MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Outline Marine Mammal Mitigation Protocol

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Glossary

Term	Meaning
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Ltd. (Morecambe OWL).
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Ensonified	Filled with sound.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Generation Assets	The generation assets associated with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm include the offshore wind turbines, inter-array cables, offshore substation platforms and platform link (interconnector) cables to connect offshore substations.
Impact	Change that is caused by an action/proposed development, e.g. land clearing (action) during construction which results in habitat loss (impact).
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bays inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
Marine Licence	The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities. Section 149A of the Planning Act 2008 allows an applicant for to apply for ‘deemed marine licences’ in English waters as part of the development consent process.
Maximum Design Scenario	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Transmission Assets.
Mean High Water Springs	The height of mean high water during spring tides in a year.
Mean Low Water Springs	The height of mean low water during spring tides in a year.
Morecambe Offshore Windfarm: Generation Assets	The offshore generation assets and associated activities for the Morecambe Offshore Windfarm.
Morecambe Offshore Windfarm: Transmission Assets	The offshore export cables, landfall, and onshore infrastructure required to connect the Morecambe Offshore Windfarm to the National Grid.

Term	Meaning
Morecambe OWL	Morecambe Offshore Wind Limited is a joint venture between Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company) and Flotation Energy Ltd.
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The offshore and onshore infrastructure connecting the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the national grid. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds. Also referred to in this report as the Transmission Assets, for ease of reading.
Morgan Offshore Wind Project: Generation Assets	The offshore generation assets and associated activities for the Morgan Offshore Wind Project.
Morgan Offshore Wind Project: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morgan Offshore Wind Project to the National Grid.
Morgan OWL	Morgan Offshore Wind Limited is a joint venture between bp Alternative Energy Investments Ltd. And Energie Baden-Württembery AG (EnBW).
National Grid Penwortham substation	The existing National Grid substation at Penwortham, Lancashire.
National Policy Statement(s)	The current national policy statements published by the Department for Energy Security and Net Zero in 2023 and adopted in 2024.
Offshore Elements	The offshore export cables of the Transmission Assets which are seaward of Mean Low Water Springs.
Offshore export cables	The cables which would bring electricity from the Generation Assets to the landfall.
Offshore Order Limits	See Transmission Assets Order Limits: Offshore (below).
Permanent Threshold Shift	Refers to a total or partial loss of hearing at a particular frequency, or frequency range, caused by acoustic trauma.
Pre-construction	The phases of the Project before construction takes place.
Sound Exposure Levels	The representation of a noise event if all the energy were compressed into a one second period. This provides a uniform way to make comparisons between sound events of different durations.
Statutory consultee	Organisations that are required to be consulted by an applicant pursuant to section 42 of the Planning Act 2008 in relation to an application for development consent. Not all consultees will be statutory consultees (see non-statutory consultee definition).
Transmission Assets	See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above).
Transmission Assets Order Limits: Offshore	The area within which all components of the Transmission Assets seaward of Mean Low Water Springs will be located, including areas required on a temporary basis during construction and/or decommissioning. Also referred to in this report as the Offshore Order Limits, for ease of reading
Underwater sound	Sound waves made underwater.

Acronyms

Acronym	Meaning
ADD	Acoustic Deterrent Devices
ASV	Automated Surface Vehicle
DCO	Development Consent Order
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EOD	Explosive Ordnance Disposal
HF	High Frequency
IUCN	International Union for Conservation of Nature
IEMA	Institute of Environmental Management and Assessment
JNCC	Joint Nature Conservation Committee
LF	Low Frequency
MBES	Multi-Beam Echo-sounder
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMMP	Marine Mammal Mitigation Protocol
MMOb	Marine Mammal Observer
MMO	Marine Management Organisation
NAS	Noise Abatement System
NEQ	Net Explosive Quantity
PAM	Passive Acoustic Monitoring
PCW	Phocid Carnivores in Water
PEIR	Preliminary Environmental Information Report
PTS	Permanent Threshold Shift
SBES	Single Beam Echosounder
SBP	Sub-Bottom Profiler
SEL_{cum}	Cumulative Sound Exposure Level
SNCB	Statutory Nature Conservation Body
SPL_{pk}	Peak Sound Pressure Level
SSS	Sidescan Sonar

Acronym	Meaning
UHRS	Ultra-High Resolution Seismic
UK	United Kingdom
UXO	Unexploded Ordnance
VHF	Very High Frequency

Units

Unit	Description
%	Percentage
µPa	Micropascal (10-6)
dB	Decibel
g	Gram
kg	Kilogram
kHz	Kilohertz
km	Kilometre
km^2	Kilometre squared
m	Metre
m/s	Metres per second
min	Minute
MW	Megawatt
nm	Nautical mile
rms	Root mean square

1 Outline Marine Mammal Mitigation Protocol (MMMP)

1.1 Background

1.1.1 Introduction

1.1.1.1 This document forms the Outline Marine Mammal Mitigation Protocol (MMMP) prepared for the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (referred to hereafter as 'the Transmission Assets').

1.1.2 Project overview

1.1.2.1 Morgan Offshore Wind Limited (Morgan OWL), a joint venture between bp Alternative Energy Investments Ltd. (bp) and Energie Baden-Württemberg AG (EnBW), is developing the Morgan Offshore Wind Project. The Morgan Offshore Wind Project is a proposed wind farm in the east Irish Sea.

1.1.2.2 Morecambe Offshore Windfarm Ltd (Morecambe OWL), a joint venture between Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company) (Cobra) and Flotation Energy Ltd., is developing the Morecambe Offshore Windfarm, also located in the east Irish Sea.

1.1.2.3 Morgan OWL and Morecambe OWL (the Applicants), being in agreement with the output from the Holistic Network Design Review, are jointly seeking a single consent for their electrically separate Transmission Assets comprising aligned offshore export cable corridors to landfall and aligned onshore export cable corridors to separate onshore substation(s), and onward connections to the National Grid at Penwortham, Lancashire.

1.1.2.4 The purpose of the Transmission Assets is to connect the Morgan Offshore Wind Project: Generation Assets and Morecambe Offshore Windfarm: Generation Assets (referred to collectively as the 'Generation Assets') to the National Grid. The key components of the Transmission Assets include offshore element, landfall and onshore elements. Details of the activities and infrastructure associated with the Transmission Assets are set out in Volume 1, Chapter 3: Project description of the Environmental Statement (ES) (document reference: F1.3).

1.1.2.5 This Outline MMMP has been developed for the offshore elements of the Transmission Assets (i.e. the offshore export cables), seaward of Mean High Water Springs (MHWS).

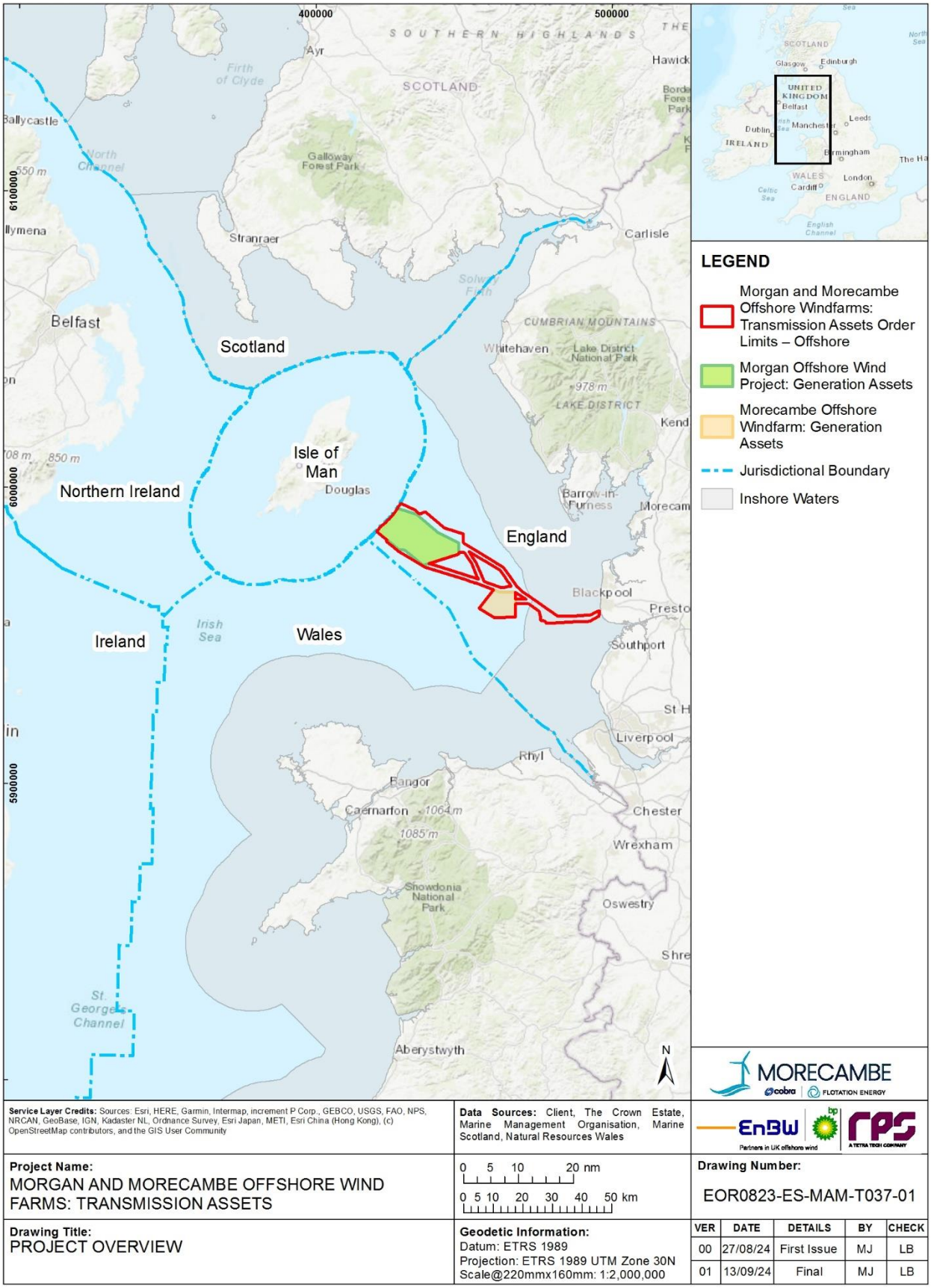

Figure 1.1: Project overview

1.1.3 Purpose of the Outline Marine Mammal Mitigation Protocol

1.1.3.1 The primary aim of this Outline MMMP is to propose planned measures for UXO clearance to reduce the risk of Permanent Threshold Shift (PTS) auditory injury to any marine mammal to negligible levels. f

1.1.3.2 The Outline MMMP sets out a review of primary measures and potential secondary measures for injurious effects as a result of underwater sound due to UXO clearance to reduce the magnitude of any residual effects (that cannot be fully mitigated by embedded mitigation measures) to a non-significant level.

1.1.3.3 Information presented in this Outline MMMP is based on Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4) and focuses on the measures adopted as a part of the Transmission Assets in line with recent guidance (Joint Nature Conservation Committee (JNCC), 2010).

1.1.4 Structure of this document

1.1.4.1 This document is set out as follows.

- **Section 1.1**: presents a background to the MMMP.
- **Section 1.2 and 1.3**: presents how the MMMP will be implemented and measures adopted, respectively.
- **Section 1.4**: presents the key species and potential impacts.
- **Section 1.5**: presents outline mitigation that may be employed for UXO clearance.

  Section 1.6: presents an outline of the next steps following the confirmation of relevant parameters.
- **Section 1.7**: presents the references used.

1.2 Implementation

1.2.1.1 Following the granting of consent for the Transmission Assets, detailed MMMPs will be prepared on behalf of Morgan OWL and Morecambe OWL, prior to commencement of the relevant stage of works. The detailed MMMPs will require approval by the Marine Management Organisation (MMO) following consultation with relevant stakeholders.

1.2.1.2 The Applicants have committed to implementation of the MMMPs via the following commitment, CoT64 (in **Table 1.1**), and is secured for UXO clearance by inclusion of condition 20(1)(b) of the draft Development Consent Order (DCO) Schedules 14 and 15 (document reference C1). Below sets out the condition wording for condition 20(1):

1.2.1.3 *20.—(1) No removal or detonation of unexploded ordnance can take place until the following have been submitted to and approved in writing by the MMO in consultation with the relevant statutory nature conservation body and, in respect of the method statement, the MCA—*

(b) a marine mammal mitigation protocol in accordance with the outline marine mammal mitigation protocol, the intention of which is to prevent injury to marine mammals, following current best practice as advised by the relevant statutory nature conservation body.

1.2.1.4 The Transmission Assets may adopt a staged approach to the approval of DCO requirements. This will enable requirements to be approved in part or in whole, prior to the commencement of the relevant stage of works in accordance with whether staged approach is to be taken to the delivery of the each of the offshore wind farms.

1.2.1.5 For offshore elements seaward of MHWS, this approach will be governed by the inclusion of condition 12 of Schedules 14 and 15 of the draft DCO, which requires a written scheme detailing the stages of construction for Project A or Project B to be submitted for approval by the MMO prior to the commencement of the licensed activities.

1.3 Measures adopted as part of the Transmission Assets (commitments)

1.3.1.1 The measures adopted as a part of the Transmission Assets which are relevant to potential injurious effects of underwater sound due to UXO clearance are described in **Table 1.1.**

Table 1.1: Measures (commitments) adopted as part of the Transmission Assets

Commitment number	Measure adopted	How the measure will be secured
Embedded measures		
CoT64	Detailed Marine Mammal Mitigation Protocols (MMMPs) will be developed and implemented in accordance with the Outline MMMP, to reduce the risk of injury to marine mammals. The Detailed MMMP(s) will include measures to apply in advance of UXO clearance. The Detailed MMMP(s) will include for the use of low order techniques, where possible, as the primary mitigation measure alongside other measures. The detailed MMMP(s) will be approved by Marine Management Organisation, in consultation with Natural England.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(g) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition18(1)(g) (Pre-construction plans and documentation)

1.4 Key species and potential impacts

1.4.1.1 Seven key marine mammal species were identified within the regional marine mammal study area encompassing the Irish Sea and the Celtic Sea (for more information see Volume 2, Annex 4.1: Marine mammal technical report of the ES, document reference F2.4.1):

- harbour porpoise,
- bottlenose dolphin,
- minke whale,
- short-beaked common dolphin,
- Risso's dolphin,
- grey seal, and
- harbour seal.

1.4.1.2 These marine mammals may experience auditory injury from elevated underwater sound as a result of:

- UXO clearance during the pre-construction phase of the Transmission Assets (**Section 1.5**).

1.4.1.3 It is anticipated that up to 25 UXOs within the Transmission Assets Order Limits: Offshore, may require clearance (i.e. 22 at the Morgan Offshore Wind Project: Transmission Assets; three at the Morecambe Offshore Windfarm: Transmission Assets) as detailed in **Table 1.2**).

Table 1.2: Maximum Design Scenario for UXO clearance.

Parameter	UXO MDS		
	Morgan Offshore Wind Project: Transmission Assets	Morecambe Offshore Windfarm: Transmission Assets	Transmission Assets Total
Number of UXOs expected to be cleared within the Transmission Assets	22	3	25
High order			
High order clearance UXO	From 25 kg to 907 kg (absolute maximum), with 130 kg the most likely (common) maximum		
High order donor charges			
High order clearance detonation donor charges	1.2 kg (most common) and 3.5 kg (single barracuda blast charge)		
NEQ clearance shot	0.5 kg		
Low order			
Low order clearance charge	0.08 kg		
Low yield clearance configurations	Up to four charges of 0.75 kg		

1.4.1.4 UXO clearance injury ranges are presented in **Table 1.3** (low order and low yield UXO), **Table 1.4** (high order donor charges) and **Table 1.5** (high order UXO detonation) (for more information see Volume 2, Chapter 4: Marine mammals of the ES, document reference: F2.4).

Please note that injury ranges presented in the tables do not include application of tertiary (embedded) mitigation which is discussed in more detail in **sections 1.5**.

Table 1.3: Potential impact (PTS) ranges for low order and low yield UXO clearance activities.

Charge Size	PTS range (m)				
	Threshold	VHF	HF	LF	PCW
0.08 kg low-order donor charge	SPL_{pk}	685	40	122	135
	SEL_{cum}	190	2	47	9
0.5 kg clearing shot	SPL_{pk}	1,265	73	223	247
	SEL_{cum}	421	4	115	22
2 x 0.75 kg low-yield charge	SPL_{pk}	1,820	105	322	357
	SEL_{cum}	650	7	196	38
4 x 0.75 kg low-yield charge	SPL_{pk}	2,290	133	406	449
	SEL_{cum}	840	10	275	53

Table 1.4: Potential impact (PTS) ranges for donor charges used in high order UXO clearance activities.

Charge Size	PTS range (m)				
	Threshold	VHF	HF	LF	PCW
1.2 kg	SPL_{pk}	1,690	98	299	331
	SEL_{cum}	596	6	176	34
3.5 kg	SPL_{pk}	2,415	140	427	473
	SEL_{cum}	885	10	297	57

Table 1.5: Potential impact (PTS) ranges for high order UXO detonation.

Charge Size	PTS range (m)				
	Threshold	VHF	HF	LF	PCW
25 kg UXO	SPL_{pk}	4,645	268	825	910
	SEL_{cum}	1,645	27	775	147
130 kg UXO	SPL_{pk}	8,045	464	1,425	1,580
	SEL_{cum}	2,520	61	1,705	323
907 kg UXO	SPL_{pk}	15,370	890	2,720	3,015
	SEL_{cum}	3,820	151	4,215	800

1.5 UXO clearance

1.5.1 Mitigation zone

1.5.1.1 The mitigation zone is defined as the area over which pre-start monitoring will be undertaken to record the presence of marine mammals. If marine mammals are recorded within the mitigation zone during the pre-start search, the operations will be delayed until such a time as there have been no sightings of marine mammals and/or acoustic recordings of marine mammals within the mitigation zone for a minimum of 20 minutes (regardless of the type of UXO clearance).

1.5.1.2 Whilst the Applicants have committed to the prioritisation of low order clearance methods, where possible (CoT64, see **Table 1.1**), the mitigation zone will be determined considering the largest injury zone across all species as per **Table 1.5**.

1.5.2 Marine Mammal Observers (MMOb)

1.5.2.1 Dedicated[1] and trained MMObs will be used to survey the mitigation zone at any one time and conduct the pre-start searches and post detonation searches in the case of UXO clearance. The MMObs will be JNCC certified and have an appropriate level of field experience (i.e. a minimum of one year's MMObs experience on offshore projects).

1.5.2.2 A minimum number of MMObs will be agreed with the MMO (as the licensing authority) post-consent. MMObs should be present in sufficient numbers to ensure that monitoring is not compromised by fatigue. MMObs will carry out pre-start monitoring from an appropriate elevated platform that allows 360° visualisation (full coverage of the mitigation zone) and record all relevant information, including the start and end times of monitoring. Environmental conditions such as sea state, weather, and visibility, as well as any marine mammal sightings, will also be documented according to JNCC marine mammal recording forms and guidelines. If relevant, any noticeable behavioural changes in animals in response to ADD activation, such as change in direction of travel, will be recorded.

1.5.2.3 The MMObs will be equipped with reticule binoculars and marine mammal reporting forms and will be capable of determining the extent of the search zone in relation to their viewing platform. A range stick may be used to aid the estimation of distance of the sighting from the survey vessel. The lead MMObs should also be equipped with a two-way radio to ensure communication with both the vessel crew and the PAM Operator. This is to allow any visual or acoustic detections of marine mammals in the mitigation zone and any subsequent delay required to the commencement of surveying to be communicated quickly and effectively between all parties. MMObs will communicate

[1] A dedicated MMOb is defined as an observer with sole role on board of conducting visual watches for marine mammals.

any detections of marine mammals with the PAM Operator as part of the procedures set out in this Outline MMMP.

1.5.2.4 The precise information pertaining to MMObs and the methods they employ will be revised and specified in the detailed MMMP(s), taking into consideration any updated guidance and available resources at the time.

1.5.3 Passive Acoustic Monitoring (PAM)

1.5.3.1 The requirement for PAM will be agreed with the MMO post-consent once relevant activity parameters are known and will be set out in the detailed MMMP(s).

1.5.3.2 Where PAM moinitoring is required, the PAM Operator will be suitably trained in passive acoustic monitoring and the use of PAMGuard software, with training having been provided by an appropriate organisation. As per the JNCC PAM guidance (2023), all PAM operatives undertaking marine mammal mitigation will be trained on how to implement the JNCC mitigation guidelines (having undertaken formal training on a JNCC approved course).

1.5.3.3 A PAM Operator will acoustically track vocalising marine mammals using a hydrophone, deployed to a suitable depth from the operation vessel. The PAM system chosen will be able to detect the required species (JNCC, 2023). The hydrophone data will be monitored by the PAM Operator via a computer interface using the software PAMGuard. This allows the PAM Operator to detect vocalisations, and signal strengths give an indication of the position of the animal relative to the hydrophone (i.e. the signal becomes weaker as the animal moves further away).

1.5.3.4 The extent to which the PAM will be able to acoustically record marine mammals will depend on the equipment used, weather and the species present. PAM Operators will be responsible for compiling all the data on marine mammal observations, mitigation activities (including ADDs and soft start) and instances of noncompliance, for reporting to the MMO and the Marine Noise Registry.

1.5.3.5 The PAM Operator will communicate with the MMObs to ‘ground truth’ any detection of marine mammals to validate species identification and determine approximate position. The PAM Operator, together with the MMObs, will provide a detailed introduction during the pre-works introduction session/s to advise the offshore team on the implementation of the procedures set out in this Outline MMMP.

1.5.4 Acoustic Deterrent Devices (ADD)

1.5.4.1 The requirement for ADDs will be agreed with the MMO post-consent once relevant activity parameters are known and will be set out in the detailed MMMP(s).

1.5.4.2 Devices with the capability to deter animals from entering the mitigation zone, such as ADDs, may be employed in combination with visual and/or acoustic monitoring, for UXO clearance.

1.5.4.3 Where ADD is required, a trained and dedicated ADD Operators will be responsible for ADD maintenance, operation and reporting. The ADD Operator will be responsible for deploying the ADD, verifying the operation of the ADD before deployment, operating the ADD, ensuring that batteries are fully charged, and that spare equipment is available.

1.5.4.4 The ADD selected will be suitable for the target species and will be placed in the water in proximity to the UXO. ADD activation will commence at the start of pre-detonation search for a specified period (see **Table 1.6**) which depends on the UXO size, to minimise the introduction of additional sound.

1.5.4.5 The use of soft start charges will, however, be applied, if required, in addition to the ADD as these are considered to further reduce the risk of injury to harbour porpoise (see **section 1.5.5).**

Table 1.6: Minimum ADD duration for high order UXO clearance and associated displacement distance, showing whether the individual can move away from the injury range during ADD activation.

Hearing group	Maximum PTS Range (m)	Swim speed (m/s)	ADD duration (min)	Swim distance (m)	Move away?	ADD duration (min)	Swim distance (m)	Move away?
UXO size: up to 3.5 kg								
VHF (harbour porpoise)	2,415	1.5	15	1,350	No	27	2,430	Yes
HF (bottlenose dolphin, short-beaked common dolphin, Risso's dolphin)	140	1.52		1,368	Yes		2,462	Yes
MW	427	2.3		2,070	Yes		3,726	Yes
PCW	473	1.8		1,620	Yes		2,916	Yes
UXO size: 3.6 kg to 25 kg								
VHF (harbour porpoise)	4,645	1.5	15	1,350	No	52	4,680	Yes
HF (bottlenose dolphin, short-beaked common dolphin, Risso's dolphin)	268	1.52		1,368	Yes		4,742	Yes
MW	825	2.3		2,070	Yes		7,176	Yes
PCW	910	1.8		1,620	Yes		5,616	Yes
UXO size: 26 kg to 130 kg								
VHF (harbour porpoise)	8,045	1.5	15	1,350	No	60	5,400	No
HF (bottlenose dolphin, short-beaked common dolphin, Risso's dolphin)	464	1.52		1,368	Yes		5,472	Yes
MW	1,425	2.3		2,070	Yes		8,280	Yes
PCW	1,580	1.8		1,620	Yes		6,480	Yes

1.5.5 Soft start procedure

1.5.5.1 The requirement and application of soft start procedures will be agreed with the MMO post-consent, once UXO parameters are known, and will be set out in the detailed MMMP(s).

1.5.5.2 If required, to mitigate risk of injury to harbour porpoise (based on VHF injury ranges, as set out in **Table 1.6**) for a UXO between 26 kg to 130 kg, pre-detonation monitoring will be carried out as per the JNCC (2010) guidance.

1.5.5.3 For UXO sizes larger than 130 kg the use of NAS as an additional secondary mitigation technique will be considered as an option post-consent (see **section 1.5.7**).

1.5.6 Post detonation search

1.5.6.1 Following UXO detonation, the MMObs and PAM Operator (if present) will undertake a post detonation search of the mitigation zone for at least 15 minutes after the final detonation. The purpose of this search is to look for potential evidence of injury to marine life, including fish kills. Any other unusual observation will be noted.

1.5.6.2 **Figure 1.2** below provides an example of a sequence of events and the necessary lines of communication for implementing this Outline MMMP for high order UXO clearance. However, this may be varied and updated post-consent, in the detailed MMMP(s).

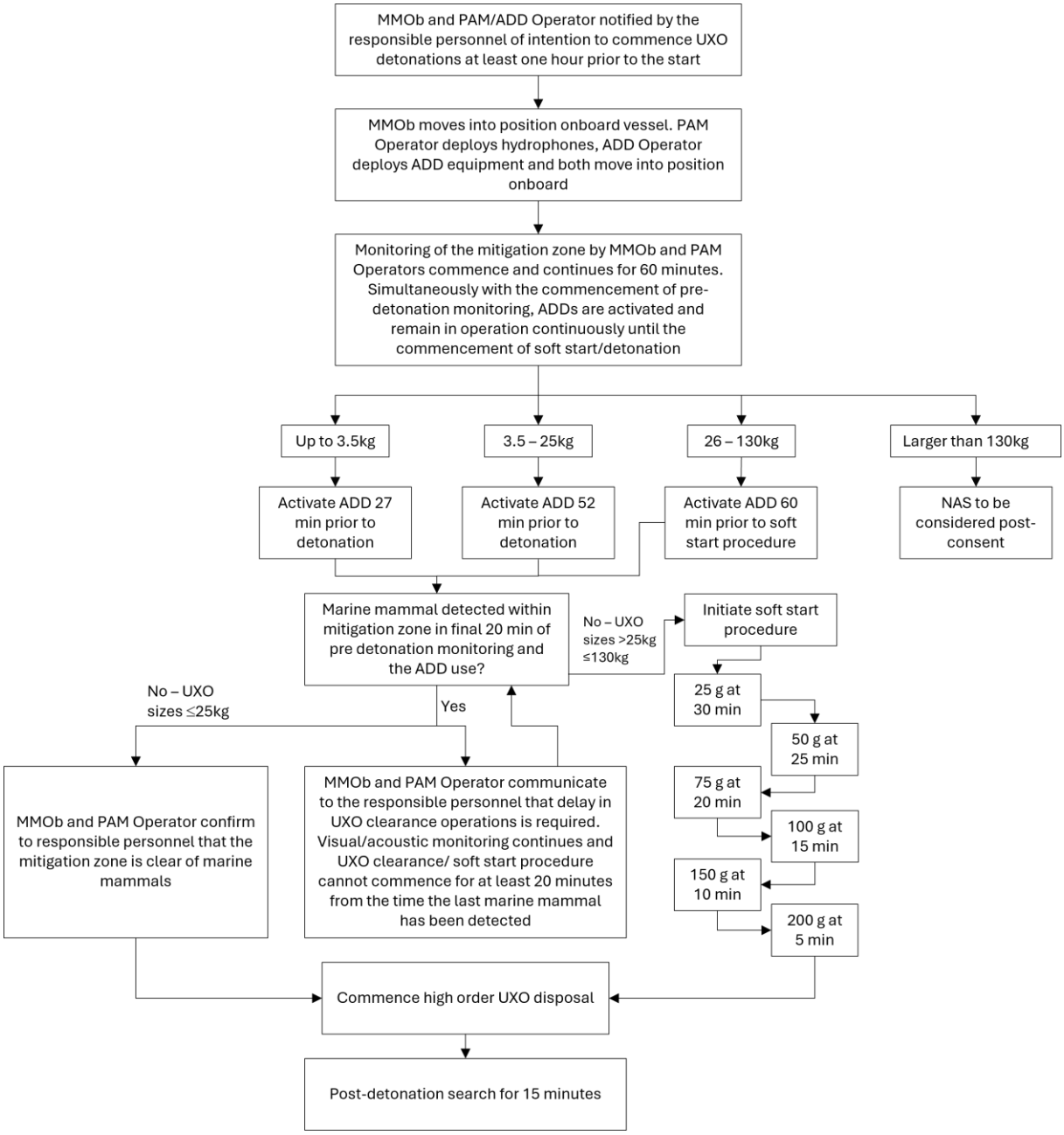

Figure 1.2: Example UXO clearance mitigation implementation for a high order clearance event.

1.5.7 Secondary mitigation measures for UXO clearance

1.5.7.1 This section of the Outline MMMP provides a summary of measures currently available or likely to be available in the future, which could be applicable to further reducing residual effects from underwater sound from UXO clearance if required.

1.5.7.2 The detailed MMMP(s) will set out which mitigation measures may be required, if at all, based upon any reduction in effects, which in turn, will be based on any refinements due to the identified UXO charge sizes, and clearance methodology.

1.5.7.3 As per the mitigation hierarchy and CoT64 in **Table 1.1**, where clearance of UXO is required (i.e. avoidance is not possible) the use of low order UXO clearance will be adopted where feasible (see **Table 1.3**).

1.5.7.4 The mitigation approach adopted is dependent upon the individual situations surrounding each UXO. A detailed UXO survey will be completed post-consent. The exact number of possible detonations and duration of UXO clearance operations is therefore not known at this stage.

1.5.7.5 Given that it is possible that high order detonation may be required, embedded mitigation measures to reduce the risk of injury from UXO clearance for UXOs up to a size of 130 kg are provided in this Outline MMMP as set out in **Table 1.6**. For higher charge sizes, additional secondary mitigation measures may be required. Secondary mitigation measures will be considered post consent and will be presented in each of the detailed MMMP(s).

1.5.7.6 Secondary mitigation measures that may be considered include:

- Relocation of UXOs - the suitability of a UXO for relocation depends on its condition (sufficiently structurally sound to remain intact) and location (as greater distances represent a higher safety risk, and factors such as weather need to be considered).
- Clustering of UXO devices - in circumstances of multiple UXO located in proximity, UXO may be relocated such that they can be disposed of in a single controlled detonation and therefore limit the total potential area of disturbance and the potential cumulative underwater sound exposure that would otherwise result from successive detonations of UXO devices in discrete areas.
- Temporal and spatial phasing – following pre-site investigation surveys, temporal and/or spatial phasing could be used for UXO clearance. UXOs could be detonated outside of critical times for species at risk of a significant residual effect (such as seasonal movements of bottlenose dolphin between Manx waters and Cardigan Bay (Howe, 2018)) or detonated sequentially, such that those furthest from key areas (such as SACs for harbour porpoise) are detonated first, and those closest to these areas detonated outside of key events.
- Sound reduction/NAS - sound reduction or NAS/noise mitigation systems are systems currently in use elsewhere or being developed and improved within the industry that enable a reduction of sound (dB) at source and could be considered for use following further investigation. It is likely that ‘far field’ systems such as Big Bubble Curtains) and Double Big Bubble Curtains could be applied if required.

1.5.8 Reporting

1.5.8.1 The mitigation compliance report will be submitted to the MMO after UXO clearance activity is completed. It will be accompanied by completed JNCC marine mammal recording forms in the original format (i.e. the raw data in the excel spreadsheets) and a copy of the relevant survey consent or licence.

1.5.8.2 This report may encompass, but is not limited to, the following.

- Brief details of the company awarded the consent or licence, relevant contractor details if appropriate, and the survey consent or licence reference number.
- Identification of all confirmed UXO, including estimated size, type, location and depth.
- Approach taken for each UXO, including dates, times, disposal method attempted (based on size and type, and number of donor charge(s) used).
- Details of any UXOs relocated.
- Presence, location, and activity of vessels during UXO clearance.
- Outcome of each UXO clearance, including evidence of high order detonation, clearing charges required, and method of debris and residue recovery.
- The mitigation procedures followed for each UXO clearance, including details of MMOb activities, and where required, PAM equipment and operation (including expected detection performance for the various species expected to be encountered), ADD duration and size and timing of soft start charges where required.
- All marine mammal sightings and completed JNCC marine mammal recording forms.
- Detailed descriptions of any technical problems encountered and what, if any, actions were taken as well as instances of non-compliance with the JNCC (2010) guidelines, MMMP, and variations from agreed procedures.
- Protocols followed and any recommendations which could benefit future projects.

1.6 Next steps

1.6.1.1 The Applicants will produce the detailed MMMPs (one for Morgan OWL and one for Morecambe OWL) post-consent to include details on identified UXOs and programme. The detailed MMMP(s) will be agreed with the MMO prior to the commencement of pre-construction activities and will provide further information and confirmation of appropriate mitigation measures.

1.7 References

Baines, M. E. and Evans, P. G. H. (2012) *Atlas of the Marine Mammals of Wales.* CCW Monitoring Report No. 68. Document Number 68. pp.129.

Benjamins, S., van Geel, N., Hastie, G., Elliott, J. and Wilson, B. (2017) *Harbour porpoise distribution can vary at small spatiotemporal scales in energetic habitats*. Deep Sea Research Part II: Topical Studies in Oceanography, 141**,** pp.191-202. DOI:10.1016/j.dsr2.2016.07.002.

Carter, M. I. D., Boehme, L., Cronin, M. A., Duck, C. D., Grecian, W. J., Hastie, G. D., Jessopp, M., Matthiopoulos, J., McConnell, B. J., Miller, D. L., Morris, C. D., Moss, S. E. W., Thompson, D., Thompson, P. M. and Russell, D. J. F. (2022) *Sympatric Seals, Satellite Tracking and Protected Areas: Habitat-Based Distribution Estimates for Conservation and Management*. Frontiers in Marine Science, 9. DOI:10.3389/fmars.2022.875869.

Howe, V.L. (2018) Marine Mammals-Cetaceans. In; Manx Marine Environmental Assessment (1.1 Edition - partial update). Isle of Man Government. pp. 51. Available at: https://www.gov.im/media/1363399/ch-34a-cetaceans.pdf

IEMA (2016) Environmental Impact Assessment: Guide to: Delivering Quality Development. Available at: https://www.iema.net/download-document/328273

JNCC (2010) *JNCC guidelines for minimising the risk of injury to marine mammals from using explosives.* Joint Nature Conservation Committee.

JNCC (2023). JNCC guidance for the use of Passive Acoustic Monitoring in UK waters for minimising the risk of injury to marine mammals from offshore activities. JNCC, Peterborough.

McGarry, T., Boisseau, O., Stephenson, S. and Compton, R. (2017) *Understanding the Effectiveness of Acoustic Deterrent Devices (ADDs) on Minke Whale (Balaenoptera acutorostrata), a Low Frequency Cetacean.* ORJIP Project 4, Phase 2. Prepared on behalf of The Carbon Trust. Document Number RPS Report EOR0692.

National Marine Fisheries Service (NMFS) (2016) *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing. Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts.* NOAA. Document Number Technical Memorandum NMFS-OPR-55.

National Marine Fisheries Service (NMFS) (2018) 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-59, 167.

O'Brien, J., Berrow, S., McGrath, D. and Evans, P. (2009) *Cetaceans in irish waters: A review of recent research*. Biology & Environment Proceedings of the Royal Irish Academy, 109B**,** pp.63-88. DOI:10.3318/BIOE.2009.109.2.63.

Reid, J., Evans, P. G. H. and Northridge, S. P. (2003) *Cetacean Distribution Atlas.* Joint Nature Conservation Committee. Peterborough pp.68.

Southall, B. L., Finneran, J. J., Reichmuth, C., Nachtigall, P. E., Ketten, D. R., Bowles, A. E., Ellison, W. T., Nowacek, D. P. and Tyack, P. L. (2019) *Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects*. Aquatic Mammals, 45 (2)**,** pp.125-232. DOI:10.1578/am.45.2.2019.125.

The Planning Inspectorate. (2022) *Advice Note ten, Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects. Version 9* [Online]. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-ten/. Accessed on: September 2024.

UK Government, Department for Business, E. a. I. S. B., Marine Management Organisation (MMO), Joint Nature Conservation Committee (JNCC), Natural England (NE), Offshore Petroleum Regulator for Environment and Decommissioning (OPRED), Department of Agriculture, E. a. R. A. D., NatureScot Marine Scotland and Natural Resources Wales. (2022) *Marine environment: unexploded ordnance clearance joint interim position statement* [Online]. Available at: https://www.gov.uk/government/publications/marine-environment-unexploded-ordnance-clearance-joint-interim-position-statement/marine-environment-unexploded-ordnance-clearance-joint-interim-position-statement#introduction-and-context. Accessed on: January 2024.

Waggitt, J. J., Evans, P. G. H., Andrade, J., Banks, A. N., Boisseau, O., Bolton, M., Bradbury, G., Brereton, T., Camphuysen, C. J., Durinck, J., Felce, T., Fijn, R. C., Garcia-Baron, I., Garthe, S., Geelhoed, S. C. V., Gilles, A., Goodall, M., Haelters, J., Hamilton, S., Hartny-Mills, L., Hodgins, N., James, K., Jessopp, M., Kavanagh, A. S., Leopold, M., Lohrengel, K., Louzao, M., Markones, N., Martínez-Cedeira, J., Ó Cadhla, O., Perry, S. L., Pierce, G. J., Ridoux, V., Robinson, K. P., Santos, M. B., Saavedra, C., Skov, H., Stienen, E. W. M., Sveegaard, S., Thompson, P., Vanermen, N., Wall, D., Webb, A., Wilson, J., Wanless, S. and Hiddink, J. G. (2020) *Distribution maps of cetacean and seabird populations in the North-East Atlantic*. Journal of Applied Ecology*,* 57 (2)**,** pp.253-269. DOI:10.1111/1365-2664.13525.