Hebridean Whale & Dolphin Trust

Licensing Operations Team,

Marine Directorate

Scottish Government,

Marine Laboratory,

Aberdeen,

AB11 9DB

5th August 2026

Dear Sir or Madam,

Objection: MachairWind Offshore Wind Farm, Environmental Impact Assessment

The Hebridean Whale and Dolphin Trust (HWDT) welcomes the opportunity to comment on the Environmental Impact Assessment (EIA) for the proposed MachairWind Offshore Wind Farm.

HWDT is working for healthy seas for nature and communities. For over three decades HWDT has been leading the way for the conservation of whales, dolphins, and porpoises in the waters of western Scotland. Based on the Isle of Mull, in the heart of the Hebrides, HWDT carries out long-term research to monitor and protect cetaceans, inspire people to take action and make a difference, inform decision-makers, and advocate for the recovery of the marine environment.

HWDT recognises climate change as one of the greatest threats to the marine environment affecting biodiversity and coastal communities. We support efforts to reduce reliance on fossil fuels and accelerate the transition to low-carbon and renewable energy sources, including the sustainable development of offshore wind.

However, this transition must ensure that the location, construction and operation of offshore wind developments are designed to minimise impacts on the marine environment and marine biodiversity. We are facing both a climate emergency and a biodiversity crisis, and these challenges should be addressed together.

Marine mammals play an important role in healthy marine ecosystems and contribute to wider ecosystem functioning and climate regulation. Protecting whales, dolphins and porpoises is therefore not only important for conserving biodiversity, but also for maintaining resilient marine ecosystems in a changing climate.

Summary of review

Following a detailed review of Chapter 10 (Marine Mammals and Leatherback Turtle), the draft Marine Mammal Mitigation Protocol (MMMP) and supporting technical appendices, HWDT objects to the current assessment of impacts on marine mammals.

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Chapter 10 demonstrates that effort has been made to incorporate regional datasets, including HWDT's survey data and recommendations regarding their analysis. The assessment also appropriately sets out to adopt a precautionary, worst-case assessment. However, our review identified a number of issues which collectively demonstrate that the assessment does not provide a sufficiently robust or precautionary basis to conclude that significant effects on marine mammals have been adequately assessed or mitigated. Our objection therefore relates to the adequacy of the current assessment rather than to the principle of offshore wind development

Summary of key concerns

The following four overarching concerns underpin our objection:

1. **Underwater noise associated with pile driving during construction has not been sufficiently addressed through the proposed mitigation measures.**

   The underwater noise modelling (Appendix 10.1) demonstrates that a nominal 10 dB reduction in source levels would substantially reduce both the predicted impact ranges and the number of animals potentially affected. For example, the predicted Permanent Threshold Shift range for low-frequency cetaceans reduces from approximately 27 km to 2.1 km, whilst the number of cetaceans and fish affected is reduced by approximately 99% and 95%, respectively. These results demonstrate that reducing underwater noise at source using noise abatement has the potential to substantially reduce risks of both injury and disturbance. HWDT therefore considers that effective Noise Abatement Systems should form the primary mitigation measure for the Project rather than remaining an optional component of the draft Marine Mammal Mitigation Protocol.

2. **The effectiveness of the proposed mitigation has not been demonstrated to the extent assumed within the assessment.**

   The assessment repeatedly relies on embedded mitigation to reduce predicted impacts from significant to not significant. However, it does not consistently demonstrate that the proposed mitigation measures are capable of achieving the reductions assumed within the assessment, particularly given the large, predicted impact ranges associated with piling, the sensitivity of the receptor species and the proximity of designated protected areas for harbour porpoise and minke whale, which lie within 0.4 km and 4.3 km of the Development Area respectively.

3. **The final conclusions are not consistently supported by the assessment evidence.**

   Throughout Chapter 10, precautionary assessment findings are repeatedly moderated through "professional judgement" and assumptions regarding mitigation effectiveness before final significance conclusions are reached. The approach is applied repeatedly throughout Chapter 10 without equivalent quantitative assessment or supporting evidence demonstrating that predicted impacts have been reduced. Consequently, the final conclusions do not represent the precautionary worst-case assessment described at the outset of Chapter 10.

4. **The assessment does not fully reflect how marine mammals are likely to experience the Project spatially and temporally.**

   The assessment primarily considers impacts at the Management Unit scale but gives comparatively less weight to the regional ecological characteristics that determine how marine mammals are likely to experience the Project. These include site fidelity, seasonal habitat use, repeated disturbance, cumulative exposure, long-term behavioural responses and the vulnerability of small regional populations. In several instances, assumptions regarding animal movements and habitat use (for example, avoidance of established shipping routes) are not supported by the available evidence. The assessment should give greater weight to these ecological characteristics and the best available evidence to ensure it reflects how marine mammals are likely to experience the Project both spatially and temporally.

We object because these four methodological issues mean the assessment does not yet provide a sufficiently robust basis for concluding that significant effects have been adequately assessed or mitigated.

Recommendations

HWDT recommends that the applicant:

- Commits to effective underwater noise abatement at source as a primary mitigation measure and demonstrates that the proposed mitigation achieves the reductions assumed within the assessment;
- Revisits significance conclusions where moderate or major adverse effects are identified and provides revised assessment and supporting evidence wherever conclusions depart from the assessment findings;
- Revises the assessment to better reflect regional ecological characteristics that determine how marine mammals are likely to experience the project, ensuring that site fidelity, seasonal habitat use, vulnerable local populations, and relevant impact pathways such as repeated disturbance and cumulative exposure are appropriately considered when interpreting significance;
- Implements project-specific monitoring and adaptive management to validate assessment predictions and assess the effectiveness of mitigation throughout construction and operation;

Further detail on these points, together with additional comments and recommendations, can be found in the Appendix that follows this letter. HWDT would welcome the opportunity to discuss any of these points further.

Kind regards,

Dr Lauren Hartny-Mills, Science and Conservation Manager, Hebridean Whale and Dolphin Trust

Hebridean Whale & Dolphin Trust

Appendix: MachairWind Offshore Wind Farm EIA – HWDT comments and recommendations

Declaration of interests

During the preparation of this response, potential conflicts of interest were considered in relation to the MachairWind project. This review was undertaken by HWDT recognising that we provided data to be included in the EIA, which was analysed by SAMS Enterprise. HWDT has also received project funding from the Scottish Power Foundation. In addition, some staff from the marine mammal team at the Scottish Association for Marine Science (SAMS) act as independent advisors on HWDT's Science Committee.

General comments

Overall assessment: Chapter 10 demonstrates that effort has been made to incorporate regional datasets, including HWDT's survey data and recommendations regarding their analysis to give a view of the site in the wider context of the west coast region. However, these results could be better used in the assessment to draw appropriate conclusions about regional occurrence of species and densities.

The assessment also appropriately sets out to adopt a precautionary, worst-case assessment. Given the uncertainties associated with assessing impacts on highly mobile marine mammals, this is considered an appropriate and proportionate approach. However, our review identified a number of issues which collectively demonstrate that the assessment does not provide a sufficiently robust or precautionary basis for concluding that significant effects on marine mammals have been adequately assessed or mitigated.

Key concerns underpinning HWDT's objection

The detailed comments below are organised under four overarching themes which collectively underpin HWDT's objection. Each section summarises the principal concern, provides examples from the assessment to illustrate the issue, and, where appropriate, identifies recommendations for further assessment, mitigation or clarification.

1. **Underwater noise associated with pile driving during construction has not been sufficiently addressed through the proposed mitigation measures.**

HWDT's primary concern relates to underwater noise generated during impact piling and the associated risks of auditory injury, disturbance and displacement of cetaceans. The assessment also identifies underwater noise associated with impact piling as the principal impact pathway during construction.

The underwater noise modelling (Appendix 10.1) demonstrates that a nominal 10 dB reduction at source would substantially reduce both the predicted impact ranges and the numbers of animals potentially affected. For example, the modelling predicts that a 10 dB reduction would reduce the predicted impact range for PTS in low-frequency cetaceans from 27 km to 2.1 km and reduce the number of cetaceans and fish affected by approximately 99% and 95%, respectively. These results

demonstrate that reducing underwater noise at source using Noise Abatement Systems (NAS) has the potential to substantially reduce the impacts from both injury and disturbance, whereas other mitigation using MMO's or ADDs would be much less effective and only attempts to reduce injury. Effective noise reduction at source using NAS therefore represents the single greatest opportunity to reduce both the spatial extent of impacts and the number of animals potentially affected.

Given the large impact ranges predicted for harbour porpoise and minke whales, together with the proximity of the development area to the Inner Hebrides and the Minches SAC for harbour porpoise (within 0.4 km) and the Sea of the Hebrides MPA for minke whales (within 4.3 km), HWDT does not consider that Noise Abatement Systems should remain an optional component of the draft Marine Mammal Mitigation Protocol (MMMP). The underwater noise modelling demonstrates that effective noise reduction at source has the potential to substantially reduce both the spatial extent of impacts and the number of animals affected. Effective noise abatement systems should therefore form the primary mitigation measure for the project. The assessment should clearly demonstrate the assumptions underpinning the proposed noise reduction, how these reductions will be achieved in practice, and how they will be secured through the final project design. Therefore, the assessment should:

- Demonstrate how the predicted 10 dB reduction will be achieved;
- Provide the evidence supporting the assumed reduction;
- Explain how the mitigation will be secured through the final MMMP;
- Demonstrate that mitigation will be effective across the hearing ranges of all relevant receptor species, particularly low-frequency cetaceans;
- Consider whether greater reductions could be achieved through the use of the latest available noise reduction technologies;
- Explain how the effectiveness of the proposed mitigation will be validated through monitoring.

The effectiveness of different noise abatement systems varies across frequency ranges and environmental conditions. Whilst technologies such as bubble curtains can be highly effective at reducing higher-frequency sound, their performance at lower frequencies may be more limited. Even so, this should not diminish the importance of implementing robust noise reduction measures wherever possible and a precautionary approach should be maintained for cetaceans which are known to be sensitive to underwater noise. Consideration should also extend to more elusive shelf and deep diving species (i.e. beaked whales and long-finned pilot whales), where evidence on abundance and distribution is limited. The assessment should demonstrate that the proposed mitigation is effective across the hearing ranges of all relevant receptor species, rather than assuming equivalent performance across taxa.

Projects should seek to implement the most effective available noise reduction technologies wherever reasonably practicable. Where appropriate, additional mitigation strategies, such as seasonal restrictions of piling activities, should also be considered alongside NAS to minimise impacts for species sensitive to lower frequency sounds. For example, minke whales are sensitive to lower frequency sound (Southall et al., 2019) and exhibit seasonal patterns of occurrence in

Scottish waters. As such, seasonal restrictions on construction activities should be considered as an additional mitigation measure when this species is present in the region.

The assessment distinguishes Temporary Threshold Shift (TTS) from Permanent Threshold Shift (PTS) in accordance with current offshore wind assessment practice. However, TTS remains a measurable auditory effect (Southall et al., 2019) and repeated or widespread sub-lethal hearing impairment may have ecological consequences beyond the immediate exposure event. For species with high energetic demands, such as harbour porpoise, temporary reductions in hearing sensitivity may affect prey detection, navigation and communication, particularly where exposure is repeated or occurs alongside other pressures. Harbour porpoises have exceptionally high energetic requirements and must forage almost continuously to maintain body condition (Wisniewska et al., 2016), making them particularly vulnerable to anthropogenic disturbance. The potential contribution of repeated TTS should therefore be considered within the cumulative assessment.

The assessment concludes that residual auditory injury and disturbance effects are negligible following implementation of embedded mitigation measures. However, these conclusions rely heavily on assumed mitigation efficacy, yet the assessment does not provide sufficient evidence demonstrating that the proposed mitigation is capable of achieving the reductions assumed.

HWDT recommendation

The noise modelling demonstrates that effective noise abatement has the potential to deliver by far the greatest reduction in predicted impact ranges and the numbers of animals affected. HWDT considers that reducing underwater noise at source represents the single greatest opportunity to minimise the risks of auditory injury, behavioural disturbance and displacement identified within the assessment and should therefore be treated as the priority mitigation measure for the Project.

HWDT therefore recommends that effective noise reduction at source through the use of noise abatement systems becomes a committed mitigation measure for the Project rather than an optional component of the MMMP. The assessment should clearly demonstrate how the assumed reduction in source levels will be achieved, provide evidence supporting the proposed mitigation strategy, demonstrate that mitigation is effective across the relevant cetacean receptor groups, and set out how its effectiveness will be validated through monitoring before final significance conclusions are drawn.

2. The effectiveness of the proposed mitigation has not been demonstrated to the extent assumed within the assessment.

The assessment relies heavily on embedded mitigation to reduce predicted impacts from significant to not significant. Whilst the proposed mitigation measures, including Marine Mammal Observers (MMOs), Passive Acoustic Monitoring (PAM), Acoustic Deterrent Devices (ADDs) and the development of a Marine Mammal Mitigation Protocol (MMMP), reflect approaches commonly applied within the offshore wind industry, the assessment does not consistently demonstrate that

these measures are capable of reducing impacts to the extent assumed within the significance assessment.

This is particularly relevant given the large, modelled impact ranges associated with piling, the proximity and overlap of the Development Area with the Inner Hebrides and the Minches SAC (within 0.4 km) and the Sea of the Hebrides MPA (within 4.3 km), and the reliance placed on mitigation to reduce significant effects. The assessment should demonstrate that the proposed mitigation is sufficient for the receptor species, impact pathways and spatial scales before it can be relied upon to reduce the significance of predicted effects.

The efficacy of the proposed Acoustic Deterrent Device mitigation is not sufficient for all receptor species: The assessment relies on Acoustic Deterrent Devices (ADDs) to reduce predicted impacts on marine mammals. However, the evidence presented does not demonstrate that the proposed ADD approach is effective for all relevant receptor species occurring within the Development Area. In particular:

- The assessment acknowledges that ADDs alone are unlikely to provide effective mitigation for mysticetes, yet no additional mitigation measures are proposed to address this limitation.
- The deterrence ranges presented (1–7 km depending on species) remain substantially smaller than the predicted injury and disturbance ranges, which are up to 27 km for low-frequency cetaceans. Again, no additional mitigation measures are proposed to address this disparity.
- The assessment refers to the Lofitech ADD as the basis for estimating deterrence ranges because it states it provides the largest deterrent ranges. However, the operating frequency of this device (approximately 14.6 kHz) exceeds the published upper hearing range for fin whales (~10 kHz; Southall et al., 2019), raising questions regarding its suitability for some low-frequency cetaceans.
- The assessment assumes that findings for minke whales can be extrapolated to other mysticetes. Given known differences in hearing sensitivity and behavioural ecology between baleen whale species, further evidence is required to support this assumption.
- Behavioural responses to ADDs vary between species. For example, humpback whales have shown little or no response to lower frequency ADDs (Pirotta et al., 2016), demonstrating that responses cannot be assumed across taxa.
- The assessment also assumes that animals remain responsive to ADD activation. Boisseau et al. (2021) undertook field trials in Iceland, where previous exposure to ADDs was deliberately limited to minimise the potential influence of habituation. The assessment should therefore provide further justification that behavioural responses observed under these conditions are representative of Scottish waters, where ADDs have previously been

widely used in aquaculture (Findlay et al., 2018), raising the possibility that previous exposure may influence behavioural responses.

Collectively, these points demonstrate that the assessment does not provide sufficient evidence to conclude that the proposed ADD approach is effective for all cetacean receptor species. Consequently, the assessment should not rely on the assumed ADD effectiveness to reduce predicted impacts without appropriate supporting evidence.

Standard mitigation is assumed to reduce impacts across very large spatial scales: The assessment relies on standard mitigation measures (MMO, PAM, and ADDs) to reduce impacts across the large, predicted impact ranges during piling. Whilst these measures represent standard industry practice, the assessment does not provide sufficient project-specific evidence demonstrating that they are capable of mitigating impacts to the extent assumed within the significance assessment. The assessment should therefore demonstrate that the proposed mitigation is effective across the spatial scales over which impacts are predicted before relying on that mitigation to reduce the significance of effects.

Vessel mitigation relies on good practice rather than project-specific mitigation measures that will reduce impact: Mitigation of underwater noise, disturbance and collision risk associated with project vessels relies primarily on existing good practice measures, including adherence to the Scottish Marine Wildlife Watching Code, use of established vessel routes and minimising vessel movements. However, these proposed measures are not specifically designed to reduce underwater noise or collision risk associated with large construction and operational vessels, particularly during transit to and from the Development Area. The assessment should demonstrate that these measures are sufficient to reduce impacts to the level assumed.

The assessment also concludes that vessel collision risk during the operation and maintenance phase is lower than during construction because fewer vessels will be operating. However, this conclusion places greater weight on vessel numbers rather than the characteristics of the vessels that will be in use and their associated impacts on cetaceans. Construction activities are likely to involve larger, slower vessels operating predominately at relatively low speeds (< 10 knots), whereas operation and maintenance commonly relies on very fast vessels, which may travel at speeds exceeding 20 knots. Given that vessel speeds are recognised as a key determinant of collision risk, the assessment should further consider vessel speeds, transit distances and operation and maintenance vessel movements throughout the operational lifetime of the project.

The assessment also assumes that marine mammals are likely to avoid established shipping routes, thereby reducing collision risk. There is no evidence that marine mammals avoid well-established shipping routes in the waters of western Scotland.

Therefore, HWDT considers that the risk of vessel strikes has not been properly assessed particularly for the operational and maintenance phase for the lifetime of the project and there should be a requirement to minimise the speeds and transit distances of vessels during the

operation and maintenance phase because these will also have to travel large distances through areas of important cetacean habitat.

Given the importance of vessel activity as a source of underwater noise, disturbance, and the potential for collision risk, the mitigation strategy should consider additional mitigation measures, including:

- Project-specific vessel speed restrictions;
- Minimising vessel transit through important marine mammal habitat;
- Consideration of vessel types and operational practices that minimise underwater noise;
- Routing and timing of vessel movements to avoid seasonal concentrations of marine mammals where supported by the best available evidence;
- Quieter vessel design and procurement where practicable.

The cumulative assessment should also consider the contribution of project-related vessel activity alongside existing commercial and recreational vessel traffic within the region.

HWDT recommendation

The assessment relies on these mitigation measures to reduce predicted impacts but does not demonstrate that they are capable of achieving the reductions assumed, particularly where large impact ranges are predicted or where moderate and major adverse effects are identified.

Where mitigation forms the basis for reducing significance, the assessment should provide clear evidence demonstrating that the proposed measures are effective for the relevant receptors, impact pathways and spatial scales considered. Where uncertainty remains, additional project-specific mitigation should be considered alongside existing industry good practice and a precautionary approach adopted.

Noise Abatement Systems reduce noise at source, whereas MMOs, PAM and ADDs primarily reduce the likelihood of animals being present during noisy activities. These measures perform different functions and should therefore be considered complementary rather than interchangeable when developing the final mitigation strategy.

3. The final conclusions are not consistently supported by the assessment evidence.

The assessment sets out to adopt a precautionary, worst-case approach to assessing impacts on marine mammals. HWDT supports this approach, particularly where uncertainties remain regarding project design, behavioural responses and population-level consequences. However, throughout the assessment, evidence generated through quantitative modelling, significance matrices and other assessment methods is repeatedly moderated through professional judgement, assumptions regarding mitigation effectiveness or alternative interpretation before final significance conclusions are reached.

In several instances, the assessment identifies major or moderate adverse effects through the significance assessment process, yet these are subsequently reduced to minor adverse or not significant in EIA terms by “professional judgement” without revised quantitative assessment or equivalent evidence demonstrating that predicted impacts have been reduced. Therefore, the final conclusions reached do not represent the precautionary worst-case assessment described. The assessment should clearly explain how assessment findings have been moderated, and why the revised conclusions are considered to better represent the likely ecological response.

Conservative assessment outputs are moderated without presenting revised evidence: The assessment applies conservative assumptions regarding monopile dimensions, hammer energies, piling duration and behavioural thresholds, consistent with a precautionary worst-case assessment. However, where these assumptions result in major or moderate adverse effects, the outputs are frequently described as "overly precautionary" or "not ecologically realistic" and are subsequently moderated through “professional judgement” without presenting revised quantitative assessments demonstrating what the applicant considers to be a more realistic scenario. If the applicant considers the worst-case assumptions to be unrealistic, revised quantitative assessments using alternative assumptions should be presented. Revised quantitative assessments are required to provide a transparent evidence base explaining how the significance conclusions have been reached. However, until that uncertainty has been resolved, the precautionary worst-case assessment should remain the basis for determining significance.

Precautionary assumptions should remain precautionary where species-specific evidence is lacking: The iPCoD modelling for minke whales predicts substantial long-term population decline when Permanent Threshold Shift is incorporated into the assessment, but these findings are presented for information only and are not fully explored within the assessment. Whilst some may consider the current iPCoD framework overestimate disturbance effects, in the absence of species-specific response data to pile driving for all dolphin and baleen whale species, it remains the most appropriate available quantitative tool for assessing potential population-level consequences and therefore remains consistent with the precautionary approach adopted within the assessment. Until improved empirical evidence becomes available, HWDT considers that precautionary assumptions remain appropriate when assessing potential population-level consequences, especially in this case given the minke whale MPA is within 4.3 km of the development site.

Similarly, the assessment adopts several behavioural response assumptions developed primarily for harbour porpoise and applies them to other cetacean species, despite limited evidence supporting their wider applicability. Examples include the application of the Effective Deterrence Radius (EDR), harbour porpoise behavioural response relationships and the 145 dB behavioural response threshold across multiple receptor species. Greater justification is required demonstrating that these approaches appropriately represent the hearing capabilities and behavioural responses of the full range of cetacean species assessed.

Behavioural response assumptions require stronger justification: The assessment relies on several behavioural response approaches that have been developed primarily for harbour porpoise and applies them more broadly to other cetacean species. Whilst this reflects the current lack of species-specific behavioural response data for many cetaceans, the assessment does not demonstrate that these assumptions are appropriate for all receptor species assessed. Greater justification is required to demonstrate that the behavioural response assessments appropriately reflect the hearing capabilities, behavioural ecology and likely responses of the full range of cetacean species present within the Development Area. Key points include:

- Application of harbour porpoise-derived response thresholds: The assessment applies behavioural response relationships and Effective Deterrence Radius (EDR) approaches derived primarily from harbour porpoise to a wide range of cetacean species. Current scientific evidence does not support applying these approaches to a wider range of cetacean species. Additional assessments against other suggested and commonly used behavioural response thresholds, such as those adopted by NOAA and Southall et al. (2019) should be included.
- Reliance on Thompson et al. (2025): The assessment relies on a distance-based approach, which has recently been suggested to provide a less conservative assessment than dose-response methods by Thompson et al. (2025). However, this work specifically relates to harbour porpoise, is based on studies undertaken only in the Moray Firth, and has yet to go through peer-review. Therefore, the assumption that the same approach can be applied to all other species, is not yet supported by any scientific evidence. Further justification is therefore required before these findings are extrapolated to other cetacean species.
- Behavioural response assessment (Impact 7): This assessment uses a behavioural response probability, derived for harbour porpoise, to assess potential response distances for all species. However, it is not clear across which frequency ranges the threshold of 145 dB has been measured, nor how it has been applied here to species with substantially different hearing capabilities. Further justification is required on how the behavioural response assessment is appropriate for all receptor species.
- Interpretation of impulsive and non-impulsive sound: The assessment frequently justifies reducing predicted impacts on the basis that sound is no longer considered impulsive beyond approximately 10 km from the source. However, non-impulsive sounds above a certain level can still cause a behavioural response, or injury where sound levels remain sufficiently high. The assessment should consider the implications of exposure to high-level non-impulsive sound.

These assumptions directly influence the predicted behavioural response distances and therefore the magnitude, significance and interpretation of effects presented throughout the assessment. Given the limited availability of species-specific behavioural response data for many cetaceans, HWDT considers that a precautionary approach should continue to be applied unless supported by

revised quantitative assessment or additional empirical evidence demonstrating that alternative assumptions are more representative of likely responses.

Small Management Units should not be discounted because they are small: Assessments of the Coastal West Scotland and Hebrides bottlenose dolphin MU and West Coast Community killer whales are discounted due to high percentages of affected animals because the Management Unit is small. The assessment then frequently places greater emphasis on larger management units where the proportion of animals affected is smaller. However, small population size is an indicator of vulnerability and as such greater weight should be given to the ecological characteristics of local populations, including long-term site fidelity, social structure and the vulnerability of small, regionally important populations. These factors are particularly relevant in this assessment for the Coastal West Scotland and Hebrides bottlenose dolphins and the West Coast Community killer whales.

The same approach is repeated throughout the cumulative assessment: The same pattern is repeated within the cumulative assessment, where precautionary assessment outputs showing high sensitivity, high magnitude and therefore major adverse effects are subsequently moderated through professional judgement before concluding that effects are minor and not significant in EIA terms.

HWDT recommendation

Where assessment findings are moderated through professional judgement or alternative interpretation, the assessment should clearly explain the decision-making framework used and provide equivalent quantitative evidence supporting the revised conclusions. Where precautionary assumptions are considered unrealistically conservative, revised quantitative assessment based on the alternative assumptions adopted should be presented.

The assessment results in conclusions that differ substantially from the assessment findings, therefore greater transparency and supporting evidence are required to demonstrate how those conclusions have been reached.

4. The assessment does not fully reflect how marine mammals are likely to experience the Project spatially and temporally.

The assessment is based primarily on Management Unit (MU) population estimates and the proportion of those populations predicted to be affected. Whilst this provides an appropriate framework for population-level assessment, it does not always reflect how marine mammals are likely to experience the project in ecological terms. The waters surrounding the Development Area support regionally important populations, some of which are characterised by long-term site fidelity, seasonal habitat use, complex social structures and repeated use of west coast waters. These ecological characteristics influence how impacts are experienced by individuals and local populations but are not considered when interpreting significance. As a result, the assessment

underestimates the potential consequences for small, vulnerable or site-faithful populations occurring close to the development area.

Management units: The assessment primarily considers Management Units and the proportion of each population affected. While these provide an appropriate framework for population-level assessment, they do not fully capture the ecological characteristics that determine how impacts are experienced by marine mammals in the region. The waters around the Windfarm Development Area support regionally important communities of animals that can be characterised by long-term site fidelity, complex social structures and seasonal patterns of habitat use. These ecological characteristics influence how animals may respond to disturbance and determine whether impacts are experienced evenly across Management Units or disproportionately by smaller local populations. Greater consideration should be given to these ecological characteristics to ensure the assessment reflects how marine mammals are likely to experience the project rather than solely the proportion of animals affected within the larger Management Unit.

Small populations: Several receptors comprise relatively small regional populations, including Coastal West Scotland and Hebrides bottlenose dolphins and the West Coast Community killer whales. In several instances, high percentages of affected animals are interpreted as overly precautionary because the populations are small. Small population size represents ecological vulnerability and therefore warrants greater, rather than reduced, consideration when interpreting significance.

Seasonal averages: Seasonal average density estimates may not adequately represent periods of peak habitat use. Whilst seasonal averages are appropriate for broad-scale modelling, they may mask periods of particularly high abundance or ecological importance, especially for migratory whales such as minke, fin and humpback whales. The assessment should give greater consideration to monthly variation and migration near the development area and across the wider west coast region to ensure that peak periods of habitat use are appropriately represented. The assessment also concludes that all receptor species are wide ranging and able to find alternative routes and foraging areas outside of the WDA.

Spatial scale: The cumulative assessment is largely centred on activities within the Windfarm Development Area and frequently adopts piling as the conservative worst-case scenario. However, marine mammals will experience project-related pressures across their wider range rather than within the boundaries of the windfarm development area. This is particularly relevant for vessel activity, which extends well beyond the Development Area as vessels transit between ports and the offshore site. Repeated vessel transit routes, operational turbine noise, behavioural disturbance and interactions with other offshore developments occur over different spatial and temporal scales and may extend well beyond the Development Area. A more integrated assessment of these impact pathways is required to ensure that the assessment reflects long-term ecological exposure rather than individual project components.

Repeated disturbance: The assessment recognises that repeated disturbance and long-term cumulative effects remain uncertain, but these uncertainties are not consistently reflected in the final significance conclusions. Marine mammals are likely to experience repeated exposure over several years of construction and throughout the operational lifetime of the Project. Despite acknowledging these uncertainties, the assessment frequently concludes that impacts remain minor adverse or not significant, with limited explanation of how uncertainty has been incorporated into the final conclusions.

Monitoring: No additional project-specific monitoring is proposed because the assessment concludes that significant impacts are not predicted. However, where assessment findings have been moderated through interpretation, assumptions regarding mitigation effectiveness or acknowledged uncertainty, project-specific monitoring should therefore be implemented to validate assumptions and support adaptive management throughout the lifetime of the windfarm.

HWDT recommendation

The assessment should give greater weight to regional ecological characteristics, including site fidelity, seasonal habitat use, repeated disturbance, long-term exposure and vulnerable local populations when interpreting significance. Where uncertainty remains regarding ecological responses or mitigation effectiveness, project-specific monitoring should be implemented to validate assessment predictions and inform adaptive management throughout construction and operation.

5. References:

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