

Marine Advice Memo

To: Seran Davies - Marine Licensing Team

From: Adam Cooper - Marine Area Management and Advice Team

Date: 10 October 2020

Response to email from Seran Davies dated 31 August 2022

Consultation: Project Erebus Further Information

Application Reference: ORML2170

Applicant: Blue Gem Wind Limited

NRW advisors consultation record

NRW Advisor	Job title/Team	Technical advice provided
Joanna Ibrahim	Specialist Advisor, Physical Processes (Marine All Wales Advice Team)	Marine and Coastal Physical Processes
Eleanor Howlett	Specialist Advisor, Marine Water Quality (Marine All Wales Advice Team)	Marine Water Quality
Lucie Haines	Development Planning Team Leader	(Marine and Transitional) WFD
Leyre Nieva	Specialist Advisor, Benthic Ecology (Marine and Coastal Ecosystems Team)	Benthic Ecology
Nick Martin	Specialist Advisor, Marine Mammals (Marine and Coastal Ecosystems Team)	Marine Mammals
Mike Bailey	Specialist Advisor, Marine Ornithology (Marine and Coastal Ecosystems Team)	Marine Ornithology
Ida Nielsen	Specialist Advisor, fish and fisheries (Marine and Coastal Ecosystems Team)	Marine and Estuarine Fish
Louise Edwards	Senior Advisor (DPAS SW)	Onshore Receptors
Olwen Maidment	Lead Specialist Advisor, Landscape (DPAS Mid)	Seascape, Landscape and Visual impact Assessment (SLVIA)

NRW Advisory comments:

Overarching Comments

This memo should be read alongside “ORML2170 Project Erebus Technical and General Consultation Responses_SEI Response_NRW response” spreadsheet. Where all responses for a receptor could fit in the spreadsheet this has been done. This memo details key issues, and also detailed comments that were too long to include in the spreadsheet.

The clarifications provided have allowed us to agree with some the overall conclusions of the applicants assessments (though not all – see below). For some receptors while we can agree the overall conclusions we do not agree with the methods/approaches undertaken, or we would have liked to see certain further information provided and these have been highlighted as recommendations for future assessments.

It might be beneficial (especially for future developments in the sector) if both the clarifications and recommendations for future assessments are referred to in Marine licensing decision documents.

Marine Water Quality

Key Issues

No major concerns.

Detailed Comments

All responses are in the SEI response spreadsheet.

Water Framework Directive (WFD) Assessment

Key Issues

No major concerns (but see Marine and Transitional Water Framework Directive comment below)

Detailed Comments

All responses are in the SEI response spreadsheet.

Marine and Transitional Water Framework Directive

Key Issues

The applicant has not assessed the impact of trenching and potential for cable protection within Milford Haven Outer waterbody stating that is “not part of the realistically expected design envelope”, but has not ruled out open cut trenching.

Detailed Comments

All responses are in the SEI response spreadsheet.

Coastal Processes

Key Issues

- Placement of Concrete Mattresses – Cable Protection – NRW have low confidence in the assessment of Morphological Form and Function of Annex 1 Sand Bank Feature of Pembrokeshire Marine SAC (see Benthic Ecology comments)

Detailed Comments

All responses are in the SEI response spreadsheet.

Benthic Ecology

Key Issues

- NRW are not able to agree a conclusion of no adverse effect on integrity to Pembrokeshire Marine SAC due to uncertainty regarding impacts to Annexe I Sandbank feature.
- NRW are able to agree a conclusion of no adverse effect on integrity to Pembrokeshire Marine SAC due to potential impacts to Annexe I reef feature from open cut trenching, but nonetheless advise that horizontal directional drilling (HDD) should be used instead of trenching if at all possible.

Detailed Comments

Detailed comments are provided in the SEI response spreadsheet, along with the text below:

Comment 1 Loss of Annex I Sandbank

The applicant has confirmed the loss of Annex I Sandbank feature in the Pembrokeshire Marine SAC from the use of cable protection at the Greenlink interconnector cable crossing is 0.004%. This takes into account the worst case scenario for cable protection (2,100m²) and uses the feature extent recorded in Lle, following consultation with NRW Advisory (NRW advised the applicant to use the feature extent recorded in Lle and not in the standard data form because the figure in Lle is the most up to date). The total loss of Annex I Sandbank feature is more than NRW Advisory originally calculated and assessed based on the figures presented in the RIAA.

In order to assess the potential significance of the impact of placing up to 2100m² of cable protection within an Annex 1 sandbank, it is important to consider the conservation objectives that have been set for features within the Pembrokeshire Marine SAC. These are as follows:

i) The conservation objective for SAC feature “Range” notes *“The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing.”*

ii) The conservation objective of “Range” needs to be considered alongside the conservation objective of “Structure and function” due to the nature and ecology of Sandbank features. The conservation objective of “Structure and function” states: *“The physical biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded. Important elements include;*

- *geology,*
- *sedimentology,*
- *geomorphology,*
- *hydrography and meteorology,*
- *water and sediment chemistry,*
- *biological interactions.”*

iii) The conservation Objective for “Typical Species” states: *The presence, abundance, condition and diversity of typical species is such that habitat quality is not degraded. Important elements include:*

- *species richness*
- *population structure and dynamics,*
- *physiological health,*
- *reproductive capacity,*
- *recruitment,*
- *mobility,*
- *range*

With regard to “Range”, whilst it is clear the loss of 0.004% of Annex I Sandbank feature would not contribute to an increase in feature distribution or extent, uncertainty remains over the potential impact of this loss on the stability of the bank. It must be noted that from discussions with the NRW Physical Process Specialist, the scale of feature loss from cable protection placed within the Greenlink crossing alone is believed unlikely to have an impact on the form and function of the bank.

Uncertainty also remains over the potential combined impacts from the cable protection required to the north and south of Turbot bank between KP 4.4. and 6.6 and to the south of the bank along the ECC approximately between KP10 to KP13 and KP 17 to KP20 on the stability of the bank (please refer to response from NRW Physical Process Specialist).

With regard to “Structure and Function” any change in sediment type and hydrodynamics would have to be large enough for the feature to no longer be able to maintain its necessary functions for the long-term maintenance of the sandbank i.e. a sufficient change in morphodynamics of the feature which in turn would impact the biological communities present in the feature. NRW believe it is unlikely that the impacts from the 2100m² cable protection placed within the bank itself would amount to such a change. However, as discussed above, uncertainty still remains over the nature and scale of the combined impacts from the cable protection required north and south of Turbot bank. An impact to the structure and function of the Annex I Sandbank feature could potentially hinder other conservation objectives such as “Range” being achieved, as the morphodynamics of the feature also help to maintain the stability and extent of the bank. The effects on the integrity of the Annex I Sandbank feature from the cable protection are therefore uncertain and could be significant.

With regard to “Typical Species” NRW note the Annex I Sandbank feature is in unfavourable condition for this conservation objective. NRW monitoring data from 2001-2008 showed a decline in species richness abundance and diversity. However, a quick analysis from the 2013, 2016 and 2019 monitoring surveys by the NRW monitoring team shows an increase in the number of taxa and species abundance with each survey, though in most circumstances, 2019 values had not returned to those found in 2001. Changes in faunal composition and abundances could have an impact on fish species that use the bank for feeding, spawning or refuge. However, from discussions with the NRW Fish Specialist, the scale of feature loss from cable protection placed within the bank is believed unlikely to have an adverse effect on the noted herring spawning ground at this location. NRW therefore believe the loss 0.004% of Annex I Sandbank feature will not prevent the sandbank feature from achieving its conservation objective for “Typical Species”

The applicant has provided an assessment based on the evidence available and it is understood no other assessment approaches could be provided to resolve the remaining uncertainty on the baseline understanding of sandwave migration rates on Turbot Bank without further survey. We note that in pre-application discussions on the Geophysical Survey specification we did advise the applicant that any large features such as Large and Very Large Subaqueous Dunes should be captured in their entirety to allow an understanding of volume changes and direction of travel. This was not undertaken, if it had been then the uncertainty around this issue would have been reduced. We also note the assessment is based on a tide only model and does not include the contribution of waves (Please refer to Physical Process Specialist comments).

In summary, reasonable scientific doubt remains over the potential impact of the combined placement of cable protections both within and to the north and south of Turbot Bank on the Annex I Sandbank feature of the Pembrokeshire Marine SAC, which could prevent conservation objectives being achieved. NRW Advisory are therefore unable to rule out an adverse effect on site integrity. We acknowledge the applicant commits to undertaking monitoring however this does not change our conclusion in respect to the HRA.

Comment 2 Loss of Annex I Reef

The applicant has confirmed the potential loss of Annex I Reef feature in the Pembrokeshire Marine SAC from open cut trenching is 0.00003% or 146m² using the feature extent recorded in Lle following consultation with NRW Advisory (NRW advised the applicant to use the feature extent recorded in Lle and not in the standard data form because the figure in Lle is the most up to date). The applicant has now also clarified the loss corresponds to shallow subtidal and not intertidal reef.

It is also noted HDD remains as the preferred option but without further detailed feasibility surveys that will be undertaken post-consent, the risk remains that HDD is not technically feasible and as such open-cut trenching is considered as a contingency option.

In order to assess the potential significance of the impact from the loss of 0.00003% of Annex I Reef feature (146m²), NRW has considered the conservation objectives as set out in the Regulation 37 advice package and the feature condition. The feature is currently assessed as favourable for the conservation objectives of “range” and “typical species”. The feature is currently in unfavourable status for the structure and function conservation objective. The assessment notes the main issue contributing to the unfavourable assessment is high levels of nutrients in the water column (in the Milford Haven waterway but not the open coast). In NRW’s opinion, the potential loss of 0.00003% of Annex I Reef feature will not contribute further to the unfavourable status for the structure and function conservation objective as the unfavourable status is related to high levels of nutrients in the water column.

The potential loss of 0.00003% of Annex I subtidal reef could potentially hinder the conservation objective of range which notes “*The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing.*” This loss is small and unlikely to be significant in the context of the whole feature of the SAC. It is also worth noting that whilst cable trenching would result in a loss of feature, this loss is a modification resulting from the trenching activity i.e. the trench cutting through the reef. Whilst an area of reef would be lost through the cutting, the trench should still be able to support colonisation of local flora and fauna as the areas of reef on the side remain. Although uncertainty remains over the nature of any colonising community.

The impact should also be assessed considering the habitats that would potentially be damaged and / or lost as a result of the trenching activity. From the information presented in RIAA, ES and supporting documents, there are no rare species or species of conservation importance present in the section of the reef that would be impacted. The *ES Vol 3 Appendix 9.1 Annex I West Angle Bay Survey* notes the habitats are strongly influenced by sand and are characterised by benthic communities that have a relatively low species richness. When considering potential loss of habitat, impacts from the loss of Annex I reef on the ecological structure and function of the habitat must also be considered. In our opinion it is unlikely the loss of 146m² of reef will have an impact on the ecological structure and function of the Annex I reef. A section of the reef will be modified due to the trenching activity but the ecological function should be maintained by re-colonisation. The same holds true for the conservation objective of “typical species”.

Notwithstanding this conclusion, NRW strongly encourages the applicant to use HDD instead of cable trenching in order to minimise/avoid any impacts, however small on the Annex I Reef habitat of the Pembrokeshire Marine SAC. Should trenching occur, NRW advises the applicant that it would be beneficial to consider d of measures to encourage colonisation of the modified reef areas by local flora and fauna, in line with SMNR principles. These could be implemented as part of the biodiversity enhancement strategy the applicant will be producing. The biodiversity enhancement strategy should be discussed and agreed with NRW and conditioned as part of the Marine Licence.

Marine and Estuarine Fish

Key Issues

No Key Issues

Detailed Comments

All responses are in the SEI response spreadsheet.

Seascape Landscape and Visual Impact Assessment (SLVIA)

Key Issues

The applicant's clarifications have reiterated their assessment and judgements from the SLVIA. Our original concerns remain:

NRW consider the proposals would have numerous and extensive adverse effects on seascape and visual receptors within the National Park. NRW are concerned that the assessment has under-estimated some seascape and visual effects on some receptors within the National Park.

Detailed Comments

All responses are in the SEI response spreadsheet.

Onshore Receptors

Key Issues

No significant issues

Detailed Comments

All responses are in the SEI response spreadsheet.

Marine Ornithology

Key Issues

We welcome the additional reassessment provided by the Erebus applicant in the Supplementary Environmental Information Addendum (SEI). We have considered the additional information and assessments provided in the SEI, and although concerns remain regarding the methods undertaken and the lack of certain information (see below for details), we are now able to state that we can agree with the overall conclusions within the document.

Detailed Comments

Detailed comments are provided in the SEI response spreadsheet, along with the text below:

We welcome the additional reassessment provided by the Erebus applicant in the Supplementary Environmental Information Addendum (SEI). Following this we can now agree with the applicant's overall conclusions of:

- No adverse effect on integrity (AEIOI) on the puffin feature of the Skomer, Skokholm and seas off Pembrokeshire SPA.
- No AEIOI on the guillemot and razorbill components of the seabird assemblage feature of the Skomer, Skokholm and seas off Pembrokeshire SPA.
- No AEIOI on the gannet feature of the Grassholm SPA alone or in-combination.
- Minor adverse effect (i.e. not significant at EIA scale) for gannet cumulative impacts.
- Minor adverse effect (i.e. not significant at EIA scale) for herring gull, lesser black-backed gull, great black-backed gull, kittiwake for cumulative collision impacts.

Recommendations for future assessment

It would be useful to note for future reference that there are instances in the updated assessments where we do not agree with the methods/approaches undertaken, or where we would have liked to see certain additional information provided, as follows.

- The applicant has assessed a worst case upper range of 60% displacement and 10% mortality. We usually advise that auk displacement assessments are based on a range of displacement and mortality rates of 30-70% displacement and 1-10% mortality. However the full displacement matrices of 1-100% displacement and 1-

100% mortality have now been presented so we are therefore able to consider the worst case scenario of our advised range. Consideration of the range of values we recommend does not alter the conclusions for the Skomer, Skokholm and seas off Pembrokeshire SPA as set out above.

- Whilst many of the PVA input parameters are provided in various tables of the SEI report, best practice going forward for any future PVAs is for the input parameter log files generated by the PVA tool to be included in appendices to applications.
- We do not agree with the use of the PVA stable age structures, as it is very difficult to say that this is what it is at the specific offshore site in a specific season. We currently advise that proportions of adults and immatures are based on age-class information from site-specific surveys. We note the difficulties associated with ageing some species from digital aerial data and currently recommend a precautionary approach would be to assume all adult-type birds are adults. In the absence of site-specific information on age classes, the precautionary approach would be to assume all birds are adults. However, we note that in this case using the PVA stable age structure doesn't materially change the conclusions as listed above.
- Whilst the results of the comparisons of the PVA model outputs undertaken by the applicant may have indicated minimal differences in the counterfactuals for the models when run with 1,000 and 5,000 simulations, it may not always be the case for any model for any species/population. Whilst this doesn't alter the conclusions for this project and no further work is required by the applicant, we recommend that for any PVA models that are constructed in the future, 5,000 simulations should be considered best practice.
- With regard to gannet, the SNCBs regard the impacts of collision and displacement as additive and advise that they should be summed. Therefore, for both EIA and HRA for the project alone and cumulatively/in-combination, the combined impacts of collision+displacement should be assessed for gannet. However, in this case consideration of this does not alter the overall conclusions as listed above.
- For cumulative collision impacts, the annual cumulative impact should be assessed as well as the individual seasonal impacts. The annual impact should be assessed against the largest seasonal BDMPS population (often this is one of the non-breeding BDMPSs) to determine if this equates to 1% or more of baseline mortality of the largest BDMPS. However, in this particular case undertaking this does not alter the overall cumulative conclusions listed above.

Marine Mammals

Key Issues

NRW welcomes the additional comments, information, and reassessments provided by the applicant in the Supplementary Environmental Information Addendum (SEI). Following this we can now agree with the applicant's overall conclusions.

We note that there are instances in the updated assessment where either our comments were not fully addressed, where we do not fully agree with the approaches taken, or where we would have liked to see certain additional information to be provided, but this does not alter the overall conclusions and no further work is required by the applicant.

Detailed comments are provided in the SEI response spreadsheet, along with the text below

Recommendations for future assessment

Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) (row: 401)

- We note that no justification was provided for ruling out the possibility of concurrent piling.
- NRW does not agree with the justification provided for the approach taken to apply a dose response curve to area-assessment for disturbance.

For the purpose of assessing potential adverse effects on a harbour porpoise SAC, NRW has ranked potential methods in order of preference where we advise the use of: (1) fixed noise thresholds over (2) EDRs (where these exist), to obtain the area ensonified to a level that might produce significant disturbance.

For harbour porpoise NRW recommends the use of a noise threshold of 143 dB re 1µPa_{2s} single-strike SEL (Brandt et al. 2018; Heinis et al. 2019) or its equivalent VHF-weighted 103 dB re 1µPa threshold (Tougaard, 2021) as the extent of disturbance for impulsive noise sources since this threshold is the modelled average of six different studies of full-scale pile driving operations (Brandt et al. 2018) and thereby represents the largest amount of empirical data.

While it is acknowledged that animals may or may not respond (Southall et al 2021), and responses to pile-driving have been observed to diminish over time (Graham et al 2019), disturbance for harbour porpoise SACs is defined through the spatial and temporal thresholds set out in the SAC Conservation Objectives as 20% daily and 10% seasonally. In this regard, an area-based assessment should be carried out where the extent of habitat that is ensonified to a level that might produce significant disturbance is determined.

Although there's a strong link between area lost and numbers disturbed, directly equating the probability of population response to loss of habitat / loss of habitat quality is currently not possible. It can be argued that loss of habitat quality is a binary event as opposed to behavioural disturbance which occurs over a continuum. An area is either insonified by a sound at a given level (and hence "lost"), or not.

8.5.1.4 Assessment of Adverse Effects Alone

Pile driving (row: 495)

Please refer to point above

Entanglement, Construction phase (rows: 517, 518)

Section 11.3 of the SIA refers only to migratory fish

Decommissioning Phase (rows: 525, 526)

Section 11.3 of the SIA refers only to migratory fish

Barrier Effects (row 528)

NRW acknowledges the applicant response, however we disagree with the view that the portion of the assessment on barrier effects should remain unchanged. We advise that this should have been revised to adequately assess the relevant pathway.

Construction phase (rows: 531, 533)

NRW acknowledge the applicant response, however we note that this does not directly address our comment on the total area impacted.

Decommissioning phase (row: 538)

NRW acknowledge the applicant response, however we note that this does not directly address our comment on the total area impacted.

DAS Surveys (rows: 566, 568, 569, 570, 571, 573, 575, 576, 588, 589, 590)

NRW advises that further information, evidence, and/or explanations of any assumptions required for DAS methodology should have been provided, particularly on:

- Species identification in inclement weather / higher sea states
- Perception bias
- Evidence that aerial surveys at 500m elicit no reaction to the passing aircraft
- Identification rates
- Statistical approach to support the assumption that “transects can be treated as statistically independently random” (currently explanation only refers to birds)

3.4 Impact Piling (row: 627)

3.4.1 Modelling parameters

We note that no justification was provided for ruling out the possibility of concurrent piling.

PTS and Disturbance from Other Construction Activities

Magnitude (rows: 789, 790)

We note the amendments made in section 6.6 of the SEI addendum, however note that our concerns have not been addressed.

Disturbance result (row: 794)

NRW acknowledges the additional information provided, however note that it would have been better to provide further source levels from the literature in addition to the predicted impact ranges from the Moray East ES based on the dBHt metric.

NRW advise against the use of dBht(Species) due to the absence of field data to support these chosen levels, and the method not having been independently applied in peer-reviewed publications (Popper & Hawkins, 2019; Hawkins & Popper, 2014, 2016).

Sheet Piling – Magnitude (row: 886)

This issue has not been adequately addressed. While NRW agrees that “given the lower hammer energies used, the predicted impact ranges for disturbance will be less than those presented for impact pile driving of the anchors,” no justification has been provided for the

statmenet that "30-40% of the energy will be transferred to the sheet pile". The applicant should ideally have provided expected source levels for sheet piling.

12.10 Cumulative Effects Assessment

12.10.3 Screening (row: 925)

NRW notes the additional information in section 6.7 of the SEI addendum, however disagrees with the explanation provided for PTS from Underwater noise:

"Since it is an offence to injure any EPS, it is expected that all offshore Projects that have the potential to cause PTS from construction activities will be required to implement an MMMP (for all explosive/piling/seismic activities), or will be required to ensure no risk of injury to EPS. Thus, this impact pathway is considered to be fully mitigated by each Project, and it is expected that the resulting risk is therefore negligible."

Given the People over Wind ruling, impacts (including cumulative impacts) should be assessed pre-mitigation.

References:

Popper AN, Hawkins AD, Fay RR, Mann DA, Bartol S, Carlson TJ, Tavalga WA. 2014. ASA S3 s-1 C1. 4 TR-2014 sound exposure guidelines for fishes and sea turtles: A technical report prepared by ANSI-accredited standards committee S3 s-1 C1 and registered with ANSI. New York, NY: Springer

Popper AN, Hawkins AD. 2016. The effects of noise on aquatic life, II. New York, NY: Springer Science+Business Media.

Brandt MJ, Dragon AC, Diederichs A, Bellmann MA, Wahl V, Piper W, Nabe-Nielsen J, Nehls G. 2018. Disturbance of harbour porpoises during construction of the first seven offshore wind farms in Germany. Mar. Ecol. Prog. Ser. 596: 213 – 232.

Heinis F, de Jong CAF, von Benda-Beckmann S, Binnerts B. 2019. Framework for Assessing Ecological and Cumulative Effects–2018 Cumulative effects of offshore wind farm construction on harbour porpoises. Rijkswaterstaat Sea and Delta.

Graham IM, Merchant ND, Farcas A, Barton TRC, Cheney B, Bono S, Thompson PM. 2019. Harbour porpoise responses to pile-driving diminish over time. Royal Society Open Science 6:190335

Popper AN, Hawkins, AD. 2019. An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes. Journal of Fish Biology. 94. 10.1111/jfb.13948.

Southall BL. 2021. Evolutions in Marine Mammal Noise Exposure Criteria. Acoustics Today 17(2) <https://doi.org/10.1121/AT.2021.17.2.52>

Tougaard J. 2021. Thresholds for behavioural responses to noise in marine mammals - Background note to revision of guidelines from the Danish Energy Agency.

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