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Marine Mammals Revised Collision Risk Modelling Signposting document

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Author: Royal HaskoningDHV

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1. CHANGES TO THE COLLISION RISK MODELLING OUTPUTS FOR MARINE MAMMALS

1.1. INTRODUCTION

1. During the course of the work undertaken as preparation for the Public Inquiry on the proposed Development, the Applicant has found an error in some of the workings for the collision risk estimates for marine mammals. There are two models that are used to inform collision risk for marine mammals i.e. the collision risk model (CRM) and the encounter rate model (ERM). The error affected the outputs from the CRM only.
2. The error affected only some of the CRM outputs and these effects were small. Following correction of this error, none of the conclusions made in the Environmental Statement (ES) Marine Mammal Chapter, Information to Support Habitats Regulations Assessment (HRA), or Further Environmental Information (FEI) have changed.

1.2. DETAILS OF THE CHANGES MADE

3. The required changes have been made to all of the relevant documentation relating to the marine mammal assessments. All of the changes made are detailed below.
4. The changes identified are the only changes that have been made to these documents.

1.2.1. Marine Mammal Additional Collision Risk Modelling (MOR/RHDHV/DOC/0118) – submitted as FEI

- **Section 1.1:** this is updated version of the previous note submitted in March.
- **Section 3.1.3: Collision Rate Model**
 - **Text updated:** using the updated CRM, the device with the highest collision risk per MW is device 2b (mid-water: SME) (previously device 4 spar buoy), reaching 0.7 bottlenose dolphin at the lowest capacity (5.48MW) (previously 6.63MW), and the lowest collision risk per MW is device 1 (surface: Orbital, Magellanes) (previously device 5a seabed mounted single rotor), reaching 0.7 bottlenose dolphin at the highest capacity (11.24MW) (previously 19.77MW).
 - **Table 3-2:** values in table have been updated for devices 2a, 2b, 4, 5a, 5b, 6a and 6b.
 - **Graph 3-2** has been updated to reflect the changes in these values.
- **Section 3.1.4: Maximum number of devices**
 - **Table 3-3:** values have been updated for devices 2a, 2b, 4, 5a, 5b, 6a and 6b.
 - **Table 3-4:** values have been updated for devices 2a, 2b, 4, 5a, 5b, 6a and 6b.
- **Section 3.2.1: Impact assessment in the ES**
 - **Table 3-6:** CRM values have been updated for all species and devices. There is no change in the magnitude of effect for worst-case device for bottlenose dolphin, harbour porpoise, Risso's dolphin, minke whale, grey seal and harbour seal, however, the potential magnitude of effect has increased from low to medium for common dolphin.

- **Table 3-7:** number of individuals and percentage of reference population has been updated for all species to reflect changes, however, there is no change to the potential worst-case magnitude for any of the marine mammal species.
- **Section 3.2.2: Cumulative Impact Assessment**
 - **Table 3-9:** values in the cumulative impact assessment have been updated to reflect the updated CRM results, however there is no change in the assessed magnitude for any long-term effect for any of the marine mammal species.
- **Section 3.2.3: Habitats Regulation Assessments**
 - **Text updated:** For harbour seal there is a very small increase in the potential collision risk in the assessments under ERM, and the updated CRM shows a decreased in the collision risk from that assessed in the HRA for the updated modelling of the 0.7 bottlenose dolphin scenarios. Previously there was no difference.
 - **Table 3-12:** values have been updated based on updates in HRA and updated modelling for 0.7 bottlenose dolphin.
 - **In-combination assessment:** text has been updated, was 30 to 27 harbour porpoise, now 32 to 27 individuals.
- **Section 4: updated modelling for 620 devices**
 - **Text updated:** in all cases, except for harbour seal under CRM, with a very small increase in collision risk of 0.04 individuals. Previously no difference for all species, including harbour seal.
 - **Table 4-2:** values updated for all species, however, no change in the assessed magnitude of effect for worst-case device.
- **Appendix 1:** all avoidance rate for additional modelling have been updated for the CRM.

1.2.2. ES Chapter 12: Marine Mammals Volume I (MOR/RHDHV/DOC/0020)

- **Section 12.6.4.5.2: Collision Risk Assessments**
 - **Tables 12-81, 12-83 and 12-84:** Numbers of predicted collisions using the CRM for the different marine mammal species and types of devices in relation to the less than one bottlenose dolphin scenario¹ have been updated. The numbers of individuals for bottlenose dolphin, harbour porpoise, Risso's dolphin, common dolphin, grey seal and harbour seal have increased for the majority of the device types. However, there is no change to the magnitude of impact with the CRM updates and the therefore no change to the previous assessment of impact significance.

¹ Note: the less than one bottlenose dolphin scenarios have been superseded by the revised less than 0.7 bottlenose dolphin scenarios. For consistency and comparison purposes the updated CRM models were run with all the same parameters, therefore some of the results are greater than one bottlenose dolphin.

- **Paragraph 645:** updated to reflected updated CRM result for percentage of bottlenose dolphin population (0.25% to 0.34%).
- **Section 12.6.4.7: Potential Overall Collision Risk for Operational Turbines and Vessels**
 - **Table 12-88:** Numbers of predicted collisions using the CRM for the different marine mammal species have been updated to reflect the changes in **Section 12.6.4.5**. However, there is no change to the magnitude of impact with the CRM updates and the therefore no change to the previous assessment of impact significance.
- **Section 12.6.6.3: Cumulative Impact Assessment**
 - **Table 12-105:** Numbers of predicted collisions using the CRM for the different marine mammal species have been updated to reflect the changes in **Section 12.6.4.5**. However, there is no change to the magnitude of impact with the CRM updates and the therefore no change to the previous assessment of impact significance

1.2.3. ES Appendix 12.2: Additional Collision Risk Assessments Volume III (MOR/RHDHV/APP/0022)

- **Section 2.1: Avoidance rates for one tidal device of each device type**
 - **Tables 2-3, 2-5, 2-7, 2-9, 2-13 and 2-15:** Numbers of predicted collisions using the CRM for the different marine mammal species and types of devices have been updated. The numbers of individuals for bottlenose dolphin, harbour porpoise, Risso's dolphin, common dolphin, grey seal and harbour seal have increased for the majority of the device types. However, there is no change to the magnitude of impact with the CRM updates.
- **Section 2.2: Less than one bottlenose dolphin scenarios for the indicative combination of different types of devices**
 - **Tables 2-17, 2-19, 2-21, 2-23, 2-27 and 2-29:** Numbers of predicted collisions using the CRM for the different marine mammal species and types of devices have been updated. The numbers of individuals for bottlenose dolphin, harbour porpoise, Risso's dolphin, common dolphin, grey seal and harbour seal have increased for the majority of the device types. However, there is no change to the magnitude of impact with the CRM updates.
- **Section 2.3: less than one bottlenose dolphin scenarios for the indicative maximum number of each type of device for one device type only**
 - **Table 2-31:** Numbers of predicted collisions using the CRM for the different marine mammal species and types of devices have been updated. The numbers of individuals for bottlenose dolphin, harbour porpoise, Risso's dolphin, common dolphin, grey seal and harbour seal have increased for the majority of the device types. However, there is no change to the magnitude of impact with the CRM updates.
- **Section 2.4: Indicative 30MW of each type of device**

- **Table 2-33 and 2-34:** Numbers of predicted collisions using the CRM for the different marine mammal species and types of devices have been updated. The numbers of individuals for bottlenose dolphin, harbour porpoise, Risso's dolphin, common dolphin, grey seal and harbour seal have increased for the majority of the device types. However, there is no change to the magnitude of impact with the CRM updates. However, due to the removal of device 7a from the Project Design Envelope the potential magnitude for bottlenose dolphin has reduced to medium from medium to high.
- **Section 2.5: Indicative 40MW of each type of device**
 - **Table 2-36 and 2-37:** Numbers of predicted collisions using the CRM for the different marine mammal species and types of devices have been updated. The numbers of individuals for bottlenose dolphin, harbour porpoise, Risso's dolphin, common dolphin, grey seal and harbour seal have increased for the majority of the device types. However, there is no change to the magnitude of impact with the CRM updates.
- **Section 2.6: Indicative 240MW full build scenario**
 - **Table 2-39 and 2-40:** Numbers of predicted collisions using the CRM for the different marine mammal species and types of devices have been updated. The numbers of individuals for bottlenose dolphin, harbour porpoise, Risso's dolphin, common dolphin, grey seal and harbour seal have increased for the majority of the device types. However, there is no change to the magnitude of impact with the CRM updates.

Note: Appendix 12.3 Population Level Assessments (Population Viability Analysis (PVA)) did not require updating following the CRM updates as the changes in numbers were within the worst-case scenarios already assessed.

1.2.4. Information to Support HRA (MOR/RHDHV/DOC/0067)

- **Section 8.3.2: Gogledd Môn Forol/North Anglesey Marine SAC**
 - **Section 8.3.2.2.4: Assessment of Potential Effects of Collision Risk with Tidal Devices**
 - **Paragraph 623:** number of harbour porpoise per year changed from 20 to 25 individuals, but there is no change to the percentage of the Management Unit (MU) reference population. Therefore, there is no change in the assessment of the potential effects on the integrity of the Gogledd Môn Forol/North Anglesey Marine SAC in relation to the Conservation Objectives for harbour porpoise.
 - **Paragraph 624:** percentage of the harbour porpoise MU has increased from 0.4% to 0.5%, based on the assessment for the indicative 240MW scenario.
 - **Table 8-9:** Collision risk values for harbour porpoise updated, with increase in numbers for majority of devices. Total number of harbour porpoise for the scenario has increased from 20 to 25, but there is no change to the percentage of the MU reference population. Number and percentage of bottlenose dolphin have also been updated and values increased, with the total for scenario increasing from 0.99

(0.25% of reference population) to 1.34 (0.34% of reference population – see **Section 8.3.8** updates below.

- **Section 8.3.2.2.6: Assessment of Potential Effects of Collision Risk with Tidal Devices and Vessels**
 - **Paragraph 645:** number of harbour porpoise per year changed from 25 to 27 individuals and percentage of MU reference population increased from 0.024% to 0.026%. However, there is no change in the assessment of the potential effects on the integrity of the Gogledd Môn Forol/North Anglesey Marine SAC in relation to the Conservation Objectives for harbour porpoise.
 - **Table 8-11:** Collision risk values for harbour porpoise updated, with increase from up to 25 (0.024%) to up to 27 (0.026%).
- **Section 8.3.2.2.12: Assessment of Potential In-Combination Effects**
 - **Table 8-15:** overall the in-combination effect for collision risk of harbour porpoise with tidal devices and vessels increased from 30 to 32, however, there is no change to the percentage of the MU reference population, therefore, no change in the assessment of the potential effects on the integrity of the Gogledd Môn Forol/North Anglesey Marine SAC in relation to the Conservation Objectives for harbour porpoise.
 - **Paragraph 701:** number of harbour porpoise increased from 30 to 32, no change to percentage of the MU reference population or overall assessment, as outlined above.
- **Section 8.3.3: The Gorllewin Cymru Forol/West Wales Marine SAC**
 - **Table 8-17:** number of harbour porpoise per year at risk of collision with tidal devices and vessels (project alone) changed from 25 to 27 individuals and percentage of MU reference population increased from 0.024% to 0.026%. However, no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for harbour porpoise.
 - **Table 8-18:** number of harbour porpoise per year at risk of collision with tidal devices and vessels (in-combination effects) changed from 30 to 32 individuals, no change to the percentage of the MU reference population, therefore, no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for harbour porpoise.
- **Section 8.3.4: Dynesfeydd Môr Hafren/ Bristol Channel Approaches SAC**
 - **Table 8-19:** number of harbour porpoise per year at risk of collision with tidal devices and vessels (project alone) changed from 25 to 27 individuals and percentage of MU reference population increased from 0.024% to 0.026%. However, no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for harbour porpoise.
 - **Table 8-20:** number of harbour porpoise per year at risk of collision with tidal devices and vessels (in-combination effects) changed from 30 to 32 individuals, no change

to the percentage of the MU reference population, therefore, no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for harbour porpoise.

- **Section 8.3.5: North Channel SAC**

- **Table 8-21:** number of harbour porpoise per year at risk of collision with tidal devices and vessels (project alone) changed from 25 to 27 individuals and percentage of MU reference population increased from 0.024% to 0.026%. However, no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for harbour porpoise.
- **Table 8-22:** number of harbour porpoise per year at risk of collision with tidal devices and vessels (in-combination effects) changed from 30 to 32 individuals, no change to the percentage of the MU reference population, therefore, no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for harbour porpoise.

- **Section 8.3.6: Rockabill to Dalkey Island SAC**

- **Table 8-23:** number of harbour porpoise per year at risk of collision with tidal devices and vessels (project alone) changed from 25 to 27 individuals and percentage of MU reference population increased from 0.024% to 0.026%. However, no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for harbour porpoise.
- **Table 8-24:** number of harbour porpoise per year at risk of collision with tidal devices and vessels (in-combination effects) changed from 30 to 32 individuals, no change to the percentage of the MU reference population, therefore, no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for harbour porpoise.

- **Section 8.3.8: Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC**

- **Section 8.3.8.2.4: Assessment of Potential Effects of Collision Risk with Tidal Devices**
 - **Paragraph 816:** updated potential collision risk for bottlenose dolphin with the CRM has increased from 0.99 to 1.34 (increase from 0.25% to 0.34% of the MU and 0.3% to 0.4% for the SACs). Updated potential collision risk for grey seal with the CRM has increased from 4.3 to 6 (increase from 0.07% to 0.10% of the MU). However, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for bottlenose dolphin and grey seal.
 - **Paragraph 817:** percentage of the bottlenose dolphin MU has increased from 4.6% to 6.16% and percentage of the SACs has increased from 5.6% to 7.4%, and the percentage of the grey seal MU has increased from 1.4% to 1.9%, based on the assessment for the indicative 240MW scenario.
 - **Table 8-30:** updated potential collision risk for bottlenose dolphin with the CRM has increased from 0.99 to 1.34 (increase from 0.25% to 0.34% of the MU and 0.3% to

0.4% for the SACs). Updated potential collision risk for grey seal with the CRM has increased from 4.3 to 6 (increase from 0.07% to 0.10% of the MU. However, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for bottlenose dolphin and grey seal.

- **8.3.8.2.6: Assessment of Potential Effects of Collision Risk with Tidal Devices and Vessels**
 - **Paragraph 835:** updated potential collision risk for bottlenose dolphin has increased from 1 to 1.4 (increase from 0.25% to 0.35% of the MU and 0.3% to 0.4% for the SACs). Updated potential collision risk for grey seal has increased from 5 to 6.3 (increase from 0.08% to 0.11% of the MU. However, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for bottlenose dolphin and grey seal.
 - **Table 8-32:** updated potential collision risk for bottlenose dolphin has increased from 1 to 1.4 (increase from 0.25% to 0.35% of the MU and 0.3% to 0.4% for the SACs). Updated potential collision risk for grey seal has increased from 5 to 6.3 (increase from 0.08% to 0.11% of the MU. However, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for bottlenose dolphin and grey seal.
- **8.3.8.2.13: Assessment of Potential In-Combination Effects**
 - **Table 8-35:** updated potential collision risk for bottlenose dolphin has increased from 1.8 to 3 (increase from 0.45% to 0.76% of the MU and 0.55% to 0.9% for the SACs). Updated potential collision risk for grey seal has increased from 24 to 25, with no change in the percentage of the reference population. There is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for bottlenose dolphin and grey seal.
 - **Paragraph 895:** updated potential collision risk for bottlenose dolphin has increased from 1.8 to 3 (increase from 0.45% to 0.76% of the MU and 0.55% to 0.9% for the SACs). Updated potential collision risk for grey seal has increased from 24 to 25, with no change in the percentage of the reference population. There is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for bottlenose dolphin and grey seal.
- **Section 8.3.9: Bae Ceredigion/Cardigan Bay SAC**
 - **Table 8-37:** updated potential collision risk for bottlenose dolphin has increased from 1 to 1.4 (increase from 0.25% to 0.35% of the MU and 0.3% to 0.4% for the SACs). Updated potential collision risk for grey seal has increased from 5 to 6.3 (increase of 0.08% to 0.11% of the MU). However, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for bottlenose dolphin and grey seal.
 - **Table 8-38:** updated potential collision risk for bottlenose dolphin has increased from 1.8 to 3 (increase from 0.45% to 0.76% of the MU and 0.55% to 0.9% for the SACs). Updated potential collision risk for grey seal has increased from 24 to 25, with no

change in the percentage of the reference population. There is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for bottlenose dolphin and grey seal.

- **Section 8.3.10: Sir Benfro Forol/Pembrokeshire Marine SAC**

- **Table 8-39:** updated potential collision risk for grey seal has increased from 5 to 6.3 (increase of 0.08% to 0.11% of the MU). However, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for grey seal.
- **Table 8-40:** updated potential collision risk for grey seal has increased from 24 to 25, with no change in the percentage of the reference population. There is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for grey seal.

- **Section 8.3.11: The Maidens SAC**

- **Table 8-41:** updated potential collision risk for grey seal has increased from 5 to 6.3 (increase from 0.012% to 0.016% of the OSPAR MU). However, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for grey seal.
- **Table 8-42:** updated potential collision risk for grey seal has increased from 24 to 25, with no change in the percentage of the reference population. There is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for grey seal.

- **Section 8.3.12: Lambay Island SAC**

- **Table 8-43:** updated potential collision risk for grey seal has increased from 5 to 6.3 (increase from 0.012% to 0.016% of the OSPAR MU). No change in number of harbour seal. Therefore, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for grey seal and harbour seal.
- **Table 8-44:** updated potential collision risk for grey seal has increased from 24 to 25, with no change in the percentage of the reference population. No change in number of harbour seal. Therefore, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for grey seal and harbour seal.

- **Section 8.3.13: Saltee Islands SAC**

- **Table 8-45:** updated potential collision risk for grey seal has increased from 5 to 6.3 (increase from 0.012% to 0.016% of the OSPAR MU). However, there is no change in the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for grey seal.
- **Table 8-46:** updated potential collision risk for grey seal has increased from 24 to 25, with no change in the percentage of the reference population. There is no change in

the assessment of the potential effects on the integrity of the SAC in relation to the Conservation Objectives for grey seal.