is over precautionary.
 - The assessment was done using the version of iPCoD predating the latest expert elicitation round. The new version (4) has radically changed how PTS is assessed in that the effect of PTS is not at all as significant as was previously thought. Therefore, even if there were individuals predicted to suffer PTS the effect on the population would not be as marked as is suggested in the HRA report.

Conclusion

Bottlenose dolphin

7. Based on the information in the EIA and HRA Report, we advise that there will be **no adverse effect on site integrity for bottlenose dolphin as a qualifying interest of the Moray Firth Special Area of Conservation (SAC)**, subject to conditions on any consent / licences.
8. We also advise that there will be **no impact on the favourable conservation status (FCS)** for bottlenose dolphins as an EPS, subject to conditions on any consent / licences.

Harbour seal

9. Based on the information in the EIA and HRA Report, we advise that there will be **no adverse effect on site integrity for harbour seal as a qualifying interest of the Dornoch Firth and Morrich More SAC**, subject to conditions on any consent / licences. Both alone and in combination with other developments, there was no significant long term effect on the population trajectory of harbour seals.

Harbour porpoise

10. We advise that there will be **no impact on the FCS** for harbour porpoise as an EPS, subject to conditions on any consent / licences.

Minke Whale

11. We advise that there will be **no impact on the FCS** for minke whale as an EPS, subject to conditions on any consent / licences. However, please see point 5 above regarding the number of animals that are predicted to experience cumulative PTS.

Other cetaceans

12. We concur with the conclusion that there will be disturbance to cetaceans and, therefore, a European Protected Species (EPS) licence will be required. We advise that it is unlikely that there will be impact on the FCS for any of the cetacean species.

APPENDIX D

SNH advice on the Moray West underwater noise modelling and use of the 0.5% conversion factor

1. Technical appendix 9.2 – Underwater noise modelling - is as we have previously seen, but we note that the units for tables 2-1 and 2-2 have not been corrected. As it stands it is not clear that the source levels are presented as SEL and not SPL.
2. We are content that the detailed approach to estimate PTS (both instantaneous and cumulative) and behavioural response to piling noise is as agreed, and uses our understanding of current good practice.
3. Our main concern has been with the use of the 0.5% conversion factor (CF). This factor is used in an energy conversion model described in De Jong and Ainslie (2008). There are and have been various methods of estimating a source level from piling, including extrapolating from measured levels and estimates using the pile diameter. We welcome the benefits of using an equation such as this; it's transparent and should lead to consistency in source level estimations – understanding that the source level isn't actually a 'real' level, but a means of describing the acoustic energy for noise propagation modelling.
4. The equation uses an energy conversion factor to estimate the proportion of hammer energy that translates into acoustic energy (that then propagates into the marine environment). To do that the parameters used are the impact hammer energy, the speed of sound through seawater and the density of seawater, plus a constant. Seabed type is not included. We assume the harder the seabed substrate is, the greater the hammer energy required, and therefore the seabed type has no bearing on the source level. The key parameter in this equation is therefore the conversion factor.
5. Our concern is that the 0.5% CF returns source level estimates that although are within source levels for piling as reported, they are at the lower end of estimates and much lower than estimates seen in contemporary applications.
6. Appendix A has been added to technical appendix 9.2 and contains CEFAS comment/reasoning on the use of the 0.5% CF, including a literature review intended to support the use of 0.5% CF. This review predominantly leans on the review paper of Dahl, deJong and Popper (2015). However, this is an article in Acoustics Today, rather than a peer reviewed paper. Having said that the authors are recognised experts in the field. Therefore, we view this as valid evidence, but not evidence in itself of a scientific consensus.
7. Evidence presented in table 1 is based on lower hammer energies than will be used for the OWF piling in Moray West, and therefore the assumption is that there is a linear relationship between hammer energy and the conversion factor to enable extrapolation. Also, these are based to some extent on received levels being back calculated to a source level and the conversion factor being calculated from that. Therefore, the sediment type is incorporated into the propagation calculation and resulting source level.

SNH advice on the use of the 0.5% CF

8. There is uncertainty in any modelling used to estimate impact zones and numbers of animals predicted to experience PTS or disturbance.
9. There is uncertainty pertaining to the prediction of the source level by any method.

10. There are a range of source levels that may be predicted from offshore wind piling.
11. Recalculation using a 1% CF will increase the size of impact zones, and the numbers of animals predicted to be affected.
12. A few dB difference at source will make a difference to the propagation modelling. However, it is considered that the ultimate conclusions relating to significance will remain the same.
13. We agree that uncertainty in back-calculation from received levels could give rise to a +/- 3dB difference in SL estimation, which is the difference between a SL estimated using a 0.5% or 1 % CF.
14. Our view is that the Dahl, deJong and Popper review article (2015) is valid evidence, but is the opinion of the authors rather than proof of scientific consensus.
15. It is likely that there is a range of appropriate conversion factors, and in that case preferably one should be chosen that reflects a degree of conservatism.
16. Therefore, we remain of the view that a 1% CF would have been preferred to a 0.5% bearing in mind uncertainty and conservatism.
17. However, the source levels as presented are within the range of piling noise levels as presented in literature and grey literature, although the use of 0.5% CF appears to return levels at the lower end of the range.
18. The predictions of ranges made for Moray West are without mitigation. Although it is possible these ranges may be an underestimate, adequate mitigation is likely to be gained via a piling strategy plan.
19. **Therefore, we do not recommend that the noise modelling for Moray West is repeated with a 1% conversion factor.**

APPENDIX E

SNH ADVICE ON NATURAL HERITAGE INTERESTS CONSIDERED IN THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PHYSICAL PROCESSES

1. The EIA Report covers both the Offshore Wind Farm (OWF), and the Offshore Transmission Infrastructure (transmission infrastructure). As part of the latter, the export cable landfall corridor has been revised (EIA Report page 7 & figure 1.5.1) to between Sandend Bay and West Head, i.e. on the west side of Redhythe Point. This change to rule out Sandend Bay and the coast to the west was apparently made very late, as Chapter 6 Physical Processes still assesses potential impacts in the original landfall corridor including at Sandend Bay.

General advice

2. The EIA Report concludes that changes to physical processes will be limited and would not lead to significant adverse impacts on the seabed in/around the OWF site and export cable corridor, or on designated coastal sites at the landfall and elsewhere. We agree with this conclusion.

Landfall: Cullen to Stakeness Coast Site of Special Scientific Interest (SSSI)

3. The landfall options ostensibly still include cutting and backfilling a trench (6.8.2.17). However, trenching was only ever being considered through the coastal sediments of the soft sandy sediments of Sandend Bay, now excluded from the revised landfall corridor. Following our advice on the draft EIA Report, the wording “rocks... associated with the SSSI that are normally exposed will not be cut” was added at 6.8.2.22. We welcome this commitment to protect the geological notified feature, which we would recommend as a condition in any consent granted.
4. That being said, we cannot rule out that the preferred option will be trenching through the less cliffed coastline at the western end of the revised landfall corridor (Red Haven area), where there is intermittent rock outcrop between beach sediments and is within the SSSI. In that scenario it is possible, though far from likely, that through detailed geological consultation a route and methodology could be agreed that avoided significant adverse impact despite minor excavation. In that case we advise there should be a condition to avoid affecting exposed rock within the SSSI, unless through a detailed landfall plan agreed in advance with MS and SNH.
5. Whatever landfall method is chosen, there is clear potential for adverse effects on the lowland heath notified feature of the SSSI, unless it is bypassed by Horizontal Directional Drilling (HDD). This potential impact has not been assessed, probably because the current application considers works below the MHWS, and work above the MHWS will be addressed in the onshore transmission infrastructure application.

BENTHIC ECOLOGY

Summary

6. Although some of the impacts will be permanent, most of the protected habitats and species are commonly occurring across the wider area, so the development is unlikely to have a significant impact on these habitats and species populations. Precise details of the landfall are unclear, and further work is required to assess potential impacts.

Protected sites

7. The cable route passes through the Southern Trench proposed Marine Protected Area (pMPA) selected for burrowed mud as well as shelf deeps, fronts and minke whale. The benthic survey shows the presence of the burrowed mud (SS.SMu.CFiMu.SpnMeg, 'Seapens and burrowing megafauna in circalittoral fine mud') Priority Marine Feature (PMF) at five sites along the export cable corridor. White cluster anemone (*Parazoanthus anguicomus*), which has also been recorded in the Southern Trench, was not recorded in the benthic survey.
8. The pMPA, and the burrowed mud feature within it, is extensive, with burrowed mud widespread across the southern half of the Moray Firth and relatively widespread across the waters surrounding Scotland. The area of habitat likely to be affected by the development is therefore comparatively small compared to the area of burrowed mud within the pMPA and the area should recover, though this may take some time.
9. We advise that the proposal is capable of affecting the burrowed mud feature of the Southern Trench pMPA. However, these effects are insignificant. Further assessment is therefore not required.

Priority Marine Features (PMFs)

10. Some PMFs are present within the site and may be affected by the development.
11. Burrowed mud is discussed above under protected sites.
12. Tide-swept coarse sands with burrowing bivalves (SS.SCS.ICS.MoeVen 'Moerella spp. with venerid bivalves in infralittoral gravelly sand') were identified at four sites on the benthic survey. These habitats are likely to be sensitive to physical disturbance but have low sensitivity to siltation changes and are likely to recover quickly. There are likely to be impacts on the PMF, but without significant impact on the national status.
13. Offshore subtidal sands and gravels (SS.SSa.CFiSa.EpusOborApri (or transitional with this biotope) '*Echinocyamus pusillus*, *Ophelia borealis* and *Abra prismatica* in circalittoral fine sand') were present at 47 stations. Sand and gravel sediments are the most common subtidal habitat around the coast of the British Isles and are abundant in the offshore waters of Scotland. There are likely to be impacts on the PMF, but without significant impact on the national status.
14. Three individual flame shells (*Limaria hians*) were identified at one site on the benthic survey, but these are not considered a PMF unless they form a flame shell bed. Individual flame shells are fairly widespread, and the biotope coding does not indicate that a bed was present. Although poor resolution, the images from this station in the technical appendices do not indicate that this is likely to be a flame shell bed, and look similar to images from other stations where no flame shells were found. Flame shell beds are also not known to exist on the east coast of Scotland. These records are therefore not considered a PMF and are not considered further.
15. The ocean quahog (*Arctica islandica*) has been found in low numbers at one station. This species is considered important as Scotland holds a large proportion of the British records and due to the fact that it is long lived, under threat of decline and functionally important. However, it is widespread around Scotland and whilst there are likely to be impacts on the PMF this is likely to be without significant impact on the national status.

Annex 1 habitats

16. There was a small area (approximately 25m wide) of stony reef identified on the benthic survey. Other areas outside the survey stations could also have stony reef and areas of mixed coarse stony/cobble habitats with boulders which may also be considered stony reef. Reef habitat will have a low recoverability and high sensitivity to physical disturbance and smothering. However, the area likely to be affected is likely to be small in the context of the wider area and the development is unlikely to have a significant impact.

Intertidal

17. It is not clear where exactly within the wider area the landfall will be and what habitats are likely to be affected, though none of the landfall area falls within a designated site for intertidal features.
18. The survey work relating to the intertidal all relates to Sandend Bay and methods appropriate for the littoral sediment habitat of Sandend Bay. However, this area has now been discounted as an option for landfall. The remaining area appears to be more rocky, though there is no survey work relating to it. We are unable to make an assessment of the potential impacts of the landfall on the intertidal without more information on both methods and location. HDD would be our preferred option for intertidal habitats over open cut trenching.

FISH (INCLUDING DIADROMOUS FISH) AND SHELLFISH

Electromagnetic fields

19. Technical Appendix 4.3 D (Electromagnetic Fields Modelling) was produced for the 'Telford, Stevenson, MacColl' wind farms and has been included in the EIA Report for Moray West. The Appendix states that, 'in all cases, where cables are buried to 1 m depth, the predicted magnetic field is expected to be below the earth's magnetic field (assumed to be 50 μ T). Where DC cables cannot be buried and are instead protected, the magnetic field is expected to be below the earth's magnetic field within 5 m from the seabed'.
20. The EIA Report for Moray West states that the cables will be buried to a minimum target depth of 1 m where possible and protected (e.g. with rock placement or concrete mattresses) where burial is not feasible. Where they come ashore they will be installed beneath the ground by either trenching or horizontal drilling methods. We welcome this mitigation for diadromous fish species, as cable burial would be expected to increase the distance between the cables and the water column. The offshore cable export corridor landfall search area does not include the mouths of any SAC rivers, and is more than 20km from the nearest riverine SAC with diadromous fish/fresh water pearl mussel interests (River Spey SAC).

Noise and vibration

21. We welcome the commitment to submit a Piling Strategy to MS-LOT for approval prior to the commencement of piling. This will set out any mitigation and management measures that will be implemented during pile installation. We support the commitment to soft starts which could allow fish to move away from the vicinity of piling operations. In Technical Appendix 9.2, figures 3-11, 3-12 and 3-13 indicate the extent of exposure effect zones for Atlantic salmon exposed to different piling methods at various hammer energies. The Non-Technical Summary sets out the programme for the proposed development and reflects that piling would be undertaken between

the start of Q2 2022 and the end of Q1 2023. Given the timespan of the proposed piling activity (spanning a 12 month period), the 'Design Envelope' scenario reflected within the EIA Report, and the extent of the area within which Temporary Threshold Shift is expected, it would be helpful if the Piling Strategy would set out for agreement with MS-LOT further details of the piling methods, cumulative impact of concurrent piling at different locations where this is anticipated to occur, and timing.