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MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Annex 3.1 to the Applicant's response to Relevant Representations from Marine Management Organisation (RR-020.58)

Applicant's response to Relevant Representation from Marine Management Organisation: Fish and Shellfish 4.6.5

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Glossary

Term	Meaning
Applicant	Morgan Offshore Wind Limited.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP).
Morgan Offshore Wind Project: Generation Assets	This is the name given to the Morgan Generation Assets project as a whole (includes all infrastructure and activities associated with the project construction, operations and maintenance, and decommissioning).

Acronyms

Acronym	Description
DCO	Development Consent Order
MDS	Maximum Design Scenario
MMO	Marine Management Organisation
OWF	Offshore Wind Farm
SPL	Sound Pressure Level
SPL_{pk}	Peak Sound Pressure Level
TTS	Temporary Threshold Shift
UWN	Underwater Noise
UWSMS	Underwater Sound Management Strategy

Units

Unit	Description
%	Percentage
dB	Decibel
kJ	Kilojoules
km	Kilometre
µPa	Micropascal

1 APPLICANT'S RESPONSE TO RELEVANT REPRESENTATIONS FROM MARINE MANAGEMENT ORGANISATION (RR-020.58)

1.1 Introduction

1.1.1.1 This document has been prepared in response to the Marine Management Organisation (MMO) Relevant Representation addressed to the Applicant. The comment raised by the MMO in RR-020.58 is as follows:

Following the review of the PEIR, the MMO requested that a detailed assessment for the impacts of underwater noise from piling using the most recent evidence/data for Atlantic cod, including the potential impacts to eggs and larvae, should be undertaken. Further modelling was requested for the SPL_{pk} of 207 dB for eggs and larvae following a worst-case scenario. This recommendation was in line with MMO's previous recommendations for projects of a similar nature in the Irish Sea, for example, the Walney Extension Offshore Wind Farm (OWF) had a piling restriction during the cod spawning season to ensure any significant impacts to cod were mitigated. This does not appear to have been modelled specifically, however modelling of UWN emissions in relation to high and low intensity cod spawning grounds has been presented in Figures 3.5, 3.11 and 3.14 (Volume 2, Chapter 3). Clarification is required on the threshold modelled in Figure 3.11, and the hammer energy modelled in Figure 3.14, which is lower than the stated maximum. Figure 3.5 presents SPL_{pk} noise contours for every 5 dB increment for a 4,400 kJ hammer energy at the north modelled location, which is in the middle of the high intensity cod spawning ground, however some clarification of this figure is also needed regarding the diameter of the pile used in the modelling (as per comment 4.6.4). The project falls entirely within the high intensity cod spawning grounds. Cod is a hearing specialist (has a swim bladder involved in hearing) and is highly vulnerable to noise disturbances (Popper et al., 2014), therefore the impact ranges for mortality and potential mortal injury, recoverable injury, TTS, startle response, and possible moderate to strong avoidance are likely to fall entirely or mostly within the spawning grounds. Clarifications requested in points 4.5.3 and 4.6.1 are required so that impacts to cod can be appropriately assessed. Pending clarifications on the UWN modelling for cod, the MMO considers that a seasonal piling restriction is likely to be necessary to protect gathering and spawning adult cod, and their eggs and larvae, will be necessary during the spawning season (January to April inclusive).

1.2 Response

1.2.1 Egg and larvae mortality

1.2.1.1 The modelled 207 dB re 1µPa SPL_{pk} contour, based upon the Popper *et al.* (2014) threshold for mortality and potential mortal injury to eggs and larvae for a 5.5 m diameter pin pile and the maximum hammer energy of 4,400 kJ is presented in Figure 1.1. The area encapsulated by the 207 dB re 1µPa SPL_{pk} contour is 0.27 km^2, representing 0.004% of the area of the mapped high intensity cod spawning ground, reflecting the range of up to 394 m presented within Table 3.21 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021).

1.2.2 Modelling thresholds

1.2.2.1 The contour decibel levels presented in Figures 3.8, 3.9, 3.10 and 3.11 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021) are derived from the contours generated for the single strike sound exposure level (SEL_{ss}) metric to provide a visual representation of the relevant cumulative sound exposure level (SEL_{cum}) thresholds. This is based upon the injury ranges (Temporary Threshold Shift; (TTS), recoverable injury and mortality) outlined within Tables 3.22, 3.23 and 3.24 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021) for Group 3 and 4 fish, drawn directly from Volume 3, Annex 3.1: Underwater sound technical report (APP-028).

1.2.2.2 The SEL_{ss} contour values are included within Figures 3.8, 3.9, 3.10 and 3.11 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021) for transparency; these contour values were used in the derivation of the relevant contours from the SEL_{ss} data to visually present the TTS, recoverable injury and mortality ranges. The Applicant has also provided a fuller explanation in response to the MMO's comments in RR-020.58 to define the relevance of these in providing a visual representation of fish injury ranges. This is set out above.

1.2.3 Hammer energies

1.2.3.1 The Applicant confirms that the hammer energy of 3,000 kJ presented in Figure 3.14 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021) is lower than the maximum hammer energy (and maximum design scenario; MDS) of 4,400 kJ.

1.2.3.2 Underwater sound contours for a hammer energy of 3,000 kJ are presented in Figure 3.14 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021) for context to demonstrate the behavioural ranges associated with this lower hammer energy which will represent the maximum hammer energy at 75% of piling, as outlined in paragraph 3.9.3.56 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021).

1.2.3.3 The modelled underwater sound contours for the maximum hammer energy (4,400 kJ) with regards to cod spawning grounds are presented in Figure 3.5 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021), as referenced within paragraph 3.9.3.56. Figure 3.5 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021) is used to support the spatial aspect of defining the magnitude of impact and is therefore not repeated as a separate figure during the sensitivity assessment but is clearly cross-referenced and discussed within the text in paragraph 3.9.3.56.

1.2.4 Modelled pile diameter

1.2.4.1 The Applicant confirms that the diameter of the pile used for modelling purposes is 5.5 m, as outlined within Table 1.16 of Volume 3, Annex 3.1: Underwater sound technical report (APP-028) and paragraphs 3.9.3.23 and 3.9.3.33 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021). Whilst this is a greater diameter than the defined MDS presented within Table 3.18 of Volume 2, Chapter 3: Fish and shellfish ecology (APP-021), this is considered to support the precautionary approach applied when assessing the impacts of underwater sound from piling on fish and shellfish ecology receptors.

1.2.4.2 The MDS for fish and shellfish ecology receptors for the impact of underwater sound from piling is based upon the greatest number of piling events (i.e., days of piling) and therefore uses the scenario with the most piles, which is based upon a pile diameter of 3.8 m (see below to demonstrate the difference in pile numbers between the two OSP options queried). However, the Applicant notes that 5.5m is the maximum pile

diameter given in Volume 1, Chapter 3: Project description (APP-010) and is what has been used in the modelling of underwater sound injury ranges. The fish and shellfish ecology assessment has presented the MDS in terms of number of piles, but used 5.5 m impact ranges. Therefore, the assessment is highly precautionary and conservative, and in reality, impacts will be well within the MDS which has combined the worst temporal scenario with larger pile diameters.

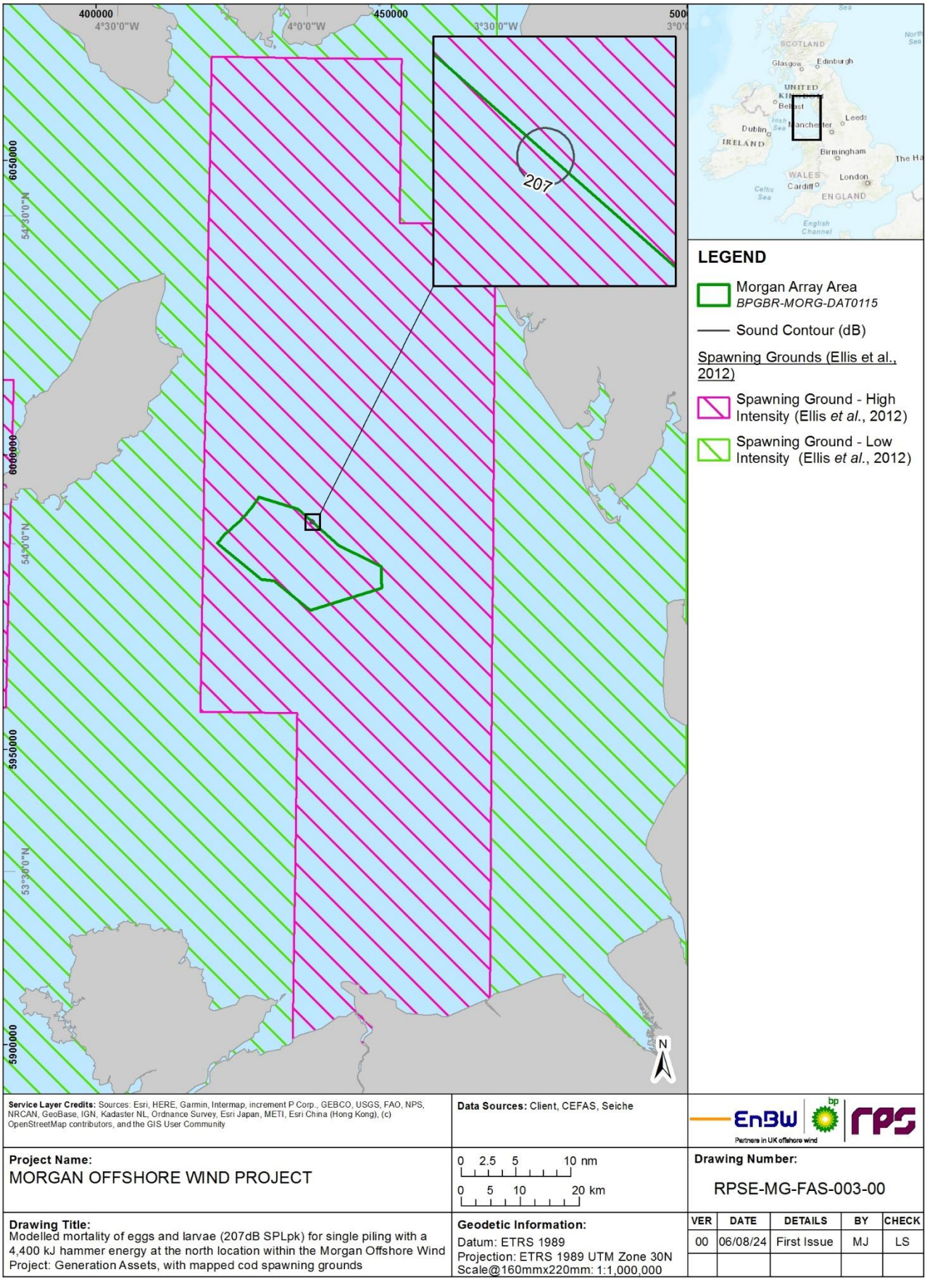

Figure 1.1: Modelled mortality range of eggs and larvae (SPL_{pk}) in the context of mapped cod spawning grounds for single piling of a 5.5 m diameter pin pile with a 4,400 kJ hammer energy.

1.2.5 Clarifications regarding points 4.5.3 and 4.6.1

1.2.5.1 Please see responses by the Applicant to 4.5.3 (RR-020.50) and 4.6.1 (RR-020.54) to address these concerns.

1.2.6 Seasonal piling restriction

1.2.6.1 The Applicant acknowledges the risk of potential adverse effects to cod spawning at the mapped high intensity spawning ground in the east Irish Sea with regards to piling during the cod spawning period(Coull *et al.*, 1998; Ellis *et al.*, 2012). This is reflected in the predicted moderate adverse effect to cod at this mapped high intensity spawning ground during the spawning season concluded in Volume 2, Chapter 3: Fish and shellfish ecology (APP-021) for the Morgan Generation Assets cumulatively with other projects and plans (due to increased areas of ensonification should multiple projects undertake piling at the same time), which is significant in EIA terms.

1.2.6.2 As a result of this predicted potentially significant effect to cod, the Applicant has committed to development of an Underwater Sound Management Strategy (UWSMS), an Outline of which is provided with the Application (APP-068). The purpose of this strategy is to apply the mitigation hierarchy, from design refinement to the application of additional measures, where required (such as temporal management, or the application of additional measures such as Noise Abatement Systems; NAS, pending forthcoming policy changes), with stakeholder input to manage the effects of underwater sound to non-significant levels to ensure no residual significant effect.

1.2.6.3 The UWSMS is secured as a condition of the deemed marine licences within the draft development consent order (APP-003) and will be approved by the MMO prior to piling activities.

1.2.6.4 Whilst the UWSMS is proposed to manage the predicted significant cumulative effects of underwater sound to spawning cod as a result of the Morgan Generation Assets with other projects and plans (and other relevant species), any measures implemented will be designed to manage the contribution to cumulative effects by the Morgan Generation Assets only. As such, the UWSMS will likewise further reduce the minor adverse effects to spawning cod predicted as a result of the Morgan Generation Assets alone.

1.2.6.5 The Applicant requires flexibility in the design and construction methods at this stage, due to ongoing design refinement and uncertainties. It is not considered appropriate to apply a blanket restriction when the final design parameters and construction programme may not require the implementation of additional mitigation measures.

1.2.6.6 Through the Evidence Plan Process, at Expert Working Group Meeting 7 on the 23 April 2024, the Joint Nature Conservation Committee confirmed agreement with the principle of the UWSMS and the outline UWSMS being finalised post-consent. At the same meeting, Natural England welcomed the proposed implementation of the UWSMS and the commitment to reduce the risk of injury and disturbance, with positive feedback to the structure of the outline UWSMS.

1.2.6.7 The UWSMS will be based upon the final design and construction programme and is a consistent approach to a Site Integrity Plan (North Sea)/Piling Strategy (Scotland) and will require stakeholder input and MMO approval prior to any construction activities commencing. This approach is endorsed within NPS EN-3 (paragraph 2.8.135). It is therefore considered a robust and proportionate measure to manage the impacts of underwater sound to ensure effects to cod during their spawning season are non-

significant, thereby avoiding the need to condition a seasonal restriction under the DCO.

2 REFERENCES

Mona Offshore Wind Ltd (2024) Mona Offshore Wind Project. Outline Underwater Sound Management Strategy. Available online: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010137/EN010137-000297-J16_Mona_Outline%20Underwater%20Sound%20Management%20Strategy.pdf. Accessed July 2024.