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Proof of Evidence
Dr Murray Grant - Ornithology

Applicant: Menter Môn Morlais Limited

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Proof of Evidence: Marine Ornithology

1. Introduction

1.1 My name is Dr Murray Grant and I am a Principal Ornithologist at Royal HaskoningDHV. I hold a BSc Honours in Ecological Science from the University of Edinburgh and a PhD from the University of Durham, and possess over 25 years' experience as an applied ecologist. I have prepared this Proof of Evidence, which represents my true and professional opinion, based on my knowledge and experience.

1.2 I have worked in consultancy since 2011, leading and contributing to a wide range of projects concerned with ornithology impact assessments, particularly in relation to major offshore renewable developments. This has included the Inch Cape wind farm, Dogger Bank A and B wind farms, the current Dudgeon and Sheringham Shoal Extension projects, the Perpetuus Tidal Energy Centre and the MeyGen Pentland Firth Tidal Energy project. Previous project work has included developing modelling approaches for assessing collision risk of diving birds from tidal turbines (which is included within the current industry guidance), whilst I also led the ornithology assessment for the Wylfa Newydd New Nuclear Power Station (also located on Anglesey). My work has involved engagement with regulators and their advisors, as well as technical work to inform industry guidance.

1.3 Prior to this, I worked in the Royal Society for the Protection of Birds (RSPB) Conservation Science Department for 18 years, where I was a Principal Conservation Scientist. As a result of my research and science background, I have gained expertise in survey and experimental design and in advanced statistical analysis and modelling techniques. I have considerable experience in writing, editing and critically reviewing scientific and technical reports. I have published widely in the peer reviewed scientific literature, and I am a contributory author for several books on ornithology and ecology.

1.4 With regard to the Morlais project, I am the technical lead specialist of the team at Royal HaskoningDHV that undertook the Environmental Impact Assessment (EIA) and Habitat Regulations Assessment (HRA) relating to ornithology, and which continues to engage with key stakeholders on outstanding matters relating to the potential ornithological effects from the Morlais project.

1.5 The evidence presented below considers both the marine ornithology and onshore ornithology elements of the Project. In relation to marine ornithology, it demonstrates that:

- The magnitude of the impact predicted from a first phase of deployment (the size of which is determined by reducing annual predicted collisions of bottlenose dolphin to an acceptable level) is at a level which will not result in significant population level effects with regard to breeding razorbill and guillemot populations at the South Stack and Penlas colonies, and breeding Manx shearwater populations at two Special Protection Areas (SPAs).
- The level of precaution that is built into the calculation of theoretical collision risk is appropriate for the purposes of the Morlais project, and despite the

uncertainty in these estimates (as acknowledged by the assessment), the models can be considered to represent a worst case scenario with respect to collision mortality.

- The approach used for the Population Viability Analysis (PVA), which estimates the population-level effects resulting from the predicted mortality due to collisions and displacement, includes key precautionary assumptions which mean that the estimated effects of a particular level of mortality on the populations of breeding razorbill and guillemot at the South Stack and Penlas colonies due to the proposed project are, in turn, likely to be precautionary.

- The monitoring methods proposed for marine birds both before and during the first phase of deployment will provide a range of information allowing for reductions in the uncertainty around several parameters key to the estimation of theoretical collision risk and, ultimately, population level impacts. This will enable the refinement of future impact predictions to ensure that decisions on further phases of deployment are based upon the best available information.

1.6 In relation to onshore ornithology, concerns are limited to a single species (chough). The evidence presented below demonstrates that the additional mitigation put in place following comments from Natural Resources Wales (NRW) and RPSB on the assessments in ES Chapter 19 Onshore Ecology (MDZ/A25.19) and the Information to Support Habitats Regulations Assessment (MDZ/A27.11) (subsequently referred to as the "shadow HRA"), sufficiently addresses concerns regarding potential impacts on chough during construction of the Morlais project.

1.7 The essential reading list for further information regarding this Proof of Evidence is set out in Table 1:

Table 1: Key ornithology documents

Reference	Submission Documents
MDZ/A25.11	Chapter 11: Marine Ornithology Environmental Statement Volume 1 (Main Report) (document: MOR-RHDHV-DOC-0016)
MDZ/A26.6	Chapter 11: Marine Ornithology Environmental Statement Volume 2 (Figures) (document: MOR/RHDHV/DRW/0085)
MDZ/A27.5	Chapter 11: Marine Ornithology Environmental Statement Volume 3 (Appendix) (document: MOR-RHDHV-APP-0017-0019)
MDZ/A25.19	Chapter 19: Onshore Ecology Environmental Statement Volume 1 (Main Report) (document: MOR-RHDHV-DOC-0037)
MDZ/A27.7	Chapter 19: Onshore Ecology Environmental Statement Volume 3 (Non confidential appendix) (document: MOR-RHDHV-APP-0038-0040)
MDZ/A27.11	Information to Support Habitats Regulations Assessment (document: MOR-RHDHV-DOC-0067)
Reference	**Post-Submission Documents**

MDZ/L2	Statement of Common Ground – NRW – Ornithology
MDZ/L3	Statement of Common Ground – RSPB – Ornithology
MDZ/F16	Marine Ornithology Updated Collision Risk Modelling and Encounter Rate Modelling Note (Document MOR/RHDHV/DOC/0115)
MDZ/A28.56	Summary of Advice Provided to Morlais with Respect to Tagging of Guillemots and Razorbills (MMC191 MOR-RHDHV-DOC-0150)
MDZ/F17	Onshore Ornithology: Response to Comments on Chough (Document MOR/RHDHV/DOC/012)
MDZ/A28.8	Outline Environmental Mitigation and Monitoring Plan (EMMP) - Outline Adaptive Management Approach to Environmental Mitigation and Monitoring during the Phased Deployment of the Morlais Project (document: MOR/RHDHV/DOC/0072)
MDZ/A28.22	ML012 MORRHDHVDOC0126 Signposting for responses to ORML1938_RSPB.xls
MDZ/A31.9	MMC360 MOR-RHDHV-DOC-0153 Marine Ornithology Revised Collision Risk Modelling Signposting document
MDZ/A31.10	MMC361 MOR-RHDHV-DOC-0115_ Marine Ornithology Collision Risk Modelling Note
MDZ/A31.11	MMC362 MOR-RHDHV-DOC-0016 ES Chapter 11: Marine Ornithology
MDZ/A31.12	MMC363 MOR-RHDHV-DOC-0019 Appendix 11.3: Encounter Rate Modelling, Collision Risk Modelling and Population Viability Analysis Technical Report
Reference	**Key Relevant Representations**
REP005	NRW (REP005); 31 October 2019 - Morlais Demonstration Zone: Transport and Works Act Order Application (TWAO)
FEI_REP004	NRW (FEI REP004); 13 May 2020 - Bwriad / Proposal: Morlais Demonstration Zone: Transport and Works Act Order Application (TWAO) – Further Environmental Information Lleoliad / Location: Holy Island, Isle of Anglesey
OBJ086	RSPB Cymru (OBJ086); 05 November 2019 - The Transport and Works Act 1992, The Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006, The Morlais Demonstration Zone Order
FEI – OBJ014	RSPB Cymru (FEI OBJ014); 26 May 2020 - The Transport and Works Act 1992 The Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 The Morlais Demonstration Zone Order Additional Environmental Information
OBJ073	NWWT (OBJ073); 31 October 2019 - RE: 3234121 Morlais Demonstration Zone
ML012	ORML1938 consultation response RSPB
Reference	**Relevant Guidance and Reports**

MDZ/F19	Scottish Natural Heritage (SNH) (2016) Assessing collision risk between underwater turbines and marine wildlife. SNH Guidance Note (version 1 May 2016)
MDZ/F15.2	ABPmer, (2020). Review of potential collision between tidal stream devices and marine animals, NRW Evidence Report No. 444, (ABPmer Report No. R.3322). A report produced by ABPmer for Cyfoeth Naturiol Cymru (Natural Resources Wales), June 2020
Appendix	**Appendices to the PoE**
Appendix 1	Details of the ornithology concerns outlined in the Relevant Representations of NRW, RSPB and NWWT
Appendix 2	Details of the key points from the RSPB Statement of Case as pertaining to the Morlais ornithology assessment

1.8 In relation to the key ornithology documents identified in Table 1, some represent revisions and updates to documents that were submitted previously. For example, the original Further Environmental Information (FEI) dealing with updated collision assessments for marine ornithology (MDZ/A28.7) was revised and resubmitted (as MDZ/F16) following consultation with RSPB to try to address issues they had raised on the material that had been presented in the original document.

1.9 Also, in the course of undertaking the work to prepare the evidence presented below, an error was found in some of the workings for the collision risk estimates for diving birds. There are two models that are used to inform collision risk for diving birds - i.e. the Collision Risk Model (CRM) and the Encounter Rate Model (ERM). The error affected certain of the outputs from the CRM only (with the ERM outputs unaffected). The effects of the error were small, such that none of the conclusions made in the ES ornithology chapter (MDZ/A25.11), shadow HRA (MDZ/A27.11) or relevant FEI (MDZ/F16) were changed following correction of the error. The correction of this error led to updates being made to ES Chapter 11 Marine Ornithology (MDZ/A25.11) and ES Appendix 11.3: Encounter Rate Modelling, Collision Risk Modelling and Population Viability Analysis Technical Report (MDZ/A27.5), as well as to the relevant FEI (MDZ/F16). No changes were required to the shadow HRA (MDZ/A27.11). The revised documents are identified as MDZ/A31.10 to A31.12 in Table 1 above, with the updates of these documents limited to the tables and paragraphs specified in the signposting document (MDZ/A31.9).

2. Structure of Evidence

- Section 3 - Factual Background
- Section 4 - Relevant Legislation, Policy and Guidance to the Subject Matter
- Section 5 – Matters for the Inquiry - The Project's Response
- Section 6 - Relevant Representations and the Project Responses to Concerns Raised
- Section 7 - Conclusions

- Section 8 – Summary of Proof of Evidence

3. Factual Background

3.1 The Morlais Development Zone (MDZ) is one of several UK marine energy demonstration zones identified by The Crown Estate with marine energy potential. Environmental considerations were used in the process of determining the zone locations. A plan-level Habitats Regulations Assessment (HRA) was produced before the leasing process was finalised and seabed agreements signed.

3.2 The application for a Marine Licence and Transport and Works Act Order seeks consent for phased deployment of tidal energy converters up to 240MW generating capacity through an adaptive management approach, as set out in the Outline Environmental Mitigation and Monitoring Plan (OEMMP; MDZ/A28.8). The OEMMP shows the commitments of the Morlais Project to safeguarding of marine ornithology receptors through the identification, avoidance and mitigation of potential adverse environmental impacts associated with the construction, operation, repowering and decommissioning of the project, including the agreement that the deployment of tidal devices by the Project will be subject to approval of the Regulators. This Proof of Evidence should be read in conjunction with that for the OEMMP provided by Mr Frank Fortune (MDZ/P4).

3.3 Part of the detailed EMMP (dEMMP), to be developed post consent, will involve the initial deployment phase being constrained to a scale of development for which the predicted collision rate for bottlenose dolphins does not exceed the Potential Biological Removal, currently calculated as 0.7 animals per annum (as detailed in the Proof of Evidence for Marine Mammals provided by Dr Jennifer Learmonth (MDZ/P2)).

4. Legislation and Policy Context and Relevant Guidance

Principal legislation and policy

4.1 Birds and their habitats receive protection through a variety of policy and legal mechanisms. In relation to designated sites, birds are protected through European legislation, notably the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora and Council Directive 2009/147/EC on the Conservation of Wild Birds. Both are transposed into national law in England and Wales by the Conservation of Habitats and Species Regulations 2017 (commonly referred to as the 'Habitats Regulations').

4.2 SPAs are sites classified in accordance with Article 4 of the EC Directive 79/409/EEC on the Conservation of Wild Birds which came into force in April 1979 (often referred to as the Birds Directive). They are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species. Effects on SPAs have been assessed separately to the EIA process, by the HRA process.

4.3 The relevant species to this Proof of Evidence that must be considered by this legislation are the breeding Manx shearwater populations from the Glannau Aberdaron and Ynys Enill / Aberdaron Coast and Bardsey Island SPA and the Sgomer, Sgogwm a Moroedd Penfro / Skomer, Skokholm and the Seas off

Pembrokeshire SPA, along with the breeding and wintering chough populations from the Glannau Ynys Gybi / Holy Island Coast SPA (Figure 1). Manx shearwater is relevant to marine ornithology issues, whereas chough is relevant to onshore ornithology. In terms of the marine ornithology issues, Manx shearwater is the only species for which SPA populations are of relevance. Following submission of FEI on marine birds (MDZ/F16) and on chough (MDZ/F17), neither the Manx shearwater SPA populations nor the chough SPA populations represent issues of concern as identified by NRW in their Relevant Representations (see Section 6 below, and Appendix 1). It is also noted that the NRW Statement of Case makes no reference to these SPA populations.

4.4 The Welsh Government has particular responsibilities with respect to Sites of Special Scientific Interest (SSSIs) under section 28G of the Wildlife and Countryside Act 1981. An authority to which this section applies has the duty *"…to take reasonable steps, consistent with the proper exercise of the authority's functions, to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest".* The key species of concern (guillemot and razorbill) are associated with the Glannau Ynys Gybi / Holy Island Coast SSSI (Figure 1) and are part of a breeding seabird colony identified as contributing to the special interest of this site and which should be maintained[1]. However, neither species are identified as interest features for the site's designation and the populations of these species at this site are not part of, or associated with, SPAs. Following submission of FEI (MDZ/F16, see also Appendix 1), concerns over the predicted impacts to these guillemot and razorbill populations are limited to RSPB and North Wales Wildlife Trust (NWWT).

4.5 Birds, their nests and eggs are protected under the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. With certain exceptions it is an offence to: a) intentionally kill, injure or take any wild bird; b) intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and c) intentionally take or destroy the egg of any wild bird.

4.6 Schedule 1 birds cannot be intentionally or recklessly disturbed when at or near an active nest and there are penalties for doing so. Licences can be issued to visit the nests of such birds for conservation, scientific or photographic purposes but not to allow disturbance during a development, even in circumstances where that development is fully authorised by consents such as a valid planning permission.

4.7 The policy context for ornithology is summarised in the Proof of Evidence for Planning and Policy provided by Mr David Bell (MDZ/P9). Examples of those policies which apply to ornithology are summarised below:

- National Policy Statement for Energy
    - Para 5.3.3 "…the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated

[1] https://naturalresources.wales/media/656163/SSSI_0963_SMS_EN0018b28.pdf

sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity".

- Para 5.3.6 "In having regard to the aim of the Government's biodiversity strategy the IPC should take account of the context of the challenge of climate change: failure to address this challenge will result in significant adverse impacts to biodiversity."

- Planning Policy Wales

  - Para 6.4.5 "Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity"

4.8 Local policy (as per ES chapter 11 - MDZ/A25.11):

- Joint Local Development Plan (Anglesey and Gwynedd)

Relevant guidance

4.9 The principal guidance documents used to inform the assessment of potential impacts on ornithology include, but are not limited to:

- Assessing collision risk between underwater turbines and marine wildlife. Scottish Natural Heritage (SNH) (2016) guidance note. This guidance note is included as a core document (MDZ/F19).

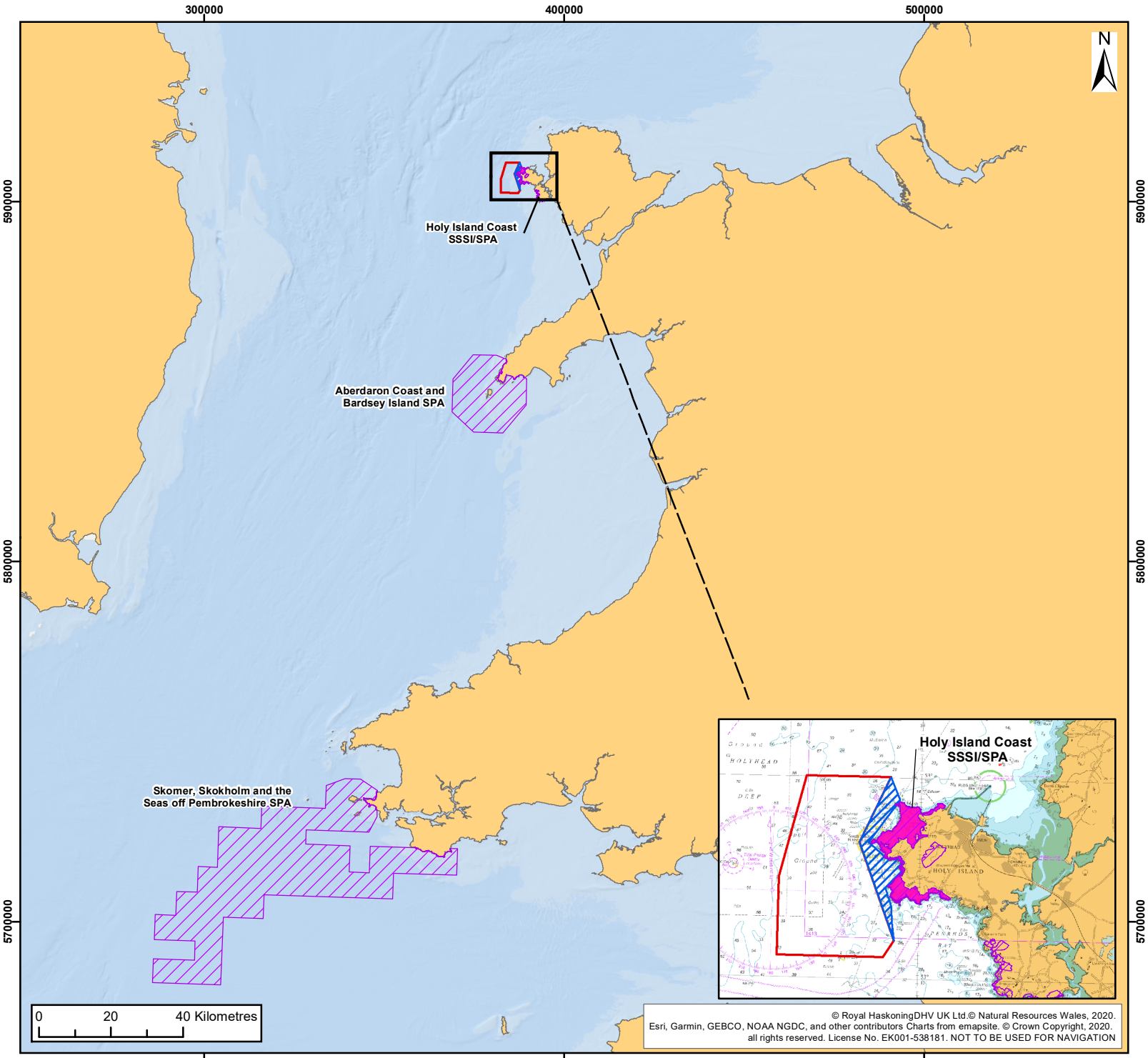
4.10 Since submission of the ES (MDZ/A25.11) and Information to Support HRA (MDZ/A27.11), NRW commissioned ABPmer to provide a 'review of potential collision between tidal stream devices and marine animals', which was issued as general industry guidance in June 2020. This report has also been included as a core document (MDZ/F15.2).

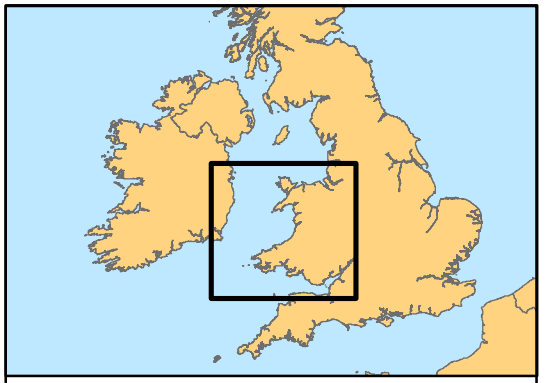
4.11 In relation to marine birds, the NRW commissioned report (MDZ/F15.2) outlines a number of conclusions which are relevant to the Morlais ornithology assessment. Notably, this report:

- States that "modelling continues to be the most commonly used approach to assess the risk of collision of marine animals. There are a range of collision risk modelling tools available, each with different input parameter requirements and assumptions which are often conservative. There appears to have been limited validation of these models with the results of monitoring during operation. The level of confidence in the outputs of these modelling tools is therefore low, but to date, they are still the best way to assess the potential risk of collision." This accords with the approach adopted by the Morlais ornithology assessment, with the models highlighted by the NRW

commissioned report being those that are used in the Morlais ornithology assessment.

- Identifies that, to date, existing monitoring studies have yet to record any direct collisions of marine birds with tidal devices but, importantly, the report states that whilst this may reflect an absence of collisions it may also be due to methodological limitations, whilst the report also notes that there is a paucity of monitoring data available.





Legend:

- Morlais Demonstration Zone
- Export Cable Corridor
- Special Protection Area (SPA)
- Sites of Special Scientific Interest (SSSI)

Client: morlais / MENTER MÔN

Project: morlais ANGLESEY MARINE ENERGY

Title:

Designated sites relevant to ornithology proof of evidence

Figure:	Drawing No:
1	PB5034-POE-011-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	02/09/2020	AB	SM	A4	1:1,500,000

Co-ordinate system: WGS 1984 UTM Zone 30N

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5. Matters for the Inquiry - The Project's Response

5.1 Assessing the potential magnitude and significance of potential impacts due to the construction, operation, repowering and decommissioning of the proposed project involves several steps. These include data collection and analysis to estimate the size of the populations at risk (including the identification of the wider populations from which birds are likely to have originated) and assessments to estimate how many birds could be affected (i.e. the magnitude of potential impact). Finally, where impacts are considered sufficiently severe or populations sufficiently sensitive, consideration of the population consequences of the predicted impact using methods such as PVA are undertaken.

5.2 To inform the assessment of potential impacts on marine birds using the MDZ, two years of monthly boat-based ornithological surveys were undertaken covering the MDZ and a surrounding 2km buffer. Information on the baseline condition of the MDZ then enabled an assessment of potential impacts, which was conducted according to industry standard guidance where available. The methodologies applied in the impact assessment, described in Section 11.4 of ES Chapter 11 Marine Ornithology (MDZ/A25.11), were agreed with Natural Resources Wales (NRW) during the Ornithology Technical Working Group (TWG) consultation prior to the production of the ES.

5.3 The assessment concluded that other than collision risk of diving marine birds with tidal energy converters, no other impacts predicted during any project phase would result in an impact significance of greater than minor adverse, defined as a *"small change in receptor, which may be raised as local issues but are unlikely to be important at a regional population level"*.

5.4 In the ES, the theoretical collision risk to diving birds was modelled for two different deployment scenarios[2]. These were a 40MW deployment of the device predicted to result in the highest number of collisions (from the nine devices included in the assessment for each species) as a worst case scenario for the first phase of deployment[3] and a 240MW indicative array, which comprised a mixture of devices.

5.5 In both scenarios, the potential impact was considered by the assessment to be significant in EIA terms for the breeding populations of both guillemot and razorbill associated with birds breeding in the South Stack and Penlas area, associated with

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[2] Collisions are assumed to result in direct mortality, and theoretical models are used to predict collision rates (based upon a range of factors including the estimated bird densities, the known foraging and diving behaviour of the species of interest and the characteristics and number of the tidal devices). As recommended by NRW, the assessment used two different models to estimate collisions of diving birds (see Table 11-4 of ES Chapter 11, vol. 1 (MDZ/A31.11)), both of which are included in the relevant industry guidance (MDZ/F19). These are the Encounter rate Model (ERM) and the Collision Risk Model (CRM).

[3] The first phase has now been reduced, the size of which is determined by reducing annual predicted collisions of bottlenose dolphin to an acceptable level.

the Glannau Ynys Gybi SSSI. A major adverse impact was predicted for both deployment scenarios for razorbill, and a moderate adverse and major adverse impact was predicted for guillemot in the 40MW and 240MW scenarios, respectively.

5.6 A major adverse impact significance is defined as a *"very large or large change in receptor, which are important at a population (national or international) level because they contribute to achieving national or regional objectives, or, expected to result in exceedance of statutory objectives and / or breaches of legislation"*. A moderate adverse impact significance is defined as an *"intermediate or large change in receptor, which may to be important considerations at national or regional population level. Potential to result in exceedance of statutory objectives and / or breaches of legislation"*. Since submission of the ES, further work has been done to reduce the collision risk to non-significant levels in EIA terms (discussed further below).

5.7 Due to the low predicted number of collisions, a minor adverse impact significance was assigned for all other diving bird species recorded in the MDZ, including Manx shearwater, for both deployment scenarios presented in the ES.

5.8 To assess the potential impacts of the proposed project on chough, information was obtained from the Cross and Stratford Chough Project. This comprised details of chough nest sites and occupancy for the period 2014 to 2018 for the area within the scoping consultation boundary for the Morlais project cable landfall, landfall substation location and onshore cable route. The Cross and Stratford project also provided ad hoc records on feeding chough from 1 km squares within or partially overlapping the consultation boundary, and records of roost sites in the vicinity of the consultation boundary.

5.9 RSPB provided summary data from the 2014 national chough survey, indicating whether breeding was confirmed, probable or possible within 1km squares in the vicinity of the Morlais project boundary, or whether no breeding was recorded. They also provided data from transect surveys of chough feeding in fields within the RSPB South Stack Reserve and off-reserve feeding areas for the period January 2013 until May 2017. The data are the numbers of chough recorded per land parcel unit for each survey along with habitat characteristics and the presence of domestic stock, from fortnightly surveys throughout the year. The data therefore indicate the relative use by chough of land parcels within the survey area. RSPB also provided data regarding the locations of known chough nest sites, including 'live' sites, sites which haven't been occupied since 2015 but are good successful sites and 'likely' to be used again, and sites were attempts were made but a successful brood was not raised.

5.10 As discussed below, FEI (MDZ/F17, see also Appendix 1) provided additional assessment and mitigation with regards to the onshore development site and the Glannau Ynys Gybi / Holy Island Coast SPA populations of breeding and wintering chough. As a result, the NRW Relevant Representations FEI (FEI_REP004) submitted in response to MDZ/F17 state that the additional mitigation proposed to ensure no/negligible displacement of foraging breeding chough sufficiently addresses concerns. The RSPB Relevant Representations FEI (FEI - OBJ014) submitted in response to MDZ/F17 acknowledge the further work that has been undertaken and the additional mitigation but does not indicate whether this is sufficient to resolve their

concerns over the potential effects on the SPA chough populations. In so far as the issues concerning chough have been raised by RSPB in their Statement of Case, these are dealt with in Appendix 2.

6. Relevant Representations and the Project Responses to Concerns Raised

Concerns identified in the Relevant Representations pertaining to the EIA and shadow HRA

6.1 Details of the Relevant Representations that concern ornithology are provided in Appendix 1. In relation to marine ornithology, the earlier Relevant Representations of NRW (REP005), RSPB (OBJ086) and NWWT (OBJ073)[4] all highlight concerns over the predicted impact (as a result of collisions) on the breeding guillemot and razorbill populations which occur at the South Stack and Penlas colonies within the Glannau Ynys Gybi / Holy Island Coast SSSI. Thus, NRW specify:

- Significant concerns over the high predicted annual mortality of guillemot and razorbill for the 240MW deployment scenario presented in Chapter 11 of the ES, which they highlight could (in theory) lead to the extinction of an entire razorbill colony and which would occur at an iconic location that is popular for visitors. However, they recognise that the predicted mortality levels may be sustainable at the scale of the wider UK and Welsh populations.

- The adaptive management framework and monitoring and mitigation programme are critical but need considerable further development and detail on a phased approach;

6.2 In addition, RSPB state in OBJ086 that the predicted impact on these guillemot and razorbill populations from the original 40MW first phase deployment scenario presented in Chapter 11 of the ES (MDZ/A25.11) is also unacceptable. RSPB further consider:

- It is not possible to conclude no adverse effects on the integrity of the Glannau Aberdaron and Ynys Enill / Aberdaron Coast and Bardsey Island SPA and Sgomer, Sgogwm a Moroedd Penfro / Skomer, Skokholm and the Seas off Pembrokeshire SPA as a result of potential impacts to their breeding populations of Manx shearwater due to the absence of any PVA to enable assessment of the population-level impacts from the predicted collision mortality.

- There are various methodological concerns, of which issues on the interpretation and treatment of the avoidance rates as applied to the CRM and ERM are of most prominence.

[4] For ornithology, all of these Relevant Representations relate to the work presented in the EIA and shadow HRA, and were submitted before the submission of FEI for ornithology.

6.3 NWWT state in OBJ073 that they support the key points made by the RSPB with regard to seabird mortality.

6.4 In relation to onshore ornithology, the earlier Relevant Representations from NRW (REP005) and RSPB (OBJ086) both identify concerns over the potential effects on the Glannau Ynys Gybi / Holy Island Coast SPA breeding and wintering chough populations. These concerns relate to functional linkage between the onshore development area and these SPA populations, the potential for disturbance and habitat loss effects on the SPA chough and the adequacy of the proposed mitigation.

Addressing concerns over predicted impacts to The South Stack and Penlas guillemot and razorbill populations

6.5 With regard to the concerns that NRW, RSPB and NWWT set out in these earlier Relevant Representations on the potential impact of the predicted collision mortality on the South Stack and Penlas guillemot and razorbill populations, the assessment undertaken in Chapter 11 of the ES (MDZ/A25.11 – now superseded by MDZ/A31.11) predicted a major adverse impact for both the 40MW and 240MW scenarios for razorbill, and a moderate adverse and major adverse impact for guillemot in relation to the 40MW and 240MW scenarios, respectively. However, in relation to these conclusions, it is important to consider the high levels of uncertainty involved in predicting collision rates of diving seabirds with tidal turbines (as outlined in SNH (2016) – MDZ/F19) and, hence, the precautionary assumptions that are incorporated into the modelling exercise and subsequent prediction of population-level impacts (detailed below).

6.6 Subsequent to submission of the Relevant Representations detailed above, the development of the adaptive management approach for the Project means that the initial deployment proposed is now considerably smaller than the scenarios assessed in Chapter 11 of the ES. Therefore, an additional assessment (submitted as FEI – i.e. MDZ/F16, now superseded by MDZ/A31.10) was undertaken to determine the potential impact of this reduced level of deployment on the guillemot and razorbill populations from the South Stack and Penlas colonies within Glannau Ynys Gybi / Holy Island Coast SSSI. The resulting predicted impact magnitude is assessed as minor adverse (or non-significant in EIA terms) for both the guillemot and razorbill populations.

6.7 The NRW Relevant Representations submitted in response to the FEI (FEI_REP004) state that the FEI appears to provide adequate evidence that populations of guillemot and razorbill at the RSPB South Stack reserve can still increase with deployment of the first phase. However, contrary to the position adopted by NRW, the RSPB Relevant Representations submitted in response to the FEI (FEI - OBJ014) do not reach this conclusion. This is because RSPB consider that the approach to calculating the revised collision risk estimates appears flawed, with the estimates extrapolated from those presented in the EIA by assuming a linear relationship between collisions and the MW output of designs. However, the Applicant considers that the approach used is valid because each of the designs assessed comprise a single device only, so that the collision risk is directly proportional to the number of devices to be installed (and it is essentially the same calculation as undertaken when calculating the ERM or

CRM outputs for multiple devices). This is explained more fully in a revision of the Marine Ornithology Collision Risk Modelling Note (MDZ/ A31.10)[5].

6.8 For subsequent deployment following the initial phase, it will have to be demonstrated via the dEMMP that the level of risk to marine birds is acceptable. Details of the mechanisms by which a decision to deploy further phases of tidal energy devices would be made are presented in the OEMMP (MDZ/A28.8). The dEMMP will be developed post consent, in consultation with NRW and RSPB as the final design of the project develops. The suite of information that will be available to stakeholders will include key ornithology data collected prior to and during the deployment of the first phase, and as detailed in the dEMMP. These data will be used to refine impact predictions to assess the extent of further deployment that is possible without significant (i.e. moderate or major adverse) impacts occurring on marine bird populations. The focus of this monitoring will be guillemot and razorbill breeding populations at the South Stack and Penlas colonies.

6.9 The RSPB Relevant Representations submitted in response to the FEI (FEI - OBJ014) highlight concerns over the details and feasibility of the approaches to ornithology monitoring proposed in the OEMMP. However, several methods are currently under evaluation for suitability for inclusion in the dEMMP. Ideally, the approach will include methods for monitoring at the level of populations, individuals, and devices. Specific monitoring methods will be agreed with the EMMP advisory group, followed by a reviewing process via the regulator. The phased deployment of tidal devices at a magnitude below levels that could result in significant population effects on seabirds provides an opportunity to obtain information which could be used to improve the modelling for collision risk from multiple devices, and further test and develop technologies to determine if a collision events occur.

6.10 To monitor breeding guillemot and razorbill populations, it is proposed to undertake counts at the South Stack and Penlas colonies. These already occur annually as part of the management of these colonies by RSPB. Methods employed will be similar to those currently undertaken, which is in line with published guidance on colony counts[6]. However, the colony monitoring would be expanded to include methods for estimating breeding productivity. There appears to be acceptance from RSPB that such an expanded colony monitoring programme (including the estimation of productivity) would be feasible (see section on 'Colony counts' in FEI - OBJ014). This information could enable assessment of whether considerably higher mortality than that predicted for the initial deployment (see MDZ/ A31.10) was occurring amongst breeding adults (which would lead to increased levels of breeding failure) in years following the deployment of devices. In addition, the seasonal coverage of colony

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[5] Note, also that this is apparent from the workings for these ERM and CRM estimates, as provided to RSPB on 26/10/20.

[6] Walsh, PM, Halley, DJ, Harris, MP, del Nevo, A, Sim, IWM and Tasker, ML (1995) Seabird monitoring handbook for Britain and Ireland. A compilation of methods for survey and monitoring of breeding seabirds. JNCC, RSPB, ITE and the Seabird Group.

counts may be extended to answer additional questions about the occupation of breeding sites throughout the year, which could usefully feed into revised estimates of theoretical collision risk and subsequent impact assessment. The assessment as it stands makes assumptions about the origins of birds recorded in the MDZ at different times of year, which could be refined by such monitoring. Colony counts and productivity estimates are anticipated to occur for two years prior to the first deployment, as well as during the first phase of the deployment itself. This will be kept under review by the EMMP advisory group.

6.11 To monitor behaviour at the individual level, it is proposed to tag breeding guillemot and razorbill from the South Stack and Penlas sites. Preliminary advice from RSPB indicates that approximately 15 individuals of each species could be caught and tagged each year from these colonies, which would likely occur during the early chick rearing phase (see MDZ/A28.56). Two types of loggers would be employed; Global Positioning System (GPS) tags, which measure the spatial location of the bird, and Time Depth Recorders (TDR), which provide data on diving behaviour (e.g. dive duration and depths). In both cases, birds must be caught for tags to be fitted. The tags would generally be designed to collect data for a period of several days, after which they would fall off. The aim would be to capture the data by remote download from a base station installed at the colony (with foraging trip data from the tags automatically downloaded to the base station on return to the colony), as opposed to having to recapture birds and retrieve the loggers. The Applicant is aware that studies of the foraging behaviour of both guillemot and razorbill involving the combined use of GPS and TDR devices with remote data download are being undertaken in other UK projects (contrary to what is stated in FEI - OBJ014).

6.12 The Applicant recognises that there are elements of uncertainty surrounding the proposed tracking studies, with some of these elements requiring the use of relatively novel technology for which the efficacy has still to be fully established. However, it is also the case that monitoring of these species using both GPS and TDR devices has been (and currently is being) undertaken at other locations. This includes studies at nearby colonies in North Wales (as described in MDZ/A28.56). Further details of such work will be obtained before finalising the tagging methods.

6.13 Data from the tagged birds will be used to refine estimates of the extent to which birds from these colonies forage in the Project site and of some of the key input parameters to the collision risk model (e.g. depth profiles of dives, whether these vary with location or during the diel cycle, nocturnal activity, dive frequency, duration and swim speed). Therefore, site-specific data on such parameters will enable refinement of the collision estimates, and an assessment of the extent to which the original estimates are precautionary (or not).

6.14 Monitoring of collisions using underwater cameras or other approaches (e.g. hydroacoustic imagery) is under consideration. Such methods would aim to record actual collisions at the devices but the technologies that could potentially monitor collisions are currently unproven. The NRW commissioned review of potential collision between tidal stream devices and marine animals (MDZ/F15.2) indicates that trials involving the use of hydroacoustic devices to detect and track diving seabirds appear to have met with some, limited, success. However, these methods are unable to

identify the species of seabird which are recorded, so limiting the value of the data that could be obtained. The OEMMP (MDZ/A28.8) outlines a range of technologies under consideration for deployment for collision detection of marine mammals and seabirds.

Population-level impacts on SPA Manx shearwater

6.15 The predicted annual collision mortality of Manx shearwater resulting from the 240MW device scenario represented <0.05%of each of the Glannau Aberdaron and Ynys Enill / Aberdaron Coast and Bardsey Island SPA population and the Sgomer, Sgogwm a Moroedd Penfro / Skomer, Skokholm and the Seas off Pembrokeshire SPA population. On the basis of these very small predicted effects, the shadow HRA reached a conclusion of no adverse effects on integrity for both SPAs.

6.16 However, PVAs were undertaken in relation to the predicted collision mortalities resulting from the full 240MW deployment on the SPA Manx shearwater populations (and also submitted as part of the FEI – MDZ/F16) subsequent to the submission of OBJ086 from RSPB. These indicate small population-level effects in both cases and, consequently, result in no change to the conclusions of the shadow HRA (MDZ/A27.11).

6.17 The NRW Relevant Representations submitted in response to MDZ/F16 (FEI_REP004) agree with the conclusion of no apparent likely significant effect on the SPA Manx shearwater populations. The RSPB Relevant Representations submitted in response to the MDZ/F16 (FEI - OBJ014) make no mention of these SPA populations or whether there is agreement with the conclusions of MDZ/F16.

Collision risk assessments and the application of avoidance rates

6.18 The earlier Relevant Representations from RSPB (OBJ086) indicate concerns over methodologies, with particular attention given to the way in which the avoidance rates applied to the CRM and ERM outputs have been interpreted and treated. The critical issues raised are that:

- The assessment focusses on CRM and ERM estimates produced only using avoidance rates between 95% and 99.9%[7] (although the estimates are presented for the full range of avoidance rates).
- For the purposes of the assessment, the CRM and ERM estimates are averaged and the avoidance rates applied to this averaged estimate (although, again, the individual CRM and ERM estimates are presented with the full range of avoidance rates applied).

6.19 In terms of the range of avoidance rates on which the assessment is based, it is considered that this encompasses sufficient precaution. In this respect, it is important to recognise that reducing the avoidance rate from 99% to 98%, for example, doubles the collision estimate (because this reduction is equivalent to assuming that 2% of the

[7] Note, OBJ086 states that the focus is on avoidance rates of 95 – 99.5% but this is incorrect, as it is 95 – 99.9%.

birds predicted to collide actually do so, as opposed to 1%). Thus, the range from 95 – 99.9% avoidance encompasses a 50-fold difference in estimated collisions (i.e. from 5% to 0.1% of the birds predicted to collide).

6.20 The RSPB correctly point to the considerable uncertainty surrounding collision risk to diving birds from tidal turbines but, as indicated above, the assessment is based upon the consideration of a wide range of potential avoidance rates. It is also worth considering how the avoidance rates applied to CRMs for onshore and offshore wind turbines have increased for many bird species (markedly so in some cases) from initial, precautionary, values of 95% or 98% as the availability of monitoring data has increased and the understanding of the interactions of birds with wind turbines has improved[8,9,10]. There are also a number of factors that would act to cause avoidance rates of diving birds in relation to tidal turbines to be higher than those of birds in flight in relation to wind turbines, including the slow travel speeds of birds when underwater (relative to flight speeds) and the greater potential for birds to be swept around the tidal turbine blades due to hydrodynamic forces (because seawater is much denser than air)[11].

6.21 Given the above, it is considered that it is appropriate for the assessment to focus on CRM and ERM outputs with avoidance rates of 95 – 99.9%, and that these avoidance rates encompass sufficient precaution.

6.22 In terms of the averaging of CRM and ERM values, this simply represents a pragmatic approach to dealing with outputs from two models, neither of which is identified as being preferred over the other by the relevant industry guidance (SNH (2016) guidance note – MDZ/F19). As stated by RSPB in OBJ086 (and recognised in the ES Chapter 11, vol. 3 – Appendix 11.3 (MDZ/A27.5)), it is correct that the avoidance rate incorporates correction for model error as well as reflecting avoidance behaviour *per se*. However, this in itself is of limited relevance with respect to the CRM and ERM because there is no basis for assuming that the estimates derived from one model are any more accurate than those from the other model (and hence it is both reasonable and valid to use the averaged value of the estimates from the two models with a common avoidance rate applied).

6.23 Irrespective of the above points concerning the validity of using the averaged ERM and CRM outputs, the conclusions of the assessment are unaffected when the worst-case of the ERM and CRM is used instead of the averaged value. Thus, for the revised initial deployment (as assessed in the FEI) the worst-case (from all devices

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8 Scottish Natural Heritage (2018) Avoidance rates for the onshore SNH Wind Farm Collision Risk Model. vs 2. (And references therein).

9 SNCBs (2014) Joint response from the Statutory Nature Conservation Bodies to the Marine Scotland Science avoidance rate review

10 Bowgen, K. and Cook, A. (2018) Bird collision avoidance: Empirical evidence and impact assessments. JNCC Report, no. 614. Joint Nature Conservation Committee, Peterborough.

11 Wilson, B., Batty, R.S., Daunt, F. and Carter, C. (2017) Collision risks between marine renewable devices and mammals, fish and diving birds. Report to the Scottish Executive. Scottish Association for Marine Science, Oban.

considered) of the individual ERM and CRM estimates is 20% higher for guillemot and 9% higher for razorbill than the worst-case as determined by the averaged ERM and CRM estimates[12]. For guillemot, the overall percentage increase in the predicted total mortality is less than this because of the inclusion of mortality from displacement (e.g. at 95% avoidance the increase in total predicted mortality is 17% and at 99.9% avoidance it is 2%). These changes have little effect on the metrics used to describe the PVA outputs (i.e. the counterfactuals of population growth rate and population size), because they represent increases to levels of predicted additional mortality which are small to begin with (relative to the sizes of the impacted populations). The predicted impact magnitude remains minor adverse (or non-significant in EIA terms) for both the guillemot and razorbill populations from the South Stack and Penlas colonies when the assessment is based upon the worst-case of the individual ERM and CRM estimates.

6.24 In addition to the above points, it is relevant to consider, more generally, the extent to which precaution has been incorporated into the estimation of collisions and the impacts of these collisions at the population level. Thus, precautionary values are used for several of the input parameters for the ERM and CRM. Notably, for guillemot and razorbill the level of nocturnal diving activity has been assumed to be 90% of the diurnal activity, which is very much at the upper end of what is likely (as detailed in ES Chapter 11, vol. 3 – Appendix 11.3 (MDZ/A27.5 – now superseded by MDZ/A31.12)). Similarly, dive depths are assumed to be the same at night as during the day, although there is evidence for both species that nocturnal dives tend to be shallower.

6.25 In terms of considering the impacts of collisions at the population level, it has been assumed that all collisions result in death but whether the strike force from the rotor blades of tidal devices would result in a trauma sufficient to cause death or injury to seabirds is unclear[11].

6.26 The PVAs used to assess the population-level impacts resulting from the predicted annual mortality are also precautionary for several reasons. First, they have used starting population-sizes for the South Stack and Penlas guillemot and razorbill populations which are considerably smaller than as currently estimated. Thus, the more recent estimates of the colony population sizes are 75% and 34% higher for guillemot and razorbill, respectively (ES Chapter 11, vol. 3 – Appendix 11.3 (MDZ/A27.5 – now superseded by MDZ/A31.12)). This will act to reduce the effect of the predicted impacts as determined by the counterfactuals of the population growth rate and population size, with the reduction likely to be considerable in the case of guillemot.

6.27 The PVAs are also are based upon density independent population models, which do not take account of likely compensatory mechanisms that will arise as populations increase towards carrying capacity (e.g. reduced breeding success due to increased competition for food resources). Amongst seabird populations, there is empirical evidence for such compensatory density dependence which acts to ‘regulate’ the

[12] See outputs provided in the files showing the workings for the Morlais ERM and CRM calculations, provided to RSPB on 26/10/20.

population[13]. Consequently, the PVAs used to assess the population-level impacts assume that the predicted mortality associated with collisions (and, where relevant, with displacement as well) is entirely additive to the baseline mortality levels that would occur in the absence of these impacts. This is likely to cause overestimation of the resulting population-level impacts[14]. Finally, the population models on which the PVAs are based assume a closed population (i.e. without any immigration or emigration). This also represents a simplification of the likely biological reality and, again, is likely to cause overestimation of impacts at the scale of the colony population[15].

Onshore ornithology

6.28 Subsequent to the submission of the NRW and RSPB Relevant Representations relating to the EIA and HRA (REP005 and OBJ086), further assessment work was undertaken (submitted as FEI – MDZ/F17) to assess functional linkage between the onshore development site and the Glannau Ynys Gybi / Holy Island Coast SPA populations of breeding and wintering chough and the potential effects of disturbance and habitat loss during construction. This identified the need for additional mitigation.

6.29 The NRW Relevant Representations submitted in response to the FEI (FEI_REP004) state that the additional mitigation proposed to ensure no/negligible displacement of foraging breeding chough sufficiently addresses concerns. The RSPB Relevant Representation submitted in response to the FEI (FEI - OBJ014) acknowledges the further work that has been undertaken and the additional mitigation but does not indicate whether this is sufficient to resolve their concerns over the potential effects on the SPA chough populations.

7. Conclusions

7.1 In terms of impacts to marine bird populations, the proposed initial deployment of tidal devices is predicted to have minor adverse effects on the breeding guillemot and razorbill populations from the South Stack and Penlas colonies, due largely to collision mortality during the operational period. No adverse effects of this deployment (or indeed of the larger deployments assessed in ES Chapter 11 (MDZ/A31.11 and MDZ/A31.12) and the shadow HRA (MDZ/A27.11)) are predicted on breeding Manx shearwater populations from the Glannau Aberdaron and Ynys Enill / Aberdaron Coast and Bardsey Island SPA and the Sgomer, Sgogwm a Moroedd Penfro /

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[13] Horswill, C., O'Brien, S.H. and Robinson, R.A. (2016) Density dependence and marine bird populations: Are wind farm assessments precautionary? *Journal of Applied Ecology* **54**: 1406-1414.

[14] Trinder, M. (2018) Flamborough and Filey Coast pSPA Seabird PVA Report: Supplementary Matched Run Outputs (2018) Annex A of Hornsea Project Three Offshore Wind Farm: Appendix 9 to Deadline I submission – Population Viability Analysis. Ørsted.

[15] Miller, J.A.O., Furness, R.W., Trinder, M. and Matthiopoulos, J. (2019) The sensitivity of seabird populations to density-dependence, environmental stochasticity and anthropogenic mortality. *Journal of Applied Ecology*, **56**, 2118-2130.

Skomer, Skokholm and the Seas off Pembrokeshire SPA (nor on any other marine bird SPA populations).

7.2 Although there is considerable uncertainty in the estimation of collisions to marine birds from tidal devices, the assessment has applied precautionary assumptions in the models used to estimate collisions and, subsequently, to predict the impacts of the additional mortality at the population level. As such, it is considered that the resulting conclusions have a high level of reliability, which is supported by the fact they are in line with the conclusions reached by NRW (as set out in FEI_REP004).

7.3 The initial deployment will be associated with a substantive monitoring programme focussed on the breeding guillemot and razorbill populations at the South Stack and Penlas colonies. This will include monitoring of breeding numbers and breeding productivity at the colonies, as well as tracking of individual birds, with resultant data used to refine some of the key assumptions in the collision risk modelling. This monitoring programme will be developed via the dEMMP, with subsequent deployment of devices following the initial phase dependent on demonstrating that the level of risk to marine birds is acceptable.

7.4 In terms of onshore ornithology, the main concerns relate to the potential effects of habitat loss and disturbance during the construction period on the Glannau Ynys Gybi / Holy Island Coast SPA populations of breeding and wintering chough. The additional mitigation proposed as a result of the further assessment work (FEI – MDZ/F17) is considered to address these concerns and this conclusion is in line with that reached by NRW (as set out in FEI_REP004).

8. Summary

Introduction

8.1 My name is Dr Murray Grant and I am a Principal Ornithologist at Royal HaskoningDHV. I hold a BSc Honours in Ecological Science from the University of Edinburgh and a PhD from the University of Durham, and possess over 25 years' experience as an applied ecologist. I have worked in consultancy since 2011, leading and contributing to a wide range of projects concerned with ornithology impact assessments, particularly in relation to major offshore renewable developments. Prior to this, I worked in the Royal Society for the Protection of Birds (RSPB) Conservation Science Department for 18 years, where I was a Principal Conservation Scientist.

8.2 I am the technical lead specialist of the team at Royal HaskoningDHV that undertook the Environmental Impact Assessment (EIA) and Habitat Regulations Assessment (HRA) relating to ornithology for the Morlais project, and which continues to engage with key stakeholders on matters concerning the potential ornithological effects associated with this project.

8.3 This Proof of Evidence considers both marine ornithology and onshore ornithology. The evidence demonstrates that:

- The predicted impacts from the first phase of deployment will not result in significant effects on the breeding guillemot and razorbill populations at the South Stack and Penlas colonies, or on the breeding Manx shearwater populations from Special Protection Areas (SPAs).
- The assessment has applied precautionary assumptions in the models used to estimate collisions between diving marine birds and tidal devices and, subsequently, to predict the impacts of the resultant additional mortality at the population level. Therefore, despite the acknowledged uncertainty in the estimation of collision risk, the assessment can be considered to represent a worst case scenario.
- The proposed monitoring programme for marine birds will provide information which reduces the uncertainty associated with some of the key parameters in the estimation of collision risk, so enabling refinement of future impact predictions.
- In relation to onshore ornithology, the proposed additional mitigation sufficiently addresses concerns regarding the potential impacts on SPA chough populations during construction of the Project.

8.4 The Project will employ an adaptive management approach to undertaking further deployments of tidal devices beyond the initial phase. This approach is set out in the Outline Environmental Mitigation and Monitoring Plan (OEMMP; MDZ/A28.8), with the initial phase being constrained to a scale of development for which the predicted collision rate for bottlenose dolphins does not exceed the Potential Biological Removal, currently calculated as 0.7 animals per annum.

8.5 The Ornithology Proof of Evidence should be read in conjunction with those for the OEMMP provided by Mr Frank Fortune (MDZ/P4) and for marine mammals provided by Dr Jennifer Learmonth (MDZ/P2), as well as that on planning and policy provided by Mr David Bell (MDZ/P9). Furthermore, several core documents should be read alongside the Ornithology Proof of Evidence to provide context to the information presented. These are detailed in the full Proof of Evidence.

Legislation and policy

8.6 This evidence is underpinned by existing relevant European, national and local legislation, policy and guidance, which is detailed in the full Proof of Evidence.

Matters for the Inquiry – The Project's Response

Marine ornithology

8.7 For the purposes of characterising the baseline conditions for marine birds using the MDZ, two years of monthly boat-based surveys were undertaken within an area defined by the MDZ and a surrounding 2km buffer. These surveys followed the industry standard methods. The methodology used for the impact assessment is described in Section 11.4 of ES Chapter 11, vol. 1 (MDZ/A25.11 / MDZ/A31.11) and was agreed with NRW prior to the production of the ES.

8.8 Collisions of diving birds with the rotors of the tidal devices during the operational period was the only impact concluded to result in an impact significance of greater than minor adverse (i.e. *"a small change in receptor, which may be raised as local issues but are unlikely to be important at a regional population level"*.). Collisions are assumed to result in direct mortality, and theoretical models are used to predict collision rates (based upon a range of factors including the estimated bird densities, the known foraging and diving behaviour of the species of interest and the characteristics and number of the tidal devices). As recommended by NRW, the assessment used two different models to estimate collisions of diving birds, both of which are included in the relevant industry guidance (MDZ/F19). These are the Encounter rate Model (ERM) and the Collision Risk Model (CRM).

8.9 In the ES, the theoretical collision risk to diving birds was assessed for both a 40MW deployment of the worst-case device and a 240MW indicative array comprising a mix of different devices. Both deployment scenarios were predicted to result in significant effects (i.e. moderate adverse or major adverse) to the breeding populations of guillemot and razorbill from the South Stack and Penlas colonies, which are associated with the Glannau Ynys Gybi SSSI. As detailed below, the impacts on the breeding populations of these two species were reduced to minor adverse when assessed in relation to the revised initial deployment.

8.10 The predicted collisions for all other diving marine bird species recorded in the MDZ were low for the two deployment scenarios considered in the ES, so that only minor adverse effects were concluded for these other species. Consequently, no adverse effects on SPA marine bird populations were identified in the Information to Support Habitats Regulations Assessment (HRA) (MDZ/A27.11).

Onshore ornithology

8.11 Onshore ornithology issues essentially concern a single species – i.e. chough. For chough, information relating to their use of areas in the vicinity of the Morlais project boundary was obtained from the Cross and Stratford Chough Project and from the RSPB. This information included details on nest site locations, roost sites and foraging areas. These data enabled the relative use by chough of land parcels within the area of interest to be determined so informing the potential effects of disturbance and habitat loss during onshore construction works.

Relevant Representations and the Project Responses

Marine ornithology

8.12 The Relevant Representations from NRW (REP005), RSPB (OBJ086) and NWWT (OBJ0073), which relate to the work presented in ES Chapter 11 (MDZ/A25.11 and MDZ/A27.5) and the Information to Support HRA report (MDZ/A27.11), all identified concerns in relation to the scale of the predicted impacts on the breeding guillemot and razorbill populations at the South Stack and Penlas colonies.

8.13 In addition, the RSPB Relevant Representations (OBJ086) also:

(i) Considered that Population Viability Analyses (PVAs) were required to fully assess the effects of collision mortality on the Manx shearwater populations associated with the Glannau Aberdaron and Ynys Enill / Aberdaron Coast and Bardsey Island SPA and the Sgomer, Sgogwm a Moroedd Penfro / Skomer, Skokholm and the Seas off Pembrokeshire SPA.

(ii) Identified methodological concerns in relation to the avoidance rates applied to the ERM and CRM.

8.14 Following submission of the Relevant Representations detailed above, the development of the adaptive management approach for the Project means that the proposed initial deployment is now considerably smaller than those assessed in the ES. The potential impact of this smaller deployment on the guillemot and razorbill populations from the South Stack and Penlas colonies was assessed and submitted as Further Environmental Information (FEI) (i.e. MDZ/F16, now superseded by MDZ/A31.10). This concluded that the predicted impact magnitude was minor adverse (or non-significant in EIA terms) for both of these populations.

8.15 The FEI (MDZ/A31.10) also included PVAs for the two Manx shearwater SPA populations, which RSPB considered to be required. These indicate small population-level effects associated with the original deployment scenarios in both cases and, consequently, result in no change to the conclusions of the Information to Support HRA report (MDZ/A27.11).

8.16 The NRW Relevant Representations submitted in response to the FEI (FEI_REP004) indicated that the revised assessment (MDZ/A31.10) provides adequate evidence that populations of guillemot and razorbill at the RSPB South Stack reserve can still

increase with deployment of the first phase, and agreed with the conclusion of no likely significant effect on the SPA Manx shearwater populations.

8.17 By contrast, the RSPB Relevant Representations submitted in response to the FEI (FEI - OBJ014) highlight further concerns. These focus on possible flaws in calculating the collision estimates for the revised deployment scenario and whether the monitoring proposed in the OEMMP is feasible and would be effective. Of these issues, the calculation to derive the collision estimates for the revised deployment scenario is considered entirely valid because the scenarios for each species involve a single device. Hence, the relationship between generating capacity and collisions is directly proportional and the calculation is essentially the same as that undertaken when calculating the ERM or CRM outputs for multiple devices.

8.18 The proposed monitoring programme will focus on the South Stack and Penlas guillemot and razorbill populations and will include annual colony counts to determine breeding abundance and productivity, and the use of Global Positioning System (GPS) tags and Time Depth Recorder (TDR) loggers to determine foraging areas and diving behaviour amongst a sample of birds from both populations. Such monitoring will be undertaken in years preceding the initial deployment as well as during the deployment phase. Additionally, methods of monitoring actual collisions at the devices will be considered, although it is recognised that this is highly challenging. The resultant data will allow detection of large increases in mortality rates associated with deployment, as well as enabling refinement of several key parameters used in predicting collision rates (so providing an assessment of the extent to which the original estimates are precautionary, or not).

8.19 The specifics of the monitoring methods will be agreed with the EMMP advisory group, followed by a reviewing process via the regulator. For subsequent deployment following the initial phase, it will have to be demonstrated via the detailed EMMP (dEMMP) that the level of risk to marine birds is acceptable.

8.20 The RSPB also raise concerns in their earlier Relevant Representations (OBJ086) over the avoidance rates applied to the ERM and CRM outputs. Specifically:

(i) The assessment focusses only on avoidance rates of 95% - 99.9%, as opposed to full range from 0% - 99.9% (although the estimates are presented for the full range of avoidance rates).

(ii) For the purposes of the assessment, the CRM and ERM estimates are averaged with the avoidance rates applied to this averaged estimate, despite avoidance rates being specific to a particular model (although, again, the individual CRM and ERM estimates are presented with the full range of avoidance rates applied).

8.21 In terms of the range of avoidance rates on which the assessment focusses, this encompasses a 50-fold difference in estimated collisions and is considered sufficiently precautionary, accepting that considerable uncertainty surrounds the estimation of collision risk to diving birds from tidal turbines. In this context, it is notable that the avoidance rates applied to CRMs for onshore and offshore wind turbines have

increased for many bird species from initial, precautionary, values of 95% or 98% as the availability of monitoring data has increased and the understanding of the interactions of birds with wind turbines has improved. There are also several factors that would act to cause avoidance rates of diving birds in relation to tidal turbines to be higher than those of birds in flight in relation to wind turbines, including the slow travel speeds of birds when underwater (relative to flight speeds) and the greater potential for birds to be swept around the tidal turbine blades due to hydrodynamic forces (because seawater is much denser than air).

8.22 The averaging of CRM and ERM values simply represents a pragmatic approach to dealing with outputs from two models when neither is identified as being preferred over the other by the relevant industry guidance (MDZ/F19). Although the avoidance rate incorporates correction for model error, as well as reflecting avoidance behaviour *per se*, this in itself is of limited relevance with respect to the CRM and ERM because there is no basis for assuming that the estimates derived from one model are any more accurate than those from the other model (and hence it is reasonable to use the averaged value of the estimates with a common avoidance rate applied). Irrespective of these arguments, the assessment conclusions are unaffected when the worst-case of the ERM and CRM is used instead of the averaged value.

8.23 In addition to the above points on avoidance rates, it is relevant to consider more generally the extent to which precaution is incorporated into the prediction of the population-level impacts. As well as the use of precautionary values for some of the input parameters for the ERM and CRM, this includes:

- The assumption that all collisions will result in death or injury (which is unclear for tidal devices).
- Starting population sizes for both the guillemot and razorbill PVAs which are considerably lower than as currently estimated.
- The PVAs being based upon density independent (as opposed to density dependent) population models, so that the predicted mortality associated with collisions (and, where relevant, with displacement as well) is assumed to be entirely additive to the baseline mortality levels, with no compensatory effects.
- The PVAs being based upon population models which assume a closed population (i.e. without immigration or emigration).

8.24 These factors are all likely to cause overestimation of impacts to the South Stack and Penlas guillemot and razorbill populations.

Onshore ornithology

8.25 The Relevant Representations from NRW (REP005) and RSPB (OBJ086), which relate to the work presented in ES Chapter 11 (MDZ/A25.11) and the Information to Support HRA report (MDZ/A27.11), both identified concerns over the potential effects on the Glannau Ynys Gybi / Holy Island Coast SPA breeding and wintering chough populations. These concerns related to functional linkage between the onshore

development area and these SPA populations, the potential for disturbance and habitat loss effects on the SPA chough and the adequacy of the proposed mitigation.

8.26 Following submission of the above Relevant Representations, further work was undertaken (and submitted as FEI – MDZ/F17) to assess functional linkage between the onshore development site and the Glannau Ynys Gybi / Holy Island Coast SPA populations of breeding and wintering chough, as well as the potential effects of disturbance and habitat loss during construction. This identified the need for additional mitigation to ensure no/negligible displacement of foraging chough.

8.27 The subsequent NRW Relevant Representations (FEI_REP004) states that the proposed additional mitigation sufficiently addresses concerns, whilst those from RSPB (FEI - OBJ014) acknowledge the further work that has been undertaken and the additional mitigation but it is unclear whether this is sufficient to resolve their concerns over the potential effects on the SPA chough populations.

Conclusions

8.28 The initial deployment of tidal devices is predicted to have, at most, minor adverse effects on populations of diving marine birds, including the South Stack and Penlas breeding guillemot and razorbill populations. No adverse effects on SPA marine bird populations are identified. The additional mitigation for chough will ensure that effects of disturbance and habitats loss on the Glannau Ynys Gybi / Holy Island Coast SPA populations of breeding and wintering chough are highly unlikely.

8.29 The initial deployment will be associated with a substantive monitoring programme focussed on the breeding guillemot and razorbill populations at the South Stack and Penlas colonies, with this programme developed via the dEMMP. Subsequent deployment of devices following the initial phase will be dependent upon demonstrating that the level of risk to marine birds is acceptable.

Appendix 1: Details of the ornithology concerns outlined in the Relevant Representations of NRW, RSPB and NWWT

Topic	Stakeholder	Reference (date)	Concerns and key points of agreement	Associated designations	Project response
Marine ornithology	NRW	REP005 (31/10/19)	High predicted annual mortality of breeding guillemot and razorbill for the 240MW deployment scenario. Accept levels of predicted mortality may be sustainable at UK and Welsh levels but concerned by potential effects on local colonies.	Colonies within the Glannau Ynys Gybi / Holy Island Coast SSSI but neither species identified as interest feature	Adaptive management approach of deploy and monitor developed with phased approach to deployment. Initial deployment constrained to a design for which predicted collisions of bottlenose dolphins do not exceed the Potential Biological Removal, currently calculated as 0.7 animals per annum. Predicted collision mortality for guillemot and razorbill calculated for the reduced design (based on worst-case device for each species), and the resultant population-level impacts predicted. This is presented in the Marine Ornithology Collision Risk Modelling Note (MDZ/F16 / MDZ/A31.10).
		FEI_REP004 (13/05/20)	Agree on no apparent likely significant effect on the SPA Manx shearwater populations.	Glannau Aberdaron and Ynys Enill / Aberdaron Coast and Bardsey Island SPA Sgomer, Sgogwm a Moroedd Penfro / Skomer, Skokholm and the Seas off Pembrokeshire SPA	No response required.

			FEI appears to provide adequate evidence that populations of guillemot and razorbill at the RSPB South Stack reserve can still increase with deployment of first phase	Colonies within the Glannau Ynys Gybi / Holy Island Coast SSSI but neither species identified as interest feature	No response required.
	RSPB	OBJ086 (05/11/19)	Impact of collision mortality (for both the 240MW and 40MW deployment scenarios) on breeding guillemot and razorbill at South Stack Reserve, risking collapse and extinction colony populations.	Colonies within the Glannau Ynys Gybi / Holy Island Coast SSSI but neither species identified as interest feature	Adaptive management approach of deploy and monitor proposed with phased approach to deployment. Initial deployment constrained to a design for which predicted collisions of bottlenose dolphins do not exceed the Potential Biological Removal, currently calculated as 0.7 animals per annum. Predicted collision mortality for guillemot and razorbill calculated for the reduced design (based on worst-case device for each species), and the resultant population-level impacts predicted. This is presented in the Marine Ornithology Collision Risk Modelling Note (MDZ/F16 / MDZ/A31.10).
			Potential impacts of collision mortality on SPA populations of Manx shearwater	Glannau Aberdaron and Ynys Enill / Aberdaron Coast and Bardsey Island SPA Sgomer, Sgogwm a Moroedd Penfro / Skomer, Skokholm and the Seas off Pembrokeshire SPA	PVA undertaken to assess predicted population-level impacts of the predicted collision mortality on the SPA Manx shearwater populations, with the details and outputs presented in the Marine Ornithology Collision Risk Modelling Note (MDZ/F16 / MDZ/A31.10).

			Methodological concerns: • Deficiencies in EIA and shadow HRA • Assessment methods (particularly the interpretation and treatment of avoidance rates, as applied to the CRM and ERM outputs) • Inadequate mitigation of impacts	As for both of above concerns from OBJ086.	The Applicant disagrees with the main thrust of these concerns and emphasises that the assessment has been undertaken in accordance with available SNCB guidance. In relation to mitigation, an adaptive management approach is now proposed with deployment beyond the initial phase dependent on the outcome of a monitoring programme to be determined via the dEMMP.
		FEI - OBJ014 (26/05/20)	Methodological flaws with revised collision risk assessment in the Marine Ornithology Collision Risk Modelling Note (MDZ/A28.7). Specifically, it is not valid to assume a linear relationship between collisions and MW output of designs to calculate the revised collision risk estimates from those presented in the EIA.	Colonies within the Glannau Ynys Gybi / Holy Island Coast SSSI but neither species identified as interest feature	The extrapolation (based on design MW outputs) undertaken to obtain the revised CRM and ERM estimates is valid because the designs in question comprise a single device only. This is explained more fully in a revision of the Marine Ornithology Collision Risk Modelling Note (MDZ/F16, now superseded by MDZ/A31.10) and provided to RSPB on 4th September 2020.

			Ornithology monitoring proposed in the OEMMP is lacking in detail whilst some elements may not be feasible.		The EMMP will continue to be progressed towards developing a detailed monitoring programme, which will address at least some of the key issues identified by RSPB. For some of the concerns raised (particularly in relation to tracking), the Applicant considers that evidence of similar work being undertaken on the same species at other colonies points to its likely feasibility at the colonies relevant to the Project.
	NWWT	OBJ073 (31/10/19)	Support key points from RSPB (OBJ086) with regard to seabird mortality, assessment methodology and proposed mitigation and monitoring.	Colonies within the Glannau Ynys Gybi / Holy Island Coast SSSI but neither species identified as interest feature	As for responses to OBJ086 above.
Onshore ornithology	NRW	REP005 (31/10/19)	Functional linkage between onshore development area and SPA chough population not recognised. Breeding season defined for chough omitted early period of courting and nest prospecting	Glannau Ynys Gybi / Holy Island Coast SPA	Issues identified by NRW addressed in Onshore Ornithology: Response to Comments on Chough (MDZ/A28.9).

		FEI_REP004 (13/05/20)	FEI document sufficiently addresses the functional link tests, confirming that onshore development area is functionally linked to SPA for both breeding and wintering chough. Additional mitigation proposed to ensure no/negligible displacement of foraging breeding chough sufficiently addresses concerns.		No response required.
	RSPB	OBJ086 (05/11/19)	Potential impacts of disturbance and habitat loss on SPA breeding and foraging chough	Glannau Ynys Gybi / Holy Island Coast SPA	Further consideration of these issues and of functional linkage between onshore development area and SPA chough population undertaken in Onshore Ornithology: Response to Comments on Chough (MDZ/A28.9).
			Methodological concerns: • Inadequate mitigation of impacts • Considerations under the Habitats Regs		
		FEI - OBJ014 (26/05/20)	Revised assessment of potential habitat loss for chough during construction and consideration of functional linkage is noted, together with the lengthening of the breeding season mitigation period.		Clarification required on whether RSPB consider the issue to be resolved.

Abbreviations used in table:

CRM – Collision risk model

dEMMP – d**etailed** Environmental Monitoring and Mitigation Plan

EIA – Environmental Impact Assessment

EMMP – Environmental Monitoring and Mitigation Plan

ERM – Encounter rate model

FEI – Further Environmental Information

HRA – Habitat Regulation Assessment

MW – Mega Watts

NRW – Natural Resources Wales

NWWT – North Wales Wildlife Trust

OEMMP **– Outline** Environmental Monitoring and Mitigation Plan

PVA – Population Viability Analysis

RSPB – Royal Society for the Protection of Birds

SNCB – Statutory Nature Conservation Bodies

SPA – Special Protection Area

SSSI – Site of Special Scientific Interest

Appendix 2: Details of the key points from the RSPB Statement of Case as pertaining to the Morlais ornithology assessment

Topic	RSPB comment	Project response
Marine ornithology	**Overview**	
	The RSPB's view is that the Application has not adequately addressed the risks to seabirds and therefore it could have unacceptable impacts on nature including on the populations of breeding guillemot and razorbill. These birds are dependent on the cliff habitats within the Glannau Ynys Gybi / Holy Island Coast SSSI, SPA and SAC; and are an integral feature of the RSPB's Reserve. Furthermore, the Application lacks appropriate mitigation for an acknowledged population decline.	Issue addressed via the details presented in Section 6 of the Proof of Evidence. As detailed in Section 6, the initial deployment is predicted to have, at most, minor adverse effects on marine bird populations.
	Summary of key concerns	
	The RSPB's key concerns regarding offshore ornithology are set out under the following headings: • Collision risk • Population Viability Analysis (PVA) • Revised Collision Risk Modelling	Details of the specific concerns raised on each of these issues are presented in Section 6 of the Proof of Evidence, together with details of how they have been addressed.
	The RSPB's key concerns regarding the proposed adaptive management, conditions, monitoring and management plans for the Application are set out under the following headings: • Monitoring	Details of the proposed approach to the ornithology monitoring that would be undertaken as part of the adaptive management strategy are presented in Section 6 of the Proof of Evidence, together with the basis for this approach and the means by which it will inform and

Topic	RSPB comment	Project response
	• Mitigation • Phases of Deployment	update the assessment of collision risk to the breeding populations of guillemot and razorbill from the South Stack and Penlas colonies.
	RSPB require access to the source spreadsheets detailing the workings for the Encounter Rate Modelling (ERM) and Collision Risk Modelling (CRM) calculations. This would enable RSPB to interrogate the results and confirm whether RSPB consider the modelling to have been carried out appropriately. This requirement extends to the workings for the FEI dealing with marine ornithology (MDZ/F16).	The Applicant provided the relevant spreadsheets for all ERM and CRM workings on 26/**10/**20.
	Issues concerning collision risk	
	Both the ERM and CRM are recommended for use in the determination of ornithological impacts arising from tidal stream devices and represent the best approaches currently available. However, it is important to note that both are theoretical, entirely unvalidated and therefore subject to considerable uncertainty as to the accuracy of the predicted outputs. The extent of this uncertainty means that precaution is needed in making any assessment and the reliance placed on that assessment.	There is considerable precaution incorporated into the ERM and CRM modelling, as outlined in section 6 of the Proof of Evidence (see particularly paragraphs 6.19 – 6.27).
	Much of the uncertainty associated with the ERM and CRM should be included in a correction factor applied to the output mortalities known as “Avoidance Rate”. This correction factor is functionally the same as that used in above surface collision risk modelling for wind farm developments, and which has been subject to considerable debate and examination. Crucially, this has highlighted the point that Avoidance Rate is not simply avoidance behaviour per se, but rather a correction factor that includes correction for uncertainty, variability and,	The fact that the Avoidance Rate applied to the ERM and CRM outputs is a correction factor that represents more than behavioural avoidance per se is acknowledged in ES Chapter 11, vol. 3 (MDZ/A27.5). The justification for applying a common avoidance rate to the averaged output values from the ERM and CRM is set out in Section

Topic	RSPB comment	Project response
	importantly, model error (Cook et al., 2014). As such, it is specific to each model and cannot simply be cross applied to different models.	6 of the Proof of Evidence (paragraphs 6.22 and 6.23). Furthermore, using the worst-case of the individual ERM and CRM estimates from the different devices considered, as opposed to the worst-case of the averaged ERM/CRM values has a small effect only on the collision estimates (and does not change the conclusions that are reached).
	As both the ERM and CRM are entirely untested, the inherent uncertainty and potential model error are considerable, and greater than those for the above surface model, and should be captured in the application of Avoidance Rate. Furthermore, in order to properly express this uncertainty, it is recommended that a range of Avoidance Rates are applied and presented, in the range of 0% to 99%.	The outputs from the ERM and CRM are presented for the full range of avoidance rates (0 – 99.9%) in ES Chapter 11, vol. 3 (MDZ/A27.5). However, the assessment is focussed on those outputs which apply avoidance rates of 95 – 99.9%. The Justification for this is detailed in Section 6 of the Proof of Evidence (see paragraphs 6.19 and 6.20).
	The inclusion of uncertainty, variability and model error has been entirely ignored by the Applicant in their discussion of Avoidance Rates, and while they have presented a range of Avoidance Rates in Appendix 11.3 (ES, Chapter 11: Marine Ornithology, Volume III) only the 95-99.5% values are used in the subsequent Population Viability Analysis and in the subsequent conclusions on magnitude of impact. Notwithstanding our concerns with the use of these avoidance rates, the scale of the impacts predicted for guillemot and razorbill are extremely large and of serious concern.	Issues pertaining to the avoidance rates used with the ERM and CRM are detailed in two separate sections of ES Chapter 11, vol. 3 (MDZ/A27.5). The second of these sections (2.5.5) provides an overview of various factors that could affect avoidance by diving birds and the uncertainty surrounding this issue (and it is incorrect to claim that these issues have been entirely ignored in the assessment). Further justification for the assessment focussing on the range of avoidance rates from 95 – 999.9% is presented in section 6 of the Proof of Evidence (see paragraphs 6.19 and 6.20).
	Avoidance Rate is model specific, and so it is not appropriate to use the same Rate for different models, as is done by the Applicant when they present a mean of the predicted mortality for the ERM and CRM using the same Avoidance rate.	As stated above, the outputs from the ERM and CRM are presented separately for the full range of avoidance rates (0 – 99.9%) in ES Chapter 11, vol. 3 (MDZ/A27.5).

Topic	RSPB comment	Project response
		However, the assessment is focussed on those averaged ERM/CRM outputs with common avoidance rates applied. The Justification for this is detailed in Section 6 of the Proof of Evidence (paragraphs 6.22 and 6.23).
	Population-level impacts	
	RSPB consider that the predicted level of impact from the 240MW and 40MW deployment scenarios on the breeding guillemot and razorbill populations from the South Stack and Penlas colonies to be wholly unacceptable.	The deployment scenarios referred to by RSPB are those that were assessed in ES Chapter 11 (MDZ/A25.11). As set out in Section 6 of the Proof of Evidence, the conclusion of the ES Chapter was a major adverse impact for both the 40MW and 240MW scenarios for razorbill, and a moderate adverse and major adverse impact for guillemot in relation to the 40MW and 240MW scenarios, respectively. However, as also detailed in Section 6 of the Proof of Evidence, the initial deployment scenario was subsequently revised (as outlined in FEI on marine ornithology – MDZ/F16), with the scale of this initial deployment being much smaller. As demonstrated in the FEI on marine ornithology (MDZ/F16), this level of deployment is concluded to result in only minor adverse effects to the breeding guillemot and razorbill populations from the South Stack and Penlas colonies (noting that these populations are not associated with SPAs, nor are they identified as interest features for the designation of the Glannau Ynys Gybi / Holy Island Coast SSSI. Expanding beyond this initial deployment will be dependent on the adaptive management strategy.

Topic	RSPB comment	Project response
	Collision risk estimation for the revised deployment	
	In the further Marine Ornithology Collision Risk Modelling Note (referenced above) a presentation of revised collision risk estimates for the reduced scale devices was included, as requested by NRW. However, the method used to generate these estimates appears to be severely flawed, although little detail is given. The method stated is that there is a calculation of "collisions per MW", based on the original Collision Risk Modelling (CRM) and Encounter Rate Modelling (ERM) presented in the ES documents, and this is then extrapolated onto a maximum MW from the 0.7 bottlenose dolphin collision scenario. Underpinning this calculation is an assumption of a linear relationship between MW output and mortality. This assumption is wholly unproven and likely incorrect.	The justification for the approach used for this calculation is detailed in Section 6 of the Proof of Evidence and the calculation is essentially the same as that undertaken when calculating the ERM or CRM outputs for multiple devices. This should be evident from the spreadsheets detailing the ERM and CRM calculations that were provided to RSPB on 26/10/20.
	Further revision of the collision risk estimation of the revised deployment	
	A further revised Marine Ornithology Collision Risk Modelling Note (Version 2) - MOR/RHDHV/DOC/0115 was provided on dated 4th September 2020. The RSPB's previous concerns about the recalculations presented in the previous Collision Risk Modelling Note had been expressed and clarification sought on the matter at a meeting with the Applicant on 04/08/20. The Applicant agreed to provide an updated version. This supersedes document 13_MOR-RHDHV-DOC-0115 as published in March 2020. Unfortunately the revised document still did not provide sufficient detail on the amended calculations for the RSPB to be able to make a decision as to the robustness of the method used, and as such cannot be relied upon to provide evidence of a reduced impact on the affected species populations.	Response as above.

Topic	RSPB comment	Project response
	This updated document also misrepresents the position taken by the RSPB at the meeting on 04/08/2020, stating that the RSPB agreed with the approach taken to amend the collision mortality estimates. The RSPB said that they may agree with the approach if sufficient detail of the working of the calculation were provided, and it is shown to be based on a straightforward reduction in turbines, as detailed above. These details have not been provided and so we are unable to agree with the approach. We will, however, continue to engage with the Applicant to get further clarification on this point.	The Applicant regrets that the updated document was perceived to misrepresent RSPB's position and emphasise that it was not their intention to do so. It is hoped that provision of the spreadsheets (as indicated above) detailing the ERM and CRM calculations will resolve this misunderstanding and clarify the approach undertaken for the calculations.
	In the absence of the workings of calculations for the reduced impact scenarios, we have to base our conclusions on the results of the Applicant's modelling of the 240 and 40 MW scenarios. These, as discussed above, show an unacceptable level of impact.	It is hoped that this is now resolved with provision of the spreadsheets (as indicated above) detailing the ERM and CRM calculations.
Onshore ornithology	**Overview**	
	The RSPB's key concerns regarding onshore ornithology relative to potential impacts on chough due the laying of the cables.	Noted. Attempts have been made to address this via the additional mitigation (as outlined in Section 6 of the Proof of Evidence.
	Potential effects on chough	
	There are potential adverse impacts on the breeding and foraging chough population of the Glannau Ynys Gybi/Holy Island Coast SPA, as a result of disturbance and loss of foraging habitat from onshore construction works associated with the cable landfall and grid connection within and in proximity to the SPA.	Further work undertaken and additional mitigation proposed, as detailed in Section 6 of the Proof of Evidence (and as per the below).

Topic	RSPB comment	Project response
	Further to the contents of the ES, the Applicant has presented clarification of data, a revision of potential loss of chough foraging habitat during construction and consideration of functional linkage of land outside the SPA boundary but on which the SPA species are reliant. We note that mitigation for chough during the breeding season has been revised through the lengthening of the mitigation period to avoid construction works from 20 March until 31 July. We consider the additional 10 days applied to the mitigation period to be helpful	Noted.
	Furthermore, some chough foraging concerns have been addressed in additional information provided in Terrestrial Ecology Assessment Update (MOR/RHDHV/DOC/0110). We welcome the revised working methods in relation to cloddiau (an important foraging resource for chough) in 7.1.1, through the application of trenchless methods to avoid direct impact.	Noted.
	The above measures help address our concerns regarding the Glannau Ynys Gybi / Holy Island Coast SPA. However, some of the land-based works need further clarification to address remaining concerns regarding the cable landfall within the Glannau Ynys Gybi / Holy Island Coast SAC.	It is unclear what land-based works RSPB is seeking clarification for, however the detailed design of the project, including landfall will be developed post consent and must be agreed with NRW through Construction Method Statements, as secured by the Transport and Work Act Order (TWAO).
	RSPB state that they defer to the NRW Advisory Team as to whether this level of detail is sufficient for conducting a robust Habitats Regulations Assessment in relation to the Glannau Ynys Gybi / Holy Island Coast SAC.	As outlined in Section 6 of the Proof of Evidence with respect to potential effects on chough, NRW in their letter dated 15th May 2020 stated *'The response to comments on chough FEI document has sufficiently addressed all three functional linkage tests and confirmed that the Onshore Development Area represents a significant contribution to the requirements of breeding and wintering chough from Holy Island Coast SPA. Following our subsequent discussions with the applicant to mitigate the impact of tests 1 and 3 we advised*

Topic	RSPB comment	Project response
		the breeding season date should be extended so that no works occur during the 2 March to 31 July and that, in association with a 5m buffer, two recommended exclusion zones (Areas 1 and 2) are provided. *The documents confirm that the applicant will include additional mitigation to ensure no/negligible displacement of foraging breeding chough by providing two additional works exclusion zones for the chough breeding season (from 2 March to 31 July). These exclusion zones also cover the core foraging areas for breeding chough. We consider that the applicant has sufficiently addressed our concerns of functional linkage between the Onshore Development Areas and the Holy Island Coast SPA with this additional mitigation.'*
Adaptive management	**The first EMMP**	
	While the RSPB welcomed the initial EMMP, we noted that in it there was scant detail provided as to how the proposed collision and avoidance monitoring scheme would work. It merely stated that monitoring would provide data allowing for a recalculation of the correction factor for the collision risk modelling process, ("Avoidance Rate", as discussed above), and according to the Applicant this recalculation would result in the revised impact predictions being negligible	The Outline EMMP has been progressed since this stage (as detailed in this Proof of Evidence and in the Evidence of Frank Fortune (MDZ/P4)). It is envisaged that the details of the approach and methods for monitoring would continue to be developed as the Project is progressed.
	RSPB suggest that based upon the experience of monitoring bird behaviour in relation to wind farms, there are considerable difficulties in determining avoidance rates, even with widespread support and large amounts of investment. The development of technologies to carry out similar monitoring in the sub-surface environment is still in its infancy. A recent review of video monitoring of tidal devices highlighted the difficulty in monitoring interactions with	The problems involved in determining avoidance rates are recognised, and this will be recognised in the further development of the Outline EMMP. However, gaining insight into some elements of avoidance behaviour would be tractable (e.g. macro-avoidance of the development site), whilst monitoring will provide data on other key input parameters of the ERM and CRM.

Topic	RSPB comment	Project response
	devises and that there was no technology that could identify the avian species involved in the interaction to the species level, frequently being only able to record as “possible bird”. As such, even if such technologies become available it is unclear whether they would be able to provide evidence of avoidance behaviour, as the attempts to do so for offshore wind developments show. Therefore, the Applicant’s advocacy of mitigation by monitoring avoidance behaviour is not only lacking in any detail but is very likely to be unachievable	As detailed in Appendix 1, Table A2 of the Proof of Evidence relating to the OEMMP provided my Mr Frank Fortune (MDZ/P4), the OEMMP identifies several potential monitoring methods which may be used to collect data pertinent to agreed monitoring requirements. It is unlikely that one method, for example video, will be deployed singly, and more likely that a combination of methods, for example, video, active sonar, tag-based tracking and possibly visual observations may be used.
	T**he second EMMP - overview**	
	RSPB welcomed more being provided but the monitoring section of the plan remained very scant in detail with the onus being placed on an advisory group to provide more detailed methodology proposals. While the role of an advisory group is to be welcomed, little thought has been put into the fundamental feasibility of the suggested approaches and whether they will be able to provide answers to the important questions inherent in a novel technology. As considerable uncertainty exists around the effects of these devices, it is crucial that the monitoring methods are more clearly delineated, with evidence that they will be possible and effective, before any consent is granted	Addressed in Appendix 1, Table A2 of the Evidence of Frank Fortune (MDZ/P4).
	T**he second EMMP – colony counts**	
	Colony counts are a fundamental component of any monitoring scheme and so the inclusion is welcomed. However, a more detailed approach of enhanced monitoring, rather than simple counts, is required to capture any sub-lethal impacts of the devices, such as displacement or changes in prey availability.	Further discussions on the subject of colony counts were held with RSPB during the meeting of 04/08/2020. The Project is broadly supportive of RSPB's suggestions regarding colony counts and productivity, and (as detailed in Section 6 of the Proof of Evidence)

Topic	RSPB comment	Project response
	Enhanced monitoring of seabird productivity and population size based at monitoring plots should be conducted on the key seabird species annually from early April to the end of August. Monitoring should closely follow the JNCC Seabird Monitoring Handbook12 but be conducted at an increased frequency (i.e. when required multiple visits per week) to the regular monitoring conducted within the colonies to ensure egg-laying, hatching, fledging and possibly nest failure dates can be derived from the data as accurately as possible. The enhanced monitoring plan should be drawn up, in consultation with any site wardens following preliminary site visits. These discussions and visits should tailor the monitoring to the specific logistical considerations of each site including topography, location of nests and existing work and monitoring plans. An absolute minimum of two years pre-construction monitoring data is required to capture the natural demographic variability	can commit to developing, in conjunction with RSPB and NRW, a programme of colony counts and productivity monitoring
	In relation to the colony counts, RSPB state that as well as ensuring a baseline demographic data set any EMMP must include an analysis of the power to detect change. This power analysis will determine the sample size and frequency of monitoring required to detect an impact of a given magnitude arising from the deployment of the tidal devices.	The detailed EMMP will be developed post consent and the colony count monitoring will be designed with account taken of the power to detect change as a result of the Project.
	T**he second EMMP – tagging studies**	
	Tracking by fitting birds with GPS tags is suggested for “diving birds”, without details provided as to which species will be tagged. We presume this refers to guillemot and razorbill, but it is unclear if Manx shearwater will also be included (they are known to dive to at least 55m). It is critical that this information is provided as considerations such as capture method, tag type, attachment	To monitor behaviour at the individual level, it is proposed to tag breeding guillemot and razorbill from the South Stack and Penlas colonies. Preliminary advice from RSPB indicates that approximately 15 individuals of each species could be caught and tagged each year, which would likely occur during the early chick rearing phase. Two

Topic	RSPB comment	Project response
	method, and data retrieval will differ depending on species and thereby understanding whether the approach is justified or not will be species specific.	types of tag would be employed; Global Positioning System (GPS) tags, which measure the spatial location of the bird, and time depth recorders (TDR) tags, which provide data on diving behaviour (e.g. dive duration and depths). In both cases, birds must be caught in order for tags to be fitted. The tags would generally be designed to collect data for a period of several days, after which they would fall off. The aim would be to capture data using remote base stations installed at the colony, enabling automatic download to the base station when birds return to the colony after foraging trips. Studies of the foraging behaviour of both guillemot and razorbill are being undertaken in other UK projects involving the combined use of GPS and TDR devices, and with automated data download incorporated. However, it is recognised that this is still novel technology, with the success of these systems still to be fully established, and further details of such work will be obtained before finalising the tagging methods. The Project team have recently held discussions with key staff on the SEACAMS project, who have successfully tagged guillemots at Puffin Island with GPS tags and accelerometers. Further discussions are planned to ensure that all available options for the EMMP are thoroughly explored to enable the production of a high quality evidence base by the monitoring programme. It would not be the intention to include Manx shearwater in the EMMP at this time. The reason for this is that the MDZ does not make up a substantial proportion of the foraging grounds for this species, it does
	In the EMMP, the data derived from these studies is said to provide "location, height, depth, speed and acceleration." However, only the first of these, location, is directly obtainable from GPS tags (flight height can be modelled from GPS data to some extent using a Bayesian approach, but this will not provide the location specific data required for monitoring). The rationale also claims that other relevant parameters "such as dive depths and durations" will be obtained. These parameters are also not obtainable from GPS tags. These data can be obtained from other additional devices, for example time depth recorders (TDR) or accelerometers. TDRs, which record dive parameters and accelerometers, which will provide accurate quantification of movement, can be integrated into GPS tags and such devises have been fitted to both razorbill and guillemot, although no tags as yet integrate all three sensors. It is unclear whether such methods will provide the data required for a comprehensive monitoring scheme, in particular, in relation to data retrieval, capture methods and the limited period over which tracking can be carried out.	
	Consideration is needed in determining capture method to minimise the potential negative impacts of the capture on the bird being studied, both for ethical reasons and to prevent altering the behaviour of the study bird. It is also crucial to consider the safety of the people capturing the birds. These considerations are especially pertinent with cliff nesting species such as razorbill and guillemot, as the risks of injury or causing nest failure are high. Before any work is carried out it is important that a feasibility study is carried out, to determine the accessibility and safety of catching (and potentially recapturing) the birds as this	

Topic	RSPB comment	Project response
	will be very site specific. None of the versions of the EMMP contain such details. The feasibility study should be carried out and fed into the EMMP rather than leaving its important results for later especially if some methods are not feasible and alternatives required, with the consequence of delays to the start of the pre-construction monitoring	not breed at/near South Stack, and significant effects have not been predicted by the ES or HRA. Reference should also be made to Appendix 1, Table A2 of the Proof of Evidence relating to the OEMMP provided my Mr Frank Fortune (MDZ/P4), for more detail on the Project responses to these comments from RSPB.
	No detail has been provided in the EMMP as to how the data collected by the tags will be retrieved. Essentially there are two methods, in situ or remote downloading. In situ retrieval requires recapture of the bird and removal of the tags, while remote retrieval can be via, for example, satellite, GSM network or using a base station. Satellite and GSM tags are currently too heavy to be used on auk species, including guillemot and razorbill, so the only suitable methods for data retrieval are by using a base station or by recapturing the bird. Careful, site specific consideration is required as recapture carries similar risks to capture, with the added complication that a bird is much harder to recapture than it is to capture. The use of a base station requires knowledge of the local topography as the station needs to be located in line of sight of the birds' nest in order that data can be downloaded while the bird is on the nest. Clearly such considerations must be made before the monitoring plan can be finalised. And as mentioned above we are concerned that this information is not currently available.	
	Currently for razorbill and guillemot, capture methods are largely restricted to a narrow window in the breeding season, early to mid chick-rearing period. Capture of these species should not be undertaken during incubation because of the risk of dislodging the egg. Late chick-rearing period should also be avoided because the chicks are mobile and can potentially move away from the	

Topic	RSPB comment	Project response
	nest site and be at risk as a result. Such phenological constraints mean that any data collected cannot be representative of the whole year and will not include periods when the birds are vulnerable, such as for razorbill and guillemot, post moult. The EMMP should account for these limitations and explore any means by which they can be overcome.	
	The EMMP lists collision of diving birds with tidal devices as one of the indicators to form part of the monitoring scheme examined via tagging. However, there are no suitable tags available that will provide this information. The reason for this is that, as noted above, data from the tags needs to be downloaded and it is impossible to do this unless the tags itself is retrieved from the collision victim. As the only method of remote downloading suitable for these species requires the bird to return to the colony, it is impossible for a fatal collision to be recorded. For non-lethal encounters, the bird may abandon the breeding attempt, in which case it also may not return to the colony. It should be noted, therefore, that there is no means of recording collision of diving birds with tidal devices included in the EMMP, and as detailed in our previous written submission, there is little practical chance of the development of device mounted sensor capable of recording bird collisions.	This is recognised and monitoring of collisions will not be an objective of the tagging work. As detailed in Appendix 1, Table A2 of the Proof of Evidence relating to the OEMMP provided my Mr Frank Fortune (MDZ/P4), the applicant is committed to improve the evidence base to allow the development of tidal stream energy through the collection of suitable data. It is proposed that this is done in partnership with regulators, RSPB and academia, through the mechanism of the EMMP. Tagging methods are unlikely to be used in isolation. Work undertaken by Marine Scotland has shown that active sonar currently used to detect marine mammals is also able to detect diving seabirds. The use of video may also be indicated, as well as other visual methods if location of the device array allows.
	The EMMP suggest that tracking data will be used to monitor any “change in use of tidal device deployment area pre and post installation”. However, the outline schedule of EMMP tasks shows that the monitoring work will only commence after construction has begun, so it is impossible for any change in	Noted, further details of the monitoring approach and methods will be progressed post-consent in consultation with NRW and RSPB.

Topic	RSPB comment	Project response
	behaviour due to the presence of the tidal devices to be described. As mentioned above, an absolute minimum of two years pre-construction monitoring data is required to capture the natural spatial variability in at sea distribution. Such variability can arise as a result of, for example fluctuations in prey density, and so a robust baseline is needed in order to disentangle such biological stochasticity from the effects of the devices.	Reference should also be made to Appendix 1, Table A2 of the Proof of Evidence relating to the OEMMP provided my Mr Frank Fortune (MDZ/P4) for the Project response to this comment from RSPB.
	As well as ensuring a baseline spatial data set any EMMP must include an analysis of the power to detect change. This power analysis will determine the sample size and frequency required to detect an impact of a given magnitude arising from the deployment of the tidal device.	Noted, further details of the monitoring approach and methods will be progressed post-consent in consultation with NRW and RSPB.
	The fourth EMMP	
	For further legal certainty we think the proposed phased approach needs to be included within both consent documents namely the TWAO and the Marine Licence. Currently as discussed above this revised EMMP is only being suggested for the Marine Licence even though no justification has been provided as to why	The Outline EMMP has been submitted to both applications and is a condition of both the draft TWAO and Marine Licence.
	Although the further work undertaken on identifying potential monitoring methods has been presented, there is still insufficient information on how the methods will be developed and applied. Consequently, due to many remaining areas of uncertainty, to ensure that this Phased approach adequately addresses the principles of adaptive management enshrined in NRW's guidance we would like to see the phases tied more directly	Addressed in Appendix 1, Table A2 of the Evidence of Frank Fortune (MDZ/P4).

Topic	RSPB comment	Project response
	to monitoring methods and technology that encapsulate both potential population and collision impacts on birds, focusing on razorbills and guillemots.	
	Proposed adaptive management approach	
	The RSPB contends that further work needs to be undertaken on identifying potential monitoring methods which the Applicant is currently proposing as there is insufficient information and evidence on how these methods will be developed and applied (as discussed in detail above). It is important to note that the technology proposed by the Applicant both does not currently exist in a form that can be readily and easily used and what technology does exist at present is too imprecise and problematic logistically to be of use. Also in the RSPB's view the data proposed to be collected, does not establish the impact of the technology on the bird colonies or the risk of collision.	The Applicant considers that there is considerable potential for valuable monitoring to be undertaken which will enable refinement of collision estimation and inform the likely effects of the initial deployment (and potential increases in the extent of deployment) on the breeding guillemot and razorbill populations at the South stack and Penlas colonies. Whilst uncertainty exists over some of the potential approaches and methods, others are clearly viable. This provides the foundations from which **f**urther progress on the monitoring approach and methods can be made post-consent in consultation with NRW and RSPB.
	Whilst the EMMP, as submitted for the TWAO application, references the potential phasing of deployment, the very nature of this document means that it is a living document and therefore subject to continual revision. It is the potential for this Phasing, as outlined in the EMMP as currently drafted to be amended which is of major concern. We believe that in order for Adaptive Management principles to be comprehensively assessed at each Phase, those Phases need to be legally binding by way of a Schedule within the Order or as a minimum, enshrined within a condition. This would ensure that Phases are specific, limited and immoveable	A phased approach to installation of devices, with a smaller initial deployment to manage impacts to marine mammals and birds has been introduced. This will be secured by a condition which requires the detailed EMMP to be agreed with NRW in consultation with an Advisory Group, including RSPB. Adaptive management provides a greater level of control to NRW and relevant stakeholders such as RSPB, whereby the monitoring and mitigation measures can be tailored to the final design of each deployment and subsequent deployments are reliant on suitable evidence from monitoring of the initial phase.

Topic	RSPB comment	Project response
	in nature to prevent the creep of deployment without due scrutiny and confirmation that actual and potential impacts are not of an unacceptable level. The need for the EMMP to be a living document is widely accepted as a vehicle to deliver adaptive management in novel developments, however we strongly recommend that the failsafe, protective measures contained within the latest version to prevent significant impacts on wildlife and the environment need to be legally binding and applicable to both consents.	The adaptive management approach will be secured through a consent condition, such that no tidal devices may be constructed or repowered until a Detailed Environmental Management and Monitoring Plan (EMMP) is agreed with NRW, supported by an Advisory group of relevant stakeholders
	Whilst not formally submitted to the TWAO application the latest EMMP submitted to the Marine Licence application does address some of our issues by way of inclusion of a 'Stop' clause and also a 'Removal' clause should an impact, significant or otherwise, be noted through agreed monitoring results. We would therefore welcome the following points to be included within the Order; • **Mitigation** ○ Mitigation through Phased Deployment: Initial stages of deployment should be limited to a level of no discernible impact on sensitive receptors are predicted. Deployment should be limited and phased not only through initial deployment but for the life of the project up to full capacity. Each Phase of deployment needs to be monitored and mitigated for with agreement by all parties within the Advisory Group that a further Phased deployment is permitted. ○ Mitigation through Corrective Measures – Stopping or Removal of Devices: Should an impact occur at any stage, the temporary and / or permanent stopping or removal of the deployed tidal	The adaptive management approach will be secured through a consent condition, such that no tidal devices may be constructed or repowered until a Detailed Environmental Management and Monitoring Plan (EMMP) is agreed with NRW, supported by an Advisory group of relevant stakeholders. The monitoring methods proposed for marine birds both before and during the first phase of deployment will provide a range of information allowing for reductions in the uncertainty around several parameters key to the estimation of theoretical collision risk and population level impacts. This will enable the refinement of future impact predictions to ensure that decisions on further phases of deployment are based upon the best available information. The phased deployment of tidal devices at a magnitude below levels that could result in significant population level effects on seabirds provides an opportunity to provide information which could be used to improve the modelling of collision risk from multiple devices, and

Topic	RSPB comment	Project response
	devices needs to be undertaken in a timely and agreed manner with all parties within the Advisory Group The RSPB will show that it is necessary for the mitigations the applicant has submitted to the Marine Licence application to be incorporated and built up on within the TWAO to be legally binding and enforceable. • **Phasing of Deployment** We welcome the Applicant's reference within the EMMP for a phased deployment of the tidal arrays linked to the mitigation, monitoring and measurable outcomes of the DEMMP to be overseen by the Regulators and Advisory Group. However, for this to be enforceable both by way of the TWAO and Marine Licence this phased approach needs to be present within the Order and the Licence (if approved) as both grant permission. The indicative phases (as set out in the EMMP for the Marine Licence (version dated July 2020) are welcomed in principle by the RSPB however we contend that at this consenting stage greater clarity needs to be given to the number and capacity of arrays envisaged as being deployed at each phase. Whilst we recognise the need for flexibility in Phase 1 deployment and, to a point, accept that Phase 1 will be installed at a capacity that has no significant impact, the range of devices between 5 to 28 (6 –12MW) when the type of array to be used is unclear in addition to our concerns about the monitoring technology, needs to be tightened in scope.	further test and develop technologies to determine if a collision event occurred. In terms of the phasing of the deployment, the details of the Phase 1 deployment will be developed post consent. This is necessary as the number of devices and capacity of the array is subject to the type of device(s) to be deployed and their associated collision risk. Phasing of the device deployments will only be allowed at scales at which Regulators agree that the best available scientific understanding does not predict adverse effects upon marine mammals or diving seabirds. Phase 1 will be installed at a capacity (MW) at which no significant impact is predicted on marine mammals or diving birds using the MDZ. This commitment ensures an initial level of mitigation in place at the start of the EMMP through the limitation of the scale of the development. Further details of the proposed approach to phasing are provided in the OEMMP (doc ref: MOR/RHDHV/DOC/0072 (03)). Reference should also be made to Appendix 1, Table A2 of the Proof of Evidence relating to the OEMMP provided my Mr Frank Fortune (MDZ/P4) for the Project response to these comments from RSPB.

Topic	RSPB comment	Project response
	This tightening of the scope of each Phase is essential in the early stages especially as the EMMP states that for Phase 2; “An example of a commercial level of deployment for a second phase of deployment is suggested in the ES, Chapter 25, Socio-economics, Tourism and Recreation as 40MW”. We contend that 4 Phases of deployment of novel technology with no confirmation of monitoring technology at consenting stage is too few Phases. This is especially concerning given the applicants statement within Phase 3 of the Phasing Deployment Strategy within the EMMP states that; “If the monitoring and mitigation requirements are still required these would continue. Note it is the Applicants intention to remove monitoring and mitigation requirements as soon as it is possible to do so.” From Phase 3 of up to 100MW to Phase 4 full deployment of 240MW is a large uplift in the potential number and increase in area of deployment and as such monitoring and mitigation needs to be maintained and the impact of full commercial deployment assessed. Indeed we contend that it is necessary, as a Demonstration Zone to test the commercial viability of this novel technology, the monitoring and mitigation of impacts needs to be maintained for the life of the project or until long term potential impacts on birds and mammals have been adequately assessed as agreed by the Advisory Group.	

Topic	RSPB comment	Project response
	Marine Licence	
	We wish to raise concern at this stage that the information currently before this Inquiry, for the TWAO application is not reflective of the most up to date and recent submission of information pertaining to the Marine Licence application.	All documents submitted to the Marine Licence Application process have now been submitted to the TWAO Inquiry.
	During ongoing discussions with the Applicant, it has become clear that some of our concerns have been addressed and these have been included within amended documents submitted to NRW for the Marine Licence. However, the documents submitted in respect of the TWAO remained unchanged. We contend that whilst the TWAO and Marine Licence applications are different processes the application itself remains the same and is subject to the same Environmental Impact Assessment and Habitat Impact Assessment and therefore should be reflective of the same monitoring and mitigation measures to address the same impacts.	All documents submitted to the Marine Licence Application process have now been submitted to the TWAO Inquiry.
	Additional documents submitted to the Marine Licence application by the Applicant include, amongst others; further environmental information in May and July 2020; revised versions of the EMMP (as discussed above).	The same OEMMP has now been submitted to both applications and is secured through a condition in the draft Marine Licence and TWAO.
	In addition the Applicant has provided the RSPB with another document, Marine Ornithology Collision Risk Modelling (Version 2) - MOR/RHDHV/DOC/0115, dated 4th September 2020. It supersedes document 13_MOR-RHDHV-DOC-0115 as published in March 2020. It is unclear whether this has been submitted to any other parties at present.	All documents submitted to the Marine Licence Application process have now been submitted to the TWAO Inquiry.

Topic	RSPB comment	Project response
	As discussed above the need for control over Phasing, monitoring and mitigation measures must be legally secured through both application processes to ensure that the necessary environmental controls are in place to protect nature and the environment.	Agreed