



Morecambe Offshore Windfarm: Generation Assets Environmental Statement

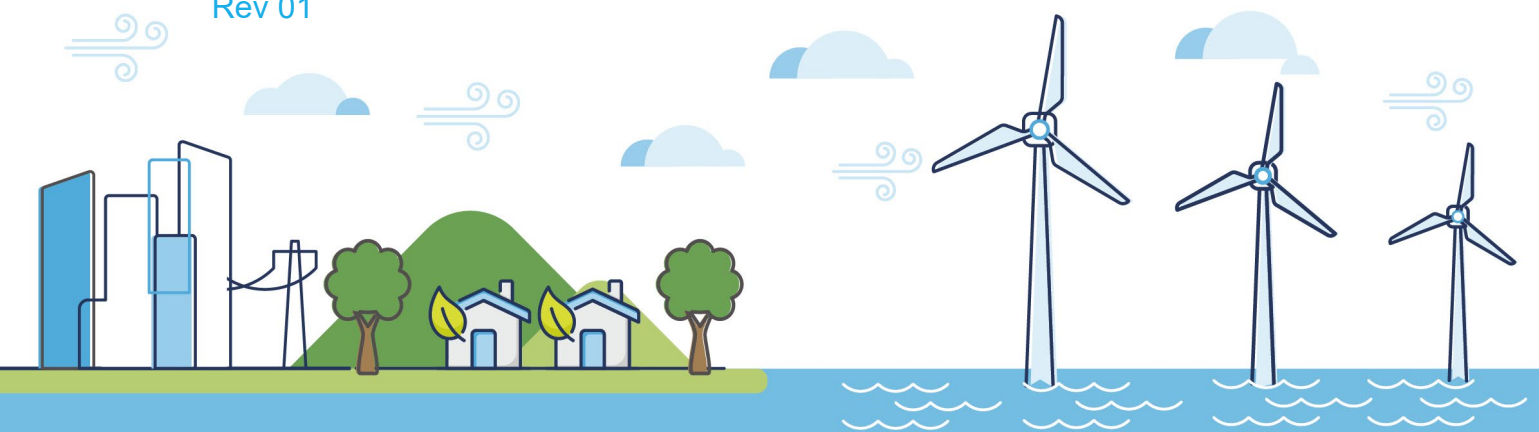
Volume 5

Appendix 11.5 Marine Mammal Consultation Responses

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Glossary of Acronyms

ADD	Acoustic Deterrent Device
ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas
ASSI	Areas of Special Scientific Interest
CBD	Convention on Biological Diversity
CEA	Cumulative Effects Assessment
CGNS	Celtic and Greater North Seas
CIS	Celtic and Irish Seas
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CL	Confidence Limit
DCO	Development Consent Order
DRC	Dose-Response Curve
EDR	Effective Deterrent Ranges
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
EPS	European Protected Species
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
HRA	Habitat Regulations Assessment
IoM	Isle of Man
iPCoD	Interim Population Consequences of Disturbance
IPMP	In Principle Monitoring Plan
JCDP	The Joint Cetacean Data Programme
JNCC	Joint Nature Conservation Committee
MAC	Maritime Area Consents
META	Marine Energy Test Area
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MNR	Marine Noise Registry
MNRs	Marine Nature Reserves
MOD	Military of Defence
MU	Management Units
MWDW	Manx Whale and Dolphin Watch

NCMPA	Nature Conservation Marine Protected Areas
NE	Natural England
NI	Northern Ireland
NMFS	National Marine and Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPWS	National Parks and Wildlife Service
NW	North-West
OSP	Offshore substation platform
OSPAR	Oslo and Paris Convention for the Protection of the Marine Environment of the North-East Atlantic
PDE	Project Design Envelope
PEIR	Preliminary Environmental Information Report
PEMP	Project Environmental Management Plan
PTS	Permanent Threshold Shift
RIAA	Report to Inform Appropriate Assessment
SCANS	Small Cetaceans in the European Atlantic and North Sea
SCOS	Special Committee on Seals
SD	Standard deviation
SEL	Sound Exposure Level
SEL _{cum}	Sound Exposure Level from cumulative exposure
SEL _{ss}	Sound Exposure Level from single strike
SPL _{peak}	peak Sound Pressure Level
TTS	Temporary Threshold Shift
TWT	The Wildlife Trust
UK	United Kingdom
UXO	Unexploded Ordnance
WTG	Wind turbine generators

Glossary of Unit Terms

µPa	Micro Pascal
dB	Decibel
kHz	Kilohertz
km	Kilometre
m	Metre
nm	Nautical mile
s	Second

Glossary of Terminology

Absolute abundance	The most accurate estimate of population size. In the case of diving birds and mammals, this includes an estimate for the number that are believed to be submerged at the time of survey.
Applicant	Morecambe Offshore Windfarm Ltd
Application	This refers to the Applicant's application for a Development Consent Order (DCO). An application consists of a series of documents and plans which are published on the Planning Inspectorate's (PINS) website.
CAVOK	"Ceiling and Visibility OK" – term used for aviation surface weather observation reports.
Coefficient of Variation CV (%)	The coefficient of variation is a standard measure that describes the dispersion of data points around the mean. The lower the CV the more precise the estimate. It is calculated as the Standard deviation (SD)/mean.
Confidence limit (CL)	The upper and lower values that define the range of the 95% confidence interval.
Density estimate (animals/km ²)	The average number of animals per square km surveyed.
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) for certain topics. The EPP provides a mechanism to agree the information required to be submitted to PINS as part of the DCO application. This function of the EPP helps Applicants to provide sufficient information in their application, so that the Examining Authority can recommend to the Secretary of State whether or not to accept the application for examination and whether an Appropriate Assessment is required.
Expert Topic Group (ETG)	A forum for targeted engagement with regulators and interested stakeholders through the EPP.
Generation Assets (the Project)	Generation assets associated with the Morecambe Offshore Windfarm. This is infrastructure in connection with electricity production, namely the fixed foundation wind turbine generators (WTGs), inter-array cables, offshore substation platform(s) (OSP(s)) and possible platform link cables to connect OSP(s)
Inter-array cables	Cables which link the WTGs to each other and the OSP(s).
Landfall	Where the offshore export cables would come ashore.

Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The transmission assets for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This includes the OSPs ¹ , interconnector cables, Morgan offshore booster station, offshore export cables, landfall site, onshore export cables, onshore substations, 400kV cables and associated grid connection infrastructure such as circuit breaker infrastructure. Also referred to in this document as the Transmission Assets, for ease of reading.
Offshore export cables	The cables which would bring electricity from the offshore substation platform to the landfall.
Offshore substation platform(s) (OSP(s))	A fixed structure located within the windfarm site, containing electrical equipment to aggregate the power from the WTGs and convert it into a more suitable form for export to shore.
Platform link cable	An electrical cable which links one or more OSP(s).
Population estimate (<i>number</i>)	The mean number of animals estimated within the survey area.
Relative abundance	In the case of diving birds and mammals, this is the estimated population size based on animals recorded on or above the sea surface and does not account for any that may be diving and thus submerged at the time of survey.
Safety zones	An area around a structure or vessel which should be avoided, as set out in Section 95 of the Energy Act 2004 and the Electricity (Offshore Generating Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations due to the flow of water.
Standard deviation (<i>SD</i>) of population estimate	The amount of variation or dispersion of a set of values.
Study area	This is an area which is defined for EIA topic, which includes the offshore development area, as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each EIA topic is intended to cover the area within which an effect can be reasonably expected.

¹ At the time of writing the Environmental Statement (ES), a decision had been taken that the offshore substation platforms (OSPs) would remain solely within the Generation Assets application and would not be included within the Development Consent Order (DCO) application for the Transmission Assets. This decision post-dated the Preliminary Environmental Information Report (PEIR) that was prepared for the Transmission Assets. The OSPs are still included in the description of the Transmission Assets for the purposes of this ES as the Cumulative Effects Assessment (CEA) carried out in respect of the Generation/Transmission Assets is based on the information available from the Transmission Assets PEIR.

Technical stakeholders	Technical stakeholders are organisations with detailed knowledge or experience of the area within which the Project is located and/or receptors which are considered in the EIA and HRA. Examples of technical stakeholders include the Marine Management Organisation (MMO), local authorities, Natural England (NE) and the Royal Society for the Protection of Birds (RSPB).
Windfarm site	The area within which the WTGs, inter-array cables, OSP(s) and platform link cables will be present.
Wind turbine generators (WTGs)	A fixed structure located within the windfarm site that converts the kinetic energy of wind into electrical energy.
95% confidence interval (CI)	A measure of uncertainty in the mean value. If the analysis was repeated, 95% of the time the mean population estimate would fall within this range. The smaller the CI range the more confident we can be that the mean estimate is an accurate reflection of the true population size.



11.5

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1 Introduction

1. This Appendix provides the consultation responses received in relation to **Chapter 11 Marine Mammals** (Document Reference 5.1.11) of the Environmental Statement (ES) for the Morecambe Offshore Windfarm Generation Assets (the Project).

2 Consultation responses

2. Consultation regarding marine mammals has been undertaken in line with the general process described in **Chapter 6 Environmental Impact Assessment (EIA) Methodology** (Document Reference 5.1.6) and the Consultation Report (Document Reference 4.1). The key elements to date have included Scoping (Scoping Opinion from the Planning Inspectorate (PINS) received on 2nd August 2022), comments received on the Preliminary Environmental Information Report (PEIR) which was published in April 2023 for statutory consultation, and the Evidence Plan Process (EPP) via the Marine Mammal Ecology Expert Topic Group (ETG) meetings.
3. Stakeholders represented on the Marine Mammal Ecology ETG included Natural England, the Marine Management Organisation (MMO), the Centre for Environment, Fisheries and Aquaculture Science (Cefas), the Isle of Man (IoM) Government and The Wildlife Trusts (TWT).
4. The feedback received throughout the EPP, the Scoping Opinion published by PINS, and stakeholder comments on the PEIR, has been considered in preparing the Environmental Statement (ES). The feedback pertinent to **Chapter 11 Marine Mammals** are shown in **Sections 1.1 – Section 2.6**, alongside details of how the Project team has had regard to the comments received and how these have been addressed within the chapter.
5. The Project consultation process has been described further in **Chapter 6 EIA Methodology**. Full details of the consultation process have been presented in the Consultation Report, which has been submitted as part of the Draft Development Consent Order (DCO) Application.

2.1 Scoping Opinion and Evidence Plan Process (EPP) responses

Table 2.1 Consultation responses received in the Scoping Opinion and EPP in relation to marine mammals and how these have been addressed in the ES

Consultee	Date	Comment	Response/where addressed in the ES
Scoping Opinion responses			
PINS (ref 3.5.1)	2 nd August 2022	The Scoping Report states that effects on marine turtles may be scoped out of further assessment. The Inspectorate agrees that this matter can be scoped out of further assessment but advises that the ES should explain the supporting evidence for the conclusions that significant effects would be unlikely to occur. This should be supported by evidence of agreement from the relevant stakeholders. In the event that marine turtles are included in the assessment, then the Inspectorate advises that this chapter of the ES should be re-named to recognise that it covers turtles as well as marine mammals.	A desk-based review of marine turtle presence in the Irish Sea, and justification for scoping them out, has been conducted in the Chapter 11 Marine Mammals , Section 11.5.11.
PINS (ref 3.5.2)	2 nd August 2022	Potential impacts from changes to water quality during construction and operation - The Scoping Report states that impacts related to changes in water quality are currently scoped in for assessment but may be scoped out once further information is available. The Inspectorate agrees this matter can be scoped out of further assessment, provided the ES can demonstrate that the remobilisation of contaminants or increases in suspended sediment concentrations would not be significant. Any mitigation measures which would be relied on to avoid significant environmental effects must also be described.	Potential changes to water quality have been assessed in Chapter 11 Marine Mammals , Section 11.6.3.8. This included suspended sediments and separately highlighted that, due to the low levels of contaminants recorded in the windfarm site, remobilisation of contaminants was scoped out of further assessment.
PINS (ref 3.5.3)	2 nd August 2022	Barrier effects on marine mammal movements from the Proposed Development alone - The Scoping Report seeks to scope out this matter on the grounds that a number of research reports demonstrate that marine mammals are not	Barrier effects have been assessed both for Project-alone and cumulatively. The potential for barrier effects from underwater noise for the Project-alone

Consultee	Date	Comment	Response/where addressed in the ES
		<p>excluded from operational windfarms and in fact will forage within them. However, it concludes that the cumulative effects of the Proposed Development with other projects will be considered in the cumulative effects assessment. The logic of this position was not entirely clear to the Inspectorate – if the Proposed Development was not going to affect marine mammal movements then why would a cumulative effect arise? In the absence of information such as evidence demonstrating clear agreement with relevant statutory bodies, the Inspectorate was not in a position to agree to scope this matter from the assessment. Accordingly, the ES should include an assessment of this matter or the information referred to demonstrating agreement with the relevant consultation bodies and the absence of a Likely Significant Effect (LSE).</p>	<p>during construction was assessed in Chapter 11 Marine Mammals, Section 11.6.3.5.</p> <p>The potential for barrier effects from underwater noise for the Project-alone during operation and maintenance has been assessed in Chapter 11 Marine Mammals, Section 11.6.4.4 and Section 11.6.4.5.</p> <p>The potential for cumulative barrier effects from underwater noise or physical presence during construction or operation and maintenance of the Project has been assessed in Chapter 11 Marine Mammals, Section 11.7.</p>
PINS (ref 3.5.4)	2 nd August 2022	<p>Direct effects of Electromagnetic fields (EMF) during operation - The Scoping Report seeks to scope this matter out on the grounds that there was no evidence to suggest that existing subsea cables affect cetaceans or seals, that harbour porpoise are known to move over operating cables in the Baltic Sea and that evidence from operational windfarms does not suggest that marine mammals are excluded. In addition, this matter has not been included in EIAs for other offshore windfarms. The Inspectorate agrees this matter can be scoped out of further assessment. However, no supporting evidence has been provided in relation to effects of EMF on marine turtles. In the event that marine turtles are not scoped out of further assessment, the ES should include either an assessment of this matter or information demonstrating agreement with the relevant consultation bodies and the absence of an LSE.</p>	<p>A desk-based review of marine turtle presence in the Irish Sea has been conducted in Chapter 11 Marine Mammals, Section 11.5.11. Based on the information available marine turtles have not been assessed further in the EIA.</p>

Consultee	Date	Comment	Response/where addressed in the ES
PINS (ref 3.5.5)	2 nd August 2022	Underwater noise during foundation installation during operation and decommissioning - It was noted that this effect would only arise during the construction phase. The Inspectorate was content that this matter can be scoped out of further assessment.	Noted, no further action.
PINS (ref 3.5.6)	2 nd August 2022	Underwater noise from operational wind turbines during construction and decommissioning - It was noted that this effect would only arise during the operational phase. The Inspectorate was content that this matter can be scoped out of further assessment.	Noted, no further action.
PINS (ref 3.5.7)	2 nd August 2022	The Scoping Report states that the study area covers the wider Irish Sea area to take account of the movements of marine mammals/turtles and relevant Management Units (MU). However, Natural England (NE) has advised that several of the MUs being scoped in are greater than the spatial extent of the wider Irish Sea and that the full extent of the MUs should be considered in the ES (see Appendix 2 of this Opinion). The Inspectorate considers that the study area should include the full extent of the relevant MUs.	Information on the study area for marine mammals, including relevant MUs has been provided in Chapter 11 Marine Mammals , Section 11.3.1, with further information in Section 1.1.1 of Appendix 11.2 Marine Mammal Information and Survey Data (Document Reference 5.2.11.2). The study area for the Cumulative Effects Assessment (CEA) has been defined in Appendix 11.4 Marine Mammal CEA Project Screening (Document Reference 5.2.11.4).
PINS (ref 3.5.8)	2 nd August 2022	Site specific survey information - The Scoping Report does not provide details on the coverage of the aerial surveys which are currently being undertaken, or how much of the data collected would be included in the final assessments. The ES should include a figure demonstrating the coverage. It should also include a description of the methods used to collect the survey data and the subsequent data analysis, supported by evidence of agreement with the relevant	An overview of site-specific surveys has been provided in Chapter 11 Marine Mammals , Section 11.4.2.1, with further information in Section 3 of Appendix 11.2

Consultee	Date	Comment	Response/where addressed in the ES
		stakeholders. Where agreement has not been possible, the ES should provide a justification for the appropriateness of the methods used.	
PINS (ref 3.5.9)	2 nd August 2022	<p>The Scoping Report states that connectivity between the windfarm site and various Special Areas of Conservation will be considered during the Habitats Regulations Assessment (HRA). Any significant effects should also be reported in the ES.</p> <p>The Applicant's attention was drawn to the advice from NE (see Appendix 2 of this Opinion) which suggests the use of an additional Marine Protected Area (MPA) for minke whale and draft MUs for seals to identify designated sites which could be affected by the Proposed Development. The Applicant should seek to agree the list of designated sites which could be affected by the Proposed Development with the appropriate nature conservation bodies (ANCB).</p>	<p>Information on designated sites, including Nature Conservation Marine Protected Areas (NCMPA) has been provided in Chapter 11 Marine Mammals, Section 11.5.10.</p> <p>The screening of designated sites for the HRA and CEA was discussed at ETG meetings and a draft screening report was provided to NE and the MMO (with comments addressed in the Report to Inform Appropriate Assessment (RIAA) (Document Reference 4.9) and HRA Screening Report (Appendix 1 of Document Reference 4.10) supplied with the DCO Application).</p>
PINS (ref 3.5.10)	2 nd August 2022	Underwater noise modelling and UXO - Please see the comment under ID REF. 2.1.7 above on the potential need for a cumulative effects assessment with the UXO clearance to be consented under a separate Marine Licence.	<p>A separate marine licence application for Unexploded Ordnance (UXO) clearance will be submitted post-consent, once detailed information on the locations and extent of UXO required to be cleared (if any) is known. An initial assessment of the potential impacts from UXO clearance at the Project has been provided in Appendix 11.3 Marine Mammal Unexploded Ordnance Assessment (Document Reference 5.2.11.3) or information purposes and to inform potential mitigation measures. Potential mitigation measures are outlined in the</p>

Consultee	Date	Comment	Response/where addressed in the ES
			Draft MMMP (Document Reference 6.5) include low-order clearance, establishing a monitoring area, ADDs and the use of bubble curtains for high order clearances. The potential cumulative effects from UXO clearance during construction of the Project has been assessed in Chapter 11 Marine Mammals , Section 11.7.
PINS (ref 3.5.11)	2 nd August 2022	Definition of sensitivity - The factors which affect the sensitivity of receptors are listed as adaptability, tolerance and recoverability. The ES should clearly explain and provide supporting evidence used to determine the adaptability, tolerance and recoverability of each species included in the assessment.	Definition of sensitivity and how adaptability, tolerance and recoverability of each species was determined has been provided in Chapter 11 Marine Mammals , Section 11.4.3.1. These have been discussed at ETG meetings, noting there was no additional guidance available from Natural England.
PINS (ref 3.5.12)	2 nd August 2022	Paragraphs 397 – 398 and Table 8.17: Definition of magnitude - The Scoping Report refers to the Joint Nature Conservation Committee (JNCC) 2010 draft guidance to determine what represents an effect of medium magnitude. The Inspectorate notes that the guidance is still draft and now around 12 years old. In relation to the definitions of magnitude used in the assessment, the ES should present evidence that the definitions have been agreed with relevant stakeholders or, if agreement was not possible, a justification as to why the approach used in the ES remains appropriate.	Definition of magnitude and how it was determined in the assessments has been provided in Chapter 11 Marine Mammals , Section 11.4.3.1. As above, the approach to determining magnitude was presented at ETG meetings.

Consultee	Date	Comment	Response/where addressed in the ES
PINS (ref 3.5.13)	2 nd August 2022	Disturbance at seal haul-out sites during construction - The Scoping Report states that the potential for disturbance at seal haul-out sites from vessel transits between the Proposed Development and the local port will be assessed. However, paragraph 125 states that at present the port facilities are unknown. The ES should explain the assumptions that have been made in relation to movements between the Proposed Development and the port and why this represents the worst-case scenario.	Assessment of potential disturbance at seal haul-out sites has been provided in Chapter 11 Marine Mammals , Section 11.6.3.9, Section 11.6.4.9 based on the most recent information and potential for port option locations.
PINS (ref 3.5.14)	2 nd August 2022	Potential mitigation measures - The Inspectorate advises that the Applicant should provide an outline Vessel Traffic Management Plan to demonstrate how effects on marine mammals would be minimised. The Applicant's attention was drawn to the comments from NE in Appendix 2 of this Opinion.	Best Practice measures and guidelines to reduce the potential effects of vessels on marine mammals (as outlined in Chapter 11 Marine Mammals , Section 11.3.3) have been included in the Outline Project Environmental Management Plan (PEMP) (Document Reference 6.2), which has been submitted with the DCO Application. As stated in Chapter 14 Shipping and Navigation (Document Reference 5.1.14) a Vessel Traffic Management Plan will also be agreed post-consent, with an outline provided as part of the DCO Application.
MMO	2 nd August 2022	The MMO note that the relevant impacts have been scoped in for marine mammals. The installation of foundations, other construction activities (e.g. seabed preparation, cable laying and rock placement) and vessels during the construction phase can all generate underwater noise. The potential impacts associated with underwater noise during operation and maintenance (including Permanent Threshold Shift (PTS), Temporary Threshold Shift (TTS), disturbance and behavioural effects, and acoustic barrier effects) will also be considered further in the EIA, taking into account the most	The potential effects of underwater noise on marine mammals have been assessed for noise sources and vessels during construction (Chapter 11 Marine Mammals , Section 11.6.3), operation and maintenance (Chapter 11 Marine Mammals , Section 11.6.4), based on the most recent guidance, research, and criteria from Southall <i>et al.</i> (2019) and National Oceanic and Atmospheric

Consultee	Date	Comment	Response/where addressed in the ES
		<p>recent and robust research, guidance, and information available. In keeping with other windfarm developments, the MMO recommend that auditory injury (i.e. PTS and TTS) was also considered, using appropriate criteria from Southall <i>et al.</i> (2019) and NOAA (NMFS, 2018). The MMO acknowledged however, that the risk of auditory injury from other (non-piling) construction activities was likely to be low, if a fleeing (marine mammal) receptor was considered.</p>	<p>Administration (NOAA) (National Marine and Fisheries Service (NMFS), 2018).</p>
		<p>As for UXO clearance, the MMO also recommend consideration of underwater noise during the installation of foundations for turbines and substations with and without mitigation options, so that the regulator was informed of the risk reduction options available. This was particularly important for the assessment of cumulative impact from multiple activities where regulators need to be informed of the measures available to reduce cumulative risk for specific populations and habitats (Faulkner <i>et al.</i>, 2018).</p>	<p>The assessments of potential effect of UXO clearance (Appendix 11.3) and piling during installation (Chapter 11 Marine Mammals, Section 11.6.3.1) have been completed without and with mitigation measures applied. This has also been considered in the CEA, and, where relevant, identified mitigation and management measures to reduce cumulative effects have been outlined (Chapter 11 Marine Mammals, Section 11.7).</p>

Consultee	Date	Comment	Response/where addressed in the ES
		<p>The proposed EIA approach for marine mammals was considered to be appropriate. Section 8.5.5.1 of the marine mammal ecology chapter confirms that site specific underwater noise modelling will be undertaken for the Project for all potential noise sources including the following activities (bullet points below). It was appropriate that noise modelling will be used to determine the potential risk of physical injury, auditory injury, disturbance and any barrier effects resulting from underwater noise.</p> <p>Installation of foundations for turbines and substations</p> <p>Other construction activities, including seabed preparations, rock placement and cable installation</p> <p>Vessels</p> <p>Operational noise</p> <p>Maintenance activities, including rock placement, cable installation and vessels</p>	<p>Site-specific underwater noise modelling (Appendix 11.1 Underwater Noise Assessment (Document Reference 5.2.11.1) has been undertaken for:</p> <ul style="list-style-type: none"> ▪ Piling of foundations for turbines and substations ▪ Other construction activities and maintenance activities, including seabed preparation (dredging), cable laying, trenching and rock placement ▪ Vessels ▪ Operational turbine noise ▪ UXO clearance <p>The potential effects of underwater noise on marine mammals have been assessed for noise sources and vessels during construction (Chapter 11 Marine Mammals, Section 11.6.3, operation and maintenance Chapter 11 Marine Mammals, Section 11.6.4).</p>

Consultee	Date	Comment	Response/where addressed in the ES
		<p>The MMO consider it appropriate that underwater noise modelling will be undertaken using the latest and best available information, in particular relating to criteria and thresholds for predicting the noise impact ranges for marine mammal species (Southall <i>et al.</i>, 2019) and turtles (Popper <i>et al.</i>, 2014):</p> <p>The peak Sound Pressure Level (SPL_{peak}), Sound Exposure Level for a single strike (SEL_{ss}) and cumulative exposure (SEL_{cum}) thresholds based on Southall <i>et al.</i> (2019) criteria for Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) in very high, high and low frequency cetaceans and pinnipeds in water.</p> <p>The SEL_{cum} scenarios for marine mammals and turtles will be completed assuming a fleeing receptor.</p>	<p>Underwater noise modelling (Appendix 11.1) has been undertaken using the latest available information and guidance relating to criteria and thresholds for predicting the noise impact ranges for marine mammal species (Southall <i>et al.</i>, 2019) and prey species (Popper <i>et al.</i>, 2014) for SPL_{peak}, SEL_{ss} and SEL_{cum} thresholds for PTS and TTS in very high, high and low frequency cetaceans and pinnipeds in water.</p> <p>The SEL_{cum} scenarios for marine mammals assumed a fleeing receptor.</p> <p>As outlined above, based on the information available Chapter 11 Marine Mammals, Section 11.5.11), marine turtles have not been assessed further in the EIA.</p>
Natural England	2 nd August 2022	<p>Marine Mammal Management Units should be used as the regional study area for the purposes of calculating the reference populations, the screening extent as regards Special Areas of Conservation, and for cumulative impacts spatial screening extent.</p> <p>We have provided some additional evidence sources within our advice, and recommend that consideration of the use of these sources in establishing the baseline characterisation.</p> <p>We advise that geophysical surveys should be included as a source of underwater noise in the cumulative impact assessment.</p>	<p>Information on the study area for marine mammals, including relevant MUs has been provided in Chapter 11 Marine Mammals, Section 11.3.1, with further information provided in Section 5 of Appendix 11.2.</p> <p>See response below on additional evidence sources.</p> <p>The study area for the CEA has been defined in Appendix 11.4.</p> <p>The screening area for designated sites has been summarised in Chapter 11 Marine Mammals, Section 11.5.10, with further information provided in the RIAA.</p>

Consultee	Date	Comment	Response/where addressed in the ES
			Geophysical surveys have been included in the CEA, see Chapter 11 Marine Mammals , Section 11.7.
		We express our concern that the full results of the digital aerial surveys will not be available in time for the submission of the PEIR. This will hamper our ability to agree the final list of species and density estimates to be used in the assessments.	Assessments have been updated for the ES using the densities derived from desk-based sources as well as data from the 24-month site-specific survey (see Chapter 11 Marine Mammals , Sections 11.5 and Section 3 of Appendix 11.2). The Applicant has provided updates through the EPP to inform stakeholders of any differences between the 12 month and 24 month survey data.
		Section 8.5.2 Several of the Management Units (MUs) for relevant cetacean species being scoped in are greater than the spatial extent of the study area (wider Irish Sea). We advise that the full extent of the MUs should be considered in the EIA e.g. for reference populations and context to local densities.	Information on the reference populations, based on relevant MUs, and density estimates used in the assessments have been summarised in Chapter 11 Marine Mammals , Section 11.5.9.
		Based on the literature presented, several other marine mammal species are present in the wider Irish Sea study area but are scoped out of the assessment e.g. short-beaked common dolphin. If such species are observed during the Project-specific aerial surveys, then we advise that they should be considered for scoping into the assessment.	The marine mammal species included in the assessments, as outlined in Chapter 11 Marine Mammals , Sections 11.3.1 and 11.5, have been based on extensive literature review and site-specific surveys, as presented at ETG meetings.

Consultee	Date	Comment	Response/where addressed in the ES
		We advise that the draft seal MUs can also be used as a tool for screening in designated sites. The MUs can also be used for determining the appropriate reference population for seals in the EIA, though consideration will need to be given as to the appropriate MUs to include.	As outlined above, MUs have been reviewed and relevant areas used to determine reference populations, including seals (see Chapter 11 Marine Mammals , Section 11.3.1) and designated sites (see Chapter 11 Marine Mammals , Section 11.5.10).
		There was an additional NCMPA for minke whale in the relevant Celtic and Greater North Sea (CGNS) MU, the Southern Trench NCMPA, which should also be considered.	Information on relevant NCMPAs has been provided in Chapter 11 Marine Mammals , Section 11.5.10.
		<p>Additional sources for consideration by the Applicant include:</p> <p>A revised Atlas of the Marine Mammals of Wales was due to be published soon. It should be included if available in time and relevant to the Project area.</p> <p>The Hilbre Island Observatory produces annual reports on grey seal haul out data for the West Hoyle sandbank (in the Dee Estuary). Such reports should be considered for inclusion.</p> <p>If available in time, there was also due to be a new Offshore Energy Strategic Environmental Assessment (OESEA) which could be of relevance.</p> <p>Data from aerial surveys undertaken by other Round 4 projects in the region.</p> <p>Manx Marine Environmental Assessment (2018).</p>	<p>Acknowledged.</p> <p>Revised Atlas of the Marine Mammals of Wales has been included in the ES.</p> <p>The Applicant has not been able access Hilbre Island Observatory annual reports. The blog post on the website where reviewed but added no further information for the baseline or area characterisation.</p> <p>The United Kingdom (UK) Offshore Energy Strategic Environmental Assessment 4 (OESEA4) report (and relevant appendices) had not yet been finalised following consultation². However, relevant information from the report and Appendix 1a.8³ sent out for consultation has been considered to inform the existing</p>

² <https://www.gov.uk/government/consultations/uk-offshore-energy-strategic-environmental-assessment-4-oesea4>

³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1061613/Appendix_1a_8_-_Marine_mammals.pdf

Consultee	Date	Comment	Response/where addressed in the ES
		<p>Joint Cetacean Data Programme (JCDP) online database should be reviewed for any relevant data.</p>	<p>environment characterisation (Chapter 11 Marine Mammals, Section 11.5 and Section 5 of Appendix 11.2 in this document).</p> <p>Survey data from other nearby sites, including aerial surveys undertaken by other Round 4 projects in the region, have been considered to inform the existing environment in Section 5 of Appendix 11.2.</p> <p>Information in Manx Marine Environmental Assessment (2018⁴) has been considered to inform the existing environment characterisation (Chapter 11 Marine Mammals, Section 11.5 and Section 5 of Appendix 11.2).</p> <p>The JCDP online database⁵ has been reviewed for any relevant data for inclusion in the ES (see Section 5 of Appendix 11.2).</p>

⁴ <https://www.gov.im/about-the-government/departments/infrastructure/harbours-information/territorial-seas/manx-marine-environmental-assessment/>

⁵ <https://jncc.gov.uk/our-work/joint-cetacean-data-programme/>

Consultee	Date	Comment	Response/where addressed in the ES
		<p>We advise that decommissioning noise should be given high-level consideration by the underwater noise modelling. It is imperative that the worst-case scenarios for noise, such as concurrent or sequential piling, are modelled. Consideration should also be given to the Acoustic Deterrent Device (ADD) as a source of underwater noise for the purpose of underwater noise modelling.</p>	<p>As outlined in Chapter 5 Project Description (Document Reference 5.1.5), details of the potential decommissioning activities are not known and would be subject to separate consent. However, for this ES, it has been assumed that decommissioning activities would be similar to those of construction (Chapter 11 Marine Mammals, Section 11.6.5). A decommissioning plan will be prepared during detailed design and development stage of the Project prior to decommissioning, including relevant underwater noise modelling.</p> <p>Underwater noise modelling has been undertaken for the piling scenarios currently under consideration (Appendix 11.1).</p> <p>Disturbance from ADD has been assessed in (Chapter 11 Marine Mammals, Section 11.6.3.2. Underwater noise modelling for ADD has not been undertaken, as the type of device to be used is currently unknown. However, if required, modelling for ADD will be undertaken prior to construction when preparing the final Marine Mammal Mitigation Protocol (MMMP) and European Protected Species (EPS) Risk Assessment (RA). The draft MMMP has been provided with the DCO Application.</p>
		<p>We understand that a separate Marine Licence for UXO clearance will be sought. However, as UXO clearance is a</p>	<p>A separate marine licence application for UXO clearance will be submitted post-</p>

Consultee	Date	Comment	Response/where addressed in the ES
		foreseeable impact associated with offshore windfarm construction, we are supportive of a high-level assessment of this pathway being included in the ES.	consent, once detailed information on the locations and extent of UXO required to be cleared (if any) is known. An initial assessment of the potential impacts from UXO clearance at the Project has been provided in Appendix 11.3 , for information purposes only. A Draft MMMP was submitted with the DCO Application outlining potential mitigation measures for UXO clearances. The potential cumulative effects from UXO clearance during construction of the Project has been assessed in (Chapter 11 Marine Mammals , Section 11.7).
		Section 8.5.5.1 The area over which TTS could occur should be modelled, and the number of animals in the TTS zone estimated, although we do not expect an assessment of impact significance from TTS.	TTS impact ranges have been modelled (Appendix 11.1) and assessments of the number of marine mammals in the TTS impact area undertaken (see Chapter 11 Marine Mammals , Section 11.6).
		We would expect to see a vessel management plan listed as a mitigation measure to minimise impacts from vessels on marine mammals. Also potentially mitigation measures related to water quality.	Best Practice measures and guidelines to reduce the potential effects of vessels on marine mammals (as outlined in (Chapter 11 Marine Mammals , Section 11.3.3)) will be included in the Outline and final PEMP(s), an outline of which has been submitted with the DCO Application A Vessel Traffic Management Plan will also be produced post-consent and an outline has been submitted with the DCO Application (Document Reference 6.9).

Consultee	Date	Comment	Response/where addressed in the ES
			Mitigation measures related to water quality have been outlined in (Chapter 11 Marine Mammals , Section 11.3.3).
EPP process			
ETG 1	25 th May 2022	Discussed EPP, methodology, Terms of Reference, approach to scoping and EIA. Overview of baseline, data sources and planned site-specific surveys given, alongside potential impacts, underwater noise modelling, HRA and CEA.	
Natural England	7 th June 2022	We welcome continued engagement on the assessment parameters, for example whether concurrent or sequential piling is being included within the assessment envelope, and whether consideration is being given to any mitigation of piling or UXO noise as part of the Project design. These will have implications for the underwater noise modelling required.	<p>Concurrent piling has not been considered as an option.</p> <p>For monopiles, sequential piling of three piles in the same 24-hour period has been assessed, as well as one pile per day in to cover longest/worst-case time period. For pin piles, four piles in the same 24-hour period has been assessed.</p> <p>Effects from underwater noise of sequential installation of monopiles and jacket piles for OSP(s) have been modelled (Appendix 11.1) and assessed (Chapter 11 Marine Mammals, Section 11.6.3.1).</p> <p>The modelling (Appendix 11.1 and indicative assessments of potential effect of UXO clearance (Appendix 11.3) and piling (Chapter 11 Marine Mammals, Section 11.6.3.1) have been completed without and with mitigation measures applied. The Draft MMMP has been provided with the DCO Application outlining Mitigation measures for piling.</p>

Consultee	Date	Comment	Response/where addressed in the ES
			<p>These measures will be confirmed post-consent in the final MMMP.</p> <p>Actual requirements for mitigation measures for UXO if clearance is required will be confirmed in the marine licence application and associated MMMP when potential UXO presence and clearance method have been confirmed.</p>
		<p>(Method Statement (MS)/Scoping report respectively) There are inconsistencies with how unidentified species are being referred to in these reports. To illustrate, in the EIA MS Table 5.1 lists “cetacean species” and “seal/small cetacean species”, whereas paragraph 38 states that “unidentified small cetaceans” will be included in the density estimate but this term has not been used in the results of the digital aerial surveys. The terminology should be clarified and be consistent in the reports. A clear explanation of what each of the terms means should be provided. We would be interested to understand if the “cetacean species” observed could be a species other than harbour porpoise (inferred as the term “small” has not been included in the term).</p>	<p>To clarify, harbour porpoise density estimates have been based on confirmed recorded sightings of harbour porpoise. For the ES this has been based on the two years of aerial survey data.</p> <p>For the aerial survey data, there were only four unidentified cetacean species and three unidentified seal/small cetacean species in the 24 months of survey.</p>
		<p>It would be beneficial to present figure(s) showing the location of the Project area relative to the marine mammal Management Units and designated sites referenced.</p>	<p>Figures of the MUs have been included in Section 1.1.1 of Appendix 11.2.</p> <p>Figures with MUs and designated sites have been included in the RIAA.</p>
		<p>There was an additional Nature Conservation Marine Protected Area (NCMPA) for minke whale in the relevant CGNS MU, the Southern Trench NCMPA, which should also be considered.</p>	<p>Information on designated sites, including NCMPAs, has been provided in Chapter 11 Marine Mammals, Section 11.5.10.</p>

Consultee	Date	Comment	Response/where addressed in the ES
		<p>For clarity, the potential for all levels of impacts from underwater noise (including PTS) should be assessed for all underwater noise sources associated with the Project.</p>	<p>Potential impacts for all levels of underwater noise have been assessed for all underwater noise sources with the Project during construction and operation and maintenance and have been presented in Chapter 11 Marine Mammals, Section 11.6.</p>
		<p>(MS/Scoping report respectively) There is discrepancy in both reports as to whether barrier effects from the physical presence of the offshore windfarm is being scoped in or out. Based on the discussion at the Marine Mammal ETG on 20th May 2022, we understand that physical barrier effects are being scoped in. Both reports should be updated to reflect this.</p>	<p>The potential for barrier effects from the physical presence of the Project-alone during operation and maintenance has been assessed in Chapter 11 Marine Mammals, Sections 11.6.4. and 11.6.4.5. The potential for cumulative barrier effects from underwater noise or physical presence during construction or operation and maintenance of the Project has been assessed in Chapter 11 Marine Mammals, Section 11.7.</p>
		<p>Based on our recent experience with another offshore windfarm, we do not agree with the assumption that fewer vessels will be present during the operation and maintenance phase relative to the construction phase. The Applicant should assess the vessel numbers/density/movements of each phase in the ES and not simply make this assumption. Similarly, given that vessels may take different routes during operation and maintenance (O&M) compared to construction, which may lead to different amount of time spent in proximity to seal haul outs, we do not agree with the assumption that disturbance to seal haul outs is likely less during O&M than during construction.</p>	<p>Vessel collision risk has been assessed based on the number of vessels and vessel movements during construction phase (Chapter 11 Marine Mammals, Section 11.6.3.6) and operation and maintenance (Chapter 11 Marine Mammals, Section 11.6.4.6). Potential disturbance at seal haul-out sites from vessel routes has been assessed for construction (Chapter 11 Marine Mammals, Section 11.6.3.9) and operation and maintenance (Chapter 11 Marine Mammals, Section 11.6.4.9). Vessel</p>

Consultee	Date	Comment	Response/where addressed in the ES
			numbers estimated have been provided in Table 11.2.
		For the avoidance of doubt, we advise that the following are considered in the CEA: Geophysical and seismic surveys across all sectors; Ministry of Defence (MOD); or Nuclear.	CEA screening (Appendix 11.4 has reviewed and identified all potential projects, activities and noise sources with the potential for cumulative underwater noise effects with the Project during construction including piling.
		No information is provided to support the scoping out of certain impact pathways from the CEA such as disturbance to seal haul-outs, water quality, barrier effects from underwater noise. The evidence to scope out these pathways should be presented in order for us to advise whether it is suitable or not. The list of impacts scoped in/out in Table 8.20 of the draft Scoping Report should be reviewed accordingly, and also to ensure it is consistent with the text.	The potential for cumulative effects of disturbance at seal haul-out sites, water quality and barrier effects have been considered in Chapter 11 Marine Mammals , Section 11.7.
		Marine mammal baseline Table 8.14 This table presents the species recorded from March-June 2021, however the EIA Method Statement has a more up-to-date table that covers the period March-September 2021. The table in the Scoping Report should comprise the fullest available data. For example, we note that harbour seal has now been confirmed as present in the survey area.	The assessments in this ES, as discussed at ETGs, have been based on full two year of site-specific aerial survey data. Harbour seal have been included in the assessments (Chapter 11 Marine Mammals , Section 11.5).
		Marine mammal baseline Section 8.5.3 We note that the decision to scope leatherback turtles in or out has not yet been made. Once a decision is made, the evidence to support that decision should be presented.	A desk-based review of marine turtle presence in the Irish Sea has been conducted in Chapter 11 Marine Mammals , Section 11.5.11. Based on the information available marine turtles have not been assessed further in the ES.

Consultee	Date	Comment	Response/where addressed in the ES
ETG 2	31 st August/9 th September 2022	Comments on the Scoping Opinion were discussed. Details of the underwater noise modelling for foundation impact piling, other construction noise, operation noise and UXO clearance. Presentation of screened-in sites in the draft HRA, and types of projects considered in the CEA.	
Natural England	9 th September 2022	Noted that while the North Sea would not be expected to interact with the Project the Celtic Sea could, particularly for harbour porpoise, and this would include consideration of floating wind projects.	Noted. Details of the CEA area and the projects and activities within this area have been provided in Appendix 11.4 .
		Noted that concurrent piling would not be in the design envelope if not modelled.	Noted, concurrent piling has not been included in the design envelope.
		Seismic surveys for all industries would need to be considered, e.g. nuclear.	Noted. These have been considered in Appendix 11.4 .
		Recommended to search for the MMO licencing portal also for potential projects for cumulative consideration.	Noted and undertaken in Appendix 11.4 .
ETG 3	9 th November 2022	Initial high-level PEIR results were discussed for EIA and CEA, and agreement on underwater noise and swimming speeds. Presentation of worst-case impact ranges and of the screening area used for CEA and HRA. Approach to selecting mitigation measures was presented.	
ETG 4	8 th June 2023	Update of completed works since ETG 3 and refinement of site boundary shared. Key comments from PEIR and RIAA were presented and agreement on cut-off date for baseline and cumulative project list sought after.	
ETG 5	11 th October 2023	Update of completed works since ETG 4 and ES/DCO submission date and refinement of the Project envelope. Presentation of noise modelling parameters use in the ES, population modelling and baseline description. Technical discussion regarding MUs, reference populations, densities, DRC ⁶ assessment approach and cumulative projects was held. Agreement on cut-off dates for baseline and worst-case modelling scenario. Species densities, reference populations and dose response method for harbour porpoise.	

⁶ Dose-Response Curve

Consultee	Date	Comment	Response/where addressed in the ES
ETG 6	21 st November 2023	High-level, preliminary results from EIA, CEA and RIAA were shared, and further information on mitigation measures outlined in the draft MMMP.	

2.2 Natural England

Table 2.2 Statutory consultation feedback received on the PEIR from Natural England (2nd June 2023) in relation to marine mammals and how these have been addressed in the ES

Ref	Comment	Recommendation	Project response/where addressed in the ES
Chapter 11 Marine Mammals			
1	Natural England notes that Appendix B to Appendix 11.1 refers to hammer energies of 6,600 kJ (for monopiles) which have been used for sensitivity testing. This hammer energy is notably higher than 5,000 kJ used in the assessment. We therefore seek clarity on what the worst-case scenario (WCS) is. It is imperative that the WCS is assessed given NE will advise that the WCS is conditioned through the deemed Marine Licence (DML).	The submitted ES should clarify the WCS for hammer energy. The piling WCS should be secured as a licence condition in the submitted DML.	Assessment for the ES has been updated for the confirmed worst-case hammer energy (6,600kJ) and has been presented in Chapter 11 Marine Mammals , Table 11.1.
2	Only 1 year of baseline characterisation has been presented at this PEIR stage. Therefore, we cannot agree with any density estimates derived from the digital aerial surveys presented at this stage. We anticipate that the density and abundance estimates will be updated in the ES.	The submitted ES should present 2 years of baseline characterisation data in the ES, as already proposed by the Applicant.	The two-year survey data has been analysed and has been presented in Section 3 of Appendix 11.2 .
3	The Applicant has applied the disturbance distances from the Project to other projects, however they have not demonstrated why their assessment results are applicable to other projects or that they are the worst-case. We do not agree that this Project's impact ranges can be considered a "standard impact range for disturbance." Natural England advises that, where available, the Applicant presents the other project's project-specific disturbance ranges.	The submitted ES should present the disturbance ranges from other projects' project-specific assessments.	Wherever possible, project-specific data has been applied for impact ranges to the assessment. If such data has been omitted, the Applicant applied known disturbance ranges based on data from the Project or from available scientific literature using the worst-case.

Ref	Comment	Recommendation	Project response/where addressed in the ES
4	The EIA Method Statement – Marine Mammals stated that assessments will be done in the context of the nearest MU as well as the wider reference population I.e. as a worst-case it is assumed that all harbour seals are from the nearest MU, the North-West England MU. However, the PEIR does not present assessments against this smaller population, only against the wider reference population of multiple MUs.	The submitted ES should present the assessment against the nearest MU, the North West MU, as the worst-case.	The seal assessments have been based on a dual approach to present the assessment based on a North-West (NW) England MU and well as an assessment considering the combined MUs for the wider reference population (Chapter 11 Marine Mammals , Section 11.6).
5	Natural England has not yet had sight of the draft MMMP (Document Reference 6.5). Therefore, we cannot agree at this stage that the measures in the MMMP will be sufficient to avoid residual significant effect in EIA terms. We advise that noise abatement systems should be included as an option in the draft MMMP (Document reference 6.5).	Provide the draft MMMP at the DCO application stage, as already stated by the Applicant. Additionally, NE would welcome sight of the draft MMMP through future Marine Mammal ETGs. Include noise abatement systems in the draft MMMP.	The Draft MMMP has been provided with the DCO Application in which mitigation measures have been considered. The mitigation requirements will be finalised through consultation post-consent when the Project design has been confirmed.
D1	Table 2: We note that the PEIR for the Transmission Assets of Morecambe OWF is being developed separately and we have not had sight of it yet. At this stage the interdependencies between these two projects are unknown.	To note.	An assessment of the Transmission Assets combined with the Project has been included in Chapter 11 Marine Mammals , Section 11.7.3.1.
D2	Table 11.1: In the assessment of disturbance to seal haul outs there is no reference to the potential port options. This information should be presented once known.	Present the potential for port options at the ETG and/or in the submitted application, once known.	The port options are currently still unknown, however the assessment considered the worst-case location in relation to proximity to haul out sites. It has been noted the operational and maintenance base could be within 50km and as such seal haul out sites on the north west of England have been considered.

Ref	Comment	Recommendation	Project response/where addressed in the ES
D3	Table 11.1: Natural England has not yet had sight of marine mammal mitigation documents (MMMP and Vessel Traffic Management Plan/Best Practice in the PEMP), which are proposed to be submitted with the DCO Application. At this stage, we do not know the parameters of these mitigation documents.	Provide the draft MMMP and PEMP at the DCO application stage, as already stated by the Applicant	The Draft MMMP and the Outline PEMP has been provided (Document Reference 6.2) has been provided with the DCO Application.
D12	Section 11.4.6: The survey methodology that has been used by the Applicant is standard for offshore wind projects. There are widely acknowledged limitations of this method for determining marine mammal density and abundance, but this is not a project-specific issue. We do not agree that there is good understanding of the spatio-temporal distribution of marine mammals in the Project area, particularly for species other than harbour porpoise. This evidence gap could be considered for post-consent monitoring.	To note.	Considerations for post-consent monitoring have been presented in the In Principle Monitoring Plan (IPMP) (Document Reference 6.4).
D13	Table 11.1: Natural England notes the Applicant's response to the various additional sources that we have recommended for inclusion. We maintain our recommendations and welcome further engagement on the final list of sources that will be used in the ES.	Noted.	Additional sources have been reviewed and included in the ES up to 6 months prior to the DCO submission as agreed during the round 5 ETGs (held in October 2023).
D14	Table 11.5: It is not clear where information on baseline noise levels have been provided.	Provide information on baseline noise levels in the submitted ES	Baseline noise levels did not contribute to the underwater noise assessment, which relied entirely on absolute noise thresholds as criteria. The best available baseline data near the region was from 2016 (Burbo Bank Ext), which may not have been valid for Morecambe.

Ref	Comment	Recommendation	Project response/where addressed in the ES
D15	Paragraph 11.132: The EIA Method Statement – Marine Mammals stated that assessments will be done in the context of the nearest MU as well as the wider reference population i.e. as a worst-case it is assumed that all grey seals are from the nearest MU, the North-West England MU. However, the PEIR assessment is done against the combined North-West England and Isle of Man MUs as the worst-case.	Present the assessment against the nearest MU, the North West MU, as the worst-case in the submitted ES.	Given the location of the Project both these MUs were reflective of the grey seal populations that would mostly overlap the site, hence the NW England MU and the IoM MU have been considered to be the “nearest MU”.
D16	Paragraph 11.135: The EIA Method Statement – Marine Mammals stated that the harbour seal reference population would include the most recent estimate for the Isle of Man population. However, this population does not appear to have been included in the PEIR.	Include the Isle of Man population in the harbour seal wider reference population in the submitted ES	Although harbour seals have been observed annually in small numbers (Howe, 2018), the report did not provide count numbers of these rare visitors in Manx waters.
D17	Paragraph 11.135: The EIA Method Statement – Marine Mammals stated that assessments will be done in the context of the nearest MU as well as the wider reference population i.e. as a worst-case it is assumed that all harbour seals are from the nearest MU, the North-West England MU. However, the PEIR does not present assessments against this smaller population, only against the wider reference population of multiple MUs	Present the assessment against the nearest MU, the North West MU, as the worst-case in the submitted ES	Data from Special Committee on Seals (SCOS (2022)) showed that NW England had a population of 7 harbour seals. The data was however outdated and only provided rough estimates (SCOS, 2022) due to a lack of surveying in this particular area. Tracking data provided by Carter <i>et al.</i> (2020; 2022) showed that seals from the Northern Ireland (NI) MU utilised Liverpool Bay and may be regarded as one population, hence the reference population has also been assessed on the combined NW England MU and NI MU.
D18	Table 11.16: The Applicant has used Waggitt et al (2019) to determine absolute density of several cetacean species. However, Waggitt et al (2019) do not advise that their maps are used in this way: “Because of these caveats, outputs should not be used as a	Present densities from other sources for comparison to those from Waggitt <i>et al.</i> (2019) in the submitted ES.	Densities for all species have been reviewed across the most recent and available sources including Project-specific surveys, Small Cetaceans in the European Atlantic and North Sea (SCANS-IV) (2023), Evans

Ref	Comment	Recommendation	Project response/where addressed in the ES
	representation of absolute densities and fine-scale distributions at the present time. Instead, it is recommended that outputs be used as a general illustration of relative densities and broad-scale distribution over several decades". The Applicant should present densities from other sources for comparison, e.g. the additional sources recommended by Natural England in the Scoping Opinion.		and Waggitt (2023) and Waggitt <i>et al.</i> (2019) (see Section 5 of Appendix 11.2). To ensure comparability across differing data sources, species densities have been calculated across the area of the SCANS block relevant to the Project and the highest density for each species has been applied to the assessment. The worst-case density from across the relevant data sources has been applied to the assessment.
D21	Table 11.1: The Applicant has not assigned any observations of unidentified species to any species categories. Based on the 1 years' worth of survey data presented at the PEIR stage, there have only been two observations of unidentified species. We acknowledge that assigning these to a species is unlikely to make a material difference because of the low number. However, should more unidentified species be observed in the second year of surveys, further discussion will be needed on how to include these observations in the assessment	To note.	Unidentified marine mammal species have been apportioned to those that have been identified to species level (where appropriate), based on their respective abundance ratio (per survey).
D22	Table 11.23 Natural England notes that the worst-case PTS distance from single strike is 660m. This is greater than the standard 500m mitigation zone in the JNCC guidelines for minimising the risk of injury from piling. Therefore a larger mitigation zone should be included in the MMMP when it is produced.	To note, use 660m as the minimum size of the mitigation zone in the MMMP.	As precautionary measure the mitigation zone has been extended to cover the potential PTS range. This has been detailed in the Draft MMMP and will be confirmed through the final MMMP post-consent.

Ref	Comment	Recommendation	Project response/where addressed in the ES
D23	Tables 11.26 and 11.27: The magnitude for common dolphin, grey and harbour seal should be low, not negligible, based on the Applicant's definitions. The magnitude for minke whale should be medium, not negligible.	Update the magnitudes in Table 11.26 and Table 11.27. Update the corresponding impact significance in Table 11.31.	A review has been undertaken of the impacts and potential magnitudes in Chapter 11 Marine Mammals , Section 11.6.3 – Section 11.6.5.
D24	Paragraph 11.263: Natural England has not yet had sight of the draft MMMP. Therefore we cannot agree at this stage that the measures in the MMMP will be sufficient to avoid residual significant effect in EIA terms. We advise that noise abatement systems should be included as an option in the draft MMMP.	Provide the draft MMMP at the DCO application stage, as already stated by the Applicant. Include noise abatement systems in the draft MMMP.	A Draft MMMP has been submitted in conjunction with the DCO Application and outlines potential noise abatement systems options.
D25	Section 11.6.3.2: Natural England welcomes that a range of approaches have been taken to determining disturbance, including EDRs and dose- response curves, as there is no single agreed threshold for disturbance. We acknowledge that there is insufficient data to apply all these methods to all species. Note that as the ADD duration has not been discussed or agreed, nor the noise impact modelled, we cannot agree with the magnitude of the effect at this stage		Disturbance from ADD has been assessed in Chapter 11 Marine Mammals , Section 11.6.3.2. Underwater noise modelling for ADD has not been undertaken, as the type of device to be used was unknown. However, if required, modelling for ADD will be undertaken prior to construction when preparing the final MMMP and EPS Risk Assessment (RA).
D26	Paragraph 11.285: Natural England does not agree that the Waggitt <i>et al.</i> (2019) densities for harbour porpoise are more accurate, given that the authors state the densities should not be considered absolute (see earlier comment). We advise that the project-specific densities are used in combination with the dose-response curve	The submitted ES should use the project-specific harbour porpoise densities with the dose-response curve.	In the ES for dose response, the use of site-specific density within the contours within the windfarm site and 10km buffer, and for all contours beyond 10km buffer the density estimate from other available sources has been applied as outlined at ETG 5 (11 October 2023). Further information is available in Chapter 11 Marine Mammals , Section 11.6.3.2.

Ref	Comment	Recommendation	Project response/where addressed in the ES
D27	Paragraph 11.382: We advise that a 4km distance is used for disturbance from construction vessels, based on Benhemma-Le Gall <i>et al.</i> (2021). The Applicant has used 4km in their assessment of disturbance from non-piling construction activities and their vessels, therefore, to use 2km here is not consistent. This is also applicable to paragraph 11.566 (impacts from vessels during operation and maintenance).	The submitted ES should use 4km for assessing disturbance from vessels.	At 4km distance to a vessel, harbour porpoise presence was nearly constant at a probability of $p=0.4$ at all vessel intensity levels, indicating that the vessel did not affect the animals. However, at 2km distance from the vessel, the probability of occurrence decreased (with vessel intensity) by ~34%, inferring that the animals were responding to the vessel disturbance and avoided the area. Based on the evasive reaction of the porpoises, most animals would leave the area up until 4km away from the vessel. At this distance, no responses from harbour porpoise were detected (Benhemma-Le Gall <i>et al.</i> (2021). As a precautionary measure the ES has used 4km for assessing disturbance from vessels.
D28	Paragraph 11.399 A more detailed assessment of barrier effects should be presented. Further information should be presented here on the movements of seals between established haul outs and the Morecambe Generation Assets, to understand the potential for a barrier between haul out sites and preferred offshore habitat.	The submitted ES should present further information on the movements of seals through and around the wind farm area.	More details have been outlined in Chapter 11 Marine Mammals , Section 11.6.4.1 and Section 11.7.3.7.
D29	Paragraph 11.430: We understand that the number of vessels during the construction period is 2778 for support vessels PLUS 150 for construction vessels, therefore totalling 2928 vessels. Collision risk should be assessed based on this total number	Revise number of vessels in collision risk assessment	Noted. Updated number of vessels has been used in ES assessment (Chapter 11 Marine Mammals , Table 11.1).

Ref	Comment	Recommendation	Project response/where addressed in the ES
D30	Table 11.47: We query the validity of such a quantitative assessment of collision risk. Particularly as the results for many species are less than 1 – it is not possible for less than 1 animal to experience collision, so the outcomes do not appear biologically relevant. The Applicant themselves also caveat the results notably, stating that in reality it the effect is unlikely to be significant. Further justification on the approach used is needed. Note this is also applicable to the assessment of this pathway during the operation and maintenance phase	The submitted ES should provide further justification for the approach to the assessment of collision risk.	Further detail has been added to this assessment to ensure it was more biologically relevant in Chapter 11 Marine Mammals , Section 11.6.3.6 and 11.6.4.6.
D31	Paragraph 11.509: Natural England welcomes continued engagement on best practice measures including minimum distances from seal haulout sites for vessels during the project lifetime. We note that Paragraph 11.781 suggests a 1km avoidance distance which we would be supportive of.	To note.	Noted, measures included in the Draft MMMP.
D41	Paragraph 11.667: As previously commented, we have concerns with the use of densities from Waggitt <i>et al.</i> (2019) in this way	Present densities from other sources for comparison to the densities from Waggitt <i>et al.</i> (2019) in the submitted ES	The limitations with the Waggitt <i>et al.</i> (2019) data have been noted, Chapter 11 Marine Mammals , Section 11.4.6 presents all available densities for each cetacean species and took the most appropriate worst-case as precautionary approach.
D42	Paragraph 11.668: No grey seal density estimate has been presented for the Isle of Man MU. The Applicant should clarify how this MU has been considered.	Clarify how the Isle of Man MU has been considered in the submitted ES.	The density for the IoM MU has been calculated using Carter <i>et al.</i> (2022); see Section 1.2.6 in Appendix 11.4 .

Ref	Comment	Recommendation	Project response/where addressed in the ES
D43	Paragraph 11.668: It is not clear why the Applicant has included a density estimate for harbour seals from MU 14 when this MU is not part of the reference population. We would not advise this density being used, and indeed as it is much higher it could lead to over-inflated impacts.	Revise number of vessels in collision risk assessment	The MU 14 NI MU has been included as part of the reference population. Please see Chapter 11 Marine Mammals , Section 11.5.8: “ <i>The total reference population for the assessment was 1,143 harbour seal, assuming that that all seals are from the nearest MU, the NW England MU and NI MU</i> ” and see overview of included MUs in Section 5.8 of Appendix 11.2 . It was noted that two closest MUs have been used given the proximity of the Project.
D44	Paragraph 11.673: The Applicant has applied the disturbance distances from the Project to other projects, however they have not demonstrated why their assessment results are applicable to other projects or that they are the worst-case. We do not agree that this project’s impact ranges can be considered a “standard impact range for disturbance.” Natural England advises that, where available, the Applicant presents the other projects’ project-specific disturbance ranges	The submitted ES should present the disturbance ranges from other projects’ project-specific assessments	Wherever possible, project-specific data was applied for impact ranges to the assessment. If such data were omitted, the Applicant continued to apply known disturbance ranges based on data from the Project or from available scientific literature using the worst-case.
D45	Table 11.71: We request further information on the likely piling activities for the Morgan and Morecambe Transmission Assets, to demonstrate the appropriateness of using a 26km EDR for disturbance for this Project.	Provide further information on the likely piling activities for the Morgan and Morecambe Transmission Assets, at the DCO Application stage.	The 26km EDR ⁷ was based on a monopile without mitigation. The Transmission Assets may use a monopile to install the Morgan booster station. As such 26km has been used as an appropriate worst-case.

⁷ Effective Deterrent Ranges

Ref	Comment	Recommendation	Project response/where addressed in the ES
D46	<p>Table 11.71: The CEA assessment reflects the contribution of projects in the screening area to harbour porpoise disturbance. The number of animals are then resented as a proportion of the CIS⁸ MU. However, the screening area is smaller than the CIS MU, creating a mismatch between the spatial scale of the impact and the reference population. Indeed, the cumulative effects of projects in the screening area are likely to affect a subset of the CIS MU, rather than the population as a whole. Therefore presenting the numbers impacted as a percentage of the whole CIS MU may downplay the potential significance of this impact. This point should be acknowledged in the assessment. We welcome further discussion with the Applicant on how to improve the assessment in this regard</p>	<p>Acknowledge the point raised in the assessment. We would welcome discussion on how this can be improved in the final assessment through the ETG</p>	<p>The screening of projects within the entire coverage of the harbour porpoise Celtic and Irish Sea MU has been undertaken (Appendix 11.4). Projects have been assessed based on their Tier and available information at the time of the assessment.</p>
D47	<p>Paragraph 701: The Applicant has set the threshold for significant effect from temporary impacts as over 5%. It is not appropriate to say that 5.09% is not significant because it is only 0.09% over the threshold. To downgrade the assessment conclusion in this way is not conservative and does not reflect the worst-case scenario of a significant impact</p>	<p>Amend Paragraph 11.701 in the submitted ES to acknowledge the worst-case scenario of a significant effect (>5% of the harbour porpoise population being affected).</p>	<p>Noted. Changes made as necessary.</p>
D48	<p>Paragraph 11.707: Natural England does not agree that geophysical surveys can be treated as a point source, as they are mobile and can cover notable area in a day. The Applicant has not presented evidence to demonstrate that animals would return to the area once</p>	<p>The submitted ES should assess geophysical and seismic surveys as mobile sources rather than point sources.</p>	<p>Where relevant, point sources were assessed as moving sources. It should be noted, however, that assuming a moving source may overestimate the number of marine mammals at potential risk. At some</p>

⁸ Celtic and Irish Seas

Ref	Comment	Recommendation	Project response/where addressed in the ES
	the vessel has passed. Note this is also applicable to seismic surveys.		point in the day, marine mammals would recover from the disturbance and return to the area, rather than staying away for the whole day, which was what the moving source assessment assumed.
D49	Paragraph 11.750, 11.759, 11.811: We note that, at this stage, the Applicant has identified the potential for a significant cumulative effect from underwater noise disturbance in EIA terms. Natural England welcomes continued engagement on the impact assessment outcomes, including likely changes following full analysis of the two years of project-specific data, and the potential need for further mitigation. We also welcome further engagement on the scenario under which population modelling of disturbance would be required	To note.	Population modelling has been undertaken to determine whether there was a risk to the population from the Project-alone and for cumulative effects in Chapter 11 Marine Mammals , Section 11.6 and 11.7.
D50	Table 11.96: The Applicant has assessed three pathways for disturbance, from piling, other construction activities, and vessels. However, it is not clear whether the possible additive effects of these pathways have been considered. Information should be presented on the potential for temporal and spatial overlap between these pathways, to inform potential additive effects. It should also be taken into account that non-piling activities may occur on days without piling, and that not all animals may respond to piling (as per the dose-response curve).	The submitted ES should present further information on the three disturbance pathways to demonstrate potential additive nature of these effects, and assess if needed.	Interactions between the various disturbance pathways have been discussed in Chapter 11 Marine Mammals , Section 11.10.

Ref	Comment	Recommendation	Project response/where addressed in the ES
Appendix 11.1 Underwater Noise Assessment			
D4	Paragraph 3.2.2 (also draft RIAA, Table 9.4): Natural England understands that sequential or concurrent piling of monopiles is not being considered. Also, that concurrent pin piles are not being considered. The only option for multiple piling events in one day is sequential piling of up to 4 pin piles. This will need to be secured as a licence condition.	The piling WCS should be secured as a licence condition in the submitted DML.	Due to updates to the Project Design Envelope (PDE) there was the potential for up to three monopiles and four pin-piles to be installed sequentially in 24 hours. Underwater noise modelling (Appendix 11.1) and impact assessments have updated accordingly (Chapter 11 Marine Mammals , Section 11.6.3.1). The final piling parameters will be confirmed post-consent and secured through the consultation on the final MMMP process.
D5	Paragraph 5.3.1; Appendix 11.3, Table 1.1: The maximum UXO NEQ size modelled is lower than as we advise in the NE Best Practice Guidance. However, as the UXO assessment is only illustrative at this stage, this is not a material concern and should be addressed when the UXO clearance application is submitted later (post-consent).		The likely UXO threats posed at the Project site were investigated by Alpha Associates in which the highest UXO, with an NEQ of 353.6kg, was determined. Subacoustech has used this size in the UWN modelling and represents the worst-case for the study site (Appendix 11.1). The UXO assessment presented in Appendix 11.3 was an indicative assessment based on current information. A marine licence application will take into account the latest information on potential size of UXO to be cleared (if any) once information on the composition of any confirmed UXO is available.

Ref	Comment	Recommendation	Project response/where addressed in the ES
D6	Appendix B (also draft RIAA Table 9.4): Natural England notes that Appendix B to Appendix 11.1 refers to hammer energies of 6,600 kJ (for monopiles) which have been used for sensitivity testing. This hammer energy is notably higher than 5,000 kJ used in the assessment. We therefore seek clarity on what the WCS is. It is imperative that the WCS is assessed given NE will advise that the WCS is conditioned through the deemed Marine Licence.	Clarify the worst-case scenario hammer energy. The piling WCS should be secured as a licence condition in the submitted DML.	Assessment has been updated for confirmed worst-case hammer energy (6,600kJ) as outlined in Chapter 11 Marine Mammals , Section 11.3.2 and Appendix 11.1 .
Appendix 11.2 Marine Mammal Information and Survey Data			
D8	Paragraph 1.34: Only 1 year of baseline characterisation has been presented at this PEIR stage. Therefore we cannot agree with any density estimates derived from the digital aerial surveys presented at this stage. We anticipate that the density and abundance estimates will be updated in the ES.	Present 2 years of baseline characterisation data in the ES, as already proposed by the Applicant.	Noted. Two-year survey data have been analysed and presented in the ES and Section 3 of Appendix 11.2 .
D9	Paragraph 22: It would be beneficial to understand the level of agreement during the QA process.	Present the level of agreement during the QA process in the submitted ES.	The QA agreement method has been described in section '2.3 Object identification' in Appendix 12.1 Offshore Ornithology Technical Report (Document Reference 5.2.12.1).
D10	Section 3.2: It would be beneficial to understand the environmental conditions during each survey. For example, sea state can affect the number of marine mammals observed.	Present the environmental conditions during each survey in the submitted ES.	The environmental conditions, taken from the monthly HiDef survey reports have been included in Section 3.1 of Appendix 11.2 .
D11	Paragraph 66: It would be beneficial to understand the proportion of Definite, Probable and Possible for each marine mammal species, with examples of each, for review	Present the proportions of Definite, Probable and Possible of each marine mammal species, with examples of each, for our	Species identification was not automated, but other tools assisted in object identification, under the scrutiny of marine mammal experts.

Ref	Comment	Recommendation	Project response/where addressed in the ES
		review through the ETG and include in the ES	
D19	Table 1.7: It is unclear why the correction factor has not been applied to the count from the Isle of Man.	Justify, or apply the correction factor, in the submitted ES.	To generate a population estimate, the correction factor was applied to the haul-out count to account for those at sea at the time of survey. The seals counted by Howe (2018) on the IoM were classified as a population estimate not a count, thus the correction factor did not need to be applied.
D20	Figure 1.26 does not show any harbour seal density (based on the key) overlapping the Project area. We therefore query how the density has been calculated.	The submitted ES should clarify how density of harbour seals in the Project area has been calculated.	This issue has been resolved and a corrected map has been presented in Section 5.8 of Appendix 11.2 .
Appendix 11.3 Marine Mammal UXO Assessment			
D32	Natural England welcomes the UXO Assessment undertaken. We acknowledge that the assessment is illustrative at this stage as the UXO clearance Marine Licence will be applied for post-consent. We do not expect that additional information will be available to refine the UXO assessment envelope prior to the Application. The illustrative assessment concludes that UXO clearance activities should not have a significant impact on marine mammal populations so long as appropriate marine mammal mitigation is secured. Subject to the Applicant's commitment to a UXO MMMP and continued engagement with Natural England on the measures in the MMMP, we are content that this document does not require any further amendments until the time of application for the UXO marine licence. Hence, we will not be providing further	To note.	Noted.

Ref	Comment	Recommendation	Project response/where addressed in the ES
	comment on this assessment at the DCO/DML Application. We welcome continued engagement on the finer details of the UXO assessment and mitigation measures post-consent.		
Appendix 11.4 Marine Mammal CEA Project Screening			
D33	Paragraph 1.11: Please clarify what the cut-off period will be for the cumulative screening process	Clarify	Natural England considered a six month cut-off prior to ES/DCO submission was reasonable as stated in response letter (dated 18/09/2023) to technical note sent on 14/08/2023. This has been agreed at ETG 5 on 11/10/2023.
D34	Table 1.1: We note that the content of the tier structure advised by Natural England has been used, however the numbering is different. This makes cross-comparison more difficult. The project-specific Tiers should be added to Table 1.1.	Add the project-specific Tiers to Table 1.1 for clarity	Table 1.1 in Appendix 11.4 shows the Natural England/ Department for Environment Food and Rural Affairs (Defra) Tier system and how this has been applied.
D35	Table 1.1: The plan-level floating offshore wind leasing round should be considered	Include the plan-level floating offshore wind leasing round in the submitted ES.	All relevant plans and projects assessed for cumulative effects have been included in the Appendix 11.4 and Chapter 11 Marine Mammals , Section 11.7. Given the impact ranges of underwater noise a large number of projects related to these effects.
D36	Section 1.3: This CEA Screening document appears wholly focused on impacts from underwater noise. Indeed, Table 1.10 demonstrates it is only looking at disturbance from underwater noise. This is contrary to the Cumulative Effects section (11.7) of Chapter 11, which states that pathways other than underwater noise are screened into the cumulative effects assessment. The CEA document should be updated to ensure consistency with the assessment in Chapter 11.	Revise the submitted CEA document so that it is consistent with the cumulative effects section (11.7) in Chapter 11.	

Ref	Comment	Recommendation	Project response/where addressed in the ES
D37	Section 1.4.1.1: We anticipate that the list of projects screened in or out of the CEA will be reviewed at the time of application, to account for any changes. For example, the White Cross Floating OWF application has now been submitted, and Morgan and Mona OWFs have submitted their PEIRs. This also applies to projects currently considered to have insufficient information to inform an assessment, as this may change	Review list of projects in CEA prior to DCO application stage.	All relevant plans and projects assessed for cumulative effects have been included in the Appendix 11.4 and Chapter 11 Marine Mammals , Section 11.7
D38	<p>Table 1.2, Table 1.3, Paragraph 1.72, Paragraph 1.81, Table 1.8: We query the overlap of certain projects:</p> <ul style="list-style-type: none"> • White Cross and Inis Ealga Floating OWFs – there is still scope for piling to be within the envelope for floating OWFs, therefore there could be overlap in piling between projects. Shelmalere OWF – construction is predicted for 2028 which is only one year apart from Morecambe OWF, therefore it would be appropriate to include this in the CEA piling phase overlap in case Morecambe OWF piling timeline was to slip by a year. • Wave and tidal projects – what evidence does that Applicant have that, because they are consented, they should be constructed before Morecambe OWF? • Oil and gas decommissioning activities – to what extent might explosives be used in decommissioning, as this method produces greater noise that would need assessing? • Larne Lough – Paragraph 1.13 of this document states that projects under judicial review will be treated as Tier 1 IV or V, putting it in the same category as for example OWF 	Clarify on the points raised is needed. Update the Cumulative effects section in Chapter 11 as necessary.	<p>-White Cross As the ES has now been submitted, updates have now been taken forward in the CEA.</p> <p>-Shelmalere OWF and Inis Ealga Floating While these projects were awarded a Maritime Area Consents (MAC) in 2022 they were not successful in the Offshore Renewable Electricity Support Scheme (ORESS) auction. As such there was uncertainty on the consenting timescale for these projects. The three projects on the east coast that were successful (North Irish Sea Array (Statkraft, 500 MW), Dublin Array (RWE and Saorgus Energy, up to 850 MW), Codling Wind Park (EDF and Fred Olsen, up to 1,450 MW) have been considered, on a precautionary basis, to have the potential for overlap of construction activities, but not piling, and have been included in the CEA.</p>

Ref	Comment	Recommendation	Project response/where addressed in the ES
	<p>projects at application or PEIR stage. Therefore we query why this project has been screened out.</p> <ul style="list-style-type: none"> The Applicant states that it is “unknown” whether some projects will overlap with the project’s construction (wave, gas storage, offshore mining, carbon capture projects). We query how these unknown projects will be assessed. 		<p>Wave and tidal projects</p> <p>The following projects have been screened in:</p> <ul style="list-style-type: none"> - Marine Energy Test Area (META) Dale Road, META East Pickard Bay, META Warrior Way: The sites were operational, in that they have been granted a Marine Licence and that technology developers can test their technology. There was no permanent infrastructure associated at the time of assessment. Relevant authorities will be notified prior to each deployment. The activities that could take place include drilled pin piling, use of vessels over the course of 3 days (as stated in the Marine License). The sites were located in or just outside Milford Haven and were insignificant to the CEA. It was considered unlikely given the timescales that overlap of construction activities would be likely, however the impact pathways have been considered in the CEA. - Morlais: landfall and cabling was nearing completion, the first turbines are due to be installed in 2026, in a 1-year construction window (www.morlaisenergy.com/tidal-energy/). Morlais is this likely to be operational by the time Morecambe is planned to commence construction in 2027.

Ref	Comment	Recommendation	Project response/where addressed in the ES
			<p>O&G decommissioning activities</p> <p>It has been noted that explosives used for decommissioning could have a financial benefit (BSEE, 2015) and may therefore be more attractive than conventional cutting methods. Using explosives would be high peaked, but brief impulsive underwater noises “with near peak energy at frequencies of 10–200 Hz before attenuation” (Brand, 2021). Whether a project will be using explosives for decommissioning is project specific. Decommissioning plans were available for the nearby platforms DP3 and DP4, where cutting methods were being deployed, but these had already been completed and thus there was no overlap with the construction of Morecambe and thus not included in the CEA. There were no other decommissioning plans or clear timelines upon which to base an assessment, noting that the Project is in proximity to the Morecambe Cluster Carbon Capture Storage project which has been assessed as a separate CEA project.</p> <p>Larne Lough: As of February 2024 judgment has been reserved in a legal bid to halt the construction of gas storage caverns under Larne Lough and parties await for the Court of Appeals' decision on the case. The facility has been reviewed as PINS Tier 1. The current marine licence is valid from</p>

Ref	Comment	Recommendation	Project response/where addressed in the ES
			<p>2021 to 2026, thus there would be no overlap with Project construction and has therefore been screened out from further consideration at this time.</p> <p>Unknown projects: If there was sufficient information on which to make an assessment for those projects, and it was likely that they will go ahead and be undertaken at the same time as Morecambe, then they have been included. All relevant information has been included in the ES and where uncertainly lay the limitations have been noted. The CEA has been undertaken based on the information at the time of writing (with a cut-off of six months prior to ES submission).</p> <p>It has been proposed that the CEA will be reviewed, updated and consulted on prior to construction for the Marine Wildlife Licence Risk Assessment.</p>
D39	Paragraph 1.102: Natural England request to be consulted on any geophysical survey applications for the project.	Consult Natural England on any geophysical surveys for the project.	<p>Applications for geophysical survey works at the Project will be listed on the Marine Noise Registry (MNR).</p> <p>Appropriate mitigation in line with JNCC guidance will be applied where required. Regular updates have been held with NE regarding survey activities.</p>

Ref	Comment	Recommendation	Project response/where addressed in the ES
D40	Table 1.10 omits OWF projects that will enter the operational phase and so overlap with Morecambe OWF, such as Erebus. This is inconsistent with Table 1.2 which states that projects in this phase will be considered in the operational scenario. Please clarify	Clarify this inconsistency in the submitted ES	All relevant projects assessed for their operational cumulative effects have been included in the Appendix 11.4 and Chapter 11 Marine Mammals , Section 11.7

2.3 Marine Management Organisation (MMO)

Table 2.3 Statutory consultation feedback received on the PEIR from the MMO (30th May 2023) in relation to marine mammals and how these have been addressed in the ES

Ref	Comment	Project response/where addressed in the ES
6.1	Table 11.2 Chapter 11 Marine Mammals , states that “sensitivity testing has also been completed at 6,600kJ in the event this technology can be utilised”. If, in the future, the project wanted to use a higher hammer energy, additional assessment and consideration would be required. The maximum hammer energy modelled is 5,000 kJ and therefore anything above this has not been fully considered.	The assessment in the ES has been updated for confirmed worst-case hammer energy (6,600kJ) and has been presented in Chapter 11 Marine Mammals , Table 11.1.
6.2	Section 11.284 Chapter 11 Marine Mammals , states that “to estimate the number of animals disturbed by piling, SEL _{ss} contours a 5 dB increments (generated by the noise modelling – see Appendix 11.1 were overlain on the relevant species density surfaces to quantify the number of animals receiving each SEL _{ss} , and, subsequently, the number of animals likely to be disturbed, based on the corresponding dose-response curve”. However, the MMO is unable to find modelling of the SEL _{ss} contours in 5 dB increments within Appendix 11.1 .	Further information on the dose-response assessment has been presented in Chapter 11 Marine Mammals , Section 11.6.3.2. Figures showing the SEL _{ss} contours in 5 dB increments have been presented in Figure 6.1 and 6.2.
6.3	The MMO considers that the statement “It is important to note that, PTS is unlikely to occur in marine mammals, as the modelling indicates that the marine mammal would have to remain within less than 100m, for 24 hours, for any potential risk of PTS” has been misapplied. The modelling is based on a fleeing receptor and therefore, the receptor is at risk if they are within 100m of the vessel when they start to move away.	It has been acknowledged that marine mammals that were within 100m when piling begins would be at risk of PTS. However, given the mitigation that would be applied (e.g. pre-watches over the mitigation zone) it was considered to be highly unlikely that marine mammals would be present within their PTS range prior to the start of piling.
6.4	The seabed sediment parameters used in the modelling are not disclosed in the assessment. The MMO notes the parameters reasonably match the Subacoustech predictions for marine mammals and fish, based on the modelling assumptions	Subacoustech modelling has been used for prediction of underwater noise propagation around the UK and to date presented good agreement with field measurements at the time of foundation installation. The model has been refined over 10 years using

Ref	Comment	Project response/where addressed in the ES
	provided in the report, such as the source levels, piling profiles and marine mammal fleeing speeds, while assuming sediment acoustical properties in between those typical for a sandy and a muddy seabed, respectively (i.e., less favourable to sound propagation than those of a sandy-type seabed). The MMO would expect notably larger effect ranges if sand was assumed to be the primary sediment type.	hundreds of datasets from field studies. It has also been noted that precaution has been built into the modelling, given that modelling has been undertaken considering the conservative maximum design scenario and modelling has been undertaken with no mitigation.
7.2	Section 1.80 (Appendix 11.1) states that “although noise levels lower than TTS thresholds may startle the individual, this has no lasting effect” however this has not been supported by evidence. Additionally, the MMO considers TTS thresholds inappropriate for unexploded ordnance (UXO) disturbance, and recommends the use of Effective Deterrent Radius (EDRs).	Appendix 11.3 assessed potential disturbance through the use of EDRs and the potential effects of TTS.
7.3	Section 1.84 (Appendix 11.1) states that “as a precautionary approach, it has been assumed that there could be an estimated worst-case of 5km disturbance range for low-order clearance” however this has not been supported by evidence.	A 5km disturbance range was listed in the most recent JNCC guidance ⁹ Further information has been presented in Appendix 11.3 .
7.4	Figure 3-1 (Appendix 11.1) shows a comparison between example measured impact piling data and modelled data. The pile sizes used in this comparison are much smaller than the proposed 14m diameter for Morecambe OWF. The MMO also recommends providing the hammer energies, alongside pile diameter, as they may vary from the proposed hammer energies being used on the Morecambe OWF. Further evidence is also required in terms of the SEL _{ss} and not just the peak sound pressure level (SPL _{peak}).	Equivalent validation charts have been added that include SEL results in Appendix 11.1 .

⁹ JNCC (2023) Marine Noise Registry Help and Guidance – Annex 1. Available at https://mnr.jncc.gov.uk/assets/mnr/documents/marine_noise_registry_helpguide_2023.pdf

Ref	Comment	Project response/where addressed in the ES
7.5	<p>Section 3.1.1 (Appendix 11.1) states that the “measurements taken during installation will be constrained by the piling plan and site limitations and a direct comparison with a modelled scenario is unlikely to be possible”, however even if the piling locations and choice of transects would not be matched precisely, both modelling and monitoring should provide enough information to deduce some envelope of received level curves in each case. The MMO recommends providing some sort of comparison for comparable hammer strike energies, with the associated envelopes of variability.</p>	<p>The modelled noise levels present at 750m from the pile have assisted with this, and these have been added in Appendix 11.1. The note of caution here has been added but it should be remembered that although a suitable ramp up and soft start has been included, there will always be variations on site.</p>

2.4 North West Wildlife Trusts (Cumbria, Lancashire, Cheshire)

Table 2.4 Statutory consultation feedback received on the PEIR from North West Wildlife Trusts (Cumbria, Lancashire and Cheshire) (22nd May 2023) in relation to marine mammals and how these have been addressed in the ES

Ref	Comment	Project response/where addressed in the ES
12	Chapter 11.2 Table 11.1: "We acknowledge that results of the digital aerial surveys are not available in time for the submission of the PIER. We look forward continued discussion of the full dataset ahead of ES submission, ultimately informing decisions about the location and design of scheme elements that could significantly influence the scale of impacts on these ecological receptors."	Two-year survey data has been analysed and presented in the ES and Section 3 of Appendix 11.2 .
13	Chapter 11.2 Table 11.1: "NE recommended scoping in several marine mammals that are present in the wider Irish Sea study area e.g. short-beaked common dolphin, but this has not been done"	Common dolphin were screened in and assessed in Chapter 11 Marine Mammals with baseline information in Section 5.3 of Appendix 11.2 .
14	Section 11.7.1 Paragraph 11.651: Cumulative effects due to operational and decommissioning impacts have been screened out of assessment however given the scale of OWF in the Irish Sea and the proximity of Wales, we believe cumulative impacts must be scoped back in.	After reviewing the OWFs in the CIS MU that have become operational after the baseline surveys started in March 2021 and prior to construction at the Project, an assessment for cumulative effects of operational wind turbines has been included (Chapter 11 Marine Mammals , Section 11.7), which was not significant given the impact ranges during operation (below <100m TTS and PTS for the Project). There are great uncertainties with regard to project timelines for the decommissioning programmes for OWFs and any impacts will have to be assessed prior to any decommissioning activities. Thus, this impact remained screened out of the CEA.
15	Section 11.6.3.5 Paragraph 11.407: Potential barrier effects across the entire site is 125km ² - worryingly how It is dismissed as a small size and very much needs to be considered as part of	The area for the Project has been reduced to 87km ² with up to 35 turbines (Chapter 11 Marine Mammals , Section 11.3.2), reducing potential for Project-alone barrier effects which have been assessed in the ES.

Ref	Comment	Project response/where addressed in the ES
	the cumulative impacts with other wind farm developments, given the scale of development in the region.	Further considerations to cumulative effects have been considered in Chapter 11 Marine Mammals , Section 11.7.
16	<p>Section 11.6.3.1 Paragraph 11.263: "We welcome the statement that an MMMP will be developed and implemented for piling to reduce the risk of PTS from the first strike of the soft start, single strike of the maximum hammer energy.</p> <p>We also welcome that a monitoring zone has been set up and ADD activation will be used.</p> <p>However, A great deal more work is required to understand the effectiveness of current mitigation for underwater noise impacts and to develop better options if the current mitigation is found to be inadequate. We suggest that monitoring is undertaken to confirm the effectiveness of ADD if this is utilised.</p> <p>We welcome the approach in engaging with NWWT & TWT on Morecambe during the evidence plan process and we hope that this can continue into the post-consent stage to reflect the best practice we have been developing with other wind farm developers post-consent. We request to be named on all marine mammal monitoring and mitigation documents as a consultee. We look forward to discussing this in more detail with you over the coming months."</p>	<p>The Applicant would welcome further consultation post-consent. The Draft MMMP has been submitted.</p> <p>Considerations for post-consent monitoring have been presented in the IPMP.</p>

2.5 Isle of Man Government

Table 2.5 Statutory consultation feedback received on the PEIR from the Isle of Man (2nd June 2023) in relation to marine mammals and how these have been addressed in the ES

Comment	Project response/where addressed in the ES
Chapter 11 Marine Mammals	
<p>Table 11.2: Realistic Worst-case scenario Table: Impact 9 - Impact sites for grey seals should include Isle of Man.</p> <p>See: https://www.mwt.im/sites/default/files/2023-03/Calf%20Seal%20Report%202021.pdf</p> <p>https://www.mwt.im/terrestrial/calf-man-bird-observatory for other year reports.</p>	<p>The haul-out sites at the IoM were not in close proximity to larger ports or harbours which could be used for the Project. Although currently the port(s) to support the Project construction has not been selected, it is unlikely that any ports used to support the Project would be in the Isle of Man. Thus, seals hauled-out on the Calf of Man etc. would not be disturbed.</p>
<p>Table 11.5: NPS assessment requirements indicates inclusion of 'known birthing/haul out areas, nursery grounds.' etc. – which therefore should include IoM sites, unless there is a distance limitation? Currently only appears to include Dee estuary and South Walney?</p>	<p>Further information has been added in Chapter 11 Marine Mammals, Table 11.5 and Section 5.7.2 of Appendix 11.2.</p>
<p>Table 11.8: no Manx data sources included? There appear to be references to several.</p>	<p>Chapter 11 Marine Mammals, Table 11.8 has been updated with relevant data sources.</p>
<p>Section 11.4.5: As noted, when considering TB effects an equivalence to European Sites and European Protected Species must be made to account for other jurisdictional legislation and classifications – e.g. Isle of Man, which has no European sites, but does have equivalent protected sites and species protected status.</p>	<p>Protected sites for the IoM have been addressed in Chapter 11 Marine Mammals Section 11.5.10 and assessed in Chapter 11 Marine Mammals, Section 11.8.1.</p>
<p>Paragraph 11.72 states there is a 'good understanding of the existing environment.' Yet, 11.5.4 (Risso's dolphin) does not mention the Manx 'population' in the areas regularly sighted, despite being the closest to the proposed site. It is difficult to understand how basic oversights such as this can be made, especially since in the Baseline information chapter, for example Pg. 54 (1.106), it states,</p>	<p>Additional information has been added to Chapter 11 Marine Mammals, Section 11.5.4.</p>

Comment	Project response/where addressed in the ES
<p>'Risso's dolphin are the most commonly seen dolphin species in Manx territorial waters.....'.</p>	
<p>Section 11.5.6 Paragraph 11.115 only refers to the UK waters presence of Minke and the Celtic and Western Irish Sea – however, 1.118 of the baseline information chapter discussed the Manx minke 'population'. Why is there no reference in the PEIR to minke in the Eastern Irish Sea or around the Isle of Man? Was the baseline information chapter referred to in writing both of these examples (Risso's and minke)?</p>	<p>Additional information has been added to Chapter 11 Marine Mammals, Section 11.5.6. To note, the CGNS MU includes the IoM and Republic of Ireland, thus baseline information regarding those areas was covered as part of assessments.</p>
<p>Paragraph 11.124: There is no mention of the Isle of Man grey seal haul-out and pupping area at the Calf of Man in this section, and yet the Manx population is referred to in general terms in section 11.129.</p>	<p>More information regarding the IoM has been added to Chapter 11 Marine Mammals Section 11.3.1 and 11.5.7, as well as Section 5.7.2 and 5.7.3.2 of Appendix 11.2.</p>
<p>Paragraph 11.398 (and Section 11.5.7): There is no mention of the Isle of Man grey seal haul-out and pupping area at the Calf of Man in this section, and yet the Manx population is referred to in general terms in section 11.129. See also earlier comments about the omission of Manx grey seal population (which is estimated to number around 400 individuals).</p> <p>11.130 – the IoM resident population is referred to as 50, but this has since been updated to 400.</p> <p>Contact Manx Wildlife Trust (MWT) for further details.</p>	<p>Population numbers have been updated to 400 and impact assessments amended.</p> <p>Information regarding IoM haul out sites has been added to in Section 5.7.2 and 5.7.3.2 of Appendix 11.2.</p>
<p>See also Paragraph 11.668: where estimated total populations may be underestimated as a result.</p> <p>There appears to be a number of Isle of Man marine mammal reference omissions from this section for the PEIR chapter, despite being recognised as relevant in Section 11.148. There's a lack of consistency in presentation/treatment of Manx sites, which makes it difficult to be confident of appropriate consideration. These sections should be redrafted, and the other species also reviewed for the same omissions.</p>	<p>More relevant information has been included with reference to the marine mammals around the IoM, see Section 5 of Appendix 11.2 and Chapter 11 Marine Mammals, Section 11.8.</p>

Comment	Project response/where addressed in the ES
<p>The Isle of Man Government requests confirmation that the regionally important populations of Risso’s dolphin, minke whale and grey seal in Manx waters have been properly and comprehensively considered within the PEIR assessment process (including in Section 11.5.9, Table 11.15 etc. and Section 11.8 Transboundary Effects).</p>	
<p>11.11 Marine Wildlife licence application: please consider whether an equivalent licence may be required under the Isle of Man Wildlife Act 1990 with respect to:</p> <ul style="list-style-type: none"> ▪ Section 9: Protection of certain wild animals ▪ Section 16: Power to grant licences <p>Please contact the Isle of Man Government, Department of Environment, Food and Agriculture for further information</p>	<p>Applications and assessment will be completed for relevant marine wildlife licences post-consent with final Project parameters.</p>
Appendix 11.2 Marine Mammal Information and Survey Data	
<p>Section 1.2: As a signatory to the CBD, the Isle of Man’s Biodiversity Strategy outlines its commitments to species and habitats: https://www.gov.im/media/1346374/biodiversity-strategy-2015-final-version.pdf</p> <p>Table 1.2 ASCOBANS (and the Bonn Convention) has also been extended to the Isle of Man (via the UK), ie. IoM is also a signatory. Similarly, IoM is signatory to the Bern and Bonn Conventions, OSPAR¹⁰, CITES¹¹ and Convention on Biological Diversity (CBD) – all extended via the UK. (It should be Bern Convention rather than Berne, which relates to authorship rights).</p> <p>For full details of IoM participation in multilateral conventions and treaties see: Appendix B, pg. 44 of the Isle of Man Biodiversity</p>	<p>Corrections have been addressed and that the IoM was a signatory to a range of national and international legislation has now been outlined in the Section 2 of Appendix 11.2.</p>

¹⁰ Oslo and Paris Convention for the Protection of the Marine Environment of the North-East Atlantic

¹¹ Convention on International Trade in Endangered Species of Wild Fauna and Flora

Comment	Project response/where addressed in the ES
<p>Strategy: https://www.gov.im/media/1346374/biodiversity-strategy-2015-final-version.pdf</p> <p>Table 1.2 The IoM Wildlife Act 1990 also establishes the legal protection of Marine Nature Reserves (under Sections 32 and 33), as well as NNRs and Areas of Special Scientific Interest (ASSIs).</p>	
<p>Section 1.2.4: Noting this relates to EPS. The Isle of Man, as a non/never-EU¹² member state, but with its own relevant legislation (as outlined in Table 1.2), it is requested that the equivalent description of legislative scope for marine mammals is indicated for IoM, if only to indicate that equivalent protection for these species extends across the Irish Sea region, and therefore equivalent. consideration in respective territorial waters is justified. For example see Table 11.5 NPS assessment requirements (PEIR) - marine mammals are legally protected species in Manx waters and must therefore be indicated and considered as equivalent under UK legislation.</p> <p>This could easily be included under 1.2.6.</p>	<p>Updates have been to Section 2.4 of Appendix 11.2.</p>
<p>Section 1.2.5: Applicable to the IoM</p>	<p>This query has been addressed in Section 2.4 of Appendix 11.2</p>
<p>Paragraph 1.31: there are ten marine nature reserves. See: https://www.gov.im/mnr. For the designation features of each, including marine mammals see: https://www.gov.im/media/1378920/designation-of-marine-nature-reserves-guidance-note.pdf</p>	<p>The 10 Marine Nature Reserves (MNRs) have been further described in Appendix 11.2 in Section 2.6 and in Table 2.2 and their Marine Mammal Designation Features.</p>

¹² European Union

Comment	Project response/where addressed in the ES
<p>Paragraph 1.55: See also Manx Marine Environmental Assessment: https://www.gov.im/about-the-government/departments/infrastructure/harbours-information/territorial-seas/manx-marine-environmental-assessment/</p> <p>https://www.gov.im/media/1363399/ch-34a-cetaceans.pdf https://www.gov.im/media/1363400/ch-34b-seals.pdf</p>	<p>Noted. These documents have been referred to as Howe, 2018 and 2018a.</p>
<p>Paragraph 1.87: Is 2018 the most recent data available? Suggest contact MWDW for updates.</p>	<p>The availability of marine mammal sighting and effort data from Manx Whale and Dolphin Watch (MWDW) has been discussed. With the recent publication of Evans and Waggitt (2023), into which data from MWDW has been incorporated, this would not provide any further insight about the overall presence of species in the Irish Sea. Evans and Waggitt (2023) has been discussed for each species within their respective section under Section 5 of Appendix 11.2.</p>
<p>Section 1.4.7: Grey seals. There is limited reference to grey seals in Manx waters, where a regionally important population is found. Details, including annual survey data can be found here, https://www.gov.im/media/1363400/ch-34b-seals.pdf https://www.mwt.im/terrestrial/calf-man-bird-observatory - Calf Seal Survey and by contacting the Manx Wildlife Trust directly.</p>	<p>Updates have been made in Section 5.7.1 and 5.7.2 of Appendix 11.2.</p>
<p>Table 1.7: the Manx population estimate of grey seals is thought to be around 400 animals</p>	<p>The grey seal population for the IoM has been updated to 400 and applied to relevant documents.</p>
<p>Marine Conservation Zone Assessment</p>	
<p>Acknowledging the specific requirements of the Marine and Coastal Access Act 2009 (1.2.1.1) in relation to MCZ, the Isle of Man Government seeks clarification and reassurance that the statutorily designated marine conservation areas in the Manx territorial sea, ie. Marine Nature Reserves designated under the Wildlife Act 1990, have been adequately, and similarly considered in relation to this</p>	<p>The MCZA includes screening of all MCZs within 100km, including South Rigg, however it has been noted that this site was designated for benthic features outside of the zone of influence of impacts for these features. The Marine Mammal ES chapter included assessment of MNRs, in relation to marine mammal features and all</p>

Comment	Project response/where addressed in the ES
<p>project. Noting Figure 1 of the MCZ Assessment document, and the inclusion of the territorial sea within the 100 km buffer zone, the inclusion of MCZ distal to the Manx territorial sea (South Rigg MCZ), it is surprising that no reference to the MNRs is included; even as an acknowledgement and explanation for exclusion. The Manx MNRs are included within the Marine Mammal PEIR, but as statutorily designated marine conservation zones within a neighbouring jurisdiction and with potential transboundary effects, it would seem appropriate to acknowledge them to some extent in this report.</p> <p>For reference the Manx MNRs are included on the following;</p> <p>OSPAR MPA Database JNCC MPA Mapper Database UNEP/IUCN (Protected Planet)</p> <p>For further information please see: https://www.gov.im/about-the-government/departments/environment-food-and-agriculture/environment-directorate/ecosystempolicy-team/wildlife-biodiversity-and-protected-sites/protected-sites/marine-nature-reserves/</p>	<p>technical topics include MNR assessments for relevant features, e.g. ornithology, fish and benthic.</p>

2.6 Natural Resources Wales (NRW)

Table 2.6 Statutory consultation feedback received on the PEIR from NRW (21st May 2023) in relation to marine mammals and how these have been addressed in the ES following further discussion with NRW

Ref	Comment	Project response/where addressed in the ES
Chapter 11 Marine Mammals		
10	No evidence has been put forward in Chapter 11, Marine Mammals, that the three disturbance pathways scoped in for the project will not act additively (i.e. inter-related effects). NRW (A) advise that this is provided, or an assessment carried out.	Interactions are discussed in Chapter 11 Marine Mammals , Section 11.10, including interrelated effects as well as effects across the phases of the Project.
11	Table 11.4: The use of noise mitigation strategies / attenuation technology such as bubble curtains, timing of piling, or piling methods, have not been proposed as potential mitigation methods in Table 11.4 – Additional measures. NRW (A) strongly recommend that these are considered and included in any future mitigation plan. Whilst mitigation might not be formally required for the purposes of removing Adverse Effect on Site Integrity (AEOSI) in the Habitats Regulations Assessment (HRA) or reducing significant effects in the Environmental Impact Assessment (EIA), it should be incorporated in accordance with industry best practice to reduce effects in relation to European Protected Species (EPS) protection.	Chapter 11 Marine Mammals , Table 11.3 presents an overview of potential mitigation measures and those considered in the ES but is not a definitive list of considerations listed in the MMMP. The Draft MMMP has been submitted with the DCO application. The final MMMP and required mitigation measures will be confirmed with consultation post-consent when the Project detailed design is further refined. A Marine Wildlife Licence will also be applied for prior to construction to assess any potential for injury or disturbance to EPS during construction based on the final project design and requirements.
12	Section 11.5: NRW (A) note reference to Waggitt <i>et al.</i> , (2019) in Section 11.5, Existing environment, which has been used to provide densities for some species. However, the authors stated that their paper should not be used for absolute densities in this way. Therefore, NRW (A) recommend using densities obtained from the newest version of the Marine Mammal Atlas (Evans and Waggitt, 2023), which are based on 30 years of sightings data. The report is now available on the	All recent information and data sources have been considered for the ES and have been presented in Section 5 of Appendix 11.2 . Evans and Waggitt (2023) has been reviewed and applied where appropriate. The new SCANS-IV survey published in Q4 2023 has been reviewed, and densities compared.

Ref	Comment	Project response/where addressed in the ES
	NRW website at 646: Modelled Distributions and Abundance of Cetaceans and Seabirds of Wales and Surrounding Waters (cyfoethnaturiol.cymru).	There are limitations to all the sources, which is discussed in the Chapter 11 Marine Mammals , Section 11.4.6, and as a precautionary approach, the density estimates for each marine mammal species are based on the highest for the area, using available data sources.
13	Alternatively, for species with low numbers of survey sightings, an approach similar to that proposed in other projects (e.g. the Mona and Morgan Offshore Wind Farms) could be taken i.e. the use of Scans II densities for common dolphin and adjacent Scans III block E density for Risso's and Minke whale.	
14	NRW (A) strongly advise against the use of dual densities – a detailed justification from an ecological perspective would be required to support their proposed use.	<p>It would be an unrealistic worst-case if the site-specific summer density for harbour porpoise would be applied, for example to the dose-response-curve. The justification for this approach is based on a comparison of harbour porpoise densities from Morgan (0.247 animals/km²), Mona (0.097 animals/km²), Awel y Môr (0.395 animals/km²) and SCANS-IV block CS-E (0.5153 animals/km²), which give evidence that surrounding area has much lower densities and thus the application of dual densities is more representative of the wider area. The 5dB noise contour levels cover most of the Liverpool Bay area, thus incorporating other OWFs where lower densities have been measured.</p> <p>Thus, for the harbour porpoise dose response assessment, the site-specific summer density within the contours of the windfarm site and 10km buffer has been used, and for all noise contours beyond the 10km buffer the density estimate from the worst-case wider density are applied.</p> <p>Dual densities are not used in other assessments (such as Effective Disturbance Range calculations) or for other species where their use cannot be similarly justified.</p>

Ref	Comment	Project response/where addressed in the ES
15	<p>With reference to Section 11.6.3.2, Disturbance from Underwater noise, Paragraphs 11.270 –1, NRW (A) disagree that there are currently no agreed thresholds or criteria for the behavioural response and disturbance of marine mammals, and recommend that the assessment for behavioural disturbance is carried out using appropriate behavioural thresholds and methods, including:</p> <ul style="list-style-type: none"> ▪ JNCC Report No. 654, which lays out JNCC, Natural England and DAERA’s advice on the assessment of significant disturbance in UK Special Areas of Conservation (SACs) for harbour porpoise. ▪ NRW PS017, which lays out NRW’s position on how to assess the effects of underwater noise on harbour porpoise behaviour (including from pile driving) ▪ Tougaard (2021), which provides details on thresholds (or potential thresholds) for behavioural reactions to noise for marine mammals ▪ Heinis <i>et al</i> (2019), which provides the background for the Dutch Framework for Assessing Ecological and Cumulative Effects (KEC) from pile driving on harbour porpoise SACs ▪ National Marine Fisheries Service (NMFS) thresholds for Level B disturbance 	<p>Whereas TTS and PTS ranges developed by Southall <i>et al.</i> (2019) have found national/ international acceptance, there are currently no widely accepted industry standards regarding thresholds or criteria for the behavioural response and disturbance of marine mammals. In the Chapter 11 Marine Mammals, Section 11.6.3.2, JNCC Report No. 654 has been applied by using EDRs for harbour porpoise.</p> <p>Additional disturbance assessments were made using several methods: dose-response curve for harbour porpoise was applied to all cetacean receptors; application of known disturbance ranges for harbour porpoise (26km EDR), seals (25km), minke whale (30km), and TTS ranges for all dolphin species for comparison. Population modelling (iPCoD) was used for harbour porpoise, bottlenose dolphin, minke whale and both seal species applying the worst-case level of disturbance for the different metrics listed alongside the potential PTS impacts.</p> <p>The Applicant acknowledges that there have been several other studies, however, there was lack of agreement on disturbance ranges. The NRW PS017 report refers to the JNCC report and Lucke <i>et al.</i> (2009).</p> <p>Heinis <i>et al.</i> 2019 reported that “there is as yet no international or national consensus in this respect (i.e prediction of behavioural responses)”.</p> <p>Regarding the Level B harassment threshold, NOAA makes no reference to where this figure has been sourced. As per Southall <i>et al.</i> (2007), there is considerable variability in reactions to disturbance from cited authors and may not have been appropriately described or widely accepted outside the U.S.</p>
16	<p>Paragraph 11.271 states that for marine mammals a fleeing response can be assumed to occur at the same noise levels as Temporary Threshold Shift (TTS). However, fleeing responses can and do take place at lower levels as can be observed in existing dose / response curve data for various species (e.g.</p>	<p>A variety of methods have been used to assess the potential effect of disturbance in Chapter 11 Marine Mammals, Section 11.6.3.2.</p>

Ref	Comment	Project response/where addressed in the ES
	<p>Graham <i>et al.</i>, 2017, 2019; Neart na Gaoithe, 2018; Thompson <i>et al.</i>, 2013; Whyte <i>et al.</i>, 2020) and other studies on pile driving impacts (e.g. Brandt <i>et al.</i>, 2018). NRW (A) draw attention to the fact that TTS thresholds are inherently under precautionary given that they mark the boundary between the highest level of disturbance and the start of physical impacts on the auditory system. NRW (A) therefore recommend that any disturbance estimates, and conclusions derived from the use of a TTS threshold are revised / re-assessed using appropriate behavioural disturbance thresholds.</p>	<p>TTS has only been applied as a proxy where there was no suitable alternative such as with species specific dose -it/response curve data or EDRs.</p>
17	<p>With reference to Paragraphs 11.278–9 Disturbance / displacement of harbour porpoise based on EDRs for piling, please note that NRW did not endorse the JNCC (2020) guidance, in order to retain some flexibility in approaches to the management of noise where NRW is the consenting / licensing authority (although the guidance still applies to Welsh waters beyond 12 nm). Effective Deterrent Ranges (EDRs), as applied in (JNCC, 2020), are area-based thresholds defined by Tougaard <i>et al.</i>, (2013) as reflecting the overall loss of habitat that would occur if all animals vacated an area within the EDR, being equivalent to the mean loss of habitat per animal. Whilst they can be used to determine the number of animals disturbed, dose/response curves (where available) allow for more realistic assumptions about animal response, where the probability of a response will gradually decrease with increasing distance from the noise source. NRW (A) therefore recommend using a dose/response curve for predicting numbers disturbed, where applicable to Welsh inshore waters.</p>	<p>Dose-response curves have been applied for harbour porpoise, grey and harbour seal in Chapter 11 Marine Mammals Section 11.6.3.2. The application of the harbour porpoise dose-response curve to dolphin spp. (Chapter 11 Marine Mammals, Section 11.6.3.2) has also been undertaken as a precautionary approach to disturbance; the limitations of this approach have been stated in Section 6.1.5.1. As dolphins are in a different functional hearing group to harbour porpoise this approach was very likely to over-estimate the number of individuals likely to be potentially disturbed.</p>
18	<p>In Paragraph 11.285, the Waggitt <i>et al.</i>, (2019) harbour porpoise densities (which are lower than the survey densities), have been used in place of the project-specific densities when applying the dose/response curve to determine number of harbour porpoise disturbed. A detailed justification from an</p>	<p>It would be an unrealistic worst-case if the site-specific summer density were applied, for example to the dose-response curve, across the full spread of the modelled contour ranges. The justification for this approach was based on a comparison of harbour porpoise densities from Morgan (0.247 animals/km²), Mona (0.097</p>

Ref	Comment	Project response/where addressed in the ES
	<p>ecological perspective is required to support the proposed use of dual densities. Alternatively, to avoid the complexities of using two densities in the assessment, NRW (A) have previously advised the use of densities taken from the newest version of the Marine Mammal Atlas (Evans & Waggitt, 2023), which are based on 30 years of sightings data</p>	<p>animals/km²), Awel y Môr (0.395 animals/km²) and SCANS block CS-E (0.5153 animals/km²) which gave evidence that the surrounding area had much lower densities and thus the application of dual densities was more representative of the wider area. The 5dB noise contour levels covered most of the Liverpool Bay area (see Figure 6.1 and 6.2) and even spread in to the neighbouring SCANS block, thus incorporating the area covered by other OWFs where lower densities have been measured.</p> <p>Thus, the site-specific summer density within the contours of the windfarm site and 10km buffer have been used, and for all noise contours beyond 10km buffer the density estimate from the worst-case wider density has been applied to the dose-response curve assessment.</p>
19	<p>Paragraph 11.288: NRW (A) believe that the dose/response relationship for harbour seal from Whyte <i>et al.</i>, (2020) has been applied incorrectly. In this instance, it is being proposed that the 180 dB SELs annulus is used as the threshold for disturbance, despite Table V of Whyte <i>et al.</i>, (2020) presenting the respective % changes in density between 180 dB to 115 dB SELs at intervals of 5 dB. Significant changes were recorded down to the 145–150 dB SELs interval, which means that the proposal here is highly under-precautionary. NRW (A) strongly recommend that the dose/response relationship is applied correctly, and the assessment and any related conclusions are revised / updated.</p>	<p>To clarify, the Whyte <i>et al.</i> (2020) dose-response curve threshold for disturbance has been applied at 5db increments from 120dB to 200 dB SEL in Chapter 11 Marine Mammals, Section 11.6.3.2.</p> <p>At 145dB SEL 36.37% of individual have been predicted to be disturbed. This percentage increased at every 5dB SEL increment, up to 180dB SEL, at which point 100% of individual were predicted as likely to be disturbed.</p> <p>As per the evidence provided in Whyte <i>et al.</i> (2020), at SEL levels below 145dB SEL no significant change in mean density was predicted.</p>
20	<p>Section 11.6.3.3: TTS and disturbance from underwater noise during other construction activities, Paragraph 11.325 states that if the response to underwater noise from other construction activities is displacement from the area, and that animals will return once the activity is completed, then the potential for any significant disturbance effects on marine mammals is unlikely. The above has considered displacement</p>	<p>Noted. In agreement with the concerns regarding behavioural responses that did not involve moving away, displacement from the area altogether would be and has been considered as the worst-case. Chapter 11 Marine Mammals, Section 11.6.3.3 has been considered with other behavioural responses to underwater noise from construction activities.</p>

Ref	Comment	Project response/where addressed in the ES
	<p>as the only metric of disturbance and overlooks behavioural responses and costs to energy balances that do not involve moving away from an area, or physiological responses that typically have no visible, external indicator and are thus not readily detectable in free-ranging animals. Existing literature shows, for example, that tagged harbour porpoises responded to fast ferry passages and vessel noise by making deeper dives, increasing swimming effort, and ceasing echolocation and foraging for several minutes (Wisniewska <i>et al.</i>, 2018). Although these individuals lived in highly trafficked coastal waters, they did not seem to have habituated to vessel noise (Wisniewska <i>et al.</i>, 2018). Similar findings were made by, e.g. Pirotta <i>et al.</i>, (2013, 2015), Dyndo <i>et al.</i>, (2015), Oakley <i>et al.</i>, (2017), Marley <i>et al.</i>, (2017a, 2017b) and Rojano-Doñate <i>et al.</i>, (2023)</p>	<p>Whilst the assessment returned values well below the 1% temporary disturbance magnitude threshold, it seemed that the use of TTS and the application of a 4km disturbance range for each construction activity (or vessel) is highly precautionary enough. Although there may be the possibility of animals altering their behaviour (other than being displaced), it would only be short term. Fernandez-Betelu <i>et al.</i> (2024) found that in relation to decommissioning activities, harbour porpoise were only displaced up to 2km, in line with Benhemma-Le Gall <i>et al.</i> (2021). As such, using the 4km radius seem appropriate to also cover possible behavioural effects, other than that of complete displacement. Further, the research noted that harbour porpoise returned to the area immediately after the activities ceased (Fernandez-Betelu <i>et al.</i>, 2024).</p>
21	<p>Tables 11.37, 11.38, 11.39 and 11.42, show the predicted impact ranges as a point source for a single day of disturbance and the numbers impacted (compared against the Mammal Unit population). Any conclusions on the magnitude of effect are therefore based on a point source over a single day. Similarly, geophysical and seismic surveys have been shown as point sources in the assessment. NRW (A) disagree with this approach as it does not take into account the area covered per day, or the numbers impacted over the construction period.</p>	<p>Geophysical and seismic survey assessments have been updated to moving (Chapter 11 Marine Mammals), rather than point sources. It should be noted, that this was a highly precautionary approach, as at some point in the day, marine mammals would recover from the disturbance and return to the area, rather than staying away for the whole day, which is what the moving source assessment assumes.</p>
22	<p>Paragraph 11.382 suggests using a disturbance impact range of 2 km for construction vessels although no evidence or explanation has been provided to justify this choice over the 4 km impact range mentioned in Paragraphs 11.345, 11.346 and 11.376. NRW (A) recommend using a 4 km impact range, based on observations from Benhemma-Le Gall <i>et al.</i>, (2021).</p>	<p>Benhemma-Le Gall <i>et al.</i> (2021) indicated that at 4km distance to a vessel, harbour porpoise presence was nearly constant at a probability of $p=0.4$ at all vessel intensity levels, indicating that the vessel did not affect the animals. However, at 2km distance from the vessel, the probability of occurrence decreased (with vessel intensity) by ~34%, meaning that the animals were responding to the vessel disturbance and avoided the area.</p>

Ref	Comment	Project response/where addressed in the ES
		However, as a precautionary approach, 4km has been used in ES Chapter 11 (Section 11.6.3.4 and 11.6.4.4) for assessing disturbance from vessels.
23	<p>Paragraphs 11.390, 11.399, 11.402-3: With reference to Section 11.6.3.5 Barrier effects caused by underwater noise, Paragraphs 11.390, 11.399, 11.402-3, evidence needs to be provided to support the statement that the windfarm site is not located on any known migration routes of marine mammals. Given the presence of a haul-out site in the Dee estuary, the potential for barrier effects to impact grey seal movement towards the haul-out site needs to be considered and adequately assessed. Given the impact ranges quoted for Paragraph 11.402, evidence should be provided to support the statement that there would be no potential for barrier effects between the windfarm site and the coast (30 km) as a result of underwater noise. A sufficiently detailed and justified assessment for barrier effects should be carried out.</p>	Noted. The evidence in Chapter 11 Marine Mammals , Section 11.6.3.5 has been reviewed, and the assessment adjusted where appropriate.
Section 11.7 Cumulative Effects		
24	<p>The project-specific impact distances calculated for this Project have been taken as 'standard' and applied to all other projects that may act in-combination. NRW (A) advise that for all projects that have been scoped in, the impact distances obtained from project-specific assessments should be used.</p> <p>There is a mismatch in the spatial scales of the assessment. Only the numbers impacted by projects within the screening area have been considered, and these have been presented as a percentage of the total Celtic and Irish Sea (CIS) Mammal Unit (MU) population. Thus, there is a risk that cumulative impacts could be downplayed as a result.</p>	<p>Project-specific impact ranges were used wherever possible and publicly available data (e.g PEIRs for Morgan, Mona, etc; ESs for White Cross and Awel y Môr) have been assessed but where such information was not available in the public domain, known distances from literature were applied.</p> <p>The CEA has been updated to include all projects within the CIS in Chapter 11 Marine Mammals, Section 11.7 and Appendix 11.4.</p>

Ref	Comment	Project response/where addressed in the ES
25	In Paragraph 11.701, it has been concluded that 5.09% is not significant due to it being “only 0.09% over the threshold” for a significant effect. The proposal suggested here is to disregard a threshold of significance set out at the start of the report and as such, NRW (A) strongly advise recognising / acknowledging that there has been a potentially significant impact.	Agreed and updated in Chapter 11 Marine Mammals .
26	The Cumulative Affects assessment and conclusions appear to have been based on simultaneous impact (i.e. activities occurring at the same time) rather than cumulative impact where multiple projects additively contribute to the total stressor load of a population over time. NRW (A) advise that this should be re-assessed, and we strongly recommend doing this by conducting population modelling (as has been carried out for the Mona and Morgan OWF Projects). For assessing cumulative effects from piling, NRW (A) recommend the methodology used in the Scottish Natural Heritage (SNH) Report 1081 (Carter <i>et al.</i> , 2019) as an example.	Population modelling (iPCoD) has been undertaken for the ES in line with the SNH Report 1081 (Smith <i>et al.</i> , 2019), and takes into account PTS and disturbance resulting from pile driving at multiple projects over time.
Appendix 11.1 Underwater Noise Assessment		
27	Section 5.3.2: With reference to Section 5.3.2, Estimation of underwater noise propagation, NRW (A) agrees that at ranges over several kilometres, impulsive noise gradually loses its impulsive characteristics (Hastie <i>et al.</i> , 2019; Martin <i>et al.</i> , 2020). The range at which this occurs is dependent on the metric used. However, the current consensus is that we do not yet have enough data about these changes in impulsive character to be able to apply them to impact assessments (Southall, 2021), although further work is ongoing (e.g. through the Offshore Renewables Joint Industry Programme’s (ORJIPs) Range Dependent nature of Impulsive Noise (RaDIN) project). Therefore, NRW (A) recommend that until further evidence is available, a precautionary assumption should be made that	Subacoustech agreed with NRW’s interpretation. The modelled impact ranges with impulsive characteristics have been included for all ranges and have been used as the worst-case Appendix 11.1 , but should be viewed with an awareness that these may well have been over precautionary.

Ref	Comment	Project response/where addressed in the ES
	impulsive noise keeps its impulsive characteristics (i.e. short duration, rapid onset, high amplitude) as it propagates away from the source, thus avoiding any potentially premature conclusions.	
28	NRW seek clarification as to why the conclusion has been made that “This consideration may begin at 3.5 km.” Given that in their analysis, Hastie <i>et al.</i> , (2019) found that some “characteristics changed markedly within ranges of ~10 km, and that the mean probability of exceeding criteria 1 and 2 was <0.5 at ranges >3.5 km. In contrast, the mean probability of exceeding criteria 3 remained >0.5 up to ~37.0 km, and the mean probability of exceeding criteria 4 remained <0.5 throughout the range.” Here criteria 1-4 refer to four metrics selected as measures of impulsivity where (1) rise time <25 ms; (2) quotient of peak pressure and pulse duration >5,000 Pa/s; (3) duration <1 s; (4) crest factor >15 dB	NRW was correct that there are many ways to define an ‘impulsive’ noise and that research into this was ongoing. There was no definitive conclusion to this. Subacoustech’s understanding of impulsive wave characteristics that were most likely to lead to direct harm or injury were a high noise level with rapid rise time, more than a relatively arbitrary pulse duration such as 1s, or the crest factor. Therefore, the suggested 3.5 km was probably the most indicative of where this consideration could begin. As per line above, the modelled impact ranges with impulsive characteristics have been included for all ranges and have been used as the worst-case Appendix 11.1 , but should be viewed with an awareness that these may well have been over precautionary.
Appendix 11.2 Marine Mammal Information and Survey Data		
29	With reference to Section 1.1.2 Study area, Paragraph 1.9, NRW (A) agree that the boundary used to capture the range and connectivity of the grey seal population is sufficiently large and is also large (and pragmatic) enough for other cetacean species	Noted, no further action.
30	Regarding the use of seal MU’s and their cumulative population estimates for grey seal, NRW (A) note that there is some disagreement about the appropriateness of their boundaries which only extend to UK waters, especially in SW Britain where photo-ID data and recent telemetry studies demonstrate movements of seals not only around the Irish Sea, but also encompassing Southwest England, Northwest	The Applicant acknowledges the provided evidence supporting the knowledge of wide ranges exhibited by grey seals. For the ES the assessment therefore included the reference populations from relevant MUs (including Republic of Ireland) that have been understood to be the most representative of this behaviour and supported by tagging data. As the assessment was not using the OSPAR region III as the baseline population in the CEA assessment,

Ref	Comment	Project response/where addressed in the ES
	France and Ireland (Vincent <i>et al.</i> , 2017, Russell <i>et al.</i> , 2019, Carter <i>et al.</i> , 2020, Langley <i>et al.</i> , 2020; Luck <i>et al.</i> , 2020).	only projects within the associated MUs have been screened in and assessed.
31	NRW (A) note that in Section 1.3 Site-specific surveys, Paragraph 1.35, only one year of baseline survey data has been presented so far, however, the applicant has acknowledged that densities may potentially change for the final environmental statement.	Noted. Two-year survey data has been analysed and taken forward to the ES baseline in Section 3 of Appendix 11.2 .
32	Similar to our comments in Paragraph 12 above, NRW (A) note in Section 1.3.2 Density estimates for harbour porpoise, Paragraph 1.49, reference to Waggitt <i>et al.</i> , (2019) for absolute densities of cetaceans other than harbour porpoise in the Project area, although the authors stated that their paper should not be used for absolute densities in this way	For harbour porpoise, the site-specific density data has been taken forward for the ES as outlined in Sections 3 and 5 of Appendix 11.2 . For all other cetacean species, the highest density from a range of sources was applied to the assessment. These included SCANS-IV, Evans and Waggitt (2023) and Waggitt <i>et al.</i> (2019). The latter two were also applied across the area of the SCANS block F (in which the Project is located), which has presented the worst-case for Risso's dolphin, common dolphin and white-beaked dolphin.
33	Regarding Section 1.4 Existing environment, Paragraph 1.56, as noted above, NRW (A) advise the use of Evans and Waggitt (2023) over Waggitt <i>et al.</i> , (2019)	The use of the more recent data by Evans and Waggitt (2023) has been reviewed and applied where appropriate. The new SCANS-IV survey was published in Q4 2023 which has been reviewed, and densities compared. There were limitations to all the sources which have been discussed in Chapter 11 Marine Mammals , Section 11.4.6 and as a precautionary approach, the density estimates for each marine mammal species were based on the highest for the area, based on available data sources.
34	Paragraph 1.143 Grey seal population counts, NRW (A) query the origin of the 0.2515 correction factor used for grey seal.	The correction factor was taken from the latest SCOS (2021) report (p.114): "[...] using the mean estimated proportion of the population hauled out during the survey window, and thus available to count, from telemetry data: [...] 0.2515 for grey seals (SCOS-BP 21/02)"
35	NRW (A) disagree in Paragraph 1.164 Review of potential disturbance from underwater noise during piling, that "there are	The Applicant acknowledges that there have been several studies, however, there was lack of agreement on disturbance ranges.

Ref	Comment	Project response/where addressed in the ES
	currently no agreed thresholds or criteria for the behavioural response and disturbance of marine mammals”. Please refer to the source material outlined in our comments in Paragraph 15 of the current document	Whereas the JNCC report No. 654 (to which NRW PS017 makes reference) was quite clear on the use of EDRs, the Tougaard (2021) report made no reference to behavioural disturbance, only TTS & PTS. Heinis <i>et al.</i> , 2019 reported that “there is as yet no international or national consensus in this respect (i.e prediction of behavioural responses)”. Refer to the response to NRW comment 15 for more detail.
Appendix 11.4 Marine Mammal CEA Project Screening		
36	With reference to Section 1.2.5 Screening area considered in the CEA, Paragraph 1.19, please refer to our comments in Paragraph 30 of the current document regarding the appropriateness of the boundaries relevant to Seal Management Units	The Applicant acknowledges the provided evidence supporting the knowledge of wide ranges exhibited by grey seals. For ES the assessment therefore included the reference populations from relevant MUs (including Republic of Ireland) that were understood to be the most representative of this behaviour. The OSPAR region III was not being used as the baseline population in the CEA assessment, and as such only projects within the associated MUs have been screened in and assessed.
37	With reference to Section 1.3.1 Underwater noise from operational offshore wind turbines, Paragraphs 1.24–5, NRW (A) disagree with the conclusion to screen out operational noise both for the Project-alone as well as cumulatively. Stöber and Thomsen (2021) found indications that behavioural impact areas from larger size wind turbines could overlap and the whole wind farm might thus be considered an impact area, despite the relatively small impact radius for a single turbine. They concluded that for larger size wind turbines (i.e. of relevance to the Mona, Morgan and Morecambe OWF projects), operational noise needs to be considered in sufficient detail as a part of the EIA. Given the presence of multiple windfarms in close proximity, NRW (A) consider the decision to screen out this pathway from the cumulative assessment in particular, as under-precautionary.	An assessment for Project-alone and cumulative impacts of operational wind turbines has been included in Chapter 11 Marine Mammals based on a review of OWFs in the CIS MU, for those projects that have become operational after the start of the baseline surveys in March 2021 and prior to construction at the Project. Based on a literature review and underwater noise modelling, the impact from operational turbines was expected to be very low; the ranges were modelled below <100m TTS and PTS, and would therefore not overlap with a neighbouring turbine noise contours.

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